

Beak's Bash

BEAK'S BEACH BASH, featuring the Flightline Follies, took place at JSC in June. This much anticipated employee event was an action-packed, fun-filled evening of zany entertainment. The "bash" was held in Hangar 990 at Ellington Field and included a social hour, catered dinner, and a show with dancing that lasted until midnight.



NASA/Blair JSC2005E2990



NASA/Blair JSC2005E2996



NASA/Blair JSC2005E2990



NASA/Blair JSC2005E2943

Space Center Roundup

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Discovering new frontiers

As astronauts prepare for possible long-duration missions to Mars they must learn how to make the transition from their cozy earth environment to the sterile environment in space. Read more about the psychological preparation and training astronauts must undergo before taking off on their journey into the unknown on page 8.

Explore. Discover. Understand.

August
2005
Houston, Texas

Guest columnist

A MESSAGE FROM DEPUTY CENTER DIRECTOR BOB CABANA



Dog days of Summer

It might be cold in the winter, but August in Minnesota is hot. As a young boy spending my summers working on the family farm, I liked nothing better than to get out of doing my chores and float down the Mississippi River on an inner tube, or just lie in the grass in the shade of an old oak tree with our dog Shep and watch the clouds go by. It sure beat going around in circles on an 80 acre field mowing and raking alfalfa. (Going around in circles isn't all bad, however; it's just a lot better at 17,500 miles per hour in the Shuttle.)

The pace of life today is a lot different than it was then, especially here at the Johnson Space Center. We don't seem to have a lot of time to just sit back and watch the world go by. We're challenged by Return to Flight, completing the International Space Station and supporting the crew on orbit, and preparing for and executing a new vision for exploration. We work long hours every day and, when we get home, we have to cram the rest of our life into the time remaining. We rush to get our exercise in, we rush to get our yard work done, we rush to get the chores done around the house, and it's hot. It's easy to get dehydrated and to get just plain tuckered out, and that's when accidents happen. When we're hot and sweaty and tired, it's easy to slip off that ladder when we're cleaning out the rain gutters. It's easy to not pay attention and back over something in the driveway. It's just plain easy to do something dumb, and it also affects our ability to make good decisions when we're at work, when clear thinking is critical.

There's a reason they're called the dog days of summer. Dogs can be pretty smart and set a good example laying out in the shade on a hot August afternoon. So take some time for yourself and learn to relax a little. Don't rush, work at an easy pace when you're out doors, drink plenty of fluids and don't become a safety statistic. We need everyone on the team functioning at their best performance if we're going to succeed.

Keep up the great work and let's go exploring!

Woof,

Mighty Dog (from Dog Crews STS-53 and STS-88)
a.k.a. Bob Cabana, Deputy Center Director

3... 2... 1...

Get ready to read all about the STS-114 mission in the September issue of the Roundup!

We've got spirit, yes we do

JSC honored with VPP Spirit Award

by Catherine E. Borsché

For NASA, safety and success are synonymous with one another. Johnson Space Center was recently awarded tangible proof of its dedication to safety with the Occupational Safety and Health Administration (OSHA) Voluntary Protection Program's (VPP's) Spirit Award.

JSC has long been a participant in VPP, which was designed to promote effective worksite-based safety and health. In the VPP, management, employees and OSHA work cooperatively to implement a comprehensive safety and health management system.

"The VPP Spirit Award is given to one VPP site that has demonstrated commitment over and above the stringent requirements and philosophies of VPP. The competition is fierce for this award, especially for a government agency such as NASA, which operates on a very tight budget," said Elmer Johnson, assistant chief for the Safety and Test Operations Division.

To comprehend the magnitude of this achievement, consider that JSC was recognized out of 350 government and private industry sites within Region VI. Region VI consists of Texas, Louisiana, Arkansas, Oklahoma and New Mexico.

JSC excelled in many areas to win this award.

