



## PROGRAM HIGHLIGHTS • FEBRUARY 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/groundsystms>.

## New Roller Bearings Tested on Crawler-Transporter 2

The crawler-transporter that will carry NASA's Space Launch System (SLS) and Orion spacecraft to Launch Pad 39B for liftoff on Exploration Mission-1 in 2017 recently passed the first phase of an important milestone test at Kennedy Space Center in Florida.

The Ground Systems Development and Operations Program completed testing of the new traction roller bearings on crawler-transporter 2 (CT-2), on two of the massive vehicle's truck sections, A and C, in late January. During the test, CT-2 was driven unloaded on crawler-way C, between the Vehicle Assembly Building and Ordnance Road.

As the crawler moved along, the left- and right-hand steering was tested in both directions. Workers performed visual inspections of the roller bearing pumps, valves and lines to ensure that the grease injectors worked properly and provided the required flow of grease to the new roller assemblies.

"The temperatures of the roller assemblies were monitored and recorded using newly installed thermocouples," said Mike Forte, a senior project manager with QinetiQ on the Engineering Services Contract. "We were looking for any anomalies and establishing a baseline operating temperature for the new roller assemblies."

Forte said temperature data on the surface of the roller assemblies also was collected using hand-held infrared temperature monitoring devices. "We also closely



Crawler-transporter 2 enters the Vehicle Assembly Building at Kennedy Space Center on Jan. 31. Visible are the new roller bearing assemblies that were installed on the crawler. GSDO recently completed a roller bearing assembly test on truck sections A and C of the crawler.

monitored the system for any unanticipated vibrations or noise, which are indications of problems," Forte added.

Upgrades to CT-2 are necessary in order to increase the lifted-load capacity from 12 million to 18 million pounds to support the weight of the mobile launcher and future launch vehicles, including the SLS and Orion.

For the complete story, visit <http://go.nasa.gov/1qfWY1s>.

# Mobile Launcher Upgrades Will Support Space Launch System

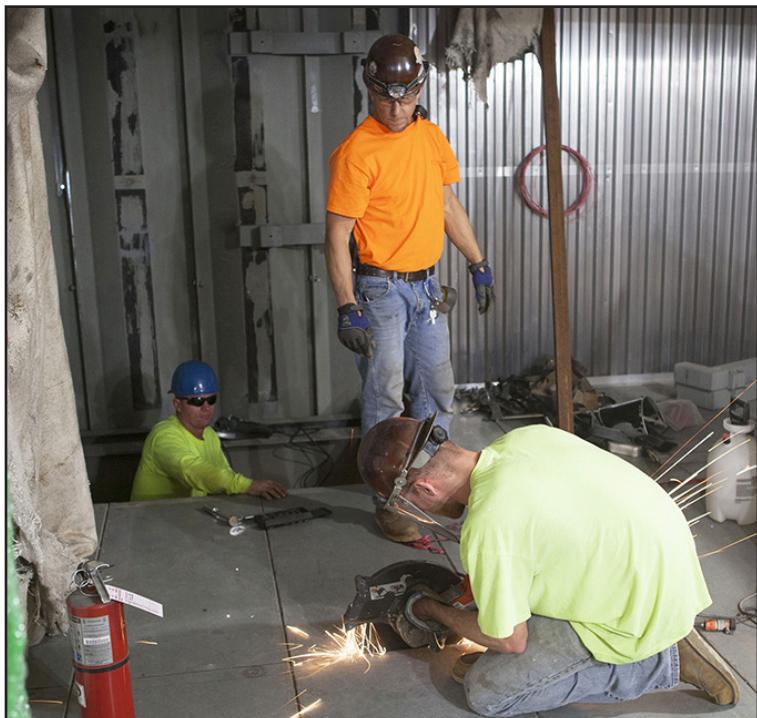
The mobile launcher that will support NASA's next heavy-lift launch vehicle, the powerful Space Launch System (SLS), is being bulked up in preparation for the forces of liftoff.

The steel mobile launcher towers 405 feet above its construction site in the heart of Launch Complex 39 at NASA's Kennedy Space Center in Florida. While the structure itself is undergoing significant modifications to fit the new vehicle, additional work is bringing new capabilities to the construction site.

The SLS rocket will be capable of sending humans to an asteroid, Mars or other destinations. Its first flight test is slated for 2017, and efforts to prepare launch facilities and support equipment are in full swing at Kennedy. The Ground Systems Development and Operations (GSDO) Program, based at Kennedy, manages the project.

Although the SLS vehicle still is in development, there is enough information already available that the team could begin the time-consuming work of updating the launcher's structure. The primary goal is to reconfigure and strengthen it to accommodate the weight, size and thrust of the new rocket.

