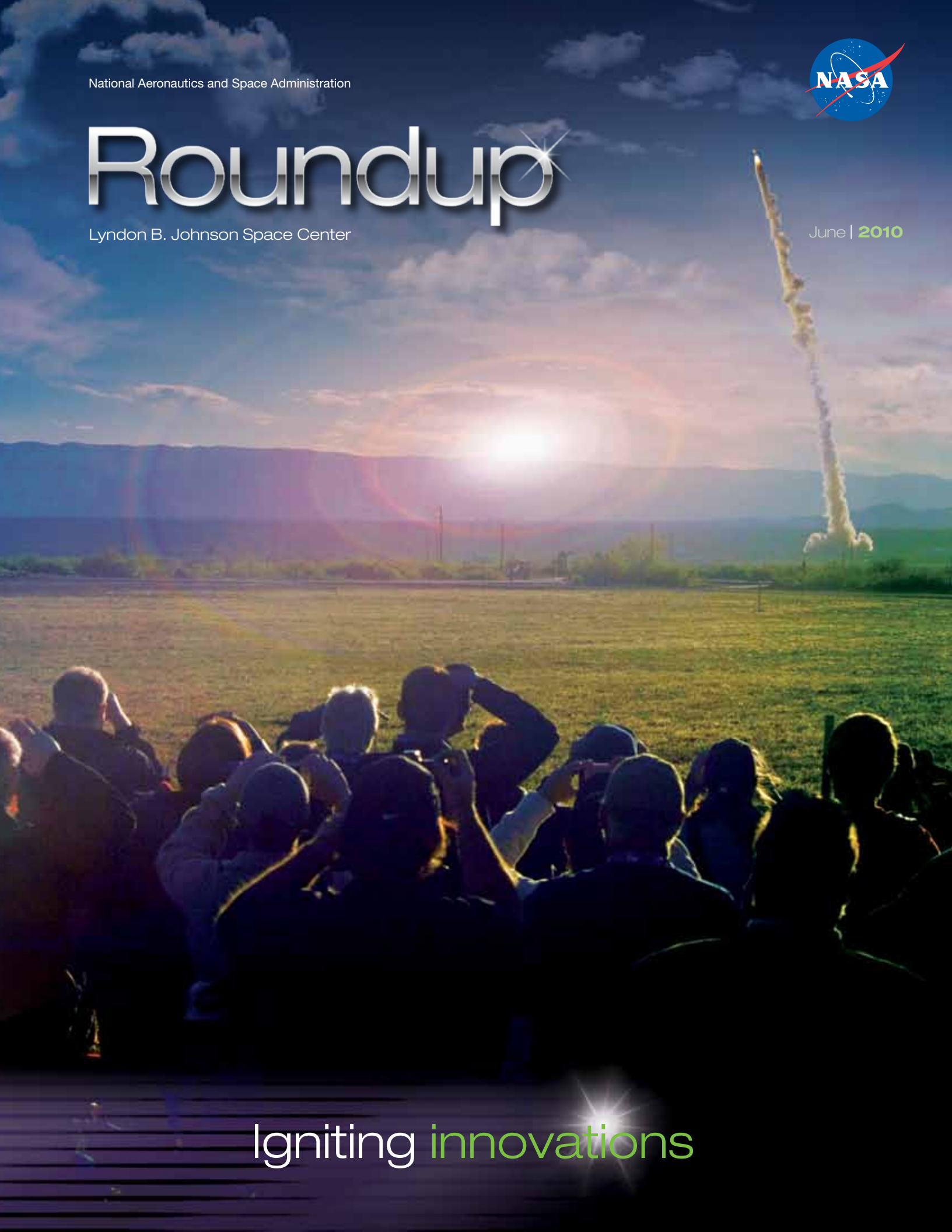
National Aeronautics and Space Administration

Roundup

Lyndon B. Johnson Space Center

June | 2010



Igniting innovations

JSC Column

On the cover:

The Pad Abort 1 test provided a gorgeous view for spectators and showed off NASA's technological brilliance.

