



# NASA celebrates 50th Anniversary

Oct. 1 marks the 50th Anniversary of NASA as it was on this date in 1958 that the National Aeronautics and Space Administration began operations. Over the past 50 years, the employees of America's space program have been at the forefront of many incredible accomplishments.

Kennedy Space Center has a rich history in the space program having been named an independent NASA installation in 1962.

From the historic launch pads here in Florida, we have launched missions of discovery. Next year, we will celebrate the 40th anniversary of a human being setting foot on the moon. That mission, Apollo 11, launched right here from our center. Some of our employees today were working here at that time.

**Director's Note**



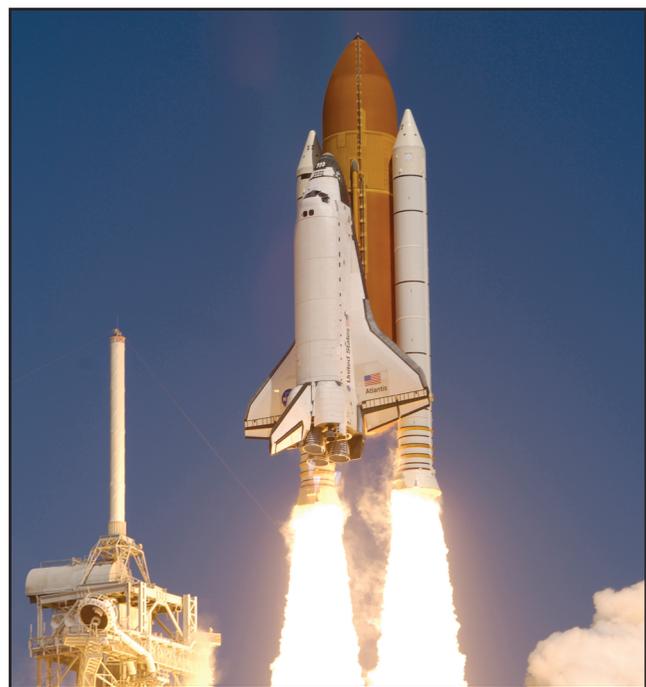
By Bill Parsons  
Director, Kennedy Space Center

I mention this historic date because once again we are preparing to go back to the moon. This time, we are going to stay. We will have a sustained human presence. NASA is a forward-looking agency, and this is our future. NASA's 50th Anniversary is a historic milestone that gives us an opportunity to reflect on past accomplishments, but we need to prepare for what's ahead.

We need to stay focused on our mission. This month, we will launch space shuttle Atlantis for

the STS-125 Hubble Space Telescope servicing mission. Over Hubble's 18 year history, many extraordinary discoveries have been made by what this amazing instrument has captured. We also are preparing for the upcoming missions to the International Space Station and preparing for launches through the Launch Services Program. Our Constellation Program work is moving ahead, and we are preparing for the Ares I-X test flight next year.

In the short history of NASA, numerous benefits to society have come through the work of America's space program. The scientific discoveries and technological innovations that have been made through America's space program give us reason to proud to be part of this legacy of space exploration.



NASA file/ 2006

Space shuttle Atlantis lifts off Launch Pad 39B on its STS-115 mission on Sept. 9, 2006. The Space Shuttle Program has helped NASA reach many of its milestones throughout the past 50 years.

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# NACA's dreams turned into NASA reality

By *Kate Frakes*  
*Spaceport News*

Since its inception 50 years ago, NASA's scientific and technological excellence has helped power the nation into the 21st century, shaping and improving life. As icons of human achievement, NASA's enduring accomplishments promise another era of discovery and innovation.

Before NASA could stamp its permanent presence in history, the National Advisory Committee for Aeronautics, or NACA, conducted the nation's aeronautical research. In response to the advancing European aeronautical programs in 1915, President Woodrow Wilson created NACA to gain back the U.S. lead. Its first center, known today as NASA's Langley Research Center in Hampton, Va., was the first government facility to coordinate aeronautical research in the civil and military sectors.

NACA's peace-oriented operations and significant contributions to aeronautics, throughout its 43-year history, led Congress to organize a national program in space science formed around NACA.



NASA file/1958

This photo, taken May 26, 1958, shows members of NACA's Special Committee on Space Technology, from right, Wernher von Braun, Abe Silverstein, Dale Corson, Hugh Dryden, H. Guyford Stever, Carl Palmer, J.R. Dempsey, Rober Gilruth, H. Julian Allen, Milton Clauser, Samuel Hoffman, W. Randolph Lovelace, Hendrik Bode, left of Lovelace, Abraham Hyatt, Col. Norman Appold, with arm on table, and Edward Sharp.

On April 2, 1958, the bill for establishing a National Aeronautics and Space Agency was submitted. It reinforced the belief that space should only be used for peaceful purposes and stated that NACA would be absorbed into the new agency with new development and flight operations responsibilities.

On July 29, President Eisenhower signed into law the National Aeronautics and Space Act of 1958,

establishing a broad charter for civilian aeronautical and space research. Two months later, on Oct. 1, the first NASA personnel reported to work.

After receiving control of the Army's Missile Firing Laboratory in 1960, NASA changed the name to the Launch Operations Directorate and formed NASA's Marshall Space Flight Center in Huntsville, Ala.

When the space competition rose with the Soviet Union, Presi-

dent John F. Kennedy proposed a lunar landing initiative to Congress that required a new launch facility capable of launching larger spacecraft.

In 1962, NASA broke away from the Launch Operations Directorate in Huntsville and designated Merritt Island Launch Area an independent field installation in Cape Canaveral, Fla., which became Kennedy Space Center in 1963.

## Debus a forefather of NASA, Kennedy Space Center

By *Kate Frakes*  
*Spaceport News*

“To go to the moon is symbolic of man's leaving Earth, the opening of a vast new frontier.”

Twenty-five years after his death, the words of Dr. Kurt H. Debus continue to challenge future generations to steadily travel down the path of progress he helped map out for space exploration.

Before the creation of the National Aeronautics and Space Act in 1958, Debus and his colleagues already had taken the first technical steps toward traveling to the moon. Their scientific contributions to



NASA file

Dr. Kurt H. Debus was director of Kennedy Space Center from July 1962 until November 1974.

NASA helped turn President John F. Kennedy's vision of landing man on the moon a reality.

Throughout his time with the United States ballistic missile systems de-

velopment program, Debus helped lay the groundwork for human spaceflight. He overcame problematic re-entry heating challenges for long-range missiles and successfully launched the first orbiting object, the Explorer I Earth satellite.

