

**MONTHLY
ACCOMPLISHMENTS**
September
2012

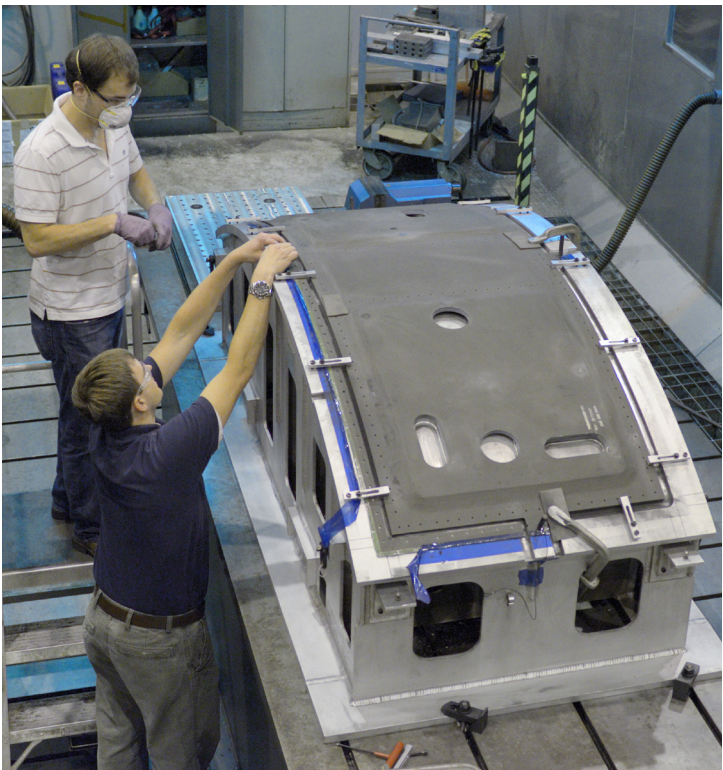
orion



EFT-1 Crew Module prepped for proof test

At Kennedy Space Center's Operations and Checkout building, work is progressing on the Exploration Flight Test (EFT-1) Crew Module. Following placement of the vessel in a birdcage tooling structure to assist the team with assembly operations, the team began installation of the ground test instrumentation and structures, including the forward gussets. The side hatch and docking hatch structures were delivered to KSC in preparation for the crew module proof test in October.

Installation of the EFT-1 Service Module forward outboard ring is in progress and backshell panels were installed on the Orion Ground Test Article. The vehicle is being prepared for loading in the crew module transportation fixture in support of an upcoming pyrotechnic shock test.



First EFT-1 Service Module panel completed at MAF, ready for KSC

Final assembly of one of the EFT-1 Service Module inboard panels is complete and will ship to KSC for final processing. The other five service module composite inboard panels, all four diamond panels and one shear panel have all completed testing and will be ready for final assembly. There are a total of 49 panels that make up the service module composite panel structure.

Other progress at MAF included final curing of the EFT-1 Launch Abort System (LAS) conical adapter, final inspection of the EFT-1 Motor Adapter Truss Assembly flight cone following its final cure, and arrival of the LAS fillet panels 1 and 2, which were installed on the fixture for further assembly.



NASA Orion splashdown tests ensure safe landings for astronauts

The 18,000-pound boilerplate test article that mimics the size and weight of the Orion Crew Module recently completed a final series of water impact tests in the Hydro Impact Basin at the Langley Research Center. The full campaign of swing and vertical drops simulated various water landing scenarios to account for different velocities, parachute deployments, entry angles, wave heights and wind conditions the spacecraft may encounter when landing in the Pacific Ocean.

The next round of water impact testing is scheduled to begin in late 2013 using a full-sized crew module that was built to validate the flight vehicle's production processes and tools. The results of these tests will help fine tune the way NASA predicts Orion's landing loads and will help safeguard astronauts on the spacecraft during their return to Earth.

