



Spaceport News

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John F. Kennedy Space Center

KSC wraps up successful year

During the past year, Kennedy Space Center began an ambitious schedule of Space Shuttle launches as construction of the Space Station shifted into high gear.

Five Shuttle missions were launched in 2000 and eight missions are planned for 2001.

The Center also enhanced its capabilities for management of NASA's Expendable Launch Vehicle Program. Six expendable launch vehicle (ELV) missions were managed during 2000 and 13 ELV missions, including the 2001 Mars Odyssey, are currently scheduled for 2001.

In addition to providing those safe, successful launches, the Center moved forward in its quest to enhance its mission as a Spaceport Technology Center. A number of partnerships with other government agencies, commercial enterprises and academia were strengthened or formed.

"The team has come a long way this year, and we should really be proud," said Center Director Roy

Bridges. "We've had a great year in terms of the success of our operational missions as well as our technology development projects.

"We reorganized the Center's management structure to better focus our resources, and we strengthened our strategic partnerships to better leverage those resources. We've laid the groundwork for more great things in the coming years."

KSC positioned itself for a productive future through a reorganization effort called KSC 2000. The reorganization is enabling the Center to participate in NASA's cutting-edge engineering initiatives. Hundreds of workers were moved to new locations on Center as part of the reorganization.

The Center and the Air Force's 45th Space Wing joined forces on several new enhancements to the Cape Canaveral Spaceport during 2000. They jointly celebrated the 50th Anniversary of the launch of Bumper 8, the first rocket launched

(See 2000, Page 6)



Endeavour lifts off from Kennedy Space Center on Nov. 30, beginning STS-97, the final Space Shuttle mission of 2000.

Home Page growth continues

As Kennedy Space Center's culture continues its evolution toward a more innovation-driven Spaceport Technology Center, the KSC Home Page Web site is helping set the pace.

Through the KSC 2000 reorganization effort, overall editorial, page layout and design responsibility of KSC public web site has been shifted to the External Relations and Business Development Directorate.

At the same time, web development and technical Internet support was transferred to the Spaceport Services Directorate under

(See WEB, Page 2)



Internet Services Manager Dennis Armstrong works with FDC web designers Andrea Sanders, left, and Debbie Barton.

Inside

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Page 3 – Control room opens and NASA managers named.

Pages 4-5 Spaceport News goes inside the Logistics Facility where 140,000-plus types of spare parts are kept.



Page 8 – Employees of the month, poster contest winners and John Sexton's new book.

WEB ...

(Continued from Page 1)

Webmaster Patrick O'Rourke. Space Gateway Services (SGS) has assembled a team of web developers that, under the direction of KSC Internet Services, has assisted with the establishment of contemporary web design standards.

SGS web developers redesigned more than 4,000 KSC public pages during the summer to give the site a more contemporary look and feel.

A Home Page Coordinating Committee was established with members from each directorate and staff office. The group helps identify, redesign and update organizational pages currently linked from the public site. Spaceport Services is planning annual audits of all KSC-generated pages accessible by the public.

But changes to the site go beyond a web design facelift and housekeeping – a number of new pages and features have been added and more are to come.

"In representing the space program, we want our Web site to convey how exciting and innovative the program is," said Dennis Armstrong, KSC Internet Services Manager. "Because our site receives millions of hits each year – we're over 200,000 million a year now – it's an especially important avenue for educating and informing the public about what we do."

Two of the newest offerings are mission-specific sites that are activated about three days prior to each Shuttle launch:

- The Live Countdown Coverage Page provides updated summaries of major processing events occurring during the final 10 to 11 hours prior to launch. See <http://www.pao.ksc.nasa.gov/kscpao/shuttle/countdown/sts97/milestonest.html>.



Above is a frame from a NASA timeline web movie that will highlight major events from the early days of the space program as well as future initiatives.

- The Shuttle Mission Quiz is an interactive game that challenges visitors to test their knowledge of the latest mission and win a prize. Answers to the questions can be found at various locations in the KSC Web site <http://pao.ksc.nasa.gov/ksc trivia/index.cfm>.

Earlier page additions include a series of pages defining the Spaceport Technology Center concept; a Shuttle Launch Simulation; a changing "Blast From The Past" feature recognizing KSC's historical contributions; and a virtual Guest Briefing that highlights the upcoming mission and crew.