With new aspirations, NASA turned to Debus and his team for help in the race to space.

In 1959, Debus began converting old launch complexes into Launch Complex 56 to support the Mercury-Redstone program for the first suborbital missions. He contributed largely to the development of the complex's new abort scenarios and techniques for detecting

and initiating emergency scenarios.

Debus' insistence on demonstrated reliability during the 1961 Mercury-Redstone precursor flights helped NASA attain the confidence to launch a manned spacecraft. He believed “at least one unmanned shot must be obtained with flawless performance” before the flight of one of the Mercury Seven astronauts.

NASA Headquarters officials and the Space Task Group added an extra MR-Booster Development flight that flew with complete success on March 24, 1961. Less than two months later, NASA successfully launched Alan Shepherd

into space - a first for American history books, and the beginning of President Kennedy's manned lunar landing challenge.

After 14 years as Kennedy's center director, Debus retired in 1974 and completed his historical tenure with words of inspiration for the next generation of innovators:

“This is not an ending, but a point of departure. I don't fear overpopulation or that the Earth will poison itself with pollution. The Earth will find ways to become that beautiful island that our astronauts saw when they viewed it from the moon ... and I can say, ‘I told you so.’”



NASA file

Mercury 7 astronauts, from left, are Scott Carpenter, L. Gordon Cooper Jr., John H. Glenn Jr., Virgil I. Grissom, Walter M. Schirra Jr., Alan B. Shepard Jr., and Donald K. Slayton.

## Mercury 7 proved they had the right stuff

By Cheryl Mansfield  
Spaceport News

In October 1958, just six days after NASA formally organized, America's first human space-flight program was born. Project Mercury's manned flights spanned just two years – from May 1961 to May 1963 – making history with its six missions launched from Cape Canaveral.

The American public first met the seven men chosen to be this country's first human space voyagers on April 9, 1959, at a press conference in Washington, D.C.

The men were dubbed "astronauts." The term was a cross between "aeronauts," as ballooning pioneers were called, and "Argonauts," the legendary Greeks in search of the Golden Fleece. These new explorers prepared to sail into

the new, uncharted vastness of space.

The Mercury 7 were: Walter M. Schirra Jr., Donald K. "Deke" Slayton, John H. Glenn Jr., Scott Carpenter, Alan B. Shepard Jr., Virgil I. "Gus" Grissom and L. Gordon Cooper.

These seven adventurers - and a quiet cape that juts out from Florida's east coast - were destined to become the focus of the new Space Age in which the designation of "first" was to become the norm.

The first U.S. spaceship was a cone-shaped, one-man capsule. The blunt end was covered with a heat shield to protect it against the 3,000 degree heat of re-entry into the atmosphere. Slowed by parachutes, the capsules were designed to splash down in the ocean allowing recovery of the astronaut and vehicle by ship. Each astronaut named his capsule

and added the numeral "7" to symbolize the team of seven astronauts.

The program used two launch vehicles: a Redstone for sub-orbital flights and an Atlas for orbital flights. Unmanned tests of the booster and capsule preceded the first human flight.

Alan Shepard was chosen for the first manned Mercury launch, becoming the first American to fly in space on May 5, 1961. His Freedom 7 capsule launched from Complex 5 at Cape Canaveral aboard a Redstone rocket. The capsule reached an altitude of 116 miles during his suborbital flight and splashed down 304 miles out into the Atlantic.

The flight lasted a little more than 15 minutes.

Another major first was achieved during the third Mercury mission on February 20, 1962, when John Glenn became the first

American to orbit Earth.

His Friendship 7 capsule launched aboard a Mercury-Atlas rocket, and during his almost five-hour flight he circled Earth three times before splashing down in the Atlantic 800 miles southeast of Bermuda.

Among the original Mercury 7 astronauts, only Slayton didn't make a Mercury flight, but he did go on to fly in space as part of the Apollo-Soyuz Test Project crew.

Many of the physical reminders of the Project Mercury days have disappeared, and mission control was moved to Houston early in the Gemini program. But it was the pioneering legacy of Project Mercury and all those who worked on it that propelled America's space program forward to the astounding feat of reaching the moon by the summer of 1969.

## Experiences from Gemini paved path for moon visits

By Anna Heiney  
Spaceport News

On May 5, 1961, Alan Shepard's Mercury flight was inked in history books. Twenty days later, President John F. Kennedy committed the United States to landing a man on the moon before the close of the decade - Project Gemini was the training ground for the moon missions of Apollo.

Although the Gemini program was based at NASA's Manned Spacecraft Center in Houston, now the Johnson Space Center, each of the Gemini-Titan vehicles launched from Launch



NASA file

This view of the orbiting Gemini 7 was taken from Gemini 6 during their rendezvous mission in space.

Complex 19 at the Launch Operations Center in Cape Canaveral, Fla.

Astronauts Gus Grissom and John Young lifted off March 23, 1965 on Gemini

3, the first human flight of the project. The nearly five-hour mission demonstrated the new capsule's maneuverability in orbit. On Gemini 4, astronaut Edward White became the first American to venture out of the safe confines of a capsule and into the vacuum of space.

The following missions continued the streak of firsts.

Gemini 5 marked the first time fuel cells were used to provide electrical power to a spacecraft, allowing an eight-day mission. Gemini 6 crew members Wally Schirra and Tom Stafford met up with Gemini 7 astronauts Frank Borman

and Jim Lovell, and the two crews carried out the first space rendezvous.

The first docking with another spacecraft - an Agena rocket stage - took place during Gemini 8. When a stuck capsule thruster caused the docked vehicles to begin spinning wildly, astronaut Neil Armstrong undocked and regained control.

Gemini 9 rendezvoused with an unmanned Augmented Target Docking Adapter, but docking was impossible due to the failed jettison of the adapter's docking shroud. The three-day mission featured a challenging two-hour spacewalk by as-

tronaut Gene Cernan. NASA continued to accumulate extensive experience in rendezvous, docking, spacewalk and orbital maneuvering during the next two flights, Gemini 10 and Gemini 11.

Gemini 12 brought the program to a close. During the nearly four-day mission, astronaut Buzz Aldrin set a spacewalk record, spending more than five hours outside the capsule while it was docked to an Agena booster.

The Gemini missions gave the agency crucial experience in real-time troubleshooting and advanced space operations - knowledge that paved the way to the moon.