First, JSC has two members on the VPP Participants Association Board of Directors. Elmer Johnson is the director-at-large, and Sandy Griffin is the current vice chairperson.

"Participation on the Board of Directors enables NASA to gain insight into the inner workings of the program and the items not necessarily written in a requirements document," Johnson said.

JSC also sent a Special Government Employee (SGE) to help OSHA during a VPP audit at another site. Johnson indicated that sending an SGE to help during an audit creates a "win-win" situation because OSHA gets free help and NASA gains insight into the latest target areas within OSHA. It also helps NASA employees see how other industries implement VPP.

Another way JSC shone is through VPP conference participation. At regional and national conferences, JSC has very visible representation.

"Sandy Griffin is also the conference committee chair and does a fantastic job," Johnson said. "She calls for volunteers throughout the region from the nearly 350 sites that are recognized as VPP quality and sites that are seeking this prestigious designation."

This award means that JSC is setting the bar high for the rest of the region.

"There is a large JSC and NASA presence within VPP, and the Spirit Award is a way of recognizing all the efforts that JSC employees and management have put forth to keep the momentum high within the region," Johnson said. "As we move toward Return to Flight, it is more important than ever to remain vigilant towards safety. It is everyone's goal at JSC to get back to a flight mode, but we cannot afford to lose sight of safety along the way. Safety applies everywhere, and we must remain vigilant for the safety and health of our families and coworkers."



Elmer Johnson and Sandy Griffin, both members of the VPP Participants Association Board of Directors, helped JSC win the VPP Spirit Award by enabling NASA to gain insight into the inner workings of VPP.

Robots descend on the NBL

by Kelly Humphries and Kimberly Harle

Overcoming underwater was the name of the game at JSC's Neutral Buoyancy Laboratory (NBL) the third weekend in June as some 400 students from across North America competed in the fourth annual national finals for student-built underwater remotely operated vehicles (ROVs).

Forty-two student teams designed, built and operated the underwater robots that competed June 17–19 at the Sonny Carter Training Facility. The event, organized by the Marine Advanced Technology Education (MATE) Center and the Marine Technology Society, is designed to help students develop technical, problem-solving and teamwork skills that will help them in future careers in ocean and space science, engineering and exploration.

Every year, the competition challenges students to develop undersea and space ROV technology that can move, grapple, carry, retrieve, install, sample and measure. ROVs come in two classes and all shapes and sizes. They are made of PVC, chicken wire, kitchen tongs and foam pool "noodles" for buoyancy. Controlled and powered by tethers, they are guided by topside student pilots using only video images from the ROVs to "fly" the vehicle and perform tasks.

"The goal this year is to help you see how technology developments in ocean work can be used in space and vice versa, to help you see how similar these two environments are," Jill Zande, MATE competition coordinator, told students at the competition's June 17 kick-off ceremony held at Space Center Houston.

"You came to compete, and many of you have your eye set on first place," Adena Loston, NASA chief education officer, told the competitors. "None of that matters to NASA. I'm here because all of you are winners to us. It's competitions like these that we hope will inspire you to pursue careers in math, science, technology and engineering."

The scenario faced by the larger explorer-class robots this year involved a mission to the waters that lie beneath the Jupiter moon Europa's ice-crust surface. The robots had to descend through a simulated ice hole to repair a communications link with a science package, retrieve data probes, take a fluid sample and measure the temperature of an underwater vent.

Explorer team robots competed on the floor of the NBL, a full 40 feet below the surface. First place went to the Eastern Edge Robotics Team, Mt. Pearl, Newfoundland, Canada. Second place went to Monterey Peninsula College, Calif., and third place went to Carl Hayden High School, Phoenix, Ariz.

The smaller "Ranger" teams had to cap an old oil well, repair a damaged subsea telecommunications cable and install a new instrument on the Hubble Space Telescope while submerged on

a platform 15 feet below the surface. High Technology High School, Lincroft, N.J., won. Second and third places went to two Texas teams from the Career and Technology Education Center, Humble, and Pasadena Memorial High School.

