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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

Cabin Pressure Monitor holds promise

KSC technology to improve safety for air, land and sea

A new NASA KSC innovation – the Personal Cabin Pressure Altitude Monitor – promises to significantly contribute to public aviation safety.

It's one of a number of KSC technologies that are being offered for technology transfer and development by private enterprise through the KSC Technology Programs and Commercialization Office.

The monitor, which is about the size of a pager, may be hand-held or worn. It serves to warn the user of a potentially dangerous or deteriorating cabin pressure altitude condition.

The inventor of the device, Jan Zysko, said the monitor operates independently of other aircraft systems and monitors the pressure/time conditions when supplemental oxygen is to be used according to federal aviation regulations. Zysko is chief of the Spaceport Engineering and Technology directorate's data and electronic systems branch at KSC.

The monitor warns the user of impending danger of hypoxia through audio, vibratory and visual alarms. In addition, a lighted digital screen displays a text message of the warning and the condition causing the alarm.

Personal Cabin Pressure Altitude Monitor inventor Jan Zysko, at left, and Shuttle Processing engineer Rich Mizell test the monitor in an altitude chamber at Tyndall Air Force Base in Florida.

The monitor was originally designed to offer Space Shuttle and Space Station crew members added independent notification about any depressurization.

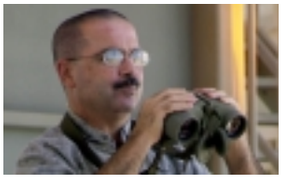
Two major incidents spurred Zysko to create the monitor, the Mir/Progress collision in June 1997 and the Payne Stewart aircraft accident in October 1999.

(See MONITOR, Page 6)

See related stories on page 7:

- *KSC Technology Transfer Week set*
- *ECS Ground Disconnect example of Spaceport Technology Center concept*

Inside



Super Safety, Health Day success

Kennedy Space Center and the 45th Space Wing celebrated the third annual Super Safety and Health Day on Oct. 18.

A Technical Paper Session was held on Oct. 19 at the Debus Conference Facility at the KSC Visitor Complex.

All normal work activities, with the exception of mandatory services such as fire and security, were suspended permitting thousands of NASA KSC and U.S. Air Force employees and contractors to participate.

It was a day to remember that the health and safety of the workforce, both on and off duty, is crucial to the overall effectiveness and success of mission goals and objectives. The theme of the event was "Safety and Health ... A Working Relationship."

Safety and Health Day began with activities planned and conducted in local work groups.

There were also astronaut visits and safety award presentations.

Afternoon programs included a keynote address by Dr. Beck Weathers, survivor of the 1996 climbing tragedy on Mt. Everest.

Following Dr. Weathers was a panel session with NASA, Air Force, and contractor subject matter experts who answered questions on safety and health.

Areas covered were health and fitness, environmental and security, voluntary protection programs, and safety and mission assurance.

The session was broadcast live on closed circuit television for all KSC and 45th Space Wing employees to view.

Employees were also able to visit safety and health displays set up in locations at KSC and Cape Canaveral Air Force Station.

The technical paper session on Oct. 19, entitled the 2000 Safety and Health Professional Development

(See SAFETY, Page 2)

Business Expo

The annual KSC and 45th Space Wing Business Opportunities Expo was held at the Port Canaveral Cruise Terminal No. 10 on Oct. 24. The annual Expo gives contractor and NASA procurement personnel the opportunity to network with over 200 supply and service vendors from across the Southeast. Exhibitors displayed a wide range of expertise including computer technology, valves, test and measurement equipment and employment services.

SAFETY ...

(Continued from Page 1)

Seminar, provided an overview of the Occupational Safety and Health Administration's Voluntary Protection Program.

Charlie Anderson, OSHA's assistant regional adminstrator, described how the VPP program has helped improve the health and safety of workers in organizations that have adopted it. NASA and contractor organizations at KSC are in the process of creating VPP programs here.

