National Aeronautics and Space Administration

Lyndon B. Johnson Space Center

roundup

NASA/MARKOWITZ JSC2006E03176

... and away we go

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JSCdirector

During these hot summer months,

I'm often tempted to exercise my First Amendment constitutional right to complain (we call it "free speech") about the heat and humidity here in Houston. As I talk with groups around the country about the space program, Johnson Space Center and Houston, I'm asked about what it's like to live in Houston. I almost always find myself talking about the good schools, friendly people, affordable housing and community involvement—and I usually add that we don't have to shovel snow very often (my family calls that my feeble attempt at humor).

I couldn't help but notice an article in the July 2008 issue of *Kiplinger's Personal Finance Magazine* listing "The ten best cities in which to live, work and play." These "ten best cities" articles come out frequently, but this one was unusual in that it listed Houston (and its surrounding suburbs) in the top spot. They rated cities according to a formula based on "strong economies, reasonable living costs and plenty of fun things to do." Their rating formula also highlighted cities with "all the ingredients for future success," including "a healthy shot of people in the creative class, such as scientists, engineers, educators" and so forth. They tout Houston as the energy capital of the United States, and when combined with the growing aerospace, technology and medical industries, Houston added more than 100,000 jobs in 2007, which led the nation in job growth. The cost of living is well below the national average, with housing prices less than half of those in other metro areas of similar size. They also pointed out that Houston "is the city of big plans and no rules … world-class museums and wiry cowboys … and the biggest liquor store on the planet." I'm not sure if they meant the last part as a positive or a negative, but as I go from my air-conditioned house to my air-conditioned car to my air-conditioned office, and perhaps to the air-conditioned baseball park, I'll try to remember the line in the article that really stuck out: "How could you not love Houston?"

So, this summer, I urge you to take some time to enjoy all that our great city has to offer. And while you're doing so, please make sure you and your families take appropriate measures to deal with the heat and humidity.

On the cover

Aerial plane to plane view of the T 38 chase flight of NASA 959 out to Colorado. View of the T 38 in flight over snowy mountains.

Spotlight on...
Ansley Collins

International Space Station Trajectory Operations Officer

NASA/BLAIR JSC2006E02122

Q: How long have you been with NASA?

A: Seven years this July. I graduated from Birmingham-Southern College in 2001 with a Bachelor of Science in mathematics. I'd been working with the Johnson Space Center e-mail system as the JSC e-mail postmaster for two years when I got an opportunity to come over to Mission Operations Directorate and start training as an International Space Station Trajectory Operations Officer (TOPO). I was certified in 2006 and, most recently, served as the Lead TOPO for Expedition 16.

Q: What is your favorite food?

A: Southern home cookin', especially my Granny's baked mac and cheese.

Q: What is your favorite sport?

A: College football—I'm a huge University of Florida fan! Go Gators!

Q: What is the last good book or article you read?

A: "Rhett Butler's People." It's a great novel telling the story of "Gone With the Wind" from Rhett Butler's perspective.

Q: What is the best movie in your collection?

A: "Pride and Prejudice," starring Colin Firth and Jennifer Ehle. I loved the book, and this movie brought the book to life just as I pictured it.

Q: What is the coolest part of your job?

A: I think the coolest part about my job is that the work I and those in my group do each day has a direct and tangible influence on what's going on in human spaceflight right now. I have wanted to work at NASA in Mission Control since I was in elementary school, and it is incredible to me that I get to live out my childhood dream each day. NASA has been a wonderful influence and inspiration to me since I was little, so I think it's cool that I can tell others about what I do now and hopefully share some of that excitement.

Q: What does JSC mean to you?

A: To me, JSC is all about people who really care about what they do and who come together to do something positive for the world. I think that those of us who work in spaceflight around the world show that by working together, we can make the world a better place.

Q: What do you look forward to at NASA?

A: I look forward to seeing NASA continue the dream of exploring space and inspiring the world to think big.

Q: What is your best memory at JSC?

A: Gosh. There are so many! I think one of my favorite memories at JSC was serving as the Expedition 16 Lead TOPO. I really enjoyed that.

Q: What is your favorite quote?

A: "If you can't be good, be colorful." – Pete Conrad

Q: What would people be surprised to know about you?

A: I love to sing. When I first came to JSC, I used to sing every so often with some of the folks in Information Resources Directorate who play guitar. My second year here, I decided to add a little liveliness to a presentation on the e-mail system by rewriting the lyrics to a song and singing my presentation at the meeting. I think some folks were definitely surprised by that change of pace!