"It was a great experience," said Michael MacIntyre of the University of San Diego High School in California. "We learned a lot about teamwork and cooperation among other practical and valuable skills, like soldering."

"It's definitely worth the work and long hours," said Sayre Jeannet of the Alaska Polar Submersible Team. "It really teaches you how to work with other people and how to meet deadlines. It was a great way to apply what you learn in class."

The students also took part in an interactive event with "aquonauts" 60 feet underwater inside National Oceanic and Atmospheric Administration's (NOAA's) Aquarius underwater habitat off Key Largo, Fla. Astronaut Clay Anderson, who lived aboard Aquarius as part of the NASA Extreme Environment Mission Operations Project, was at the ceremony to explain how the only underwater laboratory in the world is being used to train astronauts preparing for long-duration space missions.

"Every element of the competition worked very well," said Lisa Spence, an NBL flight lead for the Mission Operations Directorate, who planned and coordinated the event with MATE and other JSC organizations. "I saw a lot of interaction between the volunteers, a lot of information-sharing with the students and very good comments on how friendly, helpful and professional all of our folks were."

Almost four dozen volunteers from JSC, all dressed in bright yellow NBL T-shirts, helped keep things running smoothly. Spence said JSC plans to host next year's regional competition, and that MATE is seriously considering asking the NBL to host next year's finals. The competition is supported by funds, equipment and facilities donated by the National Science Foundation and NOAA's Office of Ocean Exploration and several space and oceanic exploration companies.

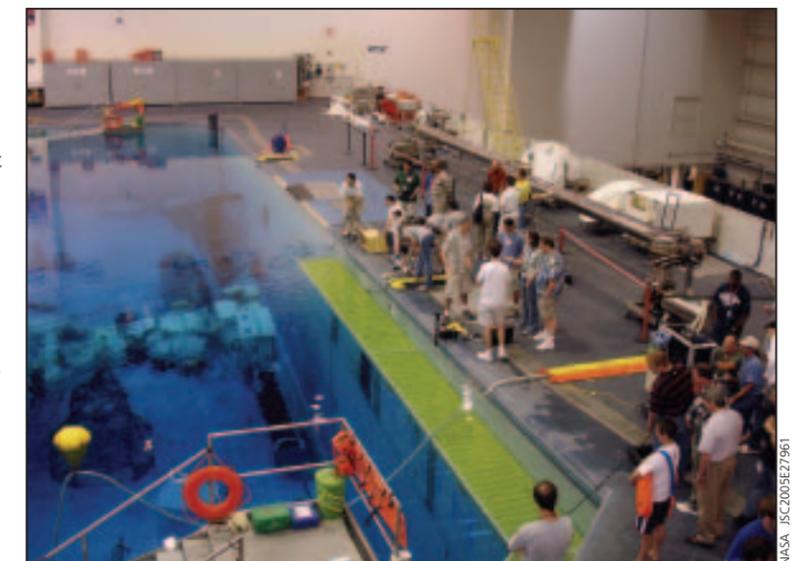
"It's just a ton of fun to see the creativity and energy that these kids have," said Spence, who organized the past three Texas Regional competitions. "It's a great

opportunity for those of us who work at the NBL to showcase our facility, especially to a group of kids who have the potential to be our coworkers in a few years."

For more information about the MATE Center or the competition, visit: <http://www.marinetech.org>



Before the students arrived, their rovers had been shipped to the NBL's light manufacturing facility (LMF). After a test run, the students were able to make last minute modifications to the underwater robots in the LMF.



The Explorer class, which consisted of high school and college students, competed on the very bottom of the NBL's pool – 40 feet deep. Their scenario involved restoring communications with an instrument package and retrieving samples from the waters that lie beneath the Jupiter moon Europa's ice-crust surface.

Setting the date

Teams work to select Shuttle launch windows

by Kendra Phipps

Wedding planners have got nothing on JSC's Flight Design and Dynamics Division.

