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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

Inside

Kennedy Space Center

40 years as NASA Center

LOC began July 1, 1962

Remembering Our Heritage

As the Kennedy Space Center team begins a yearlong celebration of our 40th year as a NASA center, it benefits us all to take a look back at the beginnings of KSC.

Only if we know where we came from will we understand where we are as a launch center and Spaceport Technology Center and how we better can help propel NASA's mission: "To improve life here. To extend life to there. To find life beyond."

By listening to those who took us to the Moon, we can learn just how far we can go if we put our hearts and souls and minds to it.

KSC's diverse beginnings started before it was first designated a Launch Operation Center (LOC) July 1, 1962, and later renamed John F. Kennedy Space Center.

This special commemorative issue of *Spaceport News* offers just a taste of that early history. For those who want to drink deeper from the vast well of the KSC story, the issue points to other sources of historical inspiration.

Above, a Mercury capsule is processed in Hangar S at Cape Canaveral. Behind the windows in the concrete wall were astronaut crew quarters. Below, the Mercury launch team poses for a group portrait.

Germans led during early days of KSC

By Anna Heiney

The road to the stars may pass through Kennedy Space Center, but it actually began more than 50 years ago in wartime Germany.

In 1945, at the close of World War II, more than 100 rocket scientists working in the German rocket center of Peenemunde surrendered to American forces rather than the Soviets. They were moved to Ft. Bliss, Texas, to develop ballistic missiles for the U.S. Army.

Under the direction of rocket pioneer Wernher von Braun, the team tested rockets in White Sands, N.M., until 1950, when they joined the Army's Ordnance Guided Missile Center at Redstone Arsenal in Huntsville, Ala.

In 1956, the group became the Army Ballistic Missile Agency, and was folded into the National Aeronautics and Space Administration in 1960.

Virginia Whitehead, Future Payloads manager in the International Space Station/Payload Processing directorate at Kennedy Space Center, worked with the German team at White Sands and fondly remembers their enthusiasm.

"I'd get the preliminary telemetry information on film," she explained. "They'd come running in from the field and grab that data right out of my hand. They'd get so excited. They just ate, slept and breathed space."

While the entire team helped boost the U.S. space program off the ground, Kurt Debus, Hans Gruene, Karl Sendler and Albert Zeiler significantly influenced KSC's growth as America's premier gateway to space.

"They were all really outstanding people," recalled Konrad Dannenberg, a propulsion engineer on von Braun's team. "They were all very involved in the early launches and brought with them quite a bit of experience from Peenemunde."

Dr. Kurt Debus, the first director of Kennedy Space Center, is perhaps best known for molding the Center into a state-of-the-art Moonport and preparing it for the Space Shuttle program. But he is also remembered for securing support for the first visitor center, and for his desire to protect KSC's environment.

Kurt Debus (left) and Karl Sendler hold and look at telemetry data.

Albert Zeiler (left) and Kurt Debus pose at the launch pad.

Hans Gruene expresses his camaraderie with secretary Ann Nelson.

When Debus came to Cape Canaveral in the early 1950s to set up a launch site, his deputy, Dr. Hans Gruene, accompanied him.

Debus considered himself and Gruene the first employees of what became KSC.

Gruene was known as a skilled engineer. As Director of Launch Vehicle Operations, he led his team to an impressive launch success record: All but one of the Saturn V and Skylab launches were on time.

A true gentleman, Gruene brought out the best in his employees through mutual respect.

"He was an ideal boss," said his former secretary, Ann Nelson, now a NASA Transportation office employee. "He had an even temper and was always open to new ideas."

Kurt Debus (center) makes a point during a launch as Wernher von Braun (to Debus' right) and Hans Gruene (front) and look on.

Kurt Debus (center) reaches out to shake hands with astronaut Frank Borman after a successful launch.

Kurt Debus' daughter Sigi Northcutt (left) and her daughter Michelle Peters are pictured with a new Debus Award display.

Karl Sendler, director of Instrumentation Systems, had a major role in the creation of the Central Instrumentation Facility. In his earlier days at Cape Canaveral, he used Doppler radar systems to develop better methods of tracking rockets after liftoff.

For early launches at Cape Canaveral, Albert Zeiler, chief of Mechanical Systems for the Missile Firing Lab, was the one who decided whether to shut off the engines or allow launches to proceed. He later provided mechanical expertise to the Mercury Redstone, Saturn and Shuttle programs, as well as several unmanned programs.

Frank Childers, a NASA retiree and historian, worked for Sendler for 20 years and came to know KSC's German leaders.

"Both Karl Sendler and Albert Zeiler were brilliant engineers and great managers," he said.

With their dedication and positive attitude, the four helped make NASA's motto – "On time, on target" – a reality.

Several innovations took shape at KSC under their leadership. These included unique equipment, facilities and concepts still in use today, such as the Vehicle Assembly Building, the crawler-transporter and launch automation.

"My father was very proud of the things his team achieved," said Sigi Northcutt, Debus' daughter. "He once said, 'You have to decide if you want to make money or make a contribution to humanity. We chose to make a contribution to humanity.'"

Pioneers helped shape space program

By Matt Cavagnaro

In 1958, Merritt Preston was sent from Langley Research Center to work at Cape Canaveral.

His assignment: assistant chief of Operations for Project Mercury, with the goal of putting a human being into orbit of the Earth.

Preston ended up spending the rest of his career at the Cape and Kennedy Space Center, working his way up the ranks.

His story isn't unique: Many of the thousands of engineers, scientists and managers that gave new purpose to the wilderness of the Space Coast spent their careers at what would become KSC.

In the beginning of 1962, however, engineers like Merritt Preston were part of teams from NASA centers with different goals.

"There was a big controversy when Mercury was established that we ought to extend the X-15 program to make it go into orbit instead of this man-in-a-can concept," remembered Preston.

Young minds from Langley and Goddard and Marshall Space Flight centers were brought to Florida as pioneers; as scientists creating something that had never existed before. It was the Marshall Launch Operations Directorate that would start the new center July 1, 1962, the Launch Operations Center.

Lee Solid started developing rocket engines in 1960, when sending a man into space was still theory, and the Cape was a proving ground for early technologies.

"At first we weren't really sure if (the operation) was capable of sustaining itself as a center, just launching vehicles," recalled Solid.

The community of engineers at the Cape was close knit, as evidenced by the sharing of information during the first years.

"Debus liked to understand what was going on. We'd have to explain the details of engineering problems to him, bringing the blue prints to his office and spreading them out on the table, trying to explain what the exact problem was," Solid said.

Bob Sieck was also a member of that original community. He came to the Cape in 1964 to work on biomedical technologies for the Gemini program.

Launch Director John Neilon (right) is pictured during a 1976 Titan Centaur countdown with George Page, who was to succeed him, and Walter Kapryan, former director of Launch Operations.

Former Shuttle launch director Bob Sieck (left) signs a memorandum.

Rockwell executive Lee Solid, now retired, is pictured with a Space Shuttle Main Engine.

Monitoring human beings in space was a very new concept, and the instrumentation being created was groundbreaking in its design.

"The NASA engineers, we were all very close. Everyone that worked out here, we knew everyone else," explained Sieck.

In July 1957, after two years of commuting back and forth from the Naval Research Laboratory in Washington, D.C., John Neilon came to the Cape as a radar and data processing specialist, on an 18-month assignment for Project Vanguard.

Twenty-nine years later Neilon retired from KSC after having served as director of Unmanned Launch Operations (ULO) and manager of the Cargo Projects Office among other assignments.

As director of ULO for six years Neilon served as launch director for 60 missions including the Viking Mars Landers and the Pioneer 10 and 11 deep space probes.

Merritt Preston (right) is pictured during a light moment with astronaut Gordon Cooper. Preston came to the Cape to work on the Mercury program in 1958 and retired as manager of the Shuttle Projects office in 1973.

"Things were less formal in the early days. We didn't have the infrastructure then that we got later and have now. As a matter of fact, I don't think the word infrastructure had been invented yet!" Neilon said."In those times, Bob Gray and I would often make and implement decisions that would entail many meetings and management reviews today."

