

BIKE TO WORK DAY AT JSC



NASA/Blair JSC2005E19547

JSC employees recently participated in National Bike to Work Day by riding their bikes to work. Riders gathered on Bay Area Boulevard at 7 a.m. on May 20 to ride their bikes along designated bikeways through Nassau Bay arriving at Nassau Bay City Hall at 8 a.m. After a short celebratory program, they rode through the front gates of JSC, made a short loop around the Center and finished in front of Bldg. 1.



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Space Center Roundup

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'It's all about the zero-g'

Their free-floating experiences in the KC-135 aircraft may have been a highlight, as Mission Specialist Jose Hernandez said, but these astronaut candidates have done much more than that during their first year of training. Read the full story on page 6.

Explore. Discover. Understand.

July
2005
Houston, Texas

Beak sends...

A MESSAGE FROM CENTER DIRECTOR LT. GEN. JEFFERSON D. HOWELL JR.



July thoughts

July is definitely an intense period for us all. Closing out the myriad of final work and reviews to get STS-114 launched into space, the turnover of key personnel at NASA Headquarters and continued new guidance toward fulfilling the Vision for Space Exploration will keep the heat up on the NASA pressure-cooker. We are living in interesting times!

Nevertheless, it would do us well to pause and consider what occurred in Philadelphia 229 years ago this month. A group of courageous men signed their names to a declaration that all people should have the right to life, liberty and the pursuit of happiness. In doing so, they put their lives and all they owned at risk and changed the course of humanity on this Earth. The effects of that declaration are still rippling throughout the world like a continuous earthquake whose end is nowhere in sight.

Let us, the beneficiaries of their bold action and the great nation that was derived from it, say a prayer of thanks for those brave souls and all of the others who followed in giving of themselves to assure our freedom and the privilege of citizenship.

Let us also rededicate ourselves to this wonderful endeavor called human space exploration. Let us be a living example of what can be accomplished by free men and women who are allowed to pursue great achievement for the good of humankind.

IT'S GREAT TO BE ALIVE AND IN HOUSTON!

Affectionately dubbed 'space nerd' is welcomed to the JSC family

by Catherine E. Borsché and Amiko Nevills

NASA Administrator Michael Griffin, or "Mike," as he prefers to be called, returned to Johnson Space Center in his new capacity to visit with JSC team members about plans for the future.

The new administrator was flanked by Rep. Tom DeLay of Sugar Land, Texas and Center Director Jefferson D. Howell Jr. during the all-hands meeting.

DeLay praised Griffin in his introduction, citing Griffin's vision, brilliance and leadership, "which the entire space community is relying on for the next few years." But DeLay saved the best for last.

"The thing that instills in me more confidence in Mike Griffin than anything else is that he is an incredible 'space nerd,'" DeLay said. "I've got to tell you, and I do say this affectionately, but we're talking about a geek of the highest order."

After the laughs died down, Griffin settled in to address the full house in the Teague Auditorium. He preferred a more casual mode of communication, sitting in a chair to talk with the employees.

"The space program of the United States needs a lot of friends, a lot of supporters, and that program has no stronger supporter than Majority Leader DeLay," Griffin said of the congressman.

As DeLay indicated in his speech, the JSC family had questions about the future and how the Center would fit into the Vision for Space Exploration. Griffin fielded questions from the audience, one of which centered on privatization and its role in space exploration.

"As capable as private enterprise is, private enterprise is not the proper vehicle to operate on the frontier. That is the role of federal research and development," Griffin said. "There's a word for companies that operate on the frontier, and the word is bankrupt."

Griffin said he believes the Agency should foster an environment where information and new ideas are shared across centers, management teams and team members.

"We exist in an environment where we must figure out how to do reliably things that are very new and very difficult. The appropriate environment that we want to create is one that



NASA Administrator Michael Griffin studies hardware in Bldg. 9 Space Vehicle Mockup Facility while the media document his visit.

not only tolerates but actively encourages dissenting views," Griffin said. "We don't do homework problems here. Sometimes it comes down to making the best guess we can. If the decision comes to me, before I make my best guess, I want to know everything about it that I can know. I would like the people who report to me to have that same view."

Griffin also indicated that the International Space Station would not be ignored amid new space exploration goals.

"Space Station is in the middle of being built. We will assemble it," Griffin said. "I don't believe anyone really plans to end Space Station operations in a particular year. My guess is that if we have an orbiting facility of value to various organizations, efforts will be made to keep it going."