Sure, it's hard to coordinate caterers, florists and musicians, but that's nothing compared to the task of flight designers and flight dynamics officers – literally making sure that the heavens are aligned for a Space Shuttle launch. It is their job to ensure that a launch window has the right combination of factors such as orbits, inclinations, planetary rotation and sunlight.

This is not a job for someone who slept through physics class.

"A Flight Dynamics Officer is responsible for all things related to Shuttle trajectory – where it is and where it's going," said Bill Tracy with United Space Alliance (USA). Tracy is the lead Flight Dynamics Officer (FDO) for STS-114. The job includes narrowing down the possible times that a Shuttle could launch.

Narrowing it down

The initial launch date selection process is up to NASA Headquarters and the Shuttle and International Space Station Programs, said Steve Staas, STS-114 Flight Design Manager with USA. After that, FDOs at JSC help in the final selection by looking at factors such as lighting and the "in-plane time."



NASA 01PPI468

In-plane time refers to the point when the plane of the International Space Station's orbit is over the Kennedy Space Center (KSC) launch site. Launches must occur within five minutes of the in-plane time to assure a rendezvous with the Station.

Tracy said that "we can launch any day of the year" because the in-plane time occurs twice every day.

However, only one window per day is usable due to the inclination, or angle, of the Station's orbit. The ascent trajectory must be headed from south to north for a Shuttle launch. If the Shuttle were to launch while the Station was headed south, the orbiter could not safely discard its External Tank into the ocean, nor could it reach its abort landing sites if needed.

Along with in-plane time and inclination, lighting must be factored in.

Good lighting is crucial for observations of the Shuttle's External Tank during launch and ascent; experts on the ground need to keep tabs on the recent adjustments made to reduce foam debris. Many cameras, including the orbiter's umbilical camera and the crew's handheld cameras, will be scrutinizing the tank. With that in mind, FDOs look for launch opportunities that will provide ample sunlight for a clear view.

But even the best planning can't guarantee a sunny day. And unlike a wedding, rain isn't considered good luck for a launch. That's where Frank Brody and his team come in.

What about the weather?

Brody is the Chief of the National Weather Service Spaceflight Meteorology Group (SMG) at JSC. One of the group's roles is to examine weather and climatology for launches and landings.

"Climatology is what you expect; weather is what you get," Brody said.

He said that, during the 80s and much of the 90s, when most missions weren't docking with a space station, climatology was a "prime factor" in selecting a launch window. Without the restriction of in-plane time to meet rendezvous requirements, experts were free to set a launch window during a summer morning if the mission's science objectives allowed, knowing that thunderstorms are less likely in Florida at that time of day.

Once rendezvous missions became the norm, however, and launch windows shrank to five or 10 minutes per day, climatology could not play as large a role in window selection. But weather – the actual, real-time conditions at launch and landing sites – is still vitally important.

When it comes to evaluating launch day weather, Brody said that there are two sets of rules involved. One set is called the Launch Commit Criteria (LCC), monitored by weather experts,

Air Force officials and launch controllers at KSC. The other set, the flight rules for an abort landing, are watched by SMG and JSC flight controllers to make sure that, if the Shuttle had to make an emergency landing, the conditions would be safe to do so. This involves watching weather conditions not only at KSC, but also at possible landing sites in New Mexico, California, Spain and France.

"Basically, you can't launch unless you can land," Brody said. For each possible landing site, his team monitors conditions such as cloud ceiling height, visibility, cross-wind speed and location of nearby thunderstorms.

"This is not a job for someone who slept through physics class."

It is possible that the LCC guidelines indicate a "go" for launch while the abort landing flight rules say "no go," and vice versa; but the decision to launch lies with the flight director, launch director and, ultimately, Deputy Shuttle Program Manager Wayne Hale, who chairs the Mission Management Team.

