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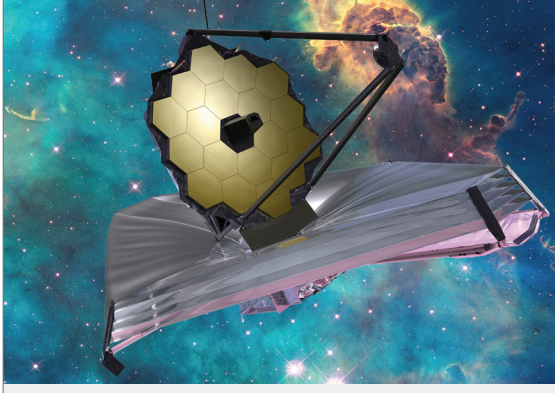
JAMES WEBB SPACE TELESCOPE



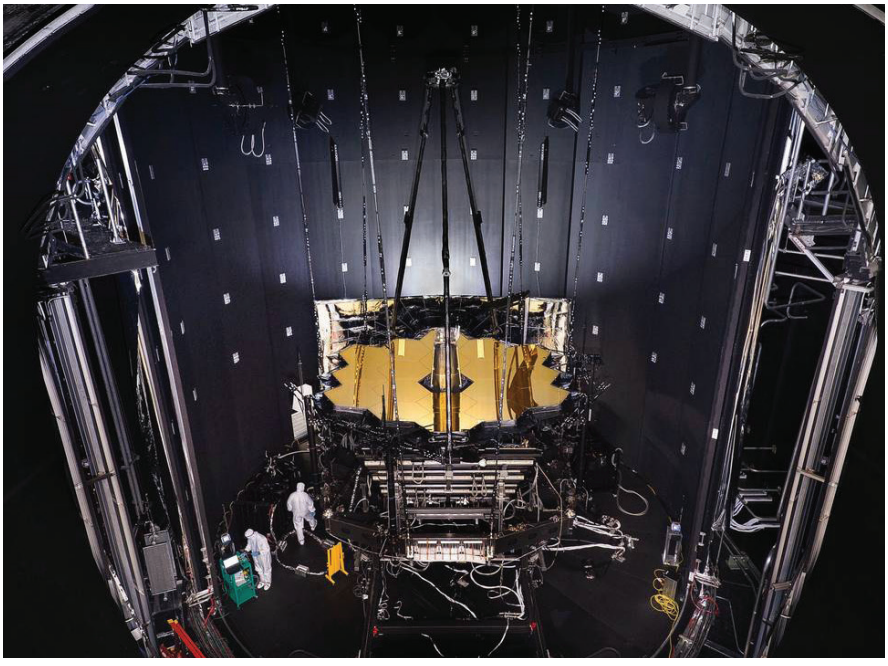
The James Webb Space Telescope is a space-based observatory that will provide unprecedented images of the universe's first stars and galaxies. L3Harris is playing an important role in the assembly, integration and testing of the telescope.

L3HARRIS' ROLE

As part of the NASA team, L3Harris integrated components made by various partners to form the Optical Telescope Element, which will collect light and provide sharp images of deep space. L3Harris also combined the components of the Integrated Science Instrument Module, which hosts four cameras and spectrographs for gathering data. L3Harris later administered about 100 days of testing in a cryogenic vacuum chamber at Johnson Space Center to ensure the telescope elements perform in the harsh environment found in space.

WEBB SPACE TELESCOPE MISSION

As the successor to the Hubble Space Telescope, Webb is slated for launch in 2021 and will take three months to travel 1.5 million kilometers (940,000 miles) to a point in space where it will be balanced between the gravity of the Earth and the sun. Webb is a large, infrared-optimized telescope designed to study the formation of the first stars and galaxies, the evolution of galaxies, the production of elements by stars and the process of star and planet formation. Webb will be located much farther from Earth than Hubble and will contain a tennis court-sized sun shade that will keep the telescope cold, which is necessary for viewing infrared light. Webb will be packed inside and carried into orbit aboard an Ariane 5 launch vehicle.



Webb in the cryogenic testing chamber at Johnson Space Center. Credit: NASA/Chris Gunne

DETAILS:

- Mission duration is 5-10 years
- Diameter of primary mirror is approximately 6.5 meters, or 21.3 feet
- Primary mirror consists of 18 segments
- Primary mirror segments are made of beryllium and coated with gold

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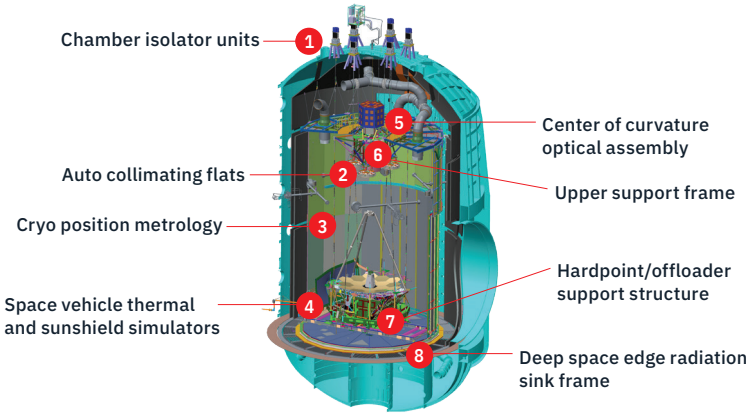
CRYOGENIC TESTING



1. CHAMBER ISOLATOR UNITS

Provide dynamic isolation from external vibration sources to create a near flight-like disturbance environment.

2. AUTO COLLIMATING FLATS (ACFS)

Three, 1.5-meter (60-inch) mirrors provide the ability to test the end-to-end performance of the telescope and instrument suite. Each flat can be tipped and tilted as needed.

3. CRYO POSITION METROLOGY

Four state-of-the-art photogrammetry cameras rotate on windmill-like booms to provide absolute position within the chamber to an accuracy of 0.1 millimeter (0.004 inch). Absolute distance measurement delivers radius of curvature of primary mirror.

4. SPACE VEHICLE THERMAL AND SUNSHIELD SIMULATORS

Replicates the thermal interfaces between the spacecraft and the telescope. Inner sunshade layer provides the thermal interaction of the flight sunshade.

5. CENTER OF CURVATURE OPTICAL ASSEMBLY (COCOA)

Optical test system used to ensure that all 18 primary mirror segments can be aligned and work together properly as one large mirror. Multi-wavelength interferometer allows the primary mirror to be phased and figure corrected using the flight mirror actuators.

6. UPPER SUPPORT FRAME (USF)

Supports the optical equipment inside the cryogenic environment. Serves as metrology base for the optical test equipment and the flight system.

7. HARDPOINT/OFFLOADER SUPPORT STRUCTURE (HOSS)

9-meter (30-inch) welded stainless steel support structure that holds the flight JWST telescope and instrument system.

8. DEEP SPACE EDGE RADIATION SINK (DSERS) FRAME

Reproduces deep space radiation sink; required for Thermal Pathfinder.

TELESCOPE DETAILS:

- Two and a half times larger in diameter, or about six times larger in area than Hubble
- 1,000 times more sensitive in the infrared spectrum than Hubble
- The overall weight of the telescope will be significantly lighter due to ultra-thin, ultra-lightweight mirror segments that were unavailable when Hubble was built

James Webb Space Telescope

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.

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