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Spaceport News

John F. Kennedy Space Center - America's gateway to the universe

Astronauts check out Dragon's accommodations

By Rebecca Regan
Spaceport News

CLICK ON PHOTO

Photo courtesy of SpaceX

NASA astronauts and industry experts are monitored while they check out the crew accommodations Jan. 30 in SpaceX's Dragon spacecraft, which is under development for NASA's Commercial Crew Program (CCP). For more on NASA's Comercial Crew Program, click on the photo.

Test drives aren't just for cars. Recently, NASA astronauts had an opportunity to get up close and personal with the spacecraft they may fly aboard in the future. They tried out the positioning of displays and generally assessed whether they would be comfortable inside of the vehicle for hours at a time.

They never got off the lot, though. Instead, the team of astronauts and industry experts climbed inside a test version of the Space Exploration Technologies (SpaceX) Dragon capsule, a spacecraft intended to carry astronauts to the International Space Station or other low Earth orbit destinations.

SpaceX's spacecraft currently is contracted to fly 12 cargo-only missions to the space station under NASA's Commercial Resupply Services Contract. In 2010, Dragon became the first commercially developed spacecraft to return from Earth orbit during a demonstration flight for the Commercial Orbital Transportation Services (COTS) Program. And, in 2011, the agency's Commercial Crew Program (CCP) signed a funded Space Act Agreement with the company to enhance Dragon's capabilities to include the transportation of humans.

"There are very important systems that need to be in place before you can put humans in a spacecraft," said Jon Cowart, NASA's partner manager for SpaceX. "You've got to have the seats and the displays, of course. But you also have to have air circulation, and air conditioning and heating. So, under CCP's second round of development, we are working on the layout of the Dragon interior, and developing concepts and some hardware for the interior's atmosphere control."

As part of the Commercial Crew Development Round 2 (CCDev2) agreement, the company invited NASA into its plant in Hawthorne, Calif., to check out a prototype of the crew capsule, which is equipped with seats, lighting, environmental controls, life support systems, displays, cargo racks, mock control panels and other interior systems.

During the day-long review, Rex Walheim, Tony Antonelli, Lee Archambault and Tim Kopra, all space shuttle veterans, participated in what are called human factor-type assessments. That included entering and exiting Dragon under normal and emergency scenarios. They also performed reach and visibility evaluations.

Dustin Gohmert, a NASA crew survival engineering team lead, Laura Crabtree, a SpaceX mission operations engineer, and Brenda Hernandez, a SpaceX thermal engineer, also participated in the assessments.

"This milestone demonstrated that the design of the crew cabin supports critical nominal and off-nominal tasks, and provided an opportunity to gain valuable feedback from both NASA astronauts and industry experts," said SpaceX Commercial

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Inside this issue...

Local teams win Zero Robotics, FIRST competitions

By Linda Herridge
Spaceport News

CLICK ON PHOTO NASA/Kim Shiflett

High school teams tinker with their robots during the regional FIRST robotics competition at the University of Central Florida in Orlando, Fla., on March 9. More than 50 teams took part in the competition called "For Inspiration and Recognition of Science and Technology," or FIRST, in hopes of advancing to the national robotics championship. This year, the competition resembled a basketball game and was dubbed "Rebound Rumble." The game measured the effectiveness of each robot, the power of collaboration and the determination of the teams. To find out more about robotics, click on the photo.

What does it take to control small, spherical flying robots in a true zero gravity environment to mine virtual asteroids while fending off opponents with virtual shields, lasers and tractor beams?

Students from Cocoa Beach and Rockledge high schools' Kennedy Space Center-sponsored For Inspiration and Recognition of Science and Technology (FIRST) robotics software teams, known as the Pink Team, found out recently when they competed in this year's AsteroSPHERES, a simulated satellite game, sponsored by NASA and the Massachusetts Institute of Technology.

"The goal of AsteroSPHERES is to use simulated satellites, or SPHERES, to virtually mine the most ore from asteroids out in space and collect points in various ways as the competition progresses," said Enrique Eligio, a software engineer and Pink Team mentor from Harris Corp. in Melbourne, Fla.

Pink Team students spent about four months writing, perfecting and demonstrating the software to control the small flying robots. Of the 104 teams from the U.S. and Europe, only 54 teams continued on past the semi-finals phase. Those 54 teams were divided into three-school alliances.

