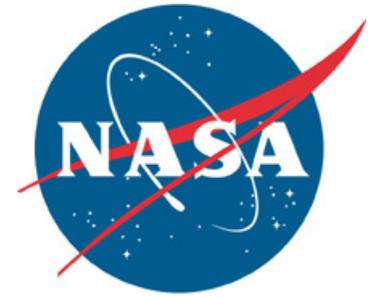


Spaceport News

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Atlantis' crew celebrates charitable strides with cargo

By Steven Siceloff
Spaceport News

With Atlantis and its crew of six astronauts expected to return to Earth this week, a host of commemorative items will begin making their way from storage lockers in the spacecraft to new homes with organizations across the country.

Many of the objects were already precious in their meaning, but the STS-132 crew members added to the inspirational value by assigning them slots aboard Atlantis for a trip to the International Space Station and back.

A lapel pin from the Susan G. Komen Foundation's "Race for a Cure," for example, was tucked inside an Atlantis locker. A green and black rubber wristband from Eli's Army Cancer Survivors also made the trip, along with a wristband from Team G Force Cancer Survivors.

There also were mementos from several other organizations inside Atlantis. A teddy bear from



NASA

One of the pair of large boxes holding flags, patches and other items is anchored to the support struts for the airlock in Atlantis' cargo bay.

the Cleft Palate Foundation of Chapel Hill, N.C., a lapel pin from the Alzheimer's Association of Chicago, and flags from the Juvenile Diabetes Foundation International and Make-A-Wish Foundation were flown into orbit.

Lapel pins and similar-

sized commemoratives often are carried because they are small and lightweight, but their symbolism can be immense. The crew tucked a pin from the "Imagine There's No Hunger" campaign, for example, into the flight kit.

There also is room for

bulkier items, including banners, shirts and jerseys. For instance, Atlantis astronauts took a red T-shirt from the charity organization Save the Children.

The astronauts also carried several other light-hearted personal items, such as a 4-by-6-inch photo of Peter Pizza in Brooklyn, a piece for a Lego space shuttle and a DVD from the 2009 induction ceremony for the Rock and Roll Hall of Fame. A red squeeze ball from the business network CNBC also was along for the ride.

Such commemorative items typically reflect a personal interest or achievement by a crew member and NASA makes room for them. The expectation is that, back on Earth, many of the objects will inspire future explorers and achievements.

Shuttles carry a host of things, such as patches, flags and other objects intended as special rewards to groups or individuals or goodwill items.

Two large boxes outfit-

ted for space duty were bolted between the braces on Atlantis' airlock in the payload bay.

The triangular containers were packed with 3 1/2-inch American flags, some 755 small international flags and 1,200 Space Shuttle Program flags. There also were six packages of the red, white and blue flags designed for the individual orbiters.

Shuttles have carried such mementos for more than 30 years. Space shuttle Enterprise, for example, was loaded with patches and flags when it was released from a 747 on several test flights in 1977. Columbia carried a similar assortment on STS-1 and each mission thereafter has included a host of similar items.

Astronaut Gus Grissom is credited with carrying the first mementos into space when he took rolls of dimes on his Mercury flight in 1961.

Almost 50 years later, the goal and effect remain the same: to celebrate and inspire exploration.

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Kennedy engineers share key knowledge, experience with commercial launch developers

By Linda Herridge
Spaceport News

NASA's Commercial Orbital Transportation Services, or COTS Program, supported by Kennedy, and engineers from the center's Engineering Directorate, recently shared key knowledge and past experiences with commercial launch developers SpaceX and Orbital Sciences as they work toward successful test flights.

Chris Rawlins, a NASA materials and processes engineer, said lessons learned about cork debonding from a Delta II launch in July 2003 helped SpaceX understand and correct their cork debonding issue. The commercial launch provider's Falcon 9 had a similar problem when some cork broke away from the first stage, during a wet dress rehearsal at Cape Canaveral Air Force Station's Launch Complex-40 on April 16.

SpaceX Vice President of Astronaut Safety and Mission Assurance

Ken Bowersox said NASA worked with them and their resin supplier to help resolve the issue.

"During our second dress rehearsal, the cork performed very well. It remained bonded and the electromagnetic interference test also completed successfully," Bowersox, a former NASA astronaut, said. "Sharing past experiences with NASA has been beneficial for both sides and continues to be an important aspect of our ongoing partnership."

