Engineering a world of help
A critical role of the Chief Executive Officer (CEO) of a company is to serve as the chief advocate for the organization, so it’s no surprise that the acronym CEO can also be seen as “C”ommunity, “E”ducation and “O”utreach. As the center for human spaceflight, the Johnson Space Center community has a long history of working together to achieve exploration goals. We also have a proud record of working outside our gates—working together to reach out to the community, support science, technology, engineering and math education in the schools, and be good community members. Today’s JSC team members, our civil servants and contractors, are involved in many activities that carry on this tradition. Here are just a few examples:

**Houston A+ Challenge Teacher Externship** program gives teachers a job shadowing and a networking opportunity to learn skills necessary to be successful in the workplace.

**JSC Speakers Bureau and Education Outreach** programs offer volunteer opportunities for employees to promote NASA’s mission at schools.

**Space Center Houston Career Day** involves education and student outreach.

**NASA FIRST robotics, Lego™ robotics, Rocket Teams and Young Astronaut** programs are found in local schools and libraries. They encourage students to participate in robotics and rocketry competitions.

I recently spent a day helping with art projects and reading to a group of very special children at the Children’s Cancer Center in downtown Houston. If you haven’t already experienced the joy of sharing your knowledge with kids and making a difference, I want to encourage you to be a “CEO” for JSC and NASA and get involved. We have numerous opportunities for each of you to become a mentor or classroom volunteer, give a speech to a local community group, help inspire teachers through your knowledge and experience and lend a helping hand.

Please join me.

JSC Director Mike Coats recently volunteered at Texas Children’s Hospital and spent time with kids in the Cancer Center.

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NASA's Ares I-X test rocket lifted off at 10:30 a.m. CDT on Oct. 28 from Kennedy Space Center in Florida for a two-minute powered flight. The test flight lasted about six minutes from its launch off the newly modified Launch Complex 39B until splashdown of the rocket's booster stage nearly 150 miles downrange.

"This is a huge step forward for NASA's exploration goals," said Doug Cooke, associate administrator for the Exploration Systems Mission Directorate at NASA Headquarters in Washington. "Ares I-X provides NASA with an enormous amount of data that will be used to improve the design and safety of the next generation of American spaceflight vehicles—vehicles that could again take humans beyond low-Earth orbit."

The 327-foot-tall Ares I-X test vehicle produced 2.6 million pounds of thrust to accelerate the rocket to nearly 3 Gs and Mach 4.76, just shy of hypersonic speed. It capped its easterly flight at a suborbital altitude of 150,000 feet after the separation of its first stage, a four-segment solid rocket booster.

Parachutes deployed for recovery of the booster, and the solid rocket motor was recovered at sea for later inspection. The simulated upper stage, Orion crew module and launch abort system will not be recovered.

"The most valuable learning is through experience and observation," said Bob Ess, Ares I-X mission manager. "Tests such as this—from paper to flight—are vital in gaining a deeper understanding of the vehicle, from design to development."

The awe-inspiring flight offered an early opportunity to test and prove hardware, facilities and ground operations—important data for future space vehicles. During the test, a range of performance data was relayed to the ground and also stored in the onboard flight data recorder. The 700 sensors mounted on the vehicle provide flight test engineering data to correlate with computer models and analysis. The rocket's sensors gathered information in several areas, including assembly and launch operations, separation of the vehicle's first and second stages, controllability and aerodynamics, the re-entry and recovery of the first stage and new vehicle design techniques.

The Ares I-X efforts are led by the Ares I-X mission management office of the Constellation Program, based at Johnson Space Center, and NASA's Exploration Systems Mission Directorate in Washington. NASA's Glenn Research Center in Cleveland designed and built the vehicle's upper stage mass simulator. NASA's Langley Research Center in Hampton, Va., provided aerodynamic characterization, flight test vehicle integration and the crew module/launch abort system mass simulator. NASA's Marshall Space Flight Center in Huntsville, Ala., provided management for the development of Ares I-X avionics, roll control and first stage systems. The Kennedy Space Center provided operations and associated ground activities and launch operations.