Team Rocket Alliance included Rockledge High and two alliance teams, River Hill High in Clarksville, Md., and a school called Storming Robots Technology Learning Center in Branchburg, N.J.

The Rockledge High and Cocoa Beach High teams advanced through several elimination rounds and semi-finals.

Rocket Alliance team member Emma Banks is a senior who plans to major in computer science or marine biology. She said the general consensus among team members was that the competition was very overwhelming at first.

"My intent was to learn more about programming because it is a future career choice for me," Banks said. "It was a good way to get used to deadlines and real-life use, like a hands-on test."

Banks said it really is unlike any other competition because it implemented the team's own computer code into real-life situations.

Clement Li is a senior at Cocoa Beach High School who plans to major in chemistry, chemical engineering or aerospace engineering in college.

Li said his team and alliance members from Shawnee Mission Northwest in Kansas and Montgomery Blair High School in Silver Spring, Md., spent considerable time debating strategies, counter-strategies and potential scenarios.

"The game was engaging, and I often spent multiple hours trying to optimize the code or develop a more effective strategy," Li said.

Team Rocket Alliance reached the final competition round which included a live demonstration of the virtual mining software aboard the International Space Station. Team Rocket Alliance was declared the winner by space station Flight Engineer Don Pettit, with assistance from Flight Engineer Andre Kuipers.

"Although competing onboard the International Space Station was fascinating in itself,: Li said, "the competition was an engaging introduction into programming, providing an experience that some schools do not offer."

Eligio said that Pettit thanked all the students who wrote spaceflight ready code for the space station because real-working hardware is a winner. He congratulated all of the participants and said he hoped to see everyone again next year.

The Pink Team also recently competed in the FIRST robotics regional competition at the University of Central Florida in Orlando. More than 60 teams took part in the competition.

Andrew Bradley, a control systems engineer in Kennedy's Engineering Directorate and Pink Team mentor said this year's competition resembled a basketball game and was called "Rebound Rumble."

Bradley said the team had some challenges with its robot, called Roccobot, but persevered to reach the second seed position at the end of the qualifying rounds. During the elimination finals, the Pink Team joined with another Brevard team, The Bionic Tigers, and a team from Jacksonville to win the competition.

"They simply didn't give up, they played smart and they ended up with the gold," Bradley said.

"They also won FIRST's highest honor, the Chairman's Award."

Bradley said the Chairman's Award honors the team that, in the judges' estimation, is the best model for other teams to emulate, and that embodies the goals and purpose of FIRST.

Bradley said one of the things that makes FIRST unique is the spirit of gracious professionalism.

"Although the competition is real and intense, the teams are all friends and openly help each other," Bradley said. "The Pink Team has helped start four other FIRST robotic teams and our mentors often moonlight as mentors for other area teams that have a need."

More online

To learn more about the FIRST competition, visit:
www.usfirst.org

To view the Pink Team's Chairman Award video, visit:
http://www.youtube.com/watch?v=IGGUDdjFiCg

To learn more about the Zero Robotics program, visit:
www.zerorobotics.org

CLICK ON PHOTO NASA/Kim Shiflett

"The Pink Team," Team 233, tinkers with its robot during the regional FIRST robotics competition at the University of Central Florida in Orlando, Fla., on March 9. The team is made up of students from Rockledge and Cocoa Beach high schools along the Space Coast of Florida. For more information on Kennedy's education events and initiatives, click on the photo.

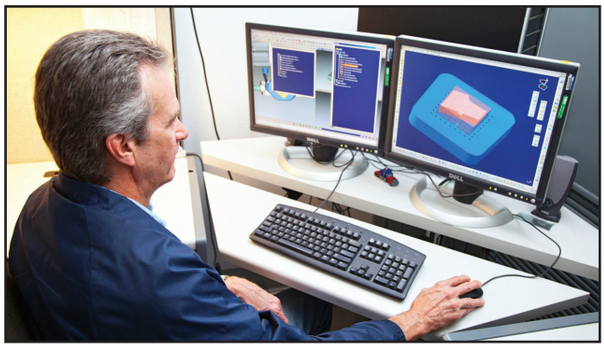
Tile-makers creating Orion shield at 'starting line'

By Steven Siceloff
Spaceport News

Workers recently began cutting and coating the first thermal protection system tiles -- part of the heat shield that will protect NASA's Orion spacecraft during an upcoming flight test that will simulate the re-entry speed and heating of returning from deep space.

