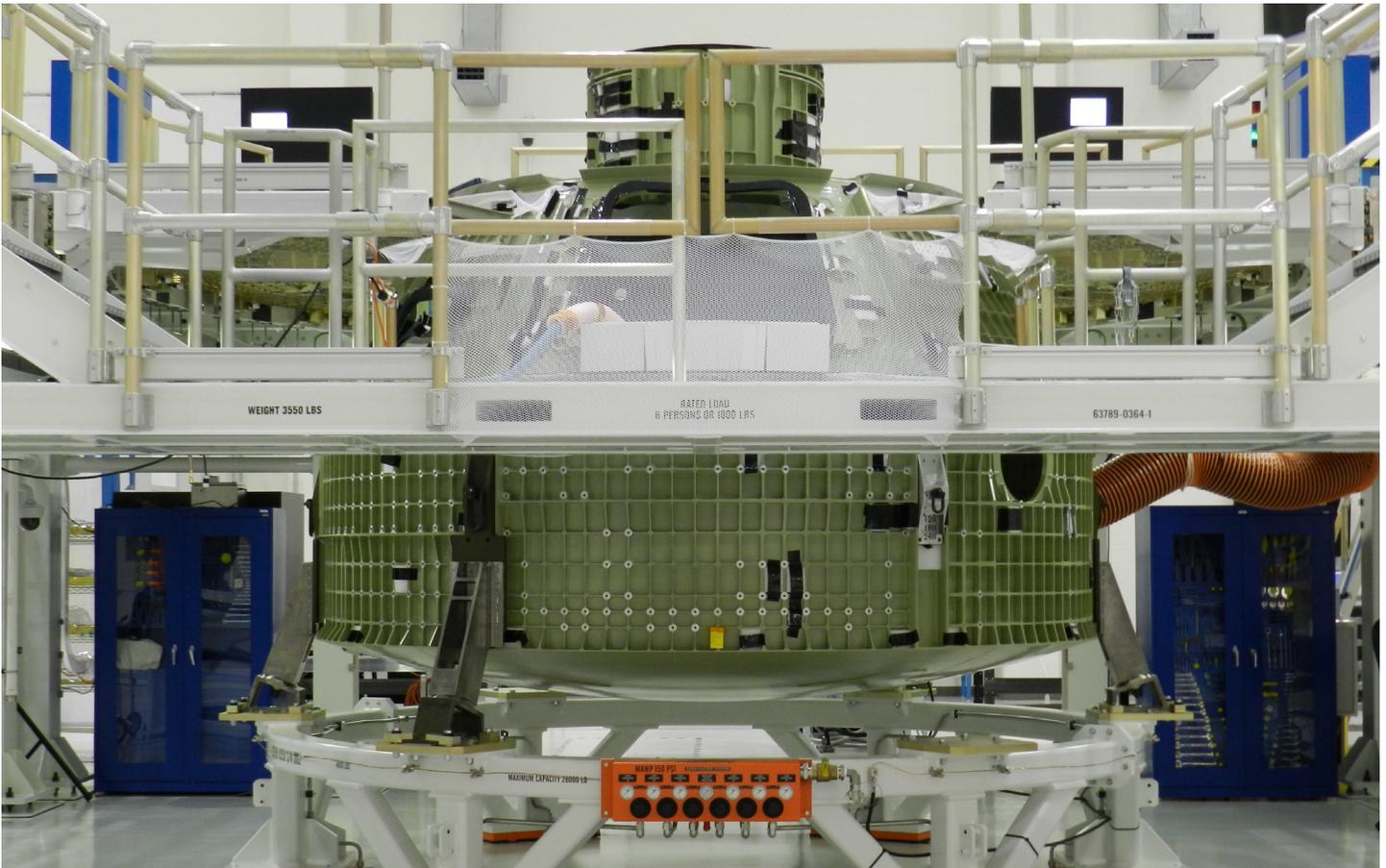
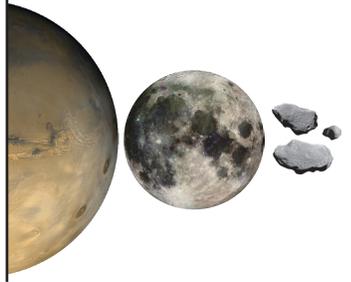