For information about Ares I-X, visit: http://www.nasa.gov/aresIX

The present meets the future as Ares I-X lifts off the pad using more than 23 times the power output of the Hoover Dam. At right is Space Shuttle Atlantis, poised at Launch Pad 39A for its Nov. 16 liftoff.

The solid rocket booster recovery ship Freedom Star, towing the spent first stage of the Ares I-X rocket, traverses the Banana River along the shore of Cape Canaveral Air Force Station in Florida. Across the river, in the background, is the Vehicle Assembly Building at Kennedy Space Center.
From evaluating spacecraft lighting systems to providing flight food for crew members, the Habitability and Environmental Factors Division (HEFD) helps ensure that humans can live and work safely and effectively in space. HEFD comprises two branches: the Environmental Factors Branch (EFB) and the Habitability and Human Factors Branch (HHFB). Through these branches, HEFD works across the agency to provide research and innovative design solutions that will support the health and productivity of crews in both current and future space systems.

**Environmental Factors Branch**
EFB specialists develop NASA spacecraft environmental standards and flight program requirements for air and water quality, toxicology, microbiology, radiation and acoustics. Additionally, EFB specialists participate in vehicle and system design reviews and evaluate the quality of the spacecraft cabin environment to help ensure crew health and safety.

EFB personnel have also played a critical role in improving spacecraft environmental monitoring systems. EFB recently invested in the development of a new air monitoring technology that is smaller, requires fewer consumables and is easier to operate and maintain than previous air quality monitors onboard the International Space Station. The Air Quality Monitor was delivered to the station last March and is currently being tested in flight.

“We’re very confident the new technology will be successful and become an operational capability on the International Space Station,” said Bill Seitz, NASA HEFD chief.

In coordination with the Avionics Systems Division, EFB is also developing the next generation of in-flight radiation monitoring devices. The new devices will be significantly smaller, more modular and provide measurements not possible with previous technologies. The new monitors will provide radiation data necessary to make real-time adjustments to spacewalk timelines.

**Habitability and Human Factors Branch**
HHFB specialists define human physical and cognitive performance parameters for spaceflight to ensure accommodation in space vehicles, habitats and flight crew systems design and operation. HHFB specialists also provide human factors assessments of vehicle and system designs and support the development and use of human-as-a-system standards, requirements and verification techniques.

As an example, the HHFB is currently conducting modeling and analysis of a station maintenance-free Emergency Egress Guidance System for crew members, using battery-free advanced photo-luminescent technology. The HHFB is also heavily involved in anthropometry and biomechanics support to next-generation Constellation Program spacesuit development—a design challenge with intense human/system form, fit and function issues.

HHFB food scientists are researching solutions for food-system issues associated with long-duration, exploration missions beyond low-Earth orbit. One of the many challenges is preservation of food quality for the entire duration (shelf life) of an exploration mission, perhaps as long as three to five years. Current food processing and packaging techniques cannot meet the anticipated food shelf life requirement needed for exploration missions.

“Currently, the packaging used for rehydratable and natural-form foods does not have adequate oxygen and moisture barrier properties,” said Michele Perchonok, NASA Advanced Food Technology project manager.

“A second foil-containing package provides the required food shelf life, but also results in increased mass and volume and increased trash.”

The HHFB Habitability Design Center (HDC) is teaming with future spacecraft developers to ensure that interior layouts are optimized for human performance, from habitability and human factors perspectives. The HDC supported the development of Orion and Altair for the Constellation Program and is currently working with the Lunar Electric Rover team on interior habitation layout and design.

Whether supporting current spaceflight operations or engaging early in the design of future space vehicles and habitats, the HEFD provides environmental and human factors expertise and innovative technologies to ensure the accommodation and integration of the “human system.”
Transforming processes, resulting in efficiencies, is innovation in the making. In the five years as Johnson Space Center’s director of Procurement, Debra L. Johnson has worked toward including more internal representatives and new external entities in the procurement process. Early on, Johnson reformulated the Source Board by adding multiple disciplines from within JSC to originate the requests for proposals and evaluate proposal submissions. Prior to the Source Board, the process was singular and often involved the office merely making the request. Johnson notes that opening the process up allowed for better evaluations for JSC and the companies involved.

