



Roundup

LYNDON B. JOHNSON SPACE CENTER

January | 2012



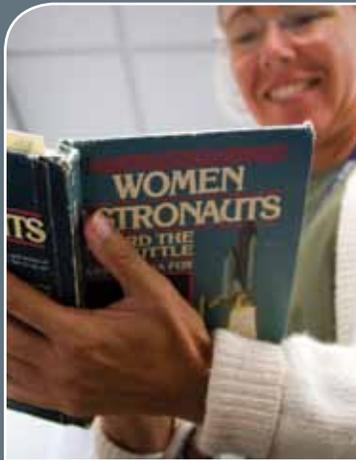
Reflections 2011

JSC Director



On the cover:

Reflections 2011.



NASA/HOUSTON CHRONICLE, SMILEY N. POOL

Photo of the month:

NASA astronaut Sandy Magnus, STS-135 mission specialist, autographs a book titled “Women Astronauts” for a member of the Flight Data File (FDF) team during the STS-135 FDF review on June 24 in Houston. The review involves examining and annotating hundreds of books and cue cards that comprise all of the detailed technical steps that will be performed during the mission.

This *Roundup* is our annual Year in Review issue, and it has been a busy—and perhaps uniquely challenging—year for all of us at Johnson Space Center. I can’t begin to tell you how proud I am of the entire JSC family.

In 2011, this team completed final assembly of the International Space Station and successfully and safely flew out the last three space shuttle missions. The unswerving professionalism shown by everyone, knowing that the Space Shuttle Program was ending and the Constellation Program was being terminated, was simply superb. The transition period has been difficult, and it has been hard for all of us to see so much experience and talent leave the agency with the loss of two major programs. Everyone stayed focused on the safe execution of the last flights of each of the three orbiters, which by any measure were as problem-free and successful as any of the previous 132 missions.

Final assembly of the International Space Station was not only completed, it was also left well stocked with supplies and spare parts. This was fortunate given the later loss of the Russian Progress resupply vehicle. The station is serving both as a world-class research laboratory and as a test bed for the exploration technologies we must perfect as we begin to explore the solar system. Despite the cancellation of Constellation, NASA Administrator Charlie Bolden instructed the Orion Multi-Purpose Crew Vehicle Project to continue to make progress while he worked to gain support from the administration, which he accomplished in May. He followed that by later gaining approval for the Space Launch System. The Orion team is to be commended for ignoring the distractions and focusing on the job at hand, which allowed the administrator to approve plans for an Orion Exploration Flight Test in early 2014.

With the NASA Authorization Act of 2010 and the “mini-bus” appropriations bill this past November, Congress and the administration have given us clear direction and support for our human space exploration program. I know all of you are as proud of the first half century of human spaceflight as I am, but I also know you came to NASA to make history—not just read about it. Let’s get on with it and have a terrific 2012.



NASA/PHOTO

Mike

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Around the Center

There's no place like Houston, whether you happen to be in space or residing at Johnson Space Center. Here's a pictorial look back at 2011 through the eyes of JSC team members on site.



NASA/PHOTO JSC2011E021379

The Texas Independence Trail Ride arrives at JSC on Feb. 22, 2011. Riders and wagons paraded along 2nd Street and made a brief stop in the Rocket Park parking lot before continuing to the Gilruth Center. A few riders swung by the JSC Child Care Center for a close-up with the kids.

my family will always treasure. It represents an unprecedented organization, a dedicated group of superb engineers, scientists and employees and a way of life that is truly an American inspiration. The spirit that resides there is a wonderful experience to be a part of."



NASA/PHOTO JSC2011E047001

National Employee Health and Fitness Day (NEHFD) is a national health observance that takes place in May to promote physical activity and healthy lifestyles at the workplace. In observance, the JSC Wellness Team hosted a full week of events and activities to promote employee health and fitness.



NASA/PHOTO JSC2011E036650

On April 14, 2011, the Mission Control Center (MCC) was named in honor of NASA's first flight director. After the ceremony, Christopher C. Kraft, Jr. sent this note to JSC Associate Director Milt Heflin: "Please give my heartfelt thanks to Mike Coats, you and your colleagues for the beautifully conducted ceremony naming the JSC Mission Control Center as the Christopher C. Kraft, Jr. Mission Control Center on Thursday. I will be forever grateful.

The MCC has always been for me the heart and soul of every U.S. human spaceflight mission. Having it now carry my name is something I and



NASA/PHOTO JSC2011E068678

Former Space Shuttle Program Manager John Shannon partakes of the magnificent shuttle cake baked in honor of the program on July 22, 2011.



NASA/PHOTO JSC2011E068861

JSC hosted a daylong Tweetup on July 19, 2011, during Space Shuttle *Atlantis*' STS-135 mission. Participants got a behind-the-scenes tour at JSC and the chance to complete a training scenario aboard the shuttle simulator. The tour included a look at the MCC and astronaut facilities. Visitors also mingled with flight directors, trainers, astronauts and managers.



NASA/PHOTO JSC2011E080712

The Salute Our Shuttle Event honored the dedication and hard work of our Space Shuttle Program and represented a look ahead to our future. It was an evening of fun, food and the sharing of fond memories with current and former team members and their family and friends.



