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# SPACE CENTER Roundup

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## New helmet camera system makes stellar debut

**A** new camera system is allowing space-walking astronauts to work and take still photos simultaneously and providing flight operations personnel and engineers on the ground real-time views of what space walkers are seeing. First used during the STS-97 mission (International Space Station Assembly Flight 4A) last December, the new camera equipment, called the Wireless Video System, has met with rave reviews.

"The system performed great during the 4A mission," said Irene Piatek, NASA WVS project manager. "All of the comments we've heard have included words like 'awesome,' 'fantastic,' and 'way cool.' It performed very well."

As STS-97 astronauts Joe Tanner and Carlos Noriega installed the ISS's massive solar array last December, video cameras embedded in their helmets provided real-time footage that enabled crewmembers inside the space shuttle and personnel on the ground to see precisely what the space walkers were seeing. For all participants, the unprecedented view, made possible by the WVS, was spectacular.

"The Wireless Video System is an incredible situational awareness tool for space walks," said Tanner. "It enables the crewmembers inside the shuttle to see our activities on the outside and it keeps ground personnel informed of on-orbit activities. It is an invaluable tool that should be used on every flight."

The system was developed to enable Extravehicular Activity (EVA) crewmembers to work and take still photos simultaneously. Previously space walkers had to use heavy handheld cameras to take photos. In addition, by allowing EVA crewmembers to work and take photos at the same time, EVA time is saved.

The first flight of the WVS was always targeted for 4A due to the mission's busy EVA schedule principally involving installation of the solar array. EVA timelines for the flight were very tight and did not allow for photo documentation using handheld cameras.

Embedded in the EVA helmet are three fixed-focus, variable aperture cameras: a 3.5-millimeter lens, located just left of center on top of the helmet shell, providing a wide-angle view; a 6-millimeter lens mounted above the light on the left side of the helmet, providing a medium-angle view; and a 12-millimeter lens mounted above the light on the right

side of the helmet, providing a narrow-angle view. The cameras get their power from a new battery system that was developed for heater gloves, the WVS and an electronic wrist display.

A crewmember operating the WVS from inside the orbiter controls the cameras, determining which one is on at any given time. A UHF antenna in the payload bay is used to send commands. A flat antenna on top of the helmet shell receives them.

Antennas on the helmet send the video to seven receiving S-Band antennas in the shuttle's payload bay. Underneath the payload bay liner are two transceivers that send commands, receive the video, and then send the video to a panel in the cabin. The video is displayed on two monitors inside the shuttle.

An Intravehicular Activity crewmember can see video from two EVA crewmembers at the same time displayed on two monitors inside the shuttle, but only one can be downlinked at a time. At this time, there is no way to distinguish which video feed is coming from which EVA crewmember. Enhancements to be added in the future will provide for this capability.

The WVS replaces the old Extravehicular Mobility Unit TV system previously used by space walkers.

"With the original EMU TV, video was received via one of the orbiter's hemispherical S-Band antennas," said Piatek. "With just one antenna, if you weren't in the right location, you didn't get the signal. So the coverage was not as good as it is with this new system. With the array of seven antennas we have in the payload bay, we have much better coverage. In addition, in the twenty years or so between EMU TV and this new system, the technology has improved significantly. Plus we have three different lenses so that you can choose a wide angle, mid-range or close-up view whereas the previous system had only one lens. So several factors show that this system has taken us a giant leap forward."

But the WVS built upon the previous system. The helmet shell design was based on the original EMU TV. Even the placement of the switch and the lights on the helmet was based on the original EMU TV. "We took the old EMU TV as a basis and tailored it for our needs," said Wayne Wondra, Lockheed Martin Space Operations (LMSO) WVS project engineer. "Positioning of the camera lenses was dictated by how we thought the astronauts would use them."

The WVS has been well received by space walkers and ground personnel alike. When a problem with the solar array occurred during STS-97—when tensioning cables came off their

pulleys—ground engineers were able to see and diagnose the problem. Using the WVS, Noriega was able to point to the problem for all to see rather than having to explain it.

"The Wireless Video System was a tremendous asset to us," said Noriega. "It cut down on the amount of communication needed to inform ground personnel of on-orbit activities and problems, and it added a measure of safety to our space walks knowing that Marc Garneau and others were watching over our shoulders."

Begun in 1997, the WVS project involved a team of government, contractor and subcontractor personnel. NASA, LMSO, Boeing, Broadcast Sports Technology and Litton played key roles in

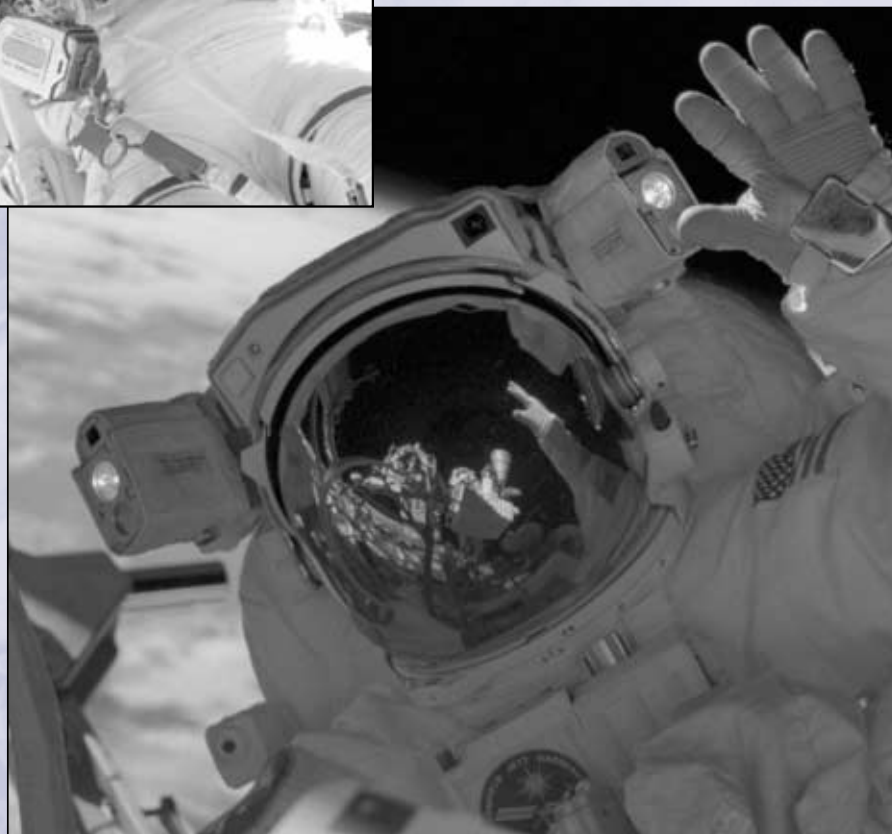
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NASA JSC STS-097e5034

Astronaut Joe Tanner, during the second of three space walks.

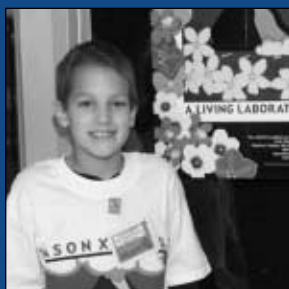
Wearing the new Wireless Video System on his helmet, STS-97 Astronaut Carlos Noriega waves toward his space-walk partner, Astronaut Joe Tanner, during the second of three space walks.



