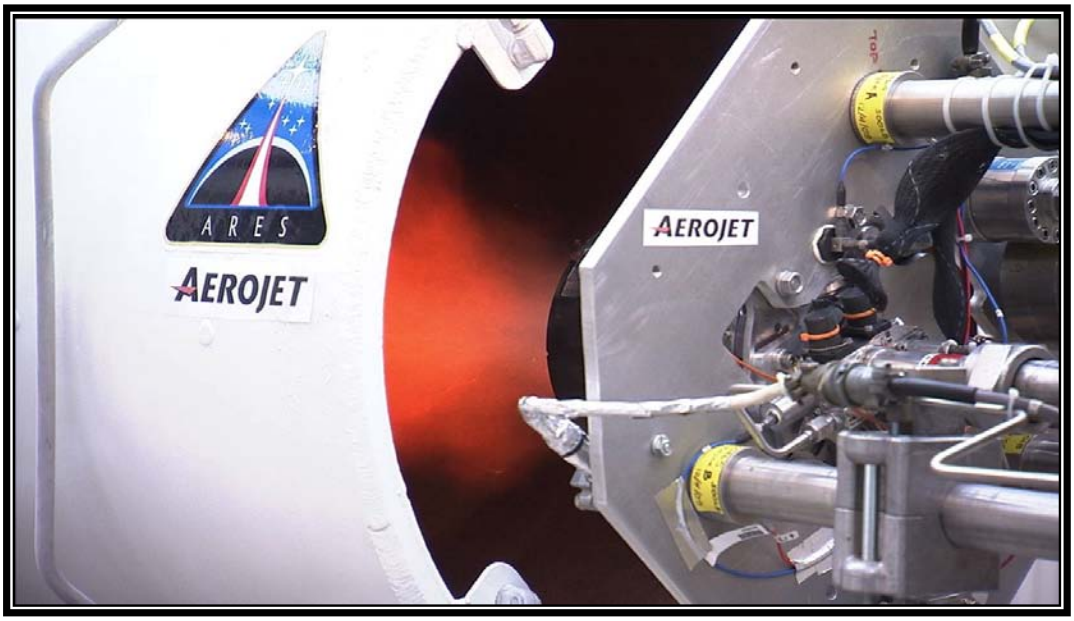
Upper Stage (US) Reaction Control System (RCS) Subsystem: Hot-fire testing of a prototype Ares I Roll Control System (RoCS) Thruster was successfully completed at Aerojet in Sacramento, CA, under an Advanced Development Contract. The 625-lbf monopropellant hydrazine thruster exhibited nominal and predicted performance in over 800 pulses and with over 1,200 lb of propellant throughput, demonstrating a life capability of over four times the required mission duration. The thruster demonstrated a wide range of operability in both pulse mode and steady state operation. Duty cycles ranged from 1% to 100%, with a minimum Electrical Pulse Width (EPW) of 100 msec while maintaining thermal stability throughout. Several ambient temperature starts were completed to verify durability of the catalyst bed. A rigorous set of hot-restart scenarios were demonstrated to verify thermal margin against spontaneous and premature hydrazine decomposition. The thruster, tested with a VACCO valve developed under the NASA Design Team through Jacobs Engineering, showed no indication of adverse behavior. This testing, along with altitude testing to be conducted in June 2009, will close development gaps and provide a high level of confidence that Boeing will successfully complete Roll Control Thruster level design, development, and qualification activities under the US Production Contract.



Hot-fire Testing of a Prototype Ares I RoCS Thruster

US Thrust Vector Control (TVC) Subsystem: The full-size US thrust cone for the TVC 2-axis rig was delivered to the NASA Glenn Research Center (GRC) from Advanced Manufacturing in Cleveland, OH, on February 17. The thrust cone was positioned in place over the base and Upper Stage Engine (USE) inertia mass simulator. The thrust cone, gimbal joint, and USE simulator were integrated together, and then attached to the base. A short test demonstrated free movement of the USE simulator.

A final grout of the base to the floor and a final concrete pour for the foundation will be completed by February 27. Installation of facility hardware, test hardware, and checkout of the system will occur in summer of 2009.

Thrust Cone Lifted Off Transportation Carrier in TVC Lab

USE Inertial Mass Simulator Centered in 2-Axis Rig Pit

USE Simulator, Gimbal Joint and Thrust Cone Connected

Thrust Cone, Gimbal, and Engine Integrated

Ares I-X Frustum: Fabrication of the Ares I-X Frustum has been completed at Major Tool in Indianapolis, IN. The frustum left Major Tool on February 17, and arrived at Kennedy Space Center (KSC) on February 20. The frustum was required to be shipped via police-escorted truck to KSC due to its size. Upon arrival at KSC, it was transported to the Assembly Refurbishment Facility (ARF) for further assembly by ATK and United Space Alliance (USA). This assembly will entail mounting of brackets, cables, etc. The photo shows the frustum on the right at the ARF and the Forward Skirt Extension (FSE) on the left.

Ares I-X Frustum after Completion of Fabrication at Major Tool in Indiana

Developmental Flight Instrumentation (DFI) Sensor Assemblies Delivered: The specialized DFI sensors to be mounted in the Crew Module/Launch Abort System (CM/LAS) Simulator have been delivered to the Vehicle Assembly Building (VAB) at KSC. The Five-Hole Probe (5HP) Total Air Temperature (TAT) and Air Vanes are mandatory DFI provided by the Jacobs/Lockheed Martin Avionics contractor team. The 5HP is expected to provide accurate air speed, pitch and yaw angles, and the total and static pressure during the flight time of the Ares I-X. The total and static pressures that are derived from the probe are considered critical as they will be used as a reference for the remainder of the 300+ pressure sensors on the vehicle. The TAT is used to provide temperature data to compare with and validate aero models for the Ares I rocket, and the Air Vanes are used to provide the angle of attack and yaw angle of the rocket.

