March 2015 Vol. 2 No. 3

National Aeronautics and
Space Administration

KENNEDY SPACE CENTER'S

SPACEPORT magazine

ONE-YEAR MISSION

Images of the Month

MMS OBSERVATORIES PROCESSED FOR LAUNCH

NASA's Magnetospheric Multiscale, or MMS, observatories are processed for launch in a clean room at the Astrotech Space Operations facility in Titusville, Florida. MMS is an unprecedented NASA mission to study the mystery of how magnetic fields around Earth connect and disconnect, explosively releasing energy via a process known as magnetic reconnection. MMS consists of four identical spacecraft that work together to provide the first three-dimensional view of this fundamental process, which occurs throughout the universe.

The mission observes reconnection directly in Earth's protective magnetic space environment, the magnetosphere.

Launch of the four identical observatories aboard a United Launch Alliance Atlas V rocket from Space Launch Complex 41 on Cape Canaveral Air Force Station is managed by Kennedy Space Center's Launch Services Program. Liftoff is targeted for 10:44 p.m. EDT on March 12.

Photo credit: NASA/Ben Smegelsky

KENNEDY SPACE CENTER'S
SPACEPORT MAGAZINE

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Front: After departing the International Space Station, the STS-130 crew onboard Space Shuttle Endeavour captured this view of the space station high above Earth. For more about the station, go to **http://go.nasa.gov/18G7GN3**. Photo credit: NASA

Back: Expedition 43 crew members take a break from training at NASA's Johnson Space Center to take part in this fun "movie" poster. Pictured from the left are NASA astronaut Scott Kelly, European Space Agency astronaut Samantha Cristoforetti, Russian cosmonaut Mikhail Kornienko, NASA astronaut Terry Virts, Russian cosmonaut Gennady Padalka and Russian cosmonaut Anton Shkaplerov. Expedition 43 to the ISS is to launch aboard Soyuz TMA-16M on March 27. That will begin the one-year mission of Kelly and Komiyenko.

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NASA'S LAUNCH SCHEDULE

Targeted Date: March 12 -- 10:44 p.m. EDT
Mission: Magnetospheric Multiscale (MMS)
Description: Launching from Cape Canaveral Air Force Station, Florida, on an Atlas V 421 launch vehicle, the Magnetospheric Multiscale, or MMS, mission will study the mystery of how magnetic fields around Earth connect and disconnect, explosively releasing energy via a process known a magnetic reconnection.

Date: March 27 -- 3:42 p.m. EDT
Mission: One Year Crew Launch to International Space Station Aboard Soyuz
Description: Scott Kelly, Mikhail Kornienko and Gennady Padalka launch to the space station aboard a Soyuz TMA-16M spacecraft from the Baikonur Cosmodrome, Kazakhstan. Kelly and Kornienko will spend a year on the station, returning in March 2016.

Date: April 28 -- Time TBD
Mission: Progress 59P Cargo Craft
Description: The Progress resupply vehicle is an automated, unpiloted version of the Soyuz spacecraft that is used to bring supplies and fuel to the space station.

Date: May 26 -- Time TBD
Mission: Expedition 44 Launch to the International Space Station
Description: Kjell Lindgren of NASA, Kimiya Yui of JAXA and Oleg Kononenko of Roscosmos launch aboard a Soyuz spacecraft from the Baikonur Cosmodrome, Kazakhstan, to the space station.

I am KENNEDY SPACE CENTER

Brandon Marsell

www.nasa.gov

National Aeronautics and Space Adminstration

I am an aerospace engineer and a part of the fluids group in the Mission Analysis division of NASA's Launch Services program, or LSP.

As part of the fluids group, I work on completing any fluid dynamics-related analyses needed to ensure the success of NASA's science missions. These analyses include calculating venting profiles, evaluating environmental control system impacts on spacecraft, developing aerodynamic coefficients using computational fluid dynamics and simulating the motion of propellants within the tanks of launch vehicles, to name a few. It is extremely exciting to watch one of our launches and know that I was a part of something as amazing as a rocket launch.

Besides my standard mission duties, I also am involved with several other projects. Most notably, I was a co-principal investigator for the Slosh experiment on the International Space Station (ISS). It was an incredible experience to lead a team of people in designing, fabricating, launching and operating a world-class fluid dynamics experiment aboard the station.

After graduating from Stetson University with a bachelor's degree in physics and a master's degree in aerospace engineering from Embry-Riddle Aeronautical University, I started working at the Kennedy Space Center. I have worked here for five years.

All of these experiences are thanks to the incredible opportunities available here at Kennedy.

ONE-YEAR CREW

Twin NASA astronauts to reveal effect of 365 days in space

BY STEVEN SICELOFF

NASA Expedition 45/46 Commander, Astronaut Scott Kelly, right, along with his brother, former Astronaut Mark Kelly at the Johnson Space Center in Houston Texas, address Scott's upcoming one-year mission aboard the International Space Station. Photographer: Robert Markowitz

NASA astronaut Scott Kelly and Russian cosmonaut Mikhail Kornienko are heading off the Earth with the goal of making life better for its residents as they conduct in-depth studies aboard the International Space Station.

The mission is a landmark for NASA as the agency works to decipher human reactions to long-term space travel and exposure to weightlessness ahead of its plans to send astronauts to deep space in the future including on a journey to Mars. Kelly will set an American space endurance record during the trip, breaking the 215-day mark set by astronaut Michael Lopez-Alegria on the station in 2006-07.

Kelly and Kornienko are to lift off March 27 aboard a Russian Soyuz spacecraft from Kazakhstan and head to the station along with Gennady Padalka who will return to Earth before the one-year mission concludes. The station hosts six resident astronauts and cosmonauts. Kelly and Kornienko will serve as part of expeditions 43, 44, 45 and 46 on the station.

Kelly's flight also will give researchers a unique study subject since the station astronaut's twin, Mark, will also serve a research subject on Earth. Mark Kelly is also an astronaut and served as a space shuttle commander before retiring from NASA's astronaut corps.

Scientists anticipate conducting research in seven human areas: functional, behavioral health, visual impairment, metabolic, physical performance, microbial and human factors. NASA selected a series of experiments in each area to be conducted given the unique nature of this mission. Taken together, the research may give mission planners clues about problems that need to be solved for deep-space explorers and how issues with bone loss and other degradation can be coped with on missions such as those to Mars, which could take as long as two years to complete.

Kelly and Kornienko have been training in Houston and Russia for the demanding aspects of spaceflight and the day-to-day operation of the space station and its complex systems. Kelly has posted numerous peeks at training life on his twitter feed, including recent photos as he has bid farewell to the home of NASA's primary astronaut training base for a year, along with his regular office there at Johnson Space Center.

The two will return in March 2016 aboard a Soyuz and then more studies will be conducted on Earth to measure the changes that took place in the low-gravity field of low-Earth orbit.

The results are expected to fuel studies and planning details for years to come and perhaps set the stage for similar research in space as NASA looks farther out from Earth so humanity can take its next giant leap of exploration.

FINE TUNING

The robots known as 'Swarmies' begin a round of testing outside the Launch Control Center at Kennedy Space Center. They are built to evaluate random search techniques modeled on the behavior of ants. Photo credit: NASA/Dimitri Gerondidakis

Engineers seek more efficient search from 'Swarmies'

BY STEVEN SICELOFF

Four small, wheeled robots are moving around the parking lot outside the Launch Control Center while their leader, Kurt Leucht, who keeps electronic tabs on them using a laptop. Months of lab work has led to this chilly day -- by Florida standards -- as he carries the laptop around as he tracks each of the four machines, occasionally tapping one off an obstacle or looking at the vehicle's line of sight to figure out what its sensors are seeing.

Together, the robots are known as the "Swarmies" and it's not their hardware that makes them noteworthy, but rather the coding each carries in its silicon brain that make them search the same way ants do. Each of the robots has its own camera and a set of hazard-avoidance sensors. They are rolling around looking for barcode sheets and leaving digital trails to tell the others when a whole lot of bar codes are found in one place.

"We're trying to prove that there's more efficient ways of searching than some other more common ways," Leucht said. "It works really well for ants and we think it could work just as well for robots."

Leucht isn't controlling the robots in the way a radio-control hobbyist does -- he's not doing their thinking for them. Instead, he's letting the software he and his team have been working on for months do the work of operating each robot independently. Besides, that's the way mechanical creatures like this would have to operate on Mars if they are to be effective resource gatherers.