NASA JSC STS-097-375-012



**JSC guitarist becomes Hall of Famer, again.**  
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**Hawaiian breeze sweeps through Teague.**  
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**Texas Aerospace Scholars needs you!**  
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# All-minority CATO team indicative of JSC’s increasing diversity

Indicative of JSC’s increasingly diverse workforce, more and more minorities are serving in key mission support positions. Recently, during International Space Station Assembly Flight 3A, the entire Communications and Tracking Officer (CATO) team was comprised of Hispanic or African-American individuals. The team included CATOs Ana Lopez (Mission Lead), Terry Hudson, and James Keeton, and Station RF Communications Officers (STARCOM) Lee Harvey, Jorge Salazar and Roger Gomez.

“As far as the job goes, this mission was no different than any other but there was a deeper sense of satisfaction because we [minorities] are getting these opportunities now,” said Terry Hudson, communications and tracking officer. “For us, it’s giving us a chance to show that we can do the work. Minorities are growing, succeeding and being recognized.”

According to Frank Markle, Station Communication and Tracking Systems Group lead, this hardworking team represents a milestone for the center and reflects the changing face of NASA.

“They are very dedicated and really helped to bring this flight off,” said Markle. “All-minority teams, such as this one, show the growth we’ve made as a center in diversity. They’ve all come from a lot of different areas and bring a lot to our work.”

As diverse as their ethnicity, however, are their paths to working in the space program. The six represent a dynamic mix of backgrounds, from pro football to the military, leading them to work with NASA.



Photograph by Bill Stafford  
**A longtime interest in aviation, including a previous job as an air traffic controller, led Jorge Salazar to his current role with the CATO team.**

## Jorge Salazar

A native of the Houston area, Hispanic-American Salazar graduated from Furr High School in 1987. Having always liked aviation, he joined the Navy and began training as a military air traffic controller. After completing his tour, he turned his training into a profession as a controller at nearby Hobby Airport. After six years of civilian flight control, he turned his talents to the space industry and joined JSC. Now three years later, he still thrives on the pressure cooker atmosphere that comes with his job.

“I knew working at NASA would be exciting and there are a lot of similarities to my Navy experience,” said Salazar. “The time-critical decision-making I had as an air traffic controller was valuable. We see this often while working space shuttle missions.”



Photograph by Bill Stafford  
**“I’ve had friends from other teams outside of my group say ‘I wish my team were more like yours.’ I think that’s a good reflection on NASA.”**

## Lee Harvey

Fellow CATO Harvey also has a military background, but maybe more surprising is his time as a professional football player with the New Orleans Saints.

“I never thought I’d be working here,” said Harvey. “But I love it. It’s boundless and infinite. And it was an honor to be working on that flight. I cut my teeth on 3A—it was a lot of hard work but it was an outstanding experience.”

Harvey grew up in east St. Louis, Ill. After high school, he joined the U.S. Army where he earned numerous awards and commendations for his participation in conflicts such as Operations Just Cause, Desert Shield and Desert Storm.

He went on to Texas Southern University to earn an electrical engineering degree and was picked up by the Saints. His professional football career was unexpectedly shortened due to a serious neck and shoulder injury. He said the transition to a technical job was an adjustment but one he’s glad he made.

“I feel a real sense of pride and esteem from being a part of the nation’s space program,” said Harvey. “And I feel the senior level managers like what the military background brings to the organization—not just with myself but with everyone here at NASA who has served our country. I think what I’ve learned in the various military leadership schools has been valuable—stay positive, accept the challenges, move on and complete the mission.”



Photograph by Bill Stafford  
**“It’s always nice to know that other people with possibly similar backgrounds have similar accomplishments.”**

## Ana Lopez

Strong encouragement from her parents and teachers led Lopez to excel as she pursued math and science as a young student. Lopez’s mother was raised in Monterey, Mexico, but moved to Texas and made San Antonio her new home. According to Lopez, it was her mother who inspired her to achieve more.

“She always stressed education,” said Lopez. “I went with her several times back to Mexico and I’ve seen how hard some of my relatives have to work. I also noticed that they did not have the same

educational opportunities that were available to me. I knew that I had to take advantage of these opportunities and get an education.”

Always interested in math and science, Lopez enrolled in a pre-freshman engineering program in middle school. A high school ROTC mentor guided her toward engineering.

“When I learned about engineering, I liked every part of it—design, research and operations,” said Lopez. “My mentor is the one who showed me how to work hard and stay motivated.”

Now she is reaping the rewards of her hard work and diligence. As a 1996 electrical engineering graduate of the University of Texas at San Antonio, Lopez joined United Space Alliance on the Instrumentation and Communications System team before transitioning to a civil servant position on the CATO team.

“It’s nice to see how diverse our team is,” says Lopez. “Hopefully we can set an example or possibly inspire others that might be currently aiming toward similar accomplishments. Anything is possible. You just need to work hard.”



Photograph by Bill Stafford  
**“The opportunities are out there if you are willing to strive to get them.”**

## Roger Gomez

El Paso native Gomez is described as the quiet one in the group, but considered very knowledgeable. He claims he was always interested in electrical engineering but was amazed that he made it to the NASA ranks.

“I considered myself lucky to get an interview,” says Gomez of his chance to join the space program in 1996. According to Gomez, when he joined the CATO team, there were only three or four minorities in his group but now nearly half of the 28-person team are minorities.

“It means that there is a big change happening,” said Gomez. “It proves that the government is hiring minorities and there are opportunities for everyone.”

“That’s an important message,” says Gomez, who shares that message with his community and the younger generation in his hometown.



Photograph by Bill Stafford  
**“My background played a part in helping me learn to meet challenges and work as a team.”**

## Terry Hudson

Hudson, a native of Houston, pursued a bachelor’s degree in electrical engineering from Southern University.

After graduating, he was employed with the Department of Energy–Rocky Flats Site located in Golden, Co. While there, he received a master’s degree in environmental engineering from the University of Colorado.

“I loved it,” said Hudson. “It entailed a lot of responsibility and work with hazardous materials.”

After five years of employment with the DOE, Hudson went to work for Boeing Helicopter in Pennsylvania as an environmental engineer, before joining the CATO team.



Photograph by Bill Stafford  
**The decision to go to college did more than set a career path for James Keeton. Quite possibly, it saved his life.**

## James Keeton

For some, the impact of the decision to pursue higher education might not be clearer than it is for Keeton.

As a young boy growing up in Texarkana, Keeton recalls looking up into the night sky full of wonder and amazement. Little did he know his intrigue with space would eventually lead him to a job in the world’s most renown space agency and that his single decision to go to college might have actually saved his life.

“My dad didn’t ask—he told me I was going to go to college that summer,” said Keeton. “Shortly after I left for college, one of my high school friends was shot. That decision to leave to go to school probably saved my life.”

Keeton received an electrical engineering degree in 1996 from Prairie View A&M and went on to join United Space Alliance, Flight 3A being his fourth mission. Because he has seen the impact higher education had on his life, Keeton remains committed to sharing the message with students in his hometown.

“I feel very good about what I’ve accomplished,” said Keeton. “Whenever I am at home, I talk with the students at my high school and tell them my story of success and how they can succeed. Anyone can do it, with God and if you put your mind to it.”