Q: What is a quality you most admire in people?

A: Loyalty and openness to listen to other people's perspectives.

Q: Who are your heroes?

A: I respect and admire many people who have chased their dreams and worked hard to make the world a better place. I have to say that my parents are the heroes I admire most. They have always supported and encouraged me to follow my dreams and believe in myself, and they taught me to appreciate good times spent with family and friends. I know I wouldn't be where I am today without their love and support.

WANTED!

Do you know a fellow JSC team member who does something extraordinary on or off the job? Whether it's a unique skill, interesting work, special professional accomplishment, remarkable second career, hobby or special volunteerism, your nominee may deserve the spotlight! The Roundup shines the light on one person each month who is chosen from a wide cross section of the JSC workforce. To suggest a "Spotlight" candidate, send your nomination to the JSC Roundup Office mailbox at jsc-roundup@mail.nasa.gov with the person's name, title and brief description of why he/she should be considered.

No 'plane' Jane

NASA/BROWN JSC2000E30015

T-38s continue their astronaut training legacy

By Catherine E. Ragin

While the fleet of sleek NASA fighter-style jets, the T-38s, might leave you with visions of "Top Gun" dancing in your head, the aircraft is serious business when it comes to training the astronauts for spaceflight. The Spaceflight Readiness Training (SFRT) that astronauts receive in the T-38s not only make them better pilots, but also better crew members when it comes to exploring the ultimate extreme environment—space.

GIVING ASTRONAUTS THE RIGHT STUFF

"Astronauts, as part of their training regimen, need to be placed in the flight environment of dynamic decision making. We need to expose them to that on a regular and frequent basis," said NASA Associate Administrator for Space Operations Bill Gerstenmaier.

The T-38s do just that.

"The T-38 was selected as a high-performance aircraft, which places air crews in stressful environments," said Jill Brigham, Engineering branch chief in the Aircraft Operations Division. "You're going really quite quickly and have a very maneuverable vehicle that you're trying to manage."

The SFRT provides astronauts the opportunity to refine critical flying skills and gives them exposure to extreme conditions that are comparable to spaceflight. Training helps develop the talents necessary for high-stress, multitasking space operations such as launch and landing aboard any vehicle, rendezvous and docking, robotics, emergency situations and spacewalks. In the T-38s, astronauts are forced to make real-time decisions and deal with unpredictable and unforeseen events. And while flight simulators are certainly invaluable tools, they are, after all, only simulations.

"Some ask, 'Well, why do we use the T-38 and why is it an effective training tool?' I think that is something people don't understand," Brigham said. "Aircraft and simulators are both effective training tools, but offer very different experiences. In an aircraft, you can't just say, 'Oh, sorry, I made a mistake,' and little red x's come up."

When you're flying in an aircraft, you have to be nearly perfect. Anything else could result in a grave consequence. There's much more at stake than just a bad score on a simulation test, and the astronauts know it.

"Every pilot and crew member is aware that when they fly a T-38, they are in a real flight vehicle and every decision they make is critical. A wrong decision can

NASA/DEHOYOS JSC2003E58223

A front view of the T-38 on the tarmac at Ellington Field with canopies open.

Two T-38s soar above downtown Houston in formation.

lead to a very bad day—not just a restart of the simulation," said David McMahon, Engineering project manager for the T-38 Electronic Flight Instrument System (EFIS) upgrade.

The T-38 training is especially helpful to astronaut pilots. "A flight crew trained to perform difficult piloting tasks has been a necessity for every generation of human-rated space vehicles, whether it was a planned part of the mission such as a space shuttle landing or a backup task such as flying the Saturn V Rocket during launch and ascent," said STS-122 Commander Steve Frick. "Simulators help during training, but they can't teach a pilot the real-life decision-making [skills] needed to land a space shuttle on a runway after two weeks in space, or land a Lunar Module on the surface of the moon—both tasks when the crew has only one chance to get it right. Training in the T-38 constantly reinforces those decision-making skills."

Two general types of flights are used for SFRT. The first type includes flying to destinations in direct support of mission activities and training. These flights may involve trips to shuttle landing facilities to work with Shuttle Training Aircraft or NASA centers for further training. The other type involves more generic flight training, which is garnered through flights in and out of Ellington Field. Flying to airports away from the Houston area exposes crews to unfamiliar conditions and provides favorable training in dealing with unexpected situations. All astronauts must log a required amount of flight time during the course of their training. The T-38s help them reach this goal.

