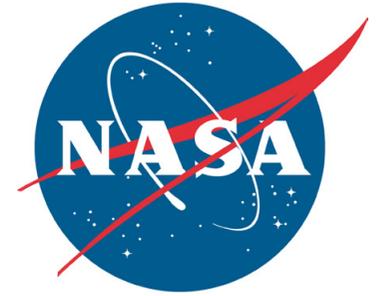


Spaceport News

John F. Kennedy Space Center - America's gateway to the universe

www.nasa.gov/centers/kennedy/news/snews/spnews_toc.html



Armored M113s ready for any emergency role

By *Steven Siceloff*
Spaceport News

Rumbling, cramped, heavy and lacking a big field of view, the M113 wouldn't seem to be a good candidate for an ambulance. It doesn't even have a steering wheel. But it has something essential for a NASA rescue mission at the launch pad: armor.

Basically a bunker on tracks, the M113 is a Vietnam-era armored personnel carrier that offers the astronauts a safe vehicle to get out of danger. It also offers firefighters heavy protection in case they have to go into danger to retrieve the flight crew and launch pad personnel.

"These things are virtually indestructible," said David Seymour, battalion chief and the lead for the pad rescue team at Kennedy Space Center.

NASA has a different kind of rescue vehicle because it has to make a different kind of rescue if a space shuttle crew is in danger. In the unlikely worst-case scenario,



CLICK ON PHOTO

NASA/Kim Shiflett

Battalion Chief David Seymour provides supervision while space shuttle Endeavour's STS-134 crew members participate in M113 armored personnel carrier training at Kennedy Space Center. An M113 is kept at the foot of the launch pad in case an emergency exit from the pad is needed and every shuttle crew is trained on driving the vehicle before launch. Space shuttle Endeavour's six crew members are at Kennedy for the launch countdown dress rehearsal called the Terminal Countdown Demonstration Test (TCDT) and related training. To learn about STS-134 mission, click on the photo.

neither the astronauts nor emergency crews have to worry about debris raining down on them when they are inside an M113.

"We never know what to expect, we always prepare for the worst," said Alan Myer, an M113 driver and firefighter.

NASA began using surplus Army M113s during the Apollo Program in case an emergency developed

with the spacecraft or the gigantic Saturn V rocket. They serve the same role for the shuttle.

"We're here for the astronauts, for the closeout crew, whoever's up there," Seymour said.

Three are on hand on launch day. Two stand by less than a mile from the launch pad. A few minutes before liftoff, the firefighters get inside wearing all

their gear, including silver protection suits, an airpack and an air mask. They close all the hatches and raise the back ramp.

The inside of the M113 is hardly spacious, so the firefighters have to curl their legs up tight. Only the driver can see out consistently, looking through four slits facing the pad. The others in the vehicle have to take turns looking through the

slits in another hatch, but that means awkwardly trying to kneel or stand in the middle of the rest of the crew.

Most of the firefighters feel the launch more than see it because the thunder thoroughly shakes the 10-ton carrier.

If an emergency call comes in before launch, the driver runs in and gets the vehicle moving in seconds, letting one of the other crew members work the lever to lift the ramp.

The astronauts and pad workers have limited air sources, so the rescue teams would work to get them to safety in less than 10 minutes from the time they get the rescue call. They constantly train and adjust methods to shave off seconds.

"I don't care about anything except getting my guys on the pad surface safely," Myer said. "If I run over signs, I don't care. I will not drive through a building, because that could hurt us, but if I have to

See **TCDT**, Page 2

Inside this issue . . .

Donating life



Page 2

AMS packed up



Page 3

FIRST Robotics



Page 5

Heritage: Stardust sends last signal



Page 7

Workers donate blood, register in bone marrow program

By Linda Herridge
Spaceport News

Fourteen years ago, Gena Henderson, an engineer at Kennedy Space Center, gave blood and registered with the National Marrow Donor Program (NMDP) during a donor drive at the center. Fast forward to 2011, and Henderson now is a match for someone in dire need of a marrow transplant.

In fact, Henderson, now the Engineering Management and Integration Services branch chief in the center's Engineering Directorate, is a perfect match. What that means, according to the NMDP, is that nine out of nine markers match. She is waiting for the next step in the process.

Florida's Blood Centers brought the Big Red Bus to several Kennedy facilities during the month of March. Bone marrow registration drives were held in conjunction at the Operations and Support Building I and the Space Station Processing Facility, which led to the registration of 26 workers with the NMDP.

Other blood drive locations included the Operations and Support Building II, the Operations and Checkout Building and the Launch Equipment Services shop.



NASA/Jack Pfaller

A Kennedy worker donates blood during a blood drive and bone marrow donor registry drive in Florida's Blood Center's Big Red Bus at the Operations and Support Building I on March 10.