Griffin also emphasized the importance of collaboration with private industry as the Agency works towards the Vision for Space Exploration.

Griffin also mentioned that although NASA has lacked firm plans to execute exploration goals, he wants to show the public where the Agency is headed by the end of the fiscal year.

JSC was the seventh of several NASA centers on Griffin's tour schedule. After the town hall meeting, Griffin met with reporters for a brief press conference, which was followed by a tour of mockup facilities and Shuttle tile repair demonstrations.

Two's Company

SPECIAL ASSIGNMENT

The Shuttle gets some company for two upcoming launches

by Catherine E. Borsché

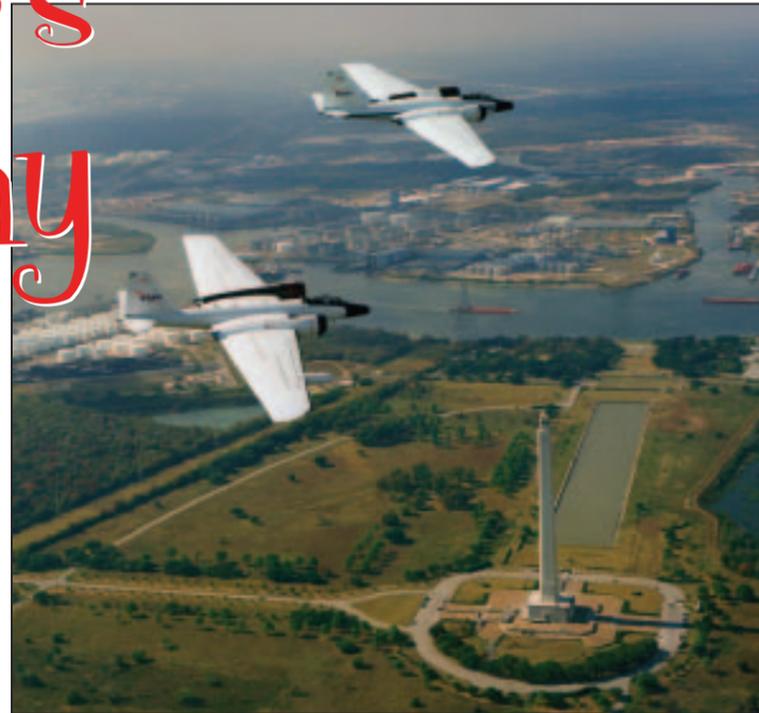
The Space Shuttle will not be alone as it soars into the sky for Return to Flight. This time around, WB-57 chase planes will escort the orbiter into the upper reaches of the Earth's atmosphere, taking video and images while trailing behind.

These high-flying chase planes will provide NASA with extra "eyes in the sky" to watch *Discovery's* flight and help safeguard its crew.

The jets will carry innovative, on-board video imaging systems, dubbed the WB-57 Ascent Video Experiment (WAVE). The system will capture detailed images of how the Space Shuttle behaves as it climbs toward orbit.

"No one has ever built a sensor that can do what this can do," Andrew Roberts, WB-57 program manager, said. "The WAVE System has an 11-inch telescope on it with a 4.2-meter focal length, and off the back of that it has both a high-definition TV camera and an infrared camera."

"Shuttle video captured by the chase vehicles will help us see the launch in greater clarity than ever before," said Bob Page, project manager for NASA's Inter-Center Photography Working



NASA/locke 599-13964

Group at JSC. "Along with cameras on the ground and in and on the Shuttle itself, this imaging system will provide an unprecedented look at Shuttle liftoff and atmospheric flight."

A large amount of legwork goes into the daunting task of having the planes keep pace with *Discovery* to obtain the imagery.

"We'll launch the planes a few hours before the actual Shuttle launch to get into position. We have developed flight patterns, and we'll be able to fly those to track the Shuttle," Roberts said. "The planes will come towards the Shuttle as it's launching and then start turning as it begins to pass us. When the Shuttle comes past us it's going to be up at about 120,000 feet – pretty far up above us."

Above: Johnson Space Center is the home of the NASA WB-57 High Altitude Research Program. Two fully operational WB-57 aircraft are based near JSC at Ellington Field. Both aircraft have been flying research missions since the early 1960's.

The jets will keep pace with *Discovery*, flying at a distance of 15 to 20 miles. The WAVE systems will track the Shuttle for approximately 150 seconds, from liftoff to main engine cutoff. However, the jets will get their best views of the Shuttle during the separation of the Solid Rocket Boosters.