SpaceX is preparing to test launch a Falcon 9 rocket and Dragon spacecraft May 28 from Launch Complex-40.

According to Kennedy COTS Program Manager Steve Cain, this is just one example of how the center shares knowledge and expertise with developing commercial launch providers when needed.

"We enable them by sharing NASA's knowledge and expertise," Cain said. "We don't try to tell them

how to do it. We share options and then they make the decisions."

"This is very much a sharing experience," Rawlins said. "Everyone learns a little bit more when we try different things."

For Orbital Sciences, Rawlins said it already has two certified and qualified vehicles, the Pegasus XL and Taurus XL, which are used for NASA Launch Services Program missions. So the engineering expertise and knowledge crosses over to the company's development of the Taurus II for commercial launches.

"We have worked closely with Orbital on the composite materials of the payload fairing," Rawlins said.

To help determine environmental control air impingement velocities across a sensitive payload component, mechanical engineers worked closely with Orbital Sciences to test air flow velocities and implement a redesign of the exit nozzle if necessary.



Photo courtesy of SpaceX

SpaceX conducted the first static test firing of all nine Merlin first stage engines on the Falcon 9 launch vehicle March 13 from Launch Complex-40 at Cape Canaveral Air Force Station in Florida. The engines fired for 3.5 seconds.

Kennedy's Prototype Development Branch created a mock-up of the mission spacecraft and shipped it to Orbital's Chandler facility in Arizona for incorporation into the test setup.

"This test mock-up allowed more accurate testing and built confidence in the results," said John Pavone, who is a mechanical ground support engineer with Analex Corp.

Recent damage to Kennedy's Launch Pad 39A from space shuttle launches has given engineers the knowledge and experience to fix it. They've shared that information with Orbital as it develops blast protection for its launch pad at NASA's Wallops Flight Facility in Virginia.

Taurus-II Ground Systems Manager Michael Brainard said Kennedy's Thermal Analysis/Blast

Protection Group developed and determined the plume-induced environments on the Transporter Erector Launcher, or TEL, for the launch of a Taurus-II vehicle.

"This group was instrumental in evaluating the thermal responses of TEL structure," Brainard said. "The Materials Branch also recommended an ablative material for protecting the TEL structure during launch. All analysis, meetings and support documentation obtained from these groups have been a great help for Orbital to move in the right direction."

Cain said as needs arise, commercial launch developers use the expertise from other Kennedy directorates, such as Spacecraft and Payload Processing, Launch Vehicle Processing, Center Operations, and Safety and Mission Assurance.



Photo courtesy of SpaceX

During processing inside the SpaceX Horizontal Integration Hangar at Launch Complex-40 at Cape Canaveral Air Force Station in Florida, the Falcon 9 first stage, second stage and Dragon qualification spacecraft are mated.

It takes a tight-knit crew to raise a sustainable building

By *Rebecca Sprague*
Spaceport News

To build NASA's greenest project, the Propellants North Administrative and Maintenance Facility's tight-knit construction crew is turning to Kennedy Space Center's rich history.

"Everything in that facility is put together to make the employees comfortable and make them more efficient," said Frank Kline, a NASA Construction of Facilities project manager.

It's not just the finished product that will glisten a shade of green when it opens for business in December. Since August 2009, the team has been working to keep the construction site just as eco-friendly.

"We've recycled 475 tons of concrete, 163 pounds of crushed bottles and aluminum cans, 2.16 tons of cardboard, 164 pounds of white paper, 2.3 tons of wood and 3.5 tons of steel," said Project Manager Jim Peacock of HW Davis Construction. "These numbers will just increase until the project is completed."

Michelle Ramsey, an environmental engineer with Innovative Heath Applications, said she even

has taken part in a little dumpster diving to retrieve recyclable materials. While it may not be glamorous, she says it's important.

She said another aspect of her job is to make sure materials are reused on center.

"Even the silt fencing," Ramsey said. "We have our girls come over and they remove the silt fence and use it for protection of burrows and stakes for burrows for the gopher tortoises."

The team is reaching for the U.S. Green Building Council's Leadership in Environmental and Energy Design, or LEED, Platinum status, which isn't easy to achieve. LEED uses a point system, and then awards those points based on the project's design and implementation.