# Moon likely a hub for Mars, beyond

By Rebecca Sprague  
Spaceport News

**W**e've done it before, and we're on the brink of doing it again.

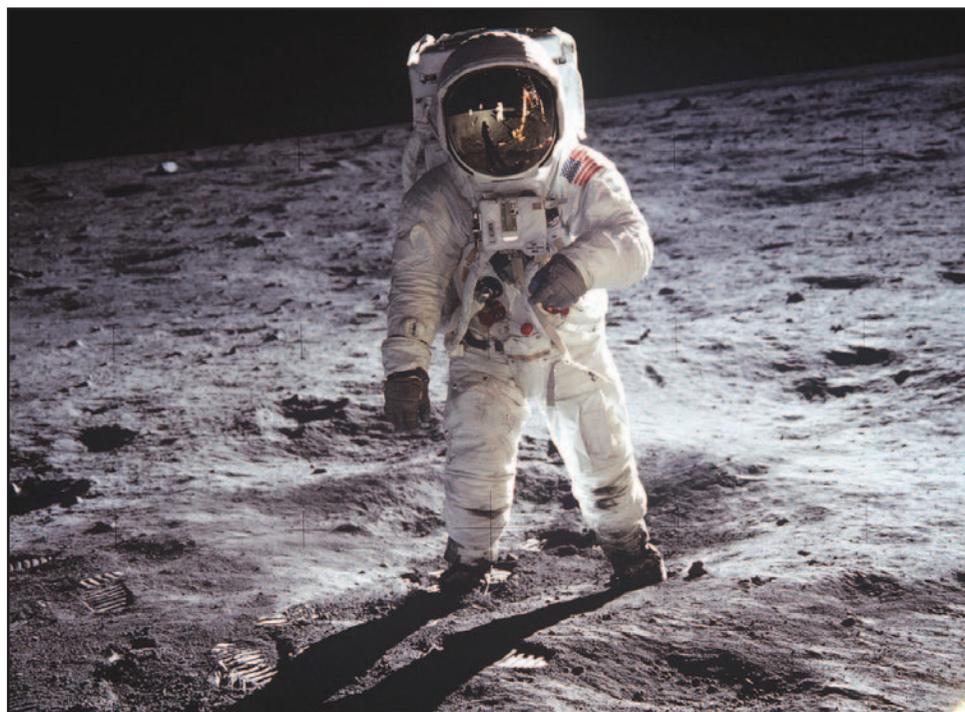
In 1961, President John F. Kennedy said, "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to Earth."

Just five months shy of the end of the 1960s, NASA rose to President Kennedy's challenge.

On July 16, 1969, a Saturn V blasted Apollo 11 through the blue sky above Kennedy Space Center. The crew traveled through space, looking back at Earth and arrived in lunar orbit on July 19.

Angelo Taiani worked for Kennedy's ground support operations during the Apollo era and recalls the long hours he put in to support the Apollo 11 mission.

"I worked 24 hours straight the day before liftoff," Taiani said. "I had nothing to do once they got into transorbit, but I stayed up for another 17 hours waiting for the lunar



NASA file/1969

Astronaut Buzz Aldrin, lunar module pilot, walks on the surface of the moon near the leg of the Lunar Module "Eagle" during the Apollo 11 mission. Astronaut Neil Armstrong, commander, took this photograph. While astronauts Armstrong and Aldrin explored the Sea of Tranquility region of the moon, astronaut Michael Collins, command module pilot, remained with the Command and Service Module "Columbia" in lunar orbit.

landing to happen. I knew how much fuel they had, so I thought at any moment they were going to abort the mission. But there was a big sigh of relief for me, as well as mission control when we heard the words 'touch-down.'"

The world watched as Neil Armstrong slowly climbed out of the lunar

module, named "Eagle," stepped out onto the moon and said, "That's one small step for a man, one giant leap for mankind."

While Command Module Pilot Michael Collins remained in lunar orbit, Armstrong and Buzz Aldrin spent 21 hours on the moon, posting the U.S. flag, taking notes and photographs,

and drilling and gathering 46 pounds of moon rocks, which they brought back to Earth.

"I was so darn tired, but I stayed up anyway watching Armstrong and Aldrin take their first steps on the moon," Taiani said. "Then, I finally fell asleep."

Taiani is now retired, but continues to volunteer at Kennedy. He, along with thousands of other NASA alumni, anxiously wait for the day we make history again.

"It's got to be different if we're going to go to Mars. I was involved with plenty of studies that showed it would take six months to get to Mars and another six months to get back, but the moon is a great taxi hub for the mission," Taiani said.

Today, John F. Kennedy's words continue to inspire NASA employees: "We choose to go to the moon. We choose to go to the moon in this decade and

## Milestones set tempo for future NASA spaceflight

During the Apollo Program, which spanned from 1961 to 1975, NASA launched numerous test missions, as well as 11 crewed missions.

The milestones reached by NASA during the program include two Earth orbiting missions, two lunar orbiting missions, a lunar swing-by and six moon landing missions.

do other things, not because they are easy, but because they are hard."

In the next decade, NASA will go to the moon again, as well as travel to Mars and beyond with the Ares and Orion spacecraft. And it's expected to be anything but easy.



NASA file/1969

The 363-foot-tall Apollo 11 space vehicle took off from Launch Pad 39A, at 9:37 a.m., July 16, 1969.



NASA image

Concept image of NASA's next-generation spacecraft and launch vehicle system, Ares I crew launch vehicle, as it roars over Cape Canaveral. The Ares I-X test flight is scheduled to launch in 2009.

# Space shuttle shines as an American icon

By Steven Sicheloff  
Spaceport News

John Young and Robert Crippen rode the first space shuttle, Columbia, into orbit on April 12, 1981, a few months before IBM introduced its first home computer.

It was the same year that MTV debuted, and the year the first Indiana Jones movie, "Raiders of the Lost Ark," premiered. Columbia flew months before Sandra Day O'Connor was nominated by President Ronald Reagan to become the first woman on the U.S. Supreme Court.

Since that first launch, the shuttle fleet has become a picture of versatility and stunning longevity colored in by dazzling success during 27 years of service to America's space agency.

From performing experiments in state-of-the-art laboratories inside a shuttle cargo bay, to erecting a new constellation of communications satellites and building the largest space station, the space shuttle quickly became the starting point for almost everything NASA wanted to do.

The spacecraft carried the renowned names of previous exploration ships: Columbia, Challenger, Discovery, Atlantis and Endeavour.