Several new pages are slated to come online in the coming weeks: a NASA timeline movie highlighting

major events from the early days of the space program, current programs and future initiatives; and a Virtual Firing Room tour.

Funding has been approved for the establishment of a web broadcast studio at the KSC Press Site by May 2001. This will allow for local Internet-specific programming of launches, landings and other events to include interviews with scientists and engineers and dignitaries of interest.

The Spaceport Services Directorate has purchased and installed a new cluster of servers to which all External Affairs pages will be moved. These new servers will provide visitors with faster access to KSC's evolving Web site.

To learn more about new KSC web policies and templates, see:

- KSC Web Design Policy. These pages lay out those NASA, KSC and other web design and administrative standards that are to be followed by any KSC organization desiring to develop a web page that will link to KSC's public web site. See <http://pao-int.ksc.nasa.gov/templates/standards/policypage.htm>
- Graphics and Template Design Main Page. A template page that presents requirements, resources, and examples to be used by NASA developers when preparing pages to be viewed by the general public via links to the KSC Home Page web site. See <http://pao-int.ksc.nasa.gov/templates/template.htm>.

For more information, contact Dennis Armstrong at 867-4493.

Alaska Kodiak Star launch set for Aug. 31

Kodiak Star, the first planned orbital launch from the new Kodiak Launch Complex in Alaska will be a NASA collaborative mission with the Department of Defense (DoD).

The KSC ELV program office will manage the launch.

The payload consists of four small satellites to be launched

aboard a Lockheed Martin Athena I launch vehicle.

NASA's spacecraft in the Kodiak Star mission is Starshine 3.

The satellite, about one meter in diameter and weighing about 200 pounds, is covered with front-surface aluminum mirrors.

They will be machined by

technology students in Utah and polished by participating grade and high schools.

PICOsat, the primary Department of Defense Satellite, is a technology demonstration satellite carrying four experiments.

The second DoD spacecraft is a Prototype Communications Satellite

(PCSat), operating in the amateur radio band.

The third DoD spacecraft is SAPPHERE, a micro-satellite. The primary mission of Sapphire is to space-qualify two sets of "Tunneling Horizon Detector."

The Kodiak Star is targeted for launch Aug. 31, 2001.

Two NASA KSC managers named

NASA employees Michael Leinbach and Charles Abner were recently named to management positions within the Space Shuttle Program at Kennedy Space Center.

Leinbach was officially named NASA's Space Shuttle Launch Director at KSC. He rejoins the Space Shuttle Program after completing two years in support of the International Space Station.

As Launch Director, Leinbach is responsible for overall Shuttle launch countdown policy, planning

and executive activities. He will conduct and oversee the final readiness poll of the KSC launch team from the firing rooms prior to liftoff.

"I'm looking forward to my new role in the Space Station construction process," said Leinbach. "Being involved with the preparation of Station hardware and then helping it get off the ground and into orbit is a real privilege."

Though new to the position, Leinbach is no stranger to firing

room activities on launch day. He served as NASA Test Director beginning in 1988 and was named Shuttle Test Director in 1991.

Charles Abner is NASA's new Chief Engineer for the Shuttle Processing Directorate at KSC. In this position he will be responsible for all engineering aspects related to processing flight hardware elements and facility/ground support equipment and for the integration of technical decisions made by both engineering and



C. Abner



M. Leinbach

management personnel before and during launch.

Abner's long career with NASA at KSC began in 1967.

Control room to keep information flowing

System engineers in the firing room will have fewer computer system glitches to contend with during launch countdowns and major prelaunch tests now that the new Central Operations Facility (COF) control room is online in the Launch Control Center (LCC).

That will be only one of many benefits of the new facility, located on the second floor of the LCC.

The COF is capable of handling computer system monitoring and maintenance across Kennedy Space Center. It was designed and installed by United Space Alliance (USA) in order to provide better customer service to NASA and its other customers.

The room's computer monitoring system allows for proactive computer network maintenance around the clock. It can detect and fix a problem in an LCC firing room server even before the user knows he has one.

During the system's support of STS-97 launch, it detected a server problem before the problem had a chance to affect the countdown.

