



J-2X Workhorse Gas Generator Test: The second phase of testing of the J-2X Workhorse Gas Generator was completed on August 15, after running over 50 successful tests. The second phase of testing included a longer, more flight-like length combustion chamber, and tested performance of two injector designs. The data generated will now be used to finalize the injector design for the flight gas generator which will be tested next year.



Mainstage operation of the Workhorse Gas Generator



Ignition of the generator using the pyrotechnic igniter



Ares Preliminary Design Review (PDR): Immediately following the PDR kick-off and Detailed Design Presentations (DDPs), review teams began the process of screening Preliminary Review Item Discrepancies (PRIDs), initiating discussions directly between the initiator, book manager, and review team in face-to-face meetings. These results are submitted to the screening team for disposition. The review team then develops the corrective action in conjunction with the initiators and book managers.

These face-to-face meetings have proven to be effective in identifying and defining valid issues to address broad reviewer community concerns. Screening activities are scheduled to conclude on August 22, with the Pre-Board scheduled on September 3, followed by the Board on September 10. An initiator has the opportunity to re-clama at any step of the process up to the Board.

Recent activities specific to the Elements include:

- **Vehicle Integration (VI)**
 - **Aerolasticity Testing Update:** The model fabrication for the Ares I rigid buffet test has been performed by Alliant Techsystems, Inc. (ATK)/Microcraft and delivery was

accomplished on August 18. This test follows the Ares I-X rigid buffet test in which higher-than-expected transonic buffet loads were noticed at the first stage/upper stage interstage/frustum area. This test entry immediately follows the Ares I-X ground wind loads test. Tunnel entry for this test is expected to be mid-September in the Langley Transonic Dynamics Tunnel Facility (TDF). Follow-on test activity may be conducted at Arnold Engineering Development Center (AEDC) to recover maximum dynamic pressure buffet forcing functions.



Ares I-X ground wind loads test



Ares I rigid buffet test

- **Ares I First Stage Re-entry Model Test:** The Ares I first stage re-entry test was performed at the Langley Research Center (LaRC) 20-inch Mach 6 facility to verify extrapolations used based on the descent testing performed at Marshall Space Flight Center (MSFC) Aerodynamics Research Facility (ARF). All runs were completed for this test after tunnel heater issues on July 25. The data has been delivered to MSFC Assembly Spacecraft and Vehicle Systems Department to incorporate into the existing first stage descent database.



Re-entry model test

- **Wind Tunnel Status Report:** The stage separation test that was held at AEDC Von Karman Facility (VKF) Tunnel A leveraged the opportunity to test both Ares I-X and Ares I hardware. This test had a large run matrix, as various radial and axial locations had to be completed for each configuration. Early power issues were worked out and testing was



completed on July 23. The Ares I-X database will be used for preflight predictions and the Ares I database will be used to aid in the determination of separation compliance for Critical Design Review (CDR).



Ares I/I-X stage separation test

- **Flight and Integrated Test Office (FITO) and Ares I-X**

- **Ares I-X Roll Control System (RoCS) Element:** Deviation Requests were presented to the Systems Engineering Review Forum (SERF) as follows: 0167 – No Vibro-Acoustics Acceptance Testing Planned for Flight Components or Assemblies; 0168 – Maximum Expected Operating Pressure (MEOP) Pressure Testing Levels on the Propellant Filter Assemblies; 0171 – No Vibro-Acoustics Qual Testing Planned for Pyro Valves and Ordnance; 0175 – MEOP Pressure Testing Levels on the Engine Bi-Prop Valve. Comments received are being incorporated before advancing the Deviation Requests to the Ares I-X Control Board (XCB). Two other RoCS Deviation Requests are still in work.