Working with computer engineer Caylyn Shelton at Kennedy and a research team at the University of New Mexico Biological Computation Lab, Leucht is using this parking lot test and dozens more just like it to try to see whether a search method based on foraging behaviors is more effective and productive than a conventional approach of scouring every square inch of an area or a purely random search. It is the same approach used by ants for eons to find and collect food and material.

The approach could be put to use in the future in service of astronauts making the journey to Mars.

One idea among many is to dispatch a corps of small robots capable of searching the Red Planet for water-ice and then digging it up for processing into breathing air and rocket fuel. The robots -- purpose-built, flightworthy machines loaded with software like the coding Leucht is working on -- would arrive at Mars months or years ahead of astronauts and use the lead-time to build up a storehouse of resources that would be waiting for the explorers from Earth.

Kurt Leucht, project lead for the 'Swarmies,' analyzes the actions of one of the four robots taking part in field tests. The robots are each autonomous but are programmed to transmit their actions so programmers can refine their software. Photo credit: NASA/Dimitri Gerondidakis

With each robot being small and weighing less than 10 pounds, a large fleet of searcher/gatherer machines could be sent into space on a single launch. With 100 robots tooling around on the surface, it also wouldn't matter so much if several broke down because there would be plenty more to do the work.

"When we eventually send people to Mars, it would be best if we use in-situ resource utilization techniques, which is a fancy scientific term for living off the land," Leucht said. "A swarm like this could be really useful in detecting resources in a mission like that which needs to go out and collect resources because it's an autonomous system."

All that is far down the road for Leucht right now, though. Before the robots can roll around on Mars scouting about for good areas to mine, he has to make sure these little Earth-bound versions do everything in real life that the simulation program said they'd do.

"Working with real robots is a lot harder than working with simulated robots," Leucht said. He's a software engineer by training, so this project is his first encounter with robotics. "There have been a lot of bugs that we have had to overcome, both hardware and software. When we got them outside into the parking lot for the first time, there were a lot of things that they did that we didn't expect them to do. It took a lot of troubleshooting and debugging and a lot of detective work to figure it out. Now we're down to the nitty-gritty of just letting them run these outdoor trials and collecting data so we can prove whether this biologically inspired search technique is better than other search techniques."

The results are promising, Leucht said, and improvements are constant.

This effort has been underway for almost a year and the goals of it are all but complete, Leucht said. The next step is to find out whether a proposal to expand the simulation capabilities of the software will be funded. If so, then the broader community of robotics experts can get involved and perhaps advance the technology faster and fine-tune the search approach into something that can be made into a swarm of robots suited for Martian work.

"It's kind of human nature to want to improve them and put more money into the robots, but we want to prove that this will work with simple robots and cheap sensors," Leucht said. "We want to make the software more accessible for testing by other universities and organizations since not too many are using biologically inspired behavior and genetic algorithms."

Such an approach may also open the doors to an increased role for the software in other robots built for work on this planet such as search-and-rescue and land mine detection and elimination.

"There's all kinds of Earth-bound uses for a project like this," Leucht said. "It's really exciting to think of the possibilities."

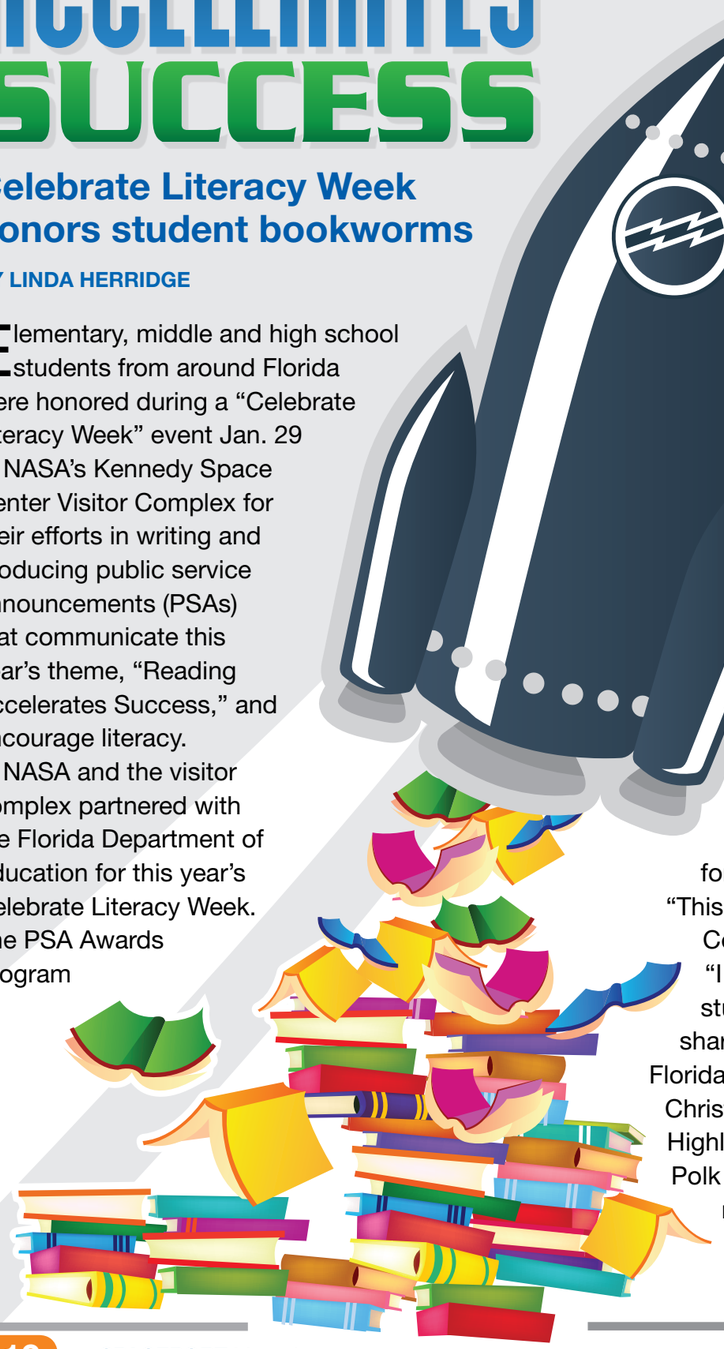
READING ACCELERATES SUCCESS

Celebrate Literacy Week honors student bookworms

BY LINDA HERRIDGE

Elementary, middle and high school students from around Florida were honored during a "Celebrate Literacy Week" event Jan. 29 at NASA's Kennedy Space Center Visitor Complex for their efforts in writing and producing public service announcements (PSAs) that communicate this year's theme, "Reading Accelerates Success," and encourage literacy.

NASA and the visitor complex partnered with the Florida Department of Education for this year's Celebrate Literacy Week. The PSA Awards Program is sponsored by Just Read, Florida!



Participating in the awards ceremony, held in the Astronaut Encounter Theater, were Florida's first lady Ann Scott; Pam Stewart, Florida Commissioner of Education; Wendy Stevens, director of Just Read, Florida!; Christie Bassett, 2015 Florida Teacher of the Year; Dr. Brian Binggeli, Brevard County Schools superintendent; David Culp, Kennedy's Communication and Public Engagement deputy director; Therrin Protze, chief operating officer with Delaware North Parks & Resorts at Kennedy; and former NASA astronaut Wendy Lawrence.

Attendees viewed the finalists' PSAs on screen. First lady Ann Scott presented the first, second and third place winners in each division with their awards. Each winning team's school received a check and books for its library.

"This is my fifth year participating in the Celebrate Literacy Week," Scott said. "I love getting to see how Florida students get creative when it comes to sharing their passion for reading."

Florida Teacher of the Year for 2015, Christie Bassett, an art teacher at Highland Scrub Elementary School in Polk County, shared her passion for reading and encouraged students to do the same.

"I've been so lucky to visit schools around the state, big and small, and every size in between," Bassett said. "Each school I visited had one thing in common: they are all proud to show off their library, filled with the books that students love to read."

Bassett said she loves helping her students find a book on a topic that interests them and ignites a passion for reading.

"If you will set aside time to read each day, you will get better at it and will find more and more books that you enjoy reading," Bassett said.

Florida Commissioner of Education Pam Stewart congratulated the PSA Award Program winners and advised students that the only way to get really good at reading is to practice.