## The Team

This CATO team represents a kaleidoscope of cultures and backgrounds combined to produce an effective flight operations team. According to the group’s members, by broadening our perspective and opening our doors to new ways of thinking, we all benefit and reap the rewards of diversity.

“We were very pleased with this team’s success on 3A,” Markle said. “And it reinforced our decision to give them critical leadership positions on the next assembly missions.”





# Space and exploration studies in full swing at University of Houston-Clear Lake

Does exploration send your imagination soaring? The new space and exploration concentration in the University of Houston-Clear Lake's master of arts in humanities program begins its second semester in spring 2001. Emphasizing the historical, philosophical and global meaning of the space pioneers' achievement, this concentration studies exploration from a multidisciplinary perspective.

"Our Futures in Space," the second course in the new concentration, will be offered Wednesday evenings during the spring semester, by futurist Peter Bishop, associate professor in UHCL's School of Human Sciences and Humanities. The seminar will consider topics such as the rationale for space exploration, NASA's approach to space, missions to Mars, colonization of the solar system and the politics of reusable launch vehicles. Course books will include McCurdy's "Inside NASA," Wachhorst's "The Dream of Spaceflight," Lewis's "Mining the Sky," and Harrison's "After Contact."

"As human beings establish what may be their first permanent presence in space, 2001 will be a perfect time to look ahead to see what's in store for us there," says Bishop about his new course.

The idea for the space and exploration concentration originated with Clay Morgan, husband of Astronaut Barbara Morgan and a member of the advisory board of the UHCL Humanities program. Clay Morgan, who is currently writing

"The Illustrated History of the Shuttle-Mir," foresaw not only interest in the concentration among NASA personnel, but also a need for such a concentration. "With the International Space Station, the space business has gotten much broader, and it requires a broader background from people who are interested in it," he says. "UHCL's new concentration puts space and exploration where it belongs—as part of the whole history and texture of humankind's search for understanding."

Current space and exploration concentration students include employees from NASA and NASA's contractors. NASA configuration management specialist Kathleen Kaminski, a student in the concentration, says she took pleasure in exchanging ideas with students from many different fields.

"I enjoy the interaction between the students. We come from a variety of backgrounds—from engineers to history majors," says Kaminski. "There's more to space and exploration than just engineering."

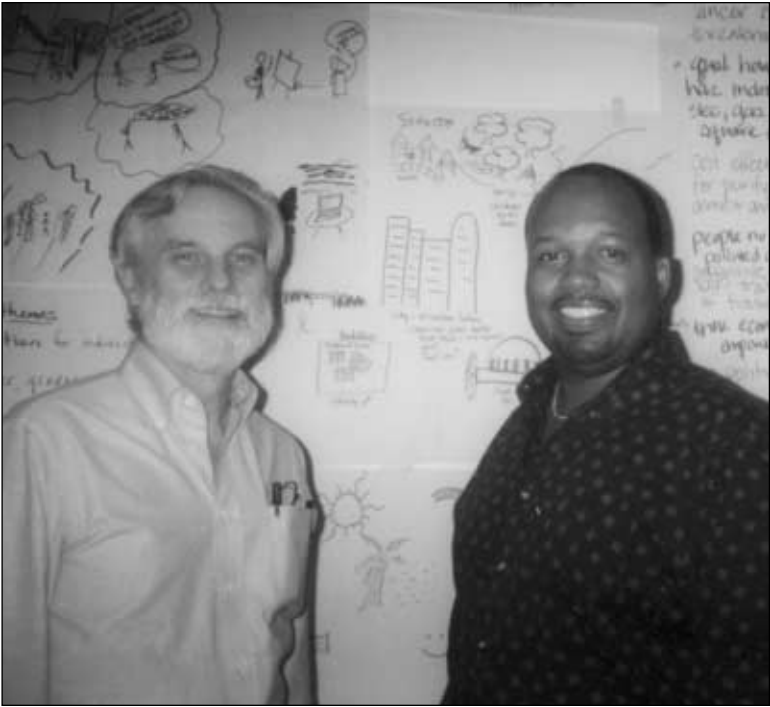
Greg Johnson, also a student at UHCL, concurs. Johnson, a space station software test engineer who works with Boeing as a contractor for NASA, says he is interested in the concentration because he wanted to know "how we arrived where we are." "If I knew that better, I could dream up better ideas for work. When I speculate about future horizons, I can

allude to past ideas." Johnson adds, "Out of all the people who work in white-collar professions, engineering students have the least exposure to the humanities. I've always been interested in space exploration—its past history and motivation. Now I can learn what I've missed."

Both Kaminski and Johnson are taking a seminar in "The History of Exploration."

The application requirement for the space and exploration concentration is a bachelor's degree in any field from an accredited institution. Classes are scheduled primarily in the evening to meet the needs of adult students, and all classes are given at the UHCL campus. Additional spring courses of interest to Space and Exploration Studies students include "Cultures of Asia," anthropology; "World Futures," futures; and "Cross-cultural Communications," psychology. ■

*For information about the space and exploration concentration and enrollment, contact Dr. Gretchen Mieszkowski, director of humanities, mieszkowski@cl.uh.edu, 281-283-3312; or Ann Hinojosa, advising coordinator, hinojosa@cl.uh.edu, 281-283-3333.*



University of Houston-Clear Lake added a space and exploration concentration to its master of arts in humanities program last fall. "Our Futures in Space," the second course in the new concentration, will be offered during the spring semester. Pictured are futurist Peter Bishop, left, associate professor in UHCL's School of Human Sciences and Humanities, and humanities student Greg Johnson.

# Sweet sounds of success

Doug Ardoin gave up a life pursuing fame and fortune as a guitarist to join the space program at JSC. Now, with an established career at NASA, he returns to the music he left behind.

Noted for his role as technical manager for the Space Shuttle Systems Integration Office, Ardoin is responsible for coordination of all on-orbit configuration and analysis requirement teams for joint mission operations between the space shuttle and International Space Station. But he is less known for his musical endeavors. Ardoin was inducted into a second hall of fame, the Museum of the Gulf Coast Music Hall of Fame, Jan. 20, "in recognition of personal contributions to the musical heritage of the Gulf Coast region, the United States and the world." He had been inducted into the Louisiana Hall of Fame in Lafayette in 1994.

Ardoin was given these honors as credit for starting the Fabulous Boogie Kings, a band that eventually toured the

country, playing venues in California, New York and Las Vegas. The band had a unique sound for its time. Described as "blue-eyed soul," the Boogie Kings were

He applied to NASA and was offered a job. Then, after a car accident postponed graduation and NASA employment, Ardoin found no positions were open. He worked and played with a band in New Orleans for a few years, then got hired at JSC in 1967 to do Lunar Module landing dynamics. For about twenty years, Ardoin did not play a note. "I love music so much," says Ardoin, "I

transferred. His current job is his favorite. He especially enjoys his work on the Joint On-orbit Verification Review Board because of the work he does in preparation for flights.

Ardoin is respected and admired by his peers. Co-worker Lambert Austin says, "He is a dedicated NASA employee and is well respected by his peers for his technical capability and his effective management style." Another co-worker, Don Noah, says, "He's at work by 6:30 every morning and is always cheerful and upbeat. He's a self-starter and good project manager."

