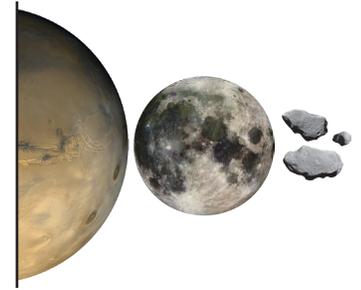


**MONTHLY
ACCOMPLISHMENTS**
Dec. 2012

orion



Year-end message to Orion

It's been an exciting and productive year in Orion...

While challenges are nothing new to the Orion team, now we are doing the hardest part of our work to actually build the hardware and software, integrate it into a deep space spacecraft, and prepare it to fly in space...

This last year alone we have delivered 57 racks of equipment, installed the majority of avionics components, and integrated more than 400 harnesses in our avionics test labs. In those labs we have executed more than 50,000 person-hours of test time. The flight boxes are starting to come off the assembly line in preparation for the vehicle power-on in 2013. The crew module structure was fabricated and welded at Michoud Assembly Facility. It was delivered to Kennedy Space Center where it underwent proof pressure testing at the Operations and Checkout (O&C) building and where the service module skeleton has been assembled. The heatshield composite is in final machining and its titanium skeleton is complete. We have delivered hundreds of parts to the O&C, and released more

than 3,000 drawings. We have completed key component tests as well as water drop tests and five integrated parachute system drop tests. Working with our Space Launch System (SLS) and Ground Systems Development Office (GSDO) partners we have completed key interface requirement documents (IRDs) and begun the integrated analysis that will be so critical to ensuring this integrated system will do the missions we have planned. In preparation for Exploration Flight Test (EFT-1), assembly of the Delta IV heavy rocket is also well underway...

EFT-1 is on schedule to fly in September 2014 and it will be not only be a huge technical test, but also evidence that NASA is still in the exploration business. Remember in the midst of your daily work that you are part of the very special team that is making human exploration of the solar system a reality.

(For Orion Program Manager Mark Geyer's full message, visit the Orion internal site at <http://mpcv.jsc.nasa.gov>)



Orion heatshield progress

The Orion team in Denver completed machining of the EFT-1 heatshield fiber carbon skin, which then went through a 48-hour inspection prior to additional drilling taking place. The final splice plates for the skeleton tool arrived in Denver and were installed on the skeleton tool structure. Once the skin is bolted to its titanium structure, the heatshield will travel to Textron Defense Systems near Boston for application of the final protective coating, called Avcoat, to make the structure heat-resistant. The heatshield is a vital part of the spacecraft as it protects the vehicle and crew during re-entry through the atmosphere. The EFT-1 heatshield should be completed and ready for installation on the vehicle by summer 2013.

NASA signs agreement with ESA for Service Module

NASA has signed the agreement with the European Space Agency (ESA) to provide a service module for the Orion spacecraft's Exploration Mission-1 in 2017. The new agreement, signed on Dec. 19, is in accordance with existing International Space Station agreements and expands on a successful partnership established while building the orbital laboratory. It continues and expands international collaboration as humans explore new frontiers in the solar system.

The service module is the powerhouse that fuels and propels the Orion spacecraft, and the storehouse for air and water that astronauts use during their space travels.

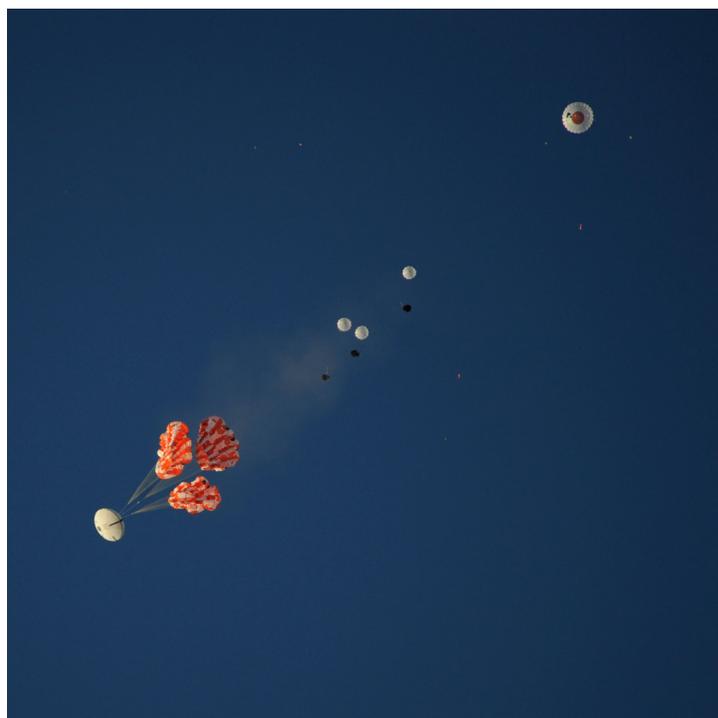
NASA will host a media briefing about this agreement at Johnson Space Center on January 16, 2013, to coincide with the Orion Service Module Design Analysis Cycle 2 kickoff meeting between the NASA/Lockheed Martin and ESA/contractor teams at the center that week.