"I would also add, find something that interests you and read about that," Stewart said. "I commend you for your ability to use creativity and technology expertise and blend them together in order to help students understand, throughout the state of Florida, the importance of reading."

Former NASA astronaut Wendy Lawrence described an example of the importance of reading.

"I will never forget my first day of work as an astronaut candidate at Johnson Space Center in Houston. On my desk was a one-foot-high stack of manuals for all of the systems on board the space shuttle," Lawrence said. "I had to read each page. You cannot get into space if you can't read.

"I'm often asked, 'What does it take to make your dreams come true?' It's a good education. You can't get a good education, that foundation for the rest of your life, unless you can read. Continue to embrace reading, a love of books and a love of learning," Lawrence said.

Scott said: "I love having the opportunity to travel around the state and visit schools and share my passion for reading with Florida students, encouraging them to keep reading and expanding their knowledge."

Other partners include the Florida Lottery, National Geographic, Scholastic Books, the Dairy Council of Florida, CENGAGE Learning, the Florida Education Foundation, Delaware North Companies Parks and Resorts at Kennedy, and Kennedy's Education Office.

AND THE WINNERS ARE...

Winners of the PSA Awards Program

Elementary School Students
First Place: Cambridge Elementary, Brevard County
Second Place: Ketterlinus Elementary, St. John's County
Third Place: Forest City Elementary, Seminole County

Middle School Students
First Place: Explorer K-8 school, Hernando County
Second Place: Dunnellon Middle School, Marion County
Third Place: Baker Middle School, Okaloosa County

High School Students
First Place: Choice High School, Okaloosa County
Second Place: Marianna High School, Jackson County
Third Place: Niceville High School, Okaloosa County

CRAWLER 50 YEARS TRANSPORTER

CELEBRATING A MILESTONE

Giant crawler-transporters turn 50 years old, pivot toward future exploration

BY LINDA HERRIDGE

NASA's crawler-transporters, two of the largest vehicles ever built, have carried NASA rockets and spacecraft to the launch pad for the past 50 years. They will continue their legacy as the "workhorses" of the nation's space program as part of the agency's journey to Mars.

The crawlers are being modified to carry NASA's Space Launch System, or SLS, with the Orion spacecraft atop it and potential commercial vehicles to their pads to begin space exploration missions. Originally constructed in 1965 to support the agency's Apollo Program, they also supported the Skylab, Apollo-Soyuz Test Project and Space Shuttle Program, helping NASA push the boundaries of human space exploration farther into the solar system.

To celebrate its 50th year of supporting NASA missions, the upgraded and modified crawler-transporter 2, known as CT-2, rolled out of the Vehicle Assembly Building, or VAB, on Feb. 18 and began the 4.2-mile trek to Launch Pad 39B at Kennedy Space Center. NASA, members of the media and guests paid tribute during a viewing and tour of the crawler at the pad Feb. 23.

But there's no time for these giant machines to rest on their laurels. The Ground Systems Development and Operations Program, or GSDO, at Kennedy has been busy beefing up crawler-transporter 2 to be ready to support SLS and Orion. CT-1 will be available to carry a variety of other launch vehicles.

Using these vehicles, NASA will send astronauts farther than ever before, first to an asteroid, and onward to Mars. The modifications will enable the crawlers to continue supporting human spaceflight for another 20 years.

The crawlers initially were manufactured by

NASA's crawler-transporter 2, also called CT-2, moves slowly along the crawlerway in front of the Vehicle Assembly Building on a test run to Launch Pad 39B on Feb. 24 at Kennedy Space Center. Photo credit: NASA/Cory Huston

the Marion Power Shovel Company in Marion, Ohio. Weighing in at more than 6 million pounds each, the larger parts that could be assembled and fit on a truck were shipped to Kennedy in 1964 where final assembly took place.

Each crawler is 131 feet long and 114 feet wide, with four pickup points spaced 90 feet apart on the upper deck that fit into four interface locations on the mobile launcher.

A technician monitors the progress as NASA's crawler-transporter 2, also called CT-2, continues to slowly move along the crawlerway Feb. 20 on a test run to Launch Pad 39B at NASA's Kennedy Space Center in Florida. Photo credit: NASA/Amber Watson

"It's important to maintain an equal amount of weight distributed on each of the crawler's trucks," said John Giles, crawler project deputy manager. "Through tests and calculations, the center of gravity is determined for the mobile launcher. The interface locations can be different according to the weight and location of the space vehicle on top."

The unique features of the giant vehicles include 16 traction motors, two alternating current generators, two direct current generators powered by diesel engines, and two control cabs each to drive the vehicles forward and backward. The jacking, equalizing and leveling, or JEL, system, among other systems, are monitored and controlled from inside the crawler's control room. The JEL system keeps the upper deck and pick-up points level at all times, even when traveling up steep inclines to the top of the pads, to prevent its rocket payload from toppling.

The crawlers' other unique features are the giant tracks, or treads, that propel the vehicles along. There are eight treads, two per corner, with each tread containing 57 "shoes." Each shoe is 7.5 feet long and 1.5 feet wide and weighs 2,100 pounds.

The original shoes were provided by Marion and replaced in 2004 with new shoes manufactured by ME Global Manufacturing in Duluth, Minnesota. In 1985, a laser docking system was added to the crawlers, allowing them to dock within 0.50 to 0.25 inches of the fixed "dead zero" position at the launch pad and in the VAB.

Traveling at only about 1 mph, the crawlers carried the weight of the massive Saturn V rocket and Apollo capsule attached to the mobile launcher along with the launch umbilical tower (12.3 million pounds), and the space shuttle with solid rocket boosters and external fuel tank on top of the mobile launcher platform (11 million pounds).

The first use of a crawler was in August 1967, when the first Saturn V rocket for Apollo 4, an uncrewed mission, was transported to Launch Pad 39A.

To date, CT-1 has traveled 1,960 miles, and CT-2 has traveled 2,207 miles to and from the pads.

NASA's GSDO Program has made steady progress on the crawlers' refurbishment since the last space shuttle rolled to the pad in June 2011.

In November 2011, CT-2 moved the SLS mobile launcher from the park site beside the VAB to Launch Pad 39B during a rollout demonstration test.

In 2012, CT-2's original alternating current generators and associated parts were removed. Two new 1,500 kilowatt diesel engines and generators were installed. Work continued over the next two years to modify and upgrade the crawler to extend the life of its operating systems, including the installation of 88 new traction roller bearing assemblies, a modified lubrication delivery system and a new temperature monitoring system.

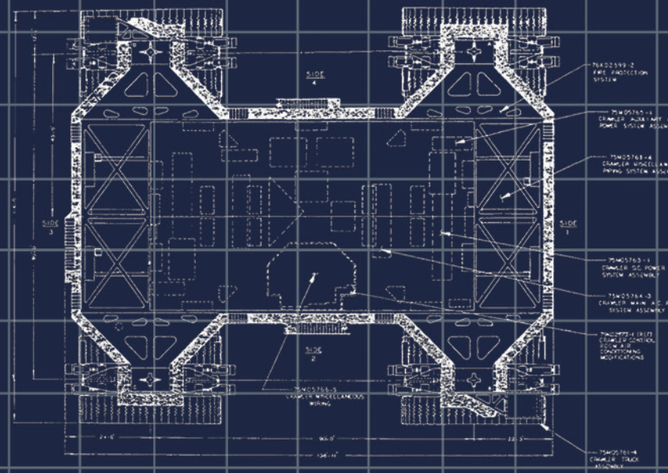
In January 2014, CT-2 passed the first phase of an important milestone by completing a test of the new traction roller bearings on two of the massive vehicle's truck sections, A and C, followed by upgrades and testing on truck sections, B and D.

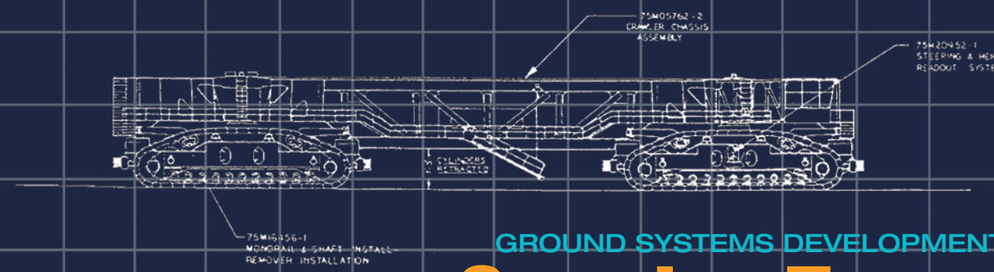
The JEL cylinders, electronics, cables and hydraulic components are being upgraded to increase load-carrying capacity. The upgrades are necessary to increase the lifted-load capacity of the crawlers from 12 million pounds to 18 million pounds to support the weight of the SLS and Orion spacecraft on the mobile launcher.

