October 29, 1999 Vol. 38, No. 22

Spaceport News

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

John F. Kennedy Space Center

Mission update

STS-103

Discovery and its seven member crew are scheduled for launch Dec. 2. The official launch date will be determined at the Flight Readiness Review on Nov. 19.

STS-103 is NASA's third servicing mission to the Hubble Space Telescope.

There are many activities planned to take place during STS-103 over four days of spacewalks.

In addition to replacing all six gyroscopes on the December flight, the STS-103 crew will replace a guidance sensor and the

(See Missions, Page 7)

Mars project gives KSC ascending role

An artist's conception shows the Mars Ascent Vehicle (MAV) rising from the surface of the red planet. A team of KSC employees is working to develop the booster system for the MAV, which will carry planetary material collected by a rover (foreground) and place it into orbit for an eventual return to Earth. The KSC endeavor is part of the Mars Sample Return project planned for 2003 and 2005.

It doesn't take much prompting to get Dave Taylor talking about KSC's role in the Mars Ascent Vehicle project. As the lead engineer on the team developing its booster system, Taylor radiates enthusiasm as he discusses all aspects of the project.

But there is one frequent question that leaves him temporarily speechless.

"People are always asking me what I can compare this to," Taylor said. "There isn't anything."

The concept of a rocket that will launch from the surface of another planet and place a cargo into the planet's orbit is unprecedented for any NASA center. The nearest likeness Taylor can offer would be the lunar module used by the Apollo missions, although that was much larger, carried humans and served a different purpose.

So the project would be unique for any center, but it represents a particular departure for KSC —

(See Mars, Page 5)

On the road to A-1a: KSC and X-34

KSC engineering technicans assisted in removal of the wing assembly (above) of the X-34 A-1a test vehicle at Dryden Flight Research Center in California in September. Eight KSC technicians spent a total of four weeks assisting in test vehicle modifications.

And you thought A1A was just a busy, beachfront thoroughfare.

It's also the designation of a vehicle designed to take space technology further down the road into the future. The true acronym is A-1a, which designates a modification (little 'a') to the first built X-34 vehicle (the A-1).

Eight KSC technicians recently returned from Dryden Flight Research Center in California, where they spent a total of four weeks working on modifications to the original airframe.

"The experience enabled us to assist in the upgrading of the X-34 vehicle without an extensive training program," said Mike Dininny, one of the mechanical engineering technicians who went to Dryden and who also served as the lead of the KSC contingent. "We worked many different areas of the vehicle — including the partial disassembly and modification of the wing, fuselage and tail section, as well as the fabrication and installation of tubing and components for the hydraulic system."

A single-engine rocket with short wings and a small tail surface, the X-34 suborbital aerospace vehicle will demonstrate low-cost reusability, autonomous landing, subsonic flights through inclement weather, safe abort conditions and

(See X-34, Page 4)

It's back to the future for *Spaceport News*

SPACEPORT NEWS

Volume 3, Number 2 John F. Kennedy Space Center, NASA, Cape Kennedy, Florida January 16, 1964

VAB — THE WORLD'S LARGEST BUILDING

Construction Activity Already Well In Swing

Construction on seven and a-half acres of Merritt Island terrain is in full swing today, as skilled craftsmen mold the foundation on which will be placed this world's largest building.

An apparent low bid of $48.8 million by three firms in a joint venture to outfit and equip NASA's Immense Vertical Assembly Building, exclusive of the foundation and structural steel was the third and final major construction contract announcement.

The firms are Morrison-Knudsen Co. Inc., Perini Corp., and Paul Hardeman Construction Co. Inc.

Firm Foundation

Earlier, Blount Brothers Corp., Montgomery Ala., was awarded an $8 million contract for the foundation work. Nearly 120 miles of piling have been driven and laying of the concrete floor slab is nearly completed.

The U. S. Steel Corporation's American Bridge Division has a $22.6 part for supplying and erecting the VAB's structural steel, which in the next few weeks will begin to give the building its framework.

Design and construction criteria for the VAB were begun in 1961, under KSC direction, working closely with the Corps of Engineers.

Actual design of the building was provided under a $3.3 million contract by New York architects-engineers Urbahn-Roberts-Seelye-Morsia.

The VAB will cost about 3.500 million when completed in mid-1966, and will be a key part of the $450 million Launch Complex 39, from which lunar-bound astronauts will be launched.

OVERPOWERING IMMENSITY of the VAB, as detailed in this up-to-date artist's concept by Bruce Gerver, is apparent through a comparison of the building with "tall" Florida Palm trees near its base.

About Today's Paper

Editor's Note: The Vertical Assembly Building now rises on Merritt Island is for every stretch of the word, awesome. There are, in fact, no proper adjectives to really describe the VAB. Use it challenges the imagination. To give you at least a partial profile on the building, here-every we have devoted this entire issue to the subject.