NASA/PHOTO S64-21000

Exploring the unknown is engrained in American culture. In the early days of America, Lewis and Clark surveyed

the Louisiana and Oregon territories, and Matthew Henson explored the North Pole. In the last half century, astronauts have become the nation's premier explorers of new frontiers. The people and activities at JSC are central to NASA's—and our nation's—revolutionary discoveries. JSC celebrated 50 years of milestones on Sept. 19, 2011, and its evolution from cow pasture to space center.



NASA/PHOTO JSC2011E020284

JSC team members staffed the NASA Experience Exhibit and their respective areas at the Ballunar Liftoff Festival and JSC Open House from Oct. 21 to 23, 2011. Astronauts Greg C. Johnson, Dottie Metcalf-Lindenburger, Kate Rubins and Scott Tingle signed approximately 600 autographs for visitors.

JSC employee Zena Perryman was the lucky winner of the JSC Golden Anniversary Trivia Challenge and rode in the Space Exploration Vehicle alongside Metcalf-Lindenburger as part of the Open House activities. More than 60 contestants signed up when they became new @NASA_Johnson Twitter followers and answered a NASA-related trivia challenge question.

A Legacy

With a wingspan of 78 feet, a shuttle orbiter resembled a majestic plane more so than the first reusable spacecraft of its kind. That is . . . until you took into consideration the 17,500 mph velocity this voluminous workhorse could achieve after 2.9 million pounds of solid rocket booster thrust at liftoff.

After seeing a shuttle launch, one understood. This vehicle was definitely no run-of-the-mill anything.

More importantly, NASA's fleet achieved numerous firsts and opened up space to more people than ever before during the Space Shuttle Program's 30 years. The 60-foot-long payload bay gave the shuttle a cargo capacity unparalleled to any spacecraft; therefore, the shuttle was able to mobilize one of the greatest engineering feats in history—construction of the International Space Station. All this happened in space, no less.

Engineering marvels and scientific discovery notwithstanding, the Space Shuttle Program alone generated more than 100 technology spinoffs. Some of these breakthroughs include the artificial heart, home insulation, video stabilization software, green lubricants and a land mine removal device.

Last year of shuttle missions

■ STS-133

Launch: Feb. 24, 2011

Landing: March 9, 2011

Roster: Commander Steve Lindsey, Pilot Eric Boe and Mission Specialists Alvin Drew, Michael Barratt, Nicole Stott and Steve Bowen

- Last flight of *Discovery*
- First time vehicles from the United States, Russia, Europe and Japan were connected to the station at the same time
- Conducted two spacewalks
- Express Logistics Carrier loaded with spare parts for station, including a radiator to cool the orbiting lab's systems
- Put finishing touches on Permanent Multipurpose Module and attached it to the underside of the station
- Took Robonaut 2, the first humanoid robot, to its new home in space aboard station



NASA astronauts Steve Bowen and Alvin Drew, both STS-133 mission specialists, participate in the mission's spacewalk.

NASA/PHOTO S133-E-007379

■ STS-134

Launch: May 16, 2011

Landing: June 1, 2011

Roster: Commander Mark Kelly, Pilot Greg H. Johnson and Mission Specialists Michael Fincke, Drew Feustel, Greg Chamitoff and Roberto Vittori with the European Space Agency

- Last flight of *Endeavour*
- Conducted four spacewalks
- Delivered and installed the Alpha Magnetic Spectrometer-2, a state-of-the-art particle physics detector
- Tested the automated rendezvous and docking system called STORRM (Sensor Test for Orion Relative Navigation Risk Mitigation)
- Dropped off critical supplies to station, including two communications antennas, a high-pressure gas tank and additional parts for the Dextre robot
- Vittori represented the last international astronaut to fly aboard a shuttle



NASA/PHOTO

In the grasp of the International Space Station's Canadarm2, the Alpha Magnetic Spectrometer-2 is transferred from *Endeavour's* payload bay for installation on the station's starboard truss.

■ STS-135

Launch: July 8, 2011

Landing: July 21, 2011

Roster: Commander Chris Ferguson, Pilot Doug Hurley and Mission Specialists Sandy Magnus and Rex Walheim

- Last flight of a space shuttle, last visit of a shuttle to the space station, last flight of *Atlantis*
- Delivered a stockpile of supplies to station, as the shuttle's vast cargo bay would no longer be accessible to future space travelers
- Conducted one spacewalk (by Expedition 28 Flight Engineers Mike Fossum and Ron Garan)
- Retrieved failed 1,400-pound cooling system pump module and replaced it
- Performed countless media interviews and spoke with President Obama, as well as students on the ground
- Deployed a small technology demonstration satellite called PicoSat, which was the 180th and last payload released from a shuttle
- Completed a unique fly-around upon leaving station to take pictures of the station from angles never before photographed



NASA/PHOTO STS135-S-274

Bon voyage, shuttle. *Atlantis* is slowly towed from the Shuttle Landing Facility to an orbiter processing facility at Kennedy Space Center for the last time.

The past and present give us a future

After the last spine-tingling liftoff, the emotion shared between NASA team members at centers around the country was palpable.

"The space shuttle spreads its wings one final time for the start of a sentimental journey into history," said Ascent Commentator Rob Navias as *Atlantis* roared into space.