Even after in-plane time, orbit inclination, lighting and weather have been coordinated as well as possible, a launch could still be postponed due to a hardware problem or a number of other factors. In that case, the big event is bumped to the next available window. The process continues until the conditions are right and the launch is as safe as it can be.

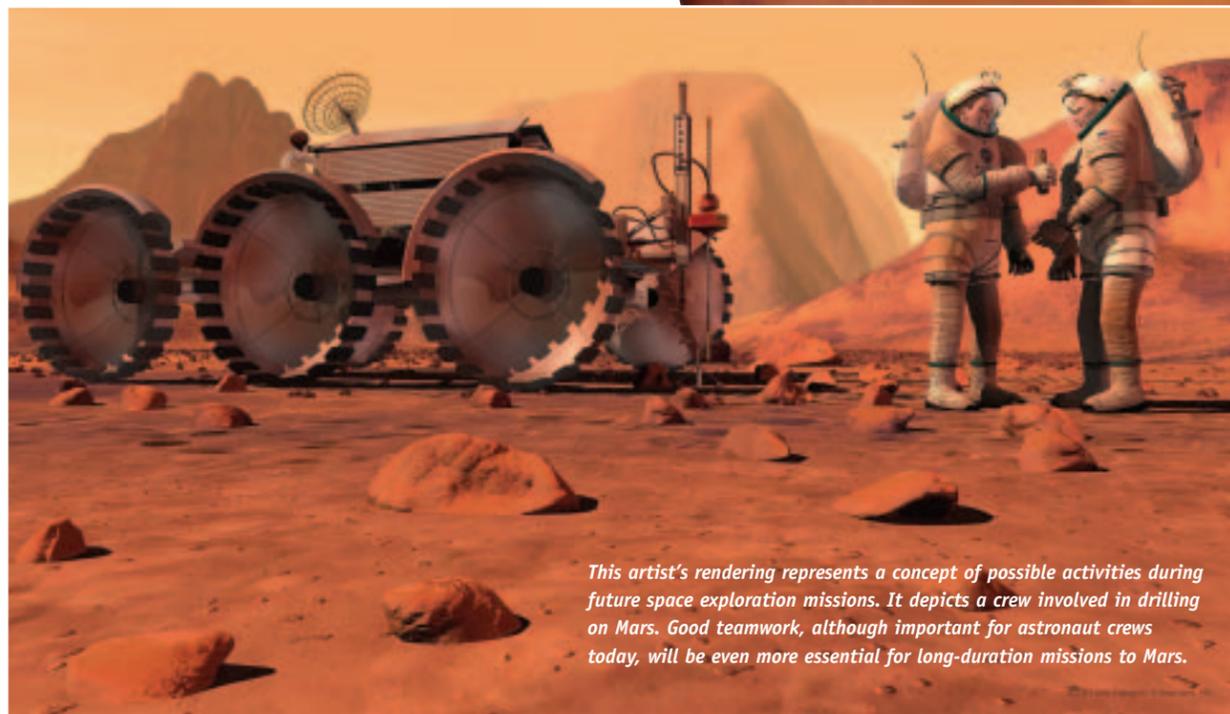
All the effort is worth it when a Shuttle lifts off the pad, said Tracy.

"I have a front-row seat to the best show in the world," he said.

Mind Games

by Catherine E. Borsché

Going to Mars? It may not be as much of a blind leap into the unknown if you consider what previous explorers had to do to explore unfamiliar territory. Columbus sailed across the ocean with only his crew, not knowing whether they would fall off the edge of the Earth.



This artist's rendering represents a concept of possible activities during future space exploration missions. It depicts a crew involved in drilling on Mars. Good teamwork, although important for astronaut crews today, will be even more essential for long-duration missions to Mars.

NASA/JSC2004E18846

From a behavioral science standpoint, the goal is to ease the crew's transition into the sterile environment of space.

"It's important to keep them based, because they're still 'Earth creatures,'" Walter Sipes, JSC behavioral science psychologist, said.

