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Spaceport News

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http://www-pao.ksc.nasa.gov/kscpao/snews/snewstoc.htm John F. Kennedy Space Center

'Cool' new transporter adapts to the future

NASA and United Space Alliance recently accepted delivery of a new landing convoy vehicle. It is designed not only to service the Space Shuttle and International Space Station payloads, but also to service space exploration vehicles of the future.

The Universal Coolant Transporter, manufactured by Precision Fabrication and Cleaning in Sharpes, will replace the Ground Cooling Unit landing convoy vehicle.

The design of the new Universal Coolant Transporter was based on the concepts of uninterruptible redundancy and automation. The new vehicle's capabilities were expanded in several areas.

The systems' design pressure rating was increased to 500 pounds per square inch (psi) from the Shuttle orbiter's supply requirements of 250 psi. The flow rate capability was increased from 10,000 pounds per hour to 12,263 pounds per hour. The heat load limit was increased from 128,000 to 174,000.

Additionally, the new unit can accommodate a variety of cooling mediums including gycolics, various ammonias and several types of freon.

"In the near term, we have new levels of redundancy to service the Space Shuttle and the ISS payloads they will carry," said Ted Moore, NASA systems engineer.

"In the longer term, we have the first piece of equipment that may be capable of supporting the future vehicles on missions to explore the Moon and Mars," he said.

THE NEW Universal Coolant Transporter was delivered to the Spaceport March 18. The tractor-trailer carries a refrigeration unit that provides Freon through an umbilical into the Shuttle orbiter's cooling system after landing. The new equipment provides the redundant cooling capabilities required by ISS payloads in the Modular Payload Logistics Modules.

New Florida quarter will launch at KSC

The new Florida quarter design, titled "Gateway To Discovery" and featuring a Space Shuttle, a Spanish galleon and a Florida beach, will be the 27th coin released in the government's program that began in 1999. The new quarter's official release is April 7 at 9:30 a.m. in the Visitor Complex.

The free event, expected to draw close to 4,000 visitors, will be open to the public. Quarter exchanges by the roll will also be available and at Kennedy Space Center Credit Union the following week.

All children attending the event will receive a free quarter. Speakers at the ceremony include Florida Gov. Jeb Bush, NASA Administrator Sean O'Keefe and U.S. Mint director Henrietta Holsman-Fore.

The event will be televised live on NASA Select.

Dr. Whitlow and students explore NASA's options

AT HOWARD BISHOP MIDDLE SCHOOL in Gainesville, Dr. Woodrow Whitlow Jr., KSC deputy director (left), meets with students to share NASA's new vision for space exploration with the next generation of explorers. The NASA Explorer School (**http://explorerschools.nasa.gov**) is one of 50 in the world. Whitlow is talking with students about the Agency's stepping stone approach to exploring Earth, the Moon, Mars and beyond, how space impacts our lives, and how people and machines rely on each other in space.

The Kennedy Update

Jim Kennedy
Center Director

It's time to have some fun! I can't wait for tomorrow's KSC picnic. Dozens of people have worked hard so we can all have a good time.

I want to pass on special thanks to Pam Biegert, Linda Mullen and their team for tending to every detail to prepare for "The Best Picnic Ever." I believe I speak for everyone when I say we appreciate your efforts and thank you for taking the time to pull off what will undoubtedly be a fun-filled day.

I look forward to meeting many of you and your families. It'll be a special treat for Bernie and me to get to know you and yours. We all have such busy jobs and lives, it's nice to set aside a day to relax and come together socially. See you there!

We have another exciting event coming to KSC April 7, starting at 9:30 a.m. at our Visitor's Complex. The state of Florida has selected KSC as the place to unveil the new Florida quarter that will enter circulation this spring.

Gov. Jeb Bush will lead the ceremony featuring NASA Administrator Sean O'Keefe and Martin Gramatica, the place-kicker for the National Football League's Tampa Bay Buccaneers.

We are expecting approximately 3,000 to 4,000 people in attendance. As part of the celebration, the U.S. Mint will have the new quarter on hand for exchange for all coin collectors who want to participate.