NASA PHOTO

Hurricane season is upon us once again, and I want to remind our Johnson Space Center community that now is the time to get prepared. The JSC Hurricane Prep Kit 2010 brochure lists actions you should seriously consider.

Hurricane Ike hit us hard just two years ago, but Mother Nature doesn't remember and seldom takes a break, so we need to get ready for every hurricane season. I have a few personal observations after sitting through Hurricane Alicia in 1983 with two small children. The storm severely damaged our home and left us without power for more than two weeks in the August heat. I would advise anyone with small kids to strongly consider early evacuation when a hurricane of any type threatens. Fortunately, my daughter and her husband took our two little grandchildren to Dallas during Hurricane Ike, so they missed the 110-mph winds that can be frightening to anyone—especially young ones.

If you decide to evacuate, don't wait—do it as soon as it's feasible. At JSC we will err on the side of safety in granting liberal leave and closing the center as soon as we possibly can, but you should also consider setting aside a few days of "hurricane leave" to allow yourself an early evacuation. Unfortunately, we can't always assume there will be adequate warning and time for an evacuation. Hurricane Humberto in 2007 formed in the Gulf of Mexico and grew from a tropical storm to a hurricane in just 19 hours. And while the accuracy of hurricane tracking forecasts have improved considerably since 1990, the hurricane intensity forecasts have not improved much. Some of the lessons learned are to be prepared, have a plan, and if you do decide to evacuate—don't wait. More hurricanes are predicted this year than in 2009, since the Atlantic and Gulf waters are noticeably warmer. Please take the time now to get prepared.

Mike

NASA/PHOTO JSC2010E080581

Photo of the month:

The NASA Extreme Environment Mission Operations (NEEMO) 14 exploration rover is pictured during an undersea session of extravehicular activity on May 13.

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NASA/PHOTO STS132-S-067

Johnson Space Center team members **'shuttle'** to Kennedy Space Center for final *Atlantis* launch

By Lisa Rasco and Hallie Mann

Many Johnson Space Center team members have never had the opportunity to see a shuttle launch from Florida. Starport took more than 130 JSC employees, family and friends to see the STS-132 launch. On a clear and sunny afternoon on May 14, they watched the final scheduled flight of *Atlantis* from Kennedy Space Center's (KSC's) recreation facility, KARS Park, located 16 miles from the launch pad.

Starport offered several ways for team members to view the launch from KARS: camping sites for recreational vehicles and tents; the bus trip from JSC; a travel package that included hotel and transportation to the viewing area; and admission-only tickets to KARS.

"I've seen launches from the Vehicle Assembly Building (VAB), the causeway and Banana Creek, and this was the most family-friendly spot to date," said Amy Ellison, JSC spectator. "Plus, I couldn't have brought family to the VAB. Obviously (it's) not as close as Banana Creek, but for a middle-of-the-day launch in the sun and heat, it was much more relaxing and comfortable."

KSC also hosted several activities for the kids, including an Exploration Station, inflatables and an astronaut autograph-signing opportunity. The KSC Exchange was at KARS Park serving lunch and drinks, as well as selling exclusive STS-132 merchandise.

"It totally broke the fun barrier," Sydney Stein, another JSC visitor, said.

Stella Barrio traveled the extra miles from White Sands Test Facility to see her first shuttle launch. Barrio was able to bring her sister, aunt and cousin along to share in this special event.

"It was truly breathtaking," Barrio said. "I was in awe. I had tears in my eyes when the shuttle launched."

The trip was a collaboration of JSC External Relations, Human Resources, Center Director's Office, Shuttle Program Office, Security, Education, Safety, and Starport. These offices brainstormed a way to get employees and their loved ones access to the launch after the offices became inundated with requests for launch viewing access.

"Many of our team members have not had the opportunity to see a shuttle launch, and we wanted to give as many of our employees (as possible the) chance to see history in the making before our fleet is retired," said Karen Schmalz, Starport Operations manager.

The bus trip tracked its journey to the launch on Twitter with the @NASA_Johnson account and the hash tag #jsclaunchtrip. Followers could see and read about the bus ride, KARS Park and the launch itself.

