First instrument for the James Webb Space Telescope completed

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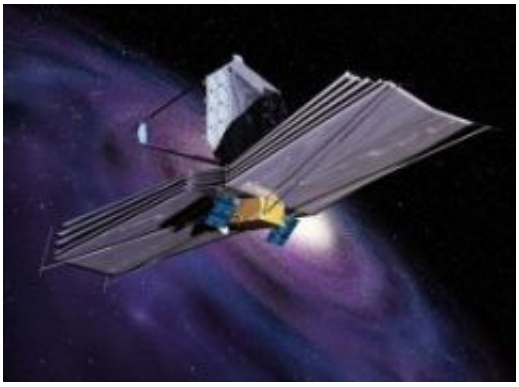

The James Webb Space Telescope, an artist's concept. Credit: ESA.

After more than ten years of work by more than 200 engineers, the Mid InfraRed Instrument (MIRI), a camera so sensitive it could see a candle on one of Jupiter's moons, has been declared ready for delivery by the European Space Agency and NASA. The MIRI Optical System, an instrument for the James Webb Space Telescope (JWST) that will eventually take up a position four times further away from the Earth than the Moon. It will now be shipped to NASA's Goddard Space Flight Center where it will be integrated with the other three instruments and the telescope.

MIRI is the first of the four instruments on board the JWST to be completed. The handover ceremony between the European Space Agency (ESA) and NASA at the Institute of Engineering and

Technology in London today is the culmination of a long term collaboration effort from teams across both continents.

Attending the ceremony was David Willetts, Minister for Universities and Science, who said: "MIRI is the impressive result of more than ten years of work, led by Britain in partnership with Europe. With world-leading space research facilities at the Rutherford Appleton Laboratory, a host of excellent universities and strategic direction from the UK Space Agency, the UK is clearly well placed to contribute to major global missions. I am extremely proud to be here for the handover of MIRI to NASA's James Webb team."

The UK guided the development work by these teams, in addition to employing UK technologies in the construction of key components and carrying out the assembly, integration, testing and ground calibration at the Science and Technology Facility Council's (STFC) RAL Space. The instrument has been subjected to exhaustive mechanical and thermal testing at the same facility to make sure it can not only survive the rigors of a journey into space, but also remain operational for the life of the mission.

Gillian Wright, the European Principal Investigator for MIRI based at STFC's Astronomy Technology Centre said: "The whole team is delighted that our hard work and dedication has resulted in a MIRI instrument that will meet all our scientific expectations. It is wonderful to be the first to achieve this major milestone for the JWST project. We can now look forward to significant scientific discoveries when it is launched."

MIRI will allow astronomers to explore the formation of planets around distant stars and could even pave the way for investigations into the habitability of other planetary systems.

MIRI offers a sensitivity and resolution many times greater than any other mid-IR instrument in existence today or for the foreseeable future. It will be able to penetrate the dust obscuring distant objects, allowing for smaller and fainter objects than have ever been detected to be mapped in unprecedented detail. Its wavelength of 5 to 28 microns brings a unique scientific capability among the other instruments on the James Webb Space Telescope. MIRI will therefore have a key role in the study of light that has travelled from the early moments of the universe by JWST. These wavelengths bring additional technical challenges due to the extremely low operating temperatures necessary (-266.5ºc). Unlike the other JWST instruments MIRI will be cooled by a dedicated cooler provided by JPL.

At today's handover, Eric Smith, JWST Deputy Program Director from NASA HQ said: "The delivery of JWST's MIRI is a significant achievement and an important milestone on our collective journey in creating a space telescope that will dramatically alter our understanding of the universe. On behalf of NASA and the JWST program I want to congratulate the MIRI team for their dedication to scientific excellence and the resulting superb instrument. I'm excited about the upcoming integration and testing of MIRI with the other science instruments and look forward to continued collaboration with the team."

Mark McCaughrean, Head of the Research & Scientific Support Department of the European Space Agency said: "It is an immensely challenging project, but together with our US and Canadian colleagues, European scientists and engineers have successfully risen to the challenge and are now delivering key parts of JWST to NASA."

Facilities at STFC's Rutherford Appleton Laboratory had to be specially designed to simulate the environment the instrument will experience in space and account for it's extremely low operating temperatures. The instrument was assembled from major sub-systems that had already been

built-up and thoroughly tested in the partner institutes. The RAL test chamber was then used to test the performance of all the scientific operating modes of the instrument and obtain critical calibration observations. Such rigorous testing promotes confidence in the science it will do when the mission is launched.

MIRI will now be transported the Goddard Space Flight Center in a specially constructed environmental container designed to protect it from moisture and keep the temperature stable. Once there it will start the long process of integration with the other instruments, two years of testing to ensure that they all function together correctly, and then integration and test with the telescope optics. The launch of the James Webb Space Telescope is scheduled for 2018.

Provided by UK Space Agency

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