HEADQUARTERS BUILDING BID ANNOUNCED

An apparent low bid of $1,142,000 has been received to build a Secondary Headquarters Building in the Merritt Island Launch Area for NASA's John F. Kennedy Space Center.

The bid was submitted by the Franchi Construction Co. of Indian River City.

To be located just west of the Operations and Checkout Building in the Merritt Island industrial complex, the headquarters building will be used by the Kennedy Space Center for administrative offices and planning facilities in connection with the manned lunar landing program.

The building will be reinforced concrete construction and will contain 23,000 square feet of space. The central portion of the building will have a fourth floor observation cabin.

The Jan. 16, 1964 issue of *Spaceport News* (above) discusses the construction activity of the Vehicle Assembly Building (then known as the Vertical Assembly Building) and plans to build a Headquarters Building in KSC's Industrial Complex.

Information about the contents of the oldest issues of *Spaceport News* can now be found through the newest technology.

Spaceport News indices are on the Internet at *http://www-lib.ksc.nasa.gov/lib/ARCHIVES/SPNINDEX.HTML*.

The indices capture for reference the march of events from the early '60s through December 1994.

The 1995 through 1999 issues are expected to be posted shortly.

They are intended to serve as a ready reference tool for the names, places and events that comprise the history of Kennedy Space Center.

The arrangement is alphabetical by subject, and under each subject, entries are arranged alphabetically.

Although not available for lending, original issues of *Spaceport News* can be seen at the Kennedy Space Center Library in the Headquarters Building.

The indices are available on the Web in intelligent portable document format (pdf), which allows for word searches on the documents.

The 1996 through 1999 *Spaceport News* issues are available individually on the Web at *http://www-pao.ksc.nasa.gov/kscpao/snews/snewstoc.htm*.

Check out KSC 2000

The KSC 2000 Web page is on-line!

On Aug. 31, Center Director Roy Bridges announced the formation of the "KSC 2000 Team," which will submit to the Executive Management Team a set of recommendations and an implementation plan for improving KSC's organizational and management structure.

To keep employees informed of the team's progress, a special web page has been created to provide the most comprehensive source of information regarding KSC 2000 efforts.

The Web site can be found at *http://www-pao.ksc.nasa.gov/kscpao/ksc2000/2000team.htm*.

This page will evolve and expand as necessary to ensure the free flow of timely and pertinent information to everyone who is concerned.

Lunar Prospector crash leaves no watermark

The controlled crash of NASA's Lunar Prospector spacecraft into a crater near the south pole of the Moon on July 31 produced no observable signature of water, according to scientists digging through data from Earth-based observatories and spacecraft such as the Hubble Space Telescope.

This lack of physical evidence leaves open the question of whether ancient cometary impacts delivered ice that remains buried in permanently shadowed regions of the Moon, as suggested by the large amounts of hydrogen measured indirectly from lunar orbit by Lunar Prospector during its main mapping mission.

Research group leaders from the University of Texas at Austin announced their results on Oct. 13 at the annual meeting of the American Astronomical Society's Division for Planetary Sciences meeting in Padua, Italy.

In an attempt to gather one last bit of scientific productivity from the low-cost Lunar Prospector mission, NASA worked with engineers and astronomers at the University of Texas to precisely crash the barrel-shaped spacecraft into a specific shadowed crater.

NASA accepted the team's proposal based on successful scientific peer review of the idea and the pending end of the spacecraft's useful life, although the chances of positive detection of water were judged to be less than 10 percent.

Worldwide observations of the crash were focused primarily on using sensitive spectrometers tuned to look for the ultraviolet emission lines expected from the hydroxyl molecules that should be a by-product of any icy rock and dust kicked up by the impact of the 354-pound spacecraft.

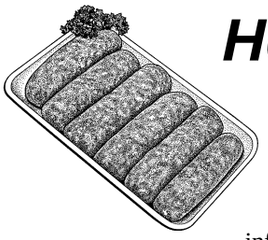
Lunar Prospector was launched Jan. 6, 1998, from Cape Canaveral Air Station on an Athena 2 rocket.

In March 1998, mission scientists announced their first tentative findings of the presence of water ice in shadowed craters near the Moon's south and north poles. They estimated later that up to six billion metric tons of water ice may be buried in these craters under about 18 inches of soil, in more concentrated deposits than originally thought.

However, the evidence was indirect, they cautioned, based on reasonable scientific assumptions given the levels of hydrogen detected, from which water ice is inferred.

Since then, Prospector data have also been used to develop the first precise gravity map of the entire lunar surface. While the Moon's magnetic field is relatively weak, Prospector has confirmed the presence of local magnetic fields that create the two smallest magnetospheres in the Solar System.

Another scientific landmark is the assembly of the first global maps of the Moon's elemental composition.



Hot links!

In a continuing effort to keep *Spaceport News* readers well informed about NASA and space-related news and events, a listing of hot Interent links will be provided as a service to readers every few issues.