Starport will offer this opportunity again for STS-133, the final scheduled launch of *Discovery*, and STS-134, the final scheduled launch of *Endeavour* and the Space Shuttle Program. Information for the next trips will be posted on the Starport Web site and in JSC Today.

PHOTO/ HALLIE MANN

The KARS Park pier provides visitors an amazing view … all around and, of course, in the sky.

PHOTO/ HALLIE MANN

The final launch of *Atlantis*, captured with memories and cameras.

PHOTO/ LISA RASCO

The bus trip from JSC to KARS park allows more employees and their families and friends a chance to see a launch in person.

From paper to prototype

The Habitat Demonstration Unit Project takes form

By Kim Boswell

When you need to accomplish something that's never been done before, you need a unique and innovative project structure. Innovation is the essence of the Habitat Demonstration Unit (HDU) Project, a multi-center team being led by HDU Project Manager Kriss Kennedy in the Systems Architecture and Integration Office at Johnson Space Center.

Believing strongly that new technology for long-duration space travel needed to get off of PowerPoint presentations and into reality, Kennedy convinced six NASA centers to form a team to develop habitat configurations. The habitats would be tested to evaluate game-changing operational concepts and hardware for future off-Earth outposts.

In addition to JSC, the other centers that comprise the team are Kennedy Space Center, Langley Research Center, Ames Research Center, Glenn Research Center and the Jet Propulsion Laboratory (JPL).

"Tracy Gill, System Integration lead from Kennedy; Terry Tri, Test Operations lead from Johnson; and Scott Howe, our design integration lead from JPL, have all been doing a really great job," Kennedy said. "It wouldn't be as successful as it is without them."

Most everyone on the team has other agency duties in addition to their work on the HDU Project.

"None of us work full time on this. We work part time, because we have other responsibilities," Kennedy said. "That's another unique thing about this project. Everyone's dedicated to it, but we know that our weeks tend to be a little longer than normal."

Kennedy identified "gaps," places where technology was lacking in creating off-Earth habitats, and steered the centers to focus their efforts on bridging those gaps while staying within each center's core competency areas.

One of the hallmarks of the HDU Project is early risk mitigation. In the planning process, the team diminished potential problems with early fit checks, using a habitat test bed for integration checks and extensive use of simulation tools and modeling.

NASA/STAFFORD JSC2010E057276

Some of the multi-center HDU team stand proudly with the HDU1-PEM prototype in Building 220.

NASA/STAFFORD JSC2010E057282

Danny Carrejo and the Habitat Software Team provide an overview of the HDU integration test bed.

Many times we do things late in the game and end up having to do a lot of software patches, Kennedy said. "That's one reason why we invested and put money into the test bed. We are getting the hardware and software operating together now before we migrate them into the HDU."

The HDU Project will outfit technologies into a testing unit and conduct evaluations in analogous environments—first in a more controlled testing area at JSC and then in extreme desert terrain in Arizona, where the arid climate, harsh winds and rock formations provide a fitting comparison to planetary surfaces.

The first habitat architecture to be tested is called Habitat Demonstration Unit 1–Pressurized Excursion Module, or HDU1–PEM. The HDU shell was manufactured at Langley and shipped in eight major pieces to JSC, then were assembled this past winter into one module.

"The real key about this is the team and what we're learning," Kennedy said. "We're driving out the mission architecture, requirements and operations concepts to define and validate them."

Also of importance is what the HDU Project means to the younger generation of engineers and scientists.

"I wanted to get young engineers engaged, have them actually get their hands dirty, working and testing hardware, software and learning," Kennedy said. "That was a big aspect of why we wanted to do this."

The HDU Project seems a perfect fit for fulfilling many aspects of NASA's new direction, focusing on research and development while motivating and educating the next generation to expand our reach into the solar system.

NASA/STAFFORD JSC2010E057285

Cindy Evans and Mike Calaway demonstrate the GeoScience Laboratory Glovebox prototype to Exploration Systems Mission Directorate Integration Office employees.

Don't just be safe—innovate

By Jenny Knotts

Have you ever wondered how you can make safety come alive? Just ask Johnson Space Center's Safety Office—they've been very creative recently in getting their messages across.