And while the T-38s are certainly one of the coolest training tools in the astronauts' repertoire, there is no mistaking the invaluable learning that comes from flying them.

"In space, an error in judgment, a lapse of attention or an innocent procedural mistake can have an unbearable cost in dollars and human lives. No simulation can prepare a person to work under that kind of stress. For astronauts with backgrounds in science, whose prior professional development may have been in safe environments where close cooperation was not emphasized, the T-38 provides crucial teamwork training and a stepping stone in speed and risk—without which the gap between the laboratory and the spacecraft would be uncrossable," said Stanley Love, STS-122 mission specialist.

KEEPING THE FUTURE ON THE RADAR

NASA's T-38 aircraft fleet is based at NASA facilities at Ellington Field, near Johnson Space Center. Throughout the years, the fleet has varied based on the size of the astronaut corps. Currently, 26 T-38s are in rotation for astronaut training.

Keeping an aging fleet airworthy with the ever-evolving spaceflight landscape is a challenge in itself, but one that the Aircraft Operations Division continually works to meet.

"A number of the T-38s are older than I am," McMahon said. "As with any aging system, careful attention must be paid to ensure that components continue to operate properly and are not wearing out. That said, we are very fortunate that the T-38 is still the U.S. Air Force's primary high-performance jet trainer, with hundreds of aircraft in active service and a large parts inventory system to support them."

Because the T-38 is active in the U.S. Air Force inventory, "we pretty much follow their guides to that, with the exception of NASA modifications that we run through our engineering group and certify for use on our airplanes. It's a very stringently followed program," said Philip Vaughn, head of the Aircraft Systems Section.

With new technologies coming out all the time, NASA has to deal with "issues where systems on the aircraft are basically not good enough for today's flight environment," Brigham said.

To keep up with the rapid changes, the T-38s have undergone two major upgrades over the course of the program.

continued on page 6

NASA/MARKOWITZ JSC2004E47

This photo was captured during a T-38 flight air-to-air photography practice session with photographers Robert Markowitz and Sheri Locke. The flight was conducted over Ellington Field. The photo was snapped from the plane's cockpit looking back at the co-pilot and the cloudy Earth below.

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"Back in the early '90s, we did a complete avionics upgrade to the aircraft," Brigham said. (Avionics refers to the instrumentation, radios, controls and navigation systems equipped on the craft.) "We removed and replaced almost all of the avionics in the aircraft with state-of-the-art avionics."

Then, the Aircraft Operations Division surveyed the Astronaut Office on the types of upgrades they would like most for the program.

"We got a list of items back and scored those in terms of what we thought we would get the most safety enhancements from. We have been working off that list ever since," Brigham said.

The most recent upgrade, called EFIS for Electronic Flight Instrument System, is comprised of the following enhancements:

- Traffic Alert and Collision Avoidance System (TCAS)
- Terrain Avoidance Warning System (TAWS)
- DataLink Weather System—a satellite-based system that provides the crew with weather information for the entire United States
- Digital Flight Director—an improvement over the 1950s vintage flight director currently in the aircraft
- Primary Flight Display and Electronic Engine Display—combines many separate instruments into two displays and allows a flexible system to display the TCAS, TAWS, DataLink Weather and Flight Director information
- Second Air Data Computer—provides a growth path for the T-38 to fly in areas currently off limits due to Federal Aviation Administration Reduced Vertical Separation Minima controlled airspace
- Power bus improvements

"EFIS is primarily an aircraft safety upgrade," McMahon said. "The schedule is to have all the T-38s modified with the EFIS upgrade by the end of 2010."

"We've upgraded from the basic airplane to a package that includes the things we need for traveling—the flights that the astronauts have to fly," Vaughn said. "We've added some weather radars, some VHF radios, some radar altimeters that give us the altitude recording when you are down close to the ground. We are in the process of doing some modifications to add a TAWS and a traffic control system into the airplane, which notifies pilots when they are close to the ground or when other aircraft are within distance."

In addition, NASA has also paved the way for better ejection seats in the T-38s.

"The T-38 seat initially installed in the aircraft was not designed for very small or very large air crews. Many of our air crews were outside the range and could be hurt on ejection. Additionally, ejection seat design has advanced a lot. We worked with the manufacturer to develop a seat that was much safer and had better performance," Brigham said. "We replaced the seat with a modern ejection seat about six years ago. It was done independently of the two avionics upgrades."

The agency took a proactive stance in making the T-38s as safe as possible for the astronaut corps.