The tiles are made of the same material and coating as those used on the space shuttle's belly. On Orion, however, the tiles will be placed along the sides and top of the conical spacecraft. A separate heat shield akin to the ablative design used during Apollo is being developed to protect the bottom of the spacecraft, which will encounter the highest temperatures.

The manufacturing work at Kennedy Space Center, marks an important time in the progression of the spacecraft following the shuttle's retirement in 2011, said thermal protection system, or TPS, engineers Joy Huff and Sarah Cox.



CLICK ON PHOTO NASA/Frankie Martin

John Livingston, a United Space Alliance engineer at NASA's Kennedy Space Center in Florida, shows the digital image of a heat-shield tile March 1 that will be used on an Orion spacecraft. For more on the Orion spacecraft, click on the photo.

NASA/Frankie Martin

Frank Pelkey, a United Space Alliance technician at Kennedy, works with a heat-shield tile March 1. For more on NASA's exploration plans, click on the photo.

"We're making something that's going to fly again, which is what we were doing for years," Huff said.

There are about 40 people involved in the tile work: 20 to make the tiles and 20 to install them.

"We're at the starting line," Cox said. "It's going to take some time to get all the parts fabricated."

The same shop that manufactured space shuttle tiles will make the 1,300 tiles needed for the Orion flight.

It is not fast work. In fact, workers will spend about 11 months shaping the insulating blocks and laying on a heat-resistant, ceramic coating. They use a 5-axis mill loaded with precise dimensions to cut blank tiles to their shapes. So far, the shop has finished 33 tiles.

Many of the tiles will have special cutouts for instruments to collect data during the flight test. Many fewer cutouts will be needed for future missions.

In an advancement from the shuttle days, each tile's dimensions are sent over digitally from Orion builder Lockheed Martin and the final tile is photographed with a 3-D camera so computers can fit the pieces together virtually before they are placed together physically, Huff said. The details are far more exact than in the past.

"They've had such good success that (technicians) are going to eliminate one pre-fit step," Huff said.

The comparisons with the tile work for the space shuttles are plentiful. For example, the smaller Orion uses tiles that average 8 inches by 8 inches compared to the shuttle's 6 inches by 6 inches. Also, Orion's design allows for many of the tiles to be the same dimensions with the same part number, but each shuttle tile was a unique configuration unto itself, with an individual part number.

"That's a huge improvement over shuttle," Huff said. "Even having nine or 10 of the same part is a big improvement."

Perhaps the biggest comparison, though, is the sheer number of tiles involved. A space shuttle heat shield required more than 23,000 tiles to the Orion's 1,300.

"It's smaller, so there's less parts," Cox said.

However, Orion's tiles will be used only once because the spacecraft will splashdown in the ocean, drenching the absorbent tiles. That means that technicians will make and install all 1,300 tiles between Orion missions. Shuttles required 100 to 150 new tiles between flights, Cox said.

Technicians who applied the tiles for the shuttle will bond Orion's tiles, too. That work will start sometime in the summer. The tiles will be connected to nine panels that will be connected to the spacecraft to make the outer skin of the spacecraft.

Although it's a new spacecraft with a new mission, it still calls for many of the same skills the work force at Kennedy used for 30 years of shuttle preparation.

Orion is expected to see significantly hotter re-entry temperatures because it will be slowing down from about 25,000 mph when returning from the moon or some other deep-space destination. Space shuttles used their heat shields to slow down from about 17,000 mph, the speed required to stay in orbit around Earth.

"The heat shield has been a very technological challenge and it will continue to be," said Huff, who has been working Orion's TPS development since 2005.

To get to this point, when tiles are being cut that will be used on a mission in space, has given the project more of a sense of being real, the engineers said. They know there is plenty of hard work ahead, but they are happy to see it start.

Huff said, "It's almost a sprint feeling, but it's a marathon length."

From **DRAGON**, Page 1

Crew Development Manager Garrett Reisman.