"Ultimately, we're modifying the mobile launcher to expand the exhaust opening from about 22 by 22 feet to approximately 64 by 32 feet," said Mike Canicatt, mobile launcher construction manager. That means re-



Modifications continue Feb. 12 on the Mobile Launcher at the Mobile Launcher Park Site at Kennedy Space Center. A construction worker uses a saw to cut through a portion of the flooring beneath the surface of the ML.



Fog envelops the top of the 405-foot-tall Mobile Launcher at Kennedy Space Center on Feb. 7.

arranging one of the massive steel support beams within the launcher's platform, installing five newly fabricated pieces, and relocating and modifying another piece.

Prime contractor J.P. Donovan of Rockledge, Fla., is handling the work for this part of the project with support from Midwest Steel of Detroit. Work under the current contract began in June 2013 with completion scheduled for December 2014. Nearly all of the necessary demolition work around the original exhaust opening already is complete, clearing the way for structural changes.

"We have to make sure everything fits perfectly," Canicatt said. "There are a lot of tight tolerances on this particular project, so if things shift just half an inch or a quarter of an inch, we'll say, 'OK, what do we need to do?'"

For the complete story, visit <http://go.nasa.gov/1qg13Jf>.

# Orion Underway Recovery Test Begins off Coast of California

About a hundred miles off the coast of San Diego, in the Pacific Ocean, a U.S. Navy ship's well deck filled with water as underway recovery operations began Feb. 18 on a test version of NASA's Orion crew module, tethered inside, to prepare for its first mission, Exploration Flight Test-1, in September.

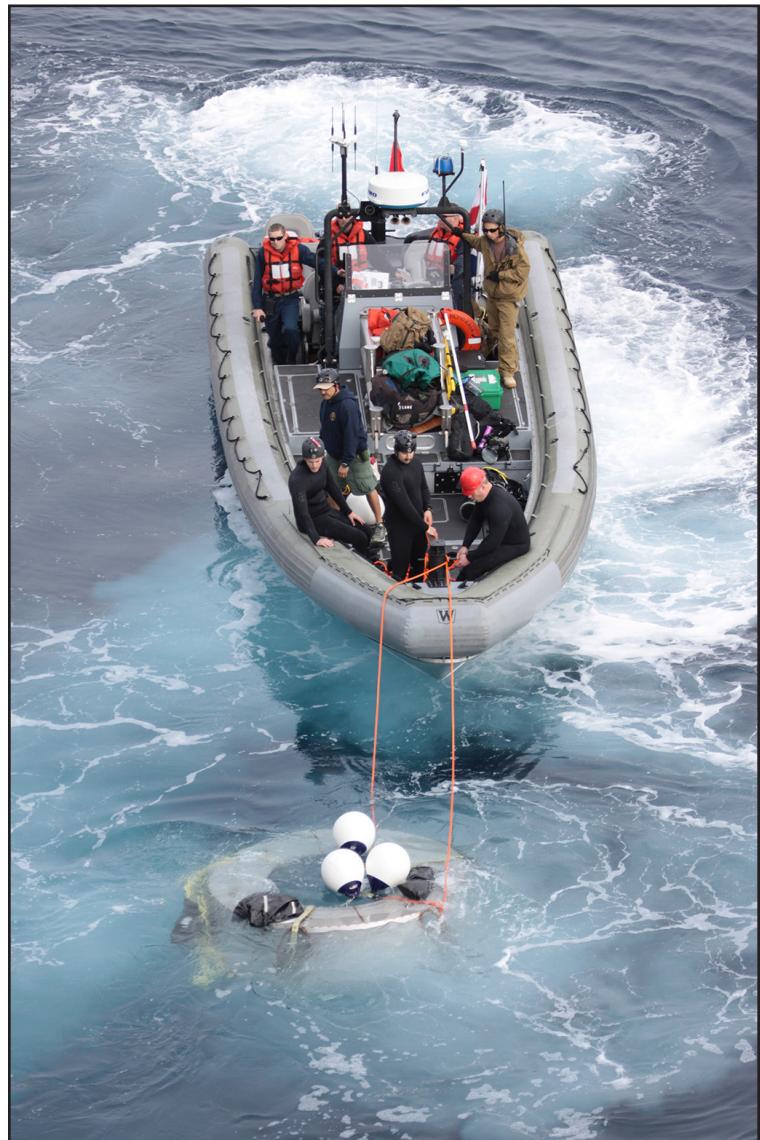
Building on the knowledge gained from previous Orion recovery tests performed in calm waters near NASA's Langley Research Center in Virginia, the agency's Ground Systems Development and Operations (GSDO) Program began the next phase, seeking turbulent water off the west coast in which to practice recovering the Orion crew module, one parachute and a forward bay cover, which keeps Orion's parachutes safe until being jettisoned, just before the parachutes are needed.

