



GSDO

GROUND SYSTEMS
DEVELOPMENT & OPERATIONS

EXPLORATION BEGINS HERE



PROGRAM HIGHLIGHTS • SEPTEMBER 2014

At NASA's Kennedy Space Center in Florida, the Ground Systems Development and Operations (GSDO) Program Office is leading the center's transformation from a historically government-only launch complex to a spaceport bustling with activity involving government and commercial vehicles alike. GSDO is tasked with developing and using the complex equipment required to safely handle a variety of rockets and spacecraft during assembly, transport and launch. For more information about GSDO accomplishments happening around the center, visit <http://go.nasa.gov/groundsystems>.

NASA Marks Ground Systems Progress at Spaceport of the Future

NASA's Ground Systems Development and Operations (GSDO) Program continues to make significant progress preparing Kennedy Space Center in Florida to launch the agency's Space Launch System (SLS) rocket and Orion spacecraft that will take humans to new destinations in the solar system, including an asteroid and Mars.

NASA announced that the agency has completed a rigorous review process to transform Kennedy from a traditionally government-only launch complex to the world's premier multi-user spaceport. Marking the completion of the milestone, NASA officials approved the program's progression from formulation to development.

"The GSDO program has performed extremely well in developing and implementing solid plans that will support the launching systems of the future," said William Gerstenmaier, associate administrator for NASA's Human Exploration and Operations Mission Directorate.

NASA's three exploration systems development programs--GSDO, SLS and Orion-- have been pursuing parallel development paths that keep each program progressing toward the first SLS and Orion mission. Individually, each program is making progress toward delivering its hardware in support of Exploration Mission (EM)-1 in Fiscal Year 2018.

At Kennedy, engineers and technicians have been improving infrastructure in ways that show the progress documented in the agency-level review.

"The team has made tremendous progress improving



The Vehicle Assembly Building and Launch Control Center are contrasted against a blue sky at Kennedy Space Center. Inside Firing Room 4, GSDO is overseeing efforts to create a new firing room based on a multi-user concept. Photo credit: NASA/Dimitri Gerondidakis

the infrastructure at Kennedy to support SLS and Orion," said Mike Bolger, GSDO program manager. "Kennedy and its ground systems are a key component of sending humans to deep-space destinations."

Third Round of Underway Recovery Tests Completed

NASA, Orion prime contractor Lockheed Martin and the U.S. Navy successfully completed the third round of tests to practice recovering Orion when it splashes down off the coast of San Diego at the end of its December flight test. The mid-September test series, led by NASA's Ground Systems Development and Operations (GSDO) Program, continued to perfect techniques and ensure the full team and all equipment are ready when Orion returns to Earth after traveling more than 3,600 miles in altitude away from the planet.

Two Navy ships, a test version of Orion, several support boats, two helicopters and associated hardware and equipment were used for the tests.

The teams practiced two methods for recovering Orion. The first test began Sept. 11 at Naval Base San Diego, with loading of the test vehicle, equipment and hardware aboard the USNS Salvor (T-ARS 52), a safeguard-class rescue and salvage ship. Also on board were Navy radiomen and a civilian crew. The ship headed out to sea Sept. 12 to test a backup recovery method using the ship's stationary crane.

Starting in calm seas, the team used a 40-ton aft boom crane attached to the Navy ship to retrieve the 20,000 pound Orion test vehicle from the water. They continued recovery efforts in more challenging waters to determine recommended weather and sea condition limits for crane recovery.

On Sept. 15, the USNS Salvor rendezvoused with the USS Anchorage in the open sea and handed off the Orion test vehicle for the next portion of the recovery test.

