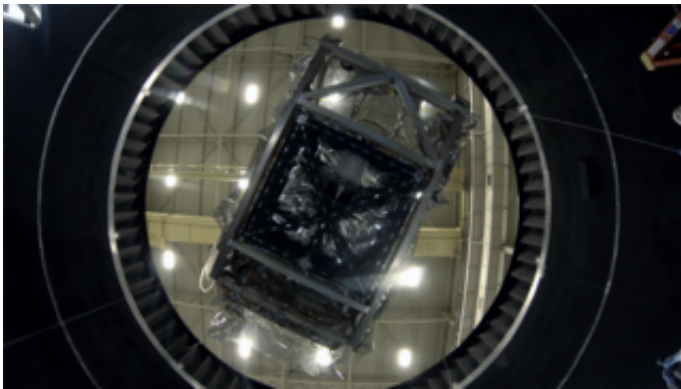


Webb's fully integrated 'heart' lowered into the chamber (w/ Video)

June 17 2014, by Laura Betz



(Phys.org) —Engineer Jack Marshall held his breath. The "heart" of the James Webb Space Telescope hung from a cable 30 feet in the air as it was lowered slowly into the massive thermal vacuum chamber at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

This "heart" of Webb is called the ISIM or Integrated Science Instrument Module, which along with its thermal vacuum test frame and supporting hardware, weighs about as much as an elephant. Within this test frame, ISIM sits inside a big-mirrored cube of cryo-panels and blankets. This process can be seen in a video by a Goddard videographer.

"This is the first time we are able to test the 'heart' in this configuration, which includes all four of Webb's science instruments installed on ISIM," said Marshall.

This major milestone was reached on schedule, but before the thermal [vacuum chamber](#) can be put into use ISIM's cooling system must be checked out. This cooling system relies on using [helium](#) says team member Marc Sansebastian of NASA Goddard who is carefully checking for any leaks.

"Helium is a very hard gas to contain because it is such a small molecule," said Sansebastian.

Once the Webb team is assured that all of the cooling lines are helium tight and all electrical connections have been completed and tested, a four-months long test on ISIM will begin by pumping out all of the air, and then dropping temperatures in the chamber, down to simulate the exceptionally cold temperatures in space.

Goddard's massive thermal vacuum chamber, called the Space Environment Simulator, uses eight vacuum pumps to achieve a vacuum and plumbing with nitrogen and cold gaseous helium to reduce the temperature inside a helium shroud to as low as -423.6 F (-253.15 C or 20 kelvins).

During this testing of ISIM, there are over 1,000 temperature sensors, almost 200 heater circuits, ten helium lines and a lot of thermal zones that need to be hooked up, says Calinda Yew, Webb test engineer for the [thermal vacuum chamber](#).

"Now we are in the process of connecting all of those sensors and heaters. The sensors will help monitor temperatures during the test and the heaters will help achieve target temperatures. We will inject helium

into a shroud to lower the science instruments temperatures even further," says Yew.

After four months of testing, the "heart" of Webb, ISIM, will return back to the world's largest clean room at Goddard for additional work and testing. Another thermal vacuum [test](#) of ISIM is scheduled in 2015.

The James Webb Space Telescope is the successor to NASA's Hubble Space Telescope. It will be the most powerful [space telescope](#) ever built and will observe the most distant objects in the universe, provide images of the first galaxies formed, and see unexplored planets around distant stars. The Webb telescope is a joint project of NASA, the European Space Agency and the Canadian Space Agency.

Provided by NASA

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