"The environment is always changing, and the message loses effectiveness over time," said Derek Robins, manager, Safety and Test Operations Department. "You need to keep it fresh, be relevant and show value, otherwise the message gets lost."

Robins indicated that one of the keys to getting the message across is mixing safety into everyday life and incorporating it into the way we do our jobs.

"The big challenge is to avoid complacency," said Occupational Safety and Health Engineer Pat Farrell.

Enter "Close Call Comics," an idea the Safety Office implemented. The comics cover many different safety topics, including close call reporting; slips, trips and falls; parking lot safety and more.

"The comics took a common, very entertaining form of communications to convey a message that is usually presented in a stodgy way," Robins said. "It's entertaining and still gets the message across."

Another inventive program is "Taste Test Tuesday," which is held on the second Tuesday of the month during lunch, alternating between Wyle's Building 1 and the JSC's Building 37 lobby.

"Committee members set up a table and provide sample-size offerings of a variety of healthy foods so that you can 'try it before you buy it,'" said Kathy Pierpoline, Health Maintenance System Operations team lead and Medical Operations procedures specialist. "Information such as nutritional content or recipe ideas are available to visitors."

PHOTO/ Kathy Pierpoline, Wyle

"Taste Test Tuesday" was developed so that employees would have the chance to experience healthier foods before buying them.

"This event is always well received by employees because they get to try nutritional food items that they normally would not try," said Tom Samson, manager, Institutional Safety, Health and Environmental.

"The message hits home," Robins said. "It's right in front of you and convenient. It's good reinforcement because people are actually experimenting with new foods."

"What is really cool about these innovations is these ideas represent the self-sufficiency, contribution and creativity that so many people at JSC have been giving to us over the years to make this a safer place to work," said David Loyd, chief, Safety and Test Operations Division. "I am profoundly grateful for that help."

Pad Abort 1 shows that NASA still has the right stuff

By Sean Wilson

NASA is continuing its mission to develop and demonstrate technologies that will allow the United States to pursue new approaches to human space exploration. Pad Abort 1 (PA-1), a flight test conducted to validate the Orion crew exploration vehicle's Launch Abort System (LAS), lifted off from the Orion abort flight test launch complex 32E at the U.S. Army's White Sands Missile Range (WSMR) near Las Cruces, N.M., on May 6. The flight lasted about 135 seconds from launch until crew module touchdown about a mile north of the launch pad.

"Through hard work and incredible dedication over the past several years, the Orion Pad Abort 1 team has successfully tested the first U.S.-designed abort system since Apollo," said Doug Cooke, associate administrator for the Exploration Systems Mission Directorate at NASA Headquarters. "This system is much more advanced in capability and technology than any abort system designed in the past. NASA strives to make human spaceflight as safe as possible, and what we learned here today will greatly contribute to that goal."

Information gathered through the PA-1 test will be valuable in the design and development of future systems built to provide a safe escape for the crew in the event of an emergency. The LAS could be used on the launch pad or during the first stage of ascent to orbit.

"The escape system is a huge part of human rating systems in the future as America continues to lead in space, so testing those systems is a huge step for the Orion Project," said Mark Geyer, manager, Orion Project Office. "Today, the highly talented team showed that we can put these systems together and make them work. We would have saved a crew today."

The nuts and bolts

The LAS, a tower atop a crew module boilerplate, was activated to pull the vehicle to safety and position the module for a safe landing. Boilerplates are the same size, shape and weight as the potential vehicles, but not exact replicas. The LAS and crew module boilerplate together are called the launch abort vehicle.

The LAS includes three solid propellant rocket motors: an abort motor, an attitude control motor and a jettison motor. The primary motor is the abort motor, which fired nearly a half-million pounds of thrust to propel the crew module away from the pad. The attitude control motor exerted up to 7,000 pounds of steering force through each of eight valves to maintain stability and reorient the vehicle. The jettison motor pulled the entire LAS away from the crew module to make way for parachute deployment and landing.

