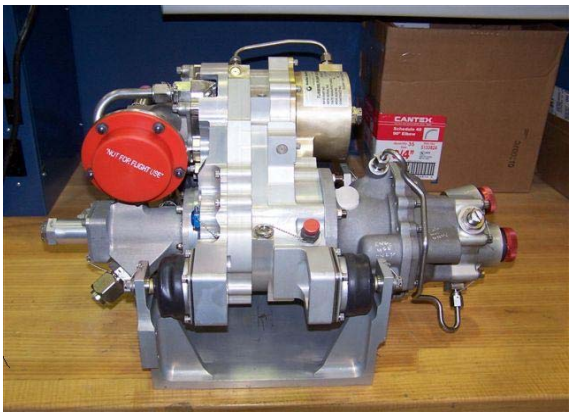
J–2X Powerpack Assembly (PPA) 1A Test #8:

The eighth test of the J–2X PPA–1A was successfully conducted on April 24 at Stennis Space Center (SSC). The test ran for 324.4 seconds and was terminated as planned when the oxygen tank reached the minimum acceptable liquid level. The primary objective of the test was to map out how the PPA–1A turbomachinery responds to variations of inlet flow and inlet pressure. The design of the J–2X turbomachinery has been based on historical performance information for the J–2S design, and the purpose of the test was to verify performance curves currently being used. The test operated at the upper limit of the J–2X Interface Control Document (ICD) run pressure and below the lower limit of the J–2X ICD run pressure, as well as over a wide variety of flow rate conditions.

Recent activities specific to the Elements include:

- **Upper Stage (US)**

  - ***US Thrust Vector Control (TVC) Subsystem Breadboard 1-Axis Testing:*** The final phase of the TVC breadboard 1-axis testing was completed on April 21 at Glenn Research Center (GRC). This last phase focused on the Turbine Pump Assembly (TPA) performance. The TPA performed well in all conditions. Total run time accumulated was 20,193 seconds without maintenance. This TPA is a modified Delta IV TPA, with the addition of a lube pump designed to increase the Delta IV TPA life from 2,400 seconds to the Ares I requirement of 7,500 seconds. At the end of testing, the TPA was still performing well and meeting its specifications. Testing ended after the depletion of two tube-trailers of helium that were used to power the TPA. The TPA will be inspected for wear and the gearbox oil will be analyzed for particulates.



The Ares I US breadboard TPA prior to the start of testing at NASA GRC

- **First Stage (FS)**

  - ***Ares I–X Team Visits Major Tool & Machine:*** The FS Ares I–X Team from Marshall Space Flight Center (MSFC) and ATK visited Major Tool & Machine in Indianapolis on April 22–24. Major Tool & Machine is subcontracted to ATK to manufacture the FS forward hardware for the Ares I–X mission including the frustum, forward skirt extension, forward skirt, and fifth segment simulator. The hardware is in various stages of manufacture throughout Major Tool & Machine's facilities with most pieces being prepared for final machining, painting, and final assembly. The frustum and forward skirt will be shipped directly from Major Tool & Machine to the Assembly and Refurbishment Facility (ARF) at Kennedy Space Center (KSC), while the forward skirt extension and fifth segment simulator will go to ATK in Utah for Development Flight Instrumentation (DFI) installation before shipment to the ARF.

MSFC Ares I–X Team with Ares I-X flight hardware at Major Tool

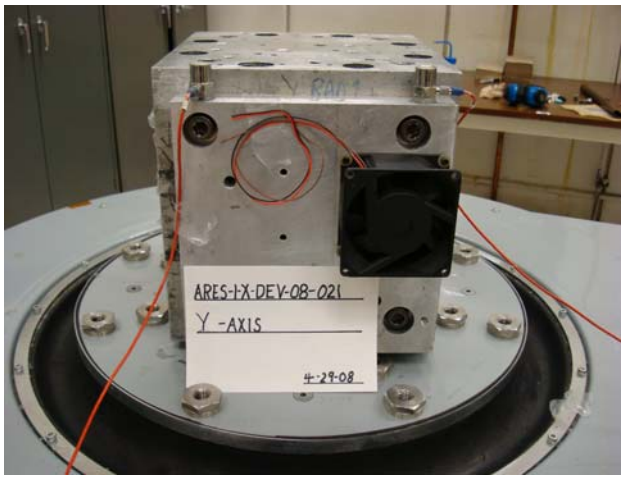
  - ***Ares I–X Reefing Line Cutter Trip to Roberts:*** On April 20, a meeting was held at the Roberts' facility in Torrance, CA, and was attended by representatives of MSFC, ATK, and USA. This meeting was held for the procurement of reefing line cutters for the Ares I–X flight. The reefing line cutters will have four different delay times and are used in the Ares I–X drogue and main parachutes. Units of four different time delays (5.5, 8.0, 9.5, and 14.0 seconds) are being purchased from Roberts as "off-the-shelf" designs and will be modified by USA. This modification will add a metal sleeve to each unit to ensure that a 60-degree pull angle can be provided to the cutter sear assembly. About half of each group of cutters will be subjected to qualification testing by USA with the remaining ones used for flight and flight spares for the Ares I–X parachutes. All the cutters were inspected and the X-Ray and N-Ray film was evaluated. The 5.5-second cutters will be N-Rayed again because of a different look than the other three delay times. The flight cutters will be shipped to KSC, modified, and packed in parachutes before the qualification testing is completed. The test cutters will be shipped to Wyle Laboratories in Huntsville, AL, modified, and subjected to qualification testing.