"When you get employees involved, it helps keep the work place safer," Anderson said. "Safety is a partnership of government, management, employees."

KSC Accident Prevention Awards were presented to the following companies in recognition of their exemplary safety records for no lost-time accidents: Boeing Rocketdyne (for fiscal years 1997, 1998, 1999), The Boeing Co. (1999), Creative Management Technology (1997, 1998, 1999), Compaq Computer Corp. (1997, 1998, 1999), Michael T. Downs (1997, 1998, 1999), Dynacs Inc. (1997, 1998, 1999), Railroad Track Construction (1997, 1998, 1999), Dynamac (1997, 1998, 1999), The Bionetics Corp. (1999), Comprehensive Health Services Inc. (1999), Federal Data Corp. (1999), Research Planning, Inc. (1999), Science Applications International Corp. (1999), Wyle Laboratories (1999), United Paradyne (1999), Information Dynamics Inc. (1999), Prevo Technologies Inc. (1999).

During Super Safety and Health Day at KSC, workers from Florida Power and Light, at left, demonstrate to an interested group of KSC employees how they safely handle high power lines.

Discovery lands at Edwards AFB

Discovery glided to a textbook landing under sunny skies at Edwards Air Force Base in California on Oct. 24, completing the successful STS-92 mission to the International Space Station.

The crew spent more than two extra days in space because of unfavorable weather at Kennedy Space Center and at Edwards.

The landing marked the first time an orbiter has not landed at KSC since March 31, 1996. The landing of that STS-76 mission began a 23-mission streak of landings at KSC.

KSC is the preferred landing site for the Shuttle because of the expense of and processing time lost from ferrying an orbiter back from Edwards or other alternative landings sites.

Discovery touched down at 5 p.m. EDT and rolled to a stop on Edward's concrete runway at 5:0l p.m., for a mission elapsed time of 12 days, 21 hours and 43 minutes.

By the time it landed at Edwards, Discovery had traveled more than 5.3 million statute miles.

The STS-92 crew left a larger and more complete Station that they had helped prepare for the early November arrival of Expedition 1.

The orbiter Discovery lands at Edwards Air Force Base completing Mission STS-92, the 100th Shuttle mission.

Expedition 1 Station crew set for launch

The International Space Station's first long-term resident crew was scheduled at press time to dock with the Station on Nov. 2.

The Soyuz spacecraft carrying the three-member Expedition 1 crew will dock with the Station's Zvezda Service Module at 4:20 a.m. EST.

The Expedition 1 mission launched from Baikonur Cosmodrome, Kazakhstan, at 2:53 a.m. EST Oct. 31.

The crew is composed of three veterans of human space flight who will make history as the first resident crew of the Space Station.

U.S. Astronaut Bill Shepherd is the Expedition 1 commander. He is responsible for the overall safety and success of the mission.

Russian Cosmonaut Yuri Gidzenko is the Soyuz commander. He is responsible for all of the systems on the Soyuz from launch until docking and during landing. Russian Cosmonaut Sergei Krikalev is the flight engineer.

While the Expedition 1 crew inhabits the Space Station, three Space Shuttle missions will visit the Station to continue on-orbit construction.

The first mission will be STS-97 on Flight 4A, which will deliver U.S. solar arrays to add to the Station's power capability.

The launch of that mission from Kennedy Space Center is set for Nov. 30.

Then STS-98 on Flight 5A in January 2001 will deliver the U.S. Laboratory Destiny. The third mission will be STS-102 on Flight 5A.1, which will deliver equipment racks for Destiny and the Expedition 2 crew in February 2001.

Expedition 1 will return to Earth on STS-102.

The first crew of the International Space Station poses aboard a Black Sea freighter following water survival training. From left, they are Flight Engineer and Russian Cosmonaut Sergei Krikalev; International Space Station commander and U.S. astronaut Bill Shepherd; and Soyuz Commander and Russian Cosmonaut Yuri Gidzenko.