Flight and Spare TATs and Air Vanes

Five-Hole Probe

Recent activities specific to the Elements include:

- **First Stage (FS)**
  - ***Ares 1-X Aft Skirt Integrated Product Team (IPT):*** Work is continuing for Ares I-X Aft Skirt Build-up. Ballast installation was completed last week. Rooster tail installation was completed on February 21. Cable installation is in work, with the T-0 installation complete. A majority of Operational Flight Instrumentation (OFI) and Ground Environmental Instrumentation (GEI) cables runs have been completed, minus those with connections to the Line Replaceable Units (LRUs). DFI cables are being installed on a non-interference basis and sensor installation into the islands is in work. Confined Detonating Fuse (CDF) panel match drilling is in work and the CDF firing line clamp drilling is complete. Pod drilling continues with the "first pod" at the point of going through Non-Destructive Evaluation (NDE), with NDE ~60% complete on that unit. Following NDE, it will be disassembled, deburred, and assembled with flight fasteners. Aft Skirt transfer to the Aft Skirt Test Facility (ASTF) is scheduled for next week.

- ***NDE of Ares I-X Thruster Pressure Cartridges:*** Several weeks ago, the Shuttle Program experienced Qualification Test failures of the newest Thruster Pressure Cartridges (TPCs), Lot AAH. Fourteen TPCs from this lot are to be used by the Ares I-X Program. Movement of the internal explosive/propellant sleeves was observed on two qualification units subsequent to the Shuttle environmental testing. Two recovery paths were developed, one for shuttle and one for Ares I-X. The Shuttle Program will procure a new lot that eliminates the root-cause of the failure. Another path was delineated to develop an NDE process to apply additional screening to the Lot AAH units in an effort to try to identify the presence (or not) of the bonding agent for the internal propellant sleeve (root cause). Ares I-X personnel from Goodrich, USA, and ATK have completed this ultrasonic NDE of the remaining Lot AAH and successfully screened and selected four units to request for transfer from Shuttle and shipment to KSC for integration into the Ares I-X vehicle. Ten additional units will be selected from this screening process for inclusion into the Ares I-X TPC Qualification Test program.

- **Upper Stage Engine (USE)**

  - ***Ongoing Construction on Test Stand A-3:*** Test Stand A-3 construction continues to progress. Figure 1 shows the tower that is now at a height of approximately 220 feet. Concrete work on the hydrogen barge dock can be seen in the foreground. Figure 2 is a detail showing a steelworker hard at work.

Figure 1

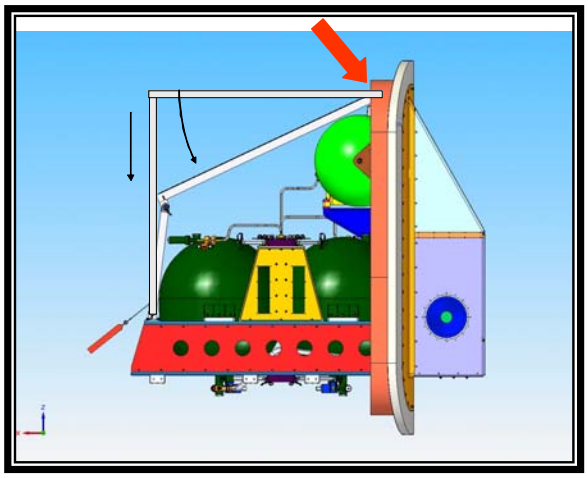
Figure 2

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

  - ***Ares I-X RoCS Element:*** Activities specific to the RoCS Element include:
    - The data drop for incremental Acceptance Review #1 was completed.

- RoCS supported Module A fit checks in Interstage Simulator (IS)-1 at KSC. Both modules are now at the Hypergolic Maintenance Facility undergoing surface prep and painting in advance of cork Thermal Protection System (TPS) installation back at the Vehicle Assembly Building (VAB).
- Fairing stress contours were received from ATA, and the fairing stiffening design iteration is in work at Teledyne.
- Breakout boxes needed for pressurant loading monitoring were sent to KSC.
- Peacekeeper Through-Bulkhead-Initiator tests were completed at ATK, in support of Peacekeeper ordnance waiver. No anomalies were reported.
- The final cap weld procedure was delivered to KSC for incorporation in the final version of the Solumina procedure. KSC is still awaiting a route sheet from Teledyne.
- Interference between the RoCS drop hazard Mat Frames and the Interstage doubler "nozzles" was noted during fit checks and is being addressed by a drawing mod to the frame. A Change Request for transferred work to have KSC perform the mod was submitted.

RoCS Module B Painted, Module A Being Prepared for Painting



Mat Frame Interference; Fix is to Shorten Vertical leg and Swing Down Horizontal Leg to Provide Clearance with Doubler "Nozzle"

The Ares Projects looks forward to the FS Drogue drop test on February 27 and Cluster drop test in April.

…and as of this Ares Projects Weekly Summary, there are only 134 days until the first Ares I test flight, Ares I-X!!!