National Aeronautics and Space Administration

Lyndon B. Johnson Space Center

roundup

NASA/JPL-CALTECH/CORNELL

Roving the Martian landscape

NOVEMBER 2007 ■ volume 46 ■ number 11

guestcolumn

On the cover

Special Effects Spirit on Flank of Husband Hill

This synthetic image of the Spirit Mars Exploration Rover on the flank of Husband Hill was produced using Virtual Presence in Space technology. Developed at NASA's Jet Propulsion Laboratory, Pasadena, Calif., this technology combines visualization and image processing tools with Hollywood style special effects. The image was created using a photorealistic model of the rover and a false color mosaic. The size of the rover in the image is approximately correct and was based on the size of the rover tracks in the mosaic.

Because this synthesis provides viewers with a sense of their own virtual presence (as if they were there themselves), such views can be useful to mission teams in planning exploration by enhancing perspective and a sense of scale.

Image note: Rover model by Dan Maas; synthetic image by Koji Kuramura, Zareh Gorjian, Mike Stetson and Eric M. De Jong.

Image credit: NASA/JPL Caltech/Cornell

COMING SOON:

A new and improved Johnson Space Center

by Joel Walker, *Director, Center Operations*

Have you looked around the center in the last few months? You may have noticed a tremendous amount of construction and repair activity. We've been putting significant resources into our infrastructure to provide support to our current programs and to speed up the transition to Constellation activities.

These repairs and upgrades include much-needed maintenance such as new sidewalk coating, resurfacing of numerous roads and parking lots, multiple roof replacements and the replacement of our 40-year-old perimeter fence.

We've also completed major upgrades to Building 24 (the central plant which controls most onsite systems), and Building 48 (the Mission Control Center's backup power plant).

But it's not all about fixing what's broken. As we move into the Constellation era, we are using new construction methods and new interior workspace designs to support changing workforce needs.

Building 2N, the Office of Communications and Public Affairs, is the first to undergo a major facelift. It will open next summer with an open-concept design, and it will even be equipped with showers.

By the end of November, the center will break ground on a new structure: Building 20. The new three-story, 83,000-square-foot office facility will be constructed across from Building 46. The new building will permanently house some center employees and act as a "flex" space to accommodate folks displaced while we continue refurbishing other buildings.

We are currently designing the Crew Exploration Vehicle Avionics Integration Laboratory facility, which will be housed within Building 29. One of the first big projects specifically for Constellation, it will be under construction by late spring.

The new elevator in Building 5 opens in November, allowing access to the facility by our handicapped visitors, and our Johnson Space Center Child Care Center was recently converted to run completely off of solar and wind power.

Soon, JSC team members will be able to work at the new outside meeting area by the pond at Building 12. Or, they can stop by the Building 11 café, sip some Starbucks coffee and connect by Wi-Fi at the new sitting area.

For those who like to jog, a new trail will soon offer a safe place to enjoy that activity away from traffic. Also, be sure to check out the new facility currently under construction at the Gilruth. The building will replace the old radio, SCUBA club and maintenance shack, and will open in December. It will provide rest rooms and a concession area. Oh, and additional parking spaces have been added, too!

Work continues on the Rocket Park facility, and we are cleaning and repainting the Little Joe and Redstone rockets.

The long list of upgrades and enhancements is part of our plan to extend the life of JSC and kick-start the transition to the Constellation Program era. Whether you sit on the console in Mission Control and fly the station, or sit on the console in Building 24 and "fly" the site, it's going to take us all working together to accomplish it.

Spotlight on...
Mark Sowa

Imagery Acquisition Supervisor

This month the Roundup kicks off our Spotlight page that takes a look at Johnson Space Center employees behind the scenes. We start this month with an employee who has a unique way of looking at our Center and its people—supervisor over JSC's Imagery Acquisition Group—Mark Sowa. Mark, who began his JSC career over 20 years ago, gives us a snapshot of his life—favorite movie, best vacation, coolest part of his job and more...Enjoy!

How long have you been with NASA? 20 years and five months.

What kind of hobbies or interesting things you do away from the office? Photography and drawing.

What is your favorite food? Ice cream.