The following is a sample of sources in cyberspace where information of interest to the space community can be found.

- **NASA News —** *http://www.nasa.gov/today/index.html*
- **NASA Image Exchange —** *http://nix.nasa.gov*
- **Shuttle countdown —** *http://www.ksc.nasa.gov/shuttle/countdown/*
- **International Space Station —** *http://station.nasa.gov/index-n.html*
- **Expendable Launch Vehicles schedule —** *http://www.ksc.nasa.gov/elv/index-n.html*
- **The X-planes —** *http://www1.msfc.nasa.gov/NEWMSFC/xplanes.html*
- **Planetary Photo Journal —** *http://photojournal.jpl.nasa.gov*
- **Mars —** *http://mars.jpl.nasa.gov*
- **Chandra X-ray Observatory News —** *http://chandra.nasa.gov/chandra.html*
- **KSC 2000 —** *http://www-pao.ksc.nasa.gov/kscpao/ksc2000/2000team.htm*

Days of Caring celebrated Oct. 22 and 23

KSC employees (above) donated elbow grease and smiles to the 1999 Days of Caring project on Oct. 22 and 23. The donation of time and effort turned out to be a great success for both Kennedy Space Center personnel and especially for some grateful senior citizens of Baxley Manor, a building of low-income apartments. On Oct. 22 and 23, about 140 NASA employees participated in the repainting project at Baxley Manor on Merritt Island and also in other projects around Brevard County. If you have questions about this project or other ways in which you can get involved through KSC's Community Relations Council, contact Liz Osborne at 867-4388 or Carol Cavanaugh at 867-2363.

A plume of gas and particles is ejected about 60 miles above Io's Masubi region in an image captured by the Galileo spacecraft. The image has been enhanced to highlight the plume. Galileo was deployed by the crew of STS-34, a mission that launched from KSC Oct. 18, 1989.

Galileo keeps an eye on Io

The Galileo space probe came within 380 miles of Jupiter's volcanic moon Io on Oct. 10, beginning a splendid finale to its four-year mission.

Io lies in an area of intense radiation from Jupiter's radiation belts, and mission managers had expressed concern that Galileo's computers and guidance systems might not survive the trip, but an hour after the craft had its closest encounter with Io, Project Manager Jim Erickson at NASA's Jet Propulsion Laboratory in Pasadena, Calif., said all systems were functioning normally.

Erickson said Galileo did experience computer problems during its encounter with Io when it passed through the densest part of the radiation belt around the Jovian moon, but NASA technicians were able to bypass the problem and reset the computer.

Duane Bindschadler, Galileo's manager of science operations for NASA, said the flyby was important because "Io is a natural laboratory for volcanoes. By studying Io close up, we will learn more about how and when volcanoes erupt and why they act the way they do.

"This may even help us predict the behavior of volcanoes on Earth," Bindschadler said.

Scientific data on Io from Galileo was not expected to reach Earth until November after being transmitted through its low-gain antenna.

But Erickson said Galileo was successfully sending data about its position, time and trajectory after the successful flyby.

Galileo was deployed from the orbiter Atlantis in 1989 during the STS-34 and arrived at Jupiter in 1995. Its primary mission — focusing on the giant planet — ended in 1997.

Galileo then began the its extended mission to study Europa, Jupiter's enigmatic ice-covered moon, as well as Io and other Jovian satellites.

This most recent flyby was just the start of Galileo's grand finale: The spacecraft is scheduled to make an even closer approach of Io on Nov. 25, flying within 186 miles of the surface. The extended mission is scheduled for completion in January.

X-34 ...

(Continued from Page 1)

landing in 20-knot cross winds.

The vehicle is 58.3 feet long, 27.7 feet wide at wing tip and 11.5 feet tall from the bottom of the fuselage to the top of the tail.

The autonomously operated technology demonstrator will be air-launched from an L-1011 airplane and should be capable of flying eight times the speed of sound, reaching an altitude of 250,000 feet.

Orbital Sciences Corporation designed the X-34 to bridge the gap between the earlier Clipper Graham, or DC-XA subsonic demonstrator vehicle, and the larger, more advanced X-33 vehicle.

The X-34 Airframe A-1 was originally planned for use only as a captive carry test vehicle, and three captive carry flights were conducted between June and September at Dryden to verify the safety of the X-34 vehicle mated with the L-1011 airplane that carries the X-34. These initial tests evaluated performance of the aircraft during scheduled maneuvers at various speeds and altitudes. The flights were also used to check the electronic connections between the mated aircraft.

In July, managers in the X-34 Program Office at NASA's Marshall Space Flight Center (MSFC) in Huntsville, Ala., decided to upgrade the A-1 to an actual flight vehicle in order to cut risk and cost to the subsequent two test vehicles to be delivered after the A-1. When built, those vehicles (the A-2 and A-3, respectively) will include more expensive hardware, such as a thermal protection system and the propulsion system, including a Fastrac engine, that the A-1 doesn't have.

