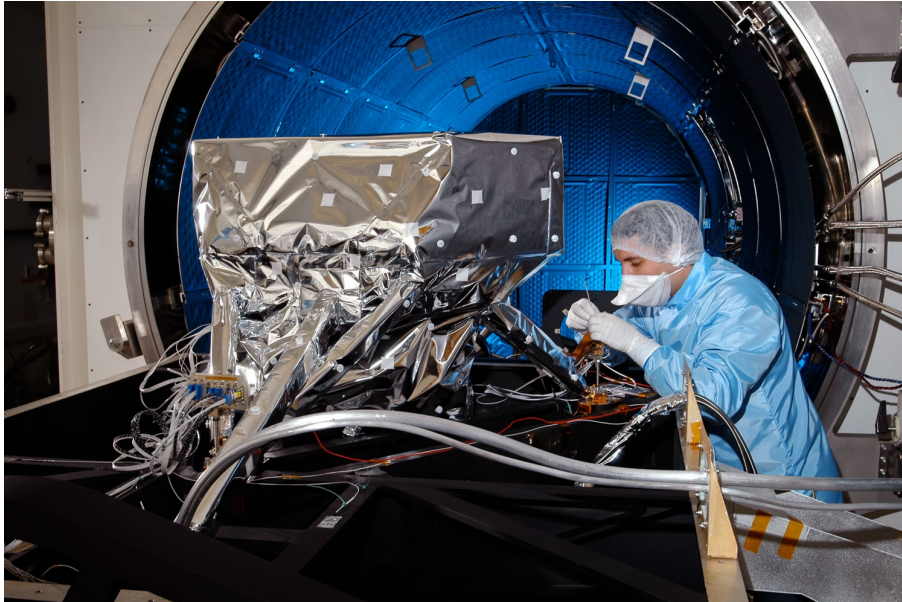


# RAL Space



Preparing the Mid-Infrared Instrument's (MIRI) Structural Thermal Model for testing at RAL Space

**RAL Space is playing an integral part in over 290 international missions and projects, supporting ground- and space-based research.**

It has been at the forefront of UK space research for more than 45 years. The unique combination of science and engineering expertise, laboratories and testing facilities, together with a commitment to quality, have made RAL Space a partner of choice for UK and international organisations including the UK Space Agency, European Space Agency and NASA.

## **Design and engineering**

A key objective in the space industry is to build instruments that are smaller, lighter and require less operational power, without compromising the ability to capture, store and transmit data. Projects have included the highly innovative camera developed for the Topsat mission. Weighing just 32 kg, this low cost optical camera has a 2.5 metres ground sampling resolution. The design is scalable, to satisfy various mission requirements, and is capable of further development into a system of 1 metre resolution. The success of this technology led to the creation of a spin-out company, Orbital Optics, which has

subsequently been acquired by Canadian aerospace company, MDA.

RAL Space also has thermal engineering capabilities. MIRI, the Mid Infrared Instrument, will be part of the James Webb Space Telescope, the successor to the Hubble Telescope. The thermal challenge is to cool MIRI's detectors to a chilly 6K (-267°C).

## **Assembly and testing**

With any space mission, sensitive instruments need to be able to withstand the rigours of launch and the harsh conditions of space. The RAL Space Environmental Test Facility, including the UK's largest thermal vacuum chamber and vibration facility, are in demand, and have made a significant contribution to the reliability of many international missions. Once the development model for a project is assembled, it is vigorously tested to highlight any design flaws. Components for SPIRE, one of three instruments for ESA's Herschel mission, were tested by RAL Space. Following these tests, design changes were made and SPIRE is now providing an unprecedented insight to the formation of stars and galaxies.

# The Science and Technology Facilities Council

## Mission management

Balancing the conflicting requirements of different instruments aboard a satellite requires skill. Operational power is limited, the components have different requirements and each research group has specific scientific needs. RAL Space has expertise in managing payloads including ESA's Cluster and Mars Express missions.

The potentially disruptive effects of coronal mass ejections - vast, fast, moving clouds of gas from the Sun, capable of paralysing communications, utilities and navigation systems – are monitored through the SOHO and STEREO missions. This solar physics expertise has enabled the discovery of phenomena including rotating columns of plasma that resemble tornadoes.

## On the Ground

RAL Space also operates ground based instruments to increase our understanding of our environment. It has a range of instruments including the world's largest fully steerable radar dish at Chilbolton Observatory which are enabling scientists to learn more about sudden, intense storms that can lead to devastating flood events.

Sea surface temperature is a critical measurement in monitoring climate change and SISTeR, an instrument designed and built by RAL Space is collecting data as it circles the globe aboard the Queen Mary II.

## Observing the Earth

Continuous observations of the land, sea and air taken over time from space allow scientists to develop models of the environment. RAL Space is an integral part of EarthCARE, a European-Japanese mission. Due for launch in 2013, EarthCARE will increase our understanding of the Earth's radiation balance and the role it plays in regulating our

climate, leading to better climate prediction models. With an optics unit designed and built by RAL Space, the Broad Band Radiometer will take images simultaneously of both the Earth's reflected sunlight and its emitted heat.

## Universal excellence

RAL Space's ISO 9001 certification testifies to a rigorously systematic approach to delivering quality science and engineering.

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