"He's also a great family man with a lovely wife, Carol, and five great kids whom he and his wife raised with excellent character and education as well," says David Hamilton of Ardoin's children, a medical doctor, two lawyers and two dental hygienists. Ardoin's talent was passed along to his children. Three of them also play guitar, one has his own band, and one even sat in for his dad's bass player a couple of times.

Ardoin now plays with Louisiana Boogie, a band he formed with friends in November 1999. They play in the Clear Lake area and some shows in Louisiana. Austin says, "like most JSC employees, Doug is very conscientious about not allowing outside endeavors to interfere with his work responsibilities."

When asked why he hasn't retired yet, Ardoin answers, "It's a fun job. If it weren't fun, I'd retire. I enjoy coming to work every day. It's the best of both worlds. I get to be a rocket scientist one day and a musician the next!" ■

Louisiana Boogie, Ardoin's current band, can be found at <http://www.orbitworld.net/dougardoin/louisianoobogie>.



Doug Ardoin, technical manager, front row, second from the left, with his band, Louisiana Boogie.

known for a mix of R&B, Blues and Swamp Pop. Ardoin began in 1955, learning to play instruments in his outdoor kitchen. He stuck with the guitar, added members, and the Boogie Kings were soon playing six nights a week. Performing only on weekends during school, the Boogie Kings were doing well enough to be Ardoin's primary income during his pre-med studies at Louisiana State University.

In spite of his love for music, Ardoin knew that life as a professional musician was not a family man's career. He had switched to the University of Southwestern Louisiana to study physics, and told the band of his intentions to quit after graduation.

did not want to be tempted." So, he put his music up in 1967, when he arrived here. "Out of sight, out of mind" was his philosophy.

Over the years, Ardoin has held many titles here at JSC. He even turned down an opportunity to work at KSC, when the Operations and Maintenance Requirements and Specifications Board he was involved with was being

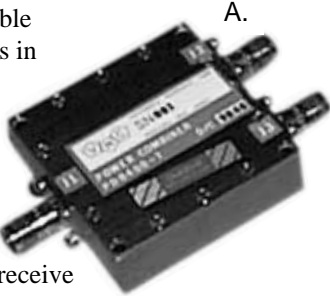
*“It’s the best of both worlds. I get to be a rocket scientist one day and a musician the next!”*  
– Doug Ardoin



Continued from Page 1

# Helmet Camera

successfully completing the project. LMSO was the local prime contractor for the job as part of the firm’s Science, Engineering, Analysis and Test Operation contract with NASA. LMSO designed and built the helmet shell that is attached to the EVA astronaut’s helmet and integrated the system’s three camera lenses and a common camera electronics box into it. LMSO’s two major subcontractors were Litton, which provided the UHF antenna, and Broadcast Sports Technology, which provided all of the video components—cameras, transceivers, and S-Band receiving antennas. Boeing Reusable Space Systems in Huntington Beach, Calif., outfitted the shuttle with all necessary antennas and equipment to receive video and control the cameras from inside the shuttle. The firm provided all of the cabling in the orbiters to connect the antennas to the transceiver



and installed brackets in the orbiters to hold the antennas onto the sill and to put the transceivers under the payload bay liner. “Wireless Video is a ‘wireless’ system between the astronaut and the supporting hardware located on the orbiter,” said Dorothy Grosskortenhous, Boeing WVS project engineer. “For the system to

work, it actually required the installation of well over 850 feet of wire and coax cabling. This—along with finding room on the already crowded sill for seven antennas—proved to be a challenge. There were many hurdles to overcome in the design and installation process, which could not have been accomplished without a coordinated team effort.”

All required equipment has been installed in *Atlantis* and *Endeavour*. It is being installed in *Columbia* during its current major modification downtime in Palmdale, Calif. It will be installed in *Discovery* when it undergoes major modifications later this year.

The new system is the result of great teamwork and a lot of hard work.

“We had a lot of good people working on this project, and we all pulled hard in the same direction to get it done,” said Piatek. ■



D.



NASA JSC 2001e02040  
The Wireless Video System team includes, from left, front (kneeling): Thomas Nguyen, Joe Perez; middle: Irene Piatek, Claire Lepper, Wayne Wondra, Jacque Myrann, Hiep Nguyen; back: Paul Wheat, Larry Johnson, Belinda Butler, Matt Johnson, Bill Bowers, Siraj Jalali.

- A. The UHF power combiner allows only one transceiver to transmit commands.
- B. One of two S-Band antennas on the helmet.
- C. One of two transceivers under the payload bay liner.
- D. The UHF command antenna installed in *Endeavour*.

“We had a lot of good people working on this project, and we all pulled hard in the same direction to get it done.”

— Irene Piatek, NASA WVS project manager

# Spirit of the tropics permeates JSC

It’s a far cry from last year’s deep sea and deep space exploration, but this year students are having just as much fun, excitement and education as ever during the annual JASON Project expedition.

You may recall last spring JSC’s campus was sprinkled with broadcast trucks and students—all eagerly sharing the sights and sounds of NASA with students around the world. This year, bus loads of students are again filling Teague Auditorium but this time to see oozing volcanoes and the lush tropical landscapes of Hawaii.

As part of JASON XII, a team of more than 28 students and teachers has once again joined up with famed Dr. Robert Ballard, the scientist who discovered the Titanic and founder of the JASON Project, to partake in a tropical expedition. The selected “Argonauts” have been studying for the last six months to prepare for the awesome adventure and now are sharing their journey with students around the country.

Dubbed “Hawaii - A Living Laboratory,” JASON XII concentrates on the biological, ecological, aquatic and geological attributes of Hawaii. Twelve scientific experts, including former astronaut Kathy Sullivan, are active participants in JASON as host researchers.

Their areas of expertise range from entomology



to ichthyology (the study of fish). There are specialists in volcanoes, astronomy and conservation. Some study the weather, others, the water, yet all share their passion and knowledge with the Argonauts and audiences throughout the two-week JASON Expedition.

For the fourth year in a row, JSC has a sponsored student argonaut participating in the JASON Expedition.

Maren Ygnve, a ninth grade student at Ball High School in Galveston, was a member of the first group of Argonauts to arrive in Hawaii. Growing up sailing, snorkeling and swimming, Ygnve had an early desire to become a marine biologist and was eager for the chance to become an Argonaut.

Ygnve had participated in past JASONS when her schools visited JSC. Last year, she decided to apply to become an Argonaut.

“I thought it would be really neat to be an Argonaut,” said Ygnve who thought she hadn’t been selected when she received the confirmation letter in the mail. “It was a thin envelope, that I was sure meant it was bad news.”

Her initial instinct was wrong in this case, and Ygnve spent the next six months preparing for the Hawaiian adventure. The Argonauts have a fairly comprehensive curriculum they have to complete before they depart on their journey, including assigned reading and experiments.

“We spend a lot of time reading and participating in online chats to get to know the other Argonauts,” said Ygnve, who read five books as part of the background reading.

Ygnve already had some related

experience in her background, such as attendance at Tyler Zoology Camp, Texas A&M Sea Camp and serving as a teen volunteer at the Moody Gardens Aquarium in Galveston. She also completed several hands-on experiments as part of the Argonauts specialized training.

All of her preparation has paid off, and now Ygnve is standing atop volcanoes while talking to other students around the world.

“She sounds a little tired but sounds like she is having the time of her life!” said Dena Ygnve, Maren’s mother who has been watching her daughter’s adventure ‘live’ from the Teague Auditorium most of the week. “I talked to her last night and it was great. Sounded like she was calling from next door versus the middle of the Pacific Ocean.”