During the testing, the tether lines were unable to support the tension caused by crew module motion that was driven by wave turbulence in the well deck of the ship. NASA and the U.S. Navy called off the week's remaining testing to allow engineers to evaluate the next steps.

"Even though the testing didn't go as we had planned, we're learning lessons that will help us be better prepared to retrieve Orion after it travels more than 3,600 miles into space and comes home," said Bill Hill, assistant deputy associate administrator for exploration



On the USS San Diego, a crane is used to lower a rigid hull inflatable boat into the Pacific Ocean as part of the Orion underway recovery test Feb. 18. The Orion boilerplate test vehicle and other hardware were secured in the well deck of the ship in preparation for the test about 100 miles off the coast of San Diego, California. NASA and the U.S. Navy practiced recovery of the Orion forward bay cover and a parachute.



During an Orion Underway Recovery Test about 100 miles off the coast of San Diego, Calif., NASA and the U.S. Navy successfully retrieved the forward bay cover and a parachute from the Pacific Ocean on Feb. 18.

systems development at NASA Headquarters in Washington. "The Orion testing work we do is helping us work toward sending humans to deep space."

Several of the objectives were accomplished before the remaining tests were called off. NASA and the U.S. Navy were able to successfully recover the forward bay cover and parachute, and demonstrations of the coordination required between the team aboard the ship and mission control in Houston were accomplished.

To read more about the recovery test, visit <http://go.nasa.gov/1qfXdQe>.

For more information about Orion, visit <http://www.nasa.gov/orion>.

# Employee Spotlight – Yves Lamothe

Yves Lamothe is a system engineer in the Ground Systems Development and Operations (GSDO) Program at Kennedy Space Center. His main responsibilities include providing technical leadership, management and integration of development activities for the program.

Prior to working in GSDO, Lamothe worked in the Engineering & Technology Directorate as a systems engineer supporting the Constellation Program. He has worked at Kennedy since 2005.

"Working in the GSDO Program, I get to be part of the team that will transform Kennedy's infrastructure to process and launch the Space Launch System rocket and the Orion capsule," Lamothe said. "Part of that also will be helping to posture the center to support commercial entities."

One of Lamothe's recent accomplishments was successfully leading, coordinating and executing the kickoff of the Preliminary Design Review for GSDO.

When he's not working, Lamothe is a DJ, a personal trainer and a life coach.

"I enjoy working with and helping people as much as I can," Lamothe said.

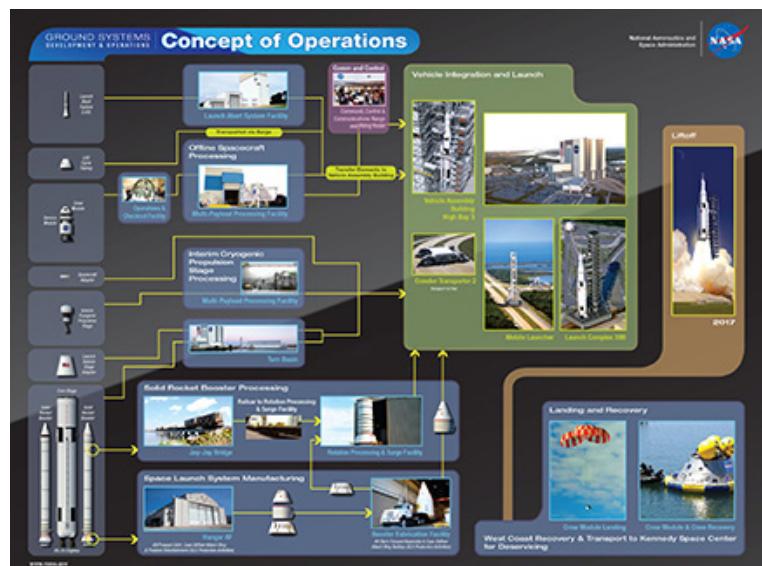
His first car was a 1986 Chevy Cavalier Hatchback that he purchased from a neighbor for \$50.



Lamothe lives in Rockledge with his wife, Jael, who also works at Kennedy, and their three children, Alena, Christian and Brielle.



From left, NASA astronauts Tyler "Nick" Hague, Andrew Morgan, Jessica Meir, Christina Hammock, crawler-transporter integration manager Mary Hanna, and astronauts Nicole Mann, Anne McClain, Josh Cassada and Victor Glover pose in front of crawler-transporter 2 inside the Vehicle Assembly Building during a daylong set of briefings and tours of different facilities March 3 at NASA's primary launch center.



GSDO developed a Concept of Operations chart that illustrates the processing flow and facilities that will be used to prepare the Orion spacecraft, launch abort system and Space Launch System for launch, splashdown and recovery. To view a full page version of the chart, click on the photo.