The shuttle is significantly larger than the capsule-sized spacecraft NASA cut its teeth on. One shuttle flight routinely carries seven astronauts into orbit at once, the size of NASA's whole class of original Mercury astronauts. Challenger set the single-flight record in 1985 when it carried eight astronauts into space for a Spacelab mission.

The spacecraft are instantly distinguished from every other crewed spacecraft because of their wings.



NASA file photos

Above, space shuttle Discovery rolls out to Launch Pad 39B on May 19, 2006 for its STS-121 mission. Top right, Atlantis returns from its STS-84 mission, to Kennedy Space Center with its drag chute deployed on May 24, 1987. Right, Columbia soared into space on the STS-1 mission at 7 a.m. April 12, 1981.

Until the space shuttle, astronauts – and Russian cosmonauts – only returned to Earth under billowing parachutes. Shuttles introduced precise landings on a runway, just like an airplane.

With a payload bay 60 feet long, a shuttle can carry an Apollo, Gemini and Mercury capsule with plenty of room to spare.

Screaming off the launch pad and reaching Mach 25 in eight minutes, the shuttle acts like a precision sports car. In orbit, the shuttle takes on a delivery truck's role by deploying communications satellites and planetary probes.

As the American pop culture and political scenes changed around them, the space shuttles went about their designed work. Columbia lofted its first communications satellites into orbit in November 1982.

Discovery launched three on one flight in 1984, and the crew still had enough equipment on board

to practice space station construction techniques in the cargo bay.

In November 1983, Columbia became a space laboratory for astronauts who were chosen for their research capacity and history rather than their pilot skills.

Challenger proved in April 1984 that space shuttles made terrific service stations for orbiting satellites. A crew of five astronauts used the shuttle and a jetpack to capture the malfunctioning Solar Maximum research satellite. Spacewalkers replaced faulty components and then returned the satellite to its sun studying mission.

That experience and expertise was called on numerous times during the space shuttle's history, including spectacular work performed on NASA's crown jewel, the Hubble Space Telescope.

Discovery launched the observatory in April 1990. The Hubble Space Tele-

scope, perched high above the distorting effects of Earth's atmosphere, would go on to rewrite nearly everything astronomers thought about the universe. Hubble has required helping hands from several shuttle crews along the way. The upcoming mission by Atlantis, STS-125, is to be the last to the orbiting observatory.

Shuttles placed the Chandra X-ray Observatory and Compton Gamma Ray Observatory into orbit where they pioneered studies on the dynamics and history of the universe.

The Magellan probe to Venus and Galileo probe to Jupiter both began their successful missions inside a shuttle cargo bay.

In 1998, the shuttles became the premier work site above the world as they took part in the groundbreaking construction of the International Space Station. Unlike any other spacecraft, the shuttle even brings its own

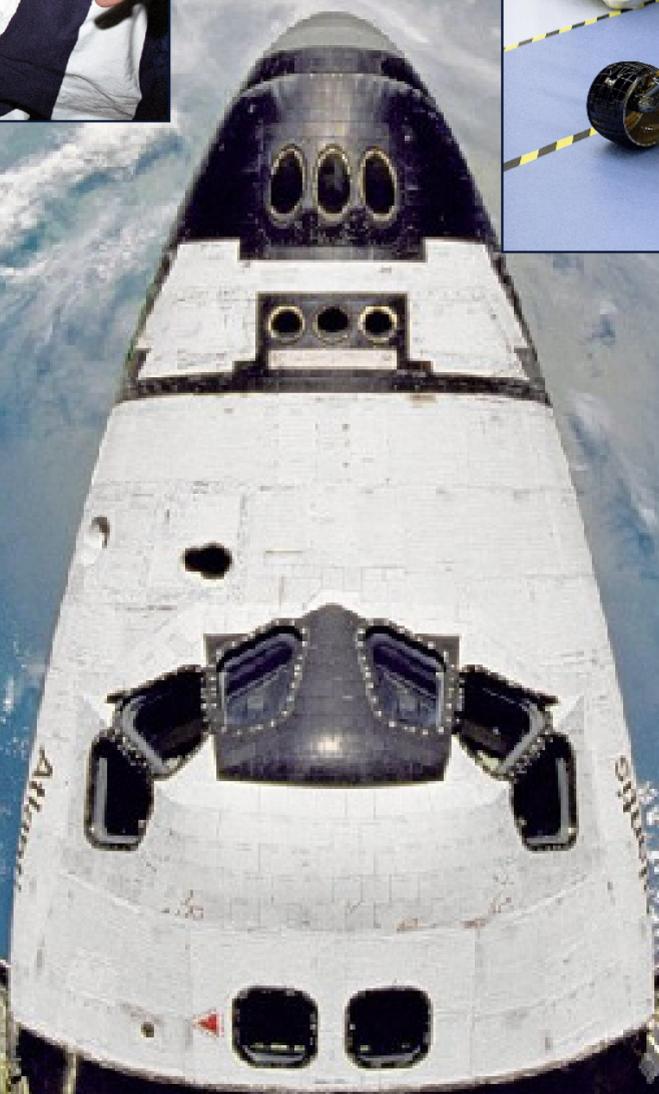
cherry picker in the form of the robotic arm that NASA calls the remote manipulator system.

The success NASA enjoyed with its shuttles carried a price, though. The Challenger and Columbia accidents in 1986 and 2003, respectively, cost 14 astronauts their lives and sent the agency into a careful examination of itself. Each time, the shuttle fleet returned to space and to its exploration work.

NASA's currency throughout its 50 years has been progress, and in the 1970s, when the space shuttles were developed and built, progress meant reusable spacecraft designed for a multitude of orbital duties.

Twenty-seven years ago Columbia ignited its engines for the first space shuttle mission; since then NASA has spent more than half its lifetime flying shuttles and routinely marking progress along the way.

# A half-century of accomplishments



1. Shuttle astronaut Winston Scott conducts the second spacewalk during the STS-87 mission on Dec. 12, 1997. 2. Astronauts, from left, Janet L. Kavandi, Dominic L. Gorie and Mamoru Mohri float on Endeavour's middeck during the STS-99 mission in February 2000. 3. Kennedy Space Center technicians check out the Mars Exploration Rover Spirit in 2003. 4. Space shuttle Atlantis lifts off from Launch Pad 39B at Kennedy Space Center on Oct. 23, 1989. 5. Missile Row at Cape Canaveral Air Force Station in 1964. 6. Attached to the robotic arm, the Hubble Space Telescope is lifted up into the sunlight during the space shuttle's second servicing mission in February 1997. 7. Against the blackness of space, shuttle astronaut Peter J.K. Wisoff, wearing an extravehicular mobility unit, stands on the robot arm during STS-61 mission in December 1993. 8. Apollo 11, humanity's first lunar landing mission, lifted off at 9:32 a.m. from Kennedy Space Center's Launch Pad 39A.