"We're in the process of changing from a reactive to a proactive culture at KSC," said USA Manager Larry Carr, who headed the team of USA integrated data system engineers and brought the system on line. "This new control room is only the first step."

Already USA has moved more than a dozen critical launch processing and ground support functions to the COF from their previous separate locations. USA



The Central Operations Facility recently opened on the second floor of the Launch Control Center.

plans to add other functions over time. The COF has been set up to be integrated with the new Checkout Launch Control System now in development.

"The COF control room will be a one-stop shop for most of our information technology requirements here at KSC," said Carr. "It's a major breakthrough in bringing state of the art technology to the systems that support Space Shuttle processing from the time the orbiter lands until it lifts off on its next mission."

The COF now is managing the Shuttle Data Center, which pro-

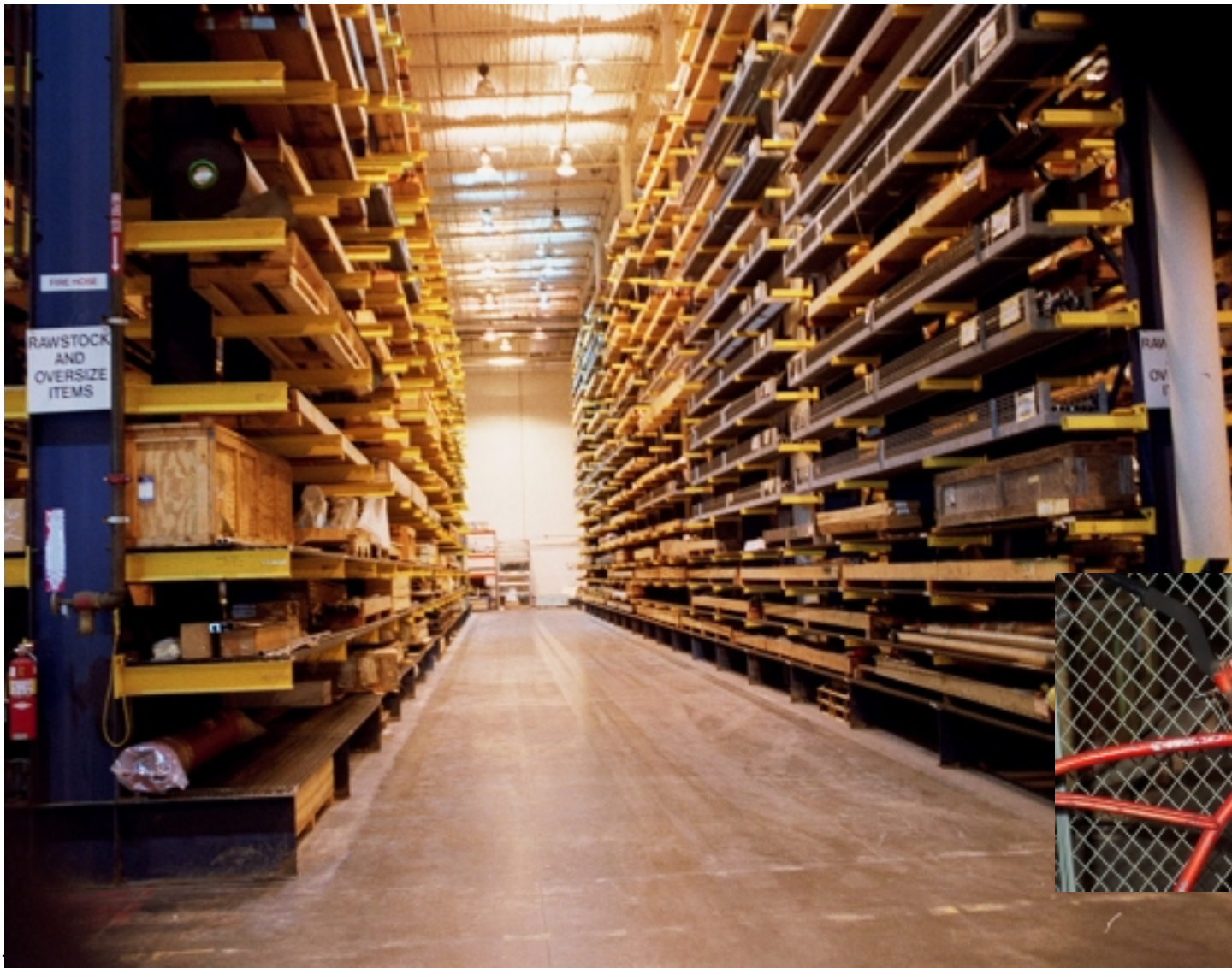
vides all flight-related software data for maintenance, simulation and launch of the Space Shuttle. The control room is also serving as a single point of contact for USA senior management during the launch countdown and other critical tests.