What is your favorite sport? Soccer and baseball.

What is the last good book or article you read? "Moral Animal: Why We Are the Way We Are" by Robert Wright.

What is your idea of a perfect vacation? My ideal vacation would be somewhere beautiful, such as the mountains of Colorado. I try to visit places that demonstrate the vastness and wonder of nature. It puts everything into perspective for me.

What is the best movie in your collection? Stanley Kubrick's "Dr. Strangelove" (1964)—one of the funniest and most frightening films ever made.

What is the coolest part of your job? The flying, diving and travel are always fun, but just being able to make a living as a photographer and to work with some of the most talented imaging people in the industry is great. In addition, just knowing that the images our team creates will be part of the official record of humankind's efforts in space exploration is very rewarding. I always think how interesting it would have been if Magellan, Capt. James Cook or other early explorers had photographic technology and an official photographer to document all their preparations and voyages.

What does JSC mean to you? I always tell people back home in Illinois that working at Johnson Space Center is like being on a college campus, only we have the world's greatest science fair project. It's a great community to be a part of. JSC is a very creative environment if you start to think about what goes on here.

NASA/MARKOWITZ JSC2007E054248

Mark Sowa today as the supervisor over JSC's Imagery Acquisition Group. Although he has more management duties, he still enjoys getting behind a camera.

What do you most look forward to at NASA? With NASA, I always feel every day is a new opportunity, with new challenges opening the door to new discoveries and rewards. No two days are the same. I'm always reminded that no matter how insignificant you think your task might be, it's part of something very noble and the foundation for the future.

What is your best memory at JSC? Spending the day as a NASA photographer with Peanuts creator Charles Schulz as he toured JSC and having an opportunity to talk with him. It was the culmination of two childhood dreams: working for NASA and meeting the creator of Snoopy.

What is your favorite quote? "I will love the light for it shows me the way. Yet, I will endure the darkness for it shows me the stars."—Og Mandino

NASA/BENAVIDES JSC2007E054245

Over his 20-year career, Mark has photographed 40 space shuttle and five ISS crew portraits. Mark is with the STS-42 crew and their trainers by the JSC ponds for a group photo. The STS-42 crew just had their official crew portrait taken moments before.

NASA/BLUNCK JSC2007E054247

As a photographer in 1989, Mark sets up a miniature simulated lunar landscape in the building 8 photo studio to photograph a lunar rover concept model created by JSC's Technical Services. Just last year, the image was reused on NASA's Web site to highlight NASA's exploration efforts.

