

# Webb telescope primary mirror segment completes cryogenic test

October 27 2010, By Kim Newton

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The chamber is opened to move the first cryogenically tested gold-coated engineering development unit out of Marshall's X-ray and Cryogenic Facility. Each of the 18 mirror Webb telescope primary mirror segments will be tested, re-polished, coated with gold, measured at Ball Aerospace, and finally tested again in the Marshall test facility at cryogenic temperatures before the mirror test program is complete. (NASA/MSFC/Emmett Given)

Last week a primary mirror milestone was met for NASA's James Webb Space Telescope project as the first gold-coated mirror segment finished testing in the X-ray & Cryogenic Facility at NASA's Marshall Space Flight Center in Huntsville, Ala.

The observatory's giant, 6.5-meter diameter, or 21.3 foot, hexagonal primary mirror will contain 18 flight mirror segments. Each mirror segment is made of beryllium and coated with a microscopically thin

coat of gold to enable the mirror to reflect infrared light more effectively.

"We've tested all of the beryllium mirror segments at least once and completed cryogenic testing of the first of the primary mirror segments, the engineering development unit," said Helen Cole, project manager for the Webb [Telescope](#) activities at NASA's Marshall Space Flight Center in Huntsville, Ala. "Now the manufacturing process and gold coating for the rest of the flight mirror segments can be completed."

Cryogenic mirror testing for the Webb Telescope began at the Marshall Center in 2009 and will continue into 2012. Each of the 18 mirror segments will be tested, re-polished, coated with gold, measured at Ball Aerospace, and finally tested again in the Marshall test facility at cryogenic temperatures before the mirror test program is complete.

During cryogenic testing, the mirrors are subjected to extreme temperatures dipping to -415 degrees Fahrenheit in the 7,600 cubic-foot helium-cooled vacuum chamber, which permits NASA engineers to measure in extreme detail how the shape of the mirror changes as it cools -- just as each mirror will change shape over a range of operational temperatures in space. The cryogenic test series helps NASA predict how well the telescope will image infrared sources in those conditions.

The facility at Marshall is the world's largest X-ray telescope test facility and a unique site for cryogenic, clean-room optical testing.

Northrop Grumman is the prime contractor for the Webb telescope, leading a design and development team under contract to NASA's Goddard Space Flight Center in Greenbelt, Md. Ball Aerospace is responsible for all [mirror](#) development.

The [James Webb Space Telescope](#) is NASA's next-generation space

observatory and successor to the Hubble Space Telescope. The most powerful space telescope ever built, Webb will observe the most distant objects in the universe, provide images of the very first galaxies ever formed and help identify 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 Marshall Space Flight Center

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