



Team Aids in Future Space Travel

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President Bush announced in 2005 the creation of the Constellation Program, consisting of a new launch vehicle program called Ares and a capsule-based manned vehicle program called Orion.

The development of any new spacecraft involves a significant investment in ground-based testing. The environmental stresses placed upon spacecraft in transportation, launch and deployment are varied, ranging from mechanical and dynamic stresses induced by acoustic effects, engine thrust and atmospheric buffeting. The size and sophistication of the Orion capsule, with its Service Module and Launch Abort System, represented a challenge to NASA and those engineers tasked with the ground test portion of the program.

NASA engineers decided early in the program to test the assembled spacecraft, rather than testing smaller components individually. This decision fueled NASA and private industry to develop what would become the world's largest vibration test system and the world's largest and most powerful reverberant acoustic test facility. *Team Corporation* is proud to have been selected as the critical technology partner in this effort.

Team partnered with The Benham Company to design, build and validate the Mechanical Vibration Facility (MVF) slated for installation in NASA's Plum Brook center near Sandusky, OH. In addition, *Team* assisted Aiolis, a Canadian firm, and The Benham Company by supplying the very high powered acoustic modulators for the Reverberant Acoustic Test Facility (RATF), also installed at Plum Brook.

The MVF is unique and has the capability of producing a swept sine test profile to simulate the expected dynamic responses produced in the spacecraft during an actual launch event. While this capability may not seem unusual, the size and weight of the spacecraft at 75 feet tall, 18 feet in diameter and weighing 70,000 lbs, certainly adds a new perspective to the achievement. And, the MVF can excite the spacecraft vertically, longitudinally and laterally without requiring the spacecraft to be repositioned. In practice, the MVF is a full 6 Degree of Freedom test system, the largest in the world.

The RATF is also unique due to its enclosed volume, and the sound pressure levels that can be produced. Once in the chamber, the spacecraft will be subjected to a series of acoustic tests designed to reproduce the peak sound pressure levels anticipated during launch and transit through the atmosphere. This requirement, i.e. producing high sound pressure levels on such a dimensionally large structure, required the most powerful noise sources available; *Team Corporation* Mk VI and Mk VII acoustic modulators. *Team's* acoustic modulators are capable of generating approximately 250kW each. Even with this remarkable energy output, NASA's chamber still required 23 units to produce levels mandated by program engineers.

For more than 50 years, *Team Corporation* has been a key player in the aerospace environment test world. The commissioning of this world-class facility in Spring 2011 is just another example of our expertise.