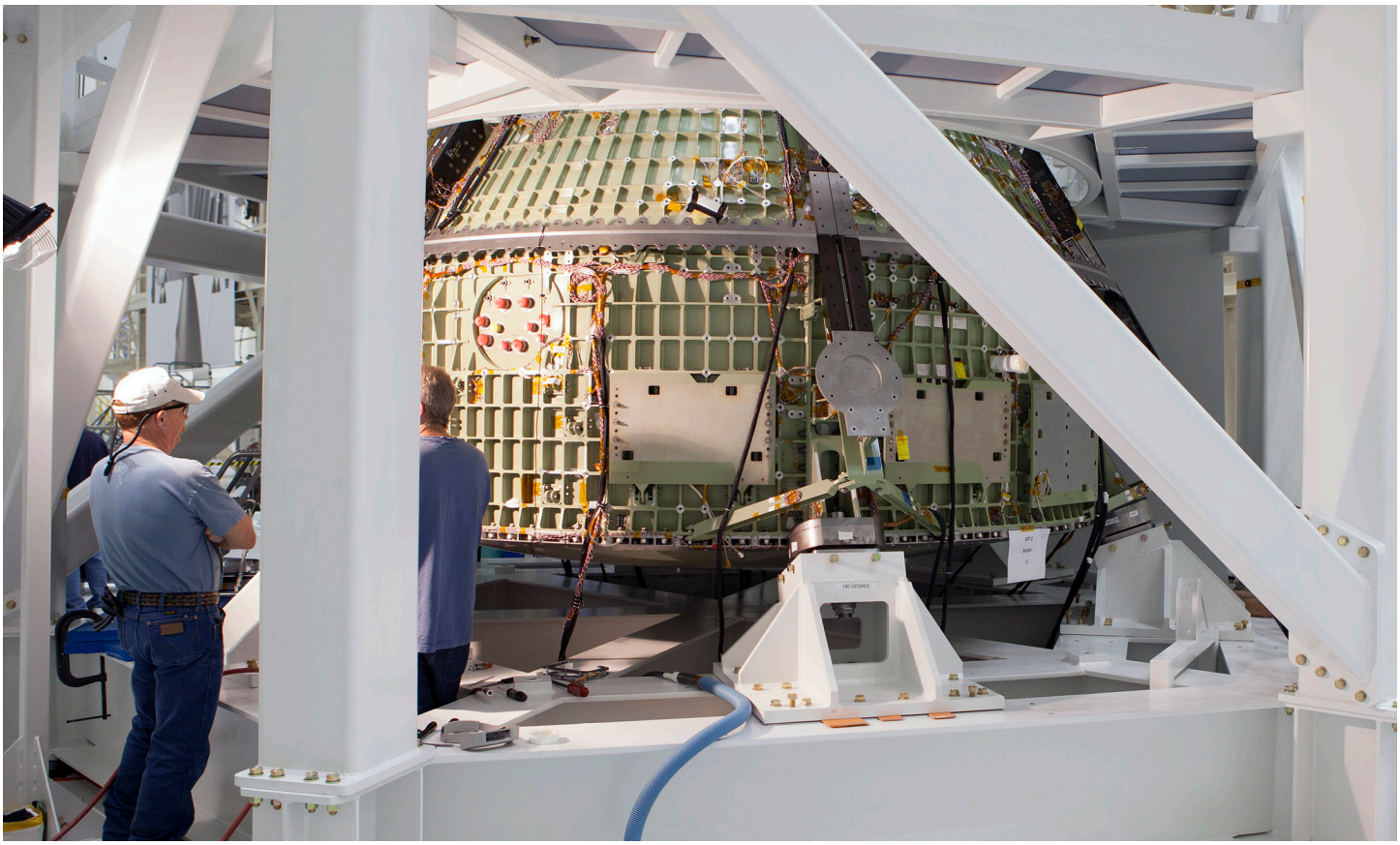
MONTHLY ACCOMPLISHMENTS
April 2013

orion

Orion flight test vehicle takes on heavy loads at Kennedy



On April 8, the EFT-1 Orion crew module was secured in a massive 20-foot-tall static load test fixture inside the Operations and Checkout Building at the Kennedy Space Center. Static loads testing uses hydraulic cylinders to slowly apply pressure to various areas of the spacecraft to simulate the loads it will have to operate under during launch, reentry and landing. The series of tests being conducted throughout May require more than 1,000 instruments to measure how the spacecraft's structure reacts to the various pressures applied.