One step closer to launch

Multiple parachute tests took place this year to ensure the Orion capsule will be able to land safely. The latest test on Dec. 20 at the U.S. Army Proving Grounds in Yuma, Ariz., with the Orion Parachute Test Vehicle (PTV-3) mock-up, demonstrated that the vehicle could land safely even if one of the two drogue parachutes fails to open. The next test in February 2013 will show how the vehicle would land safely if one of the main parachutes malfunctions.

KYMA-TV Channel 11 news covered the parachute drop test: <http://bit.ly/UZzRPD>

KNBC-TV, Los Angeles was also in attendance for the drop test and shot footage for an upcoming newscast in 2013.



Orion takes shape at KSC



The team at Kennedy Space Center's Operations and Checkout building are in the process of wiring the thousands of sensors that will monitor the crew module's performance and are installing the aft gussets on the vehicle.

Installation of the six composite inboard wall panels onto the service module is complete. There are a total of 49 composite panels that will need to be installed.



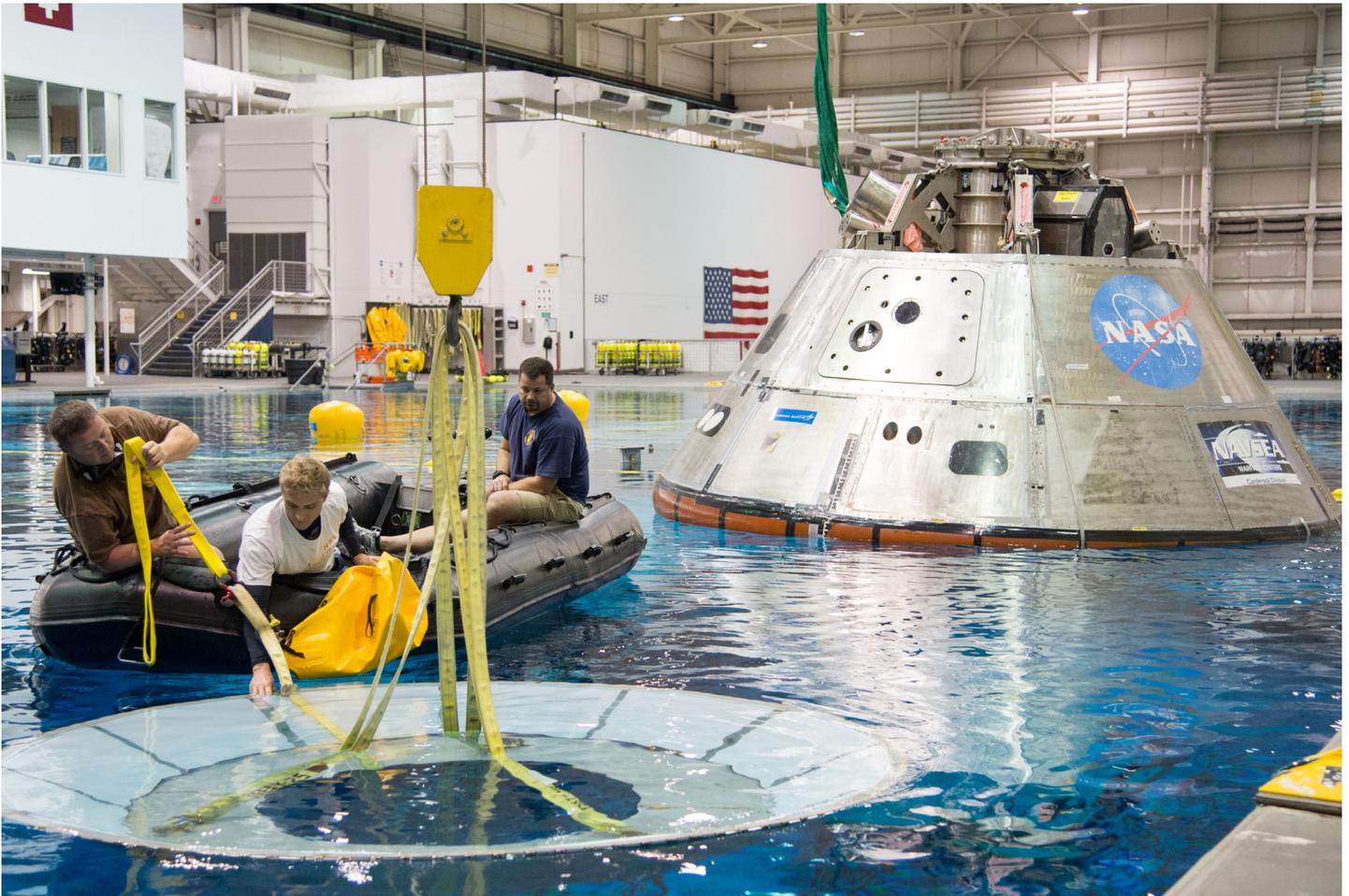
The team is also in the process of drilling and fastening the first two service module diamond panels to the shear web assembly structure.