There were 155 units of blood donated. Some donors with a rare blood type, such as O negative, were given the option of donating using the ALYX automated procedure that takes only the red cells and returns the platelets and plasma to the patient during the donor process.

Linda Scott, the north Brevard donor development coordinator with Florida's Blood Centers said that all donations stay in the local community.

"We are the sole provider of blood and blood products for Parrish Medical Center, Cape Canaveral Hospital, Wuesthoff medical centers in Rockledge and Melbourne, Holmes Regional Medical Center, Palm Bay Hospital and the new

Viera Hospital," Scott said.

Angela Solorio, a secretary with C&C International, signed up with the NMDP on her way to give blood at the OSB I on March 10.

"I'm retired military, so it's something we do for each other. And I was always interested in being a bone marrow donor," Solorio said.

Tina Gwizdalski is an NMDP specialist with Florida's Blood Centers' Orlando office.

She said that the simple act of filling out a consent form and completing a buccal cheek swab is the first step in becoming a potential match for someone in the U.S. or even another country.

"The NMDP reaches around the world,"

Gwizdalski said.

Michael Barth, a NASA civil engineer, gave blood March 28 at the SSPF, and then went inside the facility's lobby to register with the NMDP.

Barth has given blood for many years and during each Kennedy blood drive since he arrived at the center three years ago. Barth said his wife is a nurse and knows firsthand how important it is to donate blood.

"Giving blood does save lives," Barth said.

According to Kennedy blood and bone marrow donor drive coordinator Stephen Pilkenton, every year, thousands of adults and children need bone marrow transplants, a procedure that may be their only chance for survival. Pilkenton joined the marrow donor program in 2004 and was later selected as a possible donor.

"Marrow transplants are a potential cure and sometimes the last hope for people suffering from many cancers and other blood disorders," Pilkenton said. "Minority participation in the marrow donor program is desperately needed and strongly encouraged."

Henderson, who has three children, was the recipient of two blood transfusions during childbirth. One of these was lifesaving

for both her and her second child, so she understands how important being a donor can be.

"What a miracle this would be if my bone marrow would help to save someone's life," Henderson said. "I'm overjoyed for the person who needs it."

Joe Frakes, a Boeing technician, registered with the NMDP in 1993. He was a perfect match for a 28-year-old woman in 1995 and went through the marrow donor procedure.

"It's the most rewarding thing I've ever done," Frakes said. "It felt good to help someone. I would do it again if called upon."

Did you know?

More than 4.5 million patients need blood transfusions each year in the U.S. and Canada.

Only 38 percent of the U.S. population is eligible to donate blood – less than 10 percent do annually.

About one in seven people entering the hospital need blood.

One pint of blood can save up to three lives.

More information

For more information on the National Marrow Donor Program, visit www.marrows.org.

From TCDT, Page 1

drive over these logs protecting the crawlerway, I don't care. I want to get them to the pad in one piece as fast as we possibly can."

The other M113 sits empty with its back ramp open facing the door of an emergency bunker near the pad. If the astronauts have to take the slidewire baskets to get away from the pad, they would get out of the baskets and into the bunker. Then they can get inside the M113, close the ramp and drive to safety.

That's the routine all crews practice during the Terminal Countdown Demonstration Test, or TCDT. The STS-134 crew took part in the training March 30 as they prepared to launch on space shuttle Endeavour's last scheduled mission. The driving is a required course for each shuttle astronaut.

"Everybody has to drive the M113, so everybody kind of has to find their feel for maneuvering it," Seymour said.

Finding the feel for the M113 means adjusting to steering with a pair of levers instead of a wheel.

Each lever controls one of the tracks on the M113. Push both of them forward and the vehicle goes forward. There's a gas pedal to determine how quickly it goes. Pull the right lever to turn right, pull the left lever to go left. Pull them both back to stop. Don't do it too hard, though, or everyone riding along will get thrown into the metal bulkheads. After all, there's no padding on the thick metal walls, corners or shelves.

Some flight crews embrace the unusual vehicle and have a good time with the training, Myer said.

"These can be fun," Myer said. "It's exciting."

The fun aspect for the firefighters does not obscure the seriousness with which they train for emergencies. Considering part of their job requires them to climb into the orbiter and pull the astronauts out of their seats on the flight deck.

"We want to give the astronauts, close-out crew and ice inspection team the comfort to know that when called we are going to be there no matter what happens," Seymour said.

AMS to give invisible universe different look

By *Steven Sicheloff*
Spaceport News

The Alpha Magnetic Spectrometer will revolutionize what we know about invisible cosmic rays the same way NASA's Hubble Space Telescope rewrote what we know about the visible universe says the intellectual force behind the instrument. The AMS will launch aboard space shuttle Endeavour's STS-134 mission, targeted for April 19.