Other activities specific to the RoCS team included: (1) The RoCS Team supported a logistics review with the Systems Engineering and Integration (SE&I) Logistics Lead; (2) the draft RoCS Verification Requirements Document was transmitted to the SE&I Verification Lead for a pre-review prior to submittal to the Configuration Management (CM) release desk for general review; (3) the RoCS panels were shipped to Glenn Research Center (GRC) for match drill operation with the interstage doubler flanges; and (4) Solumina training was completed and application for access has been submitted in order to gain visibility and approval authority in the Kennedy Space Center (KSC) work order system.

- **Upper Stage Engine (USE)**

- **J-2X Engine Assembly Production Preparation Process (3P) Event:** A J-2X Engine Assembly Production Preparation Process (3P) event was held on August 5–7 in Building 9101 at Stennis Space Center (SSC). This event focused on identifying a planned approach to



all aspects of engine assembly, including receiving, warehousing, kitting, assembly, and transport. Mockups and simulations were developed for key pieces of hardware. This event matures the entire J-2X assembly process in time to support the upcoming J-2X Project Critical Design Review (CDR) in September 2008.

- **Test Stand A-3 Chemical Steam Generator (CSG) Liquid Oxygen (LOX) Tanks:** Fabrication of the first of three 35,000-gallon, vacuum-jacketed LOX tanks for the A-3 CSG system is progressing at Prentex Alloy Fabricators in Sunnyvale, Texas.



Welding of head on outer vessel



View of inner vessel barrel sections



Welding of withdrawal nozzle to lower head

- **First Stage (FS)**
 - **Ares I-X S/N 20019 Aft Skirt:** Engineering has released drawings for the assembly and installation of the ballast in the S/N 20019 Aft Skirt. Drilling of the interface holes has been completed. Based on agreements with the NASA Fracture Control Board, non-destructive eddy current inspection will be performed. This results in a 3-day slip in operations.



- **Ares Flight Termination System (FTS) Pyrotechnic Delay Requirement Status:** Orion representatives have requested the inclusion of a time delay to be included in the Ares FTS architecture to maximize the survivability of the crew during an abort and flight termination scenario. The 45th Space Wing has tentatively agreed to this, pending their approval of the detailed design/implementation. Ares First Stage is responsible for the design and implementation of the Ares FTS. Accordingly, First Stage has had multiple technical meetings with the Launch Constellation Range Safety Panel (LCRSP) splinter group assigned to develop the time delay requirement for the Constellation Architecture Requirements Document (CARD). Since pyrotechnic delay timing performance is significantly affected by extreme temperature dispersions, most of the recent discussions have been related to the realistic timing tolerance band to be used for the hardware. The Orion abort and destruct analyses indicate that a time delay of 3.1, +/-0.5 seconds is desirable to maximize the survivability of the crew. However, current assessments by ATK indicate that a tolerance band of +/- 1.0 second is the current state-of-the-art for the time delay service temperatures currently predicted for the upper stage and first stage stack. Thermal conditioning will likely be required for the time delays integrated into the upper stage. The current designs and thermal predictions are very preliminary for the upper stage applications, making the decision a difficult one. Discussions between LCRSP, the 45th Space Wing, and Upper Stage and First Stage Elements will continue in an effort to satisfy the timing requirements and continue maturation of the pyrotechnic time delay design with minimization of impacts to the Upper Stage and First Stage Elements.
- **Project Integration (PI)**
 - **Ares Outreach:** The Ares Projects integration team supported a tour of the Exploration Systems Mission Directorate Trailer in Coralville, Iowa, from August 12–16. During its stay at the Iowa Children’s Museum, the exhibit was seen by approximately 2,100 visitors. The team also participated in the Space and Missile Defense Conference Education Day on August 13 at the Von Braun Center in Huntsville, Alabama. Using Ares models and animation to tell the NASA exploration and Ares stories, team members spoke with more than 200 7th and 8th graders from the surrounding areas.

The Ares Project looks forward to the kick-off of the Upper Stage Engine CDR and the Ares I PDR Pre-Board and Board in September.

...and as of this Ares Projects Weekly Summary, there are only 236 days until the first Ares I test flight, Ares I-X!!!