The Fastrac engine (currently in design and development at MSFC) is a single-stage main engine, which burns a mixture of liquid oxygen and kerosene.

But in July, the captive-carry A-1 also didn't have hydraulics, avionics, landing gear mechanisms and the structural capability for a flight environment.

KSC expertise was needed for those upgrades to make it a drop test vehicle, and by August, KSC's participation was requested by Dryden and MSFC, which manages the X-34 contract.

Six KSC mechanical engineering and electrical engineering technicians from the Engineering Development Prototype Lab traveled to California from Sept. 19 to Oct. 3. Another team (including four of the first six team members) went from Oct. 17 to Oct. 31 to support the A-1a upgrade.

The KSC teams were integrated into a team with Dryden and Orbital technicians.

"Upon arrival, we threw our badges in a box and went to work as one unit," recalled Dave Rowell, a KSC mechanical engineering technician.

This integrated team began removal of hardware and mass simulators in preparation for structural modifications and the installation of hydraulic tubing, landing gear and other mechanisms.

"The activity provided experience in flight vehicle modifications and integration, including extensive work with composite materials," noted John Tinsley, KSC's X-34 project manager, "and this additional capability should prove valuable for the future increase in research and development activities at KSC. The additional experience with composite materials will also benefit our involvement in the future reusable launch vehicle environment."

"Our work here at KSC has been in the fabrication, development and testing of systems and subsystems related to all the major programs and projects," added Rowell.

The X-34 Program schedule for A-1a includes a tow test in December and five unpowered drop test flights starting in March 2000 at White Sands Missile Range in New Mexico.

Powered flights of the A-2 vehicle will begin at Dryden next summer.

Once the X-34 has demonstrated safe and reliable performance at Dryden, the project is scheduled to move to Kennedy Space Center for operations technology demonstration flights.

At KSC, the X-34 A-2 vehicle will fly every two weeks and twice in a 24-hour period, which is an unprecedented flight support schedule for KSC and the 45th Space Wing.

This schedule will test the Cape Canaveral Spaceport's ability to meet future customers' needs for faster turnaround to support lower cost launch operations.

Key technologies to be demonstrated by the X-34 include composite primary and secondary airframe structures; composite reusable propellant tanks, cryo-insulation and propulsion system elements; advanced Thermal Protection Systems and materials; low-cost avionics; integrated vehicle health monitoring system; flush air data system; and automated vehicle checkout.

Six NASA centers, two Department of Defense installations and an industry team led by prime contractor Orbital are supporting the development and eventual flight testing of the X-34.

The X-34 project is part of NASA's Office of Aerospace Technology, which oversees NASA's efforts to develop technology that dramatically reduces the cost of access to space.

"I want to thank [the] KSC team for continued support of the X-34 project. I am especially appreciative of ... technician resources for assembly of the A-1a vehicle at Dryden... . There are still many challenges that face us ... but I have observed an enthusiasm and willingness to work as a government and industry team that will allow us to achieve our goals... . KSC continues to be key in the success of X-34."

— A. G. Stephenson, Director, Marshall Space Flight Center

Above, six of the eight KSC engineering technicians who worked on the X-34 A-1a modifications at Dryden are, left to right, Mike Lane, Roger Cartier, Dave Rowell, Mike Dininny, Bryan Taylor, and Jim Niehoff. Not shown are Kevin Boughner and Jerry Moscoso. At left, the integrated KSC, Dryden and Orbital team bring the X-34 A-1a vehicle closer to flight readiness at Dryden Flight Research Center in California.

Mars ...

(Continued from Page 1)

which is precisely why Taylor and his teammates are so excited about it. If the designing of an exploratory vehicle may seem incongruous with KSC's past as a launch processing center, Taylor sees it as perfectly compatible with KSC's future as a Spaceport Technology Center.

"The stakes are high," Taylor said. "For us, it's a chance to get involved with something that's not very common to Kennedy."

Prior to the Expendable Launch Vehicle (ELV) Program's transition to KSC in October 1998, KSC processed spacecraft hardware at the end of the flow, put the hardware on a rocket and managed launch day activities. The KSC ELV Project is now responsible for management and technical oversight of all NASA ELV launches.

Working on the Mars Ascent Vehicle, or MAV, will be the first time that KSC is involved in spacecraft hardware development.

Dudley Cannon, the MAV team's legal counsel, sums it up this way: "Not to belittle any other KSC activities, I think that this is one of the most exciting things that KSC has done in a long time."