The Space Shuttle Program left us with a legacy that will allow for untold discoveries in the future—and for that, we are thankful.

Commercial Crew Program

Commercial space transportation is a vital component to the future of human space exploration.

As NASA charts a new course to send humans deeper into space than ever before, the space agency is stimulating efforts within the private sector to develop and operate safe, reliable and affordable commercial space transportation systems. Once the capabilities are matured and available to the government and other customers, NASA could purchase commercial services to transport crew and cargo to the International Space Station and low-Earth orbit (LEO).



NASA/HOUSTON CHRONICLE; SMILEY N. POOL

Lawrence Williams, SpaceX vice president for Strategic Relations, answers questions about the Falcon 9 rocket being prepped for launch in their facilities at the Cape Canaveral Air Force Station in Florida on July 6, 2011.

NASA's new Commercial Crew Program (CCP) is up and running at Kennedy Space Center (KSC). Under the leadership of Program Manager Ed Mango (KSC), Deputy Program Manager Brent Jett (Johnson Space Center) and a team of NASA and commercial engineers, CCP will pursue the development of a commercial capability to LEO and, ultimately, transport crew back to the space station.

- NASA previously awarded \$50 million in Space Act Agreements during the first phase of commercial crew development and \$270 million during the second phase. Industry partners selected during the two phases were Blue Origin and The Boeing Co. in Seattle; Paragon Space Development Corporation in Tucson, Ariz.; Sierra Nevada Corp. in Sparks, Nev.; Space Exploration Technologies in Hawthorne, Calif.; and United Launch Alliance in Denver.
- The Sierra Nevada Corporation completed their functional Vehicle Avionics Integration Laboratory (VAIL), which will be used to test

Dream Chaser computers and electronics in simulated space mission scenarios. Initially, the VAIL will be used for developmental testing, and then later as a key tool for Dream Chaser certification.

- Blue Origin successfully completed two technical reviews. Their space vehicle Mission Concept Review identified proposed mission objectives as well as the design concepts to meet them. Also, in preparation for their Reusable Booster System engine component testing next year, Blue Origin presented their test plan and test article interface data to NASA experts.
- Space Exploration Technologies (SpaceX) successfully completed a Preliminary Design Review of their Launch Abort System propulsion components. This review demonstrated that SpaceX is ready to proceed with detailed design, fabrication, assembly, integration and testing of the component test articles.
- United Launch Alliance completed a Design Equivalency Review, which presented their Atlas V requirements and certification process development to NASA technical experts for feedback.
- Together with their Bigelow Aerospace teammates, Boeing successfully completed a series of drop tests in the Mojave Desert to measure the performance of prototype landing airbags for their Crew Space Transportation (CST)-100 commercial crew spacecraft. The primary purpose of the drop tests, which were performed as part of Boeing's commercial crew development Space Act Agreement, was to collect engineering data on the impact loads and bag performance to help refine design tools.
- As part of commercial crew development second round activities, NASA and Alliant Techsystems (ATK) have entered into a new agreement for collaboration on the development of ATK's commercial Liberty launch system. The agreement is an unfunded Space Act Agreement, which means no money will exchange hands, but each party will benefit.



PHOTO CREDIT: BOEING

Boeing is working to develop what could become a true commercial space transportation system: a commercial service to take crew to the International Space Station and other destinations. Shown here is an artist concept of Boeing's CST-100 spacecraft approaching the International Space Station.

Exploration Systems

The past few years have been challenging for NASA with budget uncertainty and program changes. But things started looking up when the president and Congress signed the 2010 NASA Authorization Act, which meant exploration finally had a definite course to chart with the Orion capsule and corresponding Space Launch System (SLS).

■ Orion

It's been a busy time for the capsule that will take our explorers to new heights. Construction began in September on the first new spacecraft built to take humans to orbit since Space Shuttle *Endeavour* left the factory in 1991. The first welds were completed using an innovative new friction-stir welding process designed especially for Orion.

Orion completed acoustics analysis on the Orion Ground Test Article, as well as a series of flight-like parachute tests at the U.S. Army's Yuma Proving Grounds in Arizona. Beginning this summer and going into December at the Hydro Impact Basin of Langley Research Center, testing began to certify the Orion spacecraft for water landings. Engineers have conducted six tests from different angles, heights and pitches to simulate varying sea conditions and impacts Orion could face upon landing in the Pacific Ocean.



NASA/SEAN SMITH

The 18,000-pound Orion test article takes its eighth and final splash of the year into the Hydro Impact Basin.

■ Space Launch System

In September, the space agency unveiled the advanced heavy-lift launch vehicle that would rocket Orion out of this world. Incorporating aspects from the Space Shuttle and Constellation

Programs to take advantage of proven hardware and manufacturing technology, SLS will be NASA's first exploration-class vehicle since the Saturn V. With an initial lift capability of 77 tons, SLS will allow us to reach points in the solar system such as near-Earth asteroids, Mars and beyond. Not only that, SLS will serve as a backup for commercial and international partner transportation services to the International Space Station.

NASA conducted a successful 500-second test firing of the J-2X rocket engine on Nov. 9, 2011, marking another important step in development of an upper stage for the SLS.