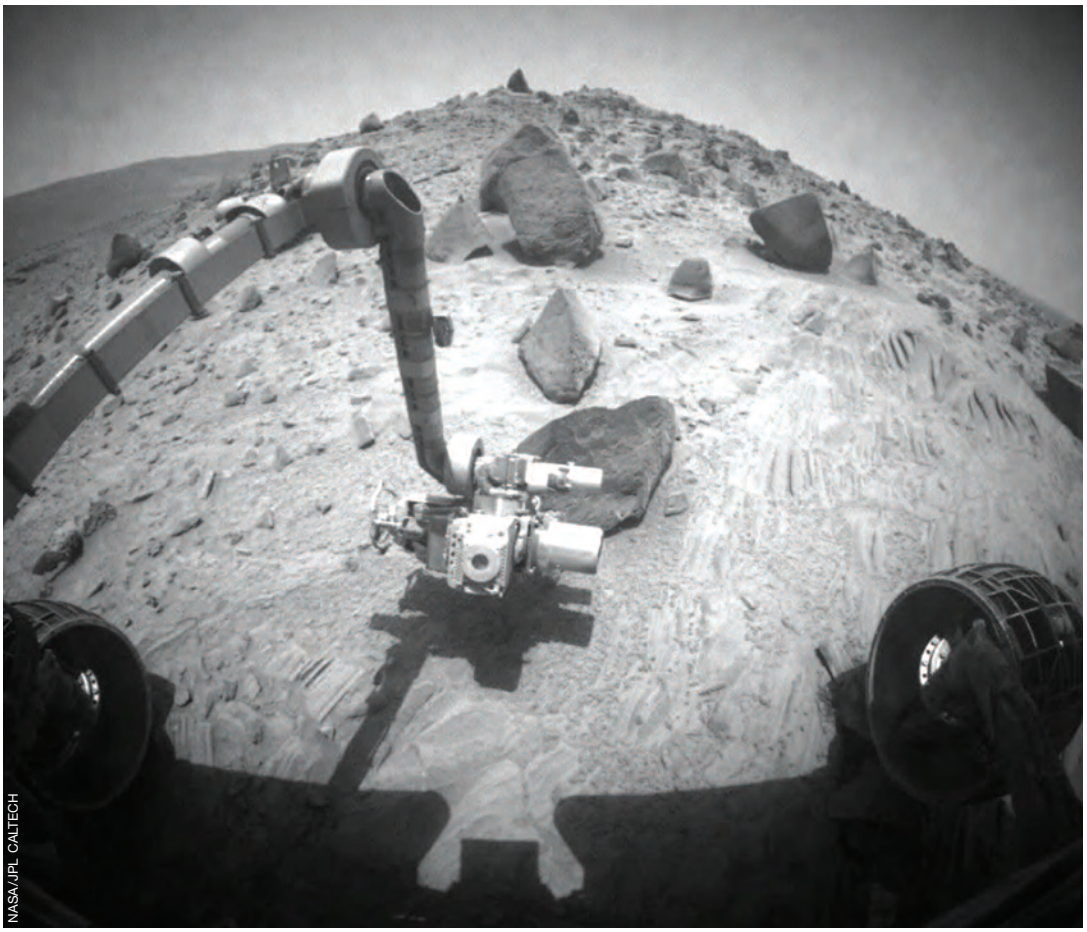
Spirit and Opportunity are still knocking

NASA is extending, for a fifth time, the activities of the Mars Exploration Rovers Spirit and Opportunity. This decision keeps the trailblazing mobile robotic pioneers active on opposite sides of Mars, possibly through 2009. The extended mission and associated science are dependent upon the continued productivity and operability of the rovers.

"We are extremely happy to be able to further the exploration of Mars. The rovers are amazing machines, and they continue to produce amazing scientific results operating far beyond their design life," said Alan Stern, associate administrator for NASA's Science Mission Directorate, Washington.

The twin rovers landed on Mars in January 2004, 45 months ago, on missions originally planned to last 90 days. In September, Opportunity began descending into Victoria Crater in Mars' Meridiani Planum region. At approximately one-half mile wide and 230-feet deep, it is the largest crater the rover has visited. Spirit climbed onto a volcanic plateau in a range of hills that were on the distant horizon from the landing site.

"After more than three-and-a-half years, Spirit and Opportunity are showing some signs of aging, but they are in good health and capable of conducting great science," said John Callas, rover project manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif.



NASA/JPL CALTECH

As it finished its second Martian year on Mars, NASA's Mars Exploration Rover Spirit was beginning to examine a group of angular rocks given informal names corresponding to peaks in the Colorado Rockies. A Martian year—the amount of time it takes Mars to complete one orbit around the sun—lasts for 687 Earth days. Spirit completed its second Martian year on the rover's 1,338th Martian day, or sol, corresponding to Oct. 8, 2007.

Two days later Spirit used its front hazard-identification camera to capture this wide-angle view of its robotic arm extended to a rock informally named "Humboldt Peak." For the rocks at this site on the southern edge of the "Home Plate" platform in the inner basin of the Columbia Hills inside Gusev Crater, the rover team decided to use names of Colorado peaks higher than 14,000 feet. The Colorado Rockies team of the National League is the connection to the baseball-theme nomenclature being used for features around Home Plate.

The tool facing Spirit on the turret at the end of the robotic arm is the Moessbauer spectrometer.