A USA duty officer is on station in the control room at all times and a central help desk is on location to support USA system users throughout KSC. It has consolidated help desks that were in the LCC, Vehicle Assembly Building and off-site at the NASA Shuttle Logistics Depot.

"It keeps communication flowing when the key people are all here and can talk face to face," said COF manager Michael Shacreaw. "Now that we're together, we can work much more efficiently and offer much better customer service."

The control room features commercial hardware and software designed and developed to meet the unique requirements of the Space Shuttle launch processing system. Its design is based on lessons learned from control rooms at Delta Airlines, Hewlett Packard, Compaq Computers and Lockheed Martin operations.

Inside the Logistics Facility



A Logistics Facility

above. At right is one of the bicycles that are used to transport some items within the facility.

Facility provides spare parts to KSC and other

Keeping Kennedy Space Center and other Shuttle support centers supplied with parts for the orbiters and ground operations – from huge fuel cells to tiny nuts and bolts – is a massive undertaking.

It's no wonder that the Logistics Facility, the building that houses administrative support and approximately 140,000 plus spare line items, measures in excess of 472,000 square feet.

The facility was built in 1985 south of the Vehicle Assembly

Building on Contractor Road to consolidate logistics functions near the processing area.

The Logistics Facility includes warehouse space, storage platforms, chemical storage area, yard storage and office space.

The value of supplies contained within the warehouse and storage areas at any one time is estimated at about \$1 billion.

While some supplies replenished and kept on hand within the facility are manufactured and periodically

delivered by vendors, a number of the parts are about 20 years old, as old as the Shuttle program.

A constant stream of parts and other materials are ordered, stored, processed and delivered to the customers.

Parts must be inspected, sorted, periodically verified and sometimes repaired.

An automated storage and retrieval system speeds processing requests.

Damaged or worn items are also

processed at the facility or sent to the vendor or the NASA Logistics Depot for repair.

Orders for parts not only come from KSC, but also from other Shuttle support sites including Dryden Flight Research Center, Transatlantic Abort Sites, Boeing Co. plant in Palmdale where Columbia is being finished.

"Customer service and attention are essential in what we do," said Eddy Walters, manager

Facility



Facility worker validates a stored item.



Receiving inspector Bob Rathjen checks a piece of convoluted tubing.



Receiving inspector Fredia Ford answers a coworker's question before checking packages received at the Logistics Facility.



Woody Smith, manager of transportation and receiving, conducts one of his daily safety walkdowns of the receiving area at the Logistics Facility.

Other Shuttle support centers across world

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Storage and Distribution for United Space Alliance. "We've got about 6,000 to 7,000 different customers – that's anyone who might order something from us."

About 500 KSC team members, primarily United Space Alliance employees, work in the facility.

About 100 work in the warehouse area and about 400 in the facility's office space.

Employees work in a variety of departments including Processing Operations, Storage and Distribu-

tion, Transportation, Procurement, Logistics Engineering, Customer Support, Commodity Management and Quality Assurance.

The major processes carried out in the facility include flight spares distribution, ground support equipment distribution, receiving, delivery, packaging and crating, kitting and repairable processing.

"So much happens here. It's like a world within a world," said John Kelly, manager, Vehicle Processing Storage Area.

"Customer service and satisfaction are essential in what we do."

Eddy Walters
Manager of Storage and Distribution for United Space Alliance

2000 ...

(Continued from Page 1)

from the Cape. They also worked together to lay the groundwork for developing a comprehensive master plan for the Spaceport.

Highlights of KSC's many accomplishments during 2000:

Space Shuttle

The first Shuttle mission of the year, the Shuttle Radar Topography mission, STS-99, gathered billions of measurements of the Earth's surface for government and public use.