But if you can't make it, don't worry; our own KSC Credit Union will have the quarters on hand the entire week. Florida is the 27th state to unveil the quarter and reports say the previous unveiling ceremonies were really exciting. If you have the time and can make it, I hope to see you there.

Finally, I want to address the reorganization currently taking place at the Center. I hope you have visited the Center's internal Web site to view a video addressing the reorganization. There are also frequently asked questions and other information to read.

We are very close to completion and I'm holding an All Hands meeting in April to address the finalized plan for the Center.

As we work toward finalizing the reorganization, please keep a couple of items in mind. First, we are doing this because I believe it's the best way to maximize our efforts to safely return the Space Shuttles to flight. Second, it ensures NASA complies with the Columbia Accident Investigation Board's findings, which we pledged to do upon their release last August.

"We are doing this because I believe itís the best way to maximize our efforts to safely return the Space Shuttles to flight."

My goals include creating a new Safety and Mission Assurance (SM&A) organization that consolidates all KSC SM&A efforts. As part of its mission, this organization will provide support to KSC's new Independent Technical Authority (ITA).

This new ITA will perform the duties of the Chief Engineer and System Management Office, along with the Center's management system function. The system function currently resides in the Safety, Health and Independent Assessment Directorate. Along with these two major reorganizations, many other directorates will see smaller realignments.

My goal is not to upset the apple cart but to rebuild our organization for a stronger KSC. The changes being made are essential given today's post-Columbia environment.

I know many people have questions about how it will impact their organization and themselves. I understand this and believe the All Hands in April will answer most questions. So, I ask for your patience for another few weeks while we finalize the plans.

I know the Brevard County School District starts Spring Break on Monday and many of you will be on vacation next week. I hope you have plenty of fun and stay safe.

Have a super weekend everyone and see you tomorrow!

Here's a 'Tip': Don't miss the Debus Award banquet

The Dr. Kurt H. Debus Award recognizes those who have made significant contributions to the improvement of aerospace in Florida, including the 2004 recipient Tip Talone, NASA director of International Space Station and Payload Processing at KSC.

The 2004 award banquet on April 3 at the Debus Conference Facility in the Visitor Complex begins at 6:15 p.m. Dinner seating begins at 7:15 p.m., followed by the award presentation at 8:30 p.m. Dress is black-tie optional.

Guests should park at the west end of the Visitor Complex and proceed to the main entrance for a table assignment.

TIP TALONE, NASA director of ISS and Payload Processing at KSC

February Employees of the Month

STANDING IN THE BACK ROW, from left, are: Robert Frostrom, Shuttle Processing; Robbie Ashley, ISS/Payload Processing; John Brand, Spaceport Engineering and Technology. Standing in the front row, from left, are: Janet Keith, Spaceport Services; Karen Bartus, Space Shuttle Launch Integration Office; Jeanne Ryba, External Relations and Business Development; Kathy Hauser, Launch Services Program.

Railroad crew gets locomotive back on track

By George Diller
NASA Public Information Officer

The NASA railroad "shop crew that could" showed it's a team of diverse mechanical talent any larger railroad would be proud to have.

The crew at the locomotive and equipment shop on Contractor Road recently saved Kennedy Space Center the hefty cost of outsourcing major work on one of its three diesel engines. NASA Railroad Locomotive No. 1 is a SW-1500 switch engine, a venerable railroad industry workhorse that was one of three switch engines acquired by the NASA Railroad in 1985.

The locomotives have been used at KSC to haul solid rocket booster segments, helium and other launch service commodities, along with mission-unique ground support equipment.

Early last year, the operating crew began to notice some unusual knocking and vibrations in locomotive No. 1, according to Will Erickson, a supervisor for Creative Management Technology (CMT) of Cocoa Beach. CMT employs the shop, train and engine crews as operator of the NASA Railroad for KSC.

The mechanical department found that a lubrication failure was preventing the locomotive's crankshaft and bearings from getting oil. They would have to be replaced, an expensive project that normally wouldn't be an on-site job.

The problem is seldom seen on major railroads, since switch engines are in almost constant use and are rarely shut down, according to Erickson. But since the locomotives at KSC are used on an as-needed basis, the oil in some of the moving parts drains off during the dwell time.

