

# RAL Space

## A New Space Integration and Test Facility



an innovative addition to the  
Harwell Campus for 2015



**Science & Technology**  
Facilities Council

The Mid Infrared Instrument (MIRI) is tested in RAL Space



# Welcome

## Welcome to the STFC RAL Space test facility.

Welcome to the STFC RAL Space integration and test facility. This brand new facility builds on the 50 years of successful test expertise and unique experience delivered by the RAL Space team in qualifying over 200 spacecraft and individual systems to operate reliably in the harsh and demanding environment of space. The facility has been created to meet the comprehensive and exacting needs of RAL Space customers and collaborators, provide capability for the needs of the next generation of spacecraft and instruments, and to contribute to the growing community of space focussed businesses, capabilities and skills located at the Harwell Campus Space Gateway.

This state of the art facility will accommodate a complementary suite of space test facilities, such as thermal vacuum chambers, clean rooms, laboratories and a vibration facility. The first instrument to arrive for calibration will be the ESA Sentinel 4 UVN (Ultra-violet/Visible/Near-infrared) instrument, which is

destined for geo-stationary orbit and forms part of Copernicus, the European Earth observation programme.

We are proud to be able to offer the facility at a time of growth for the industry and look forward to collaborating with you in the future.



**Dr Chris Mutlow**  
Director, STFC RAL Space



# Facilities – Phase 1

## The STFC RAL Space test facility a new and innovative addition to the Harwell Campus.

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Phase 1 of the facility will be officially opened on 9th July 2015; it will accommodate a coordinated set of space facilities, supported by world leading integration and calibration teams.

RAL Space is an integral part of STFC's Rutherford Appleton Laboratory. With over 50 years heritage and over 200 instruments in space, RAL Space is at the forefront of UK Space research.

RAL Space undertake world-leading space research and technology development, provide space test and ground-based facilities, design and build instruments, analyses and process data and operate ground-station facilities and lead conceptual studies for future missions.



# Services Available

## Phase 1 Facilities Laboratories, Thermal Vacuum Chambers, Vibration Facility & Clean Rooms

### • Large Vacuum Chamber Suites

- Three Space Test Chamber suites
  - STC-1 – 5 m diameter, 5.5 m long
  - STC-2 – 5 m diameter, 6 m long, with vibration isolation
  - STC-3 – 3 m diameter, 6 m long, with vibration isolation
- Temperature range -180°C to +150°C
- Vacuum rating  $10^{-7}$  mBar, payload & temperature dependant
- Dedicated Optical Ground Support Equipment (OGSE) rooms
- Direct Electrical Ground Support Equipment (EGSE) access areas
- Dry pumping system throughout
- Chambers open into cleanrooms for contamination control

### • Clean Room Facilities

- Clean room suites ISO class 5/6
- Total area 1200 m<sup>2</sup>

### • Small Vacuum Chamber Suites

- Three chamber suites, each accommodating multiple chambers
- Overall size range 1 m diameter to 0.5 m diameter
- Temperature range -180°C to +150°C
- Vacuum rating  $10^{-7}$  mBar, payload & temperature dependants
- Dedicated provision for EGSE

### • Vibration Facility

- 3 Axis Sine, Random and Shock capabilities
- 64 Channels of monitoring
- 67 kN Thrust
- 64 mm stroke

### • UK Centre for Calibration of Satellite Instrumentation

- Joint venture with National Physical Laboratory

# Instrument Calibration and Characterisation

The UK Centre for Calibration of Satellite Instrumentation (UKCCSI) operates within RAL Space to coordinate the range of existing STFC calibration activities across Earth Observation, Astronomy, Space Science and Solar Physics.

The Centre provides a coherent programme structure, effective management development and future investment. RAL Space runs this facility with the close involvement of other expert UK academic and industry teams.



SLSTR undergoes calibration testing in the UKCCSI

# Environmental Test Facility

The environmental test facilities at RAL Space are being developed to meet the exacting needs of the people involved in the design, manufacture and qualification of space hardware.