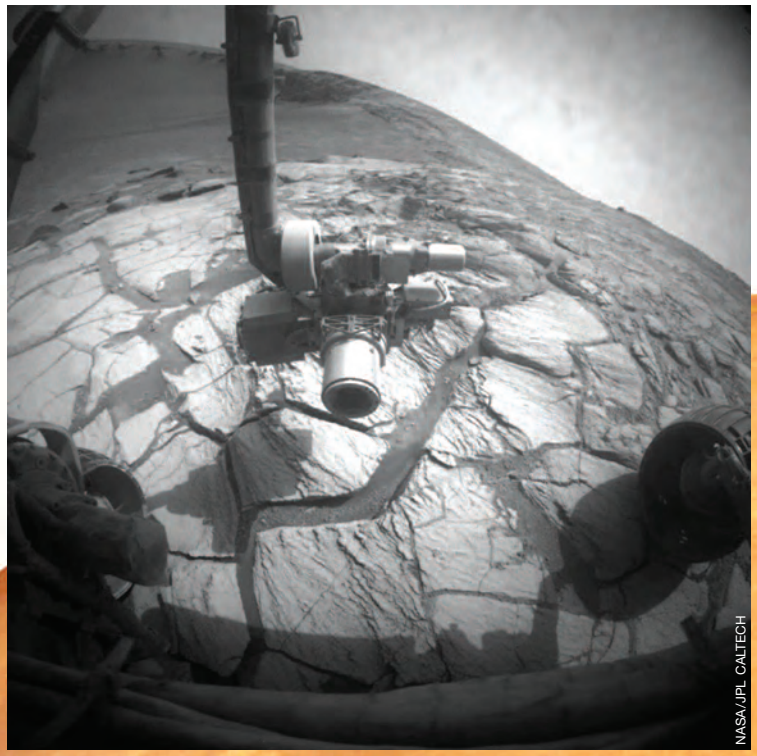
This image taken by the panoramic camera on the Mars Exploration Rover Opportunity shows the view of Victoria Crater from Duck Bay. Opportunity reached Victoria Crater on Sol 951 (Sept. 27, 2006) after traversing 9.28 kilometers (5.77 miles) since her landing site at Eagle Crater. Victoria Crater is roughly 800 meters (one half mile) wide about five times wider than Endurance Crater, and 40 times as wide as Eagle Crater. The south face of the 6 meter (20 foot) tall layered Cape Verde promontory can be seen in the left side of the inner crater wall, about 50 meters (about 165 feet) away from the rover at the time of the imaging. The north face of the 15 meter (50 foot) tall stack of layered rocks called Cabo Frio can be seen on the right side of the inner crater wall.

The rovers each carry a suite of sophisticated instruments to examine the geology of Mars for information about past environmental conditions. Opportunity returned dramatic evidence that its area of Mars stayed wet for an extended period of time, long ago, with conditions that could have been suitable for sustaining microbial life. Spirit found evidence, in the region it is exploring, that water in some form altered the mineral composition of some soils and rocks.

To date, Spirit has driven 4.51 miles and returned more than 102,000 images. Opportunity has driven 7.19 miles and returned more than 94,000 images.

Among the rovers' many other accomplishments:

- Opportunity analyzed a series of exposed rock layers that recorded how environmental conditions changed during the times when the layers were deposited and later modified. Wind-blown dunes came and went. The water table fluctuated.
- Spirit recorded dust devils forming and moving. The images were made into movie clips, providing new insight into the interaction of Mars' atmosphere and surface.
- Both rovers found metallic meteorites on Mars. Opportunity discovered one rock with a composition similar to a meteorite that reached Earth from Mars.



NASA/JPL CALTECH

A layer of light-toned rock exposed inside Victoria Crater in the Meridiani Planum region of Mars appears to mark where the surface was at the time, many millions of years ago, when an impact excavated the crater. NASA's Mars Exploration Rover Opportunity drove to this bright band as the science team's first destination for the rover during investigations inside the crater. Opportunity's left front hazard-identification camera took this image just after the rover finished a drive of 2.25 meters (7 feet, 5 inches) during the rover's 1,305th Martian day, or sol, (Sept. 25, 2007). The rocks beneath the rover and its extended robotic arm are part of the bright band.

Working together to resolve issues

By Catherine E. Ragin

As a professional working in the cutting-edge field of space exploration, your drive to succeed can sometimes be your own undoing. The feeling that you must live up to perfection, no matter what, can be detrimental to your own emotional well-being as you work to achieve things that most people outside of the space program cannot even conceive.