As we talk, Maren’s image flashes across the broadcast screen where she is standing on an inactive lava flow, now hardened, at 4,000-foot elevation.

“I think this experience is absolutely fantastic,” continued Ygnve. “I had no idea it was so well organized and so comprehensive and would expose the students to so many things. I am very happy for her to have this opportunity.”

Ygnve was also impressed with the extent of cultural exposure the Argonauts receive as part of their expedition. The Argonauts were treated to a luau and even journeyed in an outrigger canoe.

In addition to the Argonauts personally participating in JASON, many thousands of



students watched the activities ‘live’ from Primary Interactive Network sites around the world.

JSC’s Teague Auditorium was transformed into a tropical paradise, complete with an ‘erupting’ volcano for schoolchildren from around the Houston area. On three large screens, guests could see each of the three Argonauts and researcher groups traipsing through Hawaiian brush, tracking active volcano flows or studying the island geology.

“Each JASON Expedition gets more and more exciting,” said Debby Herrin, JSC JASON Project PIN site coordinator. “The sights and sounds we’re broadcasting from Hawaii are captivating. The students here can’t help but be mesmerized by what they’re seeing and we’re having just as much fun as they are, and learning at the same time. It’s something every schoolchild should participate in.” ■

For more information call 1-888-JASON-00 (1-888-527-6600) or visit [www.jason.org](http://www.jason.org).



# NASA technology and education initiatives offered to New Mexico high schools

By **Cheerie Patneau**

**P**lans for two NASA-sponsored events that would directly involve New Mexico high school students from throughout the state were presented at a recent meeting of the Las Cruces Public School Board by Pleddie Baker, senior technology and education outreach representative, at the NASA White Sands Test Facility.

The first program, the Mars Settlement Design Competition, emulates the experience of working as a member of an aerospace company team and developing a design and operating proposal for a new Mars base. “The requirements for the new base will be complex, challenging and exciting, requiring imaginative and innovative approaches and solutions,” says one of the creators of the event, Anita Gale, a Boeing aerospace engineer.

The event teaches about Mars, space science, the space environment, engineering careers, organization, and

integration of complex activities, teamwork, management, and effective communications. This year’s competition will be held at Oñate High School in Las Cruces the weekend of February 16-18.

The second program, the Johnson Space Center’s “Fly High Program,” offers the opportunity to design and conduct an experiment under microgravity conditions similar to orbital space flight. Eight southwestern New Mexico high schools were invited to participate and entered proposals, leading to the selection of Mayfield High School’s “Alternative Cardiopulmonary Resuscitation Methods for Microgravity Environments” and Las Cruces High School’s “Mo’Mentum” proposals.

The Mayfield team will design and build a mechanical CPR unit which will compare the rate and force of compressions using traditional CPR methods under microgravity conditions with results obtained on Earth. The Las Cruces High School experiment is designed to demonstrate and confirm the conservation

of momentum, both linear and angular, under idealized conditions. Students will use a ballistic pendulum to launch an object into motion and then measure the velocities of the system.

The two teams will travel to JSC on April 19-27, where they will fly on NASA’s KC-135A microgravity simulator aircraft, dubbed the “Vomit Comet,” with their teacher and a NASA mentor.

“The purpose of NASA programs like these is to show students that science is intellectually challenging and fun,” said Baker. “The participants will also begin to think about what they want to do when they graduate from high school and may consider a technical field. While these students will experience several periods of microgravity about 25 seconds at a time, it is as close as you can come to being in space without actually going there. Of course it is possible that some of them may some day become astronauts and spend months in space or even go to Mars. We at NASA think that would be terrific!” ■



Pleddie Baker explains the NASA JSC KC-135A Fly High Program to Las Cruces High School students.

## When in doubt, call the 33333’s

*Prompt attention available for medical, fire and security emergencies*

**I**n February of last year, JSC Space and Life Sciences initiated a campaign called “Got the Squeeze, Call the 33333’s” to increase heart disease awareness and expand the number of cardiopulmonary resuscitation-trained personnel on site.

Employees on site at JSC, Ellington Field and the Sonny Carter Training Facility are reminded that emergency medical service is available for anyone suffering from any atypical physical symptom, be it chest pains or any other discomfort regardless of whether it is or is not work related.

“People need to call for emergency assistance for any medical problem—for any symptom they are experiencing that is outside of the norm,” says Julie Davis, a paramedic with Kelsey-Seybold in the Occupational Health and Test Support Office. “It doesn’t mean that we’re going to take the patient to the JSC Clinic or to a hospital. It just means that we’re going to be able to get to the person in need of assistance and find out what’s going on. If it’s nothing, then there’s no problem.

But if it is something and people don’t call or they try to walk over to the JSC Clinic, then very serious problems could occur.”

Employees located on the JSC main site and at the Sonny Carter Training Facility should call x33333 for medical, fire and security issues. Employees at Ellington Field should call x44444 for emergency assistance.

The JSC Clinic reports three recent cases with potentially harmful or fatal results where no attempt—or a delayed attempt—was made to contact emergency personnel. Employees need to call promptly if there is an immediate need for medical attention. Two paramedics and two ambulances are ready to respond to all calls and medical personnel are trained to work a full code.

“If an employee is experiencing chest discomfort, shortness of breath, an allergic reaction or any other symptom, he or she or a co-worker should call immediately and get help,” said Bob Gaffney, JSC emergency preparedness manager. “It’s better to call for help and

not need any than to wait and let a potentially serious situation become a dire emergency or, even worse, a fatality. We want to err on the side of being safe.”

According to Davis, callers may be reluctant to call because they fear seeing all of the fire protection specialists and safety personnel who assist the paramedics show up in their workplace. “What scares a lot of people is that a number of people respond with us. These people are an asset to the team. But those in need of emergency assistance do need to call for help.”

Employees may call the emergency numbers any time—during regular business hours, after hours, or on weekends. When the clinic is closed, the Houston Fire Department becomes the primary medical response for emergencies at JSC.

“This is a great service that NASA offers to all employees,” said Davis. “I have never made an insignificant ambulance call. If you’re in enough doubt that you don’t know whether you need an ambulance or not, then you need an ambulance.” ■

## Deadline for NASA Scholarship applications approaching

**S**cholarship applications for the NASA College Scholarship Fund are due by March 30.

This fund will be awarding seven scholarships of \$2,000 each. The scholarship is renewable for six years, not to exceed \$8,000. Applicants must be pursuing a course of study that will lead to an undergraduate degree in science or engineering at an accredited college or university in the United States.

Applicants must be dependents of current or retired NASA employees or dependents of former NASA employees who died while employed by NASA. Applicants must be graduates of an accredited public, private, or parochial high school or be currently enrolled in college with good academic standing. An applicant must have a combined high school grade and college (if any) grade point average of 2.5 on a 4.0 scale or the equivalent.

After meeting the minimum requirements, applicants will be ranked based on the following objective standards:

- Academic preparation, including grades, class rank, and pattern of courses;
- School activities;
- Community activities;
- Performance on SAT or ACT;
- Written recommendations from individuals who know applicant;
- One-page statement of academic purpose by applicant.

