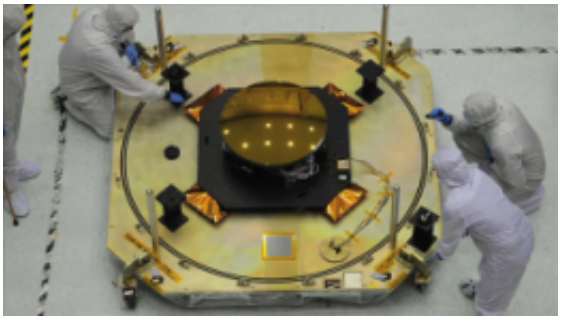
Video hails arrival of 2 different Webb Telescope mirrors

November 29 2012, by Rob Gutro



Credit: NASA

(Phys.org)—The sole secondary mirror and a third primary mirror segment that will fly aboard NASA's James Webb Space Telescope arrived at NASA's Goddard Space Flight Center in Greenbelt, Md., on Nov. 5, 2012. A video of the mirrors arriving was released today from NASA Goddard that shows the arrival of both mirror segments and movement into a giant clean room.

The video, filmed at NASA Goddard, runs two minutes and 16 seconds and is available in Quicktime format and high-resolution. The video begins with the trailer truck that transported the mirrors from Ball Aerospace & Technologies Corp. of Boulder, Colo. Ball Aerospace manufactured the mirrors, packed and shipped them to NASA.

Viewers of the video will see the canisters containing the mirrors being off-loaded from the truck and brought into NASA's clean room. Once in the clean room, technicians inspect the secondary mirror using flashlights. Reflections of one of the technicians and the roof of the giant clean room that houses the mirror are seen on the mirror's surface.

"The arrival of the flight secondary is very significant as early on that was considered the single most difficult mirror to manufacture due to the complexity of testing the large convex shape at cold temperatures," said Lee Feinberg, the NASA Optical Telescope Element Manager for the James Webb Space Telescope at Goddard.

Unlike the 18 hexagonal primary mirror segments that make up the biggest mirror on the Webb telescope, the secondary mirror is perfectly rounded. The mirror is also convex, so the reflective surface bulges toward a light source. It looks much like a curved mirror that you'll see on the wall near the exit of a parking garage that lets motorists see around a corner. The quality of the secondary mirror surface is so good that the final convex surface at cold temperatures does not deviate from the design by more than a few millionths of a millimeter - or about one ten thousandth the diameter of a human hair.

The powerful primary mirrors of the James Webb Space Telescope will be able to detect the light from the first luminous objects that formed when the universe was young, as well as distant galaxies and nearby stars and their planets. Altogether, 21 mirrors comprise the Webb's telescope optics—18 primary mirror segments working together as one large 21.3-foot (6.5-meter) primary mirror, the secondary mirror mounted on a tripod above the primary mirror, and the tertiary mirror and the fine steering mirror that are both located inside an assembly near the center of the primary mirror.

All of the mirrors are made of beryllium, which was selected for its

stiffness, light weight and stability at cryogenic temperatures. Bare beryllium is not very reflective of near-infrared light, so each mirror is coated with gold. The microscopic gold coating enables the mirrors to efficiently reflect infrared light (which is what the Webb telescope's cameras see).

On Sept. 17, 2012, two other primary mirror segments arrived at NASA Goddard and are currently being stored in the giant clean room.

The most powerful space telescope ever built, the Webb telescope will provide images of the first galaxies ever formed, and explore planets around distant stars. It is a joint project of NASA, the European Space Agency and the Canadian Space Agency.

Provided by NASA