**MONTHLY  
ACCOMPLISHMENTS**  
July 2012

# orion



## Crew Module Outfitting begins at KSC

The Exploration Flight Test (EFT-1) Crew Module pressurized structure was relocated into its processing station within the High-Efficiency Particulate Air (HEPA) clean area at Kennedy Space Center's (KSC) Operations & Checkout building this month in preparation for installation of the secondary structures. The crew impact attenuation system (CIAS) bracket drilling operations and installations have been completed and the team has started work on installing the windows on the vehicle as well as the development flight instrumentation sensors. Over the next 17 months, it will undergo outfitting with subsystem components and testing in support of the EFT-1 flight test in 2014.



# Successful parachute drop test in Yuma



The parachute team completed another successful airdrop test on July 18 at the U.S. Army's Yuma Proving Grounds in Arizona in preparation for the vehicle's orbital flight test in 2014. The test was the second to use the Parachute Test Vehicle (PTV) to represent the size and shape of the Orion Crew Module including a representative spacecraft parachute compartment.

This particular drop test determined how the drogue parachute system would perform under a normal drogue deployment, and how the main parachute system would respond if one of the three main parachutes skipped a first reefing stage. Orion parachutes have so-called reefing lines, which when cut by a pyrotechnic device, allow the parachute to open gradually, managing the initial amount of drag and force on the parachute. The objective was to determine how the entire system would respond if one of the reefing lines was cut prematurely, causing the three main parachutes to inflate too quickly.

All sequences and parachute deployments performed according to the timeline. The weeks following the test have included data reduction and analysis, disassembly of the test hardware, post test inspections and preparation for the subsequent use of the hardware on a future drop test.

The next scheduled drop test with another drop test vehicle will occur on August 28.

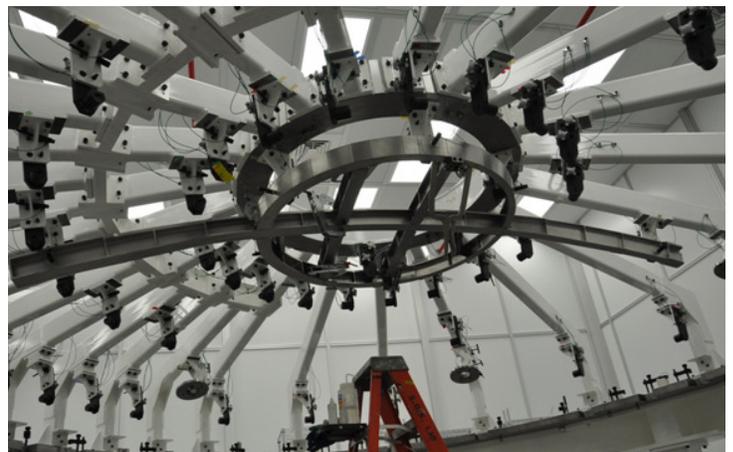
## Integrated Vehicle Avionics Communications Testing With MCC

The Exploration Development Lab in Houston (EDL-H) has been testing the vehicle command and data handling avionics with Mission Control Center (MCC) Houston to test end-to-end communications functionality. These development tests have, for the first time, successfully transmitted on-board telemetry through a simulated Radio Frequency (RF) link, including emulations of the Tracking and Data Relay Satellite (TDRS) and White Sands Ground station. Additionally, encrypted commands were sent

from the MCC White Flight Control Room (WFCR) which were properly decrypted and executed in the flight software. Also for the first time, video was streamed from the EDL-H test rig to the JSC Building 8 video processing group to process the data for playback. These tests are in preparation for a higher fidelity test in August, using an S-Band transmitter in the Lockheed Martin Communications and Tracking Integration Lab (CTIL) in Denver, which will demonstrate telemetry, commanding, file transfer and video transfer with the MCC.