"The effect is that when the locomotive is re-started, it runs for more than a minute before the crankshaft and bearings are being fully lubricated," said Erickson. This resulted in premature aging of these critical parts.

Because the NASA Railroad was fortunate enough to have personnel with a complement of skills needed for such a job, it made sense that the locomotive work be performed at KSC.

The problem could be fixed by installing a fuel pump that is part of a locomotive turbocharger system, but the cost was expensive.

NASA RAILROAD ENGINEERS disassembled this locomotive down to the block to repair its oil system. The on-site repair saved NASA approximately $100,000.

So, lead project mechanics Mike Stephens and Gary Steele designed their own "pre-lube" system from parts off the shelf, including a gear pump and a 12-volt motor.

"The locomotive had to be disassembled down to the block to do it," said Steele.

The team used a nearby boxcar to keep the locomotive clean while they removed the engine and performed the work, plumbing the pre-lube components into the oil system and attaching them to the frame.

Other major maintenance was also completed while the locomotive was apart, allowing NASA to save a total of about $100,000 overall.

Locomotive No. 1 is now back in service and should only require normal periodic maintenance for the next several years.

"We've got two other NASA locomotives that are about the same age, so they'll need some work like that in another year or two," Steele said.

Environmental engineer receives 2004 women's technical achievement award

By Linda Herridge
Staff Writer

Dr. Jacqueline Quinn, a NASA environmental engineer in the Spaceport Engineering and Technology Directorate at Kennedy Space Center, recently received the Society of Women Engineers (SWE) Technical Achievement Award.

The Space Coast section of SWE honored Quinn with the award, for her "scientific and engineering research of innovative solutions for the remediation of groundwater, soil and sediment contamination at the Spaceport."

Quinn and three University of Central Florida professors developed the Emulsified Zero-Valent Iron (EZVI), which uses iron particles in an environmentally friendly oil and water base to neutralize toxic chemicals. Ultimately, Quinn would like to see this technology used to fight groundwater contamination.

"I was very surprised to receive the award," Quinn said. "There are so many talented women engineers doing incredible science research and development in the Space Coast area. I am honored to be one of SWE's recognized achievers for 2003."

Quinn started working on the EZVI technology in 2000 with a grant from the Small Business Technology Transfer Program at KSC. A patent for the technology has been issued, with two more patents pending.

Two licenses for EZVI also were issued by NASA, which shows the high commercial potential for the technology.

DR. JACQUELINE QUINN (with plaque) earned the 2004 Society of Women Engineers (SWE) Technical Achievement Award for her research of environmental contaminants.

High schoolers make teamwork 'F

By Jeff Stuckey
Editor

Zach Martin squatted and intensely inspected Rocco-bot, a robot designed by Kennedy Space Center's "Pink" team.

It seemed the neon pink robot's tower, a crane-like "arm" that moves in all directions, would prematurely lock because of a problem with its servo motor. The Rockledge High School student worried the malfunction might affect his team's chances of winning in this year's Central Florida For Inspiration and Recognition of Science and Technology (FIRST) Robotics Regional.

The event took place March 12 at the University of Central Florida Arena in Orlando.

Even while surrounded by a hectic environment that resembles a combination of a NASCAR pit and a scene from the TV show "Robot Wars," Zach wasn't fazed. He zeroed in on the motor and went to work.

"I helped troubleshoot the servo problem by working with the power source," said Zach after finishing his task. "There's a lot of dedication on this team, especially when it gets to be crunch time. I like taking things apart to see how they work and I thought robotics would be a pretty cool field to look at."

Zach and his teammates, decked head to toe in pink, calmly fixed the problem. They replaced a servo wire with a shielded wire and routed it away from the power wire.

But unlike "Robot Wars," this event's main purpose is not on who has the fiercest, wire-mangling robot, it's about teamwork and reliance.

FIRST is a multinational competition that teams professionals and young people to solve an engineering design problem in an atmosphere similar to a professional sporting event. This year, the event will reach more than 20,000 students on more than 900 teams in 27 competitions.

Teams come from Canada, Brazil, Great Britain and almost every U.S. state. The 2004 Florida Regional competition at UCF hosted 41 teams. UCF is a major sponsor of the event, along with KSC.