After explosive bolts fired and the jettison motor separated the system from the crew module, the recovery parachute system deployed. The parachutes guided the crew module to touchdown at 16.2 mph, about one mile from the launch pad.

"Everything worked as expected. In fact, we actually touched down at a significantly lesser velocity than we had predicted, so the performance was just absolutely astounding," said PA-1 Test Director Don Reed. "Now we can get all of the data we've collected from this flight, go back and validate what we predicted, take the lessons learned here and apply them to whatever the future abort system is for the next vehicle."

NASA/U.S. ARMY WHITE SANDS MISSILE RANGE jsc2010e046919

The LAS for PA-1 rolls out to the launch pad in preparation for the test.

The Orion Project has begun the process of recovering all of the test articles from WSMR and will be evaluating the data over the coming weeks.

The testing team

The Orion Project Office at Johnson Space Center led the LAS test team. System development was led by Langley Research Center in Hampton, Va., in partnership with Marshall Space Flight Center in Huntsville, Ala. Langley designed and produced the boilerplate crew module for the flight test.

Dryden Flight Research Center in Edwards, Calif., prepared the crew module for integration and led the flight test vehicle integration at WSMR with Lockheed Martin Corp. of Denver, the prime contractor to NASA for Orion. The nearby NASA White Sands Test Facility provided design, construction and management for the launch and ground facilities at WSMR, as well as personnel on the integration and launch preparation team.

Lockheed led the industry team development efforts for the LAS. Orbital Sciences Corporation of Dulles, Va., provided design, development and support; Alliant Techsystems, or ATK, of Magna, Utah, developed the abort and the attitude control motors; Aerojet of Sacramento, Calif., developed the jettison motor; and Honeywell of Morristown, N.J., provided the avionics for onboard control of abort sequencing and inertial navigation.

"We've been working well over four years to bring this together," Reed said. "We all came together as a very dedicated professional team that has sacrificed a lot to get to this point. It's a great day for the country, for NASA and for industry."

NASA/PHOTO wstf0510e04503

PA-1, which launched May 6, is the first fully integrated flight test of the LAS being developed for the Orion crew exploration vehicle.

NASA/PHOTO jsc2010e068743

Only the adapter cone that attached the LAS to the crew module is visible. The rest of the system, including all three motors, burrowed into the ground on impact.

NASA/PHOTO jsc2010e074705

Three main parachutes function as planned, guiding the crew module to an even softer touchdown than expected.

NASA/PHOTO jsc2010e068745

The crew module reached a speed of approximately 445 mph in the first three seconds, with a maximum velocity of 539 mph in its upward trajectory to about 1.2 miles high, before touching down about a mile north of the launch pad.

"PA-1 was a tremendous step forward for the human spaceflight team, advancing our reach and honoring our commitment to the findings from the Columbia Accident Investigation Board," said former Constellation Program Manager Jeff Hanley. "The NASA team continues to lead in the critical arena of ascent abort design for the benefit of all."

Pilots retire with a splash

By Neesha Hosein

After eons of flying the friendly skies, pilots can look forward to a retirement grand finale with an ironic twist. A career of being airborne concludes with an on-the-ground ceremonial water splash in which the pilot and his plane experience a fire hose dousing. Nearest and dearest colleagues, family and friends share in the festivities.

This tradition's origin is unknown, but it is a long-standing military ritual. Its purpose is to commemorate a job well done and honor the accomplishments of retiring pilots.

"We do it here at Johnson Space Center to show the same respect to all aviators," said Michelle Gore, lead flight manager at Ellington Field.

The ceremony at JSC is organized by the Aircraft Duty Office. They begin by scheduling a fire truck.

"The only thing we do is (contact) the Fire Department to set it up and then call them back when the aircraft is ten minutes out," Gore said. "They are positioned close to the hangar and to the aircraft parking area where the crew chief of the aircraft will park the aircraft."

Once the pilot steps out of the plane, a family member, friend or co-worker pulls the trigger to start the fire hose and spray the pilot with water. This ceremony only happens if it is known that this person is not going to fly again.

The most recent such retiree at JSC is T-38 pilot Roger Zwieg, who has more than 40 years of flying time. On March 30, Zwieg had his final T-38 flight, followed by a farewell splash at Ellington Field.

