



Upper Stage (US) Avionics and Software Preliminary Design Review (PDR): The US Avionics & Software Subsystem completed its US Flight Software (FSW) PDR 1 with a successful Board on April 21. The PDR 1 activity included a review of Flight Software plans, Command Telemetry Computer (CTC) software requirement specifications, Flight Computer (FC) software requirement specifications, CTC/FC software design descriptions, and the Verification and Validation Plan. The PDR Board issued a finding of readiness to proceed to the next design phase for the CTC and to proceed with coding on the CTC. To accommodate FC software requirement specification maturity, the US FSW approach includes a second PDR in October 2009.



First Stage (FS) Development Motor (DM-1) Static Test Assembly: The first two motor segments for DM-1 have been delivered to the T-97 test stand at ATK's facilities in Utah. On April 16, DM-1's forward segment left ATK's Final Assembly work center and was successfully delivered to T-97 following minor delays due to weather. The segment was then unloaded and set on the rail-jack system and



DM-1 Assembly at the T-97 Test Stand



DM-1 Forward Segment Transportation

subsequently mated to the forward test stand. On April 21, the forward center segment was delivered to T-97. Over the next month, the remaining DM-1 segments will be delivered and assembled together in preparation for the August 2009 static test.



Test Stand (TS) 4550 Special Test Equipment (STE): The Mast Climbers have been pre-assembled at the vendor's yard (Klimer Manufacturing) to verify fit-up and prepare for shipment.



The deliveries have begun and will soon be erected in TS 4550 at Marshall Space Flight Center (MSFC). Currently, base plates are being fabricated at the TS 4550 which will enable the erection to begin.



TS 4550 Mast Climber Delivery



Climbers at Klimer Manufacturing



Off-Loading at TS 4550

Recent activities specific to the Elements include:

Upper Stage (US)

- **US – Stage Operations:** The second Stage Operations (SO) Quarterly for the Upper Stage Element was conducted on April 16 at the Boeing facility in Research Park. The SO team has the responsibility for product operations deliveries for the Manufacturing and Assembly (M&A), Logistics, and Integrated Test subsystems. More than 110 participants, including representatives from the Upper Stage Office, Boeing Upper Stage Production and Instrument Unit Avionics Contracts, and NASA Engineering Support, received:
 - Status briefings from US Integrated Vehicle Ground Vibration Test (IVGVT), Ares I-Y, Integrated Stage Test (IST), Integrated Test, Supportability Analysis, and Manufacturing Flows;
 - Overviews of the Quality Concept of Operations and the Manufacturing Execution System US will be using; and
 - Detailed briefings on the US Pathfinder, Friction Stir Weld Plug Development, Tank Proof Test, and Non-Destructive Evaluation Processes being proposed for US.



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

- Ground Command, Communications, & Control 3 (GC3) Test Summary:** The Ares I-X Mini-GC3 system was delivered to Kennedy Space Center (KSC). The system was developed by Lockheed Martin (LM)/United Launch Alliance (ULA) under the Jacobs Avionics Integrated Services contract. This system is based on the full GC3 used to support ground test and launch of Atlas V rockets. The GC3 is mounted in the Mobile Launch Platform (MLP) and interfaces to the vehicle providing power and data to the Ares I-X vehicle while it is in the Vehicle Assembly Building (VAB) and at the Pad prior to launch. The GC3 along with the KSC-provided Ground Control System (GCS) also interfaces with workstations in the firing room providing the operator interface for integrated testing and for the Ares I-X launch. Before delivery to KSC, the Mini-GC3 system was tested in the Systems Integration Laboratory (SIL) at LM in Denver the week of April 10. System testing was performed at KSC via Engineering Checkout procedures. These tests verified internal/external power, data interfaces, and software functions. The GC3 interfaces have been verified with KSC's Ground Control System and the GC3 equipment in Launch Control Center Firing Room 1.



Mini-GC3 Racks in the Mobile Launcher Platform (MLP)



Launch Control Consoles

- Ares I-X Roll Control System (RoCS) Element:** Activities specific to the RoCS Element include:
 - The RoCS team completed support at KSC to the fairing modifications and match drilling operations to the fairing-to-outer mold line panel interface. Final installation of Fairing A is dependent on completion of the Development Flight Instrumentation Control Board directive for swapping the reverse-polarity calorimeter pins and shorting the failed thermocouple lead.
 - The team also supported transfer of Module B from the Hypergolic Maintenance Facility (HMF) to the Vehicle Assembly Building (VAB) and installation into the interstage.
 - Special Test Equipment, as requested by MSFC Engineering (engine simulator block and flowmeter by-pass valves), is in fabrication/procurement to support imminent cold flows at Teledyne.



- An updated Statement of Work (SOW) has been released to Teledyne Brown for proposal for the extended Period of Performance to support the August 30 launch.
- The data drop for the final Acceptance Review is planned for May 8, with the review to be held at KSC on May 27.

Project Integration (PI)

- ***University/Student Launch Initiative:*** The Ares Projects outreach team displayed the mobile Ares I during the Student Launch Initiative/University Student Launch Initiative (SLI/USLI) Rocket Fair at the MSFC activities building April 16. The team supported an April 17 presentation to the 330 students representing 33 teams participating in the weekend of activities that culminated in the launch of student-designed rockets and experiments on April 18. This annual yearlong event challenges students from middle school through college to design, build, and fly a sport-class model rocket and internal experiment payload to an altitude of 1 mile following NASA's design cycle process.



A Team Carries Their Rocket to the Pad for Flight

The Ares Projects looks forward to the STS-125 launch of Space Shuttle Atlantis on May 12 and the FS Cluster Drop Test in May.

...and as of this Ares Projects Weekly Summary, there are only 128 days until the first Ares I test flight, Ares I-X!!!