Preston agreed with those sentiments.

"Particularly in the beginning of Mercury, we'd make up our mind what we needed to do, and do it," said Preston.

The successful ingenuity of the first years at Kennedy Space Center was due in part to the sense of cooperation that existed between contractors and civil servants.

"Rocketdyne's job was to serve the customer, which was NASA. We had a very good working relationship with the civil servants," explains Solid.

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>
> **JOHN NEILON**, FORMER DIRECTOR, UNMANNED LAUNCH OPERATIONS

The men and women who helped to build Kennedy Space Center 40 years ago were pioneers, not only in the sense of being there at the beginning, but seeing the program through.

Solid became site manager of Kennedy Space Center for Rocketdyne during the Apollo-Soyuz project, and in 1998, retired as vice president and general manager of Rockwell's Space Systems Division, Florida Operations.

Bob Sieck's work on the Gemini program continued onto the Apollo and Shuttle programs, as a test team project engineer. He became chief Shuttle Project engineer in 1978, and oversaw 11 Shuttle missions as launch director beginning in 1984.

Merritt Preston continued working for NASA until retiring manager of the Shuttle Projects Office in 1973.

Although design changes today require intense consideration and paperwork, the innovative spirit survives, Preston and the other early pioneers agree.

KSC facilities featured innovative designs

By Jennifer Wolfinger

By overcoming obstacles, thinking outside of the box, and being determined for the past 40 years, engineers and scientists developed the spaceport we know today on both sides of the Banana River.

"We had to build structures in Florida's conditions. Nobody had done that before," said R.P. Dodd, an electrical engineer who witnessed the birth of NASA and left KSC in 1979. "It was a departure from typical engineering. We had to consider things like wind forces from hurricanes."

According to Dodd, engineers had enough foresight to know how to accommodate the future.

"They tried to make do with what they already had to transition from Redstone to Saturn V to the Shuttle," he said. "We redesigned the crawlerway and the VAB for the Shuttle program. The VAB was a great investment."

The well thought-out designs of the Cape Canaveral Spaceport have stood the test of time. The story starts with the first basic structures where early NASA program teams were housed on Air Force property at Cape Canaveral.

For example, Hangar S, built in the 1950s for the Vanguard program at what is now Cape Canaveral Air Force Station (CCAFS), was used by NASA for Mercury and Gemini and then for its unmanned space program. It is now a Shuttle operations training facility.

The nearby AE building is home to KSC's Expendable Launch Vehicle (ELV) Program's upgraded Launch Vehicle Data Center.

The Center allows engineers to monitor voice, data and video systems that support ELV missions.

AE was originally built for a DoD missile program. The facility was acquired in 1960 by NASA and modified for unmanned missions.

The adjacent E&O (Engineering and Operations) Building, originally built for NASA's Mercury program later housed Unmanned Launch Operations. It recently was renovated for KSC's ELV Program.

Nearby, the E&L (Engineering and Laboratory) Building, built in 1950s by the DoD, was temporarily used for the offices of Center Director Dr. Kurt Debus' and his associates before the construction of NASA KSC Headquarters.

NASA facilities on Air Force property at Cape Canaveral in the early 1960s included the E&O and A&E buildings (at top); Hangar S (above) and the control center (left) NASA only used during Mercury and Gemini programs. Below, the Vehicle Assembly Building begins to take shape on Merritt Island.

E&L now houses the new Cape Canaveral Spaceport Planning and Customer Service Center, which provides a one-stop shop for new customers' needs.

KSC first began making its mark on the Merritt Island side of the river after acquiring property there in the early 1960s. Designers quickly began developing plans for the huge hangar we know as the Vehicle Assembly Building (VAB).

The NASA KSC Headquarters building was formally opened on May 26, 1965. Headquarters is the administrative center for all spaceport activities, including the center director's office.

In February 1964, construction on the Central Instrumentation Facility (CIF) began. The CIF is the core of instrumentation and data processing operations at KSC, which includes offices, laboratories and test stations.

Making the first KSC facilities built on Merritt Island – such as the CIF, Headquarters and VAB – a home required somebody behind-the-scenes to move everything.

Bob White, a section chief of traffic management operations, organized these moves for almost 40 years. He remembers relocating KSC's staff from facilities on the Cape as well as off-base offices in Cocoa Beach and Merritt Island to the new KSC facilities.

"For the two years, we spent every weekend and some weekdays moving offices," said White. "We were so busy and had to do it all because there weren't many employees then. We moved everything: marble slabs from labs and computers. That's when computers were very large, too."

Many of the NASA launch pad and facility design projects on both sides of the river were unprecedented and required a lot of trial and error, according to Don Buchanan, a chief design engineer who retired in 1981.

"We were pioneers, in a lot of cases. We made big strides in a short amount of time," he said.

Safety and health were priorities in designing the facilities, said Norris Gray, former Fire and Rescue Program Officer. Here when NASA formed, he retired in 1984.

Gray explained that many factors were considered during the development of the special facilities because there was nothing else like them in the country.

"We looked into many safety factors – the paints used, off-gases, speed of elevators and fire extinguishing systems," he said.

Gray and his co-workers not only provided expert advice, but they also tested their designs.

"Under each pad, there are two rooms that were used for emergency evacuations," said Gray. "Seven of us lived in there for 25 hours (during an evacuation drill). The humidity drove us crazy. Our ears wilted; we would lay down flat on the concrete floor to keep cool. But we survived."

Use of rocket technology continues to evolve

By Jennifer Wolfinger

Since the early days of rocket science, it's not the purpose, size or shape of launch vehicles that has improved so much as the knowledge of how to take advantage of that technology.

Vehicles such as Vanguard, Redstone and Thor; the era of Mercury, Gemini and Apollo – all paved the way for today's Expendable Launch Vehicle (ELV) and Space Shuttle programs.

The Space Shuttle fleet, along with Athena, Atlas Centaur, Delta, Pegasus, Taurus and Titan ELVs make up KSC's vehicle family.

Rocket science first began to take shape in the 1920s and 1930s when Dr. Robert Goddard, who is considered America's Father of Space, shifted the science community's budding curiosity in rocket science into a real effort to explore space.

Then at the end of World War II, more than 100 German rocket scientists sided with American forces. Their decision resulted in a move to Ft. Bliss, Texas, to develop ballistic missiles for the U.S. Army.

Rocket pioneer Wernher von Braun led the original team to White Sands, N.M., to test rockets until 1950, then to work in Huntsville, Ala. That group eventually joined NASA in 1960.

But there was never a single day when vehicle technology instantly transformed. Development was a building-block approach, said Frank Childers, a retired NASA electrical engineer who came to Cape Canaveral to work in 1953.

"We considered requirements of future payloads, and impulse on the engine. We measured everything and used those records to develop future vehicles and fuels," he said.

Retired Rocketdyne mechanical engineer and senior executive Lee Solid explained that the rocket engine development for the Saturn/Apollo mission was intense.

"The engines for all three stages were designed for this specific mission, and, because of the short development time, had to be built primarily on existing technology," said Solid. "The new technology was largely in the second and third stage J-2 engine, which was lox-hydrogen. The third stage engine had to restart to leave Earth orbit, which was a new challenge.

NASA's Goddard Space Flight Center was named after Dr. Robert Goddard (above, second from right) because of his pioneering efforts in liquid propellant rockets. At right, seen clockwise, are a Redstone rocket on the pad, the Space Shuttle, and launches of Atlas and Delta rockets.

"The J-2 technology would be later applied to a new engine concept – the linear engine that was taken out of mothballs for the X-33. As such, the linear engine technology was applied about 30 years after it was developed."

Solid remembered how quickly people started asking, "What is next," once we landed on the Moon.

"Next for us was the Space Shuttle Main Engine (SSME). We built on the Saturn engine technology but the requirements drove much more advanced technology," he said. "Reusability, weight restrictions, and operating temperatures and pressures drove new materials, new controls, and a radical new design. The SSME is probably the most complex and efficient machine ever designed by mortal man."