Applications and additional information are available in Bldg. 12, Rm. 105 or online at the following Web site: [http://jsc.people.jsc.nasa.gov/jsc-hro-2/special\\_programs/nasa\\_college\\_scholarship\\_fund](http://jsc.people.jsc.nasa.gov/jsc-hro-2/special_programs/nasa_college_scholarship_fund)

**Completed applications may be mailed to JSC, The NASA College Scholarship Fund, Inc.; Mail Code AH12/Scholarship Committee; Houston, TX; 77058. For details, contact Candy Hunt 281-483-1836 or Mary O’Connell 281-483-5774.**



# Ripped from the ROUNDUP

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

1 9 7 1

**T**he command ship “Kitty Hawk” splashed into the Pacific on Tuesday, February 9, at 3:05 Central Standard Time, nine days and two minutes after liftoff on January 31. Splashdown was right on target, 765 nautical miles south of American Samoa.

The crew entered a mobile quarantine facility on board the prime recovery ship, USS *New Orleans*, where they were examined by Crew Surgeon William R. Carpentier.

In Samoa, the astronauts transferred to a second MQF on board an Air Force C-141 transport. They were to have landed at Ellington Air Force Base at 12:30 a.m. this morning.

Although not without some problems and a few anxious moments, the flight of Apollo 14 was in all aspects a successful moon landing mission.

Scientists have been particularly pleased with the results of experiments set up on the lunar surface. Dr. Gary Latham, principal investigator for the Passive Seismic Events, said at a press conference earlier this week, “I think my colleagues would agree that it's the best ALSEP to date. It has the fewest problems.”

1 9 7 6

**T**he Apollo 14 ALSEP, one of five stations on the moon, was essential in providing scientists a lunar seismic network. With the Apollo 12 station and stations at Apollo sites 15 and 16 subsequently installed, the ALSEP 14 station provided geophysicists necessary data to locate moonquakes and begin the study of the moon's interior structure.

Originally designed for a life of one year, the ALSEP 14 has long outlived its specifications. It is the first of the ALSEPs to fail completely although it has had problems before. Almost one year ago, in March 1975, the ability of the station to receive commands from Earth was lost and never regained. However, in the meantime the 14 station continued to transmit data about the moon's seismic activity.

1 9 8 1

**A**s for the STS-1 launch, the window will open at sunrise plus 45 minutes. The Flight Readiness Firing as of press time is scheduled for no earlier than Feb. 17, and window opening time for that date is 6:43 a.m. CST.

The FRF pre-count will be picked up at T-53 hours with the powering up of the solid rocket boosters, orbiter, and ground support equipment. The STS-1 launch pre-countdown begins at T-68 hours. However, for the FRF, a number of events which would normally occur between T-68 hours and T-53 hours will have already been accomplished as part of earlier tests.

# Mentors needed for Texas Aerospace Scholars

**T**exas Aerospace Scholars is currently accepting mentor applications to work with its Class of 2001. This program, a joint education effort between the State of Texas and the Johnson Space Center, is designed to encourage high school students to pursue a career in math, science, engineering or computer science through interaction with engineers at NASA. Mentors will be assigned a group of eight to 10 students to work with throughout the program, and will be asked to review their scholar's final projects, attend on-line discussions, and work with their team for one week this summer as they design a human mission to Mars. The deadline for applications is March 2.

Approximately 300 Texas high school juniors, including many from the Houston area, have already begun learning in-depth information about space shuttles, space stations and Mars exploration via Web-based assignments. While at JSC during the summer, the students will tour the center, attend briefings, and assemble a group project to present at a luncheon at the end of the week. Members of both the state legislature and JSC management will be invited to attend the luncheon to



**Mentors are needed to work this summer with students as part of Texas Aerospace Scholars.**

meet the program participants and hear about their educational experience.

“Texas is in the midst of a shortage of college graduates with technical degrees which can have a serious impact on the state's economy,” said Mike Kincaid, chief of the Education and Student Programs Office at JSC. “Both JSC and the State of Texas see this program as a way to reach out to high school students and encourage them to consider technical

careers. Last year was the first year of our program, and many of the students that participated left with a new technical career goal in mind. The mentors played a significant role in helping these students see the realm of exciting possibilities that are out there for them.”

More than 1200 high schools across Texas received information on the program along with a request to submit nominees from their school to their state legislator. Each legislator was then asked to compare the student applications, including high school transcripts and an essay, to the selection criteria given by the program, and select several students from their district as participants.

According to Rita Karl, education manager of the program, “Last year, we had such a great group. Each student brought something unique to the program, and each one left here with a new perspective on engineering. We're really looking forward to working with this year's class.” ■

For additional information on the program, call 281-483-4112, or visit the Texas Aerospace Scholars Web site at [aerospacescholars.jsc.nasa.gov](http://aerospacescholars.jsc.nasa.gov).

# 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, by cash or by check, at the time of registration. No registration will be taken by telephone. For more information, call x33345.

## 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 \$12. 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/excqa/Gilruth/Gilruth.htm>**

**Nutrition intervention program:** This is a free seven-week program designed to provide an understanding of the role diet and nutrition play in health. The program includes a series of lectures and private consultations with a dietitian. You will learn how to use dietary vitamins, minerals and herbal nutraceuticals for optimizing health. Classes are held on Wednesdays from 4 p.m. to 5 p.m. For details call Tammie Labiche, registered dietitian, at (281) 483-2980.

**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 \$105. The cost for additional family members is \$58.

**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 5:25-6:25 p.m. Tuesdays and Thursdays. Cost is \$40 for eight weeks.

**Cardio-Kickboxing:** Medium impact. Learn basic kicking and punching. Tuesday and Thursday 5:30 p.m. - 6:30 p.m. Cost is \$40 for eight weeks.

**Yoga stretching:** 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 \$40 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.

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

**Aikido:** Martial arts class for men and women. Beginners meet Monday 6:30 - 7:30 p.m. and Wednesdays 5 - 6 p.m. Advanced students meet Tuesday and Wednesday 5 - 6:30 p.m. No special equipment is needed. Aikido teaches balance and control to defend against an opponent without using force. Classes run monthly. Cost is \$45 per month. Visit a class for more information.

# TICKET WINDOW

## The following discount tickets are available at the Exchange Stores

AMC Theaters	\$5.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	\$10.75
Moody Gardens (Aquarium only)	\$9.25
Space Center Houston	\$9.25
(JSC civil service employees free.)	
Postage Stamps (book of 20)	\$6.80

## Jewelry Fair

**Valentine's Day • Wednesday, February 14  
10 a.m. - 2 p.m. • Bldg. 3 Cafeteria**

Check out our new Web site on the JSC People page at: <http://hro.jsc.nasa.gov/giftshop/>