During the Exploration Flight Test (EFT-1) in 2014, Orion will travel 3,600 miles into space and return to Earth for a high-speed re-entry at more than 20,000 mph. The most intense loads on this flight will occur during ascent, first stage separation, launch abort system jettison, parachute deployment and landing. The flight test will allow NASA to evaluate Orion's performance and integrity in preparation for the spacecraft's future deep-space expeditions.

Heat shield shipped to Textron

The Orion heat shield carrier structure arrived at Textron Defense Systems in Wilmington, Mass., early this month and is now entering its next phase of development: application of the Avcoat ablator. The shield has undergone grit blasting (shown here), priming, Honeycomb lay-up and vacuum bagging, and the Honeycomb bond cure cycle is now in progress. The Orion heat shield is the world's largest composite heat shield structure ever built for a high speed deep space re-entry. The shield, which is 5 meters in diameter, is critical to the protection of the spacecraft and the crew from the extreme temperatures experienced during re-entry.

Integrated Test Lab gearing up for 2014 flight

The final avionics delivery of forward bay cameras was shipped to the Integrated Test Lab (ITL) in Denver, which is now 100 percent complete with the hardware configuration needed for the EFT-1 flight. Two of four flight power and data units (PDUs) are also at full EFT-1 configuration at the ITL in preparation for flight.

Final reaction control system pod arrives for Orion EFT-1

The last of eight reaction control system pods for NASA's EFT-1 arrived in mid-April at Kennedy Space Center's Operations and Checkout Building from the manufacturer, Aerojet, in Redmond, Wash. The first set of pods arrived at Kennedy on Feb. 18, with subsequent pods arriving March 11, and April 5 and 19.