"The J-2X engine is critical to the development of the Space Launch System," said Dan Dumbacher, NASA's deputy associate administrator for exploration systems development.

Data from the test will be analyzed as operators prepare for additional engine firings. The J-2X and the RS-25D/E engines for the SLS core stage will be tested for flight certification at the Stennis Space Center.

■ Exploration Flight Test on the horizon

NASA plans to add an unmanned flight test of the Orion spacecraft in early 2014 to its contract with Lockheed Martin Space Systems for Orion's design, development, test and evaluation.

This Exploration Flight Test (EFT-1) will fly two orbits to a high-apogee, with a high-energy re-entry through Earth's atmosphere. Orion will make a water landing and be recovered using operations planned for future human exploration missions. The trial mission will be launched from Cape Canaveral, Fla., to acquire critical re-entry flight performance data and demonstrate early integration capabilities that benefit the Orion, SLS and 21st Century Ground Systems programs.

"The entry part of the test will produce data needed to develop a spacecraft capable of surviving speeds greater than 20,000 mph and safely return astronauts from beyond Earth orbit," said Associate Administrator for Human Exploration and Operations William Gerstenmaier.

An early orbital flight test such as EFT-1 will provide data needed to influence design decisions and serve as a pathfinder to validate new approaches to space systems development. Post Apollo, NASA will once again explore beyond the bounds of our blue marble.



NASA/PHOTO

An artist's concept of the SLS on the launch pad. The SLS is designed to carry Orion, as well as important cargo, equipment and science experiments, to Earth's orbit and destinations beyond.



PHOTO/NASA DIMITRI GERONDIDAKIS

All six Pratt Whitney Rocketdyne space shuttle main engines from *Endeavour's* STS-134 and *Atlantis' STS-135* missions sit in test cells inside the Engine Shop at Kennedy Space Center. All 15 shuttle main engines are in the shop at the same time, being prepped for shipment to Stennis Space Center, where they are being repurposed for use on NASA's next-generation heavy-lift rocket, the SLS.

Media Moments

With the conclusion of the Space Shuttle Program, ongoing International Space Station missions and the space agency's drive to explore far-off places like Mars, NASA and Johnson Space Center stayed front and center in the media. Below, we shine the spotlight on some of 2011's memorable moments in front of the lens.

PHOTO: OFFICIAL WHITE HOUSE PHOTO BY PETE SOUZA



President Barack Obama looks at a photo presented to him while meeting with the crew of the Space Shuttle *Endeavour* and the U.S. commander of the International Space Station (Expedition 26) in the Oval Office on Aug. 2, 2011. From left to right: STS-134 Pilot Gregory H. Johnson, Mission Specialist Michael Fincke, Commander Mark Kelly, President Barack Obama, Expedition 26-27 crew member Catherine Coleman, Expedition 26 Commander Scott Kelly and Expedition 26-27 crew member Paolo Nespoli.



NASA/PHOTO PAUL E. ALERS

Stephen Colbert, host of "The Colbert Report," salutes the crew of STS-135 during their appearance for a taping of his TV show on Aug. 16, 2011, in New York. Seated from lower left are Commander Chris Ferguson, Pilot Doug Hurley and Mission Specialists Sandy Magnus and Rex Walheim.

NASA/HOUSTON CHRONICLE; SMILEY N. POOL



Houston Chronicle photojournalist Smiley Pool accompanied the STS-135 crew to document the last mission of the Space Shuttle Program and feature it in the *Houston Chronicle*. In this photo, the astronauts who formed the crews of STS-1, the first space shuttle mission, and STS-135, the final shuttle mission, pose for a group photo at JSC on Nov. 2, 2011. They are, from left: Doug Hurley, STS-135 pilot; Robert Crippen, STS-1 pilot; John Young, STS-1 commander; Chris Ferguson, STS-135 commander; and Sandy Magnus and Rex Walheim, STS-135 mission specialists.



NASA/PHOTO

Apollo 11 Commander Neil Armstrong speaks to Congress at a ceremony that honored fellow astronauts John Glenn, Buzz Aldrin and Michael Collins. Each received a Congressional Gold Medal during the ceremony in the Capitol Rotunda on Nov. 16, 2011. The Gold Medal, Congress' highest expression of national appreciation for distinguished achievements and contributions, was first given to George Washington in 1776.

Glenn was the first American to orbit the Earth, achieving the feat aboard Friendship 7 on Feb. 20, 1962. On July 20, 1969, Armstrong and Aldrin became the first humans to set foot on the moon, while Collins piloted Apollo 11's command module.

Education

A record-breaking year for Johnson Space Center Education programs

Last year was a year of change and breaking records for both national and center-funded programs through the Office of Education.

Johnson Space Center coordinators successfully transitioned to the newly implemented Student On-Line Application for Recruiting interns, fellows and scholars, placing 215 summer interns. In all, 335 students from 80 universities worked on site, contributing to NASA's mission. The average return on investment for interns at JSC was approximately \$2 for every dollar spent, with \$6 million yielded in technical productivity, equal to 82.3 full-time employees.

The Undergraduate Student Research Project increased placements by 47 percent, placing 449 undergraduate interns at 12 NASA facilities from more than 500 universities around the world, including Puerto Rico, Australia, Germany and Canada.