## Exchange Store hours

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

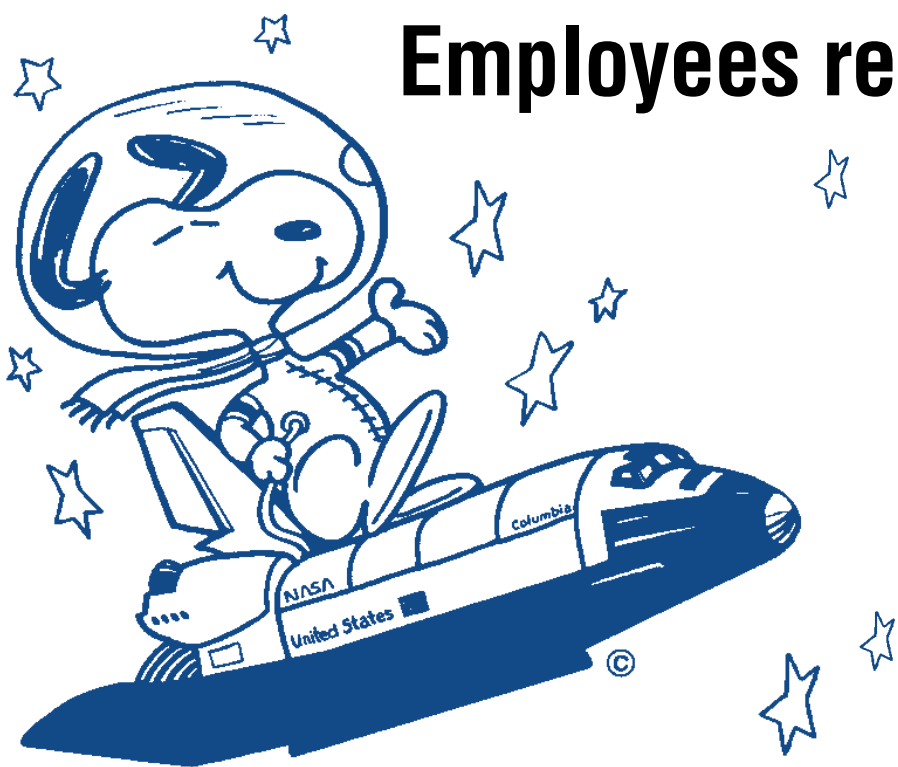
- All tickets are nonrefundable.
- Metro tokens and value cards are available.
- Sweetwater Pecans ..... \$6.25 per lb.
- Chocolate-covered Pecans .... \$8.00 per lb.

**For additional information, please call x35350.**

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







# Employees receive Silver Snoopy awards

Several employees have recently received the coveted Silver Snoopy Award in recognition of their contributions to this nation’s human space flight programs. Recipients will be featured in this edition and in forthcoming issues of the *Roundup*.



**Krystine Bui**

Krystine Bui, a contracting officer in JSC’s Projects Procurement Office, was recognized for her efforts in leading and handling many procurements in support of the X-38 Crew Return Vehicle. She helped form a procurement guideline for engineers to utilize when assembling their requirement packages. This resulted in tremendous timesaving in the award process.



Landon Moore, lead for electro-mechanical actuator (EMA) development and integration for the X-38 Crew Return Vehicle, was cited for his efforts which have enabled the accomplishment of many program goals within extremely tight cost and schedule requirements. A member of the Energy Systems Division, he coordinated the EMA activity for flight tests of the 132 Vehicle, and has led the design and integration effort for the EMAs on the 201 Vehicle.



**Landon Moore**



**Robert Cort**

Robert Cort is the manager of the White Sands Test Facility Depot. His skills in directing WSTF Depot operations have resulted in a distinguished record of refurbishing of flight components for continued flight support. His expertise in testing flight-like propulsion system test articles has contributed to the continued success of the Space Shuttle Program.



**Bernard Rosenbaum**

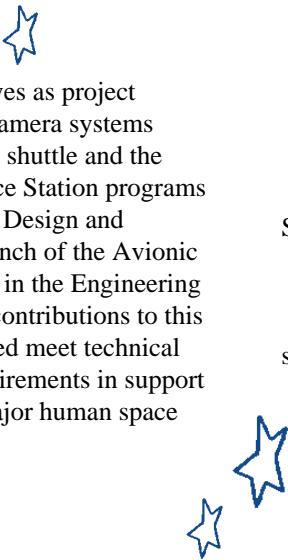


Bernard Rosenbaum, currently serving as lead for the X-38 parafoil winch control system, was recognized for his initiative, creative ideas, and technical leadership on the STS-101 Power Drive Unit failure investigation and launch pad repair of the PDU at Kennedy Space Center. His efforts to use liquid nitrogen to freeze “plugs” within the six hydraulic lines feeding the rudder/speedbrake PDU permitted the faulty hardware to be replaced on the pad, in the vertical position, thereby avoiding the need to roll back and destack the vehicle as was initially thought required.



**Dena Haynes**

Dena Haynes serves as project manager for the camera systems for both the space shuttle and the International Space Station programs in the Electronics Design and Development Branch of the Avionic Systems Division in the Engineering Directorate. Her contributions to this project have helped meet technical performance requirements in support of the nation’s major human space flight programs.



The efforts of Danny Siner, senior systems engineer in the Avionic Systems Division for the new Multifunction Electronic Display Subsystem, were critical in developing reference manuals and malfunction procedures for the data processing system flight controller and training sessions for several crewmembers. His work was critical in facilitating the operational use of the MEDS.



**Danny Siner**



The Silver Snoopy Award, administered by the Space Flight Awareness Program, is the astronauts’ personal award to individuals who have performed an outstanding effort contributing to the success of human space flight missions. Since the Snoopy represents the astronauts’ own recognition of excellence and less than one percent of the NASA and contractor workforce is given the award, receiving it is a special honor. The awards are personally presented by a member of the astronaut corps. More Silver Snoopy presentations are planned this year. An indication of a surprise presentation is the special blue Snoopy “Symbol of Excellence” poster on display in work areas. Any individual whose job performance has contributed significantly to flight safety and mission success is eligible for this very special award.



*For more information on SFA programs and awards, contact Barbara Zelon, deputy director, SFA, at x38782.*

PEOPLE 

on the

 MOVE

Human Resources reports the following personnel changes:

Key Personnel Assignments

*Bill Gerstenmaier* was named deputy manager, International Space Station Program.

*Jim Spivey* was named chief, Guidance and Propulsion Systems Branch, Systems Division, Mission Operations Directorate.

Additions to the Workforce

*Stacey Medina* joins the Human Resources Development Branch, Human Resources Office, as an employee development specialist.

*Paul Wilson* joins the Office of the Chief Information Officer, as a deputy information technology security manager.

*Janna Althaus* joins the Mechanical, Booster, and Maintenance Systems Branch, Systems Division, Mission Operations Directorate, as a flight controller.

*Kimberly Shillcutt* joins the Intelligent Systems Branch, Automation, Robotics, and Simulation Division, Engineering Directorate, as a computer engineer.

*Kristina Wines* joins the Life Support and Habitability Systems Branch, Crew and Thermal Systems Division, Engineering Directorate, as an aerospace engineer.

*Daniel Mayes* joins the Power Systems Branch, Energy Systems Division, Engineering Directorate, as an aerospace engineer.

*Thomas Simon* joins the Propulsion and Fluids Systems Branch, Energy Systems Division, Engineering Directorate, as an aerospace engineer.

Retirements

*Mary Proudly* of the Office of Procurement.

*June Larsen* of the Flight Crew Operations Directorate.

*John Hoover* of the Mission Operations Directorate.

*Albert Behrend* of the Engineering Directorate.

*Warren Brasher* of the Engineering Directorate.

*John Griffin* of the Engineering Directorate.

*John Norris* of the Engineering Directorate.

*Raul Zepeda* of the Engineering Directorate.

*Gilbert Perez* of the Space Shuttle Program.

*Elmer Taylor* of the Space Shuttle Program.