John Neilon was with NASA when it was established in 1958, served as Unmanned Launch Operations Director from 1970 - 1976, and retired in 1986 while serving as Director of Payloads Project Management. In his opinion, vehicle evolution can be seen in the life of the Delta.

"The very early Delta could carry payloads of a few hundred pounds to low Earth orbit and now the recent Deltas put thousands of pounds into the same orbit and can even send respectably sized payloads to Mars," said Neilon.

"Reliability is where the difference between then and now really stands out. Today launch vehicles work with a remarkable reliability. It was not always thus," said Neilon. "Delta, with a current reliability of well over 90 percent in about three hundred launches, started off inauspiciously with the 1960 Delta 1 failure. It then went on to 22 consecutive successes before Delta 24 failed."

The evolution of Delta also illustrates the wedding of pieces from various projects and their almost continuous upgrading with no stupendous technical breakthroughs, he said. The original Delta consisted of an Intermediate Range Ballistic Missile Thor first stage and a liquid second stage and solid third stage from the Vanguard program.

Some technology was eliminated, while some was enhanced. In the 1960s, ground-based radio guidance was replaced with increasingly accurate on-board electronic guidance and control systems that continuously improved.

"The things we launched as experiments are now used as everyday tools," said Neilon.

Konrad Dannenberg, von Braun's propulsion engineer, has strong opinions on launch vehicle technology.

"I'm surprised we have so many satellites in Earth's orbit," he said. "However, I'm disappointed we're not taking steps to send people to Mars. Also, I think NASA's Space Launch Initiative is taking the right steps by trying to develop a smaller Shuttle-like vehicle."

KSC's workforce continues to blaze trails for the development of new launch vehicles such as the Atlas V and the Evolved Expendable Launch Vehicle, Delta IV.

Future advances will build on previous technology allowing us to surpass current Space Shuttle and ELV capabilities.

KSC spins off spaceport, range technologies

By Robin Flynn

During the past 40 years Kennedy Space Center has developed innovative solutions to confront operational problems at the Cape Canaveral Spaceport.

Many of those technologies have resulted in successful commercial spinoffs.

Today KSC's Technology Commercialization Office helps businesses avoid the costly process of "reinventing the wheel" when the technology they need is already available. This returns taxpayers' money in the form of immediate commercial or consumer benefits.

Some KSC technologies and their spinoffs:

Fluid Systems Technologies

• Fire extinguishing equipment with a hard pointed tip capable of piercing an aircraft's outer layers and injecting extinguishing chemicals was developed by NASA and contractor engineers.

• NASA furthered the development of heat pipes, which have cooled critical electronic components in the Shuttle, Skylab, and the Hubble Space Telescope and are now used in conjunction with traditional air conditioning systems to cool and dehumidify air efficiently.

• KSC's Cryogenics Test Laboratory and an industry partner designed a new aerogel-based cryogenic insulation system and a method for its manufacturing and packaging. The system provides improved insulation properties.

• KSC's flow meter was used to pinpoint and correct several key problems in the design of a new tankless water heater.

Spaceport Structures and Materials

• As part of a Space Act Agreement with industry, KSC developed a unique process to prevent structural corrosion in buildings and other outdoor surfaces such as bridges and radio towers.

• Researchers at KSC developed a metal coating that can be used to extend the lives of steel structures such as bridges and towers, as well as metal components of TVs, computers, cellular phones and other electronic equipment.

• KSC's Gas/Liquid Supersonic Cleaning System incorporates one or more converging-diverging nozzles to accelerate a gas-liquid mixture to a supersonic velocity for the cleaning of various articles or components. The system uses less than 100 milliliters of water per minute, saving of enormous amounts of water.

• A safety exit system designed in the 1960's for manned rockets was used to develop a lightweight aluminum structure to assist the elderly in lifting themselves from seated positions.

Process and Human Factors Engineering

• KSC's unique Ground Processing Scheduling System, a computer-based scheduling tool to manage the thousands of activities that prepare NASA's fleet of orbiters for launch, served as a basis for scheduling software used by companies to manage their diverse manufacturing and supply chain requirements.

• A citrus industry leader adapted KSC's Shuttle Inventory Management System to monitor inventory, purchasing, receiving and costs.

Command, Control and Monitoring Technology

• The Active Particle Fallout Monitor measures the size and number of particles that are collected on a surface to provide cleanliness measurements. Targeted markets include aerospace, semiconductor, medicine and electronics manufacturers.

• A major health care supplier used a NASA information base on contamination control to improve particulate control coatings on hospital garments.

• A KSC engineer used his skills in telemetry to develop and patent an implantable digital hearing aid, the concept of today's cochlear implants.

• The image processing techniques used in the Landsat remote sensing program were used to streamline and improve Magnetic Resonance Imaging (MRI) images for diagnostic purposes. The improvements reduced the time the procedure takes and yielded more accurate results.

• A portable leak detector was developed to identify leaks in fluid systems of critical launch and ground support equipment. Commercial uses include pipelines, underground utilities, air conditioning systems, petrochemical systems, power transmission lines and medical devices.

• The Photographic Images Scaling Device can be attached directly to a camera and, through the use of laser beams, allows the photographer to provide scaling information within a picture.

• A new signal-enhancing wireless communications headset subsystem permits multiple wireless users to operate independently in the same environment without interference.

• A colorimetric gas monitoring dosimeter, developed for NASA to detect hydrazine exposure, is used where hypergolic fuel is produced or used, such as military facilities and auxiliary power plants.

Range Technologies

• KSC's upgraded Lightning Detection and Ranging Systems, which measure in-cloud and cloud-to-cloud flashes, can be used by utility providers, aviation companies, forecasting services, airports and commercial space vehicle launch facilities.

• A Lightning Current Detector was developed to monitor the magnitude of lightning strikes, which is useful in evaluating the parameters of protection designs.

• NASA researchers along with industry developed the Lightning Retardant Cable, which improves lightning protection over standard coaxial cable by 100 percent, preventing damage to satellites, antennas and cable systems.

Biological Sciences

• Researchers and industry partners developed a lifelike mannequin capable of simulating conditions of heart disease to educate cardiology students.

• The Medevac Oxygen System developed by the Biomedical Office provides therapeutic oxygen to patients being flown aboard military medical evacuation aircraft.

• The Biomass Production System is a controlled-environment facility developed for NASA's plant-growth requirements on the International Space Station. Earth-based applications include growth chambers, greenhouses, controlled-environment agricultural systems, and humidity control in homes, offices, and other facilities.

• In an effort to eliminate a waste stream of 250,000 gallons of contaminated water per year, KSC participated in the development of a control system to convert hazardous nitrogen oxide scrubber liquor into a useful, beneficial and marketable fertilizer.

NASA's annual *Spinoff* magazine lists spinoffs from NASA centers. This *Spinoff* archive photo from the 1970s was used to illustrate a Kennedy Space Center technology. Note the lighting control system on the wall. KSC researchers helped design an automatic light control system that measures available sunlight and adjusts the artificial lighting to a predetermined level, saving electricity.

KSC becomes Spaceport Technology Center

By Kathy Hagood

During the early days of the space program, NASA and the military were primarily concerned with the flight performance of launch vehicles.

Developing better vehicle technology was critical to the success of the space race.

The Moon and defense were the goals. Money was no object. The clock was ticking.

Spaceport technology, including the development of ground support and processing equipment and systems, was of secondary consideration.

Launch equipment and systems weren't designed for program life-cycle cost savings because the price of launching vehicles wasn't a major concern.

"We had plenty of money, but we didn't have much time," said retired NASA manager Don Buchanan. "We didn't design equipment and systems based on the cost for each launch or quick turnaround times. The engineering we did was based on the challenges of the time."

Buchanan worked at Marshall Flight Center before coming to Kennedy Space Center in 1965 as Marshall's launch support equipment laboratory staff were transferred here.

Through the work of pioneers like Buchanan, spaceport and range technologies at KSC continued to improve.

Emmitt "Bud" Reynolds, a retired engineer who came to work for NASA in 1963, worked on a wide range of electrical and mechanical systems at KSC before retiring in 1990.

"The advances we saw from Mercury to Shuttle have been fantastic," Reynolds said. "Those who didn't live through the changes can hardly imagine how far we've come."