"We are rock-solid getting that Platinum. I think we're way over 52 points, which is the minimum," Maurice Amozig, project manager for Jones Edmunds and Associates, said. "It looks good. It looks very good to be solid Platinum."

Everyone is on the lookout for ways to improve the score. Larry Hersey of URS, the project's inspector, for example, suggested that the electrical contrac-



NASA/Jim Grossmann

The Propellants North Administrative and Maintenance Facility takes shape at Kennedy. The facility is striving to qualify for the U.S. Green Building Council's Leadership in Energy and Environmental Design, or LEED, Platinum certification.

tor use energy-efficient bulbs as temporary lighting, instead of incandescent, a suggestion that was quickly implemented.

For each member of the team, this is the first time they are going for the platinum rating.

"No doubt about it, it's our No. 1 goal," said HW Davis' Doni Denning, the safety coordinator.

Project Superintendent Aaron Peacher agrees. He said the crew is following LEED's strict guidelines of obtaining all materials from within a 500-mile radius. He also said of all the construction waste material generated, about 95 percent has been diverted from the Kennedy landfill. These diverted materials are either processed directly on Kennedy for reuse or sent off to local recyclers for processing.

The green vision began well before the design process. Steve Szabo with Jones Edmunds and Associates designed the facility and said meeting those guidelines and expectations was a challenge, but a fun and exciting one. Probably

the most exciting, Szabo said, was incorporating the old glazing and framing from the iconic firing rooms of Kennedy's Launch Control Center.

"It's set at the same orientation and angle as it was in the Launch Control Center, looking out toward Launch Pads A and B," Szabo said.

Crushed crawlerway rocks also will be incorporated in the facility's landscaping.

"It's really a dedication to the astronauts and the launch team," Kline said. "Every shuttle passed through the crawlerway. Every launch has been viewed through those windows. And we just thought it was a shame to waste them."

New energy-efficient windows will be put into the frames to help the building maintain an energy credit of net zero. Rainwater also will be stored in underground tanks and used for irrigation and bathroom facilities.

"The building is designed to be 52 percent more efficient than a traditional commercial building.

And to do that we looked at very specific lighting fixtures, design strategies, photovoltaic panels," Szabo said. "We left no stone unturned in that process."

NASA's Mick Barth, who recently graduated from South Dakota School of Mines and Technology, says this is his first project and he has no doubt that every project after it will be green.

"Many people in the construction industry have been building the same way for many years and this being my first project right out of college, this is the only way I've known," Barth said. "So, for many years to come, this is what I'll be doing."

Kline agrees that this project is only the beginning for Kennedy and NASA.

"I hope this is just the start," Kline said. "From now on, we'll model this to the bigger buildings. NASA Construction of Facilities has always strived to get everybody the best air, the best light . . . all the best of everything."



NASA/Jim Grossmann

Workers prepare to install window glazing and framing recycled from the iconic firing rooms of the Launch Control Center at the Propellants North Administrative and Maintenance Facility. New energy-efficient windows will be set at the same orientation and angle as the old windows were at the control center, looking out toward Launch Complex 39.

Scenes Around Kennedy Space Center



NASA/Dimitri Gerondidakis

The steel framework that will hold about 60 tons of special dirt, called BP-1, for NASA's first Lunabotics Mining Competition begins to take shape at the Astronaut Hall of Fame. Twenty-two university teams from around the country built remote controlled or autonomous excavators, called lunabots, for the competition on May 27-28.



