

Spaceport News

America's gateway to the universe. Leading the world in preparing and launching missions to Earth and beyond.

<http://www-pao.ksc.nasa.gov/kscpao/snews/snewstoc.htm>

John F. Kennedy Space Center

STS-107 research mission

With hundreds of tests, and more than 40 experiments and payloads, some developed here at Kennedy Space Center, Space Shuttle Mission STS-107 is designated a research flight.

STS-107 at press time was set to launch Jan. 16.

STS-107's BioTube/Magnetic Field Apparatus (MFA) research and the Biological Research In Canisters (BRIC-14) experiment are both KSC-developed experiments.

Dozens of KSC and university personnel have contributed for the last four years. Team members

(See STS-107, Page 7)

Center Director looks forward

Proud history sets stage for bright future

By Roy Bridges Jr.

This year Kennedy Space Center marked 40 years of pioneering the future.

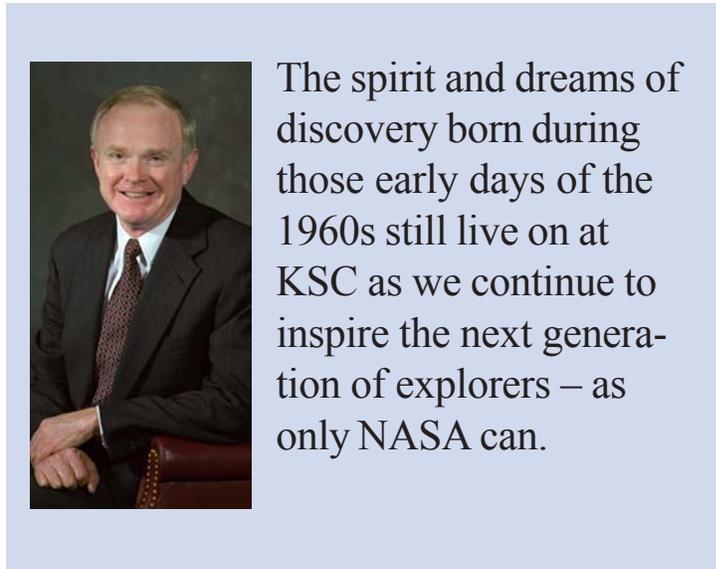
The 1960s were an exciting time at KSC as the New World set out to explore even newer worlds from our launch pads.

All eyes focused on Florida as America took its first steps in the race for Space.

Heroes were made and everyone knew them by name.

They represented everything good about our country, but especially its spirit of exploration and opening new frontiers of human experience.

During the fever pitch of the space race to see which country



The spirit and dreams of discovery born during those early days of the 1960s still live on at KSC as we continue to inspire the next generation of explorers – as only NASA can.

would be first to launch a satellite, orbit the Earth, and ultimately land on the moon, no one thought that we would one day be working in partnership with our former principal adversary.

As we held our breath and prayed for the survival of those

first explorers, no one ever imagined that "space tourists" would visit an international space station!

The spirit and dreams of discovery born during those early days of the 1960s still live on at KSC as we

(See FORWARD, Page 8)

Inside

Page 2 – "Recognizing Our People" honors employees.

Page 3 – Final truss elements and new ISS display.

Pages 4-6 – NASA's annual Holiday Picnic and KSC Christmas Coffee.



Page 8 – Astronaut Hall of Fame reopens.

Administrator advocates 'One NASA'

NASA Administrator Sean O'Keefe has a shared vision for the agency: "One NASA."

He and others in the agency envision NASA's transformation into a highly collaborative environment with a more team-oriented culture and less competition among NASA centers.

O'Keefe highlighted his "One NASA" initiative on NASA Television Dec. 11.

Kennedy Space Center Director Roy Bridges Jr. and Deputy Director Jim Kennedy spoke to the KSC workforce following the broadcast giving their support to

(See ONE NASA, Page 7)



NASA Administrator Sean O'Keefe speaks on NASA Television describing the "One NASA" initiative beginning at the agency. Kennedy Space Center employees listen in the Training Auditorium.

