



Ares

WEEKLY SUMMARY



The third drop test of a single main parachute (MDT-3) for the new Ares I first stage booster was successfully conducted at the U.S. Army's Yuma Proving Grounds (YPG) in Yuma, AZ, on Thursday morning October 8. The 150-foot diameter parachute, attached to the 60,000-pound Jumbo Drop Test Vehicle (JDTV) was extracted from an Air Force C-17 at an altitude of 25,000 feet. After extraction from the aircraft, the JDTV was allowed to descend under a programmer chute to an altitude of approximately 9,000 feet and a targeted dynamic pressure of 110 pounds per square foot for the initial deployment and inflation of the main test parachute. These staging conditions were designed to produce an opening peak load on the parachute equivalent to its design load capability. All parachute systems performed as designed and all hardware was recovered from the drop zone without damage. All onboard and range instrumentation and video data were recorded and are currently being processed. Early indications show that all test objectives have been met. This was the first parachute test in our next series of design load and overload tests. In addition, this equaled the heaviest single payload to be extracted from a C-17 aircraft. Our next test, scheduled for April 2010, will break this weight record.



The Main Parachute installed in the Jumbo Drop Test Vehicle on the extraction pallet for test #3 is being loaded into the C-17 drop aircraft



60,000-lb Jumbo Drop Test Vehicle underneath the main parachute test as it achieves its design load



The second Upper Stage heavy weight motor (HWM) hot-fire test was successfully conducted on October 8 in the Marshall Space Flight Center (MSFC) Test Stand 116. The test further validated the performance of the ullage settling motor (USM) propellant, propellant grain structure, and propellant geometry for the Ares I. The HWM insulated case and nozzle were provided by the U.S. Army's Aviation and Missile Research, Development, and Engineering Center (AMRDEC). Engineers used data collected from the first HWM test in September 2008 to modify the motor for this test. Instrumentation was also added to track motor performance by measuring acoustics and combustion stability. To keep test costs to a minimum, the Upper Stage USM subsystem coordinated with Redesigned Solid Rocket Motor and



External Tank personnel last year to use existing facilities at Marshall for the USM motor fire tests. Test Stand 116 was upgraded with the newly-developed USM Test Stand Adapter to accommodate the length of the USM. The Test Stand Adapter was designed by NASA and machined locally.



US HWM hot-fire test at MSFC

Recent activities specific to the Elements include:

Upper Stage (US)

- ***US – Stage Operations:*** The US Integrated Stage Test (IST) team conducted an Interface Working Group Meeting (IWGM) September 30 – October 1 at MSFC. The more than 60 unique participants included personnel from MSFC, Kennedy Space Center (KSC), Glenn Research Center (GRC), and Stennis Space Center (SSC). First day discussions covered test configurations, volume interfaces, and subsystem interfaces, while Day Two discussions focused on test stand interfaces. Actions assigned will help provide additional information to support the IST System Definition Review (SDR), which will kick off on November 16.

Flight and Integrated Test Office (FITO)

- ***Ares I-X FS Element Acceptance Review:*** On October 8, FS held its Element Acceptance Review (EAR) at KSC. The FS EAR board was co-chaired by the MSFC Management Representative and Manager of Ares I FS Office, and the Ares I-X Mission Manager. Board membership included representatives from MSFC engineering departments and laboratories and the Ares I-X Chief Engineer, Chief Safety Officer, and relevant Integrated Product Team Managers. Topics included: FS verification status (90% complete) with closure actions and dates assigned for open verifications, waiver status (six in Ares I-X review and two pending FS generation and submission), FS recovery operations, open technical issues including thruster pressure cartridges, and loads status (vast majority of reassessments are complete; a few component assessments will not be complete until October 22). The FS hardware was formally accepted by MSFC and Ares I-X with open work and actions, which will be traced to closure.