“We had the same companies here for a long, long time,” Johnson said. She’s made it a practice to expose more entities to JSC and the opportunity to bid on business with the center. Johnson and her team have been on the road, speaking at conferences and events to encourage more diverse participation from the business community. Their efforts have paid off.

“Now, every competitive bid issued at JSC includes a new company,” Johnson said. The new inclusion process allows companies interested in responding to a Request for Proposal (RFP) to visit JSC, ask questions and talk with the technical managers.

“Instead of standing outside the gate looking in, we give them access,” Johnson said.

The openness is beneficial for both the companies making the bids and JSC decision-makers because there is a two-way process. Johnson adds that JSC Director Mike Coats is great about making himself available to support these efforts. Now, Johnson and her team are streamlining the RFP process even further.

“The goal is to redesign the process so it is the optimum,” Johnson said. Forming the Source Evaluation Board Office is a significant step in that direction. The office is currently benchmarking the Department of Defense and Marshall Space Flight Center procurement practices to bring improvements to JSC.

Currently, a Source Board assignment can take between 18 and 24 months to process a single proposal, from developing the RFP to awarding the work. Johnson believes that if NASA is buying or designing something new, such as the Orion Crew Exploration Vehicle, then a two-year process may make sense. However, if you are putting out a proposal to buy the same items again and again, it should be done faster.

Astronauts to fly Amelia Earhart watch, scarf

Along with the obvious thrill of launching into space, astronaut Shannon Walker’s flight to the space station next year will hold a sentimental and historical significance. Flying alongside Walker will be the watch of Amelia Earhart, the legendary aviator who was the first woman to pilot a plane across the Atlantic Ocean in a solo flight. Earhart was also a charter member and the first president of The Ninety-Nines, an international organization of licensed women pilots from 35 countries that has more than 5,500 members worldwide. While there are other female pilot organizations in various states and countries, nearly all women of achievement in aviation are past or current members of The Ninety-Nines. Walker is among those women.

When asked how she felt about the watch flying into space, Joan Kerwin, director of The Ninety-Nines and a 39-year member, described it as “kind of scary in a way. Amelia is such an icon with women in aviation and now with women in space. We are thrilled that Shannon is a Ninety-Nine and will be taking Amelia into space with her.”

Kerwin presented the watch to Walker at Ellington Field in Houston on Oct. 22.

A licensed pilot since 1995, Walker learned to fly in a Cessna 150. Her grandmother served as an air traffic controller at William P. Hobby Airport in Houston and had a private pilot’s license. Walker’s mother was also a pilot.

“One thing I really like about flying is that it is an activity that my mother and I can do together,” Walker said. “There is something quite special about getting into a plane with my mother and going somewhere.”

At 30, Walker flew her first solo flight, which is required as part of pilot training. Earhart was 24 when she flew her first solo flight in 1921.

Along with the watch, another personal belonging of Earhart’s is flying in space. Astronaut Randy Bresnik, grandson of Earhart’s only authorized photographer, took a scarf of Amelia’s with him aboard Space Shuttle Atlantis as part of STS-129.
Volunteers from Johnson Space Center and the surrounding community banded together in 2004 to form a local chapter of Engineers Without Borders-USA, a national nonprofit organization that matches engineers in the United States with global health challenges to develop solutions. In the case of the local chapter, it brought a country where millions were drinking unclean water together with engineers who were already turning urine and sweat into drinkable water in space.

“Looking at how to keep people alive and healthy in a spacecraft is actually pretty similar to how we keep people alive and healthy in the developing world,” said Evan Thomas, an engineer in the Crew and Thermal Support Systems Division in the Engineering Directorate. “You’re living in a very harsh environment with limited resources, and you need to have systems that are robust enough that they can work for many years at a time with very little maintenance or resupply.”