Recognizing Our People

Sierra Lobo wins NASA contractor award

Sierra Lobo Inc., a contractor for NASA's Space Launch Initiative, recently won NASA's Small Disadvantaged Business Prime Contractor Award.

The Ohio-based company won for their Densified Propellant Management System (DPMS) contract work, which supports next-generation launch technology development efforts.

The densified propellants project is considered an enabling technology for some versions of a reusable launch vehicle since it is able to decrease vehicle mass.

Through SLI, NASA is defining, developing and testing technologies needed to make space transportation safer and less expensive. To further this initiative, Sierra Lobo developed and tested a Thermo Acoustic Stirling Heat Engine (TASHE) and a two-stage pulse tube refrigerator that will operate in two different temperature regimes and will simultaneously condition both liquid hydrogen and liquid oxygen propellants.

"This development effort capitalizes on the new technology of thermoacoustics, where refrigeration down to a temperature of 14



The Cryo-Tracker™ liquid level and temperature sensor for cryogenic fluids undergoes flexibility testing in liquid nitrogen at Sierra Lobo.

degrees K can be achieved with no moving parts, such as compressors, expanders and valves," said Bill Notardonato, densified propellant technical lead. "This makes the system more simple and reliable to operate and maintain. It is a derivative of the Stirling Cycle and uses natural gas as the energy input, so it is efficient and economical."

The Sierra Lobo team has also created a mass gauging system called Cryo-Tracker™. The system

is a liquid level and temperature sensing system that will be used to measure propellant mass onboard the vehicle prior to launch. When complete, the DPMS and Cryo-Tracker™ will produce, maintain and mass gauge densified cryogenic liquids for 2GRLV. Sierra Lobo is the only contractor working on a cryogenic liquid mass gauging system for SLI.

"Sierra Lobo has been instrumental in developing technologies for a reusable launch vehicle with KSC,"

said nominator Jalane Shelton, KSC contracting officer. "This highly unique and complex initiative has endless changes in the research and development environment and Sierra Lobo continues to be a voice of knowledge and reason. They are true experts in this field and continue to be masters of this ever-changing effort. Their effort is vital to the success of this program and their highly motivated and dedicated team continues to excel to meet the requirements of the program office."

Other contractor awardees are Flad and Associates, Space Gateway Support, V.A. Paving Inc., GEO Syntec Consultants, Launch Coast Services Inc., Central Data, Inc. and Nelson Engineering Co.

All NASA's field centers and the Air Force Research Laboratory are actively participating in the Space Launch Initiative and are vital to its success. NASA's Marshall Space Flight Center in Huntsville, Ala., leads the Space Launch Initiative for NASA's Office of Aerospace Technology.

Visit <http://www.slinews.com>, for additional SLI information.

Awards

Silver Snoopy Awards

STS-112 Crew Members presented the individuals listed below with Silver Snoopy Awards Dec. 6.

NASA/PH: Kelvin Manning, Ken Tenbusch, Lisa Colledo, Robert Beil

USA: Charles Reynolds, Sherrie Webb, Jerry Goudy, Robert Diller, Paul Bastastini, Charles Pooler, Curtis Brim

Boeing: Joel Hays

SGS: Lois Russell, Jimmie Fitzgerald, Diana Governor, Jeff Anderson

JBOSC Adopt-A-Child program

JBOSC employees donated Christmas toys for 513 children in the JBOSC Adopt-A-Child program. Pictured from left are program supporters Bill Sample, Susan Kroskey, Michael Butchko and Col. Thomas Eye.



Starboard-6 truss segments arrive

The 11th and final truss segment for the International Space Station, designated Starboard 6 (S6) Truss Segment, arrived as two pieces at Kennedy Space Center last month.

