

# Orion Weekly Summary



Week ending August 1, 2008



NASA JSC, KSC and the United States Navy conducted Water Egress and Survival Trainer (WEST) tests on a 1/4 – scale Orion Crew Module mockup last week at the Neutral Buoyancy Lab (NBL) in Houston (Photo left). Testing with the scale model of Orion will help the NBL team develop their full-scale crew training mockup that will be used for mission training and creating the crew safety procedures for Orion's water-based landings. This second in a series of tests succeeded in completing its test objectives of validating a new seal design and updated wireless communications, evaluating a Kennedy Space Center provided prototype floatation collar, improving the test configuration and collecting data for various capsule flooding scenarios.



**Initial tests of the 1:10 scale Crew Module were conducted at Texas A&M University Offshore Research Center.** The tests were performed at 2 ballast conditions - dry aft bay and flooded aft bay, at sea states of 3 through a low sea state 6, with and without righting bags. Observations noted the capsule flotation is more damped than was estimated. As a beneficial result, the capsule did not overturn in any of the tests.



**The Crew Exploration Vehicle (CEV) Parachute Assembly System (CPAS) Cluster Development Test 2 (CDT2)** experienced a test technique failure July 31; it was not a failure of the CPAS system. Observations indicate that as the Parachute Test Vehicle (PTV) separated from the test pallet, the programmer chute that positions the PTV and sets up the proper initial conditions for descent, failed to inflate. The programmer chute never consumed enough air to fully inflate and produce the proper drag because of very hard buffeting by the wake of the PTV and stabilization chutes. An investigation is underway.



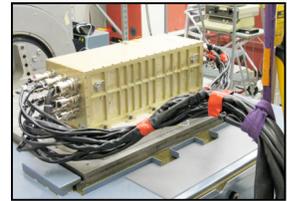
**The Landing and Descent Project and its air bag contractors, ILC Dover and Airborne Systems, completed the design and analysis of the Nominal Land Landing (NLL) air bag configuration as part of the NLL assessment.** The NLL air bags are an extension of the wrap-around air bags designed for Contingency Land Landings (CLL), but utilize slightly larger air bags to accommodate the greater dispersions in landing conditions expected for NLL. After review of land landing analyses using current structure and landing systems designs, it was determined that the wrap around air bags may not provide adequate impact protection for off-nominal landings, as in a two-chute landing. The NLL assessment team will integrate investigation findings to improve synergy between airbag and passive reduction approaches. These additional results will be presented at the System Baseline and Preliminary Design Reviews as design options to maximize the operational envelope while meeting our mass performance requirements.

**The Landing and Descent Project began a high priority contact modeling test program.** The program is using the new laboratory developed Applied Research Associates (ARA) soil models and the existing boiler plate hardware to ground contact modeling parameters in support of ongoing Contingency Land Landing (CLL) and Nominal Land Landing (NLL) assessments. An existing half scale boiler plate was prepared and instrumented for vertical drop tower testing. The soil was carefully packed in 6 inch layers with an effort to achieve density and moisture content similar to the soil in the ARA report. The first contact modeling test was completed by dropping the half scale boiler plate with zero pitch on the prepared 4 ft thick flat soil.



**Honeywell successfully completed thermal and vibration testing for the first Flight Test Remote Interface Unit (FT-RIU) in preparation for the Pad Abort-1 flight test (Photo right).**

The first of two FT-RIUs for the Pad Abort-1 flight test were delivered. The second RIU is scheduled to be delivered in late August. Two RIUs will be on each test flight. Honeywell's FT-RIU command and data handling software directs commands from the FT-VMC (Vehicle Management Computer) to the Launch Abort System and the capsule's power controller, parachutes, guidance and navigation system, and sensors and effectors. The system will also manage telemetry operations and handle all of the test vehicle's commands from ground control. The RIU unit was primarily fabricated by Aitech and also includes electronic assemblies manufactured by Lockheed Martin.



**Fabrication of the Crew Module pallet test article continues at Langley Research Center.** Energy absorbing struts for initial tests are being fabricated under a contract with Safe, Inc. of Tempe, Arizona.

Initial factory tests showed that the struts load profile was about 20% higher than expected. A new energy absorbing wire for the wire bending attenuator (the core of the strut design), was tested. The first strut has been shipped to Langley for fit checks in Langley Research Center's static test hardware and Wright Patterson's dynamic test hardware.

**The Jettison Motor DM-2 fired at Aerojet Sacramento on July 17 was disassembled and measurements made on the various parts.** There was no soot past the primary O-rings, no insulation or fastener problems.

**White Sands Missile Range AFT Launch Site Facilities work continued placing sub grade and base course material and conduit top-out work at the Launch Pad**

(Photo right). Pre-cast perimeter trench drain sections were placed around the Launch Pad. Securing and grouting the Gantry rails is complete.



**Construction continues in the Operations and Checkout Facility at Kennedy Space Center**

- The high bay and low bay roof dried in with no leaks
- Gypsum board ceiling installation and communication cable trays are 97% complete
- Power cable trays are 94% complete



*Proof Pressure Test Cell flooring poured and cell wall reinforcements being installed in the Operations and Checkout Facility (Photo left).*

**The Operations & Checkout Facility hosted a VIP tour.** This high-level tour included former center directors, deputies and launch director/director including Bob Crippen, Richard Smith, Forrest McCartney, Jay Honeycutt, Roy Bridges, Jim Kennedy, Tom Utsman, Tip Talone, Robert Lightfoot and Bob Sieck.

**Construction continues at the Michoud Assembly Facility in support of Orion Production**

The first concrete pour was completed, placing concrete in the turntable pit and creating utility trenches in the Universal Weld System #2 site.

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## Communications and Media

**An Op/Ed from Vice President and General Manager of Human Space Flight at Lockheed Martin Space Systems, John Karas supporting NASA and the Constellation Program will be featured in the August 11 edition of *Space News*.**

**Lockheed Martin will sponsor outreach initiatives with Space Center Houston** to inform and promote the Constellation Program and the Orion Crew Exploration Vehicle among teachers and students who participate in the Center's education workshop programs. More than 18,000 students and teachers from across the United States and around the world will be reached in 2008. The sponsorship program will also include outreach activities with teachers and students nationwide from schools with over 70% of their students on free or reduced lunch programs.

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