There are differences, of course. Space, with its microgravity and lack of a natural source of any kind of water—much less, fresh water—presents its own challenges. Rwanda’s challenges stem from other issues, but they’re no less daunting. One system can’t meet both needs, but having worked through the one challenge, engineers were able to bring that experience to bear on the other.

They didn’t do it alone. About 200 people keep up with the work that they do, and some 20 regular volunteers—engineers, scientists, astronauts, educators and students—might spend an extra 10 hours a week designing the systems and making the trips to Rwanda to install them.

“We didn’t really set out to invent anything,” Thomas said. “We wanted to use whatever resources were already out there and whatever technology had already been developed. But the challenge in Rwanda was that the conditions there are much different than a lot of other places where similar work is done.”

For instance, the go-to solution for most countries is to dig wells. But Rwanda is mountainous, and the ground water is too deep to make that practical. Community-scale filtration systems were not feasible because of a variety of factors, so the engineers working with other volunteers from the University of Colorado decided on a hybrid approach: a robust system that uses gravity, gravel and sand as a filter and pairs it with a solar-powered ultraviolet disinfection system.

The pieces aren’t new. Sand and gravel filters are old concepts, and even ultraviolet disinfection systems have been around a few years. But using gravity and solar power to make them simple enough to fit the needs of Rwanda was an innovation. The system can treat water for groups that range in size from 100 to 3,000 people and produce more than 13,000 gallons per day. Plus, it only takes one local technician to keep it going.

So far the chapter has installed three of the systems in Rwanda and one in Mexico. That’s a good start, but the engineers know it’s just a drop in the bucket—literally.

“We wanted to make sure that 10 years from now, we still had a measurable impact. There are over a billion people who lack access to clean drinking water, and 28,000 children die every single day from waterborne disease,” Thomas said. “So they came up with a way to get more than 400 water treatment systems installed, ultimately serving more than 330,000 people.”

“We have a vision of the future, and we’re working every day on developing technologies to get us there,” Thomas said. “In the developing world, engineers can have the same impact. We can work today on programs that will save and improve lives in the future.”
EWB-JSC installed a surface water treatment system for the Mugonero Orphanage in Rwanda.

EWB-JSC volunteer working in rural Rwanda with the local community members to identify water quality challenges.

The EWB-JSC chapter works in remote communities in western Rwanda on water treatment and energy efficiency technologies.

EWB-JSC volunteers installing a solar powered lighting system for the Mugonero Hospital, Rwanda.
Section 508, part of the Rehabilitation Act Amendments of 1998, ensures that federal employees with disabilities have equal access to information and IT. It also ensures that members of the public with disabilities have comparable access to government information. All federal agencies must ensure that this technology is accessible to employees and members of the public with disabilities to the extent it does not pose an undue burden.

This summer, the Information Resources Directorate, in collaboration with the agency office of the Chief Information Officer, hosted a training course on Section 508. More than 100 Johnson Space Center team members attended the sessions over two days. In these sessions, they learned about NASA’s policies on Section 508 compliance and related Information Technology (IT) products and services.

“This training session was the first of its kind in the agency,” said JSC Section 508 Coordinator Herbert Babineaux. “It gave us the opportunity to let people know that Section 508 compliance is very important to doing business within NASA.”

The training sessions arose from the increasing issues with closed-captioning for video and the Web. This forum allowed for information sharing on all aspects of Section 508, not just video concerns.

“Section 508 is part of civil rights law; it’s not something we can waive away,” Babineaux said.

Throughout the sessions, federal employees with disabilities, including Dr. Robert Shelton, provided testimonials on their use of assistive technologies to accomplish daily tasks. Shelton explained that their participation helped create awareness of the reality of this issue.

“I think that our management to a great extent bought into the fact that having disabled people in the workforce is a reality, and having an organized approach to allow people to make the best contributions they can is important,” Shelton said.

The team that ensures compliance with these regulations sees a human side to their efforts.