By using the WB-57 planes to obtain the imagery, scientists will be able to get excellent resolution from the cameras.

"The ground cameras have to look through the atmosphere to see the vehicle. We fly above 90 percent of the Earth's atmosphere," Roberts said. "Where we're flying, we should get some very clear information with little atmospheric effect."

The WB-57 planes are a perfect fit for the experiment. Once NASA video technicians built and tested the high-definition imaging system earlier this year, they needed a way to get the complex, bulky WAVE systems airborne.

Each system had to be mounted in the nosecone of the chase planes using a large gimbal and a stabilizing anchor to keep the cameras focused on the Shuttle, even if turbulence caused the plane to dip or drift.

Both planes have been flying research missions since the early 1960's, and continue to be an asset to the scientific community. The WB-57 is capable of flying at altitudes well over 60,000 feet. At 12 miles high, the environment is very inhospitable to people. In fact, there is less than 1 psi of atmospheric pressure and temperatures approach -70° Fahrenheit. For these reasons, flight rules mandate that for flight above 50,000 feet, all crewmembers must wear a full pressure suit similar to what astronauts wear. If the cabin was to depressurize or the crew was forced to eject, it would be the only means of survival.

While Roberts fondly refers to the plane as a "great Tinkertoy airplane" due to its ability to be reconfigured for different missions, he emphasizes that "it's the only airplane that can take a '57 Chevy up to 65,000 feet."

The WAVE will be conducted during the STS-114 Return to Flight mission and the STS-121 mission thereafter. Since this study is in the experimental phase, there are currently no plans to implement the technology for all future missions.

"Once the experiment is over, which is after the first two launches, we will then decide whether or not we want to make this an operational thing. For instance, we may want to tweak it up a little and do different things with it," Roberts said.

The WAVE project has been made possible through teamwork from all NASA centers. A truly One NASA endeavor, this unique technology was only a concept on a drawing board in June 2004. The concept will become a reality when *Discovery* lifts off for the STS-114 mission.

"Across the Agency, we are all working to make the Space Shuttle safer," Rodney Grubbs, Marshall Space Flight Center project lead, said. "We're excited about what our imagery might mean for the safety of our astronauts."



NASA/Scova JSC2005E1049

The WB-57 jet plane can fly at altitudes above 60,000 feet, which makes it the perfect vehicle for tracking and taking imagery of the Space Shuttle as it launches into space.



NASA JSC2005E21991

Two WB-57 jet planes, normally used by NASA for high-altitude weather research, will help track *Discovery* during STS-114 and *Atlantis* during STS-121. The jets will carry a swiveling, nose-mounted video recording system designed to capture visible-light and infrared imagery of the Shuttle as it lifts off on its journey to orbit. The primary optic lens, a 4,150-millimeter reflector telescope, can be seen on the right of the WAVE turret.

ASCAN "EXPLORATION" CLASS OF 2004

Beyond reality TV

by Amiko Nevills

They were ejected, spun, strapped, blindfolded, dunked in water, looped, rolled, flipped, floated, left in a forest, taught to eat leaves and roots, "injured" and rescued.

It may sound a lot like a script from a hit reality show, but these challenges surpassed any task ever seen on an episode of "Survivor" or "Fear Factor."

NASA's astronaut candidates, selected May 6, 2004, recently marked a major milestone – the completion of a year of training toward becoming the next generation of space explorers. One of their first tasks after selection was survival training.

Survival is the most critical factor in human space exploration. Unlike television reality shows, however, real survival is based on teamwork rather than elimination.

"Working as a team, whether it was through water survival training, ground or flight training, has been the most valuable lesson we've learned so far," said Educator Astronaut Joe Acaba. "Those stronger in some areas helped others and vice versa. We got through it all together."

The candidates, mere strangers 12 months ago, now consider each other family. It is through this common bond that their teamwork is recognized.

"They have great enthusiasm for every challenge and have tremendous dedication to each other, which makes them a special group," said Astronaut George Zamka, the astronaut candidate class mentor. "You can take a lot of real smart, real



NASA's newest class of astronauts gathers for a group photo at the conclusion of land survival training at the Naval Air Station in Brunswick, Maine. From the left, front row, are Dorothy M. Metcalf-Lindenburger, James P. Dutton Jr., Christopher J. Cassidy, Robert S. Kimbrough, Joseph M. Acaba and Thomas H. Marshburn. From the left, back row, are Satoshi Furukawa, Shannon Walker, Richard R. Arnold II, Robert L. Satcher Jr., Akihiko Hoshide, Naoko Yamazaki and Jose M. Hernandez. Hoshide, Yamazaki and Furukawa represent the Japan Aerospace Exploration Agency.

aggressive individuals and put them together in one place, but you don't get a team like they have unless each one decides to put the team first."