Those expectations are not lost on the team putting the finishing touches on the AMS and packing it for launch.

"This kind of has grains of Hubble, looking at the universe in a different perspective," said Boeing's Bob Hart, the payload flow manager for the AMS. "The science, the exploration potential that will come out of this makes it very exciting to be a part of."

Professor Sam Ting, a Nobel Prize winner for his 1974 discovery of a heavy elemental particle, sees the AMS as a revolutionary observatory to measure invisible cosmic rays as they traverse the universe.



CLICK ON PHOTO

The Alpha Magnetic Spectrometer-2 (AMS) is moved March 15 from the weight and center of gravity stand, where final measurements were taken before launch, to a payload canister in the Space Station Processing Facility at Kennedy Space Center. The canister will protect the space-bound payload on its journey to Launch Pad 39A, where it will later be installed into space shuttle Endeavour's payload bay. To learn about the time AMS spent at Kennedy, click on the photo.

NASA/Jim Grossmann

The AMS is a 2-ton ring of powerful magnets and ultrasensitive detectors built to track, but not capture, cosmic rays. The 15,251-pound instrument will be connected to the outside of the International Space Station, braced on the orbiting laboratory's right-hand truss and tilted a bit so it will not interfere with any of the station's mechanisms

and storage platforms. It will be operated remotely from Earth and should not require any attention from astronauts in orbit.

"The astronauts on the space station have many things to do," Ting said. "We wouldn't dare bother them."

By recording the traces cosmic rays make as they pass through, the AMS might uncover a universe that is now invisible. Although Ting is hesitant to make predictions about what the instrument will find, he said the instrument was designed with dark matter and antimatter in mind. Very little is known about dark matter although it makes up an estimated 90 percent of the mass in the universe.

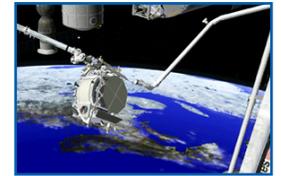
Although Earth-based facilities have been built to create powerful streams of subatomic particles, Ting said their limits are more than 14 million times weaker than the power produced by cosmic rays in space.

"No matter how large an accelerator you build, you're not going to compete with

space," Ting told reporters recently. Ting offered the news media a close look at the AMS before it was packed for loading into Endeavour's cargo bay for launch.

How much of a difference is that? Well, according to the organization that operates the Large Hadron Collider near Geneva, Switzerland, a single trillion electron volt particle is about the same amount of energy produced by a mosquito in motion. The fastest cosmic ray yet observed was a subatomic particle with the force of a baseball, according to a University of Utah account of the observation.

The AMS going up on Endeavour is the second one built in the program. The first one was a prototype instrument that flew on shuttle Discovery during STS-91. It spent about two weeks in orbit proving the merits of the design. Even with that very short mission, the instrument provided enough information to make physicists reanalyze some of their theories. Four



CLICK ON PHOTO

To watch an animated video of the installation of the Alpha Magnetic Spectrometer, click on the photo. Shortly after installation, AMS is expected to begin gathering data.

unique scientific papers were published following the mission, Ting said.

"None of the results we see can be explained by existing theory," Ting said of the findings.

The second AMS, the one flying on Endeavour, is designed to operate as long as the space station itself is operational. That's why Ting said the team opted to replace a ring of supercold magnets designed for a 3-year lifespan with a set of permanent, though weaker, magnets that can work 20 years.

"The longer you stay, the longer you learn," Ting said.

The AMS was assembled and tested in Europe, including calibration work in the Large Hadron Collider. It was flown aboard a U.S. Air Force transport plane to Kennedy Space Center in August 2010, and spent the next several months in a work stand in the Space Station Processing Facility where technicians went through the last steps of processing for flight.

The payload processing teams are used to dealing carefully with anything designed to go into space and many precautions are taken. Still, there is a new level of anticipation for the AMS.

"This is probably the most exciting one I've been on," said Joe Delai, STS-134 payloads mission manager.



NASA/Jim Grossmann

The Alpha Magnetic Spectrometer-2 (AMS) is a particle physics detector, designed to operate as an external experiment on the International Space Station. It will use the unique environment of space to study the universe and its origin by searching for dark matter. The AMS-2, shown here March 15, will fly to the station aboard Endeavour's STS-134 mission targeted to launch April 19 at 7:48 p.m. EDT.