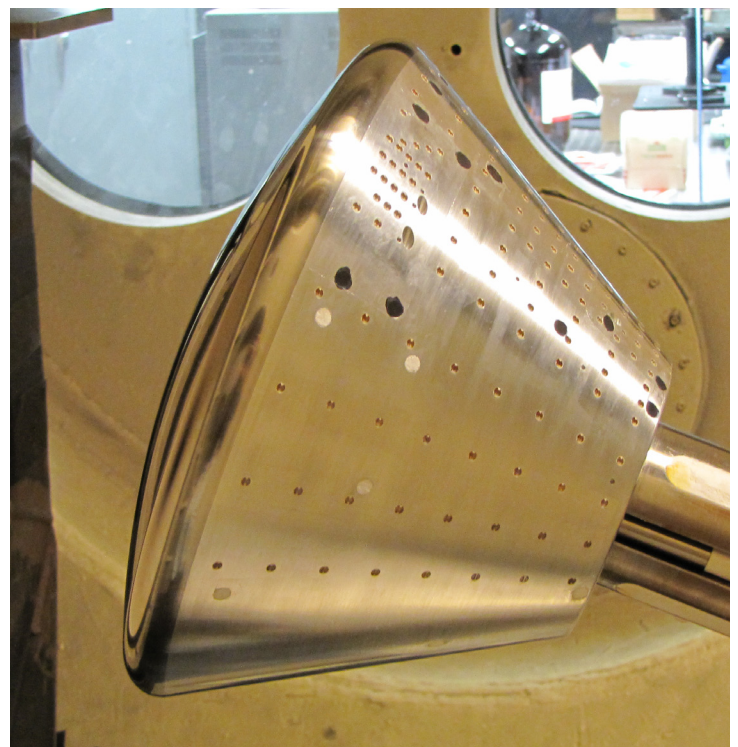
Avionics team releases next version software

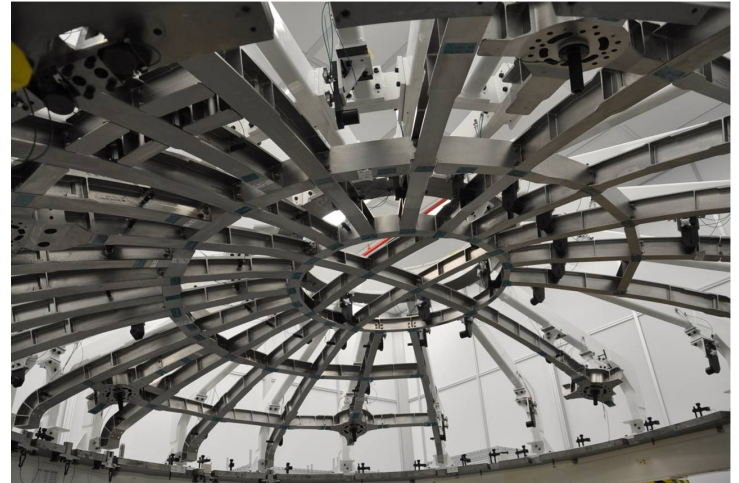
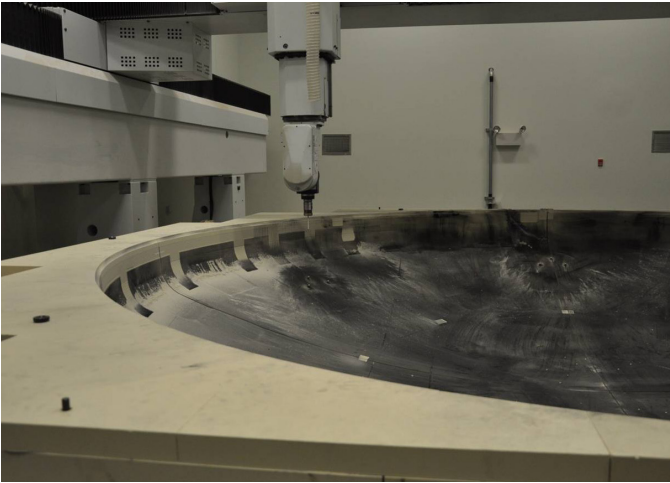
The second release of Orion software version 8.0 was completed on Sept. 8 for integration with dual string, engineering fidelity avionics hardware. This configuration will support dry run testing of crew module power-on and functional testing.