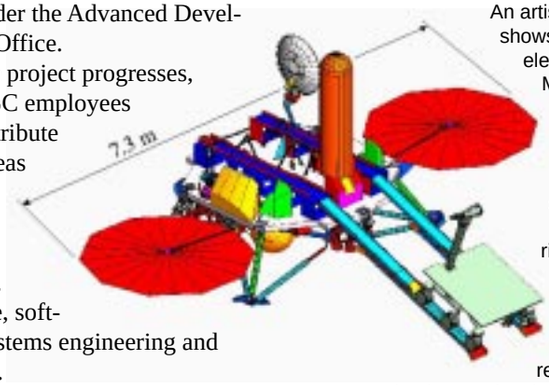
KSC's involvement arose from its ELV Program resident office at the Jet Propulsion Laboratory (JPL) in California. Because of limited resources, JPL sought a NASA center to take responsibility for one portion of the Mars Sample Return project — the booster system, consisting of a rocket and a launcher. KSC assembled a diverse team from many directorates, including Advanced Development, Space Station, Expendable Launch Vehicles, Safety and Mission Assurance, Procurement and Chief Counsel, and proposed to JPL a partnership approach to achieve Program procurement goals.

In addition to Taylor and Cannon, the KSC Mars Ascent Vehicle (MAV) Booster System Procurement Development team consists of project manager Rita Willcoxon, David Wansley, Al Mariano, Jim Medina, Maria Lopez-Tellado, Martha Vreeland, Jonathan Stabb, Dr. Phil Scarpa, Susan Woodard, Tom Tokmenko, Sharon White and Pat Beall.

JPL team members are Doug Caldwell, Scott Doudrick, Carl Guernsey, Jeff Umland and Tom Shaw.

The MAV project, with its hybrid team composition and emphasis on ground-level design work, typifies the role KSC increasingly seeks to fill as a Spaceport Technology Center. The KSC portion of this collaborative effort has been established as a "matrix organization" under the Advanced Development Office.

As the project progresses, other KSC employees will contribute in the areas of propulsion, avionics, guidance, software, systems engineering and business.



An artist's rendition shows the various elements of the Mars Sample Return (MSR) mission on the Martian surface. The rover (lower right) vehicle, which will collect planetary material and return it to the MSR Lander, is seen leaving the Lander for the final time as the rocket prepares to launch, at center. The KSC team is responsible for the booster system, including the rocket and its launcher.

Mars Sample Return (MSR) is an ambitious plan for collecting material from the Martian surface and returning it to the Earth. The joint endeavor among NASA, JPL and Europe's Centre National d'Etudes Spatiales (CNES), with the potential to answer questions about life on the red planet, calls for the first journey toward Mars to begin in 2003 on a rocket launched from Cape Canaveral Air Station.

The launch service will be procured and funded by the KSC ELV Program.

An Ariane 5 spacecraft to be launched in 2005 from Kourou, French Guyana, will take a second MAV to Mars. A smaller spacecraft carried aboard the Ariane will capture the orbiting samples and return them to Earth in 2008.

KSC has responsibility over the MAV booster system, including such elements as primary propulsion; structures, mechanisms and cabling; thermal systems; a reaction control system; a guidance navigation and control system; avionics and software. The booster system will receive samples collected by a rover on each of the two missions and launch them into orbit above Mars for later retrieval. It includes a launcher that will lift the rocket from its horizontal landing position on the planet's surface to a vertical launching orientation.

KSC will oversee production of two booster systems each for the 2003 and 2005 launches.

The rocket itself will be approximately six feet tall and 13 inches in diameter and will weigh about 300 pounds.

"I've seen bigger model rockets than that," Taylor said. "But not with as much punch."

Using a two-stage, solid-fueled motor, the rocket will produce 2,000 pounds of thrust, enough to place it in orbit about 310 miles above Mars.

The sample container, with a power system and beacon but no propulsion, can remain in orbit for several years if necessary.

The KSC team, in conjunction with a JPL group, worked from April to September to solidify design concepts and develop technical requirements for the project. When that work was completed, KSC and JPL collaborated on the technical and contractual requirements for the release of a Request For Proposals (RFP).

With the release of the RFP on Oct. 6, KSC now can await bids by contractors to do the detailed design and fabrication of the booster system. The KSC team hopes to secure a contractor by year's end. At that point, its role will shift to project management during an 11-month design phase followed by a critical design review.

Once a contract is awarded, the KSC team will work with JPL's System Engineering Team and the industry partner to perform trade studies, solidify requirements and complete the MAV design.

KSC will be responsible for ensuring that the contractor delivers the booster system on time and within budget. In addition, the KSC team will contribute expertise on engineering issues during the building and testing of hardware and will work with JPL on the integration of the booster system with the payload assembly and other missions elements, such as the lander and rover.

The decision to solicit KSC's involvement in the project was a vote of confidence on the part of JPL management of the sample return mission.

Among the factors that have fostered that sense of trust are the Expendable Launch Vehicles Program Office's five successful launches of JPL projects in the past year, the establishment of a JPL resident office and KSC's broad experience with flight launch vehicle procurement, safety, integration and testing, and also KSC's vision of the future and desire for new partnerships.