- **Flight and Integrated Test Office (FITO)**

  - ***Ares I–X Roll Control System (RoCS) Element Systems Engineering Management Plan (SEMP):*** The RoCS SEMP revision is in final review. The remaining bi-prop valve modified manifolds were delivered from Moog to Teledyne, allowing RoCS risk to be closed. The RoCS Pyrotechnics Phase III Review for Qualification Hardware was successfully conducted at Ensign-Bickford. Pyrotechnic hardware shipment to Teledyne is imminent. The kick-off with the vibration test vendor was conducted with the plan to have the vendor develop the test plan/procedure document in approximately 10 days. The draft environments expected to be included in the next update of the vibro-acoustics databook have been received. Discussions continue on the GRC desire to over-specify tolerances on the fastener size holes, which could lead to excessive Material Review Board activity, in-the-field match drilling between the RoCS module and the Interstage doubler, and deviation/waiver requests against the RoCS-to-Upper-Stage Interface Requirements Document (IRD).

  - ***Ares I–X Avionics Integrated Product Team (IPT) Constellation Safety Engineering Review Panel (CSERP):*** The Ares I–X IPT hosted the CSERP Phase II Avionics Review in Denver, CO, from April 22–25. A total of 25 Integrated Hazard Reports, 62 Fishbone Dispositions, and 13 Personnel Hazard Reports were reviewed. The data was well received and no design changes were required. The CSERP for the Shuttle-Derived Avionics (SDA) is scheduled for May 5.

  - ***Ares I–X Avionics IPT Fan/Choke Assembly Vibration Test:*** The Ares I–X Avionics IPT completed the Environmental Control System (ECS) fan/choke assembly vibration test, which was performed at the MSFC test facilities. The fan/choke assembly will be utilized on the FS Avionics Module (FSAM) as well as in US segments 1 and 7 for directed cooling of avionics boxes. The testing was successful; survivability was demonstrated with test tolerances of +3, -1.5 dB. This ensures a minimum 1.5 dB margin to Maximum Predicted Environments (MPEs).



ECS fan/choke assembly test set-up at MSFC test facility

- **Upper Stage Engine (USE)**

  - ***J–2X Delta Preliminary Design Review (PDR):*** J–2X held a successful Support Equipment delta PDR last week, leading the way toward detailed design and development of all required support equipment for the J–2X Element. RS–68 transportation trailers, shown in the photograph, will be modified to allow transportation and horizontal-vertical rotation of the engine to the Michoud Assembly Facility (MAF).

Trailers to be used to transport the engines to MAF as well as MSFC for Main Propulsion Test Article (MPTA) testing

- **Project Integration (PI)**

  - ***Ares TV YouTube Channel:*** The Ares Projects integration team uploaded Quarterly Progress Report (QRP) videos 1–7 to the AresTV YouTube channel. These public-release videos also appear on nasa.gov/ares. The move to this popular outlet holds the potential of reaching thousands of new people, including "Gen Y" viewers who have made the site so popular. The QPR videos feature recent progress in manufacturing, testing, and other projects activities. The url is: http://youtube.com/user/AresTV.

The Ares Project looks forward to the final J–2X Powerpack Assembly 1A (PPA–1A) Test #9 in early May and the STS-124 Shuttle Discovery launch in May.

…and as of this Ares Project Weekly Summary, there are only 348 days until the first Ares I test flight, Ares I–X!!!