During the week, the team performed an end-to-end recovery simulation using the ship's well deck,

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The Orion boilerplate test vehicle floated in the Pacific Ocean near the USS Anchorage on Sept. 17 during the third day of Underway Recovery Test 3. U.S. Navy divers in a Zodiac boat, at left, and other team members in a rigid hull inflatable boat prepared the test vehicle for return to the ship. Photo credit: NASA/Kim Shiflett



NASA Administrator Charlie Bolden, at left, talked with Jeremy Graeber, NASA recovery director for Exploration Flight Test-1 Landing and Recovery Operations, on the deck of the USS Anchorage on Sept. 15, during the first day of Orion Underway Recovery Test 3. Photo credit: NASA/Cory Huston



The Orion boilerplate test vehicle was lifted by stationary crane off the side of the USNS Salvor, a safeguard-class rescue and salvage ship, during Underway Recovery Test 4A in the Pacific Ocean on Sept. 14. Photo credit: NASA/Kim Shiflett

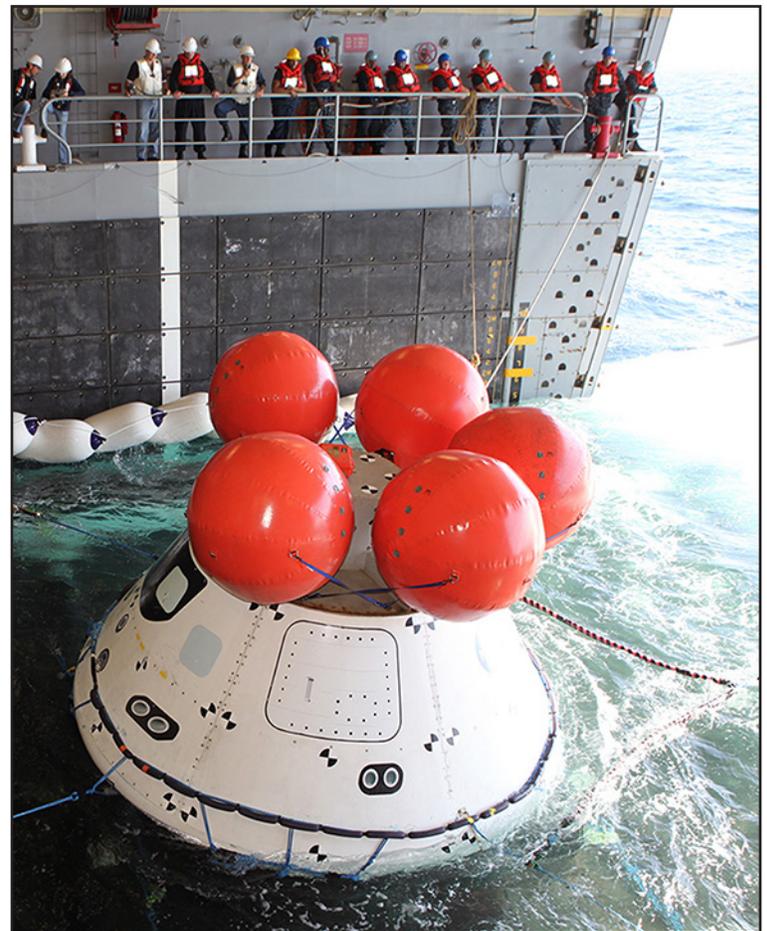
two of the Navy's Zodiac boats, four rigid hull inflatable boats, two helicopters, and equipment and procedures that were used during August testing.

U.S. Navy divers in Zodiac boats and other team members in rigid hull inflatable boats were stationed in the water near the test vehicle. Orange stabilizers on the top of the test vehicle were inflated to simulate the system that will be used to upright Orion in the water after splashdown.

Using tether lines attached to the test vehicle, the team guided Orion back to the ship. In the well deck, NASA and members of the Underway Recovery Test team set up a capture net, crew module recovery cradle, wing well fenders, speed bumps, and used a recovery winch, horse collar and Kevlar tending lines to stabilize Orion in the well deck.

They also practiced retrieving a mock-up of Orion's forward bay cover, a shell that fits over Orion's crew module to protect the spacecraft during launch, orbital flight and re-entry.