Although Dragon reminds people of NASA's Apollo-era capsules, it is much larger, designed to carry up to seven crew members instead of three. Cowart credits the roominess to the outer shell of Dragon being less steep than its Apollo predecessor.

"With all seven crew members in their seats, Dragon has sufficient interior space for three other people to stand and assist the crew with their launch preparations," said Reisman.

SpaceX said the spacecraft's seats are mounted to strong, yet lightweight, supporting structures that are attached to the pressure vessel walls. Each seat has a liner that could be custom-fitted for an individual crew member and could support an adult weighing up to 250 pounds and measuring 6 feet 5 inches tall.

"We already know that the Dragon spacecraft can go into orbit and return safely," Cowart said. "So, what we need to do is nurture SpaceX's ability to put humans on board and return them safely as well."

Photo courtesy of SpaceX

On Jan. 30, NASA astronaut Rex Walheim checks out SpaceX's Dragon spacecraft, which is under development for NASA's Commercial Crew Program.

Pratt & Whitney Rocketdyne hot-fires launch abort engine

By Rebecca Regan
Spaceport News

As NASA ushers in a new era of commercial space endeavors, the maker of the agency's reliable space shuttle main engines is working on a slightly different propulsion system, one that could save lives in the event of an emergency on the way to space.

Pratt & Whitney Rocketdyne, which is supporting The Boeing Company during the development of its CST-100 spacecraft in NASA's Commercial Crew Program's second round of development (CCDev2), completed mission-duration hot-fire tests on a launch abort engine on March 9. The demonstration in Canoga Park, Calif., is one of many milestones Boeing is meeting for its funded Space Act Agreement during CCDev2.

Photo courtesy of Pratt & Whitney Rocketdyne

Pratt & Whitney Rocketdyne hot-fires a launch abort engine March 9 for Boeing, which is developing its CST-100 spacecraft for NASA's Commercial Crew Program. For more on Commercial Space Exploration, click on the photo.

"Boeing and its contractor, Pratt & Whitney Rocketdyne, continue to make good progress on milestones supporting the development of their commercial crew transportation capabilities," said Commercial Crew Program Manager Ed Mango. "The eventual availability of these capabilities from a U.S. domestic provider will enhance U.S. competitiveness and open new markets for the U.S. aerospace industry."

Boeing's Crew Space Transportation (CST) system is a reusable, capsule-shaped spacecraft designed to take up to seven people, or a combination of people and cargo, to low Earth orbit, including the International Space Station. Its service module and integrated launch abort propulsion system are designed to push the crew capsule to safety if an abort becomes necessary during launch or ascent. If an abort is not necessary, the system's propellant could be used for other portions of a mission, including re-boosting the orbit of the space station.

"We achieved full thrust on the 40,000-pound thrust-class engine while validating key operating conditions during engine start-up and shut down," said Terry Lorier, Pratt & Whitney Rocketdyne's Commercial Crew Development program manager, who supports Boeing's program.

Under its fixed-price contract with Boeing, Pratt & Whitney Rocketdyne is combining its attitude control propulsion system thrusters from heritage spaceflight programs, Bantam abort engine design and storable propellant engineering capabilities.

"The tests provided key thermal and analytical data," Lorier said. "We are well on our way to providing an important propulsion system for safe, reliable human spaceflight."

24 posters highlight Kennedy's past on 50th anniversary

Upcoming events

April 14
KSC All American Picnic

April 16-17
Discovery Fly-Out

May 19
50th anniversary golf tournament

June 30
50th anniversary Birthday Bash
at Wet 'n Wild

July 1
Official 50th Anniversary of Kennedy

July TBD
Formal Gala-Ball

Sept. 2
Endeavour Fly-Out

Mid-November
Atlantis transported to KSC Visitor Complex

For up to date information regarding Kennedy Space Center events, visit: **www.nasa.gov/centers/kennedy/events/index.html**

By Brittney Longley
Spaceport News

To some people around Kennedy Space Center, it might just be a group of posters, but to others, it is history -- history of accomplishments and lessons learned, history that's worth more than what a picture or even a thousand words can express.

In honor of Kennedy's 50th anniversary, Elaine Liston, the center's archivist and staff member of Kennedy's Library, teamed up with the Education and External Relations Directorate and the Public Affairs Directorate to create 24 posters that depict the history of the center.

