Testing time for instrument on Hubble's successor

December 6 2007

A significant milestone for the Hubble Space Telescope successor, the James Webb Space Telescope (JWST), is on course to be reached before Christmas with the testing of the verification model of the Mid-InfraRed Instrument (MIRI) at the Rutherford Appleton Laboratory in Oxfordshire.

MIRI is one of four sophisticated instruments onboard which will study the early universe and properties of materials forming around new born stars in unprecedented detail. It will also be able to image directly massive planets orbiting other stars.

At the heart of the JWST observatory is a large cold telescope whose primary mirror measures 6.5 metres in diameter compared to 2.4 metres for Hubble, providing an enormous increase in capability to investigate the origin and evolution of galaxies, stars and planetary systems. Due for launch in 2013, JWST, which is a joint cooperative mission between NASA, the European Space Agency (ESA) and the Canadian Space Agency (CSA), is optimised to operate over a wide range of infrared wavelengths.

MIRI is the first of the JWST instruments to reach this phase of cryogenic performance testing and marks a significant milestone for this international team, which is funded in the UK by the Science and Technology Facilities Council [STFC] and spread across STFC's UK Astronomy Technology Centre (UK ATC) and Rutherford Appleton Laboratory [RAL], plus team members at Astrium Ltd, and the

universities of Leicester and Cardiff .

Speaking at the 3rd Appleton Space Conference today (6th December 2007) European Consortium Lead for MIRI, Dr Gillian Wright MBE from the UK ATC in Edinburgh said, “It is extremely exciting, after working on the project since 1998, to begin to test a complete instrument. This will provide scientists with real data which they can use to understand the best ways of making discoveries with the instrument.”

The testing is being undertaken at the STFC’s Rutherford Appleton Laboratory in Oxfordshire where all MIRI’s subsystems from collaborators in Europe and NASA’s Jet Propulsion Lab are integrated and tested in full.

This involves thermal and electromagnetic calibration testing along with scientific and environmental testing.

Dr Tanya Lim, who leads the 25 people strong international MIRI testing team explains, “Given the international nature of this project it is essential to bring together both instrument and test equipment components from around the world to ensure that they work together.”

She adds, “We will also be using the instrument flight software which will need to work with the spacecraft and ground software systems in order to command the instrument, simulate telemetry to the ground and generate images from the test environment.”

The MIRI testing team are working around the clock until the completion of the first tests just before Christmas. Paul Eccleston, MIRI Assembly, Integration and Test (AIT) Lead adds, “MIRI is the largest individual flight instrument that has been built at RAL, and has presented unusual challenges particularly with regard to cooling and thermal control. The instrument will operate at temperatures much lower

than the rest of the spacecraft. As a result, the first two weeks of testing involved cooling the instrument down to its operational temperature of -267ºC, only 6.2K above absolute zero."

Source: Science and Technology Facilities Council