- Ares I-X System-Level Verifications Closure Process:*** To facilitate the closure of Ares I-X system-level verifications, table top reviews have been implemented. Reviews were held on October 6 and October 10 and included representatives from Ares I-X Systems Engineering and Integration, Chief Engineer, Chief Safety Officer, Integrated Product Teams, and the independent assessment team. The table top reviews facilitate the timely closure of comments and verifications. Currently, 84 system-level verifications remain open.
- Test Stand 4550 – Electrical Construction of Facilities (CoF) Contractor:*** Metro Power has recently completed the electrical upgrade (CoF) to Test Stand 4550 at MSFC. This electrical upgrade was necessary to support FITO's Integrated Vehicle Ground Vibration Test (IVGVT) of the Ares I.



IVGVT Power Distribution Panels

Vehicle Integration (VI)

- A106 Force and Moment Wind Tunnel Test Completion:*** The A106 force and moment wind tunnel testing was completed at the Unitary Plan Wind Tunnel (UPWT) located at Langley Research Center (LaRC). This test was comprised of a 1% model that was used at both the UPWT and Boeing Polysonic Wind Tunnel (PSWT) to generate full six degree-of-freedom coefficients for later use in trajectory analyses. Test conditions were Mach 1.6 – 4.5 for preprogrammed pitch and roll sweeps. In order to characterize a potential risk mitigation for roll control, a preferred strake evaluation was conducted during this test. Additionally, two Booster Deceleration Motor (BDM) locations were tested in order to facilitate schedule risk mitigation due to the ongoing down-select BDM location trade.

Wind-on testing began on September 10 to characterize lift-off transition at a variety of angles of attack and for all wind azimuths. Since this database characterizes tower clearance effects, the test velocities were fairly low. The Ares I position varied from on-pad to above tower to capture vehicle / tower effects until tower clearance was achieved.



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Also, the First Stage Reentry Hi-Fidelity wind tunnel test at PSWT was completed. This test characterized the force and moments of the FS body as it returns to Earth and is critical to the re-entry simulations to determine if the vehicle can be recovered upon splashdown.



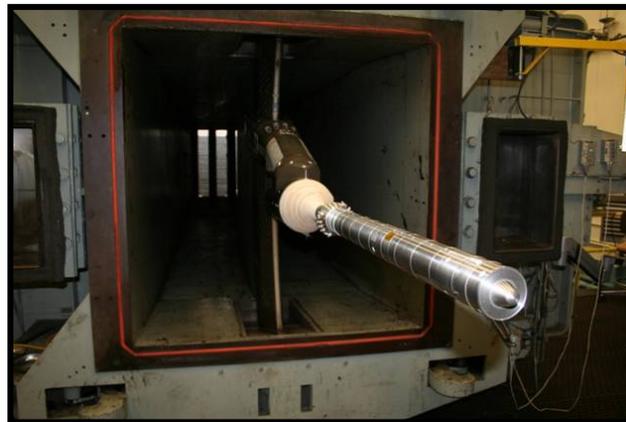
1% scale model of Ares I



Ares I model for lift-off transition testing



Launch tower model for lift-off transition testing



First stage model for re-entry testing

Project Integration

- New Beginnings Exhibit at U.S. Space & Rocket Center:*** The Ares Projects outreach team worked with Ares Graphics and Marshall Exhibits to create and install an Ares I-X “Coming Soon” attraction to the New Beginnings Exhibit in the Davidson Center for Space Exploration at the U.S. Space and Rocket Center. New Beginnings, which features the Ares and NASA exploration stories, will be periodically updated with new hardware, models, videos, and more to provide museum visitors with the Ares Projects latest accomplishments and upcoming events.



A Davidson Center visitor inspects the new Ares I-X displays

- ***Congressman Griffith's District Director Visit:*** The Ares project integration and outreach team members supported an Ares Overview presentation to Representative Parker Griffith's new District Director, Gene Tackett, on October 1. Tackett was briefed on the Ares vehicles and their technical and programmatic status and participated in the Ares fly-through in the Collaborative Engineering and Design Analysis Room (CEDAR) in Building 4600.



Ares Outreach Team Briefs Griffith District Director Gene Tackett (second from left) on the Ares Projects

The Ares Projects looks forward to the November launch of STS-129, Space Shuttle Atlantis.

...and as of this Ares Projects Weekly Summary, there are only 11 days until the first Ares I test flight, Ares I-X.