"Each poster is unique," said Gregg Buckingham, deputy director of Education and External Relations. "They are a fantastic glimpse of KSC's historic role in the nation's history."

Each poster depicts different aspects of the center's history. They highlight presidential visits to Kennedy, the Apollo Program, Shuttle Program, and the 10 center directors who have lead NASA's prime launch complex.

"They are currently displayed in major facilities throughout the center," Liston said. "They also will be posted to Kennedy's website where information related to the images will be available."

The posters will be rotated around the center monthly and displayed at different 50th anniversary events. To view the posters online, go to **http://mediaarchive.ksc.nasa.gov/search.cfm?cat=256.**

List of posters

1. Dr. Kurt H. Debus
2. Kennedy Space Center Directors
3. Kennedy Center Directors in Action
4. President Kennedy's Visits to Kennedy
5. Presidential Visits
6. Construction of Launch Complex 39
7. Construction of Industrial area
8. Project Mercury
9. Project Mercury with Scott Carpenter
10. Project Gemini
11. Apollo/Saturn program -- Rocket
12. Apollo/Saturn Program -- Apollo Spacecraft and Lunar Module
13. Launch Services Program Spacecraft
14. Launch Services Program Satellites
15. Launch Services Program Rockets
16. Space Shuttle Program
17. Space Shuttle Payloads
18. International Space Station
19. Skylab/MIR
20. Visitor Complex
21. Apollo-Soyuz
22. Commercial Crew
23. Space Launch System/Orion
24. International Cooperation

Scenes Around Kennedy Space Center

NASA

Kennedy Space Center's Medical and Environmental Management Division intern Cory Taylor, right, seen with Tom Dwyer of the Safety and Mission Assurance Directorate, is the winner of the 2012 Kennedy Voluntary Protection Program (VPP) Logo Contest. His logo highlighted "KSC VPP – Excellence in Safety / Reaching for The Star." Taylor was awarded a Kennedy Safety Certificate of Recognition, the Kennedy Safety and Mission Assurance coin and a $100 gift certificate to the NASA Exchange. The logo will appear on posters, flyers, and in *Lookout* leading up the OSHA VPP reassessment April 30 to May 4.

CLICK ON PHOTO *NASA/Jim Grossmann*

Space shuttle Discovery, in the foreground, and space shuttle Atlantis almost meet nose to nose at Kennedy Space Center on March 9. Discovery was towed out of Orbiter Processing Facility-1 (OPF-1) for its move to the Vehicle Assembly Building (VAB), while Atlantis was towed out of the VAB for its move to OPF-1. The work is part of the Space Shuttle Program's transition and retirement processing of shuttle Discovery, which is being prepared for display at the Smithsonian's National Air and Space Museum, Steven F. Udvar-Hazy Center in Chantilly, Va. Discovery will remain in the VAB until its scheduled transport atop a NASA Shuttle Carrier Aircraft modified 747 jet to Dulles International Airport in Virginia on April 17. Discovery then will be transported to the Smithsonian on April 19. For more information on the shuttles' transition and retirement, click on the photo.

Mobile launcher wins three major industry awards

Hensel Phelps Construction Co. recently was recognized for accomplishments related to the construction of the mobile launcher (ML). The national Associated General Contractors (AGC) of America awarded Hensel Phelps the AON Build America Award in the "federal and heavy new" category. This award showcases the best of construction, recognizing outstanding contractors building America's buildings, bridges, roadways, and municipal and utility construction. The Central Florida Associated Builders and Contractors (ABC) awarded Hensel Phelps the Eagle Award, which is given once a year to commercial and industrial projects which represent outstanding craftsmanship, planning and coordination efforts. In addition, Hensel Phelps received a Pyramid Award from the national ABC Chapter (not shown) for their remarkable achievements in leadership, safety, innovation and diversity.

Meteorologists balance experience with technology

By Steven Siceloff
Spaceport News

NASA file

Lightning is a frequent sight in Florida, including at NASA's Kennedy Space Center and Cape Canaveral Air Force Station.

When people talk about a meteorologist cooking up a weather forecast, they may be more right than they realize, said one of the forecasters NASA counts on to predict conditions ahead of a launch.