Jorge Rivera, team show right s

Just a few hours prior to the third launch attempt of STS-92, Ice Team member Jorge Rivera displayed his dedication to flight safety. He observed a ground support pin with a tether near the external tank's liquid oxygen feed-line during a standard pre-launch inspection. He was about 50 feet from the orbiter when he focused his binoculars on the object. Rivera immediately realized there was a problem and reported it to his team, which communicated the problem to the firing room. He is pictured at right re-enacting his discovery from the 135-foot level of the launch pad. Below is the ground support pin and tether that Rivera observed.

tuff in dedication to flight safety

When you think of a hero, what comes to mind?

Perhaps you immediately think of a professional athlete or even a famous actor or actress.

Maybe you remember that teacher or adult you looked up to as a kid.

The fact is heroes come in all shapes and sizes and from all walks of life.

Sometimes all it takes to be thrust into the hero limelight is simply doing your job or being in the right place at the right time.

Well, that's Jorge Rivera's story and he's sticking to it.

The story

The STS-92 mission, scheduled to launch on Oct. 5, was scrubbed three different times.

First, a condition was noted during a photographic review of film from an STS-106 separation camera that showed the apparent failure of the right-hand external tank attach bolt to fully retract.

On the next attempt, high winds made it unsafe to undertake tanking.

During the T-3 hour hold prior to the third launch attempt, Jorge Rivera stepped into the limelight by observing a ground support pin with a tether near the external tank's liquid oxygen feed-line during a standard pre-launch Ice Team inspection.

"I was about 50 feet from the orbiter when I focused my binoculars on this strange object and said 'uh, oh,' " remarked Rivera. "I knew right away what it was and that it most definitely should not be where it was."

Rivera immediately reported to his team, initiated communication with the firing room and the rest is history.

STS-92, the 100th Space Shuttle mission to be launched from KSC, was re-scheduled for launch on Oct. 11.

His background

One of 16 children, Rivera was born and raised in Puerto Rico.

He attended the University of Puerto Rico where he earned a bachelor's degree in Industrial Engineering.

He and his family moved to the Orlando area in 1981 and his KSC career soon began with Martin Marietta.

Rivera has been a NASA civil servant since 1987 and serves as an external tank engineer providing expertise in troubleshooting, issues resolution and technical enhancements.

Rivera is not comfortable with all the attention he has gained since the discovery of the pin and has handled the hoopla with a humble heart.

Rivera, team honored

The KSC Mission Management Team honored Rivera and his fellow Ice Team members shortly after launch with the presentation of the Launch Director Flow Award.

They were also honored by Administrator Dan Goldin at the NASA Headquarters Annual Award Ceremony with the presentation of NASA's Exceptional Achievement Medal.

"Our team works very hard and takes our responsibility seriously," commented Rivera about the recent honors. "We were just doing our job.

"I am sure that if I hadn't spotted the pin that one of the others would have. It's really a team effort."

"I was about 50 feet from the orbiter when I focused my binoculars on this strange object and said 'uh, oh.' I knew right away what it was and that it most definitely should not be where it was."

JORGE RIVERA
ICE TEAM MEMBER

Ice Team

And what a unique team it is. The Ice Team, also called the Final Inspection Team, is composed of six KSC workers representating NASA and contractors.

Their role is extremely important to the success of each mission as they provide the "final look" at the fully assembled Space Shuttle just hours before flight.

The task is not without risks. Many hazards exist at the launch pad during that specific part of countdown due in part to propellants and noise levels.

The Ice Team was initiated at the onset of the Shuttle Program.

The group has been credited with the discovery of a number of foreign object debris items like the pin. In addition, it has detected weather damage from wind and ice – not to mention the occasional damage to hardware from local wildlife. Through these efforts the team helps to provide an increased level of safety assurance.

More limelight

Though the 100th mission has officially ended and the Shuttle Program moves forward with assembly of the International Space Station, the limelight has yet to fade for Jorge Rivera and his family.

