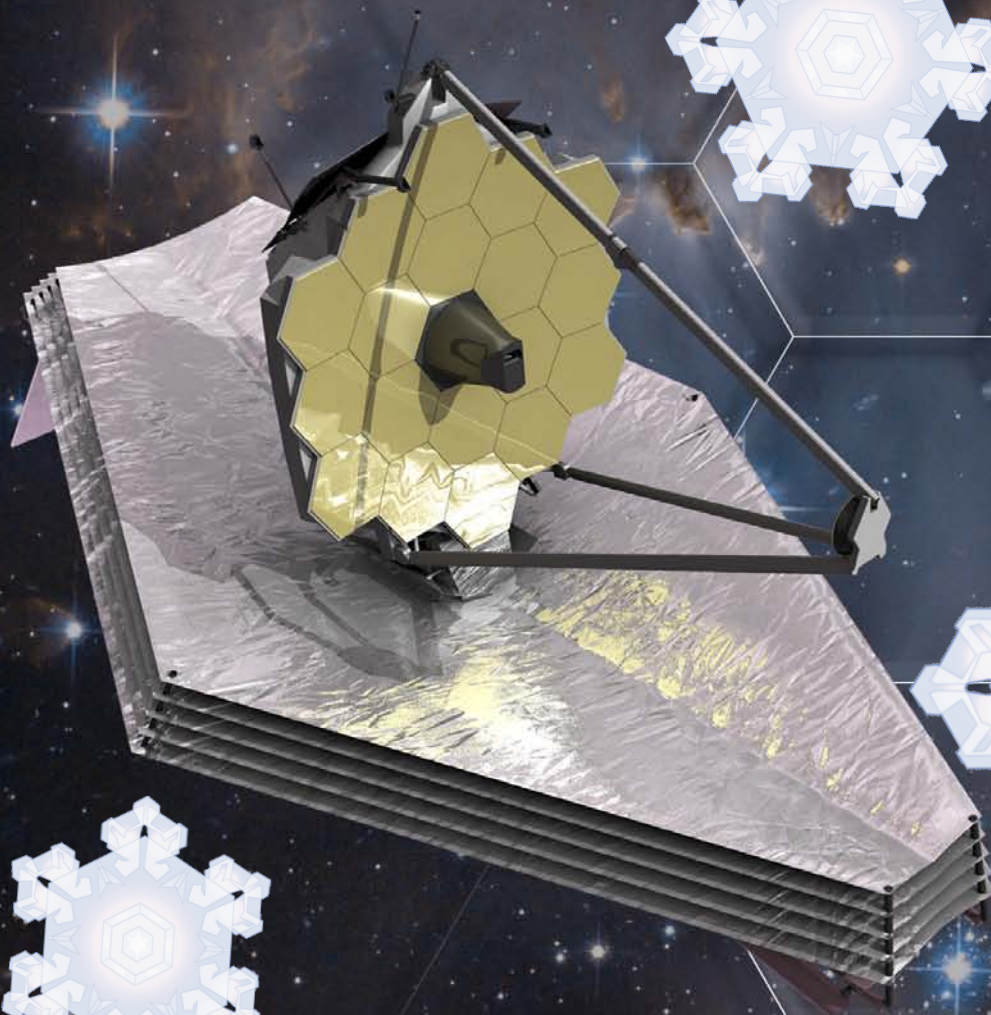


National Aeronautics and Space Administration



Webb

Update

December 2012





James Webb Space Telescope

First Flight Mirrors Arrive At Goddard

By Lee Feinberg

The JWST program passed a major milestone recently as the first flight mirrors arrived at Goddard Space Flight Center's Space System Development and Integration Facility (SSDIF) cleanroom. The first two flight Primary Mirror Segment Assemblies (PMSAs), labeled A3 and B2, arrived at Goddard on September 17th. The mirror containers were lifted off the truck and moved into the SSDIF cleanroom. Once inside the cleanroom, the mirror containers were opened and an incoming inspection was performed on September 19th. The mirrors were moved up onto the cleanroom mezzanine where they are now being stored inside their shipping containers under dry nitrogen purge to keep them clean and dry until telescope assembly begins. A video of the first mirror arrivals can be found at:

<http://go.nasa.gov/Z6oEQw>

Ball Aerospace in Boulder, CO, under contract to

Northrop Grumman, is responsible for the Webb's optical technology and lightweight mirror system. The mirrors that arrived at Goddard were shipped from Ball Aerospace in custom containers designed specifically for the multiple trips the mirrors made through eight U.S. states while completing their manufacturing. Each of the 18 hexagonal-shaped mirror assemblies that make up the primary mirror measures more than 1.3 meters (4.2 feet) across, and weighs approximately 40 kilograms, or 88 pounds. JWST will be the first space astronomy observatory to use an actively-controlled, segmented mirror.

The third flight Primary Mirror Segment Assembly (PMSA) C3 and the flight Secondary Mirror Assembly (SMA) arrived at Goddard on November 5th. Incoming inspection was performed on November 6th and both mirrors passed. These mirrors are now also stored on the SSDIF mezzanine under nitrogen purge. Five more mirror shipments are planned in 2013 and all of the flight mirrors are due to arrive at Goddard by next Fall to await telescope integration in 2015.