To help create a "homey" space environment, "there's a whole buffet of things we send them: e-books, photos of the family, care packages that the family can put goodies in and decorations for holidays," Sipes said. "It's all about maintaining life as normal as possible, especially for a long trip."

In addition to home comforts, keeping in contact with family is vital. The International Space Station is set up so that the crew has e-mail access and an IP (Internet protocol) phone, or Internet phone. The IP phone allows the crewmember to call any phone number on Earth, as long as the Space Station is in range of certain antennas. There is also a weekly private family conference, which enables the crewmember to stay connected with loved ones. Keeping in touch is also important for the families of the crew.

"If we keep the family happy, then the crewmember is happy," Sipes said. Issues at home don't stop just because an astronaut is in space. So, the less complicated family matters are for an astronaut, the better. "That's one less thing that the crewmember has to worry about when they're in space."

For future long-duration missions, NASA will work to continue such programs.

Psychological issues are taken into consideration long before missions even begin. During astronaut selection, the finalists visit JSC to complete psychological and medical evaluations. The psychological evaluation lasts four hours and is conducted in an interview format.

"We look at how suitable they would be. Will this person do well as an astronaut for long-duration or short-duration missions? What kind of experience do they have? Have they worked with other cultures – been in leadership or followship roles? What are their experiences to threats of danger? Those kinds of questions get asked," Sipes said.

Sipes noted that, unlike the original seven astronauts, they no longer challenge astronaut candidates to decipher ink blots. Testing is much more straightforward and used to determine whether there is a history of mental illness or depression.

For missions, the central theme to the happiness of a crew is simply: teamwork.

"You need competent people to work the equipment. From a psychological point of view, you can have competent people, but they also have to work well as a team," Sipes said.

Successful team relationships are nothing new to NASA.

"It's definitely going to take a special person that can handle living with just a few other people for a long period of time," Fiedler said. "People have successfully done this in the Arctic and Antarctica. The whole history of exploration shows that it can be done, but it's just tough."

Stress between coworkers still exists in space. The only difference is that while Earthlings can take a deep breath and



Cosmonaut Yuri I. Onufrienko, Expedition Four mission commander, flanked by Astronauts Daniel W. Bursch (left) and Carl E. Walz, both flight engineers, pose for an informal crew photo in the Zvezda Service Module on the International Space Station.

NASA/ISS004E3269

walk away from a problem, astronauts are stuck where they are. The lack of square footage forces crews to work out their differences and nuances at the first sign of tension.

"I have come to accept that all of us will have (and have had) good days and bad days," Bursch said. "Frank Culbertson told us some good advice. Some days you just need 'to let go.'"

Fiedler, who facilitates research for the National Space Biomedical Research Institute, says there are four areas that their research is concentrating on for future missions: team cohesion and productivity, behavioral health management, performance readiness and selection.

But while going to Mars does pose unique challenges, the challenges are not anything that astronauts can't tackle. As Bursch said philosophically, "The balancing act of life is the same in space as it is on Earth!"

Astronauts today have much more psychological and emotional support when they explore space. Teams at JSC evaluate astronaut candidates, team chemistry, family ties and more to simplify living in space. However, the longer one is away from Earth, the more important the "little things" become. Being crammed in a tiny spaceship with the same crew for months, even years, can create problems that we on Earth can easily avoid.

"Working closely with someone is a big jump from an acquaintance. Living with someone is a big jump from working with them. And living and working together with only two other

people for several months is yet another big jump," Flight Engineer Dan Bursch said in his Expedition Four 120-day Report. "If you have a bad day, you can't just go for a walk."

Psychological support is extremely important in space, especially for long-duration trips. As Dr. Edna Fiedler, liaison for Human Systems Integration/Behavioral Health and Performance at JSC, put it, "I think that the longer you are away from your support system, the harder it is. The Wyle Laboratories folks on the operational side have set up a very good program of communication with the ground and significant others, but that doesn't mean it won't be hard."