NASA/MARKOWITZ JSC2010E045102

Zwieg's son-in-law Clayton has fun hosing down his father-in-law.

"To me, the 'hosing down' of a pilot is the most heartbreaking thing to see," Gore said. "It is very emotional, not only for the pilot who is ending (his/her) career as an aviator, but also for all the people that have worked with him/her. It is also very emotional for the family as well."

But there's more to it than just the ending of an era.

"I believe the pilots love getting hosed down," Gore said. "I think it gives them closure to a part of their lives that they love so much. It brings everyone together for one moment to say 'thank you' to someone for doing such a job well done and goodbye to a person they will miss so dearly. It is such a bittersweet event."

NASA/MARKOWITZ JSC2010E045081

After 41 years of service with NASA, Roger Zwieg steps out of the T-38 for the last time.

NASA/MARKOWITZ JSC2010E045106

Mike Coats, JSC director, says thank you and goodbye to a long-time friend, co-worker and fellow aviator. Brent Jett, director of Flight Crew Operations, awaits his turn.

Innovation 2010 sparks **imaginations**

By Catherine E. Williams

Innovation 2010, the first-ever event of its kind at Johnson Space Center, showcased the imagination and ingenuity of the entire workforce with almost a full day filled with exhibits, fun team-building activities and rap forums.

Sponsored by the JSC Inclusion and Innovation Council, Innovation 2010's charter included fostering an environment of creativity and innovative thinking at JSC; exposing the workforce to ideas, issues and perspectives expressed by colleagues outside of their normal circle; and highlighting exciting initiatives and projects being incubated at the center.

"To be competitive, we must be creative and innovative, receptive to new ideas and open to the perspectives of others," said JSC Director Mike Coats. "We believe that by striving to incorporate different ideas and perspectives, we'll generate more creative solutions to our challenges so that we remain competitive today and tomorrow."

Many rap forums held around the center implemented Coats' call to action by including a good cross-section of JSC team members in the brainstorming sessions. The assortment of feedback and comments gathered will be helpful to management when moving forward with NASA's new exploration and research goals.

NASA/SOWA JSC2010E061718

Many mini rap forums were held in conference rooms around site.

"There's a switch here. It's a time of change. There's a lot of things that have to be developed in this time frame," said David Leestma, manager, Advanced Planning, during the "JSC Near Term, Long Term" rap forum.

NASA Chief Technologist Bobby Braun echoed those sentiments during the rap forum, "The Future of NASA." He maintained that the future of NASA is bright, and that our country would rely on advances in technology and research to keep it on the forefront.

At the same time various thought-provoking discussions were held indoors, many people simply enjoyed the gorgeous April weather and visited booths and exhibits outdoors. With nearly 80 booths to choose from, JSC team members could learn about topics such as "Inflatable Module Developments," "Adapting NASA Aircraft for Present and Future Missions," "Space Week Texas 2009" and many more.

If you weren't able to see everything this year, don't fret—there's still 2011.

NASA/BLAIR JSC2010E061561

Participants get in touch with their inner creativity, a hallmark of Innovation 2010.

"The goal of Innovation 2010 was to emphasize the importance of innovation in all aspects of our business and to ensure we remain competitive in the future," said Debbie Nguyen, Innovation 2010 chair. "However, Innovation 2010 was just the first step and a catalyst for continued innovation. Our team will now take the feedback from attendees to shape up Innovation 2011. We want people to keep the conversation going, and one of the ways for them to do that is by going to our Web site at http://innovation2010.jsc.nasa.gov."

Check out more great photos from the event in the Center Scoop section on page 11.

"The best way to predict

NASA/SOWA JSC2010E061723

Almost 80 booths entertain JSC team members during the stand down event.

Spotlight Emily Lawrence, Biomedical Engineer

Wyle Integrated Science and Engineering Group

NASA/HARNETT jsc2010e080621

Q: Coolest part of your job?
A: Being involved in a flight study and having the opportunity to work with a unique group of people.

