



Space Shuttles making History:

The rare sight of a shuttle on each of the two launch pads at Kennedy Space Center's (KSC) Launch Complex 39 occurred this weekend for what is expected to be the last time. Of the 19 times in program history that shuttles have been poised simultaneously at both pads A and B, this was only the fourth time that both have been exposed without the protection of the Rotating Service Structure (RSS). Space Shuttle Endeavour sits on Pad 39B, and Space Shuttle Atlantis, which successfully launched STS-125 on May 11, sat on Pad 39A. Endeavour will move to Pad A later this month, marking what will be the last time in history that a space shuttle is on Pad B.



Endeavor and Atlantis on Their Respective Pads Before Monday's Launch

With the pending shuttle retirement next year, Pad B will now be readied for the next generation of human-rated launch vehicles, the Constellation program's Ares vehicles, with work underway for Pad B modifications.



Ares I-X Frustum Separation Test T-35, May 7



First Stage (FS) Pyrotechnic and Separation

Subsystems: On Thursday, May 7, ATK test services, in cooperation with Ares project engineering, successfully conducted a full-scale demonstration of the Ares I-X Frustum Separation System with Marshall Space Flight Center (MSFC) program management and Engineering in attendance for the test. Detonation of the flight ordnance completely separated the separation ring. All 75 of 75 data channels recorded data and the data are currently being reduced by ATK with a report to follow in approximately 4 weeks. The Pyrotechnics/Separation Integrated Product Team (IPT) members are investigating the condition of the internal debris shield that showed a breach of the shield after the test.



Upper Stage Engine (USE) Test Stand A-3 Chemical Steam Generator (CSG) Risk Mitigation Testing: Chemical Steam Generator (CSG) testing is underway at Stennis Space Center (SSC) Test Stand E-2. Ignition tests were performed April 8. Multiple mainstage tests of 60 seconds or more and at various mixture ratios have since been performed to assess CSG operational limits and establish steam gas properties. The data will inform CSG system operations development.



A CSG Producing Steam during Testing at SSC

Recent activities specific to the Elements include:

Upper Stage (US)

- US Ullage Settling Motor Subsystem (USMS):** The Ullage Settling Motor (USM) team has worked with the U.S. Army's Aviation and Missile Research, Development, and Engineering Center (AMRDEC) to successfully formulate a propellant that meets all ballistic, processing, and mechanical goals set forth by the Ares Projects in 2007. Per the requirements change in January 2008, NASA continued the propellant-tailoring effort in order to meet the new ballistic requirements. This effort occurred from January 2008 through April 2009, with all testing done on Redstone Arsenal. This effort consisted of nine one-gallon mixes and two five-gallon mixes. The one-gallon mixes were used to vary constituents—the iron oxide percentage and size and fine-to-coarse ammonium perchlorate ratio—to determine the affect on the burning rate and mechanical properties of the propellant. From each mix, ballistic properties were determined using cured strands and 2x4 motor data at 75°F with pressure variations from 500 to 2,500 pounds per square inch (psi). A subset of these motors was fired at operating temperature extremes of 30°F and 120°F. From the one-gallon mixes, an optimized formulation was selected for scale up. Mechanical properties testing, including uniaxial tensile testing, was performed for each mix to determine stress, strain, and modulus of the propellant. Five-gallon mixes were used to load Army Ten Pound Charge (ATPC) motors for ballistics and cartons for mechanical properties testing.

The first five-gallon mix was used to load five ATPC motors. Two were tested at both 30°F and 120°F, and one was tested at 70°F. These motors provide scale-up ballistic data on increased propellant mass of 10 pounds versus 0.5 pounds in a 2×4 motor. All five ATPC motors were fired successfully, with propellant performance as expected and stable ballistic properties under the test conditions established.

The second five-gallon mix was used to load cartons for use in mechanical properties testing, also done at AMRDEC. Testing included: dynamic modulus, uniaxial tensile testing across a range of cross-head speeds and temperatures, relaxation modulus, strain endurance, and high-rate, pressurized ignition similitude testing.