The Integrated Equipment Assembly (IEA) and the Long Spacer (LS) were shipped separately from Johnson Space Center aboard NASA's Super Guppy cargo airplane.

The IEA arrived at KSC's Shuttle Landing Facility Dec. 11 and the LS segment arrived Dec. 16.

Upon arrival, both pieces of the S6 truss were transported to the Space Station Processing Facility (SSPF) and transferred to test stands in the highbay.

The IEA and the LS will spend approximately one year in processing in the SSPF.

The truss segments will undergo final assembly, testing and integration by the Boeing Outboard Truss Processing Team, with support from the NASA ISS/Payloads Processing Directorate, in order to ready them for flight.

The two segments will undergo final integration at KSC and ride to the Station as one segment on Mission STS-119 in early 2004.

According to Nicholas Cummings, NASA operations engineer, ISS/Payload Processing Directorate, "All of the experience of the outboard truss processing team will be required to complete the S6 element on time for launch, which is essential for NASA to meet the U.S. Core Complete deadline."

Cummings also said, "By the time S6 is integrated into the Shuttle for launch, the team at KSC will have integrated and prepared for flight all 11 of the trusses that make up the Station's long ISS truss segment."

The S6 Truss Segment weighs approximately 26,000 pounds and measures 45 feet long. The truss is a mirror image of the P6 (Portside 6) truss that was installed on the Station in November 2000 during mission STS-97.

Once the S6 Truss is attached to the Station, the entire truss will measure 300 feet long, the length of a football field.

The S6 Truss is the fourth of four power-producing modules for the Station, containing the enormous solar arrays that supply the power needed for life support and science on the Station, batteries and electronics.

The truss IEA and Long Spacer were in Houston for about a year undergoing final construction.



The Integrated Equipment Assembly is offloaded from NASA's Super Guppy cargo airplane following its arrival at the Shuttle Landing Facility. The customized four-engine aircraft has a 24-foot-diameter fuselage and a foldaway nose enabling it to load and transport oversize cargo.



The Long Spacer, the second piece of the Starboard 6 Integrated Truss Segment, rolls out of the Super Guppy.

SSPF features new ISS countdown display

The International Space Station has come a long way since the first U.S. component, Node 1 Unity, was launched aboard Space Shuttle Endeavour on Mission STS-88, Dec. 4, 1998.

The Station has evolved and the world continues to watch as it becomes a viable working resource for research and a place that many astronauts have, in turn, called their "home away from home."

Inside the Space Station Processing Facility (SSPF), where all the U.S. segments, and many of the international partners' segments, are processed, is a new display monitor that tells the ISS story in a unique way.

The display was developed at the request of Tip Talone, director, ISS and Shuttle Payloads. Talone wanted an ISS display for the SSPF lobby that would represent, in real time, how the Station has evolved.

Boeing technicians Mike



KSC workers check out the new International Space Station display in the SSPF.

Cianciotto and Bob Briggs, along with NASA Customer Processing Support Manager Mari Poulin,

worked together to develop the computer monitor display that greets workers and visitors as they enter the facility.

According to Cianciotto, the Web page design was selected because it can display all of the desired data and the team was able to complete the project in a short time.

The LED monitor displays up-to-the-minute Station time in orbit, the crew time/days spent in orbit on the Station and the countdown to U.S. core completion of the Station. An advantage of the display is that it can be easily maintained and updated.

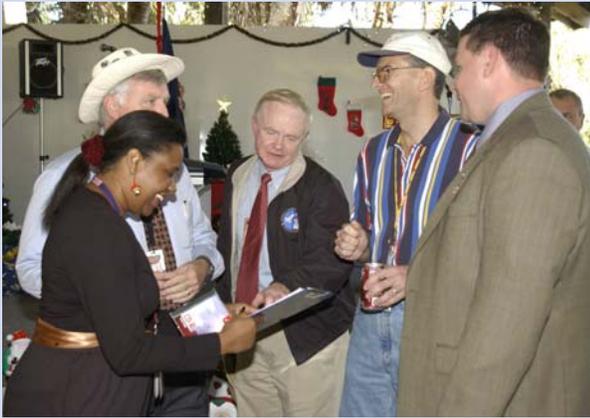
Cianciotto and Briggs developed a system that uses a personal computer versus timing and countdown displays. According to Briggs, the Johnson Space Center Web site was one of the inspirations used to design the display at KSC.