The flight secondary mirror undergoing receiving and inspection in the GSFC SSDIF Cleanroom.

James Webb Space Telescope

Workshop on Solar System Observations with JWST at the 44th Annual DPS Meeting

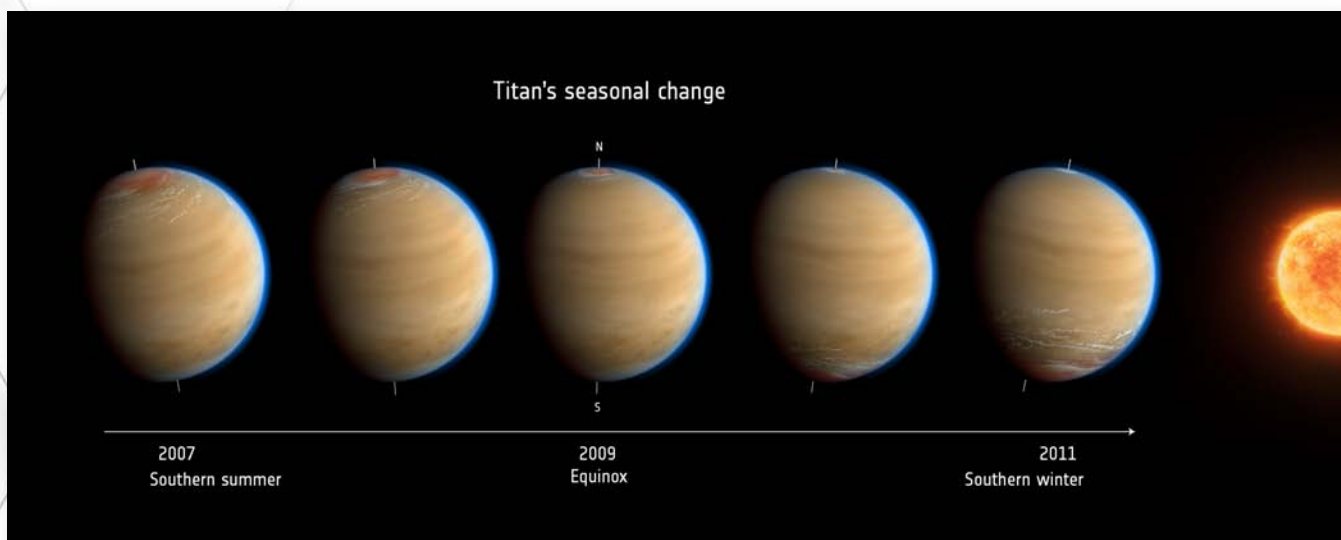
By Stefanie Milam, Heidi Hammel, & Jonathan Lunine

In October, a group of ~40 experts in Solar System observations with both space- and ground-based facilities participated in the Planning your Solar System Observations with JWST Workshop at the annual Division of Planetary Sciences Meeting in Reno, Nevada. Representatives from JWST provided the current instrument specifications and observing modes, as well as the observatory capabilities such as brightness limits, moving targets, tracking, and others. Additionally, the Solar System targets in the current Science Operations Design Reference Mission (SO-DRM), which exercises the designed capabilities of the observatory, were presented. While not inclusive of all possible solar system programs, eight different programs have been considered for the current SO-DRM and will be expanded based on the output of this workshop. A key output of the workshop was to compile capability objectives for future consideration for further pre-launch operational studies.

The JWST Science Working Group has a dedicated effort to establish the full scientific capabilities of this facility for Solar System Science. The workshop allowed for a significant amount of discussion with the participants so that the community's concerns and questions could be properly considered and addressed (or at least recorded for further work). A brief summary as well as the preliminary presentations are available at:

<http://www.stsci.edu/jwst/science/solar-system>.

Additionally, the success of this workshop has encouraged the community and the JWST Science Working Group to have more joint activities, and has led to an additional workshop at the annual Lunar and Planetary Science Conference held in the Woodlands, Texas from March 18-22, 2013. The details of this workshop will be available at the website listed above in the near future. If you are interested in participating, please contact Stefanie Milam: stefanie.n.milam@nasa.gov.



This artist's impression of Saturn's moon Titan shows the change in observed atmospheric effects before, during and after equinox in 2009.