Scenes Around Kennedy Space Center



CLICK ON PHOTO

NASA/Jack Pfaller

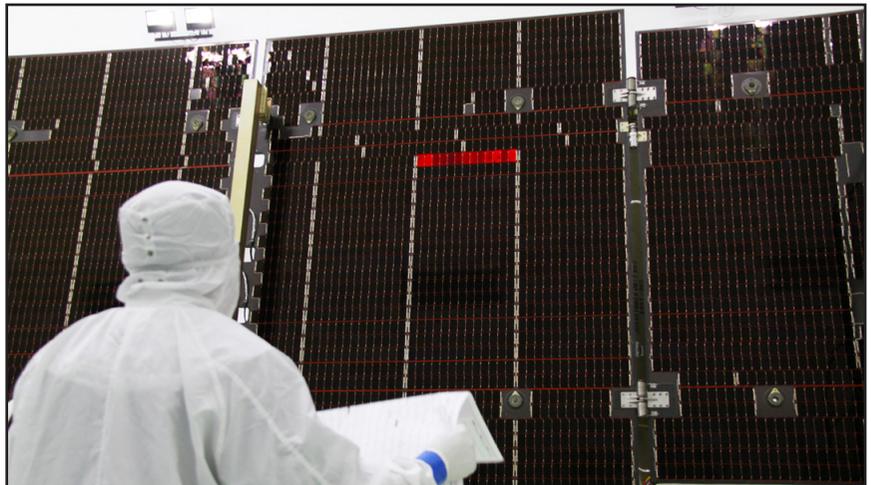
About 385 people, including some 60 volunteers, participated in the 2011 KSC Annual Walk/Run at the Shuttle Landing Facility on March 22. Sponsored by Kennedy's fitness center, the goal of the event was to motivate center employees to get moving. Center Director Bob Cabana stressed the importance of fitness in our everyday life before the event. Participants chose to walk or run 2 miles down the runway, rollerblade, or run a 5 or 10K. To learn more about Kennedy's health initiatives, click on the photo.



CLICK ON PHOTO

NASA/Kim Shiflett

About 2,100 of Kennedy Space Center employees stand side-by-side to form a full-scale outline of a space shuttle orbiter outside the Vehicle Assembly Building on March 18. The unique photo opportunity was designed to honor the Space Shuttle Program's 30-year legacy and the people who contribute to safely processing, launching and landing the vehicle. To view time-lapse video of the event, click on the photo.



CLICK ON PHOTO

NASA/Jack Pfaller

Technicians in the Astrotech payload processing facility in Titusville, Fla., test the electrical continuity of a solar array March 23 that will help power NASA's Juno spacecraft on a mission to Jupiter. Power-generating panels on three sets of solar arrays will extend outward from Juno's body, giving the overall spacecraft a span of more than 66 feet in order to operate at such a great distance from the sun. Juno is scheduled to launch aboard an Atlas V rocket from Cape Canaveral Air Force Station on Aug. 5, 2011, reaching Jupiter in July 2016. To find out more about Juno, click on the photo.



NASA/Jack Pfaller

During the Child Development Center's "Transportation Week" event March 21-25 at Kennedy, children were able to become familiar with a tour bus, heavy-equipment vehicles, alternative-fuel vehicles, and Fire Rescue and security vehicles. Here they climb aboard a four-wheeler used by the U.S. Fish and Wildlife Service.

Competition heats up for FIRST Robotics teams

By Rebecca Regan
Spaceport News

Being a member of a Kennedy Space Center sponsored or mentored FIRST Robotics team requires more than just panache . . . it takes teamwork, skill, communication and a whole lot of brain power to build and compete some of the most unique and capable robots in just six weeks.

Kennedy's house team, known as the Pink Team, consists of high school students from Rockledge, Cocoa Beach and Viera. In early March, the team was on the winning alliance in the Florida FIRST Robotics Competition, where they also took home the Industrial Design Award sponsored by General Motors. Next, they went on to the Washington D.C. regional March 25-26, where they secured another win.

"Our kids were really excited. Not only did they have the chance to see our nation's capital and meet a host of new friends, nearly half had the opportunity to see snow for the first time," said team mentor Andy Bradley of Kennedy's Engineering Directorate. "It also was interesting to see that the D.C. teams were excited to learn the Pink Team was attending. Our reputation of being a fun and outgoing group precedes us. . . it's hard to be uptight while wearing a pink outfit, donning a fuchsia wig and dancing with 50 other similarly dressed people."

It's much more than just designing, fabricating, building and testing. Team members participate in community outreach programs, such as Habitat for Humanity, and raise money for their travel costs by hosting car washes and wrapping presents during the holidays,



CLICK ON PHOTO

NASA/Glenn Benson

The Kennedy Space Center-sponsored Pink Team participates in the regional FIRST Robotics Competition at the University of Central Florida in Orlando on March 11. The team is made up of students from Rockledge, Cocoa Beach and Viera high schools. Kennedy's Deputy Director Janet Petro and Engineering Director Pat Simpkins stopped by the competition to encourage the teams. Click on the photo to view footage from the competition.

said Bradley.