Universities, corporations, businesses and individuals provide scholarships to participants. This year, nearly 180 merit-based scholarship opportunities amounting to more than $3.8 million are available to eligible FIRST high school participants.

Andy Bradley, a NASA control systems engineer who mentors the "Pink" KSC team of Cocoa Beach and Rockledge High School students, coached the group through the servo motor glitch as members prepared for a first round match.

"We've got a case of electrical controls 101," Bradley said. "We had a signal wire that was interfering with a servo motor and that wire was running near another electrical motor. This caused our servo motor to move, which we didn't want to happen.

"That servo is also what locks our tower into place," he continued. "But now we're re-routing the wires, which is a simple fix but one of those gremlins that sometimes tries to get you."

The KSC team scored a 70-70 tie in its first match, then dominated its second match by winning 125-15, with the first triple-digit score of the day. Cheers erupted above the pop music playing in the arena.

This year's game requires robots to collect and pass 13-inch balls to the human player, who then shoots them into fixed and moveable goals. There are three 30-inch balls on the playing field that can be placed on top of any goal by a robot, which will double the point value in the goal.

The ball point value in goals and the number of robots hanging from the 10-foot-tall bar located in middle of the playing field determine each team's score for the round. Each two-minute match features two-team

alliances playing from opposite ends of the playing field, which is 24 feet wide by 48 feet long.

Major sponsors of the 2004 Central Florida FIRST Robotics Regional were treated to a luncheon featuring keynote speakers KSC Director Jim Kennedy and Florida Gov. Jeb Bush, who encouraged the audience to inspire the students to continue their academic studies.

"This country needs a way, such as FIRST, to inspire the youth to want to continue their education," said Kennedy. "You can see the spark in these kids' eyes and they are touched by this competition.

"All of the things that have touched me today, such as the excitement of the competition, the innovative designs, the spirit and vitality, that's all impressive," he said. "But the most impressive thing is when I learned that when they have free time, they go help the competition. It's all about teamwork and reliance."

Bush is also excited about how the students will contribute to the nation's future.

"During my tenure as governor, I get to do some cool things, but the FIRST Robotics Competition has to be one of the highlights in terms of being inspired," said Bush.

"I appreciate Kennedy Space Center's active involvement in this. KSC is probably the number one sponsor of FIRST Robotics over the past 10 years. The glue for our future prosperity is the idealistic young people that are participating in today's event."

Zach and his teammates now move on to the next round of competion in New York City. For information about FIRST, visit **http://www.usfirst.org**.

FIRST' at robotics competition

THE 2004 Central Florida For Inspiration and Recognition of Science and Technology (FIRST) Robotics Regional was held March 12 at the University of Central Florida Arena (left). Teams came from Canada, Brazil, Great Britain and almost every U.S. state.

ABOVE, TEAM 311 and team 233, the "Pink" team sponsored by KSC, collide as they collect balls for points on the playing field.

BOTTOM LEFT, THE PITS at the FIRST competition are busy areas. If teams have any down time, they often help other teams with advice or equipment.

BELOW, PINK TEAM MEMBERS ZACH MARTIN (second from left) and Sam Miorelli took time out to explain their robot's design to Florida Gov. Jeb Bush and KSC Director Jim Kennedy. Both students attend Rockledge High School. Bush and Kennedy spoke at a luncheon held for major sponsors of the Central Florida FIRST Robotics Regional.

Orbiter undergoes multiple inside modifications

Part 2 of 3

By Anna Heiney
Staff Writer

Anyone entering Discovery's crew compartment must first go through a series of preparations, from emptying pockets and tethering eyeglasses to putting on a "cleanroom suit" and booties over regular clothes.

These precautions keep the area extra-clean and prevent anything from getting loose inside, even objects as tiny as a stray hair.

In the zero-gravity environment, loose items can impede astronauts' work, get caught in the orbiter's ventilation system or interfere with other orbiter systems.

Immediately below the flight deck is the middeck, where astronauts sleep, eat, exercise or work with small payloads. But inside the middeck on this day, suited technicians are working on wiring.