9. Kennedy Space Center's Industrial Area in 1963. 10. Kennedy Space Center's Industrial Area in 1975. 11. Kennedy Space Center's Industrial Area in 1986. 12. The Vehicle Assembly Building site as seen from across the Launch Complex 39 Turning Basin in January 1963. 13. The Vehicle Assembly Building under construction with the Launch Control Center and service towers as seen from across the Launch Complex 39 Turning Basin in January 1965. 14. The Vehicle Assembly Building with the Launch Control Center and service towers as seen from across the Launch Complex 39 Turning Basin in January 1965. **Background.** Space shuttle Atlantis as seen from the Russian Mir space station during the STS-71 mission in June 1995.

# ELV launches remain Kennedy's backbone

By Linda Herridge  
Spaceport News

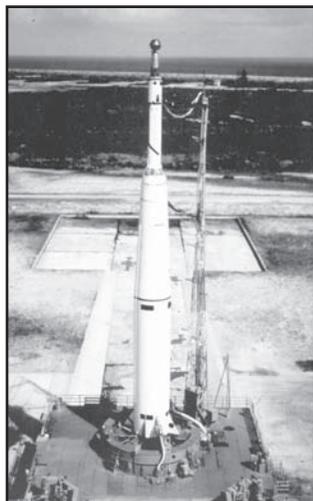
For the past 50 years, NASA has relied on the Space Coast and a fleet of expendable launch vehicles to carry the agency's multitude of scientific, Earth-observing and interplanetary missions into space.

In the late 1950s, shortly after NASA was established, the original Vanguard Naval Research Laboratory team became the Launch Operations Branch of NASA's Goddard Space Flight Center in Greenbelt, Md.

In 1965, the team merged with Kennedy Space Center.

From the earliest Vanguard launch in the 1950's to the powerful Atlas V launch in 2006 carrying New Horizons to explore Pluto, NASA's requirements for expendable launch vehicles continues to evolve.

Explorer spacecraft launched primarily aboard Delta vehicles from Launch Complex 17 at Cape Canaveral Air Force Station. The Atlas-Centaur was the launch vehicle for Surveyor I, the first U.S. spacecraft to soft land on the moon. It, along with several other Surveyors, launched from Complex 36. Two Viking



NASA file/1960

An Echo I satellite launched atop a Thor-Delta from Launch Complex 17A on Aug. 12, 1960.

missions to Mars and two Voyager missions to outer planets launched aboard Titan III-Centaur launch vehicles from Launch Complex 41.

Complex 41 later became the launch site for the most powerful uncrewed U.S. rocket at the time, the Titan IV, developed by Martin Marietta for the U.S. Air Force. A Titan IV launched the Cassini spacecraft to Saturn in 1997.

In the 1970s, the Titan-Centaur became the most powerful vehicle available in the United States' unmanned space program. The vehicle was a combination of the Air Force's Titan IIIC and the more powerful Centaur upper stage of the Atlas-Centaur. NASA used this vehicle to launch missions to study Mars, Jupiter, Saturn and the sun.

NASA used the Titan II to launch several National Oceanic and Atmospheric Administration, or NOAA, weather satellites. A Titan III sent NASA's Mars Observer on its journey in 1992.

The Atlas-Agena and Thor-Agena launched a series of Orbiting Geophysical Observatories in the 1960s, and the Atlas-Centaur launched a series of Orbiting



NASA file/1971

An Atlas-Centaur rocket carrying the Mariner I took off from Launch Pad 36B on May 30, 1971.

Astronomical Observatories in the 1960s and 70s. The powerful Atlas-Centaur sent High Energy Astronomy Observatories into space in the late 1970s.

The Atlas-Agena, a much more powerful vehicle than the Thor-Agena, could place spacecraft in lunar or interplanetary trajectories. The Atlas-Agena sent four Rangers to the moon, five Lunar Orbiters, and the first Mariner spacecraft to Venus and Mars.

The Delta launch vehicle, produced by Boeing, is referred to as the workhorse of NASA's expendable launch vehicle family. It has carried more



NASA file/1977

Voyager 1 sat atop a Titan Centaur as it soared from Launch Complex 41 on Sept. 5, 1977.

than 200 NASA scientific, wind and communications payloads into orbit and on to other planets. Delta vehicles launched a series of Orbiting Solar Observatories in the 1960s and 70s from Launch Complex 17.

By the 1990s, NASA's Expendable Launch Vehicle Program was established to oversee the expendable launch vehicle fleet. In 1997, Kennedy Space Center became the program's lead center for NASA's acquisition and program management of expendable launch vehicle missions. The program later realigned and was renamed the Launch Services Program.

NASA's first successful return to Mars after the Viking mission was the launch of the Mars Global Surveyor atop a Delta II in November 1996. The Mars Exploration Rovers, Spirit and Opportunity, launched aboard Delta II rockets in 2003. In 2005, a Delta II carried NASA's Deep Impact mission bound for the comet Tempel 1.

Today, the majority of NASA missions are launched aboard Delta II, Atlas V or Pegasus XL expendable launch vehicles. The Delta IV and Atlas V are evolved expendable launch

vehicles. The Pegasus XL, produced by Orbital Sciences, is the only expendable launch vehicle carried aloft, attached beneath an Orbital Sciences carrier aircraft, and then released for launch.

Fifty years of rocket launches produced data about the universe that researchers only dreamed of, and future missions will do the same.

The first map of the boundary between the solar system and interstellar space will be created by NASA's Interstellar Boundary Explorer, or IBEX, spacecraft, aboard a Pegasus XL. The launch is scheduled for later this year from the Reagan Test Site on Kwajalein Atoll in the Republic of the Marshall Islands.

NASA's Lunar Reconnaissance Orbiter, or LRO, is targeted for launch in 2009, aboard an Atlas V from Launch Complex 41. LRO will identify safe landing zones that are free of large boulders and craters for future lunar missions.