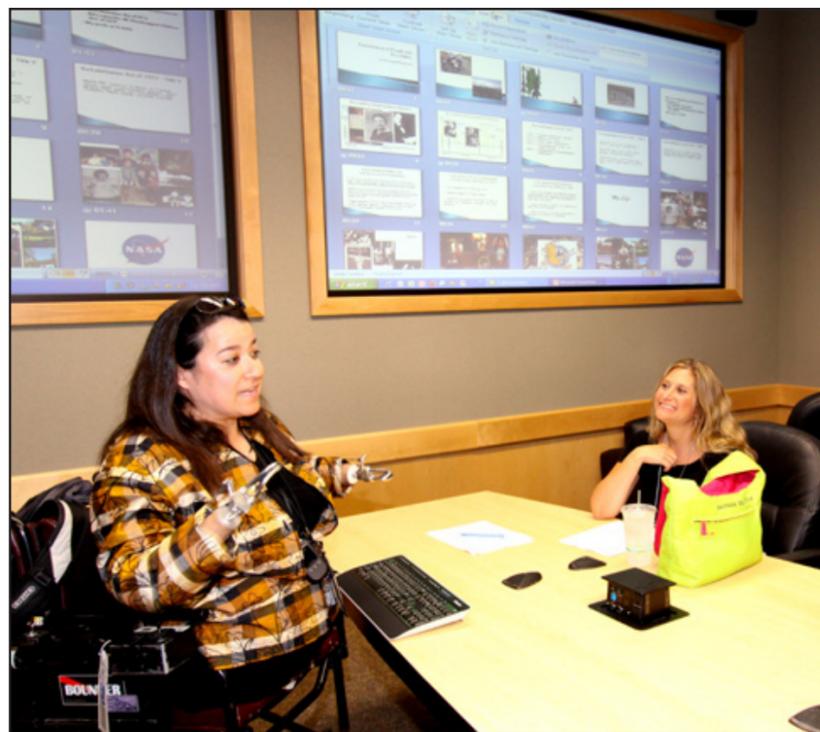
NASA

More than 300 people participated in the 2010 Annual Walk/Run at the Shuttle Landing Facility on April 27. Sponsored by Kennedy's fitness centers, the goal of the event was to motivate center employees to get moving. Participants chose to walk or run 2 miles down the runway, rollerblade, or run a 5 or 10K.



NASA/Jack Pfaller

Kennedy employees are educated on physical fitness, disease management and prevention, personal hygiene, stress management and nutrition at the Health and Fitness Day 2010 event in the Operations and Checkout Building's Mission Briefing Room on May 19. Vendors from Brevard and Orange counties showcased their services and raffled off prizes.



NASA/Jack Pfaller

Dana Bolles, an environmental compliance engineer at NASA's Ames Research Center, talks with employees about living with a disability during a Diversity and Inclusion Committee of Employees, or DICE, Launch and Learn event May 13. Bolles, who was born without limbs, previously worked in Kennedy's Safety and Mission Assurance Directorate.



NASA

Kennedy hosts an educational event May 12 at the Space Life Sciences Laboratory to celebrate National Lab Day. Dozens of Brevard County, Fla., students, ages 16 to 18, from Temple Christian School and Cocoa High attended presentations covering a general overview of NASA's STEM activities and educational opportunities. Students broke into four 30-minute laboratory sessions with hands-on demonstrations that taught material science and engineering, genetics, microbiology and physics. Through National Lab Day, NASA aims to inspire and engage students in STEM education while building a future work force skilled in these disciplines.



NASA/Jack Pfaller

The Solid Rocket Booster Retrieval Ship Liberty Star tows a booster to the dock at Hangar AF at Cape Canaveral Air Force Station in Florida. The booster was used during space shuttle Atlantis' launch from Kennedy on May 14 on the STS-132 mission. The segments will be refurbished and stored in Utah for future use if needed.

Education satellites hitch ride on Glory mission

By Linda Herridge
Spaceport News

Good things sometimes come in small packages. For Launch Services Program, or LSP, mission manager Garrett Skrobot, one of those packages is a Poly Picosatellite Orbital Deployer, or P-POD, container that can carry mini-research satellites, or CubeSats, on NASA missions.

"This P-POD will carry the first education package on a NASA expendable launch vehicle," Skrobot said. "Providing students with the opportunity to launch their satellites has always been a vision of mine, and it was finally achieved this year with NASA flight planning board approval."

The P-POD and CubeSat Project were developed by California Polytechnic State University in San Luis Obispo, Calif., and Stanford University's Space Systems Development Lab for NASA's Educational Launch of Nanosatellite, or ELaNa, missions.

Roland Coelho, a Cal Poly aerospace engineering graduate student, has had the opportunity to work with LSP for several years.

"Working with the LSP engineers has been invaluable for Cal Poly students, gaining real hands-on experience in mission integration for the ELaNa mission," Coelho said.

P-PODs are aluminum containers measuring about 5 inches square by about 16 inches long. One P-POD will carry three CubeSats as an auxiliary payload aboard a Taurus XL on NASA's Glory mission, which is scheduled to launch in November from Vandenberg Air Force Base in California.