Now KSC is being called upon to step up its efforts in developing spaceport and range technologies.

As an evolving Spaceport Technology Center, KSC is taking a lead role in helping to lower the costs of launch and make space access more available for development by private enterprise.

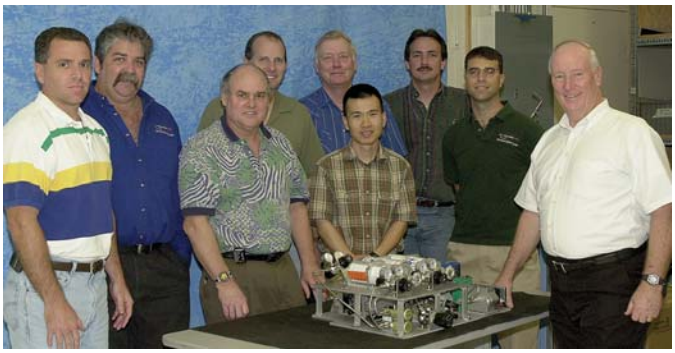
"To make space access more commercially viable, NASA, the Air Force and industry recognize the need to reduce the cost per pound to launch from $10,000 a pound to $1,000 and then to $100 a pound. And the ground-processing turnaround time needs to be reduced," said Phil Weber, who leads KSC's spaceport and range technology development. "To do that, innovative, cost-saving spaceport and range technologies must be considered and come into play as future vehicles are designed."

KSC is working with Marshall to ensure future vehicle technologies being developed through NASA's Space Launch Initiative will be integrated with cost-saving spaceport technologies.

"Such an integrative strategy might require that a vehicle be designed to fly a little less efficiently to enable cost savings and a quicker turnaround time," said Stan Starr, Chief Engineer for Dynacs, KSC's Engineering Development contractor.

Artist Pat Rawlings' conception of a future spaceport was inspired by the Cape Canaveral Spaceport. The illustration has often been used to depict what a future spaceport might look like.

Above, student engineers work with early launch-site computers. At right, engineer Graydon "Jack" Phlieger works with rotary step switches. Phlieger used switches to develop the first launch countdown clock, one of the first KSC-generated spaceport technologies.



At left, a NASA and Dynacs development team are pictured with recently retired Instrumentation Branch Chief Bill Helms and the Advanced Hazardous Gas Detection System. Helms worked on the hazardous gas detection system used for Apollo launches and led the development of the first such system for Shuttle.

For example, it costs less to fuel a launch vehicle with kerosene, Starr pointed out.

"Sacrificing flight performance for ground processing improvements is a bitter pill for vehicle designers, but swallowing it is the only way we're truely going to be able to lower the price of space launch," Weber said.

Terry Greenfield, an engineer who worked in the Redstone rocket program at Cape Canaveral in the mid-1950s, retired from NASA in 1989 and now is working for Dynacs, said that KSC has come a long way in establishing itself as a Spaceport Technology Center.

"During the early days much of the spaceport and range technologies were developed elsewhere. Now KSC is leading the charge, which is as it should be considering we face the operational challenges here," Greenfield said.

Astronauts maintain strong ties with Center

By Linda Herridge

Mercury astronaut Alan Shepard made his sub-orbital flight May 5, 1961, in the Freedom 7 spacecraft from Cape Canaveral Air Force Station, then known as the Air Force Missile Test Center.

It was about a year after these modest beginnings of the manned space program that Kennedy Space Center was created.

Since that first flight, more than 300 different astronauts have journeyed to the launch pad, strapped themselves into their spacecraft and rocketed into space.

The KSC connection was and still is strong for these space explorers. Many returned to fly into space again. Some went on to pursue related careers, while others, after retirement from the astronaut corps, returned to KSC.

Jim Lovell, Gemini and Apollo astronaut, commented about early launches, "The launch site was very primitive. We went inside a blockhouse and watched the launch through a periscope. Our crew quarters were in Hangar S on the Cape Canaveral Air Force Station side."

One of Lovell's favorite memories at KSC was the launch of Apollo 8: "It was the first launch of a Saturn V. It was the thrill of leaving the Earth and heading out towards the moon, then looking back and seeing the Earth. We were the first team to see the far side of the moon."

Lovell retains a connection with KSC as Astronaut Scholarship Foundation president.

Robert Crippen, astronaut on the first Space Shuttle Launch, STS-1 in April 1981, flew on three subsequent missions before returning to KSC to serve as center director in 1992.

Remembering back to those early Space Shuttle launches, Crippen said, "The Kennedy Space Center and Cape Canaveral area has held a fond place in my heart ever since my first visit here in 1969."

Crippen believes the commitment of the people who work at KSC is every bit as strong as during the early years. The growth of technology has continued to demand higher and higher standards from those who work at the Center, he said.

"It was an honor and a pleasure to work at KSC in the roles of support astronaut, flight astronaut, operations management and finally as the center director," Crippen said.

Jim Halsell, manager of Shuttle launch integrations, previously flew on five space Shuttle missions.

Commenting on KSC since his first visit as an astronaut, Halsell said, "It hasn't changed.

It's the home you know you can always come back to. Throughout the space program, from the early days to the present, every astronaut has trusted everyone here to use the same care and diligence to make sure that each launch is safe."

Brian Duffy served on four Space Shuttle flights including his most recent, mission STS-92, in October 2000. He has returned to KSC as vice president/associate program manager for Lockheed Martin.

Duffy shared some KSC memories: "Gawking at the beauty of an orbiter lit by the zenons. Thundering off the pad and roaring out of the atmosphere. The smell of beans in the LCC. Meeting my family at the elevator of crew quarters after a successful mission. The list could go on and on. The Kennedy Space Center is a very special place … there's no other place like it in the world."

Other astronauts who returned to KSC as contractor managers include Bruce Melnick, vice president and senior site executive for Boeing Space Coast Operations, and Andy Allen, associate program manager for ground operations for United Space Alliance.

KSC Director Roy Bridges Jr. flew as pilot on Space Shuttle Challenger mission STS-51 in July 1985. Of his earlier career he said "Being a NASA astronaut was one of the highlights of my career, and it was an honor to serve in this way. Space is our future, and we need to inspire our next generation to continue the legacy of space flight and exploration through sharing our exciting exploration missions."

Of KSC workers Bridges said, "You should be proud of the legacy and reputation you have created here at KSC as I am. We are continuing our reputation of keeping it safe, and making it work in everything we do.

"We must continue to evolve our relationships with the State, other federal agencies, academia and industry to fulfill our new NASA Vision and Mission and achieve KSC's vision of evolving into NASA's Spaceport Technology Center."

Former astronauts Bob Crippen (left) and Roy Bridges (far left) both returned to KSC to serve as Center director. Bridges was named to the post March 1997.

Charles Lindbergh (right) enjoys his meal at Kennedy Apollo 8 astronauts Borman, Lovell and Anders and

John Neilon (left) and Bob Gray, senior managers with Unmanned Launch Operations, explain satellite systems the King of Afghanistan, Mohammed Zahir Shah, in 1963.

Astronaut Walt Cunningham speaks to Lady Bird Johnson She is seated next to JoAnn Morgan, now a KSC director.

Actor John Travola is escorted at Kennedy Space Center by Norm Perry, a retired NASA engineer.

y Space Center with Security Chief Buckley.

Dr. Kurt Debus (right) experiences a proud moment during President John F. Kennedy's visit to the Launch Operations Center. Kennedy made two visits before his death and the subsequent renaming of the LOC to Kennedy Space Center.

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Presidents, kings and celebrities visit

By Anita Barrett

Fascination with space and the space program has drawn visitors to Kennedy Space Center from every sphere of the world: from politicians, musicians, actors, and heads of state to average citizens from around the world.

Many have been special guests of the Center, afforded private, escorted tours. The first VIP to the area was President John F. Kennedy in 1962.

In 1963, Zahir Shah, then ruler of Afghanistan, visited. The Shah met with Kurt Debus and others involved on the programs.