"I compare forecasting a lot to cooking, to be honest," said Joel Tumbiolo, a meteorologist with the Air Force's 45th Weather Squadron, the unit that handles forecasting for rockets launched from the Eastern Range on the Atlantic Coast of the United States. "In cooking, you have recipes that you follow, but to be a good cook you have to have a certain taste and feel for it, and I feel there's a lot of that in weather forecasting."

The weather team monitors conditions from the ground level to a few thousand feet in the air, a region the rocket will fly through in a minute or two at most. But even a low-hanging cloud can be enough to call off a launch.

"If those couple minutes don't go right, bad things happen," Tumbiolo said. "You always wonder, 'How can a rocket going at that velocity be affected by a cloud?' But we've learned through trial and error that it does affect it."

The launch teams quickly learn the impact of weather on a countdown, said Omar Baez, launch director for NASA's Launch Services Program, or LSP.

"Weather is one of those things you never think about coming into the rocket business and you quickly learn how it affects our business," Baez said. "And it's not just during the launch phase."

Weather conditions dictate many of the activities around the launch site, not only the launches themselves. For instance, high winds can prevent crews from hoisting a spacecraft onto the top of a rocket. Thunderstorms can stop all activities on the launch pad. So getting a prediction wrong for even minor preparation work can result in a launch delay down the road.

Florida weather doesn't make it any easier on forecasters. From the thunderstorm that appears almost out of nowhere on a sunny afternoon to invisible winds thousands of feet up, the state's weather patterns offer plenty of seeming contradictions.

"In a recipe, if you have A, B, C and D, you get a certain result," Tumbiolo said. "In weather, you can have all the data that tells you something's going to happen and at the end of the day having something totally different happen. Not only does that challenge me, it interests me."

Learning to expect and predict frequent changes is perhaps the most important lesson. That is a significant departure from the conditions he saw growing up in the Midwest, where whatever conditions were to the west would reliably become the conditions to the east in a short time.

"Here, a lot of weather comes in off the ocean, of course," Tumbiolo said. "That was my biggest transition, getting my hands around the fact that weather comes in from all different directions depending on what kind of day we're having."

The key to deciphering changes is experience, Tumbiolo said. Still, the weather holds a few surprises.

"Sometimes things happen, and to be honest, you just don't know, 'Why did it happen?' But that's part of being a meteorologist."

Tumbiolo, who has been performing the job for 21 years, forecasts for about a dozen launches a year, including missions for LSP.

And, yes, weather forecasters keep score on how many predictions they get right.

"You always want to know that you're doing well or what you can improve, so, yeah, I keep a batting average. Over the past 21 years, I'd have to say my batting average is in the 80 to 85 percentile. If I can get over 80, I'm pretty pleased."

For Tumbiolo and the group of five weather officers, the payoff for a correct forecast is a spectacular rocket launching into the sky to begin a multimillion-dollar mission. The penalty for an inaccurate prediction can be dire.

"We have to forecast for a very specific time, a specific location," Tumbiolo said. "So we can't give a general, broad-brush (forecast), like, 'There's a 30 percent chance of showers today.' "

The meteorologists work from a set of rules that everyone must agree are "go" before a launch is allowed. Each rule covers a specific condition, such as the likelihood of lightning occurring during launch.

"We are evaluating rules, not just making subjective judgments," Tumbiolo said.

The good news is that the forecasters have a lot of technological help to show them everything from clouds, rain and humidity levels to wind high above the surface. From weather balloons to Doppler radar and sophisticated computer models, the forecasters aren't working alone to decipher the future.

"We probably have the densest network of weather instrumentation than any other place that I know," Tumbiolo said.

Sometimes, though, forecasters want their own perspective. As a countdown moves toward zero, Tumbiolo makes his way to the roof of the Morrell Operations Center at Cape Canaveral Air Force Station. The view covers most of the sprawling base and the sky.

There have been a few times when instruments were overruled by the forecasters. For example, radar picked up a small cloud ahead of an Atlas launch. The cloud was predicted to dissipate quickly. When it started growing, Tumbiolo went outside for a firsthand look.

Tumbiolo added, "To me, your best instrument is your eyeballs."

