

UAHuntsville leading optical testing of mirrors for Hubble successor - James Webb Space Telescope

HUNTSVILLE, Ala. (Oct. 25, 2010) — Scientists at The University of Alabama in Huntsville will play a crucial role in determining whether humans will be able to peer at galaxies formed when the universe was taking shape billions of years ago.

Dr. **James Hadaway**, a **principal research scientist** at UAHuntsville, is the optical testing lead for the primary mirror segment of the James Webb Space Telescope, the successor of the Hubble Telescope.

The task has a tremendous amount of responsibility and requires a great amount of precision and accuracy. Hadaway illustrates that precision with this analogy: "If a mirror segment was scaled up to the size of the United States, then we couldn't have an error over the entire surface that was larger than the height of a basketball."



UAHuntsville research scientist Dr. James Hadaway is the optical testing lead for the primary mirror segment of the James Webb Space Telescope.

Working at NASA-Marshall Space Flight Center's X-ray and Cryogenic Facility, Dr. Hadaway and the team are in the second year of a three-year primary mirror segment test program.

The James Webb telescope is a large, infrared-optimized device will explore space at great distances from Earth and to a much greater degree than the existing Hubble. The telescope will be comprised of a large primary mirror that is 6.5 meters in diameter and a sunshield that will protect the telescope from the heat of the sun. The telescope will be folded up to fit into the rocket and will unfold after launch. To facilitate the folding of the telescope, the primary mirror is made of 18 hexagonal segments, each 1.5 meters in diameter.



Scientists inspect telescope mirrors at NASA-Marshall Space Flight Center's X-ray and Cryogenic Facility.

Because the infrared telescope will operate at very cold temperatures (around -378° F), the team cools the segments down to similar temperatures to record the segment's change in shape using a laser interferometer at the Marshall lab.

UAHuntsville's Center for Applied Optics has been contracted by Ball Aerospace and Technologies Corporation to do the calibration and testing component on the telescope. The **JWST** started in 2000 under the name Next Generation Space Telescope and is scheduled for launch in 2014.

This contract shows the advances the CAO has made in recent years, according to director Dr. Robert Lindquist. "The center has always had a strong optical

fabrication and testing program, but has recently made significant advances in these areas.”

“Our focus is really hardware,” Lindquist said. “We’re looking forward with advanced fabrication techniques and creating innovative designs.”

With the CAO’s refocus on fabrication and testing, the center is aiming to become even more relevant to stakeholders like NASA, the Army, and the Missile Defense Agency (MDA). The center includes optical and opto-mechanical design facilities, new state-of-the-art diamond turning and optical polishing machines, as well as metrology, holography, testing and prototyping of state-of-the-art optical components and systems.

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