John Neilon, Goddard Space Center deputy director at the time, recalls that state visits by foreign dignitaries "seemed to always include a stop at the Cape. I don't know how much he understood but the king listened attentively to what we were describing."

Neilon also remembers talking to the vice president of Kenya in the 60s, the vice president of China (now Taiwan), the president of Turkey and the prime minister of Israel.

"They all were probably overwhelmed by what was happening here," added Neilon.

One visitor in December 1968 had special significance historically, and retiree Charles Buckley was there. As chief of Security at KSC for 21 years, Buckley escorted astronauts to the pad between January 1960 and July 1981.

In December 1968, just days before the launch of Apollo 8 – the first lunar orbital flight with the three-man crew of Frank Borman, James Lovell Jr. and William Anders – Buckley recalls getting a phone call from Borman, with a request: "He asked me to take care of a dignitary who was coming to KSC and give him a low-key visit."

Then Buckley learned who the dignitary was – Charles Lindbergh. "He talked a lot about his own historic flight," said Buckley.

Only 41 years had passed since Lindbergh's solo airplane crossing of the Atlantic, and now three men were poised to cross the sky and circle the moon. Lindbergh and Buckley later joined the Apollo 8 crew at their traditional pre-launch meal Dec. 21, 1968.

Another NASA retiree, Norm Perry, was an engineer who often was called to escort VIPs.

He recalls the frenzy surrounding the first Shuttle launch, and how the crowds who were planning to attend filled all the nearby hotels.

"On the day before the launch, a call came in from a filmmaker and his friend. It was Steven Spielberg and George Lucas. After much searching I was able to find them two rooms at a local motel and I escorted them for the launch. I ended up as a technical consultant on E.T."

KSC continues to lure celebrities, said Debbie Frostrom, chief of guest services and special events.

"KSC has always had an open policy regarding VIP visits and tours," Frostrom said. "While we temporarily were forced to curtail these tours after September 11, we are definitely back in business to educate, inspire and influence high profile people. There is nothing like an up close and personal experience to make even skeptics into strong space program supporters!"

Fourth floor guest book signed by VIPs

The Kennedy Space Center guest book, with a nearly 40-year list of visiting VIPs, has signatures of representatives from more than 65 countries, from Australia to Zambia.

The book includes heads of state such as Prince Philip of England, Nehru of India, and King Hussein of Jordan; U.S. Presidents George Bush, Jimmy Carter, Bill Clinton and Lyndon Johnson; other political VIPS such as Alabama Governor George Wallace, Vice Presidents Spiro Agnew, Hubert Humphrey and Dan Quayle; artists Robert S. McCall and Norman Rockwell; comedians Jack Benny, Henry Morgan and Don Knotts; sports figures such as Heavyweight Boxing Champion Larry Holmes; actors such as Ben Affleck, Warren Beatty and Annette Benning, Clint Eastwood, James Garner, Tom Hanks, Tommy Lee Jones, Roy Rogers and Dale Evans, Bruce Willis, and hundreds of others.

Public affairs assists media in sharing story

By Anna Heiney

In the late 1950s, the first "press site" at Cape Canaveral was Birdwatch Hill, a sand mound about a mile south of the Jetty.

There, 10 to 12 full-time journalists, tasked with reporting the happenings of America's fledgling space program, gathered to watch early launches.

When the space program was in its infancy, the Air Force controlled the flow of information to the public, ruling with what the press often felt was an iron fist.

At the time, America was trailing Russia in the space race. A series of Russian successes, including the launch of Sputnik in 1957, led the U.S. military to keep its space operations a secret.

"The media wasn't supposed to know when a launch was planned," recalls Howard Benedict, who came to Cape Canaveral as an Associated Press space writer after the media began to receive more cooperation. "But they'd hear about it from bartenders who overheard it from workers. There were other telltale signs, like the string of beachside tracking cameras that would open up just before a launch."

On several occasions, the Air Force sent a helicopter out to the beach to hover over the journalists.

They told me "the sand would fly, and by the time the photographers had gotten themselves ready again, the missile would be long gone!" Benedict said.

When it became evident that news representatives were getting creative in order to report the news, the base commander, Maj. Gen. Donald Yates, agreed to brief them once a week.

Near the mission control center, the Air Force built the first official press site, a primitive open-air platform. Journalists were provided phones for filing stories, but for military launches, the phones were turned off until after ignition so the news couldn't be reported until after the fact.

Lt. Col. Ken Grine ran the Air Force public affairs office and remembers it as a busy but enjoyable job.

An early space program press conference featured astronaut Gus Grissom (at left).

Retired AP reporter Howard Benedict (left) listens to KSC's JoAnn Morgan. KSC director Roy Bridges poses with NBC's Jay Barbree.

"One of the biggest challenges I encountered was tight security. The biggest PR job I had was to sell our own people on the idea of being open with the media. It was difficult, but they came around."

JACK KING
FORMER NASA PUBLIC AFFAIRS DIRECTOR

"My job was to let them know we were trying to help. At the time, this was a really big change, from giving away no information to being more cooperative."

In 1960, NASA opened a Public Affairs office under the direction of Jack King. As a civilian organization engaged in a scientific endeavor, NASA had the freedom to open up to the media.

Because the media was not granted regular access to Cape Canaveral, the office was located in the Holiday Office Center adjacent to the Cape Colony Inn on Cocoa Beach.

"One of the biggest challenges I encountered was tight security," said King, who now works for United Space Alliance in the office of Vice President and Deputy Program Manager William Pickavance. "The biggest PR job I had was to sell our own people on the idea of being open with the media. It was difficult, but they came around."

Another challenge was handling the needs of television reporters. Coming from a writing background, King had limited knowledge of TV's technical issues.

Grine and his team were instrumental in helping NASA develop TV operations for coverage of the Mercury missions.

"He was a role model for dealing with the press," said Jay Barbree, who has covered every manned U.S. launch in more than 40 years as an NBC News space correspondent.

A second press site was built for the Mercury-Atlas and Gemini missions. The first manned Gemini launch attracted 780 journalists. By the end of the program, public information flowed freely, with journalists allowed to hear air-to-ground transmissions.

The Public Affairs office changed locations several times, even occupying the top floor of Cocoa Beach's Cape Royal Building, before finally moving onto Kennedy Space Center.

During the first test launch of an unmanned Saturn V, the KSC Press Site debuted in its current location on the mound across from the VAB and LCC. More than 500 news representatives watched as the power of the Saturn V shook their buildings and cars.

Only the launch of STS-95 in 1998, John Glenn's return to flight, brought more news representatives to KSC than the launch of Apollo 11 in July 1969 – nearly 3,000.

Today, many media representatives have work trailers adjacent to the Press Site – a far cry from the sandy perch of Birdwatch Hill. With few exceptions, information has been readily available to the media throughout the Space Shuttle program.

"Our relationship with the media has been good," recalled Klaus Wilckens, a NASA photographer who frequently worked with news photographers during the Apollo and Shuttle programs.

Barbree agrees. "The KSC news office gives journalists a place to go and makes our job so much easier."

History of KSC continues to be recorded

By Kathy Hagood

The history of Kennedy Space Center is a mother lode that has only begun to be mined.

While formal histories such as *Moonport* and more personal ones such as Gunter Wendt's *The Unbroken Chain* offer nuggets of knowledge and inspiration to students of history, much of the KSC story has not yet been captured.

Fortunately for those who value the lessons of history, NASA and others are now stepping up their history-gathering efforts.

KSC has developed a History Program with strategies including collecting written and oral histories, as well as expanded physical and Web-based archiving of audio, video, photo and written history. A history lecture series is planned.

"It's vital that we record our history while space program pioneers are able to share their memories and insights," said JoAnn Morgan, director of External Relations and Business Development. "KSC has played a unique role in the history of the space exploration and in the development of the technologies and processes essential for success. We need to preserve that knowledge.

"In addition, remembering our heritage can offer inspiration to workers at KSC and to the students who will be the workforce of the future."

The Center recently awarded a two-year contract to two prominent historians and authors, Dr. Kenneth Lipartito and Dr. Orville Butler, to write the history of KSC. The new text will be the first major work to document the Center's history since 1976, when *Moonport: A History of Apollo Launch Facilities and Operations* was published.