Over at the Michoud Assembly Facility in New Orleans, all six service module composite shear panels are going through non-destructive evaluation. They'll also be trimmed and tooling holes will be drilled into them before they're shipped to KSC.



Avionics test a success

A developmental interface test between the Orion Exploration Development Lab in Houston and Mission Control Center was completed on Dec. 12. The testing evaluated three different data rate configurations exercising the flow of telemetry, video, and file transfers. The results demonstrated increasing maturity in the functionality and performance of the Orion communications software, and identified specific items of interest for the next developmental test in January.



Orion landing and recovery operations training at NBL

Members of the Orion team at JSC and KSC worked closely with Patrick Air Force Base and U.S. Navy reservists at JSC's Neutral Buoyancy Lab on Dec. 4-7 to help develop procedures and outline training for recovery operations of the Orion crew module and forward bay cover when they splash down off the coast of California during the EFT-1 flight test in 2014.

Orion Recovery and Rescue Lead Tom Walker and Neutral Buoyancy Lab Orion Flight Lead Tim Goddard

were interviewed about recovery operations for the ISS Update program on NASA TV.

Tom Walker interview:

<http://1.usa.gov/ZMS1rP> or <http://bit.ly/Xo2zt4>

Tim Goddard interview:

<http://1.usa.gov/VVLXHc> or <http://bit.ly/URgvyR>

Astronaut visits Orion supplier

Read about Astronaut Drew Feustel's visit to Orion supplier, Airborne Systems. Airborne Systems in Santa Ana, Calif., works closely with NASA's Orion Program on the Orion Entry, Descent and Landing Systems module recovery system.

<http://bit.ly/WIZ7yw>



Honeywell wraps up successful year of progress



On Nov. 14, Honeywell Aerospace welcomed Orion Program Manager Mark Geyer to the Clearwater, Fla., site. Geyer presented the Clearwater Engineering and Production team with a program commendation for completing the engineering development unit (EDU) build and start of flight hardware.

Honeywell's team in Clearwater has remained dedicated to supporting the program schedule for fielding a sophisticated set of Orion avionics hardware including the vehicle management computer (VMC), power data unit (PDU) cards, network interface cards (NIC), Orion inertial measurement unit (OIMU), global positioning system receiver (GPSR) and barometric altimeter.



While in Clearwater, Geyer also provided a program update during an interview with local CBS affiliate WTSP-TV.

On Dec. 12, NASA test pilots and astronauts Lee Archambault and Rex Walheim visited Honeywell's Glendale, Ariz., facility. Honeywell manufactures control momentum products at the site including control momentum gyros and reaction wheel assemblies. Archambault and Walheim met with Honeywell employees and toured the manufacturing areas.

Orion teams receive RNASA Stellar Award nominations

The Orion Integrated Test Lab (ITL) team and the Orion Heatshield team received stellar award nominations for the Rotary National Award for Space Achievement (RNASA). Stellar award winners will be announced at the RNASA banquet in Houston on April 26, 2013.

Each year, RNASA solicits nominations for stellar awards for individual and team achievements from the government, military, and industry. Winners are selected based on which accomplishments hold the greatest promise for furthering future activities in space, the extent to which the nominee played a key role in the accomplishment, and the extent to which the nominee meets the goal of recognizing "unsung heroes."

The ITL team was nominated for demonstrating superior commitment and achievements in the build-up and integration of the Orion Integrated Test Lab and the execution of a series of integrated avionics and software tests for the Exploration Flight Test- 1 mission.

The Orion Heatshield team was nominated for their hard work and dedication in developing the world's largest (5 meters in diameter) composite heatshield structure ever built. The professionalism and teamwork shown by the team has resulted in an advanced thermal protection system that optimizes crew safety during exploration-class spaceflight and re-entry missions.