In the cockpit, or "flight deck," a series of flat-panel displays called the Multifunction Electronic Display Subsystem replaced Discovery's original monochrome screens and tape meters. Nicknamed the "glass cockpit," this flexible system displays one of several instrument or status displays on any screen.

DURING POWER-UP of the orbiter Discovery, a technician works in the "flight deck," a series of flat-panel displays called Multifunction Electronic Display Subsystem (MEDS).

"It's a state-of-the-art system," said Laurel Patrick, NASA digital processing system engineer. "It keeps the crew better informed, increases redundancy, and improves in-flight maintenance and problem management. It even weighs less and consumes less power."

Discovery is the third orbiter upgraded with the glass cockpit. Only Endeavour, the youngest of the orbiters, is still awaiting that improvement.

A hatch leads from the middeck into the payload bay, where school bus-sized payloads can travel into space. The silvery radiator panels, which reflect excess heat out of the payload bay in orbit, were removed and the payload bay doors were stripped down to the bare frame.

A variety of tests and inspections were performed, from work on the insulating blankets that line the bay to testing the latches on the doors.

Special equipment was needed to open the payload bay doors on Earth, since they are designed to operate in space.

Another important payload bay component - the airlock, with the Orbiter Docking System attached - is in a nearby workstand. The Russian Space Agency, which designed and still owns the Orbiter Docking System, sent representatives to KSC to perform maintenance and review of the system.

During space missions, the airlock is the crew's gateway to the International Space Station.

Read more about Discovery's maintenance on April 9:
From nose cap to body flap

Expedition 7 member wards off bone loss in space

By Jeff Stuckey
Editor

Dr. Ed Lu, a U.S. astronaut who has flown on two Shuttle missions, found a way to combat bone loss when traveling for long periods of time in space.

"Under weightlessness, you have to keep your bones and muscles happy," Lu told an audience during his March 10 presentation in the Training Auditorium. "We worked out three hours a day. This was an important part of what we did up there, because we are finding that astronauts can eliminate most of the muscle and bone loss by working out extra hard.

"In fact, I came back with no bone loss after six months in space, but I did work out more than most astronauts have," said Lu, who took part in the Expedition 7 mission to the International Space Station. "Bone and muscle loss is just one possible problem of going to Mars, but we may be on our way to solving that."

The astronaut, who is the first American to launch and land aboard a Russian Soyuz spacecraft, returned to KSC to talk about his six-month experience aboard the International Space Station. Lu discussed his pre-launch activities and the differences between a Space Shuttle and a Soyuz spacecraft.

The pre-launch processing is very different in Russia, according to Lu. The Soyuz rocket is brought to the pad just two days before the launch. "In Russia, it's actually considered bad luck for the crew to watch their ship go out to the launch pad," Lu said. "It only takes about an hour and a half to erect the rocket at the launch pad."

U.S. astronaut Ed Lu signed autographs after a March 10 presentation at the Training Auditorium about his Expedition 7 mission to the International Space Station

The big difference in a Shuttle and a Soyuz is that the engines on the latter are completely liquid-fueled.

"The Shuttle has the two solid rocket boosters that run for the first two-and-a-half minutes," Lu said. "So things are shaking and rolling, but once the solids leave the vehicle, it's pretty smooth afterward. The Soyuz is pretty smooth the whole way because it has all liquid-fueled engines."

Remembering Our Heritage

One small step on the Moon, one giant footprint on Mars

By Kay Grinter
Staff Writer

If a NASA zodiac were created, 1969 might be designated the year of the footprint.

Days after photos of the first Apollo footprints on the moon made front pages worldwide, pictures from the Mariner '69 mission captured what looked like a giant martian footprint.

Mariner '69 was the first dual mission to Mars, with Mariner 6 launching from Cape Canaveral on Feb. 24, followed by Mariner 7 on March 27.

The identical craft were relatively small, weighing less than half a ton when unfueled. Each was designed to study the surface and atmosphere of Mars during close flybys.

The mission was a success, returning 201 images of Mars' surface, including the picture of the "footprint" that actually was a land formation. Positioning the Mariner '69 spacecraft to take those photos, however, caused excitement for the mission teams on both coasts.