“It’s very rewarding because we don’t look at this as a job—we care about people,” said Sonia Hoarau, assistant Section 508 coordinator. “If I were disabled, it would make me feel good knowing that I had the proper tools available to allow me to do my job in a most efficient manner.”

For more information on Section 508 and NASA’s related policies, visit:

http://www.access-board.gov/508.htm
http://section508.nasa.gov/

Dr. Robert Shelton speaks to the attendees about using assistive technologies to perform daily tasks.
It was a community dazzled by the awe of NASA, inspired by its accomplishments and encouraged to be in the shoes of someone who works at NASA,” said Joeletta Patrick, acting Minority University Research and Education program manager.

Patrick recently attended the 2009 Hispanic Engineering Science and Technology (HESTEC) Program conference at the University of Texas-Pan American (UTPA) in Edinburg, Texas. She was among 25 employees from Johnson Space Center who helped staff the 16,000-square-foot NASA exhibit at the UTPA campus.

HESTEC, in conjunction with the Office of Congressman Ruben Hinojosa, serves the country’s top Hispanic student population. The year-round program was created to increase the number of U.S. scientists and engineers. It has evolved into a national model for promoting careers in science, technology, engineering and math (STEM) related fields for South Texas students, who are primarily Hispanic.


NASA’s presence helped emphasize the importance of STEM-related fields to students who are still trying to figure out what education and career direction they want to take. Approximately 30,000 pre-college students have participated in the past, and the numbers continue to grow every year. However, more than students attend. Thousands of teachers participate in hands-on workshops to see what they can take back to their classroom, and NASA is among those offering valuable workshops to teachers.

“I think it’s important for NASA to be a part of this program to increase interest in STEM disciplines,” said Shari Olson, MUREP coordinator. “It’s a return (on) investment for NASA. We participate in outreach activities like HESTEC, and we hope students enter one of our many student programs and possibly go on to enter the NASA workforce.”

Teachers were thrilled with what NASA brought to Educator Day. Among some of the workshops teachers had the opportunity to attend were “Rockets—The Latest on NASA’s New Rockets,” “Engineering Design Challenge,” “Math and Science at Work at NASA” and “NASA Robotics in Schools.”

During the Congressional Roundtable, Director of JSC Human Resources Natalie Saiz spoke about the importance of NASA’s student programs. She emphasized how the community could help reach students early so they might become interested and excel in STEM as they finish school.

The NASA exhibit, comprised of hands-on activities, two moon rocks, a model of the lunar lander and more, saw roughly 50,000 visitors during the conference.

The biggest attraction during Community Day was Astronaut Jose Hernandez, who signed autographs in the NASA exhibit hall before delivering a presentation to the crowd.

“One mother brought a tag board filled with articles of Hernandez and his mission-related successes to Community Day and asked, with tear-filled eyes, if he could sign the board for her daughter, who wanted to be an astronaut when she grew up,” Olson said.

The HESTEC conference proved to be a positive experience for the South Texas community and NASA by building partnerships and promoting STEM literacy and awareness of NASA.
Q: Coolest part of your job?
A: Training and supporting NASA’s IEM systems, I work with people from around the agency. Not only do I learn about different areas at NASA, but I also get to support people who are procuring the necessary supplies, materials and equipment to put (people) in space.

Q: What would you be doing if you weren’t in your current job at Johnson Space Center?
A: I would be training or teaching somewhere. During the IEM program implementation, I was voted “Least likely to need a microphone and proud of it!”

Q: What did you want to grow up to be when you were a child?
A: I wanted to be a fighter pilot, but my bad eyesight disqualified me.

Q: What would people be surprised to know about you?
A: I am a cowboy action shooter (CAS). I shot in the Texas State Championship four years running. This past year, I shot a clean match (no misses). I also took second place in the costume contest. CAS requires guns and costumes that existed during the cowboy era. Between my cowboy club, Renaissance Festival, Dickens on the Strand and my Galveston Mardi Gras “Krewe,” I have plenty of chances to put on costumes and get into character.

Q: What is your favorite quote or motto?
A: Ben Franklin’s quote, “Those who would give up essential liberty to purchase a little temporary safety deserve neither liberty nor safety.”