Senior management at Johnson Space Center does not want conflicts or differences of opinion to be seen as failings, but rather as issues that can be worked out painlessly through the appropriate channels. The new Resolving Issues Web site is the first step toward making employees aware of all the resources available to them to work through conflicts that may arise during their workday.

"Leaders from Human Resources, Employee Opportunity and Diversity, the Chief Counsel's Office, Procurement, the union and the Ombuds Office discussed the various conflict resolution processes available to employees," said Debbie Denton-Misfeldt, assistant to the director of Human Resources. "They discussed how resolution can take many forms, and that it is important to be flexible when considering new approaches to resolve an issue. They all agreed that resolving issues informally, and at the lowest possible level, should be the first step in most situations."

Starting small makes the most sense, because who better to identify with a potential problem than your supervisor, who is in the trenches working with you? But if that doesn't work, you can look to other channels for solutions.

"One concern senior management had was that employees don't always know that there are a number of avenues available to assist them in resolving an issue, and each avenue serves a specific purpose. For that reason, they decided to create a Web site that clearly outlines how employees can most effectively access the various conflict resolution avenues," Denton-Misfeldt said.

Center Director Mike Coats enthusiastically supported the Web site's creation and the positives it would bring to communication between employees and managers alike.

"I want us to focus on resolving our issues collaboratively and through open, honest discussion. Our success as an organization relies on our ability to express our concerns and be confident they will be heard. This site offers a single resource that identifies the tools everyone can use in resolving a workplace conflict," Coats said.

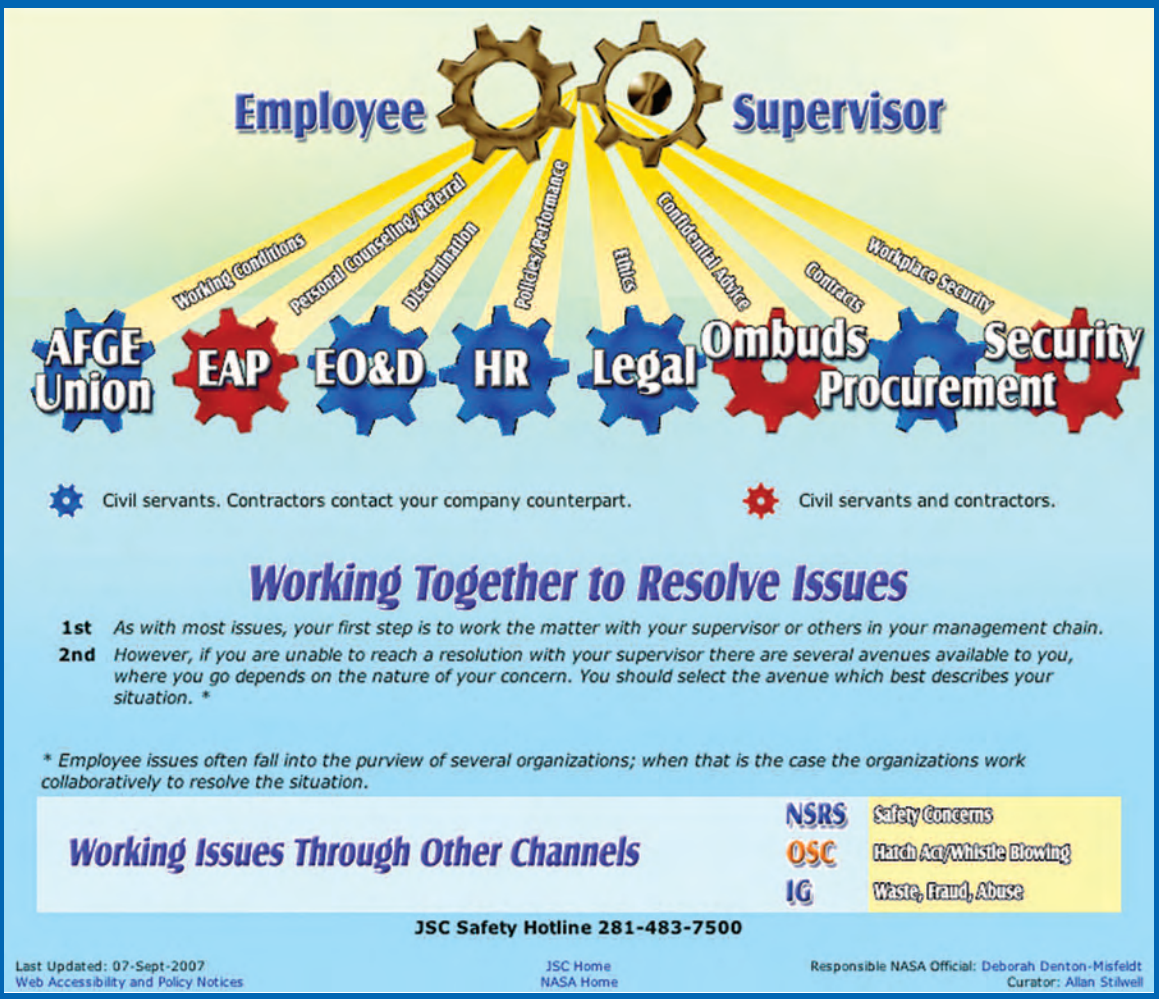
The unique, high-risk working environment at JSC requires that employees do everything possible to bring any issues forth and deal with them in a thoughtful manner. They must also be cognizant of the varying viewpoints offered by each team member and be able to see the pearl of wisdom within each suggestion or idea, even if they may disagree with it.