Most of the class of 2004 astronaut candidates – a group of schoolteachers, doctors, scientists, engineers, military pilots and a Navy SEAL – met for their first training assignment at the Pensacola Naval Air Station in Florida to start what was only the beginning of extreme challenges of wit and tenacity. Pilots Jim Dutton and Randy Bresnik, and Mission Specialist Shane Kimbrough, who had already obtained military water survival training, met the rest of the class later in Houston for their next training missions.

Tapping into a diverse knowledge base, this class includes three educator astronauts chosen by NASA to help inspire the explorers of tomorrow.

"Having the educator astronauts in the group helps make us mini-educators to be more effective at inspiring the next generation of explorers," Bresnik said.

Mission Specialist Shannon Walker added that having international partners in the class proves to be valuable to the class as a whole.

Three Japan Aerospace Exploration Agency astronauts – Akihiko Hoshide, Satoshi Furukawa and Naoko Yamazaki – are training with the 11-member astronaut candidate class.

"Space exploration is an international endeavor," said Duane Ross, astronaut training program manager at Johnson Space Center. "To work with these people on a day-to-day basis can only add to that partnership to make space exploration successful."

Weeks of water survival activities, ejection techniques and T-34 simulations were followed by T-38 jet flights, emergency landing practices and virtual reality parachute jumps – all interspersed with studying flight texts and procedural manuals.

The astronauts-in-training then took a field trip to the wilderness of Maine and learned how to live off the land using its natural resources and their own ingenuity and teamwork.

After visiting each NASA center to learn more about the scientific research behind the scenes, they got a feel for weightlessness and a 20-second "walk" on both the Moon and Mars aboard the KC-135 aircraft. Rollercoaster-like climbs and dives, which simulate the weightless environment of space on

the aircraft, were a collective favorite among the astronaut candidates.

"It's all about the zero-g," Mission Specialist Jose Hernandez said with a grin.

With only eight months left until completion of their initial training, the astronaut candidates are now hitting the books and spending a lot of time in classrooms. They are studying everything on the orbiter systems, ranging from propulsion to environmental controls and all areas of Shuttle vehicle operations.

They have begun to study Russian and will soon embark on learning about the International Space Station, astronauts' orbiting home away from home.

"We've been very happy with this group," Ross said. "They're a wonderful close-knit group, a great group to work with."

Selected as the first astronaut class since President George W. Bush announced the nation's Vision for Space Exploration, the class of 2004 meets tough expectations.

Preparing for spaceflight is hard work. Preparing to take the next steps on a journey that will take humans back to the Moon and onward to Mars is even more difficult, but is something this elite class looks forward to.

"Adding the human element to the Vision, and seeing the Agency take actual steps toward that Vision, is the best part of this," said Educator Astronaut Dottie Metcalf-Lindenburger.



Left: Astronaut Naoko Yamazaki, representing the Japan Aerospace Exploration Agency, boils water over a campfire during 2004 astronaut candidate land survival training in the wilderness of Maine.

The newest class of astronauts conducts an emergency egress drill during land survival training in the wilderness near Brunswick, Maine. In the foreground, left to right, astronaut candidates James P. Dutton Jr., Akihiko Hoshide, Dorothy M. Metcalf-Lindenburger, and Satoshi Furukawa use a makeshift gurney to extract fellow astronaut candidate Robert S. Kimbrough from the woods. In the back, Joseph M. Acaba, Richard R. Arnold II, Robert L. Satcher Jr. and Thomas H. Marshburn carry Christopher J. Cassidy.

NASA launches 2005 Explorer Schools

by Amiko Nevills



Above: JSC's Deputy Director of Education Phil West explains some of the challenges of space travel while he demonstrates an astronaut spacesuit.

Right: NASA's Chief of Education Adena Williams Loston addresses students, teachers and administrators at the 2005 NASA Explorer Schools launch ceremony.



NASA/Blair JSC2005E19310

NASA/Blair JSC2005E19315

ALONG with about 300 students and educators across the country, NASA rolled out to launch another 50 schools to explore new ways of learning math, science and technology.

