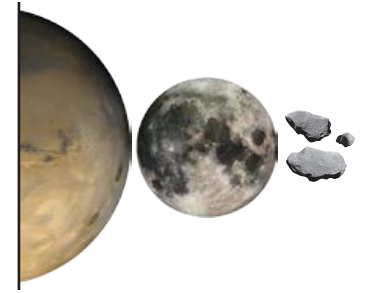


**MONTHLY
ACCOMPLISHMENTS**
February 2014

Orion



Exploration Flight Test-1 Launch Prep Gets Boost as Rocket Arrives in Florida



The Orion spacecraft has moved another step closer toward its first test flight, as the core and starboard boosters for the United Launch Alliance (ULA) Delta IV Heavy rocket contracted by Lockheed Martin for that flight have arrived at Cape Canaveral Air Force Station. The rocket will undergo testing and processing at ULA's Horizontal Integration Facility to prepare for Orion's Exploration Flight Test-1 later this year.

Technicians offloaded the boosters from a specially designed ship called the Delta Mariner, which departed from the ULA facility in Decatur, Ala., on Feb. 21 and arrived in Florida

on March 3. Once in the Horizontal Integration Facility, processing and testing will be completed in preparation for rolling the Delta IV Heavy out to Space Launch Complex 37 for launch.

Prior to its departure from Decatur, NASA, Lockheed Martin and ULA senior leadership participated in a media event on Feb. 21. They conducted interviews with Alabama television, print and radio reporters. Media coverage included WAFF-TV, WAAY-TV, WHNT-TV, Space Coast Daily, Huntsville Times and The Decatur Daily.



Photo: Ball Aerospace

Orion Communication Antennas Delivered for EFT-1 Mission

Ball Aerospace & Technologies Corp. delivered four phased array antennas to Lockheed Martin and NASA's Kennedy Space Center for the inaugural test flight of the Orion spacecraft. The antennas, which will be installed on the exterior of Orion, are the primary means of voice, data and video communications for the future astronaut crews that will pilot the nation's next generation spacecraft beyond low-Earth orbit on long-duration, deep-space missions.

The antennas are currently being tested at Kennedy to verify that the beam-pointing algorithm works accurately in the fully integrated vehicle configuration. During Exploration Flight Test-1, the antennas will be tested for their ability to maintain telemetry and command links to/from the ground under the extreme conditions encountered during ascent and re-entry, and to support high-data-rate video on orbit.



The Orion team at Kennedy Space Center successfully completed the structural loads testing of the Exploration Flight Test service module this month. The service module is now complete and ready for mating to the crew module in May.



Read about Cindy Nafus, senior production leader at United Launch Alliance in Decatur, Ala. on.fb.me/OhK22g

Orion Testing Provides Lessons and Data for Splashdown Recovery Operations

The first full joint testing between NASA and the U.S. Navy for Orion recovery procedures off the coast of California was suspended after the team experienced issues with handling lines securing a test version of Orion inside the well deck of the USS San Diego.

NASA and the Navy were conducting tests to prepare for recovery of the Orion crew module after it splashes down in the Pacific Ocean at the end of its first space-flight later this year. The testing was planned to allow teams to demonstrate and evaluate the processes, procedures, hardware and personnel that will be needed for recovery operations.

The 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. The team called off the week's remaining testing to allow engineers to evaluate next steps.

The challenges that arose demonstrate why it is important to subject Orion to tests in the actual environments that the spacecraft will encounter during a mission.

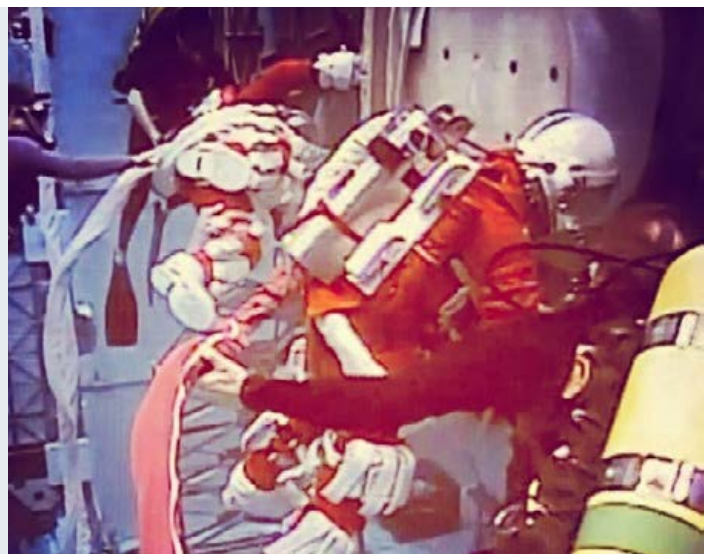
The testing has provided important data that is being used to improve recovery procedures and hardware ahead of Orion's first flight test. Several of the test objectives were accomplished before the remaining tests were called off, including successful recoveries of the forward bay cover, parachute and demonstrations of the coordination required between the team onboard the ship and mission control in Houston.



Spacewalk and Suit Testing in the NBL

An upgraded version of the Advanced Crew Escape Suit that astronauts wore for shuttle launches and landings is being developed for that role in future Orion spacecraft flights, as well as for use during contingency spacewalks. Two of those suits were tested simultaneously in the Neutral Buoyancy Laboratory (NBL), by astronauts Dan Burbank, and Rex Walheim, who is chief of the Exploration Branch in NASA's Astronaut Office and representative to the Orion program.