CT-1 is being strengthened to handle commercially operated rockets and spacecraft.

"The crawlers are ready to support NASA's SLS program and commercial missions for the next half century," Giles said. "This continued support would not be possible without the managers, engineers and technicians that maintain these highly unique and specialized pieces of equipment."

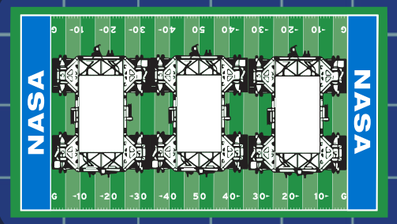
National Aeronautics and Space Administration





GROUND SYSTEMS DEVELOPMENT & OPERATIONS

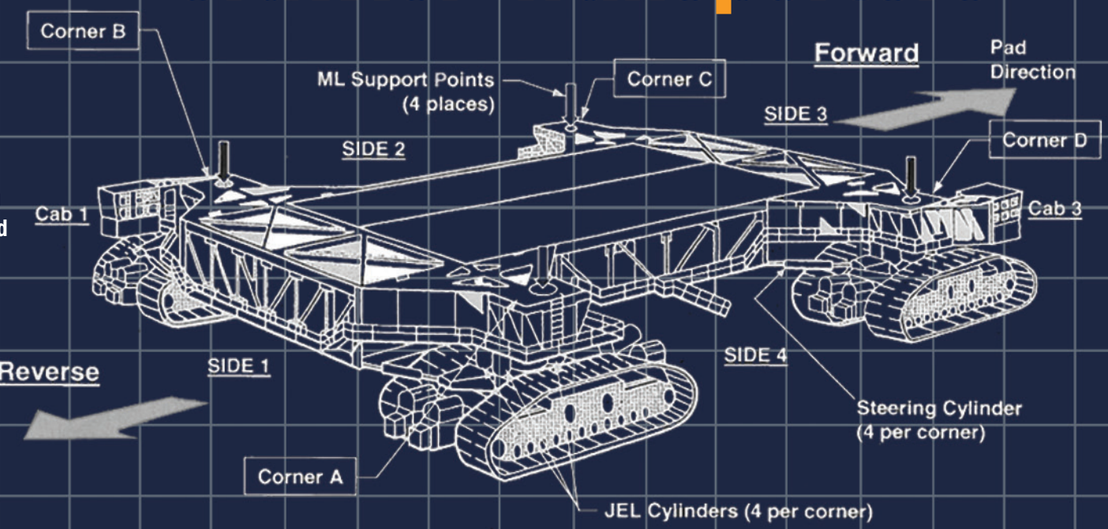
Crawler-Transporters

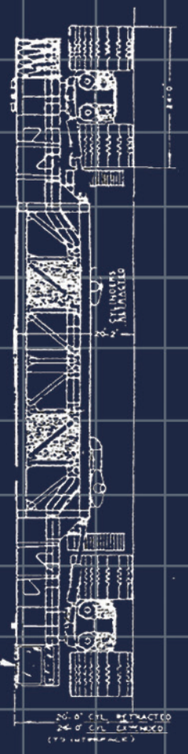


THIRD DOWN, GOAL TO GO

When placed side by side, three crawlers would take up an entire regulation size football field.

NASA's two crawler-transporters are unique in the world. Originally built in 1965 to carry the massive Saturn V rocket and Apollo spacecraft from Kennedy's Vehicle Assembly Building to Launch Complex 39, they continued to support human space exploration taking space shuttles to their launch pads for 30 years.





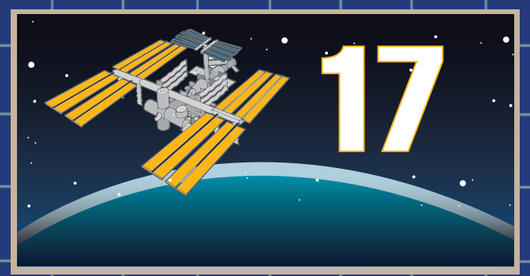
Moving the "Gateway to the West"

After modifications, one crawler-transporter will be able to lift up to 18 million pounds. Two modified crawlers would be able to move the St. Louis Gateway Arch.

(The Gateway Arch weighs 34,652,000 pounds not including the foundation)

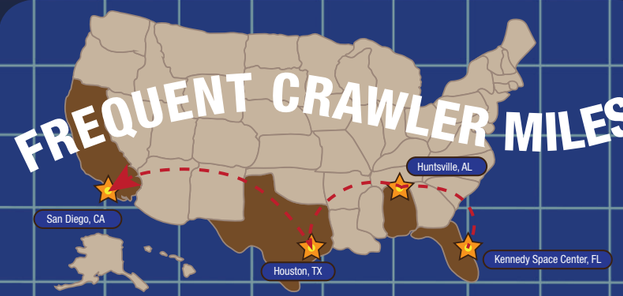
The crawlers are critical elements to enable future launch operations for NASA's Journey to Mars. They could also be major players in Kennedy's transition to a multi-user spaceport with one able to take commercially operated rockets and spacecraft to the launch pad, while the other is being strengthened to handle the Space Launch System (SLS) and Orion spacecraft atop the mobile launcher, a combination heavier than the Saturn V moon rockets the crawlers were designed to carry.

CRAWLER 50 YEARS TRANSPORTER



VAST AMOUNTS OF ENERGY

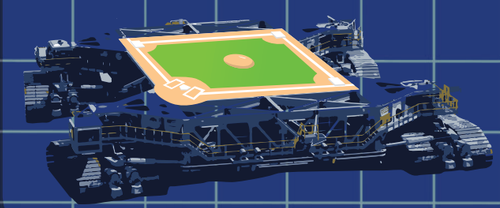
The new generators installed in the crawlers each produce 1500 watts -- enough power to run 17 International Space Stations.



During their 50 years of service, the crawlers have traveled a combined total of 5,000 miles. That is enough to travel from Kennedy Space Center in Florida to Marshall Space Flight Center in Huntsville, Alabama, to Johnson Space Center in Houston, Texas and over to San Diego, California and still have some miles to spare. All of these locations are playing a key role in preparing NASA for our Journey to Mars.

SLOW TRIP AROUND THE BASES

A baseball diamond can fit on top of the crawler.



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Integrated Effort

Officials take part in the formal groundbreaking at Space Launch Complex 41 where the Commercial Crew Access Tower will be built. The 200-foot-tall structure is designed to provide safe access for flight and ground crews to the Boeing CST-100 spacecraft at the pad. Photo credit: NASA/Kim Shiflett

Ceremony kicks off crew access tower construction

BY STEVEN SICELOFF

Boeing and United Launch Alliance teams held a ceremonial groundbreaking Feb. 20 to begin construction on the first new crew access structure at Cape Canaveral Air Force Station in decades. The preparations will enable Space Launch Complex 41 to host astronauts and their support personnel for flight tests and missions to the International Space Station.

The tower will be used for launches of Boeing's CST-100 spacecraft atop an Atlas V rocket. Boeing was selected to finalize the design of its integrated crew transportation system and work with NASA's Commercial Crew Program to certify it for crew launches to the station by 2017.

"Fifty-three years ago today, John Glenn became the first American to orbit the Earth, launching on an Atlas just a few miles from here," said Jim Sponnick, vice president of ULA's Atlas and Delta programs. "The ULA team is very proud to be collaborating with Boeing and NASA on the Commercial Crew Program to continue that legacy and to return America to launching astronauts to the station."

Boeing and ULA finished the design for the 200-foot-tall, metal latticework crew access structure in the summer of 2013. The design was made modular so crews could build large sections of the structure away from the pad, then truck them in and stack them up to complete the work in between Atlas V launches. It will take about 18 months to build the tower.