NASA/Bair, JSC2005E28061

JSC Security Special Operations Group from left to right, front row, Bran Faircloth, Michael Johnson, Mauricio Reyes, Jacob Manuel, back row, Alex Duran and Russ Tucker. Not pictured are Chief Ric Hewitt and Matthew Gillilan

Inside JSC SWAT

by Johannes Ragin

September 11 has made many agencies rethink their whole approach to safety and the security of their property and personnel. The terrorist attacks on the U.S. reminded our nation that we are vulnerable – as part of a plan to tighten its security, JSC formed and implemented the Special Weapons and Tactics (SWAT) team.

In January, 2003 the JSC SWAT team became operational. “Our SWAT team was created to provide JSC with a tactical response team that could respond to a variety of issues that could arise at the Center,” Richard Hewitt, JSC chief of security, said. The idea was to have a highly disciplined team available 24/7 with the ability to respond to a crisis that JSC security was not normally equipped or trained to handle.

The nation’s first-ever SWAT team was created in Delano, Calif., in the 1960s. Delano’s SWAT team was formed in response to an uprising by the United Farm Workers that year. Despite the rural origin, SWAT is generally limited to large urban cities, and today almost every major police force in the country has its own SWAT team.

The JSC SWAT team is made up of seven members with one backup. Applicants for JSC SWAT team positions must meet stringent requirements to even be considered for a place on the team. All members of the team have military and/or law enforcement background and have completed SWAT school.

In addition, SWAT team members have to maintain weapons proficiency and acquire and maintain the high level of physical fitness essential for the job. “There’s a lot of personality we look for also; you have to be able to play well with others and have the mindset to use a weapon appropriately and work at a team concept,” Hewitt said.

JSC SWAT is unique when compared to other tactical groups. They are security officers first, but they are also trained as SWAT officers. That gives JSC SWAT formal arrest authority under Title 18 and the Space Act, a capability no other security force in the state of Texas has. JSC SWAT also works very closely with the Combined Area Response Team (CART) and the Houston Police Department (HPD) SWAT.

The CART team is made up of several communities outside Houston jurisdiction that have come together to form their own SWAT team. JSC SWAT trains with CART and HPD SWAT teams. This is crucial considering that JSC may call upon these teams for assistance in the event that a serious crisis occurs. “We all have to be on the same path of knowledge and understand how each other operates so that, if someone comes in behind you, there’s no surprise,” Hewitt said.

Many responsibilities come with being a member of JSC SWAT. Not only is the JSC SWAT team responsible for the safety of NASA property and personnel, but its members are also continuously training. “Generally, we train no less than once a week. When we’re not engaged in training, we work on various

types of investigations and perform other security duties such as traffic and building surveys and adjudicating traffic tickets the rest of the time,” Michael Johnson, captain and special operations unit supervisor, said.

Training includes anything from examining suspicious packages, to building surveillance, to breaches of perimeter and astronaut protection. “We have to be able to respond to every facility, know every facility, and know how to go in and out of every facility. We train for a variety of different scenarios,” Hewitt said.

When the SWAT team is involved in a security situation, they need compliance from everyone involved for them to do their jobs. “One thing we have continually encountered is that, when people see us in our tactical gear, we’re not always taken seriously. Once we’re in a tactical situation, we are focused on the mission at hand as well as to perform our job as safely as possible; the peripheral distractions of people in the area who attempt to interact with the team may create a hazardous situation for all parties concerned,” Hewitt said.

The mission statement of the SWAT team is: “To enhance the quality of security to the Johnson Space Center employees and visitors by providing a professional, effective and timely response in order to enhance community safety, protect life and property.”

Specialized SWAT Training

- 60 hours of SWAT school
- Dynamic building/office entry
- Vehicle extraction
- Nonlethal weapons
- CS (0-chlorobenzalmalononitrile) gas
- Tactical shooting
- VIP protection
- Response to duress alarms