Successful wind tunnel tests

The Aerosciences team completed its planned wind tunnel tests at Calspan-University of Buffalo Research Center. These tests were performed to understand how reaction control system (RCS) jet firings interact with air flowing around the crew module during re-entry and the effect of shock layer chemistry on heating to the Avcoat heatshield.

These data will improve aerothermodynamic heating predictions on the crew module backshell and reduce heating uncertainties. The Aerosciences team is chartered to deliver environment databases covering all Orion flight phases as a government furnished equipment (GFE) product, and since program inception, the team has completed over 40 aerodynamic and 25 aerothermodynamic wind tunnel tests in facilities across the country.





Heatshield foam machining final cut in work

The heatshield carrier structure laminate skin foam manufacturing demonstration unit is in final machining in Denver, Colo. The team will verify the router path on the foam block that mimics the size of the heatshield skin prior to machining the actual flight hardware in a few weeks. Fabrication of the base structure and support ring for

the skin skeleton mate tool are also underway. Mating of the skin and skeleton structure are expected to be completed by the end of October with a proof test in early November. The heatshield will provide ample protection for the crew module as it re-enters the Earth's atmosphere at more than 20,000 mph.

Modified ACES suit undergoes fit checks

The Environmental Control/Life Support System (ECLSS) suit team installed four inflated modified advanced cockpit evaluation system, or ACES, suits in the Orion Exploration Development Lab (EDL) mockup in Houston for an initial assessment of fit and integration to the vehicle. The team is also performing a modified ACES integration into the Neutral Buoyancy

Lab (NBL) feasibility assessment. The assessment is to support the capability to do longer duration suit to seat interface development and testing such as harness manipulation for pressurized seat ingress. The team is currently working in-house hardware fabrication and developing process and hazard reports to support future testing efforts.



RCS roll thrusters testing

Hot-Fire Acceptance Testing of two EFT-1 Crew Module reaction control system (RCS) roll thrusters with long scarfed nozzles was completed at Aerojet in Sacramento. This testing included a standard set of pulse mode and steady state firing sequences at multiple propellant inlet pressures with vacuum conditions in the test cell.

Additional hot-fire testing examined the effects of variable inlet pressure, extended duration firings and total propellant throughput on the nozzle insert. The RCS roll thrusters will be used during the EFT-1 mission to help steer the Orion spacecraft.

EFT-1 voice loop test provides successful results

A voice loop test between the Lockheed Martin Denver Raptor facility, the KSC Communications Distribution and Switching Center and the JSC Mission Control Center was successfully completed on Sept. 27. Nine

voice loops were exercised during the 45 minute test with no drop-offs and good quality reported. The test was conducted in preparation for the EFT-1 launch in 2014.

Parachute team prepares for next air drop test

Initial build activities have been completed on the next parachute drop test vehicle, called PTV-3, which is scheduled for an air drop test on Nov. 7 in Yuma, AZ. The next major set of buildup activities will begin the week of Oct. 8 with installation of pilot parachutes and pyros, followed by vehicle integration and stacking and test hardware avionics checkout. The upcoming drop test will perform objectives of a single drogue parachute deployment, followed by three main parachutes deployment. It will also include the PTV under one programmer prior to drogue deployment. The testing in Yuma helps to validate the parachutes design and demonstrates reliability of a safe landing for a crew returning to Earth.



Visitors learn about Orion at JSC Open House

The Orion mockups at Johnson Space Center were part of a recent open house at the Center on Sept. 29. Special exhibits were displayed by the Capsule Parachute Assembly System team, Orion Aerosciences team and the Students Shaping America's Next Spacecraft (SSANS) project team. Larry Price, Lockheed Martin Deputy Program Manager, was one of the volunteers who came out to talk with the guests at the event that saw an estimated 11,500 visitors.



At the Michoud Assembly Facility in New Orleans, Orion team members continue to construct composite service module components for the EFT-1 vehicle. Watch a video on the latest assembly progress at Michoud. <https://vimeo.com/50317692>

Steady progress has been made by the Orion, Space Launch System and Ground Systems Development and Operations programs. This video showcases how the Agency is creating a capability to reach for new heights in the solar system and push the boundaries of space exploration. http://www.nasa.gov/multimedia/videogallery/index.html?media_id=153233911