"This is truly an integrated effort by a lot of partners and that's really represented here today by the guests celebrating this groundbreaking with us," said John Mulholland, Boeing vice president of Commercial Programs. "This is the first construction of its type on the Cape since the 1960s, so building this crew tower, returning of the human launch capability to the United States, is very significant."

Construction crews will face all the usual challenges of building a 20-story-high tower beside the ocean, plus the fact that one of the busiest launchers in the American catalog is not going to take time off during the construction phase.

The crew access structure will visually stand out at SLC-41, largely because the launch complex is a "clean pad" design with only the reinforced concrete hard stand and four lightning towers in place. About 1,800 feet to the south is a building called the Vertical Integration Facility, which houses the cranes and work platforms to assemble an Atlas V.

"Besides the VIF and the lightning towers, the crew access tower will be the tallest structure at the launch site," said Howard Biegler, Launch Operations lead of Human Launch Services for ULA.

The Atlas V launch pad has been used only for non-crewed spacecraft to this point, hosting Titan rockets beginning in 1965 and then the Atlas V since 2002. NASA missions launched from SLC-41 include the Viking robots that landed on Mars, the Voyager spacecraft that toured the outer planets, the New Horizons probe now headed to Pluto, and the Curiosity rover currently traversing Mars.

An artist rendering of Boeing's CST-100 spacecraft on the launch pad with the Commercial Crew Access Tower. Image credit: United Launch Alliance

Although the pad has proved adept at servicing those extremely complex spacecraft and probes, the demands for handling a capsule that will carry humans are far greater. For instance, the rocket cannot be rolled to the pad and fueled while astronauts are aboard. Safety considerations also require a way to get away from the rocket quickly in case of an emergency before the rocket lifts off.

"I can't wait to see this tower erected and an Atlas V up there with a CST-100 headed off to the International Space Station," Kennedy Space Center Director Bob Cabana said. "This historic pad has launched a number of NASA scientific missions and will now launch an even more valuable, precious piece of cargo, and that's NASA astronauts to the station."

Missions flown on commercial crew spacecraft are vital to the national goal of restoring to America the ability to launch astronauts to the station so the unique orbiting laboratory can continue to fulfill its promise of achieving cutting-edge research for the benefit of all on Earth. With the new spacecraft, the station's crew can expand by one, which will enable research time on the station to double from its current 40 hours a week to 80 hours a week.

"This is a shining example of the progress we'll see along the Space Coast as industry works toward safely flying our astronauts to and from the station," said Kathy Lueders, manager of NASA's Commercial Crew Program. "Once this crew access tower is complete, this historical launch complex will be an integral part of a new era in human spaceflight."

National Aeronautics and Space Administration

NASA

REACH NEW HEIGHTS

BENEFIT ALL HUMANKIND

REVEAL THE UNKNOWN

Problem Solver

Engineer applies knowledge to safety and education roles

BY STEVEN SICELOFF

One major turnaround effort at a time is typically enough for a person, but Billy Stover has taken on a second by applying his NASA know-how to local education. As Commercial Crew's Safety and Mission Assurance officer, Stover is helping NASA embrace a new culture of industry partnerships to flying astronauts into orbit. Outside of work, Stover was appointed to a local education committee to see to it that new revenue is spent on school improvements as the county voters intended.

The jobs aren't necessarily similar, but Stover says both teams can be successful as long as they remain open to possibilities around them and are willing to apply new ways of thinking to the challenges ahead.

"I like having these broad jobs because it exposes me to all these different ways and cultures, and I can look at these things and see how the different pieces can work together and maybe make something better," Stover said. "If I see something that might work better, I'm not afraid to take it or look at it and combine it with something else. Or maybe you get in a new situation where you have to draw on your past experiences to work out a way to solve challenges."

Stover's experiences are considerable: he started at Kennedy Space Center in 1987 when he was hired as a space shuttle systems engineer with Lockheed Space Operations when the company reset the workforce in the wake of the Challenger accident. He then worked up through engineering roles and positions in United Space Alliance, including as an engineering manager specializing in ground equipment and support systems. NASA approached Stover after the Columbia accident to help rebuild the Ground Projects branch at Kennedy.

As part of the center's Safety and Mission Assurance directorate, Stover has been specializing in the Commercial Crew Program since its inception. Much of his work has gone into understanding and recommending requirements for industry partners to follow to ensure spacecraft and rockets being built to take astronauts to the International Space Station are safe and reliable while at the same time being cost-effective.

"With this particular program, we are trying to ensure the crew is safe, but we're trying to do it in a new way," Stover said. "I think there was a perception that NASA Safety was strictly rooted in judging rules generated in the past that may or may not apply to today's needs. Today's Safety is focused on risk and how risks can best be managed in this environment with a business model of buying a transportation service rather than hardware."

It's a dramatic shift for an agency that designed, operated and managed all the spacecraft built to carry astronauts until this point. While the agency focuses its efforts on deep-space exploration using the Space Launch System and Orion spacecraft, Stover said the Commercial Crew Program and industry are still learning each other's needs and motivations for low-Earth orbit.

Through Commercial Crew, NASA will certify then buy space transportation services from Boeing and SpaceX to launch astronauts to the International Space Station. NASA is funding part of the development of systems that can carry people safely into orbit. In return, the companies must meet NASA's requirements for safe missions. NASA chose Boeing and SpaceX to finalize the development of their designs and build test versions that can be flown on flight tests, before certifying the spacecraft are safe and reliable to begin crew missions.

On the education committee side, Stover also hopes to be able to bridge the cultures of government boards with the perspective of private citizens.

"It's all about problem-solving -- life is all about problem solving," Stover said. "I'm going to bring my set of project management skills to a different environment, the schools."

Stover looks at the process his NASA team used in setting requirements for the commercial companies as an example to follow with the schools committee.

"We looked at every requirement we put on industry and said does that requirement really help make the spacecraft safe, reliable or more cost-effective?" Stover said. "Because every requirement you put on brings costs back on you. So we did a really good scrubbing. I think we can bring this very detailed thought process to the committee."

Stover graduated from Astronaut High School in Titusville, one of many of the county education facilities that the school board hopes to modernize and improve with the help from the citizen's oversight board on which Stover serves.

"Each company, each organization has its own culture," Stover said. "To me it's all about getting the task done as efficiently as possible with the people being as effective as they can be."

Billy Stover discusses aspects of NASA's MAVEN mission with social media event participants. Photo credit: NASA
Opposite: Billy Stover at his office with NASA's Commercial Crew Program. Photo credit: NASA/Jim Grossmann

NASA, SPACE STATION PARTNERS REVEAL UPCOMING MISSIONS' CREW MEMBERS

NASA and its International Space Station partners have announced the crew members (including NASA astronauts Kate Rubins, Shane Kimbrough and Peggy Whitson) for three upcoming missions to the space station.

Rubins will be the first of the three with her mission beginning in May 2016, when she will join the station's Expedition 48 crew already in orbit. Selected to become an astronaut in 2009, this will be her first trip into space. Rubins was born in Farmington, Connecticut, and grew up in Napa, California. She holds a doctorate in cancer biology from Stanford.

Kimbrough, born in Killeen, Texas, and raised in Atlanta, is a retired U.S. Army colonel. He previously flew aboard space shuttle Endeavour during its STS-126 mission in 2008. Kimbrough has spent almost 16 days in space and accumulated 12 hours and 52 minutes on spacewalks.

Whitson, an Iowa native born in Mt. Ayr and raised in Beaconsfield, holds a doctorate in biochemistry from Rice University. She completed two six-month tours of duty aboard the space station, the second as its first female commander. She has spent 377 days in space between the two missions. Whitson also has performed six spacewalks, totaling 39 hours and 46 minutes.