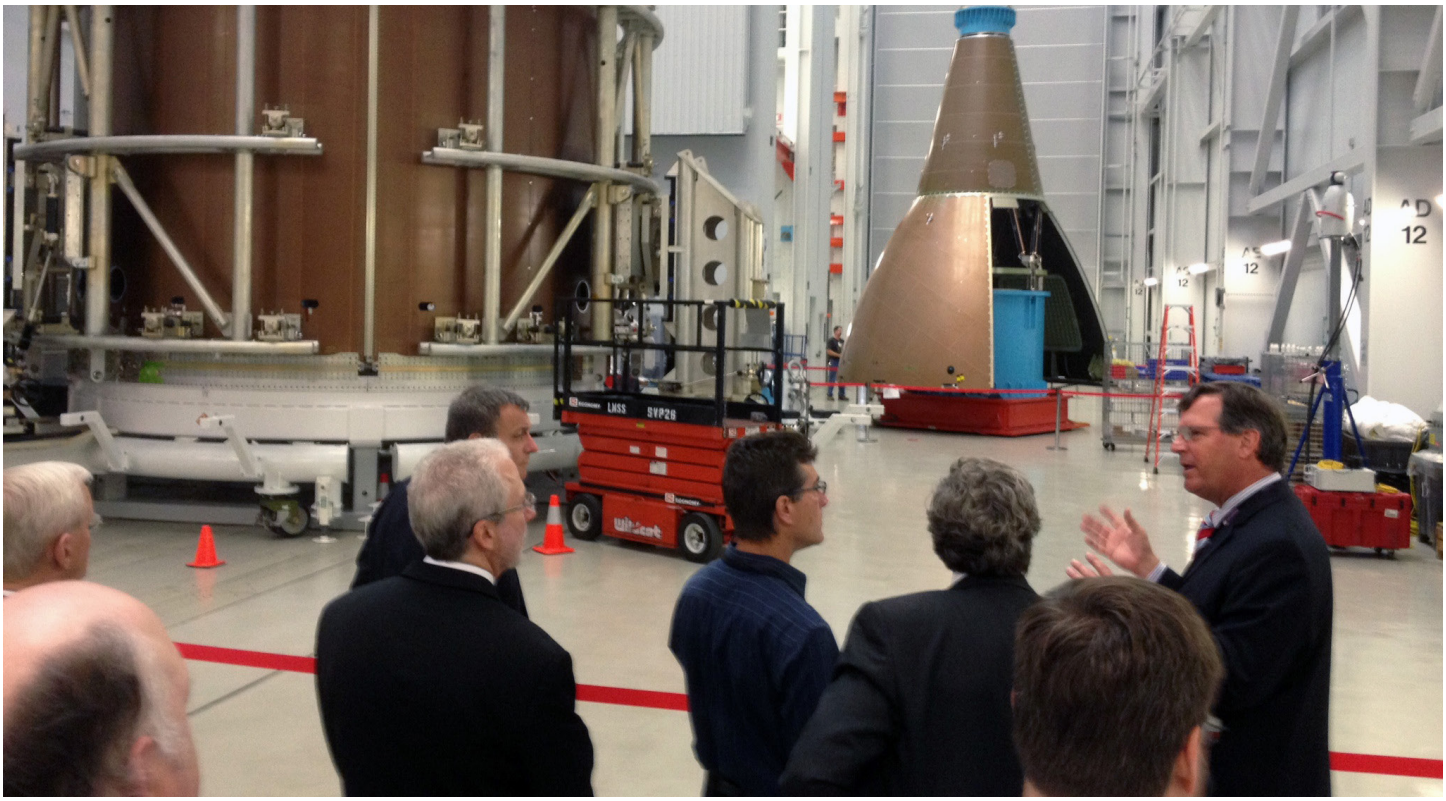
Included in the group are two pitch-up thruster pods, two pitch-down thruster pods, two yaw pods and two roll thruster pods. Two of the single engine pods will be located in the crew module's forward bay, with the remaining pods located in the aft bay. Together they will provide full attitude control during Orion's re-entry and landing.

Beginning in June, the pods will undergo additional proof pressure and leak testing, valve leak testing and rocket engine functional testing at Kennedy.

Aerojet prepares for testing with HFTA

The hot fire test article (HFTA), which was shipped from the Lockheed Martin facility in Denver to Aerojet in Sacramento, Calif., has been loaded into the test cell in preparation for the upcoming hot fire testing in June. Hot fire testing will be conducted on four crew module thrusters to validate design and performance prior to EFT-1.

Significant progress on EFT-1 service module components



White paint was applied to the EFT-1 service module shear panels at Kennedy Space Center to provide thermal protection for the vehicle. The installation of the service module forward bulkhead tooling platform was also completed and the team began drilling the aft wall panels on the service module structure.

Testing continued on the EFT-1 service module outboard wall panels at the Michoud Assembly Facility and the team received shipment of the service adaptor cone.

The team at Michoud also packed and shipped the three EFT-1 service module spacecraft adapter jettison fairing panels to Lockheed Martin's facility in Sunnyvale, Calif. (shown here) for the upcoming fairing separation test scheduled to begin on June 10.

Above: Eric Wiscavage, Lockheed Martin's Structural Test Group Manager, along with the Orion fairing separation team shows Orion program managers the service module and launch abort system test articles at the Lockheed Martin Sunnyvale facility.

Orion attitude control motor arrives at Kennedy

Orion's launch abort system (LAS) attitude control motor (ACM) was shipped from Alliant Techsystems to Kennedy Space Center's Launch Abort System Facility. The LAS mounts on top of the Orion crew module and consists of three solid propellant rocket motors: an abort motor, an attitude control motor and a jettison motor. The ACM keeps the crew module on a controlled flight path after it jettisons, steering it away from the launch vehicle in the event of an emergency, and then re-orients the vehicle for parachute deployment.