For the complete story, visit <http://go.nasa.gov/1uz9gMA>.



The Underway Recovery Test team gathered in the well deck of the USS Anchorage after completion of the test. In the background is the Orion boilerplate test vehicle. Photo credit: U.S. Navy

The Orion boilerplate test vehicle was tethered and guided back into the well deck of the USS Anchorage during Underway Recovery Test 3 in the Pacific Ocean on Sept. 17. Photo credit: NASA/Kim Shiflett

Employee Spotlight -- Sue Gaines Preece

Sue Gaines Preece serves as the Air Force Eastern Range liaison for the Ground Systems Development and Operations (GSDO) Program here at Kennedy Space Center.

As the liaison, she is the go-between for NASA programs, not only GSDO, but also the Space Launch System and the Orion programs, for any interactions with the Air Force Eastern Range.

She worked as the Eastern Range liaison for the Constellation Program. Preece said it was a pretty easy evolution to just move into the same role with the new program. It provided some continuity between the two programs, since the Air Force folks already were used to seeing her.

Preece has worked at Kennedy for 29 years. She started in the Space Shuttle Program, working on mechanical systems on the shuttle, primarily the landing gear, which was a critical system. She also worked in the Environmental Program and actually helped develop the first Spaceport Master Plan back in the early 2000s.

"One of the coolest parts of my job is actually being able to work between the two cultures, between the



NASA culture and the Air Force culture," Preece said. "It makes it a very interesting job, particularly when you're trying to discuss technical solutions. It's challenging to work across cultures, but that's what makes the job really fun."

Preece's husband, John, is a scientist for the USDA in Davis, California. They have a daughter, Erin, who lives in Portland, Oregon, and a son, Elliot, who lives in St. Petersburg, Florida.

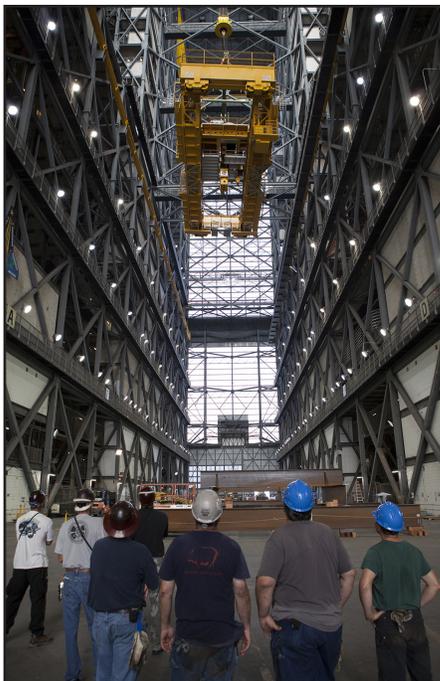
Preece grew up in Lexington, Kentucky, but also lived in Corvallis, Oregon, and southern Illinois.

She has two pets, a cat named Dottie, and a California German Shepherd named Margot. Her favorite previous pet was a para-

keet named Pearl, who talked.

Her first car was a bronze 1972 Opel Manta. Her hobbies include sewing, cross-stitch, reading and travel.

"My hope for NASA is that we will realize our vision of sending humans out into the solar system and beyond in order to learn about our universe. But, more importantly, to improve the quality of life on Earth for future generations," Preece said.



Inside the Vehicle Assembly Building, construction workers watch as the 175-ton crane is lowered by crane from Level 16 down to the transfer aisle floor Sept. 18. Upgrades to the crane's 45-year-old controls will be performed in order to improve reliability, precision and safety. Photo credit: NASA/ Daniel Casper



A crane is used to lift the final large steel beam for installation on the base of the mobile launcher (ML) on Sept. 22 at the Mobile Launcher Park Site. The ML is being modified and strengthened to accommodate the weight, size and thrust at launch of NASA's Space Launch System and Orion spacecraft. Photo credit: NASA/ Daniel Casper