For complete astronaut biographical information, visit:

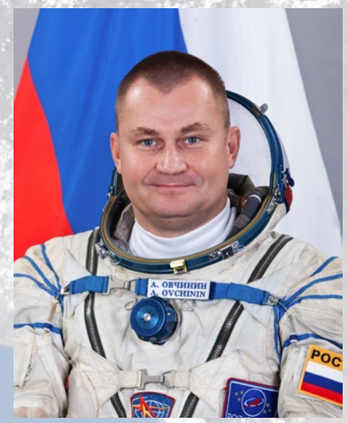
http://www.nasa.gov/astronauts

For more information about the International Space Station, visit:

http://www.nasa.gov/station

EXPEDITION 48 CREW

Jeff Williams
NASA



Alexey Ovchinin
Roscosmos

Oleg Skripochka
Roscosmos

Kate Rubins
NASA

Anatoly Ivanishin
Roscosmos

Takuya Onishi
JAXA

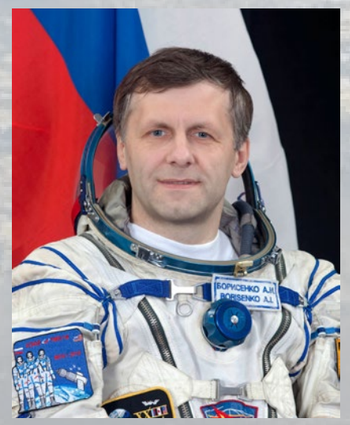
EXPEDITION 49 CREW

Anatoly Ivanishin
Roscosmos

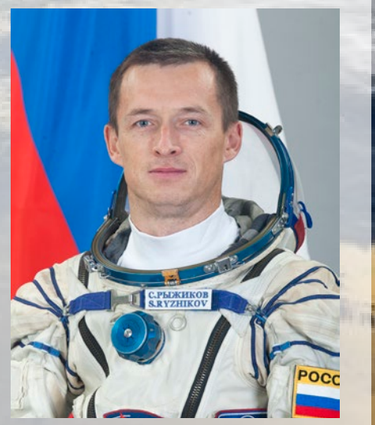
Kate Rubins
NASA

Takuya Onishi
JAXA

Shane Kimbrough
NASA



Andrey Borisenko
Roscosmos



Sergey Ryzhikov
Roscosmos

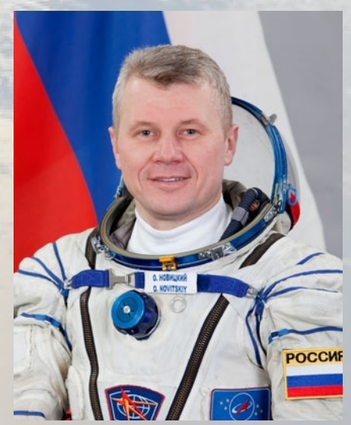
EXPEDITION 50 CREW

Shane Kimbrough
NASA

Andrey Borisenko
Roscosmos

Sergey Ryzhikov
Roscosmos

Peggy Whitson
NASA



Oleg Novitskiy
Roscosmos

Thomas Pesquet
ESA

Images of the Month

ALL IN A DAY'S WORK

NASA astronaut Barry Wilmore works outside the International Space Station on the first of three spacewalks preparing the station for future arrivals by U.S. commercial crew spacecraft Feb. 21. Fellow spacewalker Terry Virts, seen reflected in the visor, shared this photograph on social media.

The spacewalks are designed to lay cables along the forward end of the U.S. segment to bring power and communication to two International Docking Adapters slated to arrive later this year. The new docking ports will welcome U.S. commercial spacecraft launching from Florida beginning in 2017, permitting the standard station crew size to grow from six to seven and potentially double the amount of crew time devoted to research.

The second spacewalk took place Feb. 25. The third was March 1, with Wilmore and Virts participating in all three.

Photo credit: NASA

Ted Ground of Rising Star, Texas, was awarded $20,000 for his idea to study the Martian atmosphere by releasing material that could be seen and studied by other Martian spacecraft in orbit and on the ground.

Photo credit: Ted Ground

NASA reveals winning ideas for Mars Balance Mass Challenge

A member of the public with an idea to study the Martian atmosphere and a team with a way to study Martian weather are the winners of NASA's Mars Balance Mass Challenge.

Ted Ground of Rising Star, Texas, was awarded $20,000 for his idea to study the Martian atmosphere by releasing material that could be seen and studied by other Martian spacecraft in orbit and on the ground.

A team of engineers, Brian Kujawski, Louis Olds, and Leslie Hall, from Grand Rapids, Michigan, received an honorable mention and $5,000 for their idea to study Martian weather by looking at wind patterns near the planet's surface.

"The 219 submissions from 43 countries to the Mars Balance Mass Challenge show the interest the public has in directly engaging with NASA," said NASA Chief Technologist David Miller. "And the two winning ideas highlight how effective these activities can be at helping NASA bring innovative ideas into our missions."

The Mars Balance Mass Challenge, announced in September 2014 at the World Maker Faire in New York City, sought design ideas for small science and technology payloads that could potentially provide dual purpose as ejectable balance masses on spacecraft entering the Martian atmosphere. The payloads would serve two roles: perform scientific or technology functions that help us learn more about the Red Planet, and provide the necessary weight to balance planetary landers.

"We want citizens to join us on the 'Journey to Mars,' " said George Tahu, program executive for Mars Exploration at NASA Headquarters in Washington. "Challenges such as this invite innovative design ideas and creative solutions that will support our science and technology planning processes as well as encourage science, technology, engineering and math (STEM) education."

Submissions to the challenge ranged from analyzing Martian weather or the Martian surface, to demonstrating new technologies such as 3-D printing or parachutes, to pre-positioning supplies for future human missions on the planet's surface.

Ground's concept would release trace elements such as barium or strontium during the main spacecraft's entry and decent into the Martian atmosphere, while other spacecraft in orbit and on the surface of the planet observed the patterns made by the tracer elements in the atmosphere.

A similar process is used to study Earth's atmosphere by sending sounding rockets along a parabolic path anywhere from 30 to 800 miles above the Earth.

The challenge selection team also evaluated a number of concepts using balloon-carried payloads. The best of these was chosen as an honorable mention for its realistic approach to delivering the payloads and for its possible benefit to future human missions to Mars.

All four selectees are new to the world of NASA prizes and challenges, but are now eager to work on upcoming NASA challenges.

Kujawski said, "I now tell everyone that these sorts of challenges are worth giving a shot -- you get an opportunity to learn more about something that you're passionate about, and the satisfaction of coming up with a solution to a tough problem."

Ground, who was inspired to pursue other NASA challenges, agrees, "I think there are lots of skilled, creative, and educated citizens that could contribute, to help 'shape' the contents or overall goals of NASA missions, perhaps more closely than they have in the past."

The Mars Balance Mass challenge was managed by NASA's Center of Excellence for Collaborative Innovation (CoECI). CoECI was established in coordination with White House Office of Science and Technology Policy to advance NASA open innovation efforts and extend that expertise to other federal agencies. The challenges are being released on the NASA Innovation Pavilion, one of the CoECI platforms available to NASA team members, through its contract with InnoCentive Inc.

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A Personal Perspective

BEST 'Keeping the Dream Alive' with MLK celebration

BY LINDA HERRIDGE

Kennedy Space Center Associate Director Kelvin Manning was the keynote speaker at the "Keeping the Dream Alive" celebration Jan. 30 to honor Dr. Martin Luther King Jr. and kick off Black History Month. Photo credit: NASA

Kennedy Space Center Associate Director Kelvin Manning was the keynote speaker at the Black Employee Strategy Team's, or BEST, "Keeping the Dream Alive" celebration Jan. 30 to honor Dr. Martin Luther King Jr. and kick off Black History Month.

BEST is an employee resource group that represents the voice of the African-American workforce at Kennedy.

"It works to provide social, humanitarian and professional opportunities to the black community at Kennedy," said D. Lance Rogers III, an electrical engineer in the Engineering Directorate and BEST member.

Manning's presentation was a walk back in history to the beginning of the civil rights movement and some of the people who played a part in moving these efforts forward.

"Celebrating the legacy of Dr. Martin Luther King Jr. is a time for the nation to remember the injustices that Dr. King fought, a time to remember the fight for freedom, equality and dignity of all races and peoples, a time to remember the message of change through nonviolence," Manning said.

After the Civil War, in a majority of the U.S., racial segregation laws were enacted during the reconstruction period. Basically, they mandated a separate but equal status for all African-Americans.

Many states and cities across the country imposed laws that forbade interracial marriage and ordered business owners to keep their black and white clientele separated.

Manning talked about John Lewis, a black congressman from Georgia who has served in the U.S. House of Representatives for more than 23 years. During a series of talks at Stetson University highlighting key figures of the civil rights movement, Manning had the opportunity to meet Lewis and tell him he worked for NASA.