Lipartito and Butler will gather information from a variety of sources, including the KSC archives, other NASA Centers, the National Archives, event and site visits, and individual and group interviews and collections.

Those who have remembrances, photographs, documents and memorabilia that could assist in their research are encouraged to contact the NASA Archives, where they are working, at 867-2407.

Historians (from left) Dr. Patrick Moore, Dr. Orville Butler and Dr. Kenneth Lipartito visit the Apollo Saturn V Center for inspiration.

Retired NASA manager Sam Beddingfield takes a look at his U.S. Spacewalk Hall of Fame's Gemini monument.

"We have only just begun our work but one thing we have observed so far is that the management structure here has always been much flatter that your average organization," Dr. Butler said. "What that means is that there are closer ties between upper level manager and front line workers."

He and Dr. Lipartito have been impressed by the cordial, down-to-Earth work environment at KSC and the average employee's passionate dedication to the space program.

"I don't think the people here realize how unique this environment is and how it is a model for other work places," Lipartito said.

Author and former KSC Pad Leader Gunter Wendt consults with Tom Hanks during filming of "From the Earth to the Moon."

NASA engineer Carey McCleskey authored an internationally recognized paper on Kurt Debus.

Dr. Patrick Moore is also working at KSC this summer to record oral histories and produce a monograph on the relationship between NASA public affairs and the media over the years. Monographs on other subjects are planned.

"The media's role in educating the public is vital to the sucess of the space program," Dr. Moore said. "As well as investigating what has happened in the past, we also want to determine strategies to help NASA better educate the media so that the media can better help educate the public."

Dennis Armstrong, who is the NASA contract manager for the historians' work, is also leading an effort to create a KSC Honor Roll on KSC's history Web pages and a portal for employees to send in information. Watch for the project on KSC's history Web pages at **http://www-pao.ksc.nasa.gov/history/index.htm**.

KSC's history can also be experienced through numerous exhibits at the KSC Visitor Complex and the Astronaut Hall of Fame.

In addition to those sources the Center's history are the efforts of private individuals and groups.

For example, the U.S. Spacewalk Walk of Fame, a group of about 50 retired space workers, has worked to commemorate KSC's history with a museum, monuments and programs. The group recently doubled the space at its museum at the Miracle City Mall in Titusville.

"There is so much to exhibit and our collection is growing all the time," said Sam Beddingfield, one of the founders of the group.

On an individual basis, KSC engineer Carey McCleskey researched and co-wrote an internationally recognized paper on KSC's first director. To read McCleskey's paper, "Dr. Kurt H. Debus: Launching a Vision," visit **http://www-pao.ksc.nasa.gov/history/documents.htm**.

"We have so much to learn today from the pioneering efforts of Dr. Debus," McCleskey said. "He was an amazing man and I wanted to share his inspiration with others. There are many other space program pioneers whom we can learn from as well if we will take time."

Guenter Wendt, author of the recently published *The Unbroken Chain*, is a retired contractor who served as pad leader during Mercury, Gemini and Apollo.

"I wrote the book because I wanted to tell the story from the perspective of a worker at Kennedy Space Center," Wendt said. "Not everyone is an astronaut, but everyone who works in the space program plays an important role. Each person is a vital link in what I call 'the unbroken chain.' "

Cape Canaveral named and renamed

An aerial photograph taken during the early 1960s shows multiple NASA and Air Force launch pads on "missile row" at Cape Canaveral.

By Anita Barrett

Place names vary from descriptive to commemorative to geographic. Cape Canaveral can claim all three.

Maps of five or six centuries ago describe this jutting point of land "Cape of Currents" because of the dangerous coastline.

The name Cape Canaveral is credited to Spanish explorer Ponce de Leon. The name has several translations describing the Cape as a place of canes.

For a while, the area was also known as the French Cape. In the early 1560's, a shipwrecked party of French established a settlement in the area. After they were routed by the Spanish, the name reverted to Cape Canaveral.

Other names for the area arose from various small settlements. Although isolated and only accessible by boat, families and small businesses trickled onto Cape Canaveral in the 1920's.

Nathan and Titusville Beach, for example, were north of Cape Canaveral on what is called False Cape, technically the eastern edge of Merritt Island.

It wasn't until the mid-twentieth century that the land of the cane began a population explosion, thanks largely to the military, and various names became synonymous with Cape Canaveral:

- May 11, 1949 – the Joint Long Range Proving Ground at Cape Canaveral was established.
- Oct. 1, 1949 – the Joint Long Range Proving Ground Base was activated.
- May 1950 – the names were changed to the Long Range Proving Ground and the Long Range Proving Ground Base.
- June 1951 – names changed to the Air Force Missile Test Center and the Florida Missile Test Range.

The Cape itself did not receive a special military name at the introduction of launch activity.

It was referred to as "Cape Canaveral launch area" or "Cape Canaveral launching area," or simply as an extension of the Long Range Proving Ground. Then:

- August 1950 – Patrick Air Force Base was created.
- October 1951 – the military-occupied portion of the Cape was designated the Cape Canaveral Auxiliary Air Force Base.
- December 1955 – Cape Canaveral Auxiliary Air Force Base was redesignated the Cape Canaveral Missile Test Annex.
- May 1958 – the Florida Missile Test Range was renamed the Atlantic Missile Range.

On Sept. 1, 1961, NASA requested appropriation for initial land purchases on Merritt Island.

The first request was for a 200-square-mile area immediately north and west of existing launch sites.

On Nov. 28, 1963, President Lyndon Johnson announced that Cape Canaveral would be renamed Cape Kennedy in memory of President John F. Kennedy.

The following day he decreed that the NASA Launch Operations Center would be renamed the John F. Kennedy Space Center, NASA.

That name change officially took effect on Dec. 20, 1963.

Charles Buckley, Security chief at the time, remembers being "very happy" about the new name for the space center.

"It was because of President Kennedy that we were here working to put a man on the Moon," Buckley said.

The Air Force subsequently changed the name of the Cape Canaveral Missile Test Annex to Cape Kennedy Air Force Station.

Florida residents campaigned for 10 years to change the name of the Cape back to Cape Canaveral.

Finally May 18, 1973, Florida Governor Reuben Askew signed a Florida Statute requiring that Cape Kennedy be renamed on all State of Florida documents and maps.

The same year U.S. Board of Geographic Names responded by agreeing to officially recognize the name change to Cape Canaveral.

Cape Kennedy Air Force Station was subsequently renamed Cape Canaveral Air Force Station (CCAFS), the name it carries today after a brief stint with the name Cape Canaveral Air Station.

In recent years CCAFS and KSC have been jointly referred to as the Cape Canaveral Spaceport. The name reflects a growing partnership between KSC and the 45th Space Wing and a vision for the future of Florida's Space Coast.

Cape Canaveral inhabited by various groups

By Linda Herridge

Long before man was collecting rock samples from the moon, the earliest inhabitants of the Space Coast spent their days hunting and fishing to survive.

These early inhabitants were an ancient Indian tribe called the Ais (pronounced Ay-ess).

Archaeological surveys, conducted during the early 1960s in the Cape Canaveral Spaceport area, revealed remnants of Indian fishing sites, burial ground, and mounds up to thousands of years old.

According to Mario Busacca, NASA lead, Planning and Special Projects with the Environmental Program Branch, there is evidence that the Ais Indians used an area called Futch Cove near the VIP Launch Viewing Site along the Banana River for a fishing camp.

"Surveys revealed evidence of ancient hearths or fireplaces for cooking," said Busacca.

In 1973, an environmental assessment and archaeological survey was done in the area of the Shuttle Landing Facility (SLF) prior to construction.

According to Steve Harris, retired NASA chief of the Field Engineering Office and project manager for the SLF, "Three significant prehistoric Indian mounds were discovered close to the area. One on the far west side of the Banana Creek where it empties into the Indian River, one south of the Saturn V Exhibit Center, and one near the road that leads to the Mate/Demate device."

The survey also revealed remnants of building structures and orange groves from inhabitants in the early 1900s.