The Career Exploration Program (CEP) placed 73 interns from the Houston area, a 30 percent increase from last year. CEP students engage in both year-long business and technical internships.

The Reduced Gravity Education Flight Program participation grew 54 percent, with 500 students and educators boarding the "Weightless Wonder" to conduct experiments in microgravity.

An increased focus on unique partnerships and new funding sources played a large role in achieving education milestones. In 2012, the Office of Education seeks to grow its partnerships so that it may continue to provide JSC with quality interns throughout the year.

Program development: A revitalized focus on women in Science, Technology, Engineering and Math (STEM)

In March, President Obama signed an Executive Order creating the White House Council on Women and Girls to ensure that federal agencies consider the needs of females when creating policies and programs. The JSC Office of Education and Education Flight Projects piloted the Women in STEM High School Aerospace Scholars (WISH) program. Seventy-one girls took part in the online program, and 40 were invited to come to JSC for a week-long summer workshop. At the

workshop, they were given opportunities to work in teams alongside female NASA engineers and interns to conceptualize how to send a rover to Mars and back.

"WISH ignites a spark in young women to get them interested in all STEM fields and helps them to build confidence in their abilities by working with other young women with similar interests and goals,"



PHOTO: HESTEC/UTPA

Project Coordinator Diego Rodriguez helps two students during HESTEC.

said Susie Raff, NASA's lead for WISH. "The ultimate goal is that these young women will eventually pursue fields in STEM."

Unique partnerships in STEM education

This was a year of expansion as the Office of Education sought to build and maintain strategic partnerships that would further inform, inspire and engage the public in STEM education.

In May, Aerospace Scholars expedited the Jet Propulsion Laboratory (JPL) Office of Education launch of National Community College Aerospace Scholars (NCAS) in California. JSC partners with other states to share a proven model. In its first year, JPL's NCAS engaged 48 students in a project centering on engineering Mars rovers.

The Reduced Gravity Education Flight Program created a new partnership with the U.S. Department of Energy's Princeton Plasma Physics Laboratory to offer opportunities for K-12 educators. One



Participants in the Reduced Gravity Education Flight Program's flight week for students from minority-serving institutions and community colleges experience microgravity.

teacher said, "There is nothing quite like it, and even after working for NASA, this is like the Holy Grail for every kid who dreams of being an astronaut. You get to experience microgravity."

The Teaching From Space (TFS) Office fostered relationships



Undergraduate Student Research Program intern Emily McBryan experiences the excitement at Kennedy Space Center before the launch of STS-133.

with LEGO Group in Denmark, "Sesame Street" producers and the International Space Station crew to provide unique educational opportunities to children.

- LEGO: Educational videos were created of astronauts performing tasks with 10 different LEGO Bricks education kits to demonstrate simple science concepts, perform experiments and determine whether the bricks function differently in microgravity.
- "Sesame Street:" TFS worked closely with producers to create kid-friendly STEM-based content for the 120 million children who view the show each year and coordinated a special trip for Elmo to visit the STS-135 launch at Kennedy Space Center.

The JSC Office of Education, in collaboration with University of



Four high school students work on their Mars rover projects as part of the WISH program for young women interested in STEM careers.

Texas Pan America, celebrated the 10-year anniversary of the Hispanic Engineering, Science and Technology Conference (HESTEC). During HESTEC, JSC team members supported education activities and events attended by 11,000 members of the community. As one said, "My favorite part of the week was when a student said to me, 'You love your job, don't you? Everyone I talk to at NASA loves their job.'" This inherent enthusiasm exuded by JSC volunteers serves as a living testament to why students should continue their STEM education and become part of the NASA team.

The NASA Office of Education is in the midst of designing a new portfolio. The current budgetary environment, Congressional direction, a charge from the NASA Administrator, NASA Education Design Team recommendations and the White House's Office of Science and Technology Policy's Committee on STEM education have all signaled that a change is required in the way NASA Education does business. This year will be a year of transition.



This map of the United States represents the places where individuals or groups interacted with a JSC-managed Education project.

Outreach

Everyone at Johnson Space Center understands how important it is to inspire and educate our communities about the space program. Team members throughout JSC reached out in 2011 by traveling to air shows, museums, science centers, schools and sporting events throughout the United States and even to locations around the world. We also reached out to the local community at events such as Wings Over Houston and Rodeo Houston.

■ Destination Station

The Destination Station exhibit went from a far-out concept to an out-of-this-world experience in 2011. The exhibit, part of an ongoing outreach campaign that continues to touch major cities, visited Denver and Columbus, Ohio—and even our own space city at Space Center Houston. The Denver and Columbus stops received more than 160,000 visitors combined.

Destination Station is a multimedia exhibit that immerses visitors in the story of the International Space Station and how the 24-hour-a-day, 365-days-a-year research platform brings those results down to Earth. The exhibit includes hands-on activities, imagery and audio and visual technology.

Each Destination Station visit reacquaints that community with the station and serves as a way to get new experiments aboard the orbiting laboratory. The exhibit got rave reviews from those who stopped in and sparked tons of interest about the space station. In 2012, the exhibit is scheduled to be in California, North Carolina and Boston.



NASA/BLAIR JSC2011E082082

An interior view of the Destination Station exhibit.