"It's taken us time to get where we're at right now with the Station and this display is a way to remind us all of the hard work that everyone has contributed to the Space Station program," said Poulin. "It also serves as a reminder of the hard work still ahead of us to reach the critical milestone, U.S. core completion of the Station. We've had lots of positive feedback on the display."

The unique display is so popular, in fact, that Center Director Roy Bridges would like to adapt the display for the Headquarters building to display real-time information about the Space Shuttle program.

"The new ISS countdown clock in the SSPF is a fantastic idea," said Bridges. "It's a great reminder to the whole spaceport of the great strides we've made and to keep our eye on this critical milestone," said Bridges.

Holiday C



celebration





KSC Christmas Coffee



Kennedy Space Center workers take part in the 23rd annual Christmas Coffee Dec. 10 at the Debus Conference Facility at the KSC Visitor Complex. Employees and retirees enjoyed the fellowship.



ONE NASA ...

(Continued from Page 1)

the initiative. Kennedy is to lead a similar One KSC effort in support of One NASA.

The first step of the One NASA initiative is an open dialogue on what needs to change in the

agency, O'Keefe said.

He encouraged NASA and contractor employees to voice their ideas on what is keeping the agency from functioning as One NASA.

"Not every suggestion will be adopted, but every suggestion should be considered," O'Keefe

said. "If there is no compelling reason why a suggested improvement shouldn't be made, then it should be put into effect."

He asked employees to visit the One NASA Web site for a thorough discussion of the concept and to complete the online survey. He encouraged workers to contact

their center One NASA team representatives with input on the One NASA growth process.

For KSC, the team reps are Michele Foster and Hugo Delgado.

For more information, visit www.onenasa.nasa.gov

STS-107 ...

(Continued from Page 1)

including BRIC-14 Principal Investigator Dr. Fred Sack from Ohio State University and BioTube/MFA Principal Investigator Dr. Karl Hasenstein from the University of Louisiana/Lafayette, Project Engineers Dave Reed and April Boody, hardware designers Ken Anderson and Bill Wells, Science Coordinators Cheryl Frazier and Howard Levine, NASA Project Managers Dave Cox and Fred Ahmay, and local off-site designers and fabricators Mark Best and Mark Woodbury contributed to assure these experiments will be a success on orbit, said BRIC-14 Project Manager Guy Etheridge.

BRIC-14 explores how moss cells sense and respond to gravity and light, and intends to understand the space flight's influence on cell growth. One objective is to determine the age/stage at which moss grows in a non-random pattern when exposed to microgravity and the minimum illumination required for a phototropic response on moss growth patterns in the absence of gravity. Another is to understand how microgravity affects the distribution of cell substructures.

"The results will not necessarily have any influence on the way plants are grown on Earth, but will provide keen insight into the roll of sub-cellular organelles in the orientation of plant growth development," Etheridge said. "Microgravity provides an environment in which light is the only known influence on plant growth direction. Scientists can investigate the threshold at which light becomes a factor on plant growth."

BioTube/MFA research provides insight into the organization and operation of gravity-sensing systems of plants and other small organisms.