On Nov. 9, they will be flown to Bayamon, Puerto Rico, Rivera's hometown, to be honored at a special recognition celebration in commemoration of his achievement and honors bestowed by NASA.

"The trip is a great opportunity for me and my family to be together to celebrate," said Rivera.

"I will be speaking with many people and be able to tell the NASA story."

NASA Administrator Daniel Goldin, left, applauds the Space Shuttle Ice and Debris Inspection Team who were recognized for their keen safety observations prior to the launch of Space Shuttle Discovery. Standing next to Goldin are, left to right, D. Scott Otto, with Lockheed Martin Space Services Company; John B. Blue, Thomas F. Ford and Michael Barber, with United Space Alliance; Gregory N. Katnik and Jorge E. Rivera, with NASA. Katnick and Rivera received the agency's Exceptional Achievement Medal; Barber, Blue, Ford and Otto received the NASA Public Service Medal. While scanning the launch pad before launch, the team found a stray 4-inch pin near the Shuttle's external fuel tank that could have caused damage during launch.

MONITOR ...

(Continued from Page 1)

A technology licensing industry briefing on the monitor was held by the Technology Programs and Commercialization Office at KSC Headquarters on Oct. 26.

About a dozen aerospace companies sent representatives to the briefing, which included a description of the technology and an explanation of the technology licensing process.

Part of the royalties from licenses that the technology generates will be used to help fund other research and development projects at KSC, which continues to grow as a Spaceport Technology Center.

Although KSC's patent licensing program is only four years old, among NASA centers, KSC was the No. 1 producer of licenses during fiscal year 2000.

Licensing Manager Melanie Chan said there are several potential NASA and aviation/ aerospace applications for the monitor.

Pilots flying both pressurized and non-pressurized aircraft could benefit from the warning system.

Human space operations also could use the innovation. Low-Earth Orbit vehicles – the Space Shuttle, Space Station, and Mir – are markets, as well as long-duration/interplanetary vehicles and future planetary habitats.

Ground systems are also applications, including the Mars simulation chamber and pressure/ vacuum test chambers.

Applications beyond aviation and aerospace include scuba diving, skydiving, mountain climbing, meteorology, underwater habitats, hyperbaric chambers, altitude chambers, and positive/ negative pressure vessels.

During the industry briefing, Zysko explained the technical aspect of the monitor's operation and the primary aviation applications.

"For pressurized aircraft, the invention provides an independent warning of cabin pressure altitude where a cabin leak or other reason for pressurization loss might go undetected," Zysko said. "For non-pressurized aircraft, the monitor tracks time and altitude profiles and warns when supplemental oxygen is needed."

"There are so many great opportunities for research and development here at Kennedy. I encourage anyone with an interest and flair for this type of work to pursue their interest and get involved in one of our many technology need areas."

JAN ZYSKO
MONITOR INVENTOR

Zysko said he's pleased to see the widespread response and interest in his innovation. His hope is that it will improve air safety.

"If this technology can help to avoid even one incident or accident, it will have been worth all the effort and resources put forth over this past year," he said.

Hypoxia, a state of oxygen deficiency in the blood, tissues, and cells sufficient to impair functions of the brain and other organs, is a concern to pilots who fly above 10,000 feet.

The symptoms of hypoxia often go unrecognized, as the brain is the first organ to be affected.

Once hypoxia occurs, it is difficult, and often impossible, for the person to acknowledge the situation or take corrective action. In the early stages, there is considerable loss of judgment and cognitive ability.

The person may become euphoric or even belligerent, and in the later stages, suffer impaired visual, physical, and motor skill functions, and then succumb to unconsciousness or even death.

Zysko emphasized the contributions of the KSC team involved in developing this technology.

The monitor went from concept to prototype to commercialization in less than 12 months, at the total cost of under $100,000.

Multiple government agencies, including the National Transportation Safety Board (NTSB), the Federal Aviation Administration (FAA), and the US Air Force contributed to the project.