The NASA Explorer Schools are the heart of a unique educational program that reaches elementary- to high-school pupils in all 50 states, Puerto Rico and the District of Columbia.

The 2005 class of NASA Explorer Schools, which spans 25 states, was named recently at Space Center Houston, the official visitor's center next to Johnson Space Center, during a ceremony that launched the program's third year.

Before countdown, some students of the 2003 and 2004 Explorer classes got a quick lesson in spacesuits, spacewalks and the laws of inertia and gravity.

Student volunteers took the stage as Phil West, deputy director of education at JSC, used a balloon to demonstrate spacesuit pressurization and answered questions like "What happens when an astronaut sweats?" and "How does an astronaut breathe in a spacesuit?"

To begin the liftoff ceremony, NASA's chief education officer, Adena Williams Loston, greeted students and the educators of the newest class of Explorer Schools.

"The entire universe – the planets, stars and distant galaxies – will be your classroom," Loston said. "As NASA pursues the Vision for Space Exploration, we want to prepare you for tomorrow's space exploration challenges, when we send a combination of human pioneers and robotic pathfinders to the Moon, Mars and beyond."

A breaking message from the Expedition 11 crew in space on the International Space Station was played for the students. Commander Sergei Krikalev and NASA ISS Science Officer and Flight Engineer John Phillips welcomed the class of 2005 Explorer School from afar. "See you in space," Phillips said, signing off.

Eighth-grader Latasha Sharp, who attends a NASA Explorer School at Dr. Anna Howard Shaw Middle School in Philadelphia, Pa., talked to the group about her experiences in the program.

"Because we are a NASA Explorer School, many universities and community organizations have become our partners," Sharp said. "I met mathematicians who taught me how math connects with everyday life. I also met professors and graduated students who taught me robotic designs and programming."

"With the support of my parents and teachers, these experiences make my dream of becoming an engineer more realistic," she said.

Astronauts Ellen Baker, Barbara Morgan and Franklin Chang-Diaz talked with students about their inspirations and the impact education has had in their careers today.

Baker, who graduated from Bayside High School in New York, credited her parents and teachers with supporting her to pursue her dreams.

"My heroes were my teachers," she said. "Schools had numbers instead of names. My high school was so big there were 1,400 kids in my graduating class. Even though I was one of many, many students, my teachers took great care in each of us, and they supported me and they nourished my brains and they encouraged me."

NASA's first educator astronaut Morgan, a former third-grade teacher, thanked the teams for allowing her the opportunity to work with them during the NASA Explorer School Symposium.

"I have seen education at its very best," Morgan said. "The students, teachers, parents, administrators and NASA folks all have been working together in teams to learn. You've been exploring; you've been experimenting and you've been discovering to open doors to great opportunities, and what I think are great opportunities for our country and for the world."

Veteran of seven spaceflights Chang-Diaz told students that he had always dreamed of becoming an astronaut. He talked about how the early days of spaceflight inspired him to pursue his dreams.

"We are charting a new course," Chang-Diaz said. "We have great hopes, but we face a lot of challenges. The ships that will take us to Mars will be like nothing we've ever seen, but maybe you will get to design that ship. We have great hopes and aspirations for you."

The Explorer Schools Program is sponsored by NASA's education office in collaboration with the National Science Teachers Association. Each year, the program establishes a three-year partnership between NASA and 50 Explorer Schools to enrich student learning across the nation.

Eighty-seven percent of all NASA Explorer Schools are in high poverty areas, and 76 percent represent predominantly minority communities. Ninety-eight percent of the 2005 class is in high poverty areas, and 82 percent in predominantly minority communities; 19 are in Hispanic communities.

During the three-year partnership, Explorer Schools work with NASA people and others to create and apply strategic plans for staff and students. Learning agendas promote and support the use of NASA content and programs to address the teams' local needs in mathematics, science and technology education.

"NASA has helped to change my life by exposing me to careers and student opportunities while increasing my knowledge of the universe, solar system and our planet Earth," Sharp said.

Keeping an eye on the sky

by Brad Thomas

Weather affects many aspects of everyday life. People often turn to weather forecasts to help plan activities and it is no different with human spaceflight endeavors. Flight controllers at the Mission Control Center and NASA officials turn to the Spaceflight Meteorology Group (SMG) at Johnson Space Center to provide forecasts for Space Shuttle missions and other activities.

