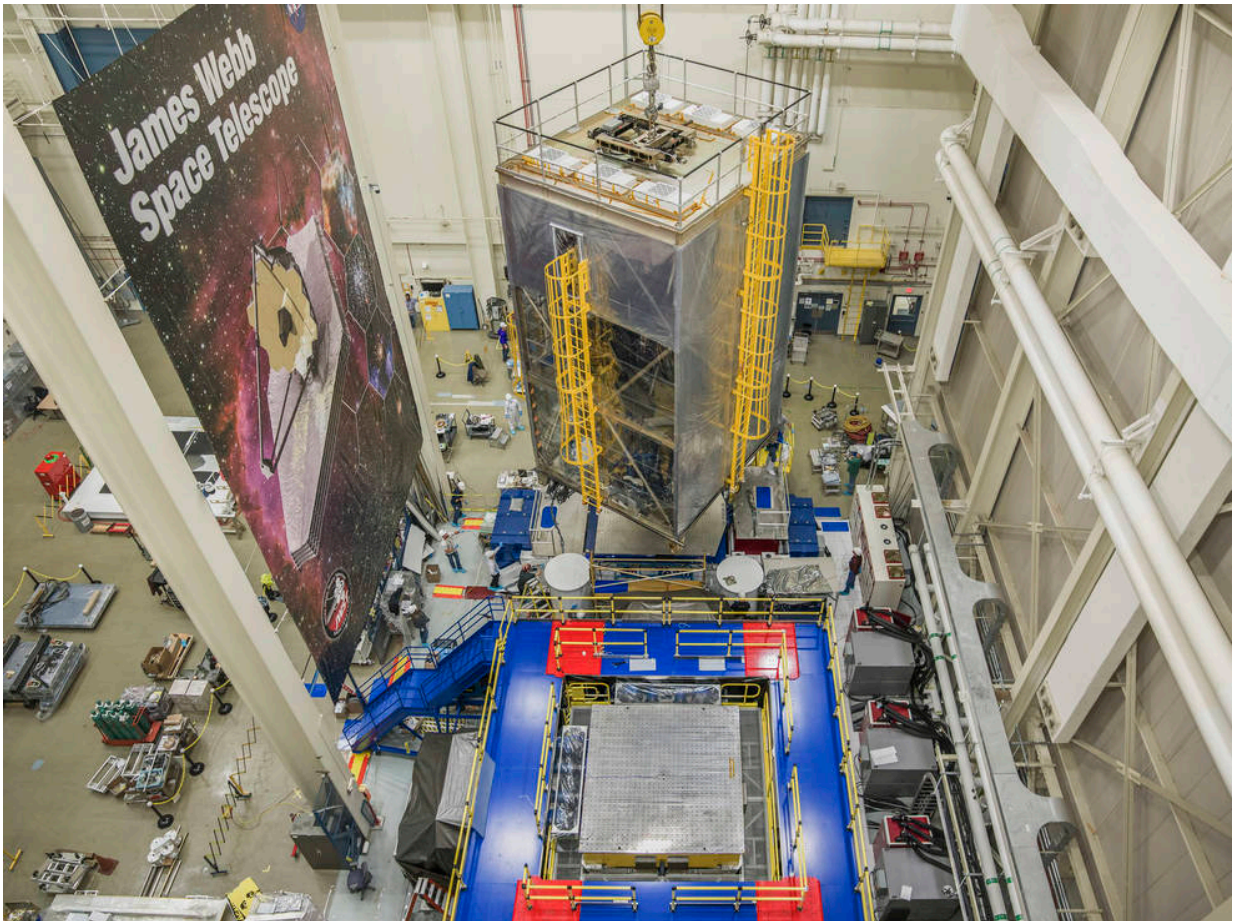


NASA gives the Webb Telescope a shakedown

February 13 2017, by Rob Gutro



NASA engineers and technicians perform vibration testing on the James Webb Space Telescope. Credit: NASA/Chris Gunn

Scientists and engineers had many challenges in designing the

components of NASA's James Webb Space Telescope and then had to custom design and build ways to test it.

Because of the sheer size and scale of the assembled Webb [telescope](#), some of the equipment typically used to test spacecraft simply doesn't measure up. One of those is a "shaker table" that is used to shake satellites to ensure a spacecraft like Webb can withstand the shaking that comes with a ride into space on a rocket.

So, engineers at Team Corporation in Burlington, Washington built a new, large and advanced shaker table [system](#) at NASA's Goddard Space Flight Center in Greenbelt, Maryland, especially for testing Webb. "The new "Vibration Test Systems" simulates the forces the telescope will feel during the launch by vibrating it from 5 to 100 times per second" said Jon Lawrence, Webb telescope mechanical systems lead and launch vehicle liaison at NASA's Goddard Space Flight Center.

For Webb, the need for a new shaker system was a combination of things, including shaker force magnitude, the shaker table's ability to handle the telescope's highly offset center of gravity, and the need for a precision "smart" shaker control system—one that will automatically adjust shaker input levels based on test article responses, including an automatic 'soft shutdown' capability. "No matter what facility anomaly might be experienced during testing (loss of power, loss of coolant, etc.), the Vibration Test System or VTS is designed to shut down 'softly' so as to avoid imparting potentially damaging loads," Lawrence said. After vibration testing of the telescope is completed soon, the new VTS can be used to test other future large spacecraft.

To make sure it works properly before using it to [test](#) the flight telescope, engineers put the new shaker system through its paces with many practice runs over months, using a dummy mass to represent the telescope. In November, Webb was moved from the Spacecraft Systems

Development and Integration Facility 'cleanroom' and onto the new neighboring Vibration Test System (VTS), where testing is ongoing. While in the shirtsleeve environment of the VTS, a large 3-story tall cover enshrouds the telescope, acting as a portable 'cleanroom' that protects it from dust and dirt.

This spring, after vibration testing is complete, the Webb telescope will be shipped to NASA's Johnson Space Center in Houston, Texas, for end-to-end optical tests in a vacuum at extremely cold temperatures, before it goes to Northrop Grumman Aerospace Systems in Redondo Beach, California, for final assembly and testing prior to launch.



The specially-constructed shaker table at NASA's Goddard Space Flight Center in Greenbelt, Md. during its construction. This view only shows the horizontal shaker, as the vertical hadn't been installed yet. Credit: NASA/Chris Gunn

Provided by NASA's Goddard Space Flight Center

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