"We work in a dynamic environment, and it's important that every member of the JSC team understand how to resolve issues at the earliest possible stage before they become major problems," Coats said. "We will have disagreements and differences of opinion… And, in fact, we need to learn to appreciate our differences as a source of creativity and a real strength. We need to understand how to discuss and resolve those differences so we can focus on the important work we're doing here in support of NASA's goals."

The new Web site is meant to be an informative tool for the workforce to utilize when involved in a conflict or issue.

"It's not so much a process improvement as it is an increase in awareness of all the available tools. With a broader choice of tools, issues may be resolved more quickly, at a lower organizational level and with less acrimony than before," said Bernard Roan, JSC chief counsel in the Legal Office. "Overall, this can mean less friction and fewer and lower barriers between the parties, as well as less resources spent trying to resolve a conflict by means of the wrong—that is, a less-effective—process."

Each specific office listed on the Resolving Issues Web site has a certain stake in the conflict resolution plan, depending upon the nature of the issue.



For instance, "The Human Resources Office serves as both an employee advocate and management consultant to assist in resolving issues at the lowest level. We work with civil service employees and supervisors on issues relating to a variety of workforce practices and policies," said Natalie Saiz, director of Human Resources. "When seeking to resolve issues, we collaborate with all the other organizations mentioned on the Web site, such as the union, the Office of Equal Opportunity and Diversity, or Legal when the situation calls for it."

"As one of the stakeholders of one of the opportunities to resolve issues, we defined our process and the types of issues that would bring employees to our office," said Gloria Stiner, director of Office of Equal Opportunity and Diversity. When the issue doesn't fall within their particular mission, the office will "refer the employee for possible resolution," she added.

The Web site even contains resources for issues that may not fall within the ordinary realm of conflict resolution, but instead will involve things of a more serious nature, such as whistle-blowing, safety reporting, fraud and more.

With increased awareness of all the available channels out there, all JSC team members can feel confident that their voices will be heard. Even if they feel that they are just tiny cogs in the bigger exploration picture, senior management does not view employee concerns as insignificant.
To visit the Resolving Issues Web site, click **http://resolvingissues.jsc.nasa.gov/**.

Fit to be lit

NASA/BLAIR JSC2007E049868

One of the wind turbines now powering the JSC Child Care Center.

NASA/BLAIR JSC2007E049856

Jerry Rowlands, Energy Management and Control System manager for CSC, scrolls through to find historical data on the production of the solar array.