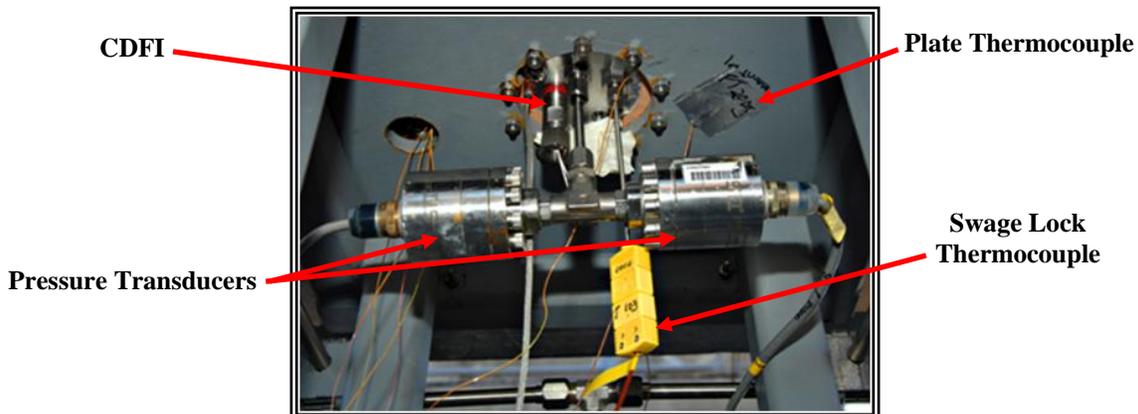


2×4 Motor

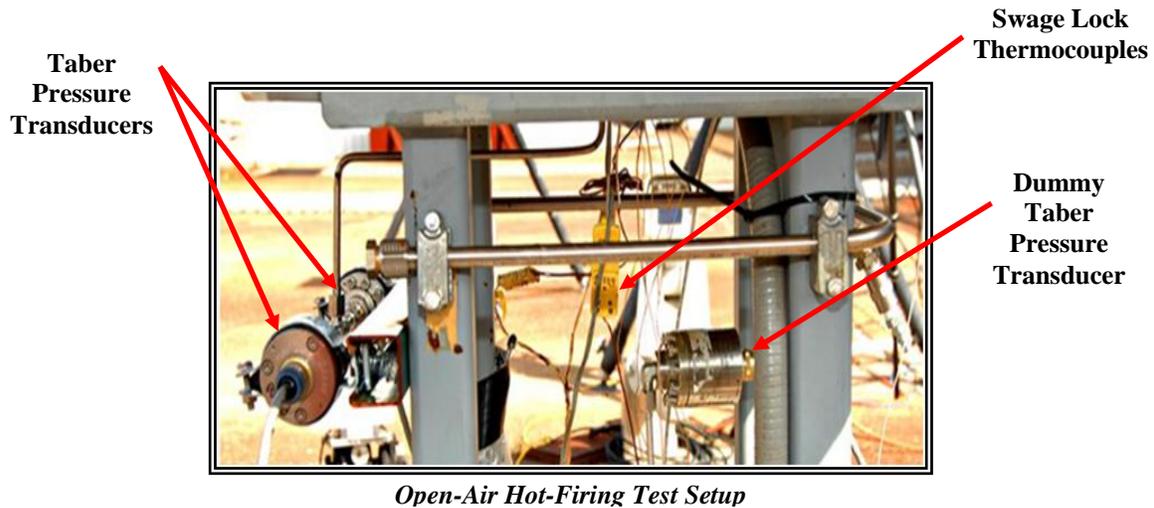


ATPC Motor

- US Ullage Settling Motor System (USMS) Subsystem:*** The USMS Integrated Product Team recently created a multi-discipline team to investigate a data ringing issue in the ambient and cold ullage settling motor (USM) igniter pressure traces observed during ongoing ambient and cold temperature open-air igniter testing in the MSFC East Test Area. The team identified a two-phase problem. The first was a spike started by the electronic bridgewires (EBWs) initiating the confined detonating cord initiators (CDFI). This created sufficient energy to cause the second problem: the pressure transducers (PTs) ringing at their natural frequency. EBWs will only be used for static firings and not for flight. For the flight configuration, a detonation cord will be used for initiation of the igniter hardware.



Original Test Instrumentation Setup



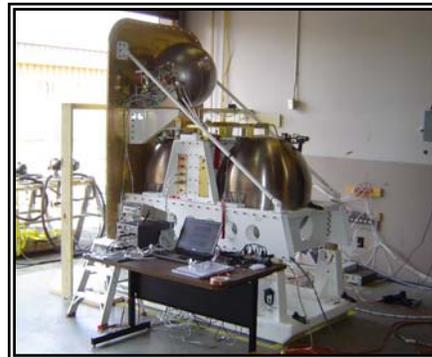
The investigation team determined that the initial spike in data could not be negated using the available test initiation hardware. However, the ringing could be minimized by adjusting the length of the tubing used between the igniter and the PTs. Also, the PTs could be secured to the stand after being wrapped in rubber sheeting to help isolate any stray frequencies that could interfere with the data. The final change was to reduce the sample rate from 100,000 samples/sec to 50,000 samples/sec. The first successful test with fixes incorporated occurred on May 5.

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

- ***Ares I-X Roll Control System (RoCS) Element:*** Activities specific to the RoCS Element include:
 - The cold flow test was completed on the Engineering Development Unit. All ordnance was observed to have fired. Propellant tanks were at flight pressure in about 4 seconds (within the 6-second maximum limit). The helium pressure switch tripped as expected at ~3,200 psi as tank pressure bled down, and all instrumentation appeared to have responded properly. The pressure surge information for the possible waiver will take several days to reduce.



Mat Frame (Drop Hazard Mitigation) Installation on RoCS Modules



Engineering Development Unit Being Readied for Cold Flow Test



- The mod kit containing locking fasteners for the tank mount block has been received at Kennedy Space Center (KSC). The KSC bolt installation procedure is in review.
- The modified Mat Frames for drop hazards mitigation were installed on flight modules, already installed in the interstage.
- The data drop for the Acceptance Review is under way, with the review to be held at KSC on May 27.

Project Integration

- ***Education Outreach:*** The Ares Projects outreach team presented the Ares and NASA exploration stories to 267 students in a variety of educational venues in the past week. Those included second- and third-grade students at Oakwood Academy during its Space Day celebration and students in kinderggarten through fourth grade at The IDEA Place at Louisiana Technical University, Ruston, LA, also on May 4. U.S. Representative Rodney Alexander of Louisiana made opening comments before the Ares presentation. The team supported a presentation to students from 10 schools attending the High Schools United with NASA to Create Hardware (HUNCH) recognition ceremony at MSFC on May 8.



Ares Outreach Team Lead Talks About Ares and Exploration with Students at The IDEA Place in Louisiana

The Ares Projects look forward to the First Stage Main Chute Cluster Drop Test on May 20.

...and as of this Ares Projects Weekly Summary, there are only 107 days until the first Ares I test flight, Ares I-X!!!