Taylor notes that a successful mission could solidify a new role for KSC in future exploratory missions. JPL has suggested that KSC could have responsibility over ascent vehicles on any subsequent missions to the moon or other planets.

"The MAV Booster is, without a doubt, the most exciting project going on at KSC," said Jonathan Stabb, a KSC system engineer stationed at JPL. "We can step up to the plate and apply both our spacecraft and launch vehicle expertise since the MAV must endure an Earth launch and then perform its Mars launch. As if that isn't enough, excitement comes from knowing that we sit squarely on the critical path to successful Mars sample return. I also feel that I'm learning more every day as a result of the daily exchange of ideas between KSC engineers and JPL engineers. Simply put, I'm stoked."

The rest of the KSC team, sequestered among the pines and palmettos at the Source Evaluation Board Building, exhibits similar enthusiasm for the project. As eager as they are to discuss it, however, they quickly excuse themselves and return to work — a sign of both their commitment to the task and their awareness of how much work lies ahead.

KSC/Cape Canaveral Air Station Open House just around the corner

It's an Open House with quite a few rooms added. KSC employees will have more areas to explore than ever before at the KSC/Cape Canaveral Air Station (CCAS) Employee Open House on Nov. 6.

The traditional KSC event has been expanded to include many historic sites on CCAS as well as the grounds of the Naval Ordnance Test Unit. The theme — "Space Partners Opening the Gateway to the Future" — reflects the new era of collaboration between NASA and the 45th Space Wing.

OPEN HOUSE

"This event is always one of the highlights of the year for our employees and their families," KSC Director Roy Bridges said. "We are especially pleased this year to welcome the Air Station's employees to visit our facilities, and I'm sure our employees will enjoy the opportunity to see the historic sites on the Cape side."

Gates will open for the event at 9 a.m. and close at 2:30 p.m., with most facilities closing at 3 p.m. Employees and their guests will be admitted through Gates 2B, 2C, 3 and 4 at KSC and Gate 1 at CCAS. Each vehicle (no larger than a 15-passenger van) must contain at least one badged employee.

Among the day's many highlights, six astronauts will be present at various locations, including Orbiter Processing Facility Bay 3 and the Operations and Checkout Building at KSC; and Complex 14 and the Air Force Space and Missile Museum at CCAS.

Guests can enjoy a driving tour of Launch Complex 39 Pads A and B, and if the current launch schedule holds, Shuttle Discovery will be seen at Pad B as it is prepared for the STS-103 mission.

Plans call for the High Bay 3 door of the Vehicle Assembly Building (VAB) to be open, allowing a view of the external tank and solid rocket boosters stacked for STS-99. The adjacent Launch Control Complex will also be open, with access to two firing rooms.

The nearby Orbiter Processing Facility will feature displays of Thermal Protection System, orbiter processing hardware and other equipment. The OPF-3 low bay is scheduled to be open, yielding a view of the orbiter Atlantis, and the Thermal Protection System Facility will give guests a look at the tiles used to protect the orbiters.

A self-guided tour will be available in the Solid Rocket Booster Assembly and Refurbishment Facility. Another perennial favorite is the Shuttle Landing Facility (SLF). Drivers can enter near the midpoint at Sharkey Road, and signs will direct them around the facility.

The Operations and Checkout Building will offer views of the International Space Station S0 Truss Element, and several exhibits also will be on display in the Mission Briefing Room.

Although the Space Station Processing Facility's high bay will be closed to visitors, guests will have an opportunity to see International Space Station (ISS) flight hardware from the high bay viewing window at the ISS Center.

The Advanced Systems Laboratory will demonstrate some of the automation and robotics projects being developed to improve Shuttle ground processing operations. In addition, some of the advanced software exhibits in the Intelligent Systems Lab will offer a chance for visitor interaction.

The KSC Visitor Complex will offer special opportunities for employees, who may pick up complimentary tickets to the Robot Scouts and Universe Theater attractions at the Guest Relations Desk. The Center for Space Education, located in the Visitor Complex, will have hands-on science activities for students.

The list of open facilities at Cape Canaveral Air Station includes Complex 3, site of the first rocket launch at Cape Canaveral on July 24, 1950. The adjacent complexes 1, 2 and 4 also are included in the tour.

Complex 14 features the Mercury Monument, dedicated in 1964. A time capsule buried beneath the monument is scheduled for retrieval in the year 2464. Four manned launches took place at Complex 14, including Friendship 7, which made John Glenn the first American to orbit the Earth.

Another National Historic Landmark, Complex 34, was the launching pad for the first missions of the Apollo program.

Complex 40, the northernmost launch structure on CCAS, also will be available for viewing.

Also, the Air Force Space and Missile will have numerous rockets and missiles on display, as will the indoor exhibits in the Complex 26 Blockhouse and Exhibit Hall.

Visitors will have a rare chance to visit the Cape Canaveral Lighthouse, the oldest structure on CCAS. Though safety concerns prevent visitors from entering the lighthouse, visitors have a chance to park and take photos.