By Catherine E. Ragin

If the landscape at the Johnson Space Center Child Care Center (CCC) seems a little "alien" these days, it's for a good—and beneficial—reason. Construction to add solar arrays, or photovoltaic (PV) panels, wind turbines and a solar water heater to the CCC concluded at the end of September. Not only did these modifications alter the landscape with some can't-miss additions, but the greening project is also ushering JSC into a new era of environment preservation and energy conservation.

"Within Center Operations, we are always looking at energy conservation projects, or items to obviously reduce energy consumption at JSC and also meet federal government mandates to reduce the energy usage that we have here," said Melissa McKinley, who manages the Utilities Branch within Center Operations. "In addition to that is the new initiative toward Leadership in Energy and Environmental Design construction in both new construction and existing buildings, so we're looking at ways to do that in many facilities."

This project also serves as a testbed for renewable resources.

"Center Operations and Computer Sciences Corporation (CSC) wanted to do a renewable-type project, and they had thought about doing a couple different technologies. The CCC was the place we wanted to try because of the location of the substation and a few other things that made it easier to accomplish the plan," said Jerry Rowlands, Energy Management and Control System manager for CSC.

"This particular project was attractive to us because we could look at various technologies and get to try them out at the CCC and see what is particularly practical for us to use at JSC," McKinley said. "We were able to use different technologies such as the PV panels, the wind turbines, the hot water panels, and get an idea of the applicability."

The CCC was also one of the easiest places to tie into the JSC electrical grid, which could store the excess energy produced by the sun that wasn't used at the CCC.

"We could power the CCC, and on the weekends, when they aren't in operation, put that power back out on the JSC grid for use within our fence line as well," McKinley said.

The greening project for the CCC was conceived back in January, and it ended up being a collaborative effort between Center Operations and Systems Engineering at JSC. The design concept went through a few iterations before the groups settled on the final layout.

NASA/BLAIR JSC2007E049863

These photovoltaic panels utilize the sun's rays and convert it to usable energy.

"Systems Engineering was interested in putting up a PV array and working on the communications, as far as being able to manipulate it and get data from it," Rowlands said. "They ended up buying three trackable PVs, the three in the front (of the CCC)."

Initially, the arrays were going to be positioned on the roof of the CCC, but it could not be adequately determine whether the roof could support the weight.

"So those came off the roof, and that's how we ended up getting eight 2.8-kW trackers, the big ones in the yard," Rowlands said. "The solar water heater was able to remain on the roof, because it was determined the roof could structurally support the residential unit."

The renewable energy system is set up to gather data so that Center Operations and Systems Engineering can use it for future planning and development.

"The metering system will tell us if we're generating more than what we need or not enough," said Rowlands. "We're using software to isolate each individual energy component (to get accurate readings)."

NASA/BLAIR JSC2007E052092

An aerial view of the JSC Child Care Center, which is now running completely off of renewable energy resources: photovoltaic panels, a solar water heater and wind turbines.

In addition to the information that will prove valuable to engineers and planners, the project is also going to enlighten our littlest explorers in the making.

"They're going to put a kiosk in the lobby of the CCC, so at any time you can walk up to it and see how much energy is being generated. And I think it's a really good tool to get people to think that way… I know the director of the CCC is using that as a tool to teach the kids about sustainability and what it means, and how it's part of our everyday lives," McKinley said.

JSC team members will also get a chance to monitor the project from the comfort of their desks.

"One of the cool things that we are going to see in the next couple of weeks is a Web site where you can go to and actually see the amount of energy being generated," McKinley said.

Being attuned to the benefits of sustainability and renewable energy is important for everyone on site, because it's an integral part of keeping our own blue marble healthy for years to come. JSC and all NASA sites are looking to implement more cutting-edge ideas similar to what the CCC has going on now.

"We're going to look at how much energy we are able to generate. This is all kind of a 'let's get a system up and take a look at it, and let's see where it's best suited for us to move forward,'" Rowlands said.

Rowlands is encouraged by what he sees so far, and hopes there are more such projects to come. "I would like to do it again. I don't see why we couldn't do more of this and really supplement the electrical use at JSC through renewables."