Kennedy's Launch Services Program is the backbone of the space program in Florida and will continue its essential role in the oversight of rocket launches throughout NASA's next 50 years.



NASA file/1975

A Titan III-Centaur 4 rocket carrying Viking I took off from Launch Complex 36B on Aug. 20, 1975.



NASA file/1996

A Delta II carrying the Mars Global Surveyor took off from Launch Complex 17A on Nov. 7, 1996.



NASA file/1996

An Atlas V carrying the New Horizons Deep Space Probe shot from Launch Complex 41 on Jan. 19, 2006.

# Bumper Project led to birth of a moonport

By Kay Grinter  
Reference Librarian

Brevard County's introduction to the Space Age came in October 1949, when President Harry S. Truman established the Joint Long Range Proving Grounds from Cape Canaveral to Ascension Island in the South Atlantic.

Kennedy Space Center's origins reach back to the Army Ballistic Missile Agency's Missile Firing Laboratory in Alabama, headed by Dr. Kurt Debus, a key member of Wernher von Braun's renowned rocket team.

The first launch by the team from Cape Canaveral was of a modified German V-2 on July 24, 1950. The rocket reached an altitude of 10 miles.



NASA file/1950

The Bumper V-2 was the first missile launched from Cape Canaveral on July 24, 1950.

After NASA was established, the launch team became the Launch Operations Directorate of the Marshall Space Flight Center.

Planning got under way for what was called the Merritt Island Launch Area, or MILA. At that time, what

became Launch Complex 39 and Industrial Area were undeveloped and overgrown with reeds and palmettos.

In May of 1961, when President John F. Kennedy challenged America to land men on the moon, the launch facilities and flight hard-

ware needed, existed only in the imaginations of their creators.

In September, NASA asked Congress to authorize the acquisition of a tract of land on Merritt Island to build a moonport.

While space center planners drew up the requirements, the U.S. Army Corps of Engineers created a new management office - the Canaveral District - to supervise construction contracts for NASA.

Clearing of the land and dredging for a barge canal and turn basin began in 1962. The independent Launch Operations Center, or LOC, was established on July 1, with Debus as its first director.

The LOC's name was changed to the John F. Ken-

nedy Space Center by an Executive Order signed by President Lyndon B. Johnson on November 29, 1963, five days after the death of President Kennedy.

The launch pads at Complex 39, designed to support the Saturn V rockets, saw the Apollo Program through to its end in 1972. The Skylab and Apollo Soyuz Test Project missions also lifted off from these pads.

After modifications, these stalwart facilities launched 124 space shuttle missions and will be transformed, once more, to support the Ares rockets for the Constellation Program, re-establishing Kennedy Space Center as the preeminent moonport.

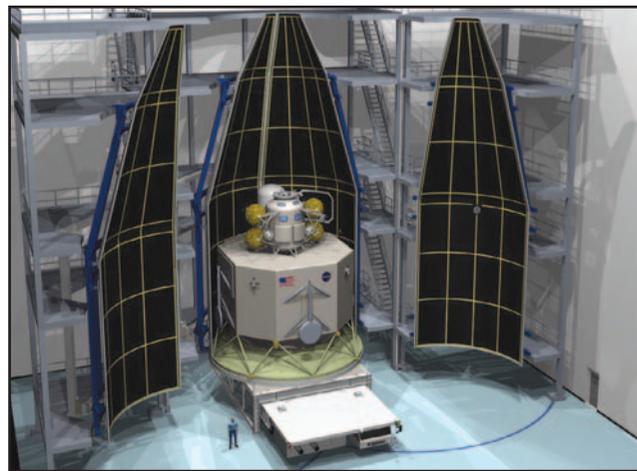
# Emergence of a Marsport the next logical step

By Kay Grinter  
Reference Librarian

Excitement is in the air at Kennedy Space Center as planning gets under way to support NASA's new Constellation Program, the space transportation system for the next generation of explorers. Kennedy will take the lead in ground operations, as well as launch and recovery operations for the initiative.

Kennedy's focus for its next 50 years is to establish "a program to develop a sustained human presence on the moon, including a robust precursor program to promote exploration, science, commerce and U.S. preeminence in space, and as a stepping stone to future exploration of Mars and other destinations," as described in the NASA Authorization Act of 2005.

Elements of the project



NASA image

Concept image of the Altair lunar lander undergoing ground processing.

will undergo processing at Kennedy, including the Ares I crew launch vehicle, the Ares V heavy-lift launch vehicle, the Orion crew exploration vehicle and the Altair lunar lander. Apollo and shuttle heritage facilities and hardware will provide the foundation.

NASA's goal is to develop and fly Orion by 2015 and

return to the moon by 2020. A sustained human presence on the moon eventually will lead to a lunar outpost and pave the way for future human and robotic missions to Mars and other destinations.

"I am 100 percent convinced that we will go to Mars some day," said Shawn Quinn, future elements manager for the Constellation

Project Office at Kennedy. "We are already developing detailed flight and ground operations concepts to support the lunar phase of the Constellation Program. While the initial focus for this effort is focused on lunar missions, applicability to future Mars missions is considered in the evaluation of different architectures. Eventually, what we are doing to return humans to the moon will be used for the first human missions to Mars."

The Space Station Processing Facility will be called into service for off-line processing of Altair.

The Vehicle Assembly Building high bays will support mating of Orion to the Ares I rocket, as well as integration of Altair onto the Ares V.

New mobile launchers will be built for the Ares I, but the existing shuttle launch platforms - the same

ones used during the Apollo Program - may be modified to support the Ares V.

Changes to Launch Pad 39B have already begun to support the test of the Ares I-X in 2009.

Pad 39A will go through a metamorphosis of its own to support Ares V launch operations after the last shuttle liftoff. Modifications to Pad A will include demolition of the existing shuttle fixed and rotating service structures, as well as adding additional cryogenic storage capacity required by the Ares V. A new flame deflector also is planned to be built.

As the first steps are taken to transform Kennedy into a true Marsport to support NASA's next 50 years, Griffin expressed the dreams of employees across the agency, "I believe that we will, one day, find a civilization on Mars. Ours."

# Great Observatories view light as time

By *Steven Sicheloff*  
Spaceport News

**W**ant to know what you're made of? Look into space. Focus on that nebula where an opaque disk of cosmic dust points to a brilliant light. That light is a young star, and its birth has filled space with atoms that make up the fundamental elements of planets, stars, galaxies and even people on Earth.