Dynacs Inc., the KSC Engineering Development Contractor, played an important role in the circuit design and fabrication of the prototype.

During the next phase of the monitor's development, Zysko would like to integrate carbon monoxide (CO) and carbon dioxide (CO_2) sensors into the unit for more complete aviation and aerospace environmental monitoring.

The presence of CO in an aircraft environment due to engine exhaust gases entering the cockpit is a significant aviation hazard.

The CO_2 sensor addition would be particularly helpful for independent monitoring of the CO_2 scrubber effectiveness on long-duration space vehicles and space habitats.

Zysko, who is a private pilot, pointed out the need for his invention by noting hypoxia and cabin pressure-related incidents contained in the NTSB and FAA accident and incident databases.

The FAA and NTSB agree that there are probably many more hypoxia-related incidents and accidents than are listed, but in many cases there has been insufficient evidence to determine whether hypoxia was a probable or contributing cause, he said.

Zysko noted that a recent tragic Australian Beechcraft King Air flight, dubbed a "ghost flight" by the media, implicates flight crew hypoxia.

The Australian Transportation Safety Board reported: "The airplane, on a flight from Perth to Leonora, had climbed through its assigned flight level and continued on a northeast heading beyond Leonora.

"Attempts to contact the pilot by radio were unsuccessful.

"The aircraft, with one pilot and seven passengers, remained airborne for about five hours, before crashing in Queensland, across the island continent.

"About a year earlier, a similar aircraft was flying at high altitude, with the autopilot engaged. A passenger who was qualified as a pilot but not endorsed on the aircraft type, was occupying the co-pilot seat.

"He noticed that the pilot in command was acting erratically and repeatedly performing the same task on the Global Positioning System unit.

"Soon after, the pilot lost consciousness and slumped forward over the controls.

"The passenger, realizing that the pilot had succumbed to the effects of hypoxia, assumed control of the aircraft and descended to 6,000 feet.

"The pilot regained consciousness and subsequently resumed control of the aircraft.

"It was then discovered that both bleed air switches were in the 'environment off' position and that the aircraft was not pressurized."

Most recently, Zysko and a colleague, Rich Mizell, a Shuttle processing engineer, carried a couple of the KSC-developed prototype pressure monitors to Tyndall Air Force Base, located near Panama City, to test the performance in an altitude chamber.

This chamber is routinely used to help flight crews recognize their personal symptoms of hypoxia.

The engineers took a non-pressurized "chamber ride" to 35,000 feet to test the response of the units to varying cabin pressure conditions.

They also tested the units' response to a rapid decompression where the chamber pressure explosively went from near sea level to 10,000 feet pressure altitude in less than one-fourth of a second. The monitors caught and warned of every event right on cue.

"There are so many great opportunities for research and development at Kennedy. I encourage anyone with an interest and flair for this type of work to pursue their interest and get involved in one of our many technology need areas," Zysko said.

KSC Technology Transfer Week set

Kennedy Space Center's annual Technology Transfer Week will be held Nov. 13-20.

Hosted by the NASA Technology Programs & Commercialization (TP&C) Office, Technology Transfer Week is designed to heighten awareness of new technology reporting and commercialization activities. Those activities include marketing KSC technologies, patenting, licensing, dual use and the Space Act Monetary Awards program.

The Tech Transfer pop-up display will be located in the lobbies of the Operational Support Building (OSB), Space Station Processing Facility (SSPF) and NASA KSC Headquarters (HQ) building. The displays will be shown on the following dates:

- OSB – Nov. 13 and 14
- SSPF – Nov. 15 and16
- HQ – Nov. 17 and 20

TP&C office staff will be available to answer questions. This year, for the first time, contractor technology representatives will also be on hand to discuss their technology reporting process with employees.

In a recent communication, Center Director Roy Bridges wrote: "As KSC continues to evolve as a Spaceport Technology Center, the reporting of new technology will become a key metric for measuring our progress in making that transition. Additionally, new technology reporting is the backbone of the technology transfer and commercialization effort at KSC.