*Arthur Schmitt* of the Safety, Reliability, and Quality Assurance Office.

*Lois Walker* of the Safety, Reliability, and Quality Assurance Office.

*Curtis Hanks* of the International Space Station Program.

*Gerald Egan* of the White Sands Test Facility.

*Bobby Kyle* of the Space and Life Sciences Directorate.

Resignations

*Clarence Williams* of the Human Resources Office.

*Laura Hembree* of the Mission Operations Directorate.

*John Brennan* of the Center Operations Directorate.

*Sandra Ostrosky* of the Office of the Chief Financial Officer.

*Aimee Woolverton* of the Office of the Chief Financial Officer.

*Paula Lee* of the EVA Project Office.

DATES & DATA

February 9

Chess Club meets: The Space City Chess Club meets each Friday evening, February 9, 16 and 23, from 5:30 p.m. until 9 p.m. at the Clear Lake United Methodist Church, 16335 El Camino Real, Rm. 423. All skill levels are welcome. For details, please call James Mulberry at x39287 or James Termini at x32639.

Houston Livestock Show and Rodeo runs through March 4. Go to <http://www.hlsr.com/> for more information.

Astronomers meet: The JSC Astronomical Society meets at 7:30 p.m. at the Twin Towers beside the Sonny Carter Training Facility. For details contact Chuck Shaw at x35416.

February 13

Aero Club meets: The Bay Area Aero Club meets at 7 p.m. at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information contact Larry Hendrickson at x32050 or check out [www.bayareaaero.org](http://www.bayareaaero.org).

IAAP meets: The Clear Lake/NASA chapter of the International Association of Administrative Professionals meets at 5:30 p.m. in the Colonial Room at Grace Community Church, 14325 Crescent Landing. Cost is \$12. For more information, contact Elaine Kemp at 281-483-0556.

February 14

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon February 14, 21 and 28, in Bldg. 31, Rm. 248A. For more information contact Al Jackson at x35037.

MAES meets: The Society of Mexican-American Engineers and Scientists meets at 11:30 a.m. in Bldg. 16, Rm. 111. For more information contact Laurie Carrillo at x35831.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters meet Feb. 14, 21 and 28 at 11:30 a.m. at United Space Alliance, 600 Gemini. For more information, contact Patricia Blackwell at 281-280-6863.

February 15

Communicators meet: The Clear Lake Communicators, a Toastmasters International club, meets Feb. 15 and 22 at 11:30 a.m. at Wyle Laboratories, 1100 Hercules, Suite 305. For more information contact Allen Prescott at (281) 282-3281 or Richard Lehman at (281) 280-6557.

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

February 21

Scuba club meets: The Lunarfans meets at 7:30 p.m. For more information contact Mike Manering at x32618.

JSC to observe Black History Month

JSC will observe Black History Month with a series of activities to be held at 11:30 a.m. Feb. 14 in the Bldg. 3 cafeteria.

One highlight of the Black History Month Observance will be the performance of the recording group "For the Lord." Formed in 1994, the group brings a soulful contemporary flavor to the gospel music industry.

The group recently signed with Worldwide Gospel Records. The group's first release should be available in record stores soon.

For more information on activities planned for Black History Month Observance, contact Pat Burke at x30606.

Correction:

The date above the last item in the "Ripped from the Roundup" column in the Jan. 26 edition should have read 1981.

Applications sought for Spirit of Apollo Scholarship

The AIAA Houston Section is again sponsoring the Spirit of Apollo Scholarship Program, which provides a \$1,000 scholarship during the 2001-2002 academic year. Applicants must have defined a scholastic plan that provides entry into some field of engineering or science pertinent to AIAA technical activities and must meet other specified eligibility requirements.

The Spirit of Apollo Scholarship was established in 1988 and is funded from interest on monies the Section maintains in a local savings account. This year's applications must be postmarked no later than May 1. The scholarship committee is responsible for evaluating the applications and

selecting the recipient for the following academic year. The successful applicant(s) will be notified in June. The first half of the scholarship amount is mailed to the school's financial office at the start of the fall term; the second half is provided at the start of the spring term.

A copy of the application form and selection information can be found on the AIAA Houston Section Home Page at <http://www.jsc.nasa.gov/aiaa>

For additional information on the scholarship program, e-mail [edward.j.jablonski@boeing.com](mailto:edward.j.jablonski@boeing.com) or [dlechner@ems.jsc.nasa.gov](mailto:dlechner@ems.jsc.nasa.gov).

NASA BRIEFS

RAINFALL CHANGE MAY GIVE EARLIER SIGNAL OF EL NINO

A decrease in rainfall over the Indian Ocean may give the world the earliest signal that a strong El Niño is about to start, according to researchers studying a 21-year global record of precipitation. Scott Curtis of the University of Maryland, Baltimore County, and Robert Adler of NASA's Goddard Space Flight Center now have a better understanding of precipitation patterns and can, in some cases, identify when a strong El Niño is coming before ocean temperatures warm.

El Niño events occur when the trade winds that normally blow from east to west over the Pacific Ocean diminish and the waters of the eastern Pacific become warmer than normal. These events in the tropical waters of the Pacific have impacts on global weather patterns, including increased rainfall in the eastern Pacific, and drought conditions in Indonesia and Australia.

Curtis and Adler examined changes in precipitation patterns, amounts and intensities of precipitation of El Niño/Southern Oscillation (ENSO) events over the past 21 years. With this information they created the first ENSO indices based on precipitation over the open Pacific Ocean to identify and define interannual climate variations.

Curtis presented the findings in his paper entitled "The Evolution of Tropical and Extratropical Precipitation During ENSO Events" at the 81st annual meeting of the American Meteorological Society at the Albuquerque Convention Center on Jan. 18. The findings from Curtis and Adler may provide a way to recognize the earliest signs of a strong El Niño and help nations around the world make better preparations.

HUBBLE AND CHANDRA PROVIDE EVIDENCE OF EVENT HORIZON

NASA's two Great Observatories, the Hubble Space Telescope and the Chandra X-ray Observatory, have independently provided what could be the best direct evidence yet for the existence of an event horizon, the defining feature of a black hole and one of the most bizarre astrophysical concepts in nature.

An event horizon is the theorized "one-way ticket" boundary around a black hole from which nothing, not even light, can escape. No object except for a black hole can have an event horizon, so evidence for its existence offers resounding proof of black holes in space.

By using data from Chandra and previous X-ray satellites, a team of researchers studied a dozen "X-ray novae," systems that contain a Sun-like star that orbits either a black hole or neutron star. By comparing the energy output from X-ray novae in their inactive, or dormant, phase, the Chandra team determined the black hole candidates emitted only one percent as much energy as neutron stars.

Scientists using the Hubble Space Telescope took an entirely different approach. Joseph F. Dolan, of NASA's Goddard Space Flight Center, observed pulses of ultraviolet light from clumps of hot gas fade and then disappear as they swirled around a massive, compact object called Cygnus XR-1.

Hubble, measuring fluctuations in ultraviolet light from gas trapped in orbit and around the black hole found two examples of a so-called "dying pulse train," the rapidly decaying, precisely sequential lashes of light from a hot blob of gas spiraling into the black hole. Without an event horizon, the blob of gas would have brightened as it crashed onto the surface of the accreting body. The results are consistent with what astronomers would expect to see if matter were really falling into a black hole, Dolan said.