The Naval Ordnance Test Unit (NOTU), located on the northern side of Port Canaveral, exists to support Trident missile test and submarine operations at Cape Canaveral. Its facilities include missile assembly and checkout areas, missile storage magazines, the Trident launch pad at Complex 46 and two waterfront structures, Poseidon Wharf and Trident Wharf. The entrance is at Basin Drive, off Phillips Parkway just east of Gate 1.

Food and drink services will be available at several places during the day, and all four NASA Exchange retail stores will be open for business during the event. The stores will offer free commemorative medallions to visitors while supplies last.

The gift shop in the CCAS museum also will be open.

Brochures containing detailed descriptions of the facilities and maps will be distributed to employees before the event. On Open House day, copies will be available at security gates. Check the brochure and the Open House website at *http://kscinfo.ksc.nasa.gov/openhouse/* for more detailed information.

October employees of the month

October employees of the month are, from left to right, Al Diaz, Shuttle Processing; Johnny Shamrock; Engineering Development; Geoffrey Swanson, Office of the Chief Counsel; Gloria Norton, Office of the Chief Financial Officer; Wayne Ranow, Logistics Operations; Lisa Zuber, Office of the Chief Information Officer; and David Cox, Space Station and Shuttle Payloads. Not shown are Michael Dalton, Checkout and Launch Control System Office; Abraham Negron, Safety and Mission Assurance; Nazario Escobar, Installation Operations; Steve Brisbin, Biomedical Office; Bob Raymond, Space Station Hardware Integration Office; and Maria Lopez-Tellado, ELV and Payload Carriers Program.

Technology 2009

KSC is leading a major initiative to identify the technologies that will enable revolutionary spaceports of the future. The goal is to develop the infrastructure needed to support the next generation of manned space planes, which would take off and land much like a commercial aircraft, and eventually carry passengers.

KSC has initiated a joint-sponsored research program called "Vision Spaceport." Current partners, referred to collectively as the 'Spaceport Synergy Team,' include KSC, NASA's Ames Research Center, The Boeing Company, Command and Control Technologies, Lockheed Martin, Quantum Technologies Services, Science Applications International Corporation, and the University of Central Florida.

On Nov. 1-3, NASA will sponsor a national technology transfer conference called "Technology 2009" at the Miami Fontainebleau Hilton, where the Spaceport Synergy Team will be looking for design ideas, partners and investors. The "Vision Spaceport" initiative will be one of the main tracks of a workshop to be held during the conference. The workshop will focus on emerging business opportunities in aerospace, aviation, space-based manufacturing and related technologies.

For more information about the conference, check out *http://www.techeast.net*, and learn more about Vision Spaceport at *http://www.visionspaceport.org* .

Missions ...

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spacecraft's computer.
The new main computer — 20 times faster with six times more memory than its predecessor — was successfully tested aboard STS-95 in 1998.

It is expected to dramatically increase capabilities, reduce maintenance and lower operational costs.

STS-99

STS-99, scheduled to launch no earlier than Jan. 13, 2000, is the Shuttle Radar Topography Mission (SRTM) — an international project spearheaded by the National Imagery and Mapping Agency and NASA, with participation of the German Aerospace Center DLR.

Its objective is to obtain the most complete high-resolution digital topographic database of the Earth.

RFP issued for Launch Services contracts

On Oct. 18, NASA released a Request for Proposal (RFP) for multiple award Indefinite Delivery Indefinite Quantity (IDIQ) Launch Services contracts covering a broad range of expendable launch vehicles.

Called the NASA Launch Services contracts, for which KSC has lead center responsibility, the RFP includes medium-light, medium, intermediate and heavy launch vehicles with a performance capability of launching payloads of 3,300 pounds and greater. Traditional examples of vehicles in this performance range are the Athena II, Delta and Atlas class family of expendable launch vehicles.

The NASA Launch Services contracts will span a 10-year period and include an initial mission set of three firm launches with six additional launch options. The contracts also include an IDIQ portion under which up to 60 additional launches can be competed and awarded. If all firm, option and IDIQ launches are awarded, the total value of the NASA Launch Services contracts could exceed five billion dollars.

The NASA Launch Services contracts also contain an "on-ramp" clause under the IDIQ contract portion. This will create an opportunity for new, emerging launch service providers and incumbents to introduce qualified launch vehicles not available at the time of the award of the initial contracts, and to compete for additional launch service requirements not identified as firm or option requirements under the basic contracts.

NASA is soliciting proposals from all interested companies. It is NASA's intent to award multiple IDIQ "task order" contracts that will encompass a broad range of launch vehicles.

To be eligible for award of a contract, the potential launch service provider must be a domestic company with at least 51 percent United States ownership. It must also have demonstrated at least one successful launch of at least a 3,315-pound payload to a 125-mile circular orbit at a 28.5 degree inclination.