Three missions that followed – STS-101, STS-106 and STS-92 – enabled astronauts to continue to build, outfit and prepare the International Space Station for its first set of long-term occupants, the Expedition 1 crew.

The Expedition 1 trio took residence in November after being launched from Baikonur Cosmodrome, Kazakhstan.

KSC's most recent launch, STS-97 in late November, allowed astronauts to deliver and attach the P6 truss segment to the International Space Station. Two 108.6-foot-long solar array wings were also delivered and activated, providing the Station with power for both habitation and Station science experiments.

Orbiters launched by the KSC Team during 2000 carried 32 crew members into space, logged more than 23.4 million miles and carried many major payloads into orbit. Four of the five missions landed in KSC.

Poor weather conditions at KSC forced the landing of Discovery at Vandenberg Air Force Base in California completing STS-92.

Expendable Launch Vehicles

As lead center for NASA's acquisition and management of expendable vehicle launch services, KSC enjoyed a third successful year and moved headquarters into a refurbished E&O Building at the Cape Canaveral Air Force Station (CCAFS).

For the first time, NASA KSC remotely managed a rocket launch.

The High-Energy Transient



A newly arrived external tank is transported to the Vehicle Assembly Building (VAB). The tank was moved to one of the VAB's high bays to await stacking for a future Shuttle mission.

Explorer 2 (HETE-2) launched from the Kwajalein Missile Range in the South Pacific in October. Because the Kwajalein site does not have a monitoring setup necessary for the level of management required by NASA, a system for remotely monitoring the launch was created at the Spaceport from Hangar AE.

KSC's Expendable Launch Vehicle team supported two missions launched from CCAFS. Satellites launched were the GOES-L weather satellite in May and the latest Tracking and Data Relay Satellite (TDRS-H) in June.

From Vandenberg Air Force Base in California, the KSC expendable launch team supported the successful launch of the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) in March; the National Oceanic and Atmospheric Administration's NOAA-L spacecraft in September; and the Earth Observing (EO-1) satellite and SAC-C in November.

International Space Station

Several series of Multi-Element Integration Tests on Space Station components were held during the year to help avoid problems that would be costly to address in space.

Vacuum chamber tests using a reactivated Apollo-era high altitude

chamber were also held to ensure that Station elements, including the U.S. Laboratory, were airtight.

Several Station components were officially transferred to NASA from The Boeing Co., including the Zenith 1 and P6 Integrated Truss Structures. In addition, a number of other Station components arrived at KSC for processing. Among major components delivered to KSC were the P1, P4 and S3 Integrated Truss Structures and the Joint Airlock Module.

Spaceport Technology and Technology Transfer

KSC leadership continued to foster KSC's development as a Spaceport Technology Center. Specific technology areas targeted for emphasis were Fluid System Technologies; Spaceport Structures and Materials; Process Engineering; Command, Control, Monitoring and Range Technology; and Plant and Microbiological Sciences.

KSC led the Agency in the number of technology licenses generated.

Notable among new KSC-developed technologies:

The Personal Cabin Pressure Altitude Monitor was offered for licensing. The monitor, which is about the size of a hand-held pager,

is designed to warn individuals of potentially dangerous or deteriorating aircraft cabin pressure altitude conditions through audio, vibratory and visual alarms. In addition, a lighted digital screen displays a text message of the warning and the specific condition causing the alarm.

The Medevac Oxygen System was shared with the Air Force through a technology transfer agreement with the KSC Technology Programs and Commercialization Office. The system was originally designed to provide therapeutic oxygen supply to astronauts being flown aboard the C-130 aircraft in case of a forced landing at a Space Shuttle Transatlantic Abort Landing site. It will be used by the U.S. Air Force Air Mobility Command in C-130 and C-141 aircraft.

A new nitrogen oxide scrubber for converting toxic vapors from the Shuttle's hypergolic oxidizer into fertilizer was installed at Launch Pad 39A and the technology licensed to Phoenix Systems International, Inc. of McDonald, Ohio. KSC plans to install the system at all scrubbers, and CCAFS plans to install the system at the Titan Launch Complex 40. Phoenix Systems anticipates applying the technology to at least 40 percent of the country's coal-, oil-, and gas-



Endeavour lands at Kennedy Space Center, ending STS-97. Four of the past five Shuttle missions this year ended with a landing at KSC.

fired boilers.