Carbon-based life, which is what all of us are, began as atoms created in the gravity and fire of a star's birth.

"We can look back to see where we came from," said Jonathan McDowell, an astrophysicist at the Harvard-Smithsonian Center for Astrophysics, which operates the Chandra X-ray Observatory. "It's giving us evidence of where we came from. It explains why iron is common and gold is rare. You can trace it directly back."

We didn't know that with certainty until NASA launched four specialized telescopes called the Great Observatories. Three rode into orbit aboard space shuttles from Kennedy Space Center, and one was lofted on the top of a Delta II rocket from Cape Canaveral Air Force Station.

Each was designed to look at a different kind of light, much of which is invisible to the human eye, but critical in explaining why the universe acts as it does and how it got there in the first place.

"There's all this important stuff going on that is completely invisible," McDowell said.

The Hubble Space Telescope was the first, launched in 1990. Hubble sees the universe much as the human eye does, looking at the same light we can see, plus portions of the ultraviolet spectrum. Its images revealed galaxies as they were created some 13 billion years ago, when the



NASA file/2003

This picture, often called the "Eye of God," is a blend of NASA Hubble Space Telescope images and the wide view of the Mosaic camera at Kitt Peak National Observatory near Tucson, Ariz. Astronomers call the trillion-mile-long tunnel of glowing gasses the Helix Nebula.

universe was relatively young.

The Compton Gamma Ray Observatory came next in 1991 to evaluate pulsars, quasars and neutron stars, the sources of the strongest energies found in the universe.

Chandra launched in 1999, to focus on the beams of X-rays produced throughout space. Its observations proved that black holes not only exist, but are plentiful. Many of them are so large they require two adjectives to explain them: super-massive black holes.

The Spitzer Space Telescope, which looks for infrared light, completed the suite of space-borne observatories in 2003. It found that the materials which are basic ingredients for human life are sprinkled throughout areas where planets and comets are thought to be forming.

Although each observatory has made significant findings on its own, the real strength of the program is the ability to use the facilities together to study a single part of the sky in detail and see all that is going on there.

"It's not just that we see a different set of stars, we're seeing fundamentally different faces of the universe," McDowell said.

For example, the Compton could pick up signs of intense energy on its own and make groundbreaking discoveries. But adding a Hubble observation to the mix gave astronomers the chance to turn Hubble's lens on the place the energy came from so astronomers could find out what caused the energy.

"Imagine that you could only see yellow," said Mario Livio of the Space Telescope Science Institute, which runs the Hubble observations. "Then you get to extend (your vision) to the rest of the visible spectrum. You would see a lot more in the world."

Dark energy was discovered in much the same manner, by focusing multiple instruments on the same part of space at about the same time. The discovery has been arguably the most dramatic find of the Great Observatories program. It has answered

some questions while leading to profound new ones.

"Nobody really expected dark energy to be discovered," Livio said. "When I studied astrophysics, nobody studied dark energy because nobody expected it to be there. Now, everybody studies dark energy."

Before the Great Observatories, McDowell said the prevailing theory among astronomers was that nuclear fusion, which makes the sun burn, was the chief powerhouse for the universe. Now, they have found that gravity is every bit as important as fusion.

"In terms of miles per gallon, so to speak, you get much more from gravity than from fusion," McDowell said.

All the discoveries are ones that will be studied by astronomers who have not yet been born.

"If you open any new book on astronomy, it is basically full of Hubble images," Livio said.

The images Hubble creates are not limited to astronomy. They also are used as album covers and hung in art museums.

"Hubble has taken this beauty of the cosmos and brought it in the homes of people," Livio said. "This has been a complete shift in the way non-scientists see the universe."

The observations by the four telescopes are being stored in large digital libraries that researchers are expected to consult for decades to come.

This is due in part to the precise instruments that produce exquisite images which hold more information than even their users can explain. Future astronomers can look again and again at the images and make new discoveries.

"These studies will keep going on long after the observatories have shut down," McDowell said.



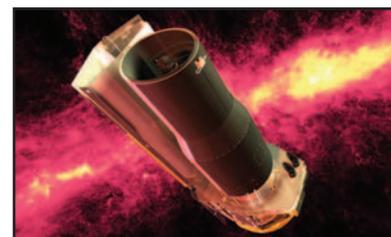
The Hubble Space Telescope launched in 1990 aboard shuttle Discovery on the STS-31 mission.



The Compton Gamma Ray Observatory launched in 1991 aboard shuttle Atlantis on the STS-37 mission.



The Chandra X-ray Observatory launched in 1999 aboard shuttle Columbia on the STS-93 mission.



The Spitzer Space Telescope launched in 2003 aboard a Delta II rocket from CCAFS.

# Kennedy has hosted VIPs since inception

By Elaine M. Marconi  
Spaceport News

**K**ings, queens, presidents, politicians, movie stars, musicians and tens-of-millions of everyday people from all over the world have flocked to NASA's Kennedy Space Center to experience America's space program.

President John F. Kennedy, for whom the center was later named, was the first American president to visit in 1962.

Through the years, royalty including Prince Philip of England, Queen Beatrix of the Netherlands and former Prime Minister of Great Britain Margaret Thatcher, just to name a few, toured the center.

The filming of space-related movies like "Apollo 13," "Contact," "Space Cowboys," "Armageddon" and "The Right Stuff" brought movie stars, directors and producers such as Tom Hanks, Bruce Willis, Ron Howard, Steven Spielberg and George Lucas to the



President John F. Kennedy inspects the interior of the Friendship 7 Mercury capsule with astronaut Col. John Glenn, Jr. while touring Cape Canaveral in February 1962.

center for authentic scene shoots.

Television journalists and film crews from TV series such as "Modern Marvels," "Dirty Jobs," and the History and Discovery Channels are a few that have come to Kennedy to cover space shuttle launches, landings and to film documentaries.

First lady Laura Bush, only the third first lady to attend a launch, watched the liftoff of space shuttle Dis-

covery on its historic Return to Flight mission, STS-114, in July 2005.

In February 2006, pilot Steve Fossett soared into record books when he took off from Kennedy's Shuttle Landing Facility in a Virgin Atlantic's single seat, Global Flyer aircraft. Establishing a new aviation non-stop flying record of more than 25,000 miles, Fossett endured 76 hours and 45 minutes in

the cramped cabin sitting atop hundreds of gallons of fuel.

Although suffering from amyotrophic lateral sclerosis, also known as Lou Gehrig's disease, physicist Dr. Stephen Hawking traveled to Kennedy in April 2007 to realize a long-lived dream - to experience weightlessness.