The first record of European landfall came in 1513 when Ponce de Leon arrived with three ships, in search of gold and glory. He landed along the coast and went ashore just south of the Cape to replenish water and wood supplies. Not finding treasure, he sailed down the coast to the Florida Keys. He is credited with discovering Florida.

The first record of Europeans inhabiting the Cape came in 1562. That year a Frenchman named Jean Ribault sailed a fleet of ships to the

Above, an early settler on Cape Canaveral poses with an alligator. Below left, a lighthouse keeper adjusts the lamp for the Cape Canaveral Lighthouse. At right, a Cape hunter poses outside his hunting shack.

Cape area. During a tropical storm the ships were destroyed.

Using what was left of the ships, Ribault and his men built and established Fort Caroline near the area of the Shuttle launch pads. Their occupancy was short lived as the Spanish drove them out.

In 1565 Spanish forces built a blockhouse at the northern tip of the Indian River. They also erected several fortifications on Cape Canaveral in hopes of protecting their trade routes. The buildings were abandoned a few months later after several attacks by the Ais.

The Spanish are credited with bringing citrus trees and pigs to the area. Feral pigs still roam the woods of the spaceport.

In 1763 the Treaty of Paris was signed and Florida became a British possession. After the Revolutionary War, Florida became a possession of the United States.

Fort Ann was built in December 1837 and used through April 1938. The fort was one of 200 forts constructed in Florida during the second Seminole War. Located near the old Haulover Canal, the fort was a three-sided stockade that backed up to the Indian River.

"It was a unique fort because troops could arrive by land or water, it served as a main supply fort for food and forage to U.S. troops at Ft. Pierce and Ft. Jupiter and troops were actually garrisoned there," said David Paterno, a retired dean at Keiser College who is researching and compiling information on Florida forts.

In the 1840s, the first group of American settlers to establish a permanent residence on Cape Canaveral came from Georgia and the Carolinas. They were primarily of English and Scottish-Irish heritage. These tough settlers survived the scorching heat, and hordes of mosquitos.

The first Cape Canaveral Lighthouse was constructed between 1843 and 1847 to help guide ships away from the shoals and rocks along the coastline.

"Many of the early settlers and their descendants served as lighthouse keepers through the years," said Rose Wooley, local researcher, historian and author of the booklet *History of Cape Canaveral and The Early Settlers*. During the Civil War the lighthouse mechanism and reflectors were dismantled, place in crates and buried in an orange grove.

After the war a larger and taller lighthouse was constructed. In 1892 it was moved inland one mile to save it from storm erosion.

Merritt Island was originally settled by Douglas Dummett, who used orange trees left by the Spanish to start the first grove in Brevard County. He started the first recorded commercial citrus packing and shipping business in Florida.

In 1868, the island saw an influx of settlers. The primary way of life was agriculture, including citrus, pineapple and avocado groves, sugar cane plantations and cattle.

In 1885, the U.S. Census listed seven families living on Cape Canaveral. The next year, the Jacksonville, Tampa, Key West railway was extended to reach the city of Titusville, then Sand Point, at the northern end of Brevard.

In the 1920s a few more families arrived at the Cape. The area still remained accessible only by boat.

By 1939 there were about 120 people living on Cape Canaveral and Merritt Island. Of the settlements formed, Artesia was located at the south end of the Cape. The Stinkmore Settlement was located near Launch Complex 17 and Launch Pad 5 where America's first astronaut was launched.

DeSoto Beach was located near Launch Complex 36. It featured 15 permanent homes, a small hotel, and even a brothel. Other settlements included Orsino, located in the present day KSC Industrial area, Wilson's Corners and Sunrise Beach, a community that included the present astronaut beach house.

In the late 1940s, after Cape Canaveral was selected as the first long-range missile proving ground, the government began condemning and purchasing private property.

The existing homes and buildings were converted into storage areas and offices. Today, all the buildings are gone. Only remnants remain including numerous grave sites, scattered orange groves and the Cape Canaveral Lighthouse.

Wild landscape becomes space center

By Anita Barrett

A sand pyramid, at top, was formed for the creation of a launch pad at KSC's Complex 39 on Merritt Island.

Before human occupation, Central Florida – including Cape Canaveral – was filled with marshes, mangroves and cypress swamps; palmetto and palm trees; scrub and pine flatwoods, hollies, hickories and oaks.

Native wildlife included deer, alligators, rattlesnakes, fox, otter, raccoons, bobcats; panthers; water and woodland birds like pelicans, wood storks, egrets, herons and ospreys; reptiles and amphibians.

Many of these species still live in relative abundance at Kennedy Space Center because of the establishment of the Merritt Island National Wildlife Refuge and other protective measures instituted by KSC beginning in the early 1970s.

The first human occupation in this area of Florida (estimated between 8000 BC and 1705 AD) began a long, steady, slow impact on the environment by clearing trees and burning wildlands.

Early Florida statehood brought extensive live oak logging and some town establishment around citrus groves, although later abandoned. Logging of virgin pine became prevalent. From 1900-1962 there was repeated logging of pine, burning for free-ranging cattle, and the draining and diking of wetlands for mosquito control.

Still, Brevard County was predominantly rural prior to 1950 and Cape Canaveral was a scenic but comparatively unsettled place.

Then in 1950 began the development on Cape Canaveral that would have the greatest impact – constructing a concrete launch pad for rocket launches – and jumping across the river for the manned space program.

In 1962, NASA began acquiring what is now KSC property.

Before thousands of skilled craftsmen could begin building KSC's unique structures, sites had to be prepared, access channels dredged, and mosquitoes dealt with.

Part of the work involved the clearing of surface growth, ranging from palmetto scrub to citrus trees, and the stripping away of undesirable surface material.

"They put out a notice offering free citrus trees and many of us took advantage of the offer. I still have the grapefruit tree in my back yard," said George Jenkins, who headed the MILA Spaceflight Tracking and Data Network Station before retiring from NASA in 1992.

Bulldozers cleared about 1.5 square miles of land, while other earth-moving equipment removed almost 1 million cubic yards of soft sand and muck. Sand that was dredged for the access channel to the site of the Vehicle Assembly Building was deposited on the site, the crawlerway, Launch Pad 39-A and the Banana River causeway.

The second, and perhaps larger, part of construction was dredging a barge canal 125 feet wide, nearly 10 feet deep, and 12.4 miles long from the original Saturn barge channel in the Banana River to a turning basin near the VAB. The canal would serve barges bringing in the first and second stages of the Saturn V. A channel to pad A allowed barges to deliver material directly to the LC-39 construction site.

During the dredging operations, powerful hydraulic pumps sucked up 7.5 million cubic yards of sand and shell for fill. A major portion of it went into the 187-foot wide, 6.6-foot high crawlerway, which would stretch more than 3 miles from the VAB to pad A.

Steve Harris, who came to work on Complex 36, launching Surveyor spacecraft, in August 1962 and transferred to the manned space program in 1963, worked as project engineer for the VAB.

"It was rather pristine country," he said. "They had excavated the land from the VAB to the pad to build the crawlerway . . . and were driving piles for the (VAB) foundation. In that process they discovered a free-flowing artesian well on the north end, where now the transporter brings in the orbiter. They had to have the well capped, and they put a marker there."

Out at the pad site, the pumps piled a step-pyramid of sand (note photograph) and shell 80 feet high, one of the highest recorded pumping operations. All the while, draglines, bulldozers and other earth-moving equipment molded the mound into the approximate shape of the launch pad.

For reasons of health and comfort, the mosquito population had to be reduced before workers could begin any sustained outdoor work during the prime mosquito season from April to late October.

The most effective permanent control on the Merritt Island Launch Area (MILA) consisted of the construction of dikes to flood breeding areas. With the flooding of marshes, the minnow population increased and mosquito eggs and larvae declined.

In addition, combined efforts of the Brevard County Mosquito Control District, Launch Operations Center and the Air Force Missile Test Center, and the State of Florida accomplished reasonable mosquito control in the MILA.