Kaitlin Lostrosio, student chief of the Pink Team's pit crew and official spokesperson for the team, won the FIRST Deans List Finalist Award at the Florida competition. Lostrosio also is a member of the PD Bot Team, which recently created a robot for the Rockledge Police Department.

"She is in those positions of leadership not just because she was selected, but because she works so hard and contributes so much," said Bradley.

The Bionic Tigers team, sponsored by NASA's Launch Services Program (LSP) at Kennedy, consists of students from Cocoa High and Holy Trinity Episcopal Academy. Bill Benson of LSP said the competition benefits both students and mentors.

"Theoretically, it's possible that these students might show up a few years from now to work for

NASA or one of our contractors," Benson said. "The more immediate benefit, for us, is hands-on project management experience for our younger engineers. They go from inception to completion, manage a time schedule, personnel and personality differences. It really is a good leadership laboratory for both the mentors and the student leadership."

Along with perfecting their robot, students on the Bionic Tigers team play a vital role in the organization and logistics associated with travel, community outreach and fundraising.

Next up for the Bionic Tigers is the Smokey Mountain regional competition in Knoxville, Tenn., March 31 through April 2. Also attending that competition is the Horsepower team, which is mentored by Kennedy employees. It includes students from Merritt Island High, Edgewood Junior/Senior High, Merritt Island

Christian School, Jefferson Middle and Brevard County home schools.

"FIRST Robotics takes science, technology, engineering and mathematics (STEM) out of the books and classrooms and presents it in an incredibly fun way," said mentor David Bush of Kennedy's Center Operations Directorate.

Bush said FIRST also places emphasis on teamwork, gracious professionalism and helping out the competition.

"Teams are always giving technical advice to each other, lending tools and parts," said Bush. "It really is amazing to see the environment at a FIRST competition . . . the kids really do get the message."

When asked to describe his team with one word, Bush thought it near impossible, so he said, "Supercalifragilisticexpialidocious," which in literal terms means, "Atoning for

educability through delicate beauty."

If they do well in Knoxville, the Bionic Tigers and Horsepower teams could potentially travel to the national championship in St. Louis, where they would go head-to-head with the Pink Team in late April.

Additional Brevard County teams include: ComBBAT from Astronaut and Titusville high schools; Team Voltage from Melbourne High; Purple Haze from Space Coast High; PiraTech from Palm Bay High; Bionic Bears from Bayside Engineering and Technology Academy; Team 3332 from Melbourne Central Catholic and Palm Bay Municipal Charter high schools; and Team 3376 from Satellite High.

"It's easy to become discouraged about the future," Bradley said. "But when you meet the wonderful kids in FIRST Robotics -- and I've met them by the thousands -- hope is restored. We really do have someone to which we can pass the torch."



NASA

The police robot developed by volunteers from Kennedy Space Center's Engineering Directorate and students from the FIRST Robotics Pink Team was turned over to the Rockledge Police Department during a ceremony March 16 at a Rockledge City Council meeting. According to the Rockledge Police Chief Ronald Krueger, this robot will save lives.

The team, called PD Bot, will join forces with a FIRST Robotics team from Tampa, Fla., to provide a similar machine for its police force.

Unique quilt tells story of NASA's space shuttle missions

By Linda Herridge
Spaceport News

United Space Alliance (USA) employee Vicky Turner has witnessed every space shuttle launch since STS-1 in April 1981, and she has the memories and a unique mission patch quilt to prove it.

Turner, who has been at Kennedy Space Center for 32 years, works in USA's engineering group in technical operations. After witnessing every shuttle launch and collecting each mission patch, she decided to incorporate them into a quilt design.

"I've been collecting these patches for so many years, that I wanted to do something special with them rather than just storing them in a box," Turner said. "I wanted to make something that represented the Space Shuttle Program and my years here at Kennedy."

She consulted with a few friends and began to design the quilt about two years ago. With no formal experience in quilting, Turner came up with a design that includes all of the space shuttle mission patches and NASA's five orbiter vehicles. She



CLICK ON PHOTO

United Space Alliance employee Vicky Turner, lower right, displays her space shuttle mission patch quilt with help from co-workers, clockwise from lower left, Angie Buffaloe, Perry Njuguna and John Young. To view, download or print shuttle mission patches, click on the photo.

NASA/Jim Grossmann

has added STS-134 to the quilt, and is waiting for the STS-135 patch. She also plans to add the launch and landing patch and the end-of-shuttle patch to the design.

As she sewed the patches onto the quilt, Turner said she reminisced about each mission and noted the detail in each one of them. A few of the missions stood out as she sewed. These included

STS-1, because the patch was flown on Columbia, and STS-51L, because a teacher was among the crew.

Turner used an embroidery machine to make the shuttles, the stars representing the lost crews of Columbia and Challenger, and the STS mission numbers below each patch.