"NASA has gone ahead and installed that seat, and now the Air Force is following our lead and getting ready to put the same seat in their airplanes," Vaughn said.

The future looks bright for these nimble jets, as they will still be an integral part of the newer exploration programs.

Vaughn said, "We're going to complete this modification of the EFIS on 20 aircraft and, at the end of 2010, our goal is to have those T-38s carry on through Constellation."

A few of the T-38s at Johnson Space Center s Ellington Field installation are shown in the dawn s morning light.

NASA/STEBBINS/SOWA S99-08621

New smiling faces:

HSPD-12 badging nearly complete

By Catherine E. Ragin

If the freshly updated pictures on most Johnson Space Center team members' badges are any indication, completion of the Homeland Security Presidential Directive (HSPD)-12 process is at our fingertips—literally. Many employees have gone to their second appointment with JSC Security to pick up their new badge, choose a Personal Identification Number (PIN) and verify their identity with their fingerprints.

HSPD-12 mandates that all government agencies must implement security controls and measures under the direction of the National Institute of Standards and Technology. Issued Aug. 27, 2004, HSPD-12 was hailed as the answer to audits showing that the government lacked adequate network security for Information Technology (IT) operations. In addition to stringent IT security, which will be ensured with Smart Card technology encoded in an employee's badge and his or her specially chosen PIN, physical security at the center will also be vastly improved.

"As of July, JSC and the White Sands Test Facility (WSTF) are more or less 95 percent complete with enrollment (the capturing of your picture, fingerprints, electronic signature, etc.)," said Tom Miglin, JSC and WSTF HSPD-12 deputy implementation manager and account authorization official. "JSC is also close to 50 percent complete with HSPD-12 badge issuance."

In the overall HSPD-12 implementation process, "we are nearing the end of the phase to provide workers with new badges and just beginning the phase to be able to use those badges for physical and IT access," Miglin said.

Employees are the driving force behind keeping the center current with the new changes that come with HSPD-12.

"The main thing employees can do now is to promptly respond to invitations for enrollment or badge issuance. If you have lost your e-mail invitation or are not sure if you have received one, you can always go to https://pivs.jsc.nasa.gov and check on your status," Miglin said.

Some changes with HSPD-12 will become more evident as time goes on. Updates in security procedures are gradually being incorporated into normal day-to-day operations with this transition.

HSPD-12 is on the forefront of enhanced security measures, requiring employees to undergo vigorous background checks and supply fingerprints for record.

"Immediately after receiving your new badge, you can use it to enter Controlled Access Areas (CAAs), just as you did with your old badge. You will also notice more and more IT resources (JSC domain IDs, e-mail accounts) requiring a NASA identity for access," Miglin said. "This provides NASA with a formally documented list of who has access to NASA data."

During the badge issuance process, individuals will be required to select a PIN for the card and a PIN for physical access.

"Once we have confirmed that the required individuals have received their new badge, we will begin the process of configuring CAA access for two-factor authentication (something you have, the badge; and something you know, the PIN) to access the facility," said Lynn Vernon, HSPD-12 implementation manager.

These new measures will offer unprecedented security and protection to NASA facilities and resources, which should give employees working at JSC peace of mind.

"First, users are already experiencing the increased validation of an individual's identity with background checks, two forms of ID and electronic fingerprints. Next, increased physical security based on the new badge will start this year," Miglin said. "Finally, the use of the Smart Card badge for more secure IT access will be phased in starting early next year."

Securing our future is not something NASA takes lightly.

"Our agency has been recognized in the U.S. Congress for the great progress we've made with HSPD-12 implementation. NASA is used as an example to show other U.S. government agencies how to successfully approach HSPD-12 implementation," Miglin said. "This is due to the efforts of both the agency teams developing our HSPD-12 infrastructure and NASA team members for their cooperation in the re-badging process."

And while many government agencies have issued HSPD-12 badges to all their employees, they do not yet have an infrastructure in place to use the badge for physical and IT access.

"NASA has a solid design and implementation plan for using the badges for access," Miglin said.

This plan will help JSC be prepared when the HSPD-12 security overhaul comes to fruition in the coming months.

SPACE LIFE SCIENCES:

Teaching the Next Generation

By Jenny Knotts

Think the scientists in the Space Life Sciences Directorate spend all their time in a lab? Think again. Some of them spend time teaching and mentoring the next generation of scientists from the University of Texas Medical Branch (UTMB) in Galveston, Texas.