More online

Find out launch weather criteria and more expendable launch vehicle facts at:
www.nasa.gov/centers/kennedy/news/facts/elv/elv_facts.html

Remembering Our Heritage - Celebrating Women's History Month

Duration records of women on Mir set high expectations

By Kay Grinter
Reference Librarian

The fireworks created by the Russian space station Mir as it re-entered Earth's atmosphere over the South Pacific on March 23, 2001, during Women's History Month, seemed not only a celebration of 15 years on orbit, but of the records set by its female crew members.

Only two women contributed to the knowledge amassed aboard Mir during NASA's Shuttle-Mir Program in preparation for the assembly and permanent staffing of the International Space Station, but each made significant space history during her sojourn.

Russian cosmonaut Elena Kondakova, the first woman to visit Mir, served as flight engineer on Mir 17 for 169 days from October 1994 to March 1995. On her first spaceflight, she set the record for being the first woman to make a long-duration spaceflight.

A year later, NASA astronaut Shannon Lucid, with the experience of four shuttle missions, joined the crew of Mir 21. In residence 188 days from March to September 1996, she set an endurance record for the longest spaceflight by an American astronaut.

NASA file/1997

Russian cosmonaut Elena Kondakova, the first woman to make a long-duration spaceflight, prepares to fly on STS-84 in 1997.

Lucid also set the record for the most flight hours in orbit by any woman, a record that stood for 11 years until surpassed by Sunita "Suni" Williams in 2007, with her 195-day stay on the station. Mir 21 was Lucid's last space assignment.

Mir 17 was not Kondakova's only visit to Mir. She served as mission specialist on the STS-84 crew in May 1997, NASA's sixth shuttle mission to rendezvous and dock with the Russian station. Also on the nine-day mission was pilot Eileen Collins, who later became the first woman to serve as a shuttle commander.

The career of NASA astronaut Nicole Stott mirrors that of Kondakova. Stott's first assignment was a long-duration flight aboard the station in 2009, as flight engineer for the Expedition 20 and 21 crews, during which she logged 91 days in space, followed by a 13-day flight in 2011 aboard shuttle Discovery on its final mission, STS-133.

Unlike the astronaut candidates during the Mercury, Gemini, Apollo and space shuttle eras, applicants to NASA's astronaut corps today expect potential assignments to fall in the long-duration category.

NASA file/2011

NASA astronaut and aeronautical engineer Nicole Stott, from Clearwater, Fla., joined NASA at Kennedy Space Center in 1988.

NASA file/1996

NASA astronaut Shannon Lucid set an endurance record aboard Russia's Mir space station in 1996, which stood for 11 years.

"The entire long-duration flight experience was even better than I expected," Stott said, "and I had very high expectations."

Stott explained: "The crew training that we have prepares us very well for both the nominal and potential off-nominal things that can happen. I think this is why I felt so comfortable when I was strapped into Discovery for the first time for launch and the first time floating through the hatch from Discovery to the station. It was a very surreal feeling --- to have the physical place look so familiar, but to be floating at the same time!

Over the years, 44,657 people have applied to become astronauts, not counting those vying for a slot in the 2013 astronaut class. Of the 330 selected, 48 women were deemed to have the "right stuff." Today, 14 of the 57 active astronauts are women.

Stott had this advice to offer her colleagues: "Take the time to talk with flown crew members who are more than happy to share their experiences and lessons learned.

"Know that when you finally do fly, it will be a challenging, busy, rewarding and totally awesome experience."

A typical station assignment lasts 180 days. However, NASA's International Space Station Program Manager Mike Suffredini announced March 20 that a 500-day international expedition aboard the station is under consideration to determine whether deep-space explorers could function physically and mentally on an interplanetary mission to Mars.

One can almost hear spacefaring candidates worldwide sigh in unison, "Awesome!"

Women's panel discusses '50 Years of Progress' at Visitor Complex

By Brittney Longley
Spaceport News

Eleanor Roosevelt once said, "The future belongs to those who believe in the beauty of their dreams." For many women 50 years ago, the dreams of becoming an engineer, an astronaut or even a scientist seemed out of reach. But for half a century, women at NASA have taken those dreams and made them come true, as many started to break barriers and create names for themselves and the women who followed after.

