Upper Stage (US)

Stage Operations, Logistics Subsystem: Excavation and core drilling of the existing foundation in Marshall Space Flight Center (MSFC) Building 4707 was recently performed to support installation of a Vertical Assembly Tool (VAT) Plug Weld Tool and Turntable. The VAT will perform circumferential welds to mate the US Manufacturing Demonstration Article (MDA) barrel sections previously welded in MSFC Building 4755 as well as attach the domes and Common Bulkhead to the end of the barrels. Multiple 22-inch diameter core drilled holes were made through the concrete slab in 4707, which is up to 8-feet thick in places. Thirty piles were then driven to bedrock to alleviate the possibility of future differential settlement of the foundation.

Foundation of MSFC Building 4707 VAT

Stage Operations, Test Subsystem: Ares I US Structural Development (SD) test activities are nearing completion for the large Aluminum-Lithium (Al-Li) panel buckling tests in MSFC Building 4619. These activities (designated SD02) consist of a series of structural buckling tests of Isogrid and Orthogrid panels representing Liquid Hydrogen (LH2) and Liquid Oxygen (LO2) tank wall sections.

The primary test objective is to characterize the compression behavior of various grid-stiffened candidate panel designs.

A welded Orthogrid test panel was successfully tested on July 21. The test was divided into two phases: (1) Weld failure occurred at a load of 470,000 lbs., versus the predicted load of 369,000 lbs. (2) Overall panel failure occurred at a load of 495,200 lbs., versus the predicted load of 524,000 lbs. The speckle pattern in the image below is used by the photogrammetry optical measurement system to determine panel displacements real-time during SD02 testing.

This is the last panel planned for the SD02 series of tests. However, if resources will allow, a remaining panel currently in storage may be sufficiently modified and tested. If not, the analysis and test groups will close out their final reports and documentation for SD02.

A post-test photo of the Orthogrid panel as mounted in the MSFC Building 4619 Gilmore test machine.

The Ares Projects look forward to the test firing of DM-2 on August 31, and the launch of STS-133, Space Shuttle Discovery, in the fall.