"I'm looking forward to completing it," Turner said.

"I may take it to quilt shows or maybe allow it to be on display somewhere."

Turner said the quilt will measure about 78 inches wide and 78 inches long when it is finished. The fabric for the edges and back of the quilt will feature a space design.

For now, she takes the quilt with her so she can photograph it in various

processing areas as allowed. The quilt has been inside Kennedy's orbiter processing facilities, in front of Endeavour during its final scheduled rollover, in front of the Vehicle Assembly Building's signature wall and out to Launch Pad 39A.

"Each time I take it out for a photograph the quilt draws a crowd," said Turner. "I hear some nice comments about how beautiful it is."

Currently, Turner works on the Collaborative Integrated Processing Solutions (CIPS) program, which includes the business system for USA's paperless work environment, the transition and retirement of NASA's shuttle fleet, and future contracts work.

Turner came to Kennedy in 1979 to work as a tile inspector.

She has two children, a son Shawn, 23, and a daughter, Heather, 26. Her husband of 28 years, Mike, owns a local business.

"I am proud of and appreciate all the people who have been part of the shuttle program," Turner said. "I've met a lot of nice people during my career here at Kennedy."

2011 KSC All-American Picnic all about safely having fun

By Rebecca Regan
Spaceport News

This year's KSC All-American Picnic on April 2 promises to be a memorable event with new contests, exciting entertainment for children, extreme obstacle courses for teens and the much-anticipated astronaut appearances.

"The vision for this year's picnic was to ensure everyone has a safe and entertaining day," said picnic committee member, Teresa Nguyen. "The committee is excited to present some new events and activities, such as the KSC Idol singing competition, a 3-on-3 basketball tournament, and, of course, we can't

forget about the pony rides for the kids."

All-time favorites are in the rundown, too, such as the car and motorcycle show, chili cook-off, and dessert contest. Live entertainment will feature Dr. Dan the Magic Man from Cocoa Village and a classic and contemporary rock band called Bandwidth. The group features Launch Services Program's Deputy Program Manager Chuck Dovale.

Astronauts scheduled to sign autographs and snap photos with attendees include STS-130 Pilot Terry Virts, two-time shuttle flier Kay Hire, and member of the 2009 astronaut class Mark Vande Hei.

Planning for this year's event, dubbed "Celebrating 47 Years of Success at the Kennedy Space Center," presented some challenges. But the picnic chairperson, Eli Schoen, said his team of creative thinkers, experienced and newcomers, found ways to accomplish more with less.

"A big challenge the committee faced this year was an expectation to provide a similar event to years past with a considerably smaller budget and fewer volunteers," Schoen said. "What began as a seemingly impossible challenge revealed itself as a great opportunity to come together as a community."

An initiative Schoen said the

committee is trying to perfect this year is the "Greening of the Picnic." Frank Kline with Kennedy's Center Operations Directorate helped make that initiative a reality by implementing similar principals used at the ultra-green, environmentally friendly Propellants North Administrative and Maintenance Facility.

The committee hopes the initiative will carry on into the work environments and homes of all who attend. "We are excited to say that the committee as a whole feels this year's picnic will be an all-time best," Schoen said. For more info, click <http://kscpicnic.ksc.nasa.gov/program.htm>

Stardust's final signal resonates 'celestial three-peat'

By Kay Grinter
Reference Librarian

NASA's Stardust spacecraft sent its last transmission to Earth at 7:33 p.m. EDT March 24, shortly after depleting fuel and ceasing operations. During its 11 years in space, the venerable spacecraft collected and returned comet material to Earth and was reused after the end of its prime mission in 2006 to observe and study another comet during February 2011.

The Stardust team performed the burn to depletion, because the comet hunter was literally running on fumes. The depletion maneuver command was sent from the Stardust-NExT mission control area at Lockheed Martin Space Systems in Denver. The spacecraft sent acknowledgment of its last command from about 194 million miles away in space.

As it lifted off Feb. 7, 1999, Stardust was the last of three planetary missions launched from Complex-17 on Cape Canaveral Air Force Station between December 1998 and February 1999.

NASA's Darren Bedell was Kennedy Space Center's mission manager for all three, including the Mars '98 missions: the Mars Climate Orbiter and Mars Polar Lander.

"We called it the "celestial three-peat," said Bedell, now system integration manager for NASA's Launch Services Program (LSP). Stardust was the fourth mission managed by LSP.