The launch vehicle to be considered must be a domestic product with a least 51 percent of its components manufactured in the United States. Also, the potential launch service provider and its subcontractors must have ISO 9001 certification.

Proposals are due at the Kennedy Space Center not later than Jan. 7, 2000. The contract awards will be made during the second quarter of 2000.

"Think Ability" highlighted at Disability Awareness and Action Working Group Technology Fair

Center Director Roy Bridges stopped to pet one of the dogs that serves with Canine Companions for Independence, a vendor displaying its capabilities at the Disability Awareness and Action Working Group (DAAWG) Technology Fair, held Oct. 20-21 at KSC. The fair highlighted vendors demonstrating mobility, hearing, vision and silent disability assistive technology to create an awareness of the types of technology currently available to assist people with various disabilities in the workplace. The theme of the fair and this year's National Disability Employment Awareness Month is "Think Ability."

Historic launch pad is now history and ready for the future

When the countdown reached zero at historic Launch Complex 41 at Cape Canaveral Air Station on Oct. 14, history was made, but no rockets were launched. At the T-0 mark, the 34-year-old pad was imploded into a pile of twisted metal and memories in order to pave the way for a new line of Atlas V rockets.

Demolishing the mobile service tower and umbilical tower at Launch Pad 41 — the site of NASA's Viking spacecraft to Mars and Voyager probes to the outer planets, as well as many satellite launches — was the quickest, cheapest way for Lockheed Martin to renovate the area for its new rockets.

It also happened to be fun. The demolition — the first at Cape Canaveral in 23 years — turned into a party and charity fund-raiser.

Hundreds of workers gathered a safe 2,500 feet away to watch the two steel launchtowers come tumbling down within milliseconds of each other.

Hundreds of other onlookers at Cape Canaveral Air Station and Kennedy Space Center stopped wherever they were to watch the historic implosion.

A countdown preceded the 10:05 a.m. demolition. At the precise moment the explosives (about 200 pounds) were detonated, the winner of a Demolish-the-Pad raffle pushed a make-believe plunger. Hundreds of $5 raffle tickets were sold to win the honor.

The last time a launch pad was deliberately blown up, in 1976, the Army was called in to do the job. Launch Complex 14 — John Glenn's pad — had become too dangerous, and the Air Force lacked the money to fix it.

The much larger Launch Complex 41 was brought down by demolition experts hired by Lockheed Martin.

Built in 1965, Complex 41 was the starting point for 27 Titan flights, most of them military.

Initial construction began in 1963 with 6.5 million cubic yards of landfill dredged from the Banana River and hauled to the launch site.

The first launch from the complex was on Dec. 21, 1965, with the launch of a Titan IIIC. In 1975, NASA launched its two Viking Mars landers and two years later, the twin Voyager interplanetary spacecrafts.

Prior to the date of the implosion, demolition workers used blowtorches to weaken the legs of the 200-foot umbilical tower, from which propellants once flowed to the rockets. The 300-foot mobile service tower, which shielded the rockets until just before liftoff, stands 500 feet away.

The towers won't be needed for Lockheed Martin's powerful Atlas V, which will be transported from a still-unfinished building to the pad a mere 12 hours before liftoff, a process intended to speed up launches. The first flight is set for 2001.

The Atlas V also will soar from Vandenberg Air Force Base in California; an old launch pad there will be razed the same way.

It may take about one month for the 7 million pounds of steel left after the demolition to be hauled away for recycling. To dismantle everything piece by piece — the traditional method — would have taken three months.

After 27 launches spanning three decades, the last launch from Pad 41 was an Air Force Titan IVB rocket on Apr. 9, 1999. A total of 17 Titan III and 10 Titan IV rockets were launched from Launch Complex 41.

Historic Launch Pad 41's umbilical tower (above left) at Cape Canaveral Air Station (CCAS) was demolished on Oct. 14, along with its mobile service tower (above right). The implosion left the launch complex a pile of twisted metal and memories from 34 years of launches, including several significant missions for NASA. The Viking 2 spacecraft (at left) was launched Sept. 9, 1975, from CCAS' Launch Complex 41. Viking 2 entered Mars' orbit less than one year later. The Viking Lander 2 touched down at Utopia Planitia on Sept. 3, 1976, and the Viking Orbiter 2 was powered down on July 25, 1978, after 706 orbits.

Voyager 2, on an interplanetary mission to explore Jupiter and Saturn, was launched on Aug. 20, 1977, from Cape Canaveral Air Station's Launch Complex 41. It was propelled into space on a Titan/Centaur rocket. Voyager 1 was launched from the same complex a few weeks later. Initially, both spacecraft were only supposed to explore two planets — Jupiter and Saturn — but the incredible success of those two first encounters and the good health of the spacecraft prompted NASA to extend Voyager 2's mission to Uranus and Neptune.

John F. Kennedy Space Center

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