President Lyndon B. Johnson signs the Civil Rights Act on July 2, 1964, as Rev. Dr. Martin Luther King Jr. and others, look on. Photo credit: Cecil Stoughton/White House Press Office

"It is people like John Lewis, who in 1961 at the age of 21, made the decision to join Rev. Dr. Martin Luther King Jr. and become a part of the civil rights movement," Manning said.

Lewis remained at the vanguard of progressive social movements and human rights struggles in the U.S. As a young man, he served as the chairman of the Student Non-violent Coordinating Committee. He was arrested 40 times and participated in numerous lunch counter sit-ins. In Selma, Alabama, he led the first march there in what became known as "Bloody Sunday" and is featured in the recent motion picture "Selma." At the age of 23, he was a keynote speaker at the historic March on Washington on Aug. 28, 1963.

King was the featured speaker at the March on Washington, and was best-known for his "I Have a Dream" speech, which resonated around the country.

Some of the other people recognized for their efforts included the Tuskegee Airmen, who were part of a program in Alabama to train black Americans as pilots. First Lady Eleanor Roosevelt became interested in the flight school's efforts and requested a flight with one of the airmen. Instructor Alfred Anderson, known today as "The Father of Black Aviation," was the pilot who gave Mrs. Roosevelt a ride over the skies of Alabama for more than an hour.

In 1947, Jackie Robinson became the first African-American to play major league baseball, with the Brooklyn Dodgers. His story was told in the recent movie, "42."

"A lot of events that happened in that movie occurred right here in Central Florida," Manning said. "It's an eye-opener."

Also in 1947, Martin Luther King Jr., at the age of 18, decided to become a minister and delivered his first prepared sermon at Ebenezer Baptist Church in Atlanta. In 1951, Brevard County NAACP leader Harry Moore and his wife Harriette, were killed by a bomb blast beneath their bedroom on Christmas Day.

In 1954, the U.S. Supreme Court, in a landmark decision, ruled unanimously in Brown v. the Board of Education, that racial segregation in American public schools was unconstitutional. In 1955, Mrs. Rosa Parks, a 42-year-old seamstress, refused to give up her seat to a white passenger on a Montgomery, Alabama, bus and was arrested. Dr. King became involved in the incident, which later led to the famous Montgomery bus boycott.

Just two years later, Congress passed the Civil Rights Act of 1957, which was primarily a voting bill. It was the first civil rights legislation passed since 1875.

In 1962, riots broke out on the campus at the University of Mississippi, requiring 12,000 federal marshals to restore order, when James Meredith, a 28-year-old Air Force veteran, was enrolled under a court order.

In 1963, King met with President John F. Kennedy. Shortly afterward, he delivered his famous "I Have a Dream" speech on the steps of the Lincoln Memorial to a crowd estimated at 250,000.

Three civil rights workers, one black and two white, were murdered on a trip through Philadelphia, Mississippi, in 1964. Their bodies were found 44 days later in an earthen dam near the murder site and sparked national outrage and a massive federal investigation. This, among other events, helped push through the Civil Rights Act of 1964. It was signed into law on July 2, 1964, by President Lyndon B. Johnson.

Johnson also signed into law the Voting Rights Act in 1965, which prohibited racial discrimination in voting. In 1966, Dr. King marched on the issue of open housing in Chicago and was stoned by an angry crowd.

In 1967, Thurgood Marshall was confirmed by the U.S. Senate and became the first African-American to sit on the U.S. Supreme Court. A year later, on April 4, 1968, Dr. King was assassinated in Memphis, Tennessee. He was 39 years old.

"Over the years, as a result of the challenges and struggles that Dr. King confronted and overcame, people of my generation and those that have followed, have been given opportunities that we otherwise might not have had," Manning said.

Rogers agreed: "It is this day, just over 50 years after the Civil Rights Act of 1964, the landmark legislation which Dr. King sacrificed so much to achieve, that people like myself are able to stand on the strong shoulders of giants to grace the grounds of NASA, one of the most prestigious and technologically advanced organizations in history."

"This event allows us to open the doors of discussion with the Kennedy community," said DeAntae Cooper, a program analyst in the Chief Financial Office and BEST co-chairman.

Manning concluded his thoughts by saying: "Celebrating the legacy of Dr. Martin Luther King Jr. is a time for the nation to remember the injustices that Dr. King fought. A time to remember his fight for the freedom, equality and dignity of all races and peoples. A time to remember his message of change through nonviolence and a time for all of us to speak up against injustice."

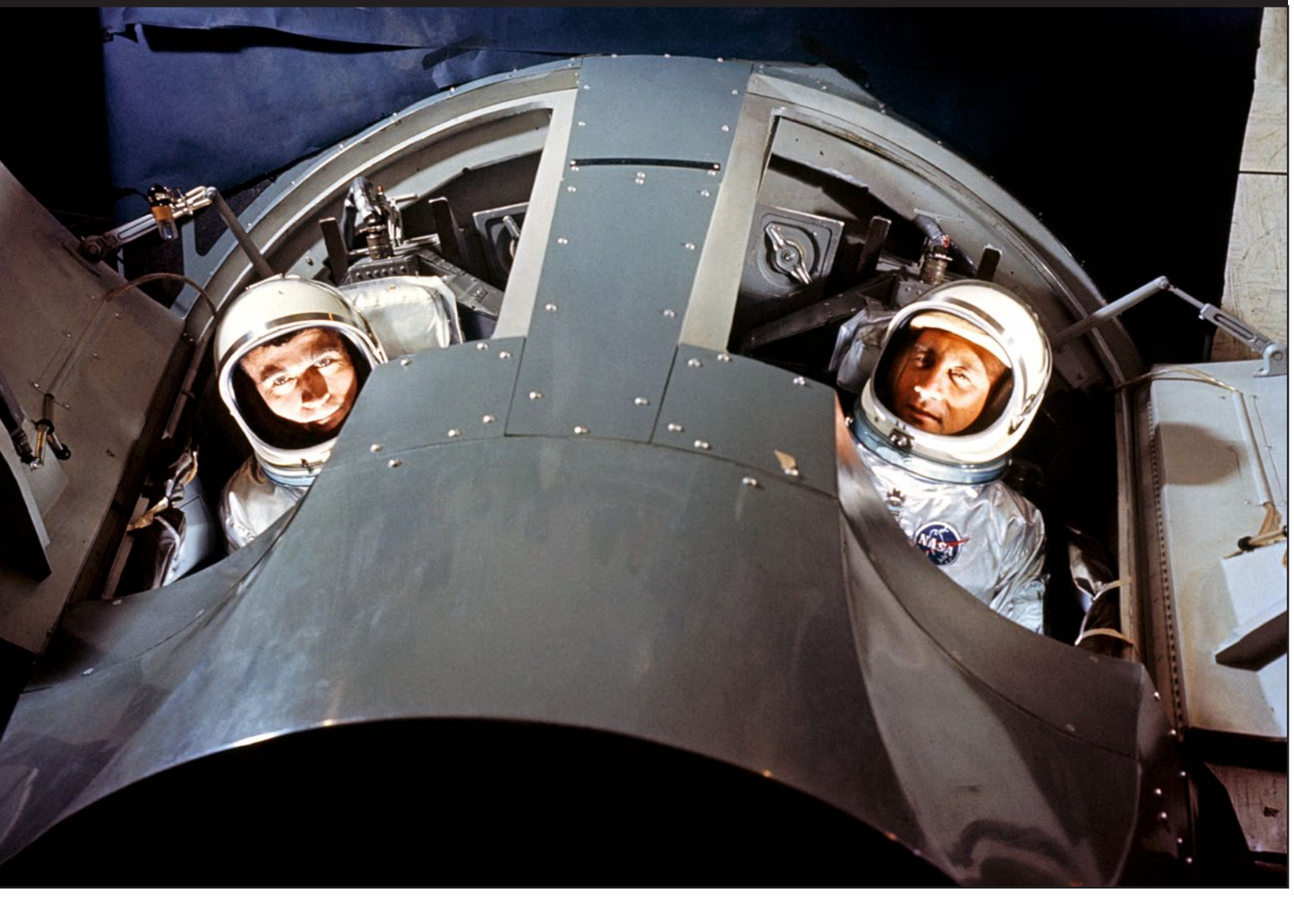
In Memoriam

FORMER NASA CHIEF TEST DIRECTOR DIES AT 81

NASA Chief Test Director Norm Carlson holds up a "Beans are Go" banner in the firing room after the successful launch of the space shuttle Discovery on Sept. 29, 1988. A 35-year NASA veteran, Carlson died March 1 at the age of 81. A native of Enid, Oklahoma, Carlson earned a bachelor's degree in mechanical engineering from Oklahoma State University in 1960. That same year he began working at the Marshall Space Flight Center and helped develop the Saturn launch vehicles that sent Apollo crews to the moon. He transferred to Kennedy Space Center in 1964 working on Apollo, Skylab and the Apollo-Soyuz Test Project. From 1978 to 1991, Carlson was the NASA test director for Space Shuttle Integrated Test Operations. During this time, launch controllers enjoyed beans and cornbread as a reward for a successful launch. Carlson started the tradition with one small crock pot of northern beans for his hungry staff. The tradition grew in popularity and Carlson eventually turned the cooking over to Kennedy's food-service contractor. A resident of Titusville, Florida, Carlson retired from NASA in March 1995. Photo credit: NASA