Watch a recent interview with Rex Walheim on Space Station Live: bit.ly/1cNHj7A



Engineers Continue Pushing Orion Parachute System to its Limits

The parachute system designed for NASA's Orion spacecraft passed another hurdle on Feb. 26, in a test that put extra stress on its drogue parachutes and simulated a failure of one of its three main parachutes.

Engineers dropped a dart-shaped test vehicle that simulates Orion's parachute compartment from a C-17 flying 35,000 feet above the U.S. Army's Yuma Proving Ground in Arizona. Although one test has been conducted from that height before, this was the first using the dart-shaped vehicle at that altitude.

This test verified that the drogue parachutes will perform successfully during the most extreme speed, altitude and pressure loads they would see in a mission, providing invaluable information to add to the computer models used to design the system that will allow crews in Orion to splashdown safely in the Pacific Ocean.

During this test, engineers repeated the failure of one of the three main parachutes from a previous test to provide more data and opened the two main parachutes at different rates from previous tests to assess a design improvement. They also were able to use three forward bay cover parachutes as programmers to set the test up, which allowed them to obtain more data on those parachutes, even though no cover was used during the test.

Testing Orion's parachutes will ensure that the system is dependable when the spacecraft reenters Earth's atmosphere.

The next parachute test, set for April 23, will skip the drogue parachutes altogether, demonstrating a launch abort scenario that relies only on the three main parachutes to slow the spacecraft safely.



Orion subcontractor Alliant Techsystems, Inc. (ATK) and NASA hosted media preview and grand opening events Feb. 26-27 for the new exploration exhibit at the Clark Planetarium in Salt Lake City, Utah. Orion and Space Launch System content is included in the exhibit, where students participated in Exploration Design Challenge activities, met astronauts, and received a photo of themselves launching on a rocket.

Orion Teams Received The Prestigious Orion Program Manager's Commendation Award



Members of the United Launch Alliance Common Booster Core and Integration, Assembly and Check Out team received the Orion Program Manager's Commendation for their dedication to perfect product delivery, continuous hard-work and focus on mission success for the Exploration Flight Test vehicle.



The Orion Program Manager's Commendation was presented to the Orion Spacecraft Adapter Cone Acceptance Test team for their outstanding efforts in successful testing of the Orion spacecraft adapter cone in support of Exploration Flight Test-1.



The Orion Service Module Composite Fairing Acceptance Test team received the Orion Program Manager's Commendation for their outstanding efforts in successful testing of the Orion service module composite fairings in support of Exploration Flight Test-1.



Brent Gaddes and Patrick Hull, engineers at NASA's Marshall Space Flight Center in Huntsville, Ala., recently were honored for their work on Orion's spacecraft adapter hardware. The awards were presented by John Casper, Orion special assistant for program integration and former astronaut.



Get On Board!

The NASA Orion Program kicked off I'm on Board, a public engagement campaign to generate awareness and excitement about Orion's first space flight – Exploration Flight Test-1. Banners for the campaign were featured at several outreach and supplier events held in February, including on board the USS San Diego, the Reuben H. Fleet Science Center and San Diego Air & Space Museum Feb. 21 – Feb. 23, the Clark Planetarium in Salt Lake City, Utah, on Feb. 26-27 and United Launch Alliance in Decatur, Ala., on Feb 19.

The “I’m on Board” outreach gives people of all ages a chance to learn about Orion, sign the I’m on Board banner and post their “selfies” to the #ImOnBoard Twitter, Facebook and Instagram conversations. Social media postings from these events can be seen on:

Facebook	facebook.com/NASAO Orion
Twitter	twitter.com/NASA_Orion
Instagram	instagram.com/explorenasa



◀ Julie Kramer White, Orion's chief engineer, discussed the future of human spaceflight at a Lunch and Learn event at the Johnson Space Center on Feb. 13.

View the latest Exploration Systems Development quarterly videos at:

bit.ly/1ITw2dC
bit.ly/1epD9me





Californians Contribute to Orion Progress

NASA and Lockheed Martin representatives met with California suppliers Feb. 22-25 in the San Diego and Los Angeles area in conjunction with the Underway Recovery Testing at Naval Base San Diego. Pentair Technical Solutions of San Diego, Meggitt Sensing Systems of Irvine, and Martinez & Turek Inc. of Rialto,

hosted employee all-hands Orion presentations and facility tours to provide a behind-the-scenes look at how they design and build their components for the Orion spacecraft. Photos of the visits can be found on the Orion Facebook page at: on.fb.me/1oJ895n



SEEC and Ye Shall Learn

Lockheed Martin and NASA Orion team members supported the 2014 Space Exploration Educators Conference held at Space Center Houston on Feb. 6 - 7.

Hundreds of teachers from around the world attended presentations by NASA program scientists, engineers and educators to learn new ideas to invigorate Science Technology, Education and Math (STEM) education in the classroom, including the Exploration Design Challenge, which will fly a student payload on Orion this fall.

In addition, Orion engineers provided briefings for the educator tours as they stopped by the full-scale Orion mockup in the Space Vehicle Mockup Facility at Johnson Space Center. More information and photos from the event can be found at: on.fb.me/1foXZ9o



Read about John Menoni, captain in the United States Navy, USS San Diego, San Diego, Calif. on.fb.me/PoG4pX

Coming up in March

- Crew module functional testing
- Forward bay cover ground jettison testing
- Launch abort system fillets on dock at KSC