Q: Favorite hobbies or interesting things you do away from the office?
A: I play rugby for the Houston Athletic Rugby Club and compete professionally in the sport of Disc Golf.

Q: What did you want to grow up to be when you were a child?
A: I've always wanted to be an engineer.

Q: What is your favorite quote or motto?
A: "The ultimate measure of a man is not where he stands in moments of comfort, but where he stands at times of challenge and controversy." - Martin Luther King Jr.

Q: What is your favorite food?
A: Anything Japanese.

Q: What is your favorite sport?
A: Rugby.

Q: Last good book you read?
A: "Homesteading Space: The Skylab Story."

Q: Favorite movie and why?
A: "Life is Beautiful," because it encourages me to remain strong and have a positive mental attitude in the face of adversity.

Q: Who are your heroes and why?
A: I've many heroes. To me, they are people who are able to achieve success while overcoming seemingly insurmountable obstacles. Specifically, some of those people include Marie Curie, Susan B. Anthony and Billie Jean King.

Q: What quality do you most admire in people?
A: Being able to laugh at your mistakes, learn from them and move ahead.

Q: What do you most look forward to at NASA?
A: The amazing situations and unique challenges presented to us regularly that many people don't have the opportunity to experience.

Q: What is your best memory at NASA or Johnson Space Center in particular?
A: Watching my first shuttle landing (STS-129) in person at Kennedy Space Center.

Emily Lawrence, pictured holding the ball, is an avid rugby fan.

WANTED!

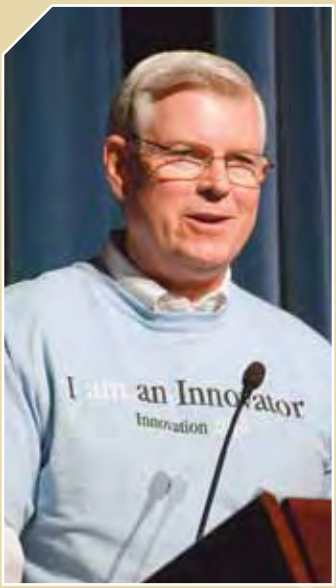
Do you know a JSC colleague or team that does something extraordinary on or off the job? Whether it's a unique skill, interesting work, special professional accomplishment, remarkable second career, hobby or volunteerism, your nominee(s) may deserve the spotlight!

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.

Showcasing our wares

Innovation 2010 on April 28 was all about Johnson Space Center team members and organizations showcasing their innovations, whether intellectual or physical. Rap forums, exhibit booths and games created an impressive atmosphere perfect for sharing ideas and advancements. See more photos from that special half-day stand down event sponsored by the JSC Inclusion and Innovation Council. Visit the Inclusion and Innovation Web site at http://inclusionandinnovation.jsc.nasa.gov/ to keep the conversation going all year long.

NASA/DEHOYOS jsc2010e061641



NASA/SOWA jsc2010e061684

NASA/BLAIR jsc2010e061615

NASA/HARNETT jsc2010e061676

Photo courtesy Karen Schmalz

Atlantis is celebrated

More than 700 employees filled Teague Auditorium to witness the last scheduled launch of *Atlantis* and the STS-132 crew on May 14. Following the successful launch, Starport held door prize drawings in the Building 3 café and sponsored a free ice cream sundae social for attendees.

