***Progress on Test Stand (TS) A-3 at Stennis Space Center (SSC):*** Construction of TS A-3 continues, bringing the tower height to approximately 150 ft. The engine deck will sit at approximately 175 ft and the total stand height will be approximately 320 ft. Progress on the propellant barge docks can be seen along the canal. The walls for the Liquid Oxygen (LOX) dock have been poured and the forms for the Liquid Hydrogen ($LH_2$) dock are in place.

***LOX Barge Dock***


***Tower Construction***


***A-3 Construction Site***

***Upper Stage (US) Manufacturing and Assembly (M&A) Subsystem:*** Aluminum-Lithium (Al-Li) 2219 y-rings for the Ares I US Common Bulkhead have been roll forged at Ladish Forging in Cudahy, WI, and are ready for shipment to a final machining vendor—STADCO in Los Angeles, CA—before shipment to the Marshall Space Flight Center (MSFC). The final design of the forward y-ring is currently being modified to accommodate changes to the design, making cryogenic proof testing of the Common Bulkhead feasible and easier. Once drawings are revised, the rings will be final machined and used for the Common Bulkhead demonstration article and Structural Development (SD) 19-1 and SD19-2 test articles.

***Al-Li 2219 Forward Y-Rings***

*Recent activities specific to the Elements include:*

- **Upper Stage (US)**

***Weld engineers examine the VWT confidence panel after welding is complete.***

***US Element Confidence Weld of Al-Li Barrel:*** The Ares I US Element conducted a 116-inch confidence weld of Al-Li barrel panels in MSFC Building 4755 on January 26. The panels were welded together on the Vertical Weld Tool (VWT), the major equipment needed for welding the full Manufacturing Demonstration Article (MDA) barrel construction scheduled to begin in summer 2009. The VWT will use the conventional friction stir welding process for the longitude welds required to make the quantity panels into a completed barrel weld assembly. Friction stir welding transforms the Al-Li alloy from a solid state into a "plastic-like" state, and then methodically stirs the materials together under pressure to form a welded joint. This confidence weld qualifies the schedule for the MDA barrel weld and lays the groundwork for future work on the Ares I US.

  - ***US Test Subsystem:*** The MSFC Engineering design team working on the Ares I US Common Bulkhead proof pressure test fixture recently solved a problem with the seal design of the forward $LH_2$ dome that forms the top of the fixture. The team was having a difficult time determining a reliable way to seal between this forward fixture dome and the mating barrel leg of the forward y-ring of the Common Bulkhead. After reviewing and analyzing several options, the team decided to incorporate a new sealing flange on the barrel leg of the forward y-ring of the Common Bulkhead itself. Enough raw material exists in the forward y-ring forging to incorporate this new flange. The flange would then be machined off, following proof pressure testing. A US Change Request (CR) will now be processed so that all affected US systems can formally implement this change. The team is hoping to complete the design of the proof test fixture by the end of February 2009. Work will then begin on the process of determining the fabrication source.

- **First Stage (FS)**

  - ***FS Subsystem Specification Resynchronization:*** FS Systems Engineering and Integration (SE&I) led a thorough re-synchronization review between the FS Contract End Item (CEI) Rev A, as approved by the FS Engineering Review Board (ERB), and the Deceleration, Structures, and Five-Segment Reusable Solid Rocket Motor (RSRMV) Subsystem Specifications. The updated Deceleration Subsystem Specification (DSS) review package

was presented to the FS ERB for the second time and approved on January 22. The FS Element Control Board (ECB) approved the DSS review package on January 26. The updated Structures Subsystem Specification review package is scheduled to be presented to the FS ERB on February 3. The subsystem specification resynchronization activity is still ongoing with the Pyrotechnic, Flight Safety System, Thrust Vector Control, and Avionics Subsystem Specifications yet to review.

- **Project Integration (PI)**

  - ***Ares Education Outreach:*** The January/February "energy" themed issue of *Spigot Science Magazine for Kids and Classrooms* contains an article on Ares titled "The Great Escape" by an MSFC Ares Projects outreach team member. A Portable Document Format (PDF) copy of the article is available by clicking on the following link and then completing the free registration: http://www.spigotsciencemag.com.

Social Studies Connection

The Great Escape

How NASA's New Moon Rocket Will Escape Earth's Gravity

By Tracy McMahan, Historian/Writer NASA Ares Project

Take a NASA Poll

Space Travel

If you could travel to any place in the solar system, where would you go?

Go to http://www.nasa.gov/mission_pages/constellation/ares/ares_education.html. Look for *What do YOU Think?* and take the poll.

While you're at the site, you can learn more about the Constellation Program and the Ares rockets.

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Ares I

Launch Abort System
Orion
Service Module
Instrument Unit
Upper Stage
Interstage
First Stage

Ares I rocket stages

Activities

1. Make a timeline or graph to show when the parts of the Ares I rocket use their fuel and drop off.
2. Using photos from the NASA Ares web site, make a photo story to show the parts of the rockets and what they will do. See more Ares pictures at: http://www.nasa.gov/mission_pages/constellation/multimedia/ares_images_search_agent_archive_1.html
3. Imagine that you are an astronaut sitting in the Orion going from the Earth to the Moon. How would you feel? What would you say as you take off, as each stage of the rocket drops off, as you dock with the Altair lunar lander? Write a story or a script for a play showing how you feel.

Ponder

The Ares rockets are designed to help us get to the Moon and possibly to other planets in the future. What would it be like to be part of an astronaut team that goes far into space?

launch pad and in an orbit about 80.5 miles (129.6 kilometers) above Earth.

- Ares I burns roughly 1.6 million pounds (0.7 million kilograms) of solid and liquid fuel. By comparison, a stock car uses 137.5 pounds (62.4 kilograms) of gasoline or 111 gallons (420 liters) for a 500-mile (805-kilometer) race.

To reach its destination, Orion fires its small rocket engine that places the spacecraft into the desired orbit to reach the International Space Station, a laboratory orbiting around 250 miles (400 kilometers) above Earth. Orion circles Earth at about 17,500 miles per hour (28,000 kilometers per hour).

**Ares V Carries Cargo**

For lunar missions Orion will dock with the Altair lunar lander carried to space by Ares V. This will be the largest NASA launch vehicle ever built. Ares V needs even more energy because it carries heavy cargos and provides enough energy to send Orion and Altair all the way to the Moon. To lift off, it will use six liquid rocket engines and two solid rocket boosters. If the energy produced by the boosters' fuel were converted to electric power, they would produce 2.3 million kilowatt hours of power, enough to supply the power for more than 92,000 homes for a full day.

Together, Ares I and Ares V can deliver 156,700 pounds (71,078 kilograms)—over 78 one-ton pickup trucks worth of crew and cargo—to the Moon. These rockets, along with the fleet of vehicles being developed by NASA's Constellation Program, will make it possible to take enough people and equipment to set up lunar outposts. From here, people can explore locations on the Moon that humans have never visited and practice living away from Earth for months. These are skills they will need before heading to Mars and beyond.

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

***…and as of this Ares Projects Weekly Summary, there are only 162 days until the first Ares I test flight, Ares I-X!!!***