Skrobot said that after the Glory spacecraft has been released, the P-POD



For NASA

Keith Mashburn, a physics student at Montana State University, tests the Explorer-1 Prime satellite for its upcoming flight into space aboard the Glory spacecraft. The mini-satellite, set to study the intensity and variability of electrons in low Earth orbit, will be packed in a P-POD that will release it once in orbit.

will release the CubeSats to start their missions.

"The CubeSats were selected based on NASA's education goals and visions," Skrobot said.

The first three research cubes were developed by college undergraduate and graduate students at Montana State University, the University of Colorado in Boulder, and several Kentucky universities that combined their efforts to become Kentucky Space Consortium.

Measuring about 4 inches cubed, with a volume of about 1 quart, and weighing in at about 2.2 pounds, the CubeSats are indeed very tiny. Skrobot said the CubeSat must conform to standard aerospace materials and operate without the

use of propulsion.

"When you give students an opportunity to design an experiment in a confined space, they come up with great creativity," Skrobot said.

Montana State University's Explorer-1 Prime, or EIP, will study variations in the Van Allen radiation belts and will fly to commemorate the 50th anniversary of Explorer-1, America's first satellite that discovered the cloud of highly energetic electrons trapped in the Earth's magnetic field in 1958.

David Klumpar, a research professor of physics, said the cube will contain a miniature Geiger tube donated by Dr. Van Allen and it will be used to measure the intensity and variability

of the electrons in low Earth orbit.

"It's very challenging to pack all of the required functionality of a full satellite into a volume about the size of a third of a loaf of bread," Klumpar said. "We hope that we accomplish the scientific and engineering goals of our mission. Getting to the launch pad achieves 99 percent of the educational objective, but having a working satellite on orbit is the real gold medal."

The University of Colorado's CubeSat is the Hermes-1. About 70 students contributed to the design, fabrication and testing of the system. Hermes' primary mission goal is to design a reproducible satellite bus that can be used for future missions. The science mis-

sion goal of Hermes is to test the viability of a high-speed communications system in the hopes of replicating the system on future CubeSats.

Kentucky Space Consortium designed the KySat-1 orbital satellite. Its primary mission is educational outreach to both university students who are designing the satellite, and K-12 students and teachers, ultimately providing opportunities for hands-on learning in the science, technology, engineering and math, or STEM, disciplines.

The KySat-1 outreach payload includes a low-resolution camera and a relatively high-powered UHF/VHF radio to allow satellite communication from small portable ground stations that can easily be set up on a playground or parking lot of a school. KySat also will carry a communications payload, a commercial 2.4 GHz high-speed transceiver, which will be tested for feasibility of use in a space environment.

"It's exciting to be able to do a project like this," Skrobot said.

The project, though, has not been wrought without challenges, including developing the process and a certification flight readiness process.

"Our primary concern is that they do not harm the launch vehicle or primary spacecraft," Skrobot said. "They must comply with all NASA LSP requirements and also follow orbital debris policies."

Skrobot said NASA created a pilot CubeSat Launch Initiative to determine which educational missions will fly, both at Vandenberg and Cape Canaveral Air Force Station. Currently, studies are under way for future P-POD missions in 2011 and 2012.

Remembering Our Heritage

Gala honors 50 years of Delta dependability

By Kay Grinter
Reference Librarian

Several years ago, a group of retired engineers and managers from McDonnell Douglas and NASA began having annual socials to reminisce about the glory days of launching Delta rockets from Launch Complex-17 at Cape Canaveral Air Force Station and Space Launch Complex-2 at Vandenberg Air Force Base in California.

As the 50th anniversary of the first launch approached, the group decided that the Delta Program deserved a more formal celebration of the contributions the expendable launch vehicle has made to the U.S. space program.

Lyle Holloway, the McDonnell Douglas director of Delta Launch Sites for both coasts when he retired in 1997, was chosen to lead the celebration.

"It was a labor of love for me," Holloway said, "nurturing this celebration."

After months of planning, former and current employees who contributed to the Delta Program's success gathered in Cocoa Beach, Fla., on May 15 and 16 to celebrate the heritage of this dependable rocket.

The festivities began with a Santa Maria-style barbeque at Kiwanis Island on May 15, attended by more than 400 people. Participants were given a tour of Cape Canaveral's Delta facilities May 16.