Roundup

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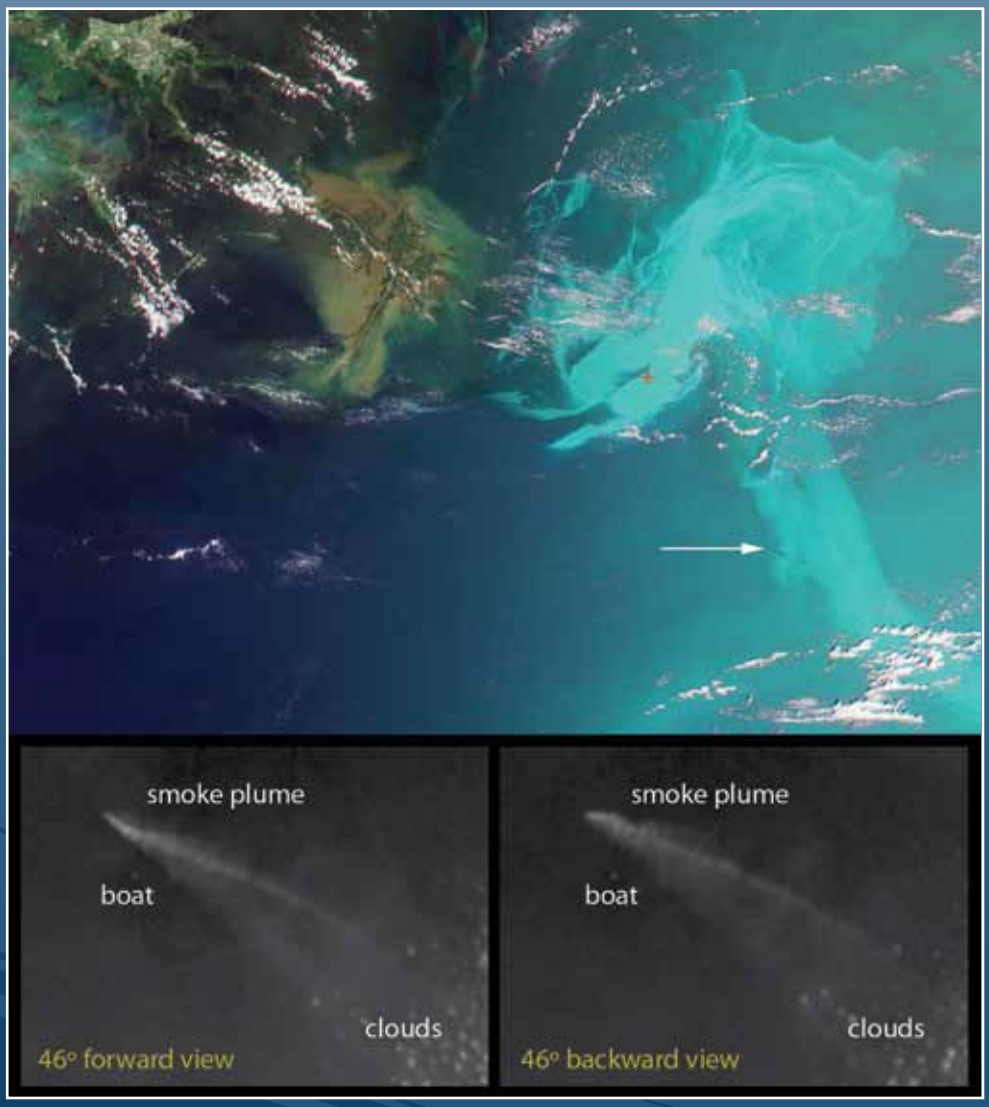
NASA's Multi-angle Imaging SpectroRadiometer provides unique views of **Gulf oil slick**

These unique images of the Deepwater Horizon oil slick in the Gulf of Mexico were obtained by the Multi-angle Imaging SpectroRadiometer (MISR) instrument aboard NASA's Terra spacecraft on May 17. The top panel is a false-color image created by combining data from the red band of the 26-degree forward-viewing camera (where the oil appears dark) with the blue and green bands of the nadir (vertical-viewing) camera (where the oil appears bright). The result causes the oil spill to stand out dramatically, while other features like clouds and land appear close to their natural color. The Mississippi River Delta is visible in the upper-left portion of the image. The red symbol represents the former location of the Deepwater Horizon drilling platform.

The white arrow in the right center of the image points to a plume of smoke, most likely from a controlled burn of oil collected on the surface. Controlled burns of oil began in early May to attempt to remove oil from the open water. The plume appears as a dark streak against the brighter reflection of sunlight off the ocean surface



Top: False-color image of the Gulf of Mexico oil spill, created by combining data from different color bands on two of MISR's nine cameras. Bottom: Two MISR camera views of a smoke plume believed to be from a controlled burn of oil on the ocean surface.

NASA/GSFC/LARC/JPL, MISR TEAM