The experiment, in development



As part of In-Flight Maintenance training, members of the STS-107 crew check out one of the BioTube experiments that will be part of their research mission. From left (in uniform) are Payload Specialist Ilan Ramon of Israel, Mission Specialists David Brown and Kalpana Chawla, Pilot William "Willie" McCool, Commander Rick Husband, and Mission Specialist Laurel Clark. Also pictured are BioTube/MFA Project Engineer April Boody and Project Manager Dave Cox.

since 1996, specifically examines how gravitational forces serve as directional signals for low-gravity environment growth. Investigators hope to discover if plant cells perceive gravity with amyloplasts, if amyloplast position or movement affects root growth direction and what gravity's effect is on cells by exposing plants to a high-gradient magnetic field while in microgravity.

"The goal of BIOTUBE/MFA is to improve understanding of the basic phenomenon of how plants respond to gravity. This research could also lead to simple countermeasures to the lack of a gravity stimulus for plants grown in microgravity," said Boody. "As with all basic research, an improved understanding of plant growth and development will have important implications for improving plant growth and biomass production on Earth."

Fifteen other STS-107 investigations will monitor space flight effects on basic body systems, specifically on cardiovascular and musculoskeletal systems. Research subjects include viruses, bacteria, fungi, rats and astronauts. The

human research will be conducted in the Baseline Data Collection Facility (BDCF), which is managed by NASA's International Space Station/Payloads Processing Directorate.

Two separate experiments will allow cell cultures to grow together in weightlessness, improving enhanced genetic characteristics development. Prostate cancer combatants, anti-cancer drugs and bone cancer pain therapy advancements, protein crystal growth and crop yield improvements are all experiment research areas.

Some experiments will study physics of lean combustion, soot production and fire quenching gaining insight into combustion and fire-suppression.

Also being studied on Columbia are zeolite crystal formations and the use of pressurized liquid xenon to illuminate complex fluid behavior.

One payload carries more than 500 protein samples for crystallization in continuing life structure studies. Another commercially sponsored NASA payload comprises drug delivery technique experiments.

This will be the first flight of STS-107's primary payload, SPACEHAB-Research Double Module (RDM), which provides enhanced science capability over previous SPACEHABs.

Through a contract, the European Space Agency will fly a payload covering astronaut health, biological functions and basic physical phenomena. SPACEHAB allows universities, companies and other government agencies to perform space research.

The Canadian Space Agency is sponsoring three bone-growth experiments, and is collaborating with ESA on two. The German Space Agency will study gravity-sensing organs of fish. One university is growing ultra-pure protein crystals for drug research and another is testing future satellite navigation systems.

The U.S. Air Force is conducting a communications experiment. Elementary school students in Australia, China, Israel, Japan, Liechtenstein and the U.S. are probing space flight effects on fish, insects and inorganic crystals.

ESA will perform one ground-based and seven in-flight experiments on astronauts' cardiopulmonary changes. Additional ESA biological investigations will examine bone formation and maintenance, immune system functioning, connective tissue growth and repair, and bacterial and yeast cell responses to space flight stresses.

Joining the SPACEHAB RDM in the payload bay is the Fast Reaction Experiments Enabling Science, Technology, Applications and Research (FREESTAR), comprising six science payloads. Included is the Hitchhiker Carrier avionics, which provides interfaces for electrical systems, payload power control, and command and telemetry capabilities. One FREESTAR experiment is made up of 11 U.S. student experiments.

FORWARD ...

(Continued from Page 1)

continue to inspire the next generation of explorers – as only NASA can.

This year we celebrated the 112th Space Shuttle launch and 33rd Expendable Launch Vehicle (ELV) launch since KSC became the manager of the ELV program in October of 1998.

All but one of this year's Shuttle missions were focused on the daunting task of building the most complex laboratory ever built, the International Space Station (ISS).

More than 390,000 pounds of ISS components are in orbit today and another 110,000 pounds will be processed during the next 14 months, with U.S. Core Complete in 2004. KSC has played a crucial role in making sure everything worked when it got to orbit, always remembering there are no second chances.

KSC has also been actively involved in the areas of the Space Launch Initiative (SLI) and the development of new Spaceport and Range Technologies.