■ Hometown Heroes

Sports fans around the country were given the chance to learn about the International Space Station and see astronauts flip the coin or throw out the first pitch at professional basketball, football or baseball games through NASA's Hometown Heroes campaign.

In 2011, astronauts visited their hometowns and participated in pre-game activities with the Philadelphia Phillies, Denver Broncos, Philadelphia Eagles, Denver Nuggets and Tennessee Titans. Also, the astronauts met people in the community and visited local museums and hospitals.



PHOTO CREDIT: MILES KENNEDY, 2011 THE PHILLIES

STS-135 Commander Chris Ferguson poses with Phillie Phanatic, the Phillies' mascot, at the game



PHOTO CREDIT: THE DENVER BRONCOS

Astronaut Steven Swanson participates in festivities at the Denver Broncos game.

NASA/BLAIR JSC2011E082084



Destination Station visited Space Center Houston in between outreach visits.



The DTE exhibit informs attendees about NASA's human space exploration efforts.

■ Driven to Explore

NASA's Driven to Explore (DTE) exhibit traveled to many states in 2011. This mobile, multimedia experience highlights the benefits of space station and human exploration. A big draw for DTE is the 3-billion-year-old lunar rock sample that the public can touch and feel.

Some of the DTE stops included the Vidalia Onion Festival and Air Show in Georgia; the Discovery Center at Murfree Spring in Tennessee; the EdVenture Children's Museum in South Carolina; the Rodeo of the Ozarks in Arkansas; the Goodguys Midwestern Nationals Rod and Custom Car Show in Kansas; and the NAS Oceana Air Show in Virginia. More than 46,000 people visited the exhibit.



Cosmo entertains crowds at NASA Night at the Houston Astros versus the San Francisco Giants.

■ NASA Nights

Houstonians were given a slew of opportunities to attend a NASA Night in 2011. These special events, sponsored by Houston sports teams such as the Texans, Dynamo and Astros, gave the community a chance to celebrate NASA and our more than 50 years of space exploration.

■ Space Day at the Capitol

In late March, astronaut Doug Wheelock and JSC team members descended on Austin for Space Day at the Capitol to inform legislators and the general public about the importance of our foothold in space. While Wheelock spoke with legislators about the benefits of space, volunteers educated students of all ages about our ongoing missions in the cosmos.



Astronaut Doug Wheelock spoke with key Texas legislators during Space Day at the Capitol.

■ Speakers Bureau

NASA explores answers that power our future. JSC team members offer their time and talent through the Speakers Bureau Program to share how NASA affects you, your children and future generations. In 2011, speakers reached far corners of the world and traveled to India, England, Trinidad and, of course, Texas.

With topics ranging from aeronautics to the benefits of space exploration, volunteers shared their personal perspectives to students, teachers, business leaders and the public during almost 200 presentations.



Frequent Speakers Bureau volunteer Heather Paul teaches kids about spacesuit technology.

Missions

NASA/PHOTO ISS026-E-022368



JAN. 29, 2011:
An unpiloted Progress resupply vehicle approaches station, bringing 1,918 pounds of propellant, 110 pounds of oxygen, 926 pounds of water and 3,080 pounds of spare parts and supplies for the Expedition 26 crew members.

NASA/PHOTO STS133E07911



MARCH 1, 2011:
STS-133 Mission Specialist Alvin Drew floats in the newly installed Permanent Multipurpose Module of the space station.

NASA/PHOTO STS133-S-134



MARCH 9, 2011:
Space Shuttle *Discovery* rolls down Runway 15 at Kennedy Space Center (KSC).

NASA/PHOTO 201104260006HQ



APRIL 26, 2011:
STS-134 Commander Mark Kelly and his crew speak to the media following their arrival to KSC.

MAY 20, 2011:
STS-134 Mission Specialists Andrew Feustel and Greg Chamitoff participate in the mission's first spacewalk.

JAN 2011 FEB 2011 MAR 2011 APR 2011 MAY 2011 JUNE 2011

FEB. 26, 2011:
Discovery is featured in this image by an Expedition 26 crew member as the shuttle approaches the International Space Station during rendezvous and docking operations.



NASA/PHOTO ISS026E037208

MARCH 2, 2011:
STS-133 Mission Specialist Steve Bowen participates in the mission's second spacewalk.



NASA/PHOTO STS133E008218

APRIL 22, 2011:
Expedition 27 Flight Engineer Catherine Coleman works with the Internal Thermal Control System Moderate Temperature Loop in the Tranquility node.



NASA/PHOTO ISS027E019689

MAY 23, 2011:
This image of *Endeavour* docked to the space station was the first photo taken of a shuttle docked to station from the perspective of a Russian Soyuz spacecraft.



NASA/PHOTO ISS027E036706

The Crews

NASA/PHOTO STS133-S-002



STS-133

NASA/PHOTO STS134-S-002



STS-134

NASA/PHOTO STS135-S-002



STS-135

NASA/PHOTO ISS026-S-002



EXPEDITION 26

NASA/PHOTO 201107070027HQ



JULY 7, 2011:

Atlantis is seen shortly after the rotating service structure was rolled back at Launch Pad 39A.

NASA/PHOTO S138E008061



JULY 15, 2011:

The crews of STS-135 and Expedition 28 pose with an American flag that was flown on STS-1.