Even though SMG is part of the National Weather Service (NWS), its duties are different than the more common regional weather office.

"A regional weather office does forecasts, statements, watches and warnings for a set of counties around its area," Frank Brody, SMG chief, said. "We provide support for NASA and the human spaceflight program."

That support includes providing weather forecasts and briefings to NASA personnel. SMG, which is part of the Mission Control team, provides pre- and post-flight weather analyses and documentation for Space Shuttle missions. The group also informs the JSC community of adverse weather impacting the Center.

The SMG forecasters serve as meteorological consultants to the JSC community for current and future spaceflight endeavors. In addition, SMG develops tools and techniques to enhance its weather support and to improve the science of meteorology.

For a Space Shuttle mission, SMG provides around-the-clock operations for a 36-hour period before a scheduled launch. While the Shuttle is in orbit, the group provides mission support each day, and resumes around-the-clock support 36 hours before landing. If there are delays, they will maintain 24-hour support until the orbiter touches down.

"In the event they (the crew) have to come home early, we generate forecasts for Kennedy Space Center (KSC), Edwards Air Force Base and the White Sands Test Facility," Karl Silverman,



SMG forecaster, said. "We also provide upper winds forecasts for the emergency landing sites around the world."

The NWS, originally called the Weather Bureau, has provided support for NASA missions dating back to the early days of human spaceflight. The NWS has supported such programs as Mercury, Gemini, Apollo and Shuttle.

In the 1960s, the spaceflight meteorology branch of the Weather Bureau had offices located at JSC, Cape Canaveral, Fla., Miami, Honolulu and Washington D.C. When NASA tasked each Center to select its weather support structures in the late 1970s, KSC elected to use the U.S. Air Force and JSC chose to retain the NWS.

SMG works with the U.S. Air Force 45th Weather Squadron, which forecasts weather for Shuttle and uncrewed rocket



From left to right: Spaceflight Meteorology Group Forecasters Doris Hood, Richard Lafosse (standing), Karl Silverman and Dan Bellue analyze and discuss weather conditions for a Space Shuttle landing site.

launches from KSC and Cape Canaveral. The Air Force forecasters provide daily weather support for launch processing operations at KSC, toxic dispersion weather support and Shuttle ferry flight support.

SMG has been busy during the past two years, working to increase and improve its training during the lag in Shuttle missions.

In addition to participating in mission simulations with Mission Control, SMG has added two simulations specifically designed to help the forecasters. These training exercises, one for launch and one for landing, use the current weather conditions on the days of the exercises.

"Most simulations were done without weather as a main purpose," Brody said. "These used real weather. Real weather gives forecasters better training."

The launch and landing simulations involved people from JSC, Marshall and KSC as well as Mission Control. Richard Lafosse, SMG forecaster, said the simulations have helped in their efforts with other weather and spaceflight groups. "We have really increased our communication," he said.

During hurricane season, the SMG serves in advising JSC officials. The forecasters at the National Hurricane Center in Florida are responsible for tropical system forecasts, but the SMG personnel are able to listen to the forecast discussions. This allows SMG to relay more in-depth information to officials who are considering in which hurricane condition, or level of preparation, to place JSC. SMG also provides 24-hour support for hurricanes if requested by JSC.

Silverman said the constant state of change in weather and SMG's global view is what he likes most about being a meteorologist. "It is never the same," he said. "It is always a challenge. We have an opportunity to see weather happening all around the world."

Brody said that working with the people involved in the space program gives him the biggest thrill. "It is being in a position to be an expert and taking that expertise to help other experts," he said.

For more information on the Spaceflight Meteorology Group and current JSC forecasts and conditions, visit: <http://www.srh.noaa.gov/smg/>.

NASA launches new hurricane Web page

NASA recently launched an Internet resource page highlighting the Agency's diverse hurricane research. The site opens just in time for the 2005 Atlantic Ocean hurricane season, which officially runs from June 1 through November 30. The information is available on the Web, at:

<http://www.nasa.gov/hurricane>

The Web page is a compilation of data from various satellites and computer models, and it explains why and how NASA investigates hurricanes. It also covers the relationship of NASA's research focus as compared to other agencies' operational emphasis.

The site provides access to data about active hurricanes and famous past storms. Users can search by hurricane topic, such as how storms are formed, how they are measured and how they affect land or ocean life. The multimedia section of the site features animation, satellite, video and still images of hurricanes.