With SLI we have been engaged in and have influenced the design criteria with operational and human factors considerations.

The Spaceport and Range technology development initiatives are pressing forward and making steadfast progress in researching technologies that will be essential for future spaceports of the world.

As a result of a shared vision with the state of Florida, the Space Experiment Research and Process-

ing Laboratory (SERPL) and the 400-acre International Space Research Park are fast becoming part of our space center's landscape.

SERPL will soon host the world's most prominent scientists who will push the frontiers of research using facilities and the unique environment of microgravity aboard the International Space Station.

Even as we reflect on 40 years of thrilling launches, evolving spacecraft, and amazing discoveries, we unveiled our vision for the spaceport for the next 50 years – the Cape Canaveral Spaceport Master Plan.

NASA Kennedy Space Center, the Air Force's 45th Space Wing and the Florida Space Authority created this plan with support from the Canaveral Port Authority, the U.S. Fish and Wildlife Service, the National Park Service, and the Department of the Navy.

The plan envisions a future of low-cost, efficient space travel and provides a way to expand our capabilities and facilities while protecting our unique environmental treasures on the Space Coast.

As we look toward the future with renewed enthusiasm and energy, we hope that you will join with us as partners.

Together we will share in the excitement and new discoveries that will come as we commit our passion and excellence to advocating the state of the art in space launch operations and spaceport and range technologies to serve our customers well into the future.

I can hardly wait ... !

Remembering Our Heritage



30 years ago: Apollo 17

Almost 30 years to the day after they took man's last steps on the surface of the moon, Apollo 17 astronauts Eugene Cernan (second to right) and Harrison Schmitt (in front of Cernan) recounted their historic journey. The commander and lunar module pilot of the last Apollo flight to the moon made two special appearances at Kennedy Space Center Visitor Complex Dec. 13.

Astronaut Hall of Fame reopens

The Astronaut Hall of Fame, Kennedy Space Center Visitor Complex's newest attraction chronicling the personal side of the NASA story, opened its doors to the public Dec. 14.

A formal grand opening celebration and unveiling of new educational programs at the Hall of Fame will take place in Spring 2003.

Kennedy Space Center Visitor Complex acquired the Astronaut Hall of Fame in late September on behalf of NASA and made it an official part of the Visitor Complex experience. Since that time, the

facility, located on State Road 405 in Titusville, has undergone more than \$700,000 in improvements, from new paint to upgraded computer systems.

The Astronaut Hall of Fame houses the world's largest collection of astronaut memorabilia, as well as displays, exhibits and tributes dedicated to the heroes of Mercury, Gemini and Apollo.

The Exhibit Hall houses an historic collection of spacecrafts, including a Mercury Sigma 7 capsule, a Gemini training capsule and an Apollo 14 command module.

Delta II chosen for 19 payloads

NASA has chosen the Delta II expendable launch vehicle, provided by Boeing Launch Services Inc., to launch 19 NASA and NASA-sponsored medium-class scientific payloads between 2006 and early 2009.

Boeing Launch Services Inc. is headquartered in Huntington Beach, Calif., and is a wholly owned subsidiary to The Boeing Company.

This is a firm fixed-price launch service task order awarded under the terms of the current NASA Launch Services contract and has a value of \$1.2 billion, if all options are exercised.

The contract calls for 12 firm launches with options for seven more.

Twelve launches are planned from the Cape Canaveral Air Force Station and seven are planned from Vandenberg Air Force Base, Calif.



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 External Relations and Business Development in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted two weeks before publication to the Media Services Branch, XAE-1. E-mail submissions can be sent to Katharine.Hagood-1@ksc.nasa.gov

Managing editor..... Bruce Buckingham
Editor..... Kathy Hagood

Editorial support provided by InDyne Inc. Writers Group.
NASA at KSC is located on the Internet at <http://www.ksc.nasa.gov>

USGPO: 733-133/600023