Contracts, Agreements and Facilities

NASA selected Boeing Delta Launch Services Inc. and Lockheed Martin Commercial Launch Services Inc. for the NASA Launch Services contract awards. An Indefinite Delivery/Indefinite Quantity contract was awarded to each contractor with a minimum of one launch service over 10 years.

NASA is authorized to order a total of 70 launch services under all the contracts bringing the total estimated value to \$5 billion.

KSC and the 45th Space Wing marked their second full year under its Joint Base Operations and Support Contract (J-BOSC).

Through J-BOSC, a single set of base operations and support service requirements have been established for KSC, CCAFS and Patrick Air Force Base (PAFB).

Eighteen different contractors, often with overlapping and duplicate responsibilities, previously performed these services.

The two organizations further strengthened their partnership by signing an interagency agreement that established the Joint Planning and Customer Service (JPCS) office.

The agreement brings together an integrated staff into a single office to represent both agencies at the Spaceport. The JPCS serves as a "one-stop shop" for new customers of the two federal agencies.

The two organizations also signed the Consolidated Comprehensive Emergency Management Plan (CCEMP). The CCEMP established uniform policy guidelines for the effective mitigation of,

preparation for, response to and recovery from a variety of emergency situations at the Spaceport.

Emergency Preparedness at the Spaceport was further enhanced by the acquisition of the Mobile Command Center (MCC), a specially equipped emergency response vehicle. The MCC allows the emergency response team to better respond when emergencies at the Cape Canaveral Spaceport require a mobile field command center. The vehicle was purchased by the J-BOSC contractor Space Gateway Support through J-BOSC contract savings.

The State of Florida appropriated \$14 million to help fund construction of the Space Experiment Research and Processing Laboratory (SERPL), a magnet facility for KSC's planned Space Station Commerce Park. The SERPL, being designed by NASA, will support life sciences and biological flight experiment processing and research for the Space Station.

The Cryogenics Testbed Facility was unveiled in April. The facility provides a resource for collaborative research and development in the areas of thermal insulation systems, cryogenic components, propellant process systems and low-temperature applications.

The new Vapor Containment Facility, adjacent to the Space Station Processing Facility, opened in July. Ammonia servicing equipment used to perform preflight tests and service of ISS hardware is now housed in the facility.

The Vehicle Assembly Building's "Safe Haven" modifications were tested in August. For the first time in Space Shuttle history, a fully stacked Shuttle rolled into High

Bay 2 of the VAB. Modifications to the VAB and nearby rock-paved crawlerway were completed, allowing more storage space and protection for Shuttle flight hardware from hurricanes or tropical storms.

The new Checkout and Launch Control System (CLCS) at the Hypergolic Maintenance Facility was declared operational in September. It was the first of several new CLCS rooms scheduled to come on line in the coming months. CLCS is a multi-year project designed to replace outdated control rooms at KSC with highly sophisticated computer systems and software.

A new high-pressure helium pipeline to service launch needs at the new Delta IV launch complex, Complex 37 at CCAFS, was commissioned in November. The nine-mile-long, buried pipeline for Complex 37 will save NASA money through sharing use and costs of the KSC Helium Facility. It will also serve as a backup helium resource for Shuttle launches.

Also in November, a ribbon cutting was held for the refurbished E&O Building. Home for NASA's unmanned missions since 1964, the building was renovated to host the Expendable Launch Vehicle Program at KSC.

Tourist Destination Upgrades

Several new exhibits, an Astronaut Encounter show and the Dr. Kurt Debus Conference Facility opened at KSC Visitor Center.

The major new additions represented the final phase of a \$120 million redevelopment project by Delaware North Parks Services of Spaceport Inc.

The new conference facility features an Early Space Exploration exhibit, which highlights early missions. A second new exhibit, Exploration in the New Millennium, showcases explorations to Mars.

To ensure funding for significant future upgrades to the Visitor Center, a new admissions policy went into effect.

An all-inclusive admission ticket now provides access to the KSC bus tour, IMAX films and the Robot Scouts and Universe Theater attractions.