## Team makes progress on heatshield structure

The Orion team in Denver is in the process of fabricating the EFT-1 heat shield. The composite skin layup, initial and post cure and non-destructive evaluations were completed on schedule. The heatshield skeleton assembly tool arrived this month and the team began placing the first heatshield ribs into the tool. Once the metallic ribs are bolted together, the skin will be mated to the structure. The heatshield will provide protection for the crew module as it re-enters the Earth's atmosphere. In addition, a series of EFT-1 Crew Module backshell panels are continuing through fabrication in Denver.



# Service Module diamond panel testing in progress

Fabrication continues on the EFT-1 Service Module panels. The first two of four diamond panels have undergone shear testing at the Marshall Space Flight Center (MSFC). The first pair will remain at MSFC and the two test frames will be returned to the Michoud Assembly Facility in New Orleans. The second pair of diamond panels will be installed into the test fixture and be sent to MSFC to start testing.

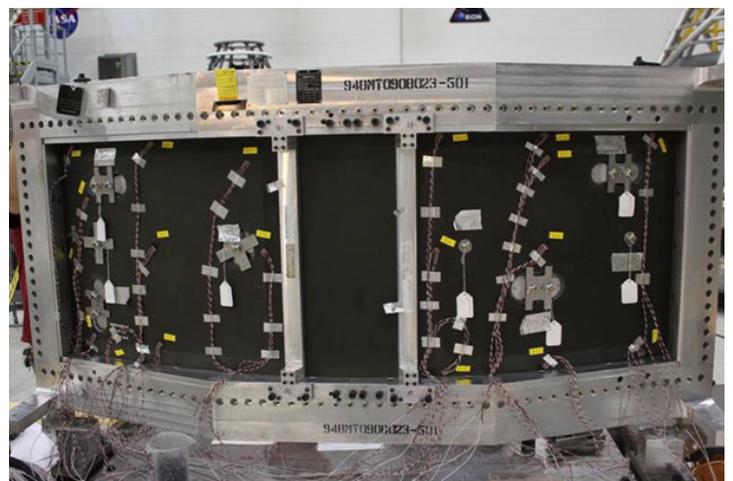
## Avionics components delivered to Denver

The Integrated Test Lab (ITL) in Denver is coming together with Engineering Development Unit (EDU) hardware and flight software deliveries. The recent delivery of EFT-1 ITL components, including the first release of software build 8.0, EDU Power Distribution Units (PDU) cards C-3 and C-4, Vehicle Management Computer (VMC) EDU and media converter 1 all enable testing of Crew Module power-up and Guidance Navigation and Control functionality in the EFT-1 flight configuration from now until fall. The next expected deliveries include EDU PDU C-2 and C-4.



## LAS cone in fabrication process

The EFT-1 Launch Abort System (LAS) flight cone finished fiber placement lay-up on the fiber placement machine and is bagged and ready for cure process in the autoclave at the Michoud Assembly Facility in New Orleans.



## Pressure testing at Michoud

The team at Michoud Assembly Facility in New Orleans completed the strain gauge installation and began pressure testing on EFT-1 Service Module inboard wall panel five. All the panels will go through pressure testing following fiber completion, non-destructive evaluations and strain gauge installations.



# Over 41,000 visit SpaceFest in New York

Members of the Orion team staffed an exhibit at SpaceFest, a four-day celebration of the opening of Intrepid Sea, Air & Space Museum's Space Shuttle Pavilion in New York, and its newly acquired Space Shuttle Enterprise. Over 41,000 people were

in attendance for the event. Orion managers also presented an Orion overview to approximately 200 students and teachers from various schools in the area at the Cradle of Aviation Museum in Long Island, New York.



## Students learn about Orion

NASA and Lockheed Martin supported the Texas Southern University Community Science and Space Fair as part of the Dr. Ronald E. McNair Educational Science Literacy Foundation Camp. The camp works with teachers and students in grades 5-10 to present science, technology, engineering and mathematics, or STEM information in an innovative and learning atmosphere. The Fair was attended by approximately 300 students, educators, parents and friends from the Houston community.



## Orion takes VASC spotlight at Researcher Tuesdays

Read more about Langley's participation at the Virginia Air and Space Center during the Orion Pad Abort-1 Crew Module's summer visit to the museum.

<http://www.nasa.gov/centers/langley/news/researchernews/OrionVASC.html>