"It was the faster, better, cheaper era," Bedell recalled. "While Stardust was in development, the mass of the spacecraft outgrew the capability of the launch vehicle. We were challenged to decrease the spacecraft's mass while at the same time increasing the capability of the Delta II. We met some-



CLICK ON PHOTO

NASA file/1998

Workers remove the Stardust solar panels for testing in the Payload Hazardous Servicing Facility at Kennedy Space Center in 1998. Thirteen years later and about 194 million miles away in space, the Stardust spacecraft sent its last transmission to Earth at 7:33 p.m. EDT on March 24. During its 11 years in space, the venerable spacecraft collected and returned comet material to Earth and was reused after the end of its prime mission in 2006 to observe and study another comet during February. To learn more about the Stardust mission, click on the photo.

where in the middle.

"It was a joint effort by Jet Propulsion Laboratory and Lockheed Martin engineers. It took a lot of great engineering accomplish," Bedell said "The spacecraft's swivel antenna was replaced with a fixed antenna to reduce its weight. There was a similar constraint for the solar arrays. Reducing the number of movable parts, though, may have contributed to the spacecraft's success."

The Delta II used a new third stage, the Star 37, conceived for the Stardust mission.

Bedell explained: "Bigger stages couldn't be controlled carrying such a light payload. Stardust, at 385 kilograms, was the lightest spacecraft to be launched on a three-stage Delta II. The energy requirement for the launch was very high -- 2.5 times the energy required to go to Mars.

"There were complications with post-separation collision avoidance. We did a lot of work to ensure the

More online

For more information about Stardust and Stardust-NExT, visit <http://stardustnext.jpl.nasa.gov>.

motor would not come in contact with the spacecraft early in its flight."

Spacecraft and launch vehicle issues were not the only ones being worked out. The fledgling LSP also was perfecting its review procedures. What became known as the Launch Vehicle Launch Readiness Review, or LVRR, was under development.

"The first few of these reviews involved a few people sitting around a table discussing launch readiness with the center director," Bedell said. "The Stardust review processes, especially the LVRR, helped LSP establish the process that has been used to determine launch readiness ever since."

Stardust traveled halfway to Jupiter to collect the particle samples from

the comet Wild 2. Aerogel, the world's lightest solid material, was used to capture comet particles, as well as samples of interstellar dust. The spacecraft returned to Earth's vicinity to drop off a sample return capsule and was retasked, as Stardust-NExT, to perform a bonus mission and fly past comet Tempel 1, struck by the Deep Impact mission in 2005. Stardust-NExT collected images and other scientific data to compare with images of that comet collected by Deep Impact.

Stardust traveled about 13 million miles around the sun in the weeks after the successful Tempel 1 flyby. The Stardust-NExT mission met all mission goals, and the spacecraft was extremely successful during both missions, part of the Discovery Program managed at NASA's Marshall Space Flight Center in Huntsville, Ala. From launch until final rocket engine burn, Stardust traveled about 3.54 billion miles.



CLICK ON PHOTO

NASA file/1999

Billows of exhaust roll across Launch Pad 17-A at Cape Canaveral Air Station, Fla., as a Boeing Delta II rocket carrying the Stardust spacecraft launches on Feb. 7, 1999. To view the launch online, click on the photo.

NASA Employees of the Month: April



NASA/Tom Farrar

Employees for the month of April are, from left, Roger Rudig (Employee of the Quarter), Space Transportation Planning Office; Kimberly Knight, Center Operations; Mariah Champagne, Chief Financial Office; Tammy Annis, Constellation Project Office; John Hueckel, Launch Services Program; Teresa Parham, Safety and Mission Assurance Directorate; and Emily Weiland, Procurement Office. Not pictured are, David Campbell, Information Technology and Communications Services; Nancy Hoffman, Engineering Directorate; Christopher Iannello, Engineering Directorate; and Thomas Marren, Launch Vehicle Processing Directorate.

Space Shuttle Program 30th Anniversary Celebration

On April 12 at 4 p.m., the Kennedy Space Center Visitor Complex will commemorate the 30th anniversary of the first space shuttle launch to honor Kennedy and Cape Canaveral Air Force Station (CCAFS) workers. A ticket is required for entry into the visitor complex for employees and their families, which includes a barbeque meal (choice of chicken or pork, cole slaw, chips, dinner roll, and soft drink or water). Tickets are available for advance purchase for \$6 per person through April 6 at the following NASA Exchange Stores: Headquarters from 7 a.m. to 4:30 p.m.; and the Operations and Support Building I from 7 a.m. to 5:30 p.m. Tickets will be available the day of the event for \$10. A Kennedy or CCAFS badge is required for purchase and family members must accompany the badged employee for entry. Employees and family members can enter the Visitor Complex at 3:30 p.m. For more information, call NASA Guest Operations at 321-867-2144.

Looking up and ahead . . .

