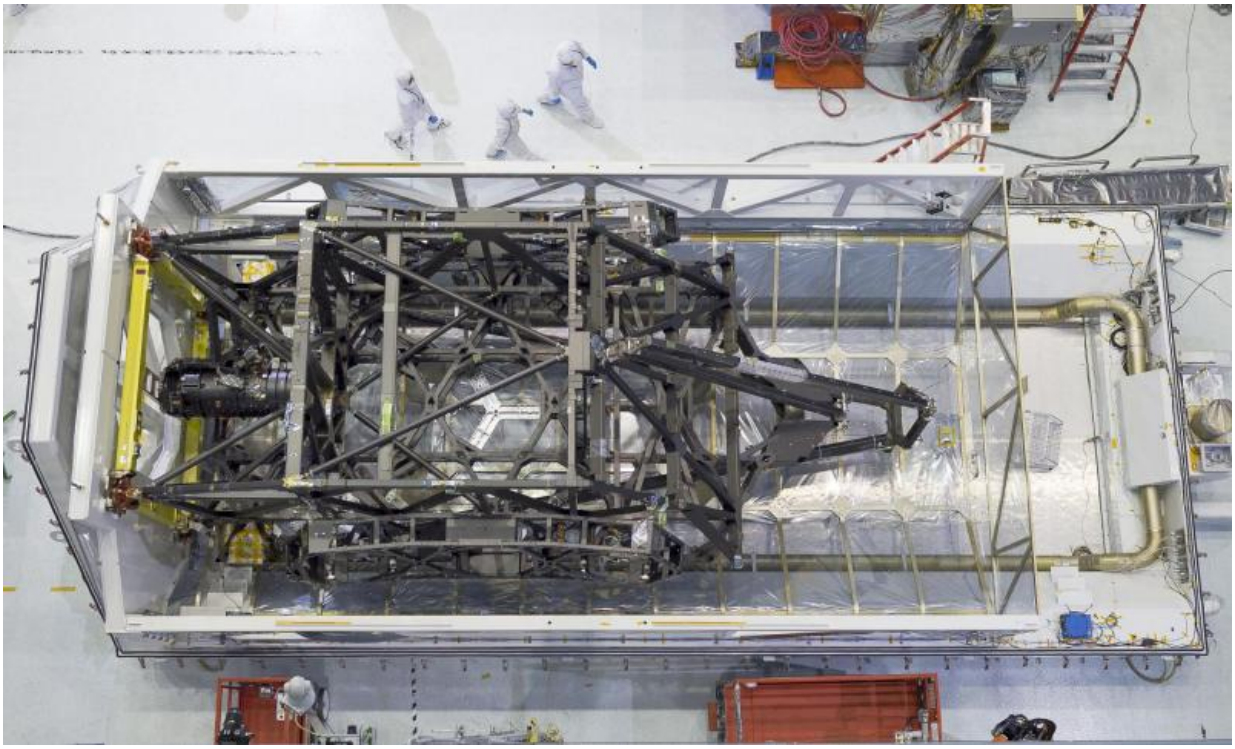
James Webb Space Telescope backplane arrives at NASA Goddard for mirror assembly

August 26 2015, by Laura Betz



The James Webb Space Telescope's "spine" or backplane arrived on Aug. 25 at NASA's Goddard Space Flight Center in Greenbelt, Maryland from Northrop Grumman. Credit: NASA Goddard/Chris Gunn

One of the most crucial pieces of the James Webb Space Telescope, the

flight backplane, arrived on Aug. 25, on schedule for Webb's 2018 launch date at NASA's Goddard Space Flight Center in Greenbelt, Maryland, for mirror assembly. The backplane is the "spine" of the telescope, responsible for holding its 18 hexagonal mirrors and instruments steady while the telescope is looking into deep space.

Engineers will be unpacking the backplane live on webcam and making sure that it works as it should, and that nothing was damaged during its transit.

Once settled in the large clean room at Goddard, the backplane will be hoisted onto an assembly stand. In late fall, Webb's flight mirrors will be placed by a robotic arm onto the backplane. Together, those 18 mirrors make up Webb's "primary mirror." Along with the secondary, tertiary and fine steering mirrors, this primary mirror comprises a telescope that will help scientists observe the formation of the first stars and galaxies more than 13.5 billion years ago.

"The delivery of the backplane to Goddard represents another significant step in the evolution of Webb," said Bill Ochs, James Webb Space Telescope project manager. "Final assembly of the telescope can now begin this fall leading to integration of the telescope and science instruments in late spring of 2016."

The flight backplane arrived at Goddard after undergoing integration and testing at Northrop Grumman Aerospace Systems in Redondo Beach, California.

"The telescope's beryllium mirrors are held together nearly motionlessly in space by the backplane, which also acts as a stable platform during ground test operations and launch," said Scott Texter, telescope manager at Northrop Grumman Aerospace Systems. "The stability of this hardware contributes to the Webb telescope's ability to provide an

unprecedented look at our own solar system as well as discover exoplanets well beyond this solar system."

The backplane will also meet the most stringent thermal stability requirements of any space-based telescope to minimize thermal distortion. Webb undergoes extreme temperature changes in the time between its construction and its final home in deep space. Webb's components are built at room temperature, but will eventually operate at extremely cold temperatures as low as minus 389 F. While in orbit the temperature of the backplane will also vary depending on where it is pointing relative to the sun. Extreme changes in temperature may cause the backplane to shrink or expand. Throughout this swing in temperature the backplane portion of the telescope structure must not vary more than 38 nanometers (approximately a thousandth the diameter of a human hair). Additionally, the breakthrough folding design of the transformer-like backplane enables it to fit inside the 15-foot-diameter fairing of the launch vehicle.

The James Webb Space Telescope is the scientific successor to NASA's Hubble Space Telescope. It will be the most powerful space telescope ever built. Webb is an international project led by NASA with its partners, ESA (the European Space Agency) and the Canadian Space Agency.

Provided by NASA's Goddard Space Flight Center

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