PROJECT GEMINI

PART 1



Program pioneered technology driving today's exploration

BY BOB GRANATH

Project Gemini is often referred to as the "bridge to the moon." It spanned the period between Project Mercury, America's first efforts to determine if humans could survive in space, and the Apollo lunar landing flights. Looking back across a half-century, Gemini proved to be a bridge to the future.

NASA's two-man spaceflights demonstrated that astronauts could change their capsule's orbit, remain in space for at least two weeks and work outside their spacecraft. They also pioneered rendezvous and docking with other spacecraft. All were essential skills to land on the moon and return safely to Earth.

In a span of 20 months from March 1965 to November 1966, NASA developed, tested and flew transformative capabilities and cutting-edge technologies that paved the way for not only Apollo, but the achievements of the space shuttle, building the International Space Station and setting the stage for human exploration of Mars.

Above: Cape Kennedy Air Force Station, Gemini III pilot John Young is followed by command pilot Gus Grissom as they walk to elevator at Launch Pad 19 for their three-orbit flight. The first mission of the Gemini spacecraft took place March 23, 1965. Photo credit: NASA
Left: The crew for the first piloted Gemini mission astronauts, Gus Grissom, right, and John Young, practice in a mission simulator at McDonnell Aircraft Corp. in St. Louis, Missouri during March of 1964. The simulator provided Gemini astronauts and ground crews with realistic mission simulation during intensive training prior to actual launch. Photo credit: NASA

On May 25, 1961, three weeks after Alan Shepard became the first American in space aboard a Mercury spacecraft, President John F. Kennedy challenged NASA and the nation to "land a man on the moon and return him safely to Earth" before the end of the decade of the 1960s. To develop the technology and experience from Mercury's one-person flights to the Apollo missions, NASA proposed Project Gemini.

The program was given its name from the Latin word for "twins," as the new capsule would accommodate two pilots.

A Mercury spacecraft weighed 3,000 pounds to seat one astronaut. By comparison, Gemini weighed 8,490. It had a large equipment module to carry increased consumables such as propellant for the Orbital Attitude and Maneuvering System (OAMS) thrusters that allowed the crew to change the spacecraft's orbit, a requirement for rendezvous in space.

The heavier spacecraft required a larger launch vehicle. The 109-foot Titan II rocket would do the job with a first stage thrust of 430,000 pounds lifting off from Launch Pad 19 at Cape Kennedy Air Force Station.

Following the final Mercury flight in May of 1963, NASA's Mission Control Center at the Cape also needed extensive modifications. For Gemini, additions to the facility almost doubled its capacities including four new consoles

GEMINI III

TITAN III

Gemini Titan III lifts off Launch Pad 19 at 9:24 a.m. EST on March 23, 1965. The Gemini spacecraft "Molly Brown" boosted astronauts Gus Grissom and John Young on three orbits around the Earth. Photo credit: NASA

for a total of 10 flight controller stations in the operations control room.

In April 1964 and January 1965, two unpiloted missions were launched, clearing the way for the first astronauts to fly. Veteran Mercury astronaut Gus Grissom was selected as command pilot, making him the first person traveling into space twice.

Joining Grissom was John Young, the first member of the second group of NASA pilots to fly in space. Young would go on to become the first person to make six spaceflights, including commanding Apollo 16 during which he walked on the moon. He also commanded STS-1, the first shuttle mission.

Gemini III's primary goal was to test the new, maneuverable spacecraft. In space, the crew members fired thrusters to change the shape of their orbit, shift their orbital plane slightly, and drop to a lower altitude.

NASA Test Conductor George Page would be one of those responsible for giving Gemini III the final go-ahead for flight on launch day. He offered high praise to the extensive team preparing for the crucial flight.

"All phases of acceptance testing have gone very smoothly, and everything went according to schedule," Page said. He attributed this smoothness to the teamwork and cooperation among NASA, the Department of Defense and contractor professionals responsible for various phases of the mission.

Like many supporting the early days of human spaceflight, Page would serve in many key roles in future agency projects, including assignments as launch director for the first three space shuttle missions and, later, as deputy director of Kennedy Space Center.

As the Titan II rocket roared to life on March 23, 1965, capsule communicator and fellow Mercury astronaut, Gordon Cooper, radioed, "You're on your way, Molly Brown."

"Yeah man!" responded Grissom.

Shortly after splashdown on his suborbital Mercury mission, the hatch on Grissom's capsule blew off prematurely. The astronaut jumped out and was rescued by a helicopter crew, but his spacecraft, Liberty Bell 7, sank. Molly Brown was a reference to a popular Broadway musical at the time, "The Unsinkable Molly Brown."

"Controllers report that all systems are looking good," said NASA Public Affairs commentator Paul Haney as the two-stage Titan boosted Grissom and Young to space.

Gemini III entered an orbit of 100 miles by 142 miles above the Earth. Nearing the end of the first orbit, while passing over the tracking station in Corpus Christi, Texas, Grissom and Young fired their OAMS engines for 1 minute, 14 seconds.

"They appear to be firing good," said Young, confirming that the maneuver was going well. The change of velocity adjusted their orbit to 97 miles by 105 miles. A second burn 45 minutes later altered the orbital inclination by 0.02 degrees.

This crucial maneuver was the first orbital change by any piloted spacecraft.

The revolutionary orbital maneuvering technology paved the way for rendezvous missions later in the Gemini Program and proved it was possible for a lunar module to lift off the moon and dock with the lunar orbiting command module for the trip home to Earth. It also meant spacecraft could be launched to rendezvous and dock with an orbiting space station.

From the earliest days of NASA spaceflight, the agency also has been a world leader in Earth and climate science research from this unique vantage point. During their three orbits, Grissom and Young took time to photograph and comment on the view from their perspective high above the Earth.

"Look at the sunrise," Grissom said as they were completing their first orbit.

"Yes, here comes the sunrise," Young said. "Isn't that beautiful?"

"Aren't you going to take any pictures?" asked Grissom.

"I'll get the camera out," said Young.

During their three orbits, Grissom and Young took time to photograph the view from their perspective high above the Earth. This picture shows cloud formations as Gemini III approached sunset.
Photo credit: NASA

After a busy first flight in the new spacecraft, the Gemini III crew fired the retrorockets 4 hours, 33 minutes after liftoff. While talking to the capsule communicator on the tracking ship, USNS Rose Knot Victor, Grissom reported that “All retrorockets fired normally.”

Grissom and Young splashed down in the Atlantic Ocean 19 minutes later. With the landing 52 miles short of the aircraft carrier, USS Intrepid, the crew of a U.S. Navy helicopter hoisted each astronaut aboard for the short trip to the ship.

After being greeted by the Intrepid’s captain and crew, Grissom and Young received a telephone call from President Lyndon B. Johnson in which he congratulated the astronauts.

“This nation has embarked on a bold program of space exploration and research which holds promise of rich rewards in many fields of American life,” the president said. “Our boldness is clearly indicated by the broad scope of our program and by our intent to send men to the moon within this decade.”

In a letter sent shortly after the mission to Kennedy Space Center Director Dr. Kurt Debus, Grissom and Young praised those supporting the new program.

“Credit for the success for this Gemini flight – or any spaceflight for that matter – cannot be given to one person,” Grissom and Young wrote. “It belongs to the thousands of dedicated men and women, many of whom work at the Kennedy Space Center, whose combined efforts made our space accomplishments possible.”

National Aeronautics and Space Administration

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