For more KSC technology news, view the *Technovation* newsletter at http://technology.ksc.nasa.gov/TECHNO/technovation.html

Ground Disconnect created for Delta IV

As Kennedy Space Center garners greater recognition as a Spaceport Technology Center, its various development teams are being called upon by industry, other NASA centers and other government agencies to help meet various spaceport engineering challenges.

A recent example is the design, fabrication and testing of an umbilical disconnect system for a payload air-conditioning duct developed for Boeing's new Delta IV Evolved Expendable Launch Vehicle, which is expected to make its maiden launch in 2001.

The Environmental Control System (ECS) Ground Disconnect for the Delta IV was tested in August and September and will soon be delivered to Boeing representatives at Hangar E at Cape Canaveral Air Force Station. The disconnect system will be installed at the new Delta IV pad, which is under construction at Space Launch Complex 37 at CCAFS.

NASA KSC was contracted by Boeing to provide all the engineering and support required to design, fabricate, test and deliver a payload ECS Ground Disconnect for the metallic payload fairing. The new disconnect will be used instead of a heritage Titan IV disconnect originally considered.

The old disconnect design was incompatible with the common Delta IV umbilical release and separation systems being designed for the fixed umbilical tower swing-arm umbilicals. The new GSE disconnect will fasten the flexible air-conditioning duct to the vehicle and will be released by a lanyard retraction system.

Dynacs technician Mark Stratton installs the Environmental Control System Ground Disconnect on the Delta IV vehicle simulator.

"Boeing came to us because of our expertise in umbilicals. Our office has been doing this work for about 30 years and they wanted to take advantage of our experience and insight," said NASA Project Lead Joseph Porta. "The benefit for us is that such projects provide new design challenges for our engineers and technicians and continue to build their expertise."

The project was an in-house design using NASA engineering for design and development. The umbilical was fabricated by NASA's prototype lab.
A Reimbursable Space Act Agreement between NASA KSC and The Boeing Co., for the design, fabrication and testing of a payload ECS Ground Disconnect was approved and signed in August 1999.

Porta and NASA Lead Designer Paul Schwindt formed a design team consisting of Boeing and NASA personnel. The team developed the design requirements, design drawings, test requirements, test procedures, and stress analysis and held design reviews.

The design used the computer-aided design tool Pro-Engineering. A 3D computer model of the ground disconnect and Delta IV interfaces was constructed.

This model was used to check for interferences, tolerances, alignment and weight and then to produce the fabrication drawings.

Boeing's Project Lead Rick Iacabucci and Lead Engineer Fred Jankowski approved the design.

A series of acceptance tests were conducted in August and September to verify the ECS Ground Disconnect could maintain a reliable connection up to launch, to verify its leak rate, and to verify proper actuation and release of the umbilical.

NASA's Malfunction Testing Lab completed the vibration testing which simulated acoustically induced random vibration environments generated during pre-flight operations. This testing was done to make sure the umbilical does not disconnect prior to liftoff.

Leak check, electrical grounding and release testing were completed successfully at the Launch Equipment Test Facility by a Dynacs team.

The primary and secondary release mechanisms were tested independently to verify that the ECS Ground Disconnect is capable of operating until disengaged from the simulated vehicle skin panel without exceeding maximum limit loads.

"The efforts of the NASA KSC team were exemplary, in both their final product as well as their commitment to high customer service standards," Boeing's Iacabucci said.

The project is yet another success in KSC's evolution as a Spaceport Technology Center, said Gale Allen, assistant KSC chief technologist.

"This project directly supports the fluid system technologies focus area at KSC, which is one of five major technology thrusts in the Center's current Spaceport Technology Center concept," Allen said.

"We will achieve the Spaceport Technology Center goals by satisfying one customer at a time, and this project has delivered outstanding results."

Abstracts for Space Congress due

The 38th Space Congress, sponsored by the Canaveral Council of Technical Societies, will be held in Cape Canaveral May 1-4.