Hawking boarded a modified Boeing 727, managed by the Zero Gravity



NASA file/2001

Margaret Thatcher, former Prime Minister of Great Britain, visited Kennedy Space Center in 2001.

Corp. at the center's Shuttle Landing Facility. In flight, Hawking was able, with the support of his team, to float around the cabin for a few brief minutes, releasing him from the bonds of gravity.

Kennedy Space Center, through NASA's first 50 years, not only has served as a launch platform to the universe, but has brought the universe closer to Earth for all to appreciate, study and enjoy.



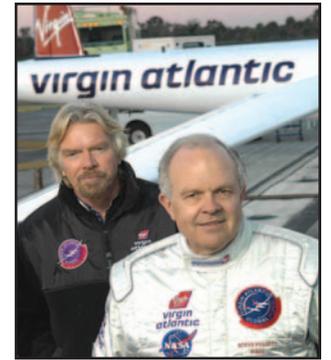
NASA file/2007

Physicist Stephen Hawking enjoys zero gravity during a flight aboard a modified Boeing 727 aircraft April 26, 2007. Hawking suffers from amyotrophic lateral sclerosis, also known as Lou Gehrig's disease.



NASA file/2005

Laura Bush, the third first lady to visit Kennedy Space Center, and former Florida Governor Jeb Bush watched as shuttle Discovery launched in the Space Shuttle Program's Return to Flight on July 26, 2005.



NASA file/2006

In 2006, Steve Fossett, right, flew a record 25,766 miles after taking off from Kennedy Space Center.



NASA file/1997

The cast of "Armageddon," from left, Ben Affleck, Liv Tyler, Ken Hudson Campbell, Billy Bob Thornton, Bruce Willis and Steve Buscemi, filmed at Kennedy Space Center in late 1997.



NASA file/1994

Director Ron Howard, wearing headphones, and actor Tom Hanks filmed scenes at Kennedy Space Center for the movie "Apollo 13" in 1994.

# Diverse work force brings success to KSC

By Anita Barrett  
Spaceport News

The House Committee on Science and Technology in Washington, D.C., held a hearing July 30 to celebrate NASA's 50th Anniversary by reviewing its accomplishments and examining its future opportunities and challenges.

Space and Aeronautics Subcommittee Chairman Mark Udall said, "I think we owe a debt of appreciation to all the men and women of NASA, its contractors, and the universities and research institutions that have made it all possible."

Achievements at Kennedy Space Center happen because of a superior work force characterized by its diversity.

The diversity of Kennedy's work force includes job titles, culture, ethnicity, gender and disabilities.

As Kennedy's Space Shuttle Program and Launch Services Program matured, its work force expanded. In 1968, Kennedy had more than 25,000 employees, 2,921 of which were NASA civil servants. Kennedy's work force now numbers around 14,950. That includes 2,197 civil servants and students, and 10,937 contractor employees.

Ten years ago, there were 1,985 civil servants at Kennedy: 61 percent in scientific and engineering positions, 21 percent in professional administration, nearly 10 percent in technical support and eight percent in clerical.

Of the 2,197 civil servants in 2007, 62 percent were scientific and engineering, 27 percent administration, 7 percent technical and 4 percent clerical.

In 1983, minorities made up less than 10 percent of the civil servant work force. That increased to more than 17 percent between 1995 and 1996. In 2007, minorities made up 23 percent of NASA's civil servants.

Reinforcing Kennedy's diversity goals are more than eight affinity groups and professional organizations that seek to improve working conditions and opportunities at the center. They provide networking and mentoring opportunities for career development and also seek to diminish any barriers that might prohibit that development.



NASA file

Former Center Director Roy Bridges stops 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's 1999 Technology Fair at Kennedy Space Center.



NASA file

At Kennedy Space Center's annual Black Employee Strategy Team's African-American History Month luncheon, Erin Parrish, left, displays a plaque she received from Elaine Johnson that names her the recipient of the Evelyn Johnson Scholarship in 2006.

The Black Employee Strategy Team, or BEST, is an organization of the center's African-American employees.

Wanda Harding, mission manager of the Flight Projects Office of the Launch Services Program, said, "BEST represents a voice of conscience that the opportunities for African-Americans to serve across all levels of responsibility and leadership at KSC remain uncompromised. BEST is therefore not only interested in keeping the pipeline populated, but in the growth and development of those employees to remain competitive and ready to serve at the highest levels." Harding is a member of the BEST Steering Committee.

In 1989, the National Society of Women Engineers or SWE, chartered the Space Coast Section in Florida for women engineers in the Brevard, Indian River and Volusia Counties. Kennedy provided 25 of the charter

members for Florida's Space Coast Section.

SWE's mission is to inform the community of opportunities open to women in engineering and encourage women to enter and grow in engineering and the sciences. Of the 143 members in the section, 58 are from Kennedy. Seven of the charter members remain active: Kathleen F. Harer, Judith A. Kersey, Merri Anne Stowe, Charlotte L. Ort, Joan M. Wenaas, Katherine M. Gay and Monique P. Butler.

SWE gives awards to deserving women engineers annually, such as Outstanding Woman Engineer of the Year, the Distinguished New Engineer of the Year and Woman Engineer Technical Achievement. Since 2003, the society has recognized 18 women, eight awards going to Kennedy employees.

Susan Floyd, a senior manager

in Systems Engineering with Florida Space Shuttle Operations, has been a member of SWE for 10 years. Inspired by a joint SWE-University of Central Florida conference in Orlando to bring awareness of career choices in math and science to high school girls, Floyd decided to work in SWE to bring similar exposure to Brevard County and include girls in third through ninth grades.

Floyd says a benefit of SWE involvement is how "management looked at me differently – they considered it important to work in SWE and appreciated how active I was at both the local and national level." She adds, "I enjoy the ability to network with other women in SWE for personal and professional reasons."

The Disability Awareness and Action Working Group, known as DAAWG, is an advocate for hiring individuals with disabilities and disabled veterans. DAAWG enhances awareness of their capabilities and value throughout the center, removing barriers that hinder employees from working at their full potential, and providing a forum for discussion and resolution of issues concerning people with disabilities.

The group hosts a special event annually, frequently including vendors demonstrating mobility, hearing, vision and silent disability assistive technology that assist people with various disabilities in the workplace.



John F. Kennedy Space Center

## Spaceport News

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