NASA/PHOTO ISS029E02806



OCT. 13, 2011:

Robonaut 2 (R2) is pictured in the Destiny laboratory as Mike Fossum, Expedition 29 commander, and Satoshi Furukawa, flight engineer (both out of frame), joined forces to conduct the second onboard tests of R2.

NASA/PHOTO ISS030E007429



DEC. 1, 2011:

Expedition 30 Commander Dan Burbank works at the Light Microscopy Module in the Fluids Integrated Rack/Fluids Combustion Facility located in the Destiny laboratory.

JULY 2011

AUG 2011

SEPT 2011

OCT 2011

NOV 2011

DEC 2011

JULY 12, 2011:

This photo, taken during a July 12 spacewalk, shows the station's Cupola and various components of the outpost, including the Leonardo Permanent Multipurpose Module, right, along with two "parked" Russian spacecraft—a Soyuz and a Progress supply ship.

NASA/PHOTO ISS028E016202



JULY 21, 2011:

Wheels stop for STS-135 ... and the end of an era.

NOV. 22, 2011:

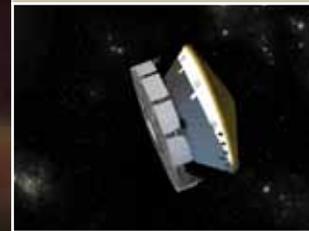
Russian support personnel work to help get Expedition 29 crew members out of the Soyuz TMA-02M spacecraft shortly after the capsule landed.



NASA/PHOTO 201111220006HQ

DEC. 13, 2011:

NASA's car-sized Curiosity rover begins monitoring space radiation during its eight-month trip from Earth to Mars.



NASA/PHOTO



EXPEDITION 27

NASA/PHOTO ISS028-S-002



EXPEDITION 28

NASA/PHOTO ISS029-S-002



EXPEDITION 29

NASA/PHOTO ISS030-S-002



EXPEDITION 30

Information Resources Directorate: Enabling your missions through innovation, resourcefulness and dedication

In 2011, the Information Resources Directorate (IRD) developed a new motto to reflect the growth of their organization:

“Our motto, ‘Innovative, Resourceful, Dedicated to Service: Our Mission is to Enable Your Mission,’ was developed by three of our team members: Scott Browns, Reese Squires and Michelle Croce,” said IRD director and Johnson Space Center Chief Information Officer Larry Sweet. “After all, it’s people that transform technology into innovation. Our team will continue to strive to be innovators, technical experts and solutions providers for the center and agency in 2012 and beyond as we prepare to take the next steps in human space exploration.”



(Front row, left to right) IRD team members Reese Squires, Scott Browns and Michelle Croce had their cars hand-washed by the IRD leadership team for coming up with the directorate’s new motto, “IRD: Innovative, Resourceful, Dedicated to Service: Our Mission is to Enable Your Mission.”

Other notable ‘bytes’ of IRD activities in 2011 and why IT (Information Technology) matters:

From the ground ...

- RSA Token Obsolescence and Replacement: Making it safer for you to perform your work when you’re away from your physical desk.
- Consolidated Logging System: Improving the storage and usability of security log information, which helps improve the quality and responsiveness of our IT security efforts.
- Isolated Local Area Network Redesign, Firewall and Intrusion Detection System Replacement Projects: Enhancing network performance and security at JSC and reducing the cost of operations.
- Virtual Education and Help Sessions: IRD held several IRDLive sessions that enabled employees to talk to technical subject matter experts real-time and virtually via Webinars.
- Making IT Stellar at NASA: Supported the agency’s IT Summit held in California. Through technical presentations and social media outreach and management, the summit helped develop and strengthen partnerships with organizations in the IT industry, such as Amazon and Google.

... to the Cloud

- Developed the Cloud Computing Working Group, which brought



Connecting the next generation of explorers. IRD summer intern Phillip Perabo uses the capabilities of the Collaboration Center in Building 3 to connect to an IRDLive Webinar session away from his desk.

several vendors to inform the center about cloud services and to help inform the agency about

JSC’s needs and risks of going to the cloud.

... to outer space

- On track to downlink the 1,000,000th image shot in space this coming spring. The multimedia team, who provides support to the International Space Station 365 days per year, creates and maintains the NASA mission imagery collections.

Transition

As the agency transitions to new programs, IT is also being redefined with NASA’s IT Infrastructure Integration Program (I3P). I3P is transforming NASA’s IT Infrastructure services from a center-based model to an enterprise-based management and provisioning model. JSC I3P transition activities in 2011 included:

- Common services that employees use, such as email/ calendaring, domain services and virtual team seats (a.k.a. WebEx) services, have transitioned into the Agency Consolidated End-user Services (ACES) contract, managed by Hewlett Packard.
- Communications services such as long distance and wide-area network services are now being provided by the NASA Integrated Communications Services contract, serviced by SAIC. I3P’s Enterprise Service Desk is currently supporting help requests for the common services that have transitioned into ACES.
- I3P’s Enterprise Applications Service Technologies Contract, managed by SAIC, has fully transitioned and is now operational.

For more, go to: <http://ird.jsc.nasa.gov>



JSC employees speak with vendors, such as Apple, to learn about computer equipment options available through I3P.