The ACM consists of a solid-propellant gas generator, with eight proportional valves equally spaced around the circumference of the three-foot-diameter motor. In combination, the valves can exert up to 7,000 pounds of steering force to the vehicle in any direction upon command from the crew module.

Orion astronaut visits suppliers, conducts outreach in Denver

NASA Orion Program Astronaut Rex Walheim traveled to Denver on April 25 and 26 to conduct Orion facility tours at Lockheed Martin's Waterton Facility and SEAKR Engineering in Centennial, Colo. Program commendations were presented to the SEAKR Orion program management team and the SEAKR Orion program Design and Engineering Team. Rex was a key speaker at Lockheed Martin's Young Minds at Work event and the Denver Museum of Science & Nature.

Orion reaches out to Georgia

In a coordinated effort to tell the larger human space exploration story, the Orion Program joined forces with the International Space Station Destination Station team during a recent visit to Atlanta. NASA Public Affairs Officer Brandi Dean answered questions about the Orion spacecraft at the Fernbank Science Center in Atlanta during an Evening with an Astronaut event. A future combined team event is scheduled for June in Seattle.

Orion and SLS teams update the JSC community

On April 30, Orion Program Manager Mark Geyer, Lockheed Martin Orion Program Manager Cleon Lacefield and SLS Deputy Program Manager Jody Singer addressed the NASA and contractor team at the Johnson Space Center in Houston. A special topic presentation was given on the upcoming fairing separation test by Lance Lininger with Lockheed Martin.

RNASA recognizes stellar Orion team members at 2013 annual awards gala

The NASA/Lockheed Martin Orion team made a stellar showing at the 27th Annual Rotary National Award for Space Achievement (RNASA) gala which honored former United States Senator Kay Bailey Hutchison as the recipient of the 2013 National Space Trophy award for RNASA. The winners were announced at a banquet held April 26 at the Houston Hyatt Regency hotel in downtown Houston.

Out of 135 nominations received, the RNASA panel selected 23 individuals and seven teams for recognition. Orion team members receiving this year's Stellar Award included NASA Orion Crew and Service Module Manager Charles Lundquist and Charles Seaback of UTC Aerospace Systems. Receiving the Stellar Team awards were the NASA Orion Capsule Parachute Assembly System test team and Lockheed Martin's Orion Integrated Test Labs and Orion heat shield teams. Other Orion team members honored as Stellar Award nominees included Lockheed Martin's Les Theard, Razvan Gaza and Jim McMichael, as well as the Oceaneering Space Systems Orion Crew Module Uprighting System engineering team.

Each year, RNASA solicits nominations for Stellar Awards for individual and team achievements from the government, military, and industry. The winners are chosen based on whose accomplishments hold the greatest promise for furthering future activities in space.

Orion participates in third anniversary of president's vision

Kennedy Space Center Director Robert Cabana was host to an event marking the third anniversary of President Obama's new exploration vision at Kennedy's Operations & Checkout building on April 15. At that site in 2011 the president challenged NASA to send astronauts to an asteroid by 2025.

Deputy Associate Administrator for Exploration Systems Development Dan Dumbacher, Orion Program Manager Mark Geyer and Space Launch System Program Planning and Control Manager Keith Kefner had an opportunity to speak to the media about NASA's future. Geyer discussed the progress made on the Orion spacecraft in preparation for the EFT-1 mission in 2014.

Orion team member recognized as IAF Young Space Leader

Kat Coderre from Lockheed Martin Space Systems Company was selected as a 2013 International Astronautical Federation (IAF) Young Space Leader for her overall accomplishments and contributions to the aerospace community and especially to the IAF. The 2013 Young Space Leaders will be inducted at the 64th International Astronautical Congress in Beijing on Sept. 27.