Q: Last good article you read?
A: An article about President Kennedy and his vision for America’s space program. My friend Vann Jones had a poster in his office that listed President Kennedy’s goals. Putting a man in space and landing on the moon was only the beginning. Going back to the moon, establishing a base and looking toward Mars may have been rekindled by President (George W.) Bush, but it was all part of President Kennedy’s vision for America.

Q: Favorite music, artist or band and why?
A: I like classic rock. If I had to pick one band, it would be Styx.

Q: Who are your heroes and why?
A: The first name that pops into my mind is John Wayne. Not only the characters that he played, but from all I have read, the man himself.

Q: What is the quality you most admire in people?
A: Integrity! When I was trying to decide between honesty, trustworthiness, dependability, etc., I realized that integrity pretty much sums (up) all the most important qualities in one.

Q: What do you most look forward to at NASA?
A: I am very excited about returning to the moon and a possible manned mission to Mars!

Q: What is your best memory at NASA or JSC in particular?
A: I was at Kennedy Space Center for a meeting and went on a tour, (where) I got to see the shuttle, crawler and pad. You get a perspective for the size when you are that close. I would love to go to a launch before the shuttle is retired.

WANTED!

Do you know a JSC colleague or team that does something extraordinary on or off the job? Whether it’s a unique skill, interesting work, special professional accomplishment, remarkable second career, hobby or volunteerism, your nominee(s) may deserve the spotlight!

The Roundup shines the light on one special person or team each month, chosen from a cross section of the JSC workforce. To suggest “Spotlight” candidates, send your nomination to the JSC Roundup Office mailbox at jsc-roundup@mail.nasa.gov. Please include contact information and a brief description of why your nominee(s) should be considered.
October was bursting at the seams with community events, two of which were the 16th Annual Ballunar Liftoff Festival and Johnson Space Center Open House from Oct. 23 to 25.

The festival transformed JSC for a unique weekend of fun and family-oriented activities. Guests were able to enjoy hot air balloon competitions, evening balloon glows, skydiving exhibitions, commercial exhibits, food from local restaurants, arts and crafts, entertainment and aviation displays. The Experience NASA Zone hosted the Driven to Explore interactive exhibit, and astronauts were on hand to sign autographs. This year the festival kicked off Navy Week in Houston, with a special Navy band performance the evening of Oct. 24. Also included in the festivities was a Salute to Law Enforcement display at the entry with fire, police and emergency equipment on display and demonstrations throughout the day.

Earlier on Oct. 24, JSC opened its doors a number of facilities to give attendees an up-close look at space activities. Visitors had the opportunity to celebrate NASA’s past, present and future during a special storytelling event that ran all day in the Teague Auditorium. Presentations included stories from the Apollo era given by the NASA Alumni League, spacesuit and space food demonstrations, the challenges of living and working in space and a glimpse into NASA’s future plans for returning humans to the moon, Mars and beyond. A variety of space-themed videos were shown to add to the audience’s space exploration experience.

JSC Open House offered visitors a glimpse of Buildings 3, 9N, 11, 14, 30S, 220 and the Saturn V complex. Space was brought down to Earth with full-scale space shuttle and station mockups, robotic exhibits, spacesuits, tools, Mission Control Center (MCC) and the historic Apollo MCC. In addition, the Lunar Rover, moon rocks, meteorites and other inspiring demonstrations captivated the imagination of NASA fans.
Coats in the Trenches

Nov. 6, JSC Director Mike Coats and members of senior staff toured Aircraft Operations at Ellington Field. They were briefed, among other topics, on recent aircraft upgrades and the improvements made since Hurricane Ike descended on NASA’s unique facility.

Clark and Coats converse about the new T-38 shelters that replaced the ones destroyed by Hurricane Ike.

JSC Director Mike Coats (left) listens as Aircraft Operations Chief Richard Clark gives an overview of the T-38 Electronic Flight Instrument System avionics upgrade.

Alan Flint briefs Coats on T-38 improvements.