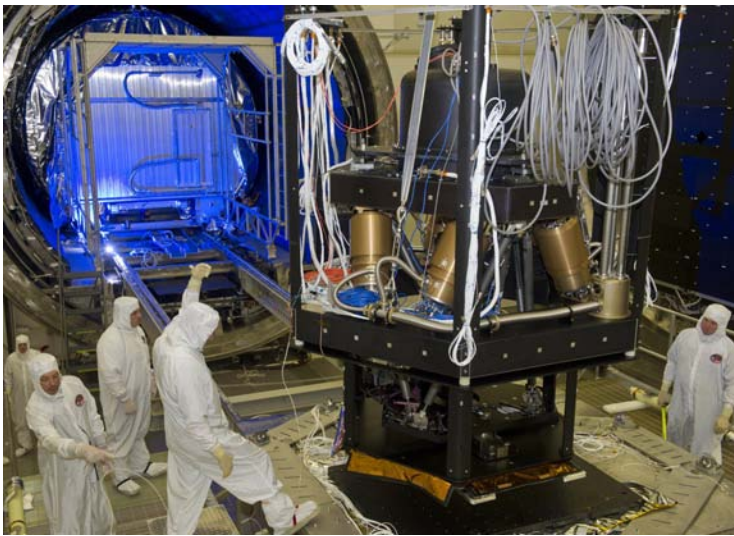
James Webb Space Telescope

Construction and Testing Complete for JWST's COCOA

By Paul Geithner

The JWST program achieved another major accomplishment this summer with the completion of construction and testing of the Center of Curvature Optical Assembly, or COCOA. The COCOA is a key piece of optical test equipment that will be

used to check that the JWST mirrors will work as designed in the frosty environment of space. Building this very complex piece of opto-mechanical hardware roughly the size of a car was very challenging, and the team did an outstanding job doing it.



Testing of the James Webb Space Telescope's Center of Curvature Optical Assembly, or COCOA, in the X-ray and Cryogenic Test Facility at NASA's Marshall Space Flight Center in Huntsville, Ala.

The COCOA is a precision assembly of optical instrumentation and mechanisms that engineers will use to measure the shape and alignment of all the 18 segments of JWST's 6.5-meter diameter main (a.k.a. primary) mirror. Although every individual mirror segment has already been tested to confirm that each one has the correct shape, the COCOA has been built to test the assembled telescope and ensure that all 18 primary mirror segments can be aligned and work together properly as one large mirror. At the heart of the COCOA is an interferometer, which utilizes the wave nature of light to make extremely precise measurements of optical performance and positioning down to nanometers, or millionths of a millimeter. The COCOA will accompany the JWST telescope and instruments inside the enormous Chamber A facility at NASA's Johnson Space Center (JSC) in Houston, Texas, where they will be subjected to a

vacuum and temperatures of around 40 Kelvin (-233 degrees Celsius, or -387 degrees Fahrenheit), simulating operational spaceflight conditions.

ITT Exelis of Rochester, New York, built the COCOA with subcontractor Micro Instruments, also of Rochester. After it was assembled, the COCOA was tested at room temperature at Micro Instruments, and then in a vacuum at extremely cold, or cryogenic temperatures at the X-Ray and Cryogenic Facility at NASA's Marshall Space Flight Center (MSFC). The tests at MSFC verified the COCOA's performance under the same conditions it will experience inside of Chamber A at JSC when it will be used to test JWST. Currently, the COCOA is staged at MSFC until engineers are ready to use it at JSC for preliminary tests ahead of flight telescope testing, beginning about two years from now.



James Webb Space Telescope

JWST Guest Speakers

Would you like a colloquium at your university on JWST? How about a talk at a conference you are organizing? These JWST scientists are willing to give a talk. The JWST project has allocated some funding to pay the expenses for talks in the US; talks in other countries can also be arranged. In addition to the specific topics listed below, the speakers are also available to give JWST Mission Overview talks and talks at the general public level.

- Mark Clampin, GSFC, "Exoplanets with JWST"
- Rene Doyon, Universite de Montreal, "JWST NIRISS Science"
- Jonathan Gardner, GSFC, "JWST and Galaxy Evolution"
- Matt Greenhouse, GSFC, "JWST Mission Overview and Status"
- Heidi Hammel, AURA, "Planetary Exploration with JWST"
- Jason Kalirai, STScI, "Resolved Stellar Populations in the Near IR with JWST"
- Jonathan Lunine, Cornell University, "JWST, Exoplanets, and the Solar System"
- John Mather, GSFC, "JWST Mission Overview and Status"
- Bernie Rauscher, GSFC, "JWST and its HAWAII-2RG and SIDECAR ASIC Detector Systems"
- George Rieke, University of Arizona, "Debris Disks and the Evolution of Planetary Systems," or "The Place of JWST in the growth of Infrared Astronomy"
- Marcia Rieke, University of Arizona, "NIRCam for JWST: Exoplanets to Deep Surveys"
- Jane Rigby, GSFC, "Gravitationally Lensed Galaxies and JWST," or "AGN and JWST"
- George Sonneborn, GSFC, "Imaging and Spectroscopy with JWST"
- Massimo Stiavelli, STScI, "Studying the first galaxies and reionization with JWST"
- Amber Straughn, GSFC, "JWST and Galaxy Assembly"
- Rogier Windhorst, Arizona State University, "First Light, Reionization and Galaxy Assembly with JWST" or "JWST and Supermassive Black Hole Growth"

To arrange a talk, please email jwst-science@lists.nasa.gov or contact the speaker directly. For European universities and institutions interested in inviting speakers to give talks covering the full range of scientific topics addressed by JWST, please contact Pierre Ferruit (ESA JWST Project Scientist, ESTEC, pferruit@rssd.esa.int).

Editor: Amber Straughn; Graphics: Jay O'Leary; Layout: Maggie Masetti