On May 2, some students from UTMB's Graduate School of Biomedical Sciences were given an opportunity to spend the day visiting the Space Life Sciences facilities and touring Johnson Space Center. These students were participating in the space life sciences curriculum offered through the graduate school. Quite a few lecturers for this program are NASA scientists, and most are from JSC.

UTMB Graduate School of Biomedical Science students were given an in-depth, behind-the-scenes look at JSC facilities.

"The collaboration with UTMB provides unique opportunities for graduate students to perform space life sciences research that is directly involved with NASA," said Dr. Janice Meck, Human Health and Countermeasures Element scientist at JSC.

The first half of the students' day was spent in JSC's Life Sciences Research Laboratories, meeting the lab personnel and participating in interactive endeavors. This gave the students a chance to put the lectures into perspective and see the information used in real-world applications.

In the afternoon, students got an insider's view of JSC. It started at the Neutral Buoyancy Laboratory, where they watched astronauts train for spacewalks inside the facility's 6.2-million-gallon pool.

From there, the group visited the Fixed Base Simulator, Space Vehicle Mockup Facility, Mission Control Centers for the space shuttle and International Space Station and the historic Mission Control Center.

The relationship between NASA and UTMB's graduate school began with Meck and Dr. Cary Cooper, dean of the Graduate School of Biomedical Sciences. They wanted to see a space life sciences curriculum offered at UTMB and thought NASA would be a perfect partner.

Meck and Cooper started with offering one course, Space Medicine and Physiology, to see how it would be received. They had 15 students register and considered all the interest a success. This was the start of what continues to be a rewarding partnership between NASA and UTMB.

"What began as a single course in space physiology has now grown into an entire academic effort, drawing students internationally with biomedical expertise of all types," Meck said.

This new graduate curriculum, which now offers four courses including a space life sciences laboratory rotation, allows students to specialize in the space life sciences and learn to conduct important and relevant research.

"This dynamic project is exposing graduate students to all sorts of challenges involving the physiology of human systems and cells in microgravity," said Courtney Barringer, project and course coordinator.

Since that first class in 2002, around 35 NASA scientists and crew members have been lecturers and mentors for this program. They have addressed many topics, including radiation and cardiovascular effects, psychological factors and exercising in space.


NASA/BLAIR JSC2008E038516

A student emerges from the shuttle mockup in the Space Vehicle Mockup Facility in Building 9.

Dr. Jean Sibonga, Basic Science lead at the JSC Bone and Mineral Laboratory and one of the 2008 lecturers, focused her instruction on spaceflight-induced bone loss and possible countermeasures to such loss. She shared with the students how understanding normal bone physiology on Earth is necessary to understanding the changes spaceflight produces in an astronaut's bones.

Sibonga's interest in teaching is apparent. "The bone and mineral field is a young and exciting area of research and [I] like to share that enthusiasm," she said.

Sibonga started out at NASA as a cooperative education student. She feels "there's a need to bring a new generation into the space program, and I think this is the best way to tap into that new savvy generation."

The topic of the psychological factors of spaceflight was covered by Dr. Walter Sipes, chief psychologist of the JSC Behavioral Health Performance Group. Sipes spoke to the students about the psychological factors of long-duration missions. He also talked about the support services offered to astronauts and their families to help them cope.

In addition to his day job as a NASA scientist, Sipes has been a lecturer at several universities around the country for 32 years.

"Lecturing fulfills me personally by passing on knowledge and challenging students to learn from history and others," Sipes said.

"This type of curriculum will be necessary as we progress toward future lunar and Mars missions," Barringer said. "It's interesting to see all the types of research the students are getting involved in, and it's inspirational to think about the contributions they'll be making to the space life sciences in the future."

The students were briefed at the Neutral Buoyancy Laboratory, Fixed Base Simulator, Space Vehicle Mockup Facility, Mission Control Centers for both shuttle and station, as well as the historic Mission Control Center.


NASA/BLAIR JSC2008E038513

A picture-perfect solution

Engineer finds way to lessen hazardous waste at Johnson Space Center

NASA/MARKOWITZ JSC2005-00019

Michael Freiberg monitors the Zero Discharge System at Johnson Space Center, which recycles all of the center's photo processing waste into ultra-purified water.

By Heather Nicholson

Ever wonder how a machine from a tomato paste factory saved NASA $400,000 a year? Michael Freiberg knows how.

Most days, Freiberg, an engineer in the Information Resources Directorate (IRD), finds himself outside monitoring the recycling of chemical waste. The Zero Discharge System (ZDS), housed in a concrete structure outside Building 8 at Johnson Space Center, takes harmful chemicals such as acid, caustic and salt, and turns them into ultra-purified water.