During a routine pre-launch test on Feb. 14, the engine relay box of the Atlas/Centaur for Mariner 6 malfunctioned, causing the pre-valves to remain open. The vehicle, which relies on internal pressure to maintain its shape, lost its rigidity.

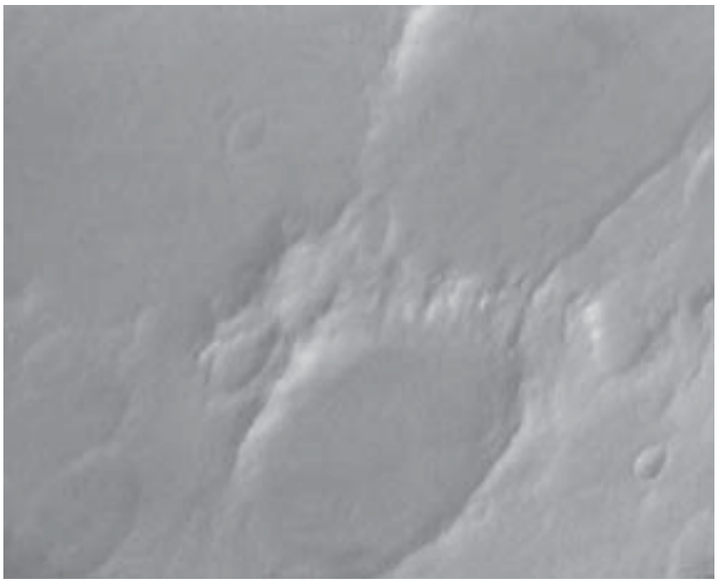
John Gossett, chief of the Centaur Operations Division, was in the blockhouse. Now retired and living in Brevard County, he explained: "The Atlas collapsed to a 20-degree angle and banged into the platforms on the gantry. Two fast-thinking propulsion technicians risked their lives to close the valves manually. Their efforts restored the vehicle's pressure and returned it to an upright position."

Both General Dynamics employees, Charles Beverlin and Billy McClure, later received the NASA Exceptional Bravery Medal for their prompt action which prevented the destruction of the spacecraft.

Harris Schurmeier Sr., the Mariner '69 project manager, was in mission control at the Jet Propulsion Laboratory during both encounters, which occurred only five days apart.

From his home in San Diego County, Calif., he recalls: "Following the arrival of Mariner 6 at Mars, we found ourselves in a kind of crisis. While we were managing its flyby on July 30, we suddenly lost the signal from Mariner 7."

Thankfully, the signal was reacquired seven hours later by switching from one antenna to another, and Mariner 7 made its closest flyby of Mars on Aug. 5.



A CAMERA ABOARD MARINER 7 captured this giant "footprint" (above) on the martian surface. Below, both Mariner 6 and 7 (pictured) carried a wide and narrow-angle television camera, an infrared spectroscope, an infrared radiometer and an ultraviolet spectroscope.

Mission manager inspired by early visit to Spaceport

By Jennifer Wolfinger
Staff Writer

Wanda Harding, Gravity Probe B (GP-B) mission integration manager, is excited about the scheduled April 17 mission.

"Gravity Probe B is one of those physics missions that causes you to increase your appreciation of the beauty, wonder and awesomeness of space and time," she said. "There is absolutely nothing random about it."

If anyone could testify to this, it's Harding. She's been part of the Kennedy Space Center team for nearly a decade, and part of this mission for six years.

Harding said she is the primary interface between the spacecraft program and the launch service provider. She also serves as the lead of the KSC Mission Integration Team (MIT) assigned to GP-B. The MIT is responsible for managing all aspects of launch services integration for the GP-B mission, including launch site support, budgets and contracts.

She's also the mission integration manager for the Demonstration of Autonomous Rendezvous Technology (DART), and Aeronomy of Ice in the Mesosphere (AIM) missions.

Harding's roles prompt relationships with space industry leaders, including Marshall and Goddard Space Flight Centers, Lockheed Martin, Boeing, Orbital Sciences Corporation and various universities. When she's not working with these diverse teams that make space flight

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WANDA HARDING is the mission manager for Gravity Probe B.