Community Outreach and Education

KSC's contributions through the 2000 Combined Federal Campaign exceeded its goal of \$220,000, with more than \$260,000 given by KSC Civil Service employees.

In addition, 1,174 KSC, CCAFS and PAFB employees joined the National Marrow Donor Program at KSC's third annual registration drive.

KSC and CCAFS jointly hosted a Community Appreciation Day on Nov. 4. More than 43,000 Brevard County residents in addition to thousands of KSC and CCAFS employees attended.

KSC hosted the first Florida Space Summit in January. The summit looked at the future of space as it relates to the state of Florida.

Then in August, KSC hosted the annual Community Leaders Briefing. KSC executives met with various community leaders from across Brevard County and the State of Florida about long-term viability of KSC and benefits the space program contributes to the community.

On the education front, the NASA KSC Property Disposal Office coordinated the donation of 1,501 computers to students during Fiscal Year 2000, which ended Sept. 30. Major donations were made to schools in Pike County, Ala., and Memphis, Tenn.

Students from all over the country gathered for the FIRST (For Inspiration and Recognition of Science and Technology) regional competition at the KSC Visitor Complex in March.

Thirty teams of high school students tested the limits of their imagination using robots they designed to compete in a technological battle against other schools' robots.

To educate employees and help facilitate the changing Spaceport culture, "7 Habits" personal mastery training of all civil service employees was completed.

Through these efforts and others, KSC began the new millennium with a reinvigorated sense of destiny and a clear plan for continuing excellence in launch operations and technology development.

Employees of the Month

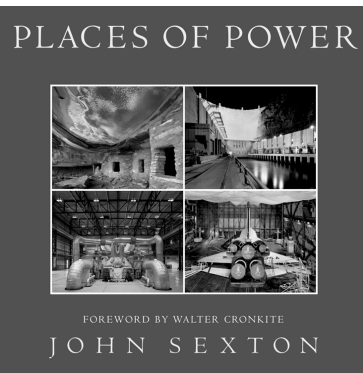


December employees of the month are, from left, Robert Summers of the Shuttle Processing Directorate, Kathleen Mease of the ELV and Payload Carriers Program, Penny Chambers of the Chief Counsel's Office and Klaus Staefe of the Spaceport Services Directorate. Employees of the month not shown are Roslyn McKinney of the Equal Opportunity Office, Carol Aiello of the Joint Performance Management Office and Walter Feitshans of the Spaceport Engineering and Technology Directorate.

Contest winners



As part of America Recycles Day, the NASA Environmental Program Office coordinated a Center-wide poster contest that was sponsored by the Office of the Federal Environmental Executive. A Certificate of Appreciation was awarded to the four entries submitted by NASA, all of which were submitted from KSC. Posters were designed and submitted by the following children: Afton Shelton, 11, pictured right, Mathew Houser, 8, and Ryan Mulcahy, 14, pictured left. ARD 2000 Calendars, highlighting the winning posters, are expected to be released by the end of January 2001. To view the posters, see <http://environmental.ksc.nasa.gov/recycle/intro.html>.



Photographer John Sexton's new calendar, "Space Shuttle An Inside Look," and book, "Places of Power," are available through the NASA Exchange store. For more information on the book or calendar, see www.VentanaEditions.com.

Evidence of past water on Mars

In what ultimately may be their most significant discovery yet, Mars scientists say high-resolution pictures showing layers of sedimentary rock paint a portrait of ancient Mars that long ago may have featured numerous lakes and shallow seas.

"We see distinct, thick layers of rock within craters and other depressions for which a number of lines of evidence indicate that they may have formed in lakes or shallow seas. We have never before had this type of irrefutable evidence that sedimentary rocks

are widespread on Mars," said Dr. Michael Malin. He was the principal investigator for the Mars Orbiter Camera on the Mars Global Surveyor spacecraft at Malin Space Science Systems, San Diego, Calif.

Such layered rock structures where there were once lakes are common on Earth.

The pancake-like layers of sediment compressed and cemented to form a rock record of the planet's history.

The regions of sedimentary layers on Mars are spread out and scattered around the planet.



John F. Kennedy Space Center

Spaceport News

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