In honor of Women's History Month, Kennedy Space Center hosted a panel discussion, "50 Years of Progress," on March 16, celebrating women and their accomplishments at the center. Held at Kennedy's Visitor Complex, the panel was made up of astronaut Nicole Scott, Launch Services Program Senior Mission Manager Wanda Harding, United Space Alliance's Patty Stratton, Dr. Merri Sanchez of Sierra Nevada Corp., Carol Craig of Craig Technologies, and former NASA employees Kathleen Harer and Judy Kersey. The event was moderated by WKMG-6 news anchor Lauren Rowe.

The women discussed the struggles and achievements it took to pave the way for the women of today.

"I think it is important to tell women that they can do more than become a nurse or a teacher, that they can become a scientist or even an engineer," Harding said.

In a centerwide letter addressing Women's History Month, Kennedy Director Bob Cabana said, "I hope this will inspire each of us to do our part to mentor and encourage young women in our community to reach for the stars."

A common thread among the speakers was each had a strong interest to push the agency's initiative to encourage people to pursue careers in the science, technology, engineering and math (STEM) disciplines.

"We wanted to give the audience a diverse set of experiences as we celebrated their triumphs and learned from their tribulations," Speakers Bureau coordinator Amanda Griffin said.

Many of the women agreed that it took a lot of effort and struggle to get them where they are today. They said with perseverance and strength, they were able to pave the way where no women had gone before, breaking stereotypes and enabling them to go wherever their dreams led them.

In celebration of Kennedy Space Center's 50th anniversary, enjoy this vintage photo . . .

FROM THE VAULT

NASA file/1983

Delta 170 thunders away from Complex 17B on Cape Canaveral Air Force Station at 7:08 p.m. on June 28, 1983, carrying the Galaxy 1 communications satellite into orbit. The north side of Port Canaveral is visible in the foreground.

Looking up and ahead . . .

*** All times are Eastern**

2012

Under review	Launch/Reagan Test Site Kwajalein Atoll: Pegasus XL, NuSTAR Launch window: 11:30 a.m. to 3:30 p.m.
No earlier than April 27	Launch/CCAFS (SLC-41): Atlas V, AEHF 2 Launch window: TBD
Targeted for April 30 +	Launch/CCAFS (SLC-40): SpaceX Falcon 9, Dragon C2/C3 Launch time: 12:22 p.m.
No earlier than June 28	Launch/CCAFS (SLC-37B): Delta IV-Heavy, NROL-15 Launch window: TBD
No earlier than Aug. 23	Launch/CCAFS (SLC-41): Atlas V-401, RBSP Launch window: TBD
No earlier than September	Launch/CCAFS (SLC-37B): Delta 4, GPS 2F-3 Launch window: TBD
Dec. 1	Launch/VAFB: Pegasus XL, Interface Region Imaging Spectrograph (IRIS) Launch window: TBD
No earlier than December	Launch/CCAFS (SLC-41): Atlas V, Tracking and Data Relay Satellite-K (TDRS-K) Launch window: TBD

NASA file/2011

Annual All-American Picnic celebrates Kennedy's 50 years

On Saturday, April 14, Kennedy Space Center will host its annual All-American Picnic at the Kennedy Athletic, Recreation and Social (KARS) Park I. This year is special because Kennedy is celebrating its 50th anniversary (1962-2012). All KSC civil service, contractor, and Cape Canaveral Air Force Station personnel associated with a NASA program and their families are invited to attend.

The picnic will be fully catered with the choice of a traditional barbeque or a vegetarian meal. Scheduled events include a special 50th anniversary exhibit, KSC Idol and Talent Show, a sustainability fair, live entertainment, children's games, community exhibits, a car and motorcycle show, the Chili Cookoff, and much more.

Advance tickets are on sale through April 13 at $8 for adults and $6 for children ages 3 through 12. Children ages 3 and younger are admitted free, but require a ticket. Tickets on the day of the picnic will be available at $12 for adults and $8 for children, but purchase early to ensure your entry to the picnic. Ticket sale locations will be provided in the "KSC Daily News."

As in years past, many volunteers are needed to make this event successful. If you volunteer for a minimum of two hours, you can purchase a discounted ticket for $5 and receive a "2012 KSC All-American Picnic" T-shirt. If you are interested in serving as a volunteer or would like more information about the picnic, visit **http://kscpicnic.ksc.nasa.gov**.

John F. Kennedy Space Center

Spaceport News

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