Targeted for April 19 Planned for May 3	Launch/KSC: Endeavour, STS-134; 7:48 p.m. EDT Landing/KSC: Endeavour, STS-134; 1:27 p.m. EDT
No Earlier Than May 5	Launch/CCAFS: Atlas V, SBIRS GEO-1; TBD
No Earlier Than June 9	Launch/VAFB: Delta II, Aquarius / SAC-D Satellite; TBD
No Earlier Than June 23	Launch/CCAFS: Atlas V, GPS IIF-2; TBD
Targeted for June 28 Planned for July 10	Launch/KSC: Atlantis, STS-135; 3:48 p.m. EDT Landing/KSC: Atlantis, STS-135; 11:03 a.m. EDT
No Earlier Than July 15	Launch/CCAFS: SpaceX Falcon 9, Dragon C2; TBD
Aug. 5	Launch/CCAFS: Atlas V, Juno; Launch Window 12:10 to 1:40 p.m. EDT
Sept. 8	Launch/CCAFS: Delta II Heavy, GRAIL; 8:35:52 a.m. to 9:14:35 a.m. EDT
No Earlier Than Oct. 9	Launch/CCAFS: SpaceX Falcon 9, Dragon C3; TBD

Kennedy Space Center Activities

2011 KSC Spring Flag Football League Standings and Upcoming Schedule

TEAM	RECORD	POINTS SCORED	POINTS ALLOWED	Week 3 Schedule (April 6)
Stuffers	1-0	27	7	5:30 p.m. - Redheads vs. Blood Hunters
Islaughter	1-0	24	0	6:30 p.m. - Rowdies vs. Islaughter
Redheads	1-0	21	6	7:30 p.m. - Stuffers vs. FAT
Rowdies	0-1	7	27	Week 2 (Rescheduled to May 18, due to inclement weather March 30)
FAT	0-1	6	21	5:30 p.m. - FAT vs. Blood Hunters
Blood Hunters	0-1	0	24	6:30 p.m. - Stuffers vs. Islaughter
				7:30 p.m. - Rowdies vs. Redheads

Games are played Wednesdays at KARS Park I.

POC: Matt Jimenez, 321-867-4509 or matthew.j.jimenez@nasa.gov

2011 KSC Tennis League Rankings, Leaders and Upcoming Schedule

Singles

Group 1 Rankings	Group 2 Rankings	Group 3 Rankings	Week 2 Schedule (April 7)	Week 3 Schedule (April 14)
Tom Bond	Alan Wheeler	Laura Scott	Bond vs. Ingham	Bond vs. Specht
Billy Specht	Calvert Staubus	James Hudleston	Specht vs. Young	Ingham vs. Young
Bob Ingham	Kevin Panik	Scott DeWitt	Wheeler vs. Panik	Wheeler vs. Staubus
Ken Young	Norm Hosan	Kate Liu	Staubus vs. Hosan	Panik vs. Hosan
			Scott vs. DeWitt	Scott vs. Hudleston
			Hudleston vs. Liu	DeWitt vs. Liu

The league seeks new players and is open to all Kennedy civil service and contractor personnel and dependents. Matches are played Thursdays at KARS Park I and II.

POC: Alan Wheeler, 321-867-3565 or alan.j.wheeler@nasa.gov

Doubles

COURT LEADERS FROM MARCH 29

Court 9 - Russ Jones	Court 7 - Rod Downing	Court 4 - Teresa Billig	Court 2 - Kate Liu
Court 8 - Dave Davies	Court 6 - Art Shutt	Court 3 - Tom Li	

COURT GROUPS FOR APRIL 5

Court 9	Court 8	Court 7	Court 6
Russ Jones	Ron Feile	Jay Hebert	Alan Wheeler
Scott Schilling	Ray Jones	Chip Hooper	Jeff Andress
Miguel Rodriguez	Andy Maffe	Vijay Shravah	Debbie Streiber
Dave Davies	Rod Downing	Art Shutt	Teresa Bollig

Court 4	Court 3	Court 2
Norm Ring	Ken Tenbusch	Debbie dela Fuente
Amy Lombardo	Kyle Nowlin	Donna Waln
Ted Moore	Jane Mosconi	Laura Scott
Tom Li	Kate Liu	Laura Rochester

The league seeks new players and is open to all Kennedy civil service and contractor personnel and dependents. Matches are played Tuesdays at KARS Park I and II.

POC: Teresa Bollig, 321-264-8575 or teresa.e.bollig@nasa.gov



John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published online on alternate Fridays by Public Affairs in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted **three weeks** before publication to the Media Services Branch, IMCS-440. E-mail submissions can be sent to KSC-Spaceport-News@mail.nasa.gov

Managing editor Candrea Thomas
 Editor Frank Ochoa-Gonzales
 Copy editor Rebecca Regan

Editorial support provided by Abacus Technology Corp. Writers Group.

NASA at KSC is on the Internet at www.nasa.gov/kennedy

USGPO: 733-049/600142