Later that night, 325 people turned out for a banquet in the convention center at the Radisson Resort at the Port to hear former NASA Administrator Michael Griffin and United Launch Alliance Chief Operating Officer Daniel



NASA/Amanda Diller

Mike Griffin, NASA's former administrator, helps the space agency, the U.S. Air Force, United Launch Alliance, Boeing, Pratt & Whitney Rocketdyne, Aerojet and the NASA Alumni League celebrate the Delta expendable launch vehicle program's 50th anniversary at the Radisson Resort in Cape Canaveral, Fla., on May 16.

Collins offer their views on the past and future of the Delta Program.

"It's a pleasure and an honor to be here for the Delta reunion," Griffin said. "I think when I counted up, I've launched six payloads on Delta launch vehicles of one kind and another where I was directly involved, and more than that where I was a senior manager. So, I owe an awful lot of my career to the successes of the Delta launch vehicle team, and I couldn't be more grateful."

Griffin was Johns Hopkins University Applied Physics Laboratory's lead systems engineer for the Delta 180. He and John Dassoulas, Delta 180 program manager, conceived the Delta 180 mission and found Delta the only launch vehicle program that was willing to accept the challenge.

It was the first attempt at a kinetic energy intercept and important to the Air Force's Strategic Defense Initiative Organization, or SDIO, in the missile defense arena.

"Delta 180 was my most memorable launch," Holloway said. "We'd only had one launch in two years, and it was a failure. Our production line was in mothballs. We needed a successful test if we wanted to become a credible launch provider to compete for the USAF's GPS contract."

The demonstration was a success, re-establishing confidence in the Delta Program. Winning the Global Positioning System satellite contract provided the program with more

than 20 additional years of business after many years in the survival mode with only a few launches on the manifest.

With the advent of USAF's Evolved Expendable Launch Vehicle Program, the Delta rocket was transformed, with Collins leading the effort for McDonnell Douglas and later Boeing, and emerged as a completely new vehicle, the Delta IV.

"Delta means 'change' to an engineer," Collins said, "but not change for change's sake. The customer needed for Delta to change in order to make their mission."

The Delta has evolved from being capable of carrying near 100 pounds to

low Earth orbit in 1960 to handling more than 40,000 pounds today.

Chuck Dovale,

deputy program manager for NASA's Launch Services Program, said, "I have very fond memories of the Delta Program dating back to my first few days as a co-op in Hangar AE telemetry when I supported Delta 175/AMPTE, which was an international science cooperation mission among NASA, Germany and the UK in August of 1984.

"Even though I was told to 'not get too comfortable . . . the Delta Program was going out-of-business,' I did get comfortable with Delta and with the NASA ELV program . . . so much so I never left."

Dovale talked about his fondest memories throughout the last 26 years, transitioning from a co-op student to full-time systems engineer and then Avionics Branch chief and now launch director.

"Mostly I recall all of the hard-working, dedicated people who worked on the Delta Program throughout the years. They always were willing to teach and educate a young engineer on what it takes to build and maintain a successful rocket program," Dovale said. "I will always be grateful to the Delta Program and all the people who made it so successful."

The first Delta launch May 13, 1960, unfortunately a failure, began a string of 22 successes that was unheard of in the early 60s and set the standard for the rocket's very impressive launch reliability. The upcoming launch of the first of the Air Force's new generation of GPS satellites from Cape Canaveral's Launch Complex-37 aboard a Delta IV rocket will be the 349th Delta launch to date.

"The Delta II is a great launch vehicle, because of the team of people whose personal goals seem to be to make each mission successful and special."

Amanda Mitskevich
program manager, Launch Services Program



NASA

Donated bears go to kids in crisis

Titusville's Fire and Emergency Services Department was selected to receive six "Rescue Bears" that are outfitted in firefighting gear. The stuffed animals were donated to the department by Kennedy's Senior Secretarial Team, which participated in a leadership and team building workshop in April. During the workshop, the group worked in teams to solve puzzles and answer questions to earn the pieces needed to build and outfit the animals. The bears, along with other stuffed animals donated by the group, can be used by the city's fire departments for distribution to sick, injured or traumatized children.

Upcoming events . . .

- June 24 KSC On-Site Job Fair in the SSPF and OSB II, featuring local and national, private and federal employers. Must register on launchnewcareers.com to participate. For more information, visit VOICE at <https://hrapps.ksc.nasa.gov/voice>.
- June 25 Off-Site Job Fair at the Radisson Resort in Cape Canaveral. Must register on launchnewcareers.com. For more information, visit VOICE at <https://hrapps.ksc.nasa.gov/voice>.