These chemicals are used in JSC's photo processing lab when developing the thousands of pictures we take every month in support of our programs. Costing about $1.8 million, the system Freiberg brought to JSC eliminated all chemical waste produced by the photo lab, ultimately saving the center $400,000 to $500,000 a year in containing and shipping hazardous waste.

"It was already used somewhere else and I brought it here," Freiberg said. "It pretty much paid for itself in the first year of operation."

The system starts by using vacuum distillation, which is often found in tomato paste factories. The purple and black liquid chemicals then move to an ultraviolet ozone oxidation system, nanofiltration and then reverse osmosis. The ZDS returns 95 percent of the photographic waste back to the facility as pure water for re-use in the photo lab.

"It's pretty much the same process they use in purifying bottled water," Freiberg said. "But since this water lacks minerals, it's not good to drink."

The remaining five percent of the water is a nutrient- and silver-rich concentrate that is transferred into a 90-day storage tank for shipment to a refining company.

Working closely with the JSC Environmental Office, a contract was established with Itronics, Inc. in Reno, Nev., to recycle the five percent nutrient- and silver-rich concentrate left over from recycling. Itronics, Inc. recycles this into pure silver fertilizer, which is distributed to golf courses.

Freiberg's incorporation of numerous advances in recycling technologies enables the ZDS to comply with and exceed recycling guidelines established by the Environmental Protection Agency.

For his efforts, Freiberg was presented a Certificate of Achievement Award on March 27 as JSC's selected candidate for the Quality and Safety Achievement (QASAR) Award. The QASAR Award is sponsored by the office of Safety and Mission Assurance, which promotes safety, quality and continuous improvement throughout NASA. They recognize government and contractor employees who have displayed exemplary performance in contributing to the quality and/or safety of products, services, processes, management programs and activities, or the working environment.

Freiberg explains the logistics of the ZDS to a group touring the facility.

NASA/BLAIR JSC2002E23053

This system has been in operation for five years at JSC, recycling about 230 gallons of chemical waste every six months. Before, JSC would store the chemical waste underground and then hire a tanker trunk every three months to remove about 4,000 gallons of waste. Freiberg estimates that JSC spent $42,000 per trip.

"Now we spend zip – nothing," he said.

This particular type of system is one of only two that exist, the other being at an Air Force base in California. The future of ZDS is to go completely green with wind or solar energy powering it. Freiberg is currently working on getting grant money to make this happen.

"It is our goal that the system will eventually be the world's largest treatment system that is totally green," Freiberg said.

In addition to bringing the ZDS technology to JSC, Freiberg also wrote a manual on its operation and maintenance. The Interactive Electronic Technical Manual for use with ZDS combines 45 equipment manuals into one, easy-to-navigate data information source. It covers safety, operations, maintenance, spare parts and a quality assessment program. The manual's 165 Web pages contain 2,049 pictures, 1,798 linked files, 9,954 hyperlinks, 8,929 internal hyperlink and 10 video files to aide the operator during operation and maintenance.

When nominating Freiberg for NASA's highest safety award, Yolanda Y. Marshall, director of Safety and Mission Assurance, said Freiberg's efforts showed strong leadership.

Marshall said, "Through his strong leadership and expertise, Freiberg took the largest source of hazardous waste and nonhazardous industrial solid waste at JSC and made it into a safe, clean process that produces no waste. The ZDS has become one of NASA's largest liquid recycling and reuse systems."

Center Director recognized by space industry

Mike Coats, center director at Johnson Space Center, was recently given two awards by the American Institute of Aeronautics and Astronautics (AIAA) and the Federation Aeronautique Internationale (FAI).

Coats was chosen as a Fellow of the AIAA because he is "a person of distinction who has made notable and valuable contributions to the arts, sciences, or technology of aeronautics or astronautics." As part of this honor, he received a certificate and a pin.

The FAI bestowed Coats with the Gold Space Medal, which is reserved for "those who have contributed greatly to the development of astronautics by their activities, work, achievements, initiative or devotion to the cause of space."

Congratulations, Mike!

NASA/CREATIVE IMAGES PHOTOGRAPHY, WASHINGTON, D.C. JSC2008E045789

Mike Coats with AIAA President Paul Nielsen.

NASA JSC2008E039668

Coats is pictured with his family and Deputy Director Ellen Ochoa, far right, after receiving the FAI Gold Space Medal.

Space Center Roundup

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