University of Nebraska gets a shout that's out of this world

By Jenna Mills

NASA/MILLS

Sporting their Husker red apparel, University of Nebraska fans filled the stadium one recent Saturday afternoon to watch their beloved football team take on the Iowa State Cyclones. Fans expected to see their team score a few touchdowns, but never anticipated getting a message that was, quite literally, out of this world!

Eighty-four thousand spectators were directed to watch the Jumbotron as astronaut Clay Anderson greeted fans with a special message from the International Space Station during the first-quarter break. Though the message was short, Anderson thrilled fans when he expressed his love and devotion for the Huskers and how honored he was to be from the great state of Nebraska. Before ending his message, Anderson held up a University of Nebraska flag that sent the entire stadium screaming with excitement. Anderson's wife and children were also recognized at the game and waved to the crowd when they were shown on the Jumbotron.

Anderson was also honored at the Strategic Air and Space Museum where the "Clayton Anderson: Heartland Astronaut" exhibit was unveiled to special guests, alongside Anderson's friends and family. Among those who imparted a few special words were U.S. Senator Ben Nelson, Executive Director of the Air and Space Museum Steve McCollister, astronaut Chris Cassidy and Anderson's wife Susan.

"The exhibit tells the story of Nebraska's first astronaut and shares his journey from his Nebraska hometown to space," said McCollister. "Anderson's story is an inspiration to all and we are excited to be a part of it."

Before being invited to view the brand new exhibit, guests heard a few words from Anderson himself, spoken from the space station. Wearing red clothing and a big smile on his face, he told the crowd how humbled he was by all the attention and hoped everyone liked the exhibit that was put together in his honor.

The exhibit runs through Jan. 6 and displays some of Anderson's personal items, including his NASA flight suit and boots, and various mementos from his high school and college days. The gallery exhibits an Extravehicular Activity glove pouch, hatch-closing device and life vest flown on Gemini XII; shuttle insulation tile flown on STS-9; a weather observation 35mm camera used and flown on Mercury Sigma 7; and a sleep-restraint pallet and liner used by astronauts today. All items are on loan from the Smithsonian National Air and Space Museum. The Kansas Cosmosphere also loaned a Soyuz spacesuit and Snoopy cap, Atlas Vernier rocket engine, and NASA launch control blast window. Interactive components were added as well, including a computer program that tests people's skills from "basic" to "no fear" to land the shuttle.


NASA/MILLS

Anderson's daughter shows onlookers how to launch rockets with compressed air.

Johnson Space Center also honored Anderson by having an official "Clay Day." Because the Husker color is red, employees came to work dressed in their favorite red shirt. They indulged in cafeteria specials such as stadium-style pizza, hot dogs, and Anderson's favorite food, beef quesadillas. "Clay Day" was also in celebration of Anderson achieving over 100 days living in space.

"Clay Day at JSC was a huge success! It was wonderful to see all of the enthusiasm and support from friends who celebrated Clay Day by wearing red," said Psychological Support Scientist Jennifer Loofboro. "Clay was thrilled to see pictures and video greetings that were uplinked from this special day. He appreciated everyone who participated!"


NASA/MILLS

Invited guests to the grand opening celebration receive a special message from Clay Anderson, who is currently working aboard the International Space Station.

Wings Over Houston

JSC recently supported an exhibit tent at the annual Clear Lake-area Wings Over Houston event. This amazing air show included the Canadian Forces Snow Birds as this year's highlight. Employee volunteers staffed the NASA tent and shared NASA's spirit of exploration with the public, and the ever-popular astronaut autograph sessions were a big hit.

NASA/HARNETT JSC2007E051290

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NASA/HARNETT JSC2007E051306

NASA/HARNETT JSC2007E051304

NASA/HARNETT JSC2007E051328

Space Center Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all Space Center employees. The Roundup office is located at 2200 Space Park Drive, Rm. 220. The mail code is AP22. Visit our Web site at: http://www.jsc.nasa.gov/roundup/online/
For distribution questions or to suggest a story idea, please call 281/244-6397 or send an e-mail to jsc-roundup@mail.nasa.gov.

Joanne Fontenot Editor
Catherine E. Ragin Staff Writer
Perry Jackson Graphic Designer

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