Looking up and ahead . . .

Planned for May 26	Landing/KSC, Shuttle Landing Facility: Atlantis, STS-132; 8:48 a.m. EDT
Planned for May 27	Launch/CCAFS: Delta IV, GPS IIF-1; 11 to 11:19 p.m. EDT
Targeted for May 28	Launch/CCAFS: Falcon 9/Dragon; Window 11 a.m. to 3 p.m. EDT
To Be Determined	Launch/CCAFS: Falcon 9/Dragon C1, NASA COTS - Demo 1; TBD
Targeted for July 30	Launch/CCAFS: Atlas V, AEHF 1; 4:52 to 6:52 a.m. EDT
Targeted for Sept. 16	Launch/KSC: Discovery, STS-133; 11:57 a.m. EDT
To Be Determined	Launch/CCAFS: Falcon 9/Dragon C2; TBD
No earlier than mid-November	Launch/KSC: Endeavour, STS-134; TBD
Targeted for Nov. 17	Launch/CCAFS: Atlas V, GPS IIF-2; TBD
Nov. 22	Launch/VAFB: Taurus, Glory; TBD
Targeted for Jan. 22, 2011	Launch/CCAFS: Atlas V, SBIRS GEO-1; TBD
Aug. 5, 2011	Launch/CCAFS: Atlas V, Juno; TBD
Aug. 15, 2011	Launch/Reagan Test Site: Pegasus, NuSTAR; TBD
Sept. 8, 2011	Launch/CCAFS: Delta II Heavy, GRAIL; TBD
To Be Determined	Launch/VAFB: Delta II, Aquarius / SAC-D Satellite; TBD
To Be Determined	Launch/VAFS: Delta II, NPP; TBD
No Earlier Than Nov. 25, 2011	Launch/CCAFS: Atlas V, Mars Science Laboratory; TBD

WORD ON THE STREET

Spaceport News recently asked what you, the reader, would ask an astronaut if you could. Former NASA astronaut Dan Bursch, right, who has launched aboard a space shuttle four times and spent 196 days aboard the International Space Station as an Expedition 4 crew member, answered.



Bennett Wight, Abacus Technologies Corp.: I'd like to know what's going through their mind during launch and when they experience zero g.

Bursch: At engine start it gets very loud, and the vehicle shutters at liftoff. We focus on the checklist again and our training in the simulator prepares us well for the sequence of events, but not the sensations! At main engine cutoff, it seems like instantly we are transported to freefall. Most people take it slow (head movement) at first so that they don't get sick to their stomach, and you really have to think about what you want to do and where you want to go.

Cory Williams, Brevard Achievement Center: How does it feel to re-enter the Earth's atmosphere after deorbiting?

Bursch: We are still in freefall for a long time after the deorbit burn. Gradually, a lightshow develops out the overhead window of the shuttle and we soon perceive even just hundredths of g's. I don't think that we experience more than 1.5 g's during re-entry, and our arms definitely feel heavy at that point.

Christa Casleton, NASA: Give a vivid description of what it was like to be weightless and if they got motion sickness.

Bursch: All of us experienced free fall in the "Vomit Comet" before we launched in the shuttle, so we are used to the initial feeling but now we have to REALLY concentrate on moving slowly, thinking ahead about what and where we want to go, and TRY not to kick anyone! We also try to minimize any rapid head motion since our inner ear is now sending information to our brain, but without sensing gravity.

Kim Nickerson, URS Corp.: What goes through their head right before the shuttle launches?

Bursch: Some folks look through their checklist, concentrate during the voice checks, think about the many family and friends who may be watching, really wish that we take off that day, and others "rest" their eyes.

Barbara McCormack, CNC International Computers and Consultants: What is your biggest challenge when you got back to Earth?

Bursch: My biggest physical challenge was getting used to gravity again after 6 1/2 months in orbit. My feet had lost all calluses, my tail bone hurt when I sat down, my shins and calves were sore from walking/standing and I had to be careful not to lift anything too heavy for a while. It took about three days before I totally regained my balance, and many months before my heart rate seemed normal for a typical run.



John F. Kennedy Space Center

Spaceport News

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