The congress is a gathering of a significant portion of the world's aerospace community to discuss the status and future of space activities around the world.

The theme for this year's congress is "A Space Odyssey – The Next 50 Years."

Panel sessions and paper presentations will address how the combined efforts of the scientific, commercial, military and educational communities have contributed and will continue to contribute to the growth of knowledge and understanding of space and to the well being of humankind.

The 38th Space Congress invites individuals from the United States and international communities wishing to offer papers on the listed subjects to submit a 200-word abstract as soon as possible.

Please e-mail paper abstracts to SpaceConTechPapers@kscems.ksc.nasa.gov.

To make arrangements for submitting Space Congress abstracts past the deadline of Nov. 4, contact Susan Hutchison, 867-5828, or Jeanne Hawkins, 476-4032.

Indicate on the top of each abstract which technical paper session you believe your paper best fits, chosen from the list below. Also attach your professional affiliation, return mailing address, e-mail address, FAX, and telephone number.

All abstracts will be forwarded to the appropriate paper session chairman, who will make the final selection of papers to be presented and published in the Space Congress Proceedings.

All proposers will be notified by mid- November**.** Successful proposers will be given specific instructions and format requirements by the paper session organizers.

Papers in final form must be received no later than Jan. 12, 2001, in order to be included in the proceedings.

Topics for the Technical Paper Sessions:

- **Launch Vehicles:** A look at worldwide launch vehicles and facilities – past, present and future.

Papers are sought on all aspects of launch vehicles, including design, systems, upgrades and launch facilities. This session includes military, government and commercial vehicles. Also sought are papers on propulsion advancements and research as well as new or unusual launch services.

- **Global Space Initiatives:** This session will address the various space agencies including their programs, policies and infrastructure. Papers are sought on domestic, international, and military agencies and spaceport authorities as well as global launch sites and capabilities.
- **Space Station:** A look at past, present and future space stations.

Emphasis will be on the International Space Station as well as lessons learned from the Mir Program. This session may cover such topics as the ISS elements, issues in space construction, operations, long-duration concerns, closed loop environmental systems and utilization.

- **Scientific Enlightenment – Knowledge Gained From Space:** A look at recent discoveries and where they are taking us. Papers are sought on topics that cover research and development, discoveries and scientific advancements. Topics may include past, present and future scientific payloads, biotechnology, material science research and spinoffs.
- **Earth, Moon, Mars and Beyond (Earth and Space Sciences):** Papers are sought on Earth and space sciences topics. Included in this session are space-based telescopes, Earth observation systems, inter-planetary missions and human exploration.
- **Hubble Discoveries:** Six scientists will reveal recent discoveries and findings from the Hubble Space Telescope in addition to information on the Next Generation Space Telescope. (No papers sought – session already filled with invited presenters.)
- **Space Odyssey – The Next 50 Years:** Papers are sought on a broad spectrum of topics that covers future space initiatives and activities as well as current activities and research that provide a foundation for this future activity.

Topics may include space tourism, commercialization, satellite communications and spaceport technology.

- **Education – Space Based Research and Development:** This session includes papers on college and professional level space-based educational programs. Topics may include research grants, facilities and opportunities for space-based scientific research.
- **Educating the Next Generation:** Papers are sought on topics that primarily relate to K-12 educational programs. Space provides an interesting forum for educating students not only in traditional technical fields but also in other academic areas. Papers are sought on space-based programs, projects and opportunities to implement into the classroom curriculum, or as extra curricular activities for school-age children.

For further information, visit our Web site at http://www.SpaceCongress.org.

Employees of the month

NASA Employees of the Month for October are from left to right, standing, Doug Kverek, Richard Wolfe and George Dutt. Seated left to right are Joy Jones and Tami Wilson. Employees of the Month not pictured are Dicksy Hansen and David Fowler.

John F. Kennedy Space Center

Spaceport News

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

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