Robotics team 'gets to the bottom of it' with search

By Linda Herridge
Staff Writer

Teamwork and the use of sophisticated sensor equipment already available at Kennedy Space Center led to the successful recovery of a Shuttle Training Aircraft thrust reverser.

"We used technology to do the work, which makes it more efficient," said Steve Van Meter, KSC robotics specialist with the Spaceport Engineering and Technology directorate. The recovery team saved the Agency approximately $110,000 by retrieving the part rather than hiring a salvage contractor that couldn't guarantee a recovery in shallow water.

The part was retrieved by employees from KSC, Johnson Space Center, Space Gateway Support (SGS) and United Space Alliance.

Search methods in the Banana River, north and south of the Roy D. Bridges Jr. Bridge, included using sonar, a global positioning satellite (GPS) navigation system, metal detectors and KSC's Remotely Operated Vehicle (ROV) VideoRay over a three-week period in January.

A side-scan sonar detector towed behind the search boat transmits a signal below the water's surface. The water depth in the search area ranged from 3 to 30 feet, according to Van Meter. The team used a GPS integrated to the side-scan sonar to determine the location of targets in relationship to the boat's location.

JOE GERKY, a Johnson Space Center employee (right) and Steve Van Meter, KSC robotics specialist, check the lifting slings on the thrust reverser.

Targets were then scanned with a metal detector to determine their composition. If metal was detected, the team anchored the boat and sent the ROV VideoRay underwater to provide a view of the item on a TV monitor.

"Shallow areas are very difficult to search using sonar," said Van Meter. "But we were successful with this form of detection equipment due to past experience working in the KSC lagoon waters." While searching for the thrust reverser, the team found several items in the river, including old crab traps and small metal items.

Mike Lane, KSC electrical engineer at the Development and Integration Lab, used sophisticated software to download information from the GPS system to an office computer to create an accurate picture of search sites.

The divers spent many hours in the murky, 55-degree-Fahrenheit water, braving conditions that included possible encounters with snakes and alligators.

When the team located the thrust reverser south of the bridge, the SRB recovery divers were called in to attach lift bags to the part to help float it to the surface. The thrust reverser, approximately 4 feet wide and 5 feet long, weighed 585 pounds.

The part was towed to the bridge and SGS brought in a heavy-lift crane to hoist it out of the water and onto a truck. After transport to the Shuttle Landing Facility, it was packaged and readied for shipment to JSC.

HARDING . . .

(Continued from Page 7)

possible, she's making the best use of her personal time.

"My free time is spent with family, friends and music," she said. "My niece and nephew, Hope and Caleb, help to keep life fun because they are at the age of discovering the world around them. I also serve as the musician of the children's choir at my church."

As a child, Harding was as much in awe of the world as her niece and nephew are today. "The return-to-the-moon projects sound really exciting, since I was a pre-schooler the first time around," she shared.

"My father found a 1973 photograph from a family summer vacation trip to KSC. The picture shows me with my mom and sister standing in front of a large board listing the Apollo/Saturn V launches from Complex 39.

"He sent it to me last spring, reminding me that you never really know how things will work out for you in life," said Harding. "It's simply a matter of being prepared for whatever blessings come your way."

Visit **http://www.nasa.gov** for information on Gravity Probe B.

Are you ready for the All American Picnic?

The KSC All American Picnic will run from 10 a.m. to 4 p.m. Saturday, March 27 at KARS Park 1. Today is the last chance to purchase advance price tickets from the Sundry stores located in HQ, O&C, SSPF, OSB, the CCAFS Hangar I Annex, room 204 and the KARS Country Store.

Advanced tickets are $5 for adults, $3.50 for children ages 3 to 12 years and free for children under 3. Tickets at the gate are $7 for adults and $5 for children 3 to 12. Each person must have a ticket to enter the park and for food.

Plan for a great day of festivities, food and laughter. Visit the KSC internal Web site at **http://kscpicnic.ksc.nasa.gov** for the updated information. You will be sure to enjoy the chili cook-off competition, dunking booth, children's games, parade and so much more. Look for a complete review of the picnic in the April 9 *Spaceport News*.

John F. Kennedy Space Center
Spaceport News

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