Statistics

NASA Johnson Space Center Economic Impact in Texas | Fiscal Year 2011 (FY11)

While Johnson Space Center has earned a global reputation for its manned spaceflight endeavors, less evident are the economic benefits the institution brings locally and to the state of Texas. JSC plays a vital role in regional and state economics. Here are some of the highlights.

PROGRAM	OBLIGATIONS (\$B)	OBLIGATIONS %
Space Shuttle	1.16	19%
International Space Station	2.42	40%
Exploration	1.65	28%
Cross-Agency Supt. (Inc. Institution)	0.49	8%
Other	0.28	5%
Total	6.00	100%

Local and State Level Economic Benefits

- JSC had nearly \$5.2 billion in FY11 Procurement obligations.
- 103 large businesses performed portions of the contracts, totaling about \$2.8 billion in Texas.
- JSC obligated nearly \$197,000 on grants, contracts and agreements with Texas universities and Texas education institutions in FY11.
- JSC did almost \$70.7 million in business with women-owned businesses in Texas in FY11.
- Nearly \$13.1 million was spent on contracts performed in Texas by veteran-owned businesses.
- Nearly \$17.6 million of JSC funding in FY11 was obligated on grants, contracts and agreements with non-profit organizations in Texas.

NASA Johnson Space Center Economic Impact in Texas -- Fiscal Year 2011 (FY11)

COMMUNITIES	CIVIL SERVANT HEADCOUNT	SALARY (\$M)
CLEAR LAKE AREA TOTAL	2,452	292.9
Bacliff/Kemah/San Leon	43	4.7
Clear Lake	925	113.4
Dickinson	62	6.9
Friendswood	362	45.7
LaPorte/Shoreacres	19	2.0
League City	705	80.9
Seabrook/El Lago/Taylor Lake	261	31.6
Webster	75	7.7
HOUSTON REGION TOTAL (Outside Clear Lake Area)	799	85.4
Houston (except Clear Lake)	350	36.5
Alvin	42	4.6
Deer Park	17	1.5
Pasadena	33	3.0
Pearland	174	20.1
Brazoria County	31	3.4
Fort Bend County	43	4.8
Other Harris County Areas	44	4.4
Other Houston Region Areas	65	7.1
Houston Region Total (including Clear Lake Area)	3,251	378.3
Other Areas of Texas Total	55	4.0
Outside of Texas Total*	207	14.3
GRAND TOTAL	3,513	396.6

Note: The headcount includes any individual that received salary payments via the Federal Personnel and Payroll System during FY11. These salary payments include base pay plus the locality differential, overtime and awards. Income numbers are rounded.

** The "outside of Texas" value includes White Sands Test Facility.*

Roundup

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Innovation and Partnerships

Change touched all areas and organizations in 2011. Johnson Space Center and NASA were able to meet existing and new challenges by building on innovative ideas and making the most of collaborative efforts.

■ Innovation 2011

Innovation 2011, sponsored by the JSC Inclusion and Innovation Council, was an exciting one-day event on May 4, 2011. Similar to prior years, exhibits located in the JSC mall area showcased some of the leading technology advancements and great work produced by organizations throughout the center. Rap forum tracks were held within various conference rooms and auditoriums, enabling the exchange of ideas between people who ordinarily do not work together.



NASA/SOWA JSC2011E205091

Organizations showed off visible examples of innovation and technology breakthroughs during Innovation 2011.

■ Center of Excellence for Collaborative Innovation

NASA has already taken a proactive role in investigating new business models, tools and strategies that support innovation within the agency's mission. Now, NASA is poised to not only share its wealth of knowledge with other government agencies, but learn from them as well through the virtual Center of Excellence for Collaborative Innovation (COECI).

"The new COECI will involve all disciplines across the federal government, contributing to the mission of stimulating innovation to improve processes and practices," said JSC Director of Space Life Sciences Dr. Jeffrey Davis. "Whether it's a best practice or prize competition, we hope to learn from other federal agencies."

Along with collaboration facilitated through the COECI portal, NASA aims to host its first workshop with fellow agencies in the spring.

■ Innovation Design Center

The Innovation Design Center (IDC) in Building 348 opened for spaceflight business on Nov. 2, 2011, with JSC Director Mike Coats and Yolanda Marshall, director of the Strategic Opportunities and Partnership Development Office, wielding some very hefty scissors to cut the ribbon during the reveal.

"This is a big day for us," Coats said. "The business dynamics, as they're related to human spaceflight, NASA, and certainly JSC and around the world, are changing. Success in this realm necessitates complete and unrelenting dedication to the advancement of new technologies. In response to this challenge, JSC continues to develop a series of initiatives designed to place this center in the position of success that maximizes the knowledge base and innovation of this workforce, as well as those of the local communities and the state of Texas. We are standing here today to celebrate the results of one of those initiatives: The opening of the IDC."

The IDC is where inventors can go and "play" with ideas. Whether constructing prototypes or using the specialized meeting space, the facility incubates innovation in its earliest stages.



NASA/STAFFORD JSC2011E205091

JSC Director Mike Coats and Yolanda Marshall, director of the Strategic Opportunities and Partnership Development Office, unveil the new IDC.