Merritt Island National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service, was established in 1963 to manage lands and waters not being used directly by the space program. KSC Director Kurt Debus arranged with the Department of Interior's Bureau of Sport Fisheries and Wildlife to establish and manage a wildlife refuge on the Center. The original area encompassed 25,300 acres but NASA kept adding to it, resulting in a 220-square-mile reserve.

Canaveral National Seashore (CNS), managed by the National Park Service (NPS), was established in 1975. NASA remains the landowner and lands are occasionally removed as needed by the program.

The NASA Biomedical Operations and Research Office at KSC has been supporting environmental monitoring and research since the early 1970s.

Initiatives related to wildlife include minimizing effects of new facilities, enhancing workforce awareness, minimizing environmental risks, and enhancing environmental management.

Areas of the office's activity have included estuarine ecology, sea turtle and manatee biology, fisheries, water resource utilization, fire ecology, small mammals, habitat management, and Space Shuttle launch effects.

Families boast 3 generations of workers

By Isabel Rougeau

Norman Perry retired from NASA in May 1989. But he refuses be referred to as an ex-NASA employee.

"There is no ex-NASA … it's something that stays with you forever," said Norman Perry. "If you cut me, RP1 Rocket Fuel would bleed out."

But Perry's dedication to the Space Center extends beyond his own 46 years of service as an employee and volunteer. His enthusiasm inspired his daughter, Sheila Perry, and grandson, Will Perry, to work at KSC.

The three generations working toward the same goal: To safely lead the world in preparing and launching missions around the Earth and beyond.

Sheila Perry is one of the few female Special Agents for NASA and is proud to share the special bond of working at KSC with both her father and son.

"My dad had a big influence on me. I grew up loving the space program," said Sheila. She extended her passion for space to her son Will, whom Sheila brought to numerous launches throughout his youth.

"She'd give me a walkie-talkie and say 'alright they're going to count down and when they say one, hit that button and the Shuttle will go up,' " recalled Will Perry, an access administrator for Boeing. "And until I was about 13 I used to believe that I was shooting the rockets up."

Another legendary three-generation KSC family is that of former deputy director, George Page. His son, Steve Page, worked at Kennedy for 17 years before moving to California to work on the X-33 project and on Shuttle refurbishment. George Page's grandson, Matt Page, currently works at KSC as a computer scientist for United Space Alliance.

All three generations of Pages worked in the LCC firing room during launch.

Matt Page said, "It's a source of pride knowing that I'm carrying on the family tradition."

He admits that, as a child, he didn't realize the significant contributions that his grandfather and father made at KSC. Now, he looks to their examples as his inspiration.

"I haven't been here long but I'm hoping to add as much as they did to the Space Program," he said.

Matt's most memorable experience at KSC was his first time working as a primary operator in the firing room during the STS-105 launch.

This is a room where, at one time, George and Steve worked together. Now they were both invited to watch a third generation Page take on a key position during launch.

Steve Page remembers watching Matt at work on that proud day.

"It was special because both my dad and I understood what was going on during all of the excitement," he said, "and now we were watching as Matt took part." Steve also added "There was never any pressure to stay in the space business, but we all just tended to gravitate towards it."

The same is true about another three-generation KSC family.

Ray Dougherty was a logistics specialist at KSC for 13 years.

He's happy that he shares such an amazing bond with his son-in-law, Cecil Boggs, and his grandson, Andy Boggs, but Ray never intended to begin a family tradition.

Will, Sheila and Norm Perry have made working at KSC a three-generation tradition.

KSC retiree Ray Dougherty (center) is proud his son-in-law Cecil Boggs (left) and grandson Andy Boggs work at KSC.

KSC engineer Matt Page shows a photo of his father and his deceased grandfather, George Page, who served as KSC deputy director.

"He just told me that this is the best place to work," said Cecil Boggs, the supervisor of launch and landing security and special projects at KSC. "And it was, without a doubt, the best choice of all."

Cecil is proud that his son Andy, who currently supervises uniformed officers in the field, aspires to follow in his footsteps.

"The best part of working for KSC Security is protecting all of the people that work out here," said Cecil. "I'm proud that my family is a part of that."

Many precedents have been set during Kennedy Space Center's first 40 years.

Employees have impacted KSC at work and in their homes, beginning a family tradition that continues to influence the future generations of our Space Program.

KSC major events highlighted in timeline

October 1957 – Project Mercury was initiated just six days after NASA was formally organized from the National Advisory Committee for Aeronautics.
May 1961 – Alan Shepard Jr. became the first American to fly into space during a 15-minute suborbital Mercury mission.
August 1961 – NASA announced that it intended to expand the Cape Canaveral facilities to launch humans to the Moon by acquiring 80,000 acres of land north and west of the Air Force Missile test center.
February 1962 – John Glenn Jr. became the first American to orbit the Earth.
July 1962 – The Launch Operations Center (LOC), which later became the John F. Kennedy Space Center, was formed and Kurt Debus named its first director.
July 1963 – Construction of the Vehicle Assembly Building began.
November 1963 – The LOC was renamed the John F. Kennedy Space Center seven days after the president was assassinated.
January 1967 – The three-man crew for the first manned Apollo spaceflight died in an accidental flash fire at Launch Complex 34 during dress rehearsal.
November 1967 – One of KSC's two new pads at Launch Complex 39, Pad A, was used for the first time to launch the Saturn V spacecraft development flight. This was also the first time that one of the firing rooms in KSC's Launch Control Center was used.
July 1969 – A Saturn V safely boosted Neil Armstrong, Buzz Aldrin and Michael Collins into space on July 16, culminating in the first lunar landing on the Moon.
May 1973 – Saturn V rocket launch completes first Skylab mission.
January 1975 – Lee Scherer assumes duties as second KSC director.
July 1975 – Launch of Apollo-Soyuz Test Project designed to test rendezvous and docking system compatibility for American and Soviet spacecraft.
September 1979 – Richard Smith named the third KSC director.
March 1979 – The first Space Shuttle orbiter, Columbia, arrived.

President Kennedy visits NASA's Launch Operations Center, which was to be renamed John F. Kennedy Space Center, NASA, after his death.

Telstar 1, the first privately financed satellite, launched July 10, 1962.

April 1981 – The newly refurbished and modified Pad 39-A was used for the first Shuttle launch.
February 1984 – For the first time, following the completion of STS 41-B, the Space Shuttle landed at the Shuttle Landing Facility.
January 1986 – Pad B at Launch Complex 39 was used for the first time to launch Space Shuttle Challenger on mission STS 51-L, which ended tragically during an explosion approximately 73 seconds after launch.
September 1986 – Lt. Gen. Forrest S. McCartney named the fourth KSC director.
September 1988 – Space Shuttle flights resumed after an extensive investigation into the STS 51-L accident and an assessment of the Space Shuttle program.
January 1992 – Robert Crippen named the fifth KSC director.

A Gemini capsule becomes the first orbiting spacecraft photographed.

June 1994 – The Space Station Processing Facility (SSPF), the central preflight checkout and processing point for International Space Station, was dedicated.
January 1995 – Jay Honeycutt named the sixth KSC director.
March 1997 – Roy Bridges Jr. named the seventh KSC director.
July 1997 – The KSC Implementation Plan and Road Map, a bold plan for KSC's future through the year 2025, was unveiled.
October 1997 – KSC assigned responsibility as lead center for the acquisition and management of Expendable Launch Vehicle Launch Services for the agency.
December 1998 – The first Space Shuttle mission dedicated to the assembly of the ISS was launched carrying the Unity node.
May 1999 – Shuttle Discovery was launched on the first mission for a Shuttle to dock with the ISS.
July 1999 – The first Shuttle mission commanded by a female, astronaut Eileen Collins, was launched.
May 2000 – KSC 2000 reorganization effort begins, streamlining the Center and adapting it to modern technology and customer needs.
February 2001 – Groundbreaking for Space Experiment Research and Processing Laboratory and connecting roadway.
November 2001 – NASA amends KSC's Mission Area to be Space Launch Operations and Spaceport and Range Technologies.
January 2002 – KSC hosts national working groups of government and industry leaders tasked to develop organized strategies for future spaceport and range technology development.

John F. Kennedy Space Center
Spaceport News

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