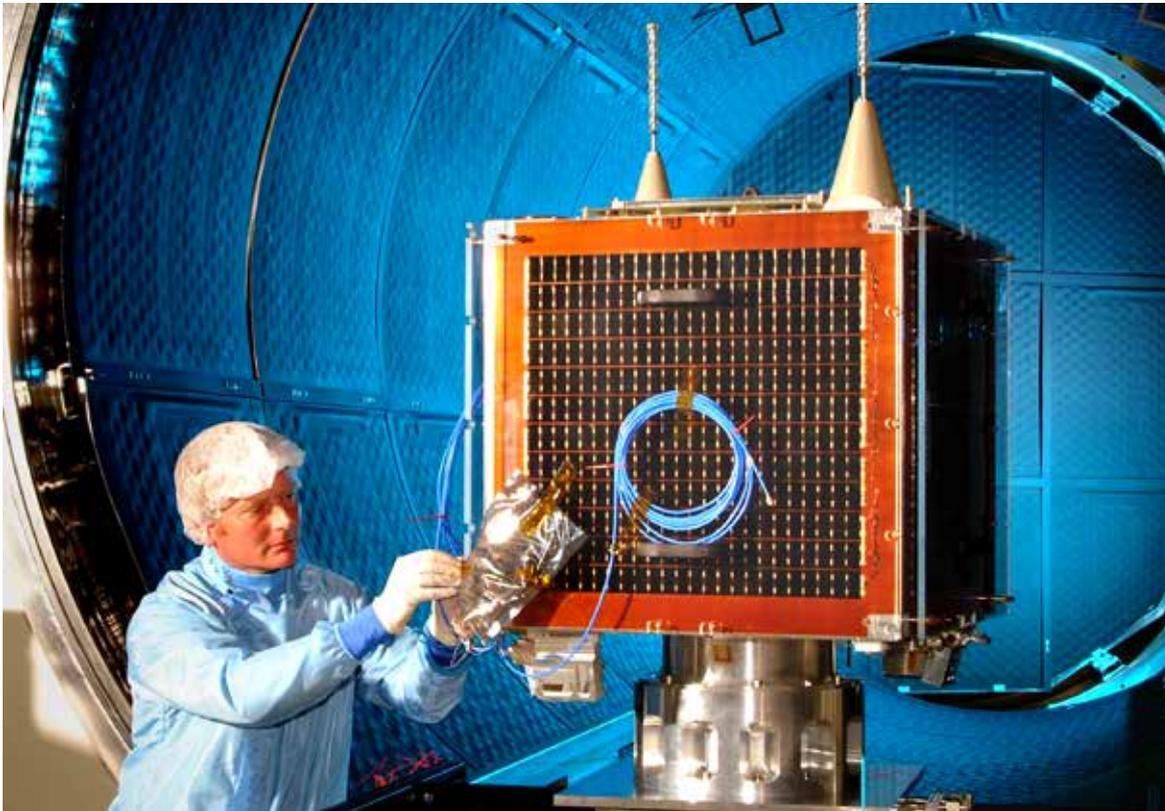
These facilities are available for use by industry and universities.



The Environmental Test facility at RAL Space

# Small Satellite (Assembly integration and Test) Facility

A facility designed to meet the exacting needs of those required for the testing of small satellites, with the ability to test multiple items in a single facility to offer a cost saving to projects and customers.



A DMC Satellite from SSTL is tested in the AIT at RAL Space

# Facilities – Phase 2

Following the successful completion of Phase 1 the plans for phase 2 will get under way.

This phase will house facilities such as:

## **The Molecular Spectroscopy Facility (MSF)**

The Molecular Spectroscopy Facility (MSF) is available for UK and international scientific research and development. The MSF offers world-class instruments combined with scientific and technical support. The facility meets the needs of academic and industrial researchers by:

- achieving a spectral resolution of 1 part in  $10^6$
- spanning the spectrum from the terahertz to UV
- probing solid, liquid, aerosol and gas phases
- providing facilities for calibration and validation

## **Millimetre Technology Facility**

The Millimetre-Wave Technology Group (MMT) has delivered cutting edge technology for frequencies ranging from 50 GHz to above 2 THz for more than twenty years.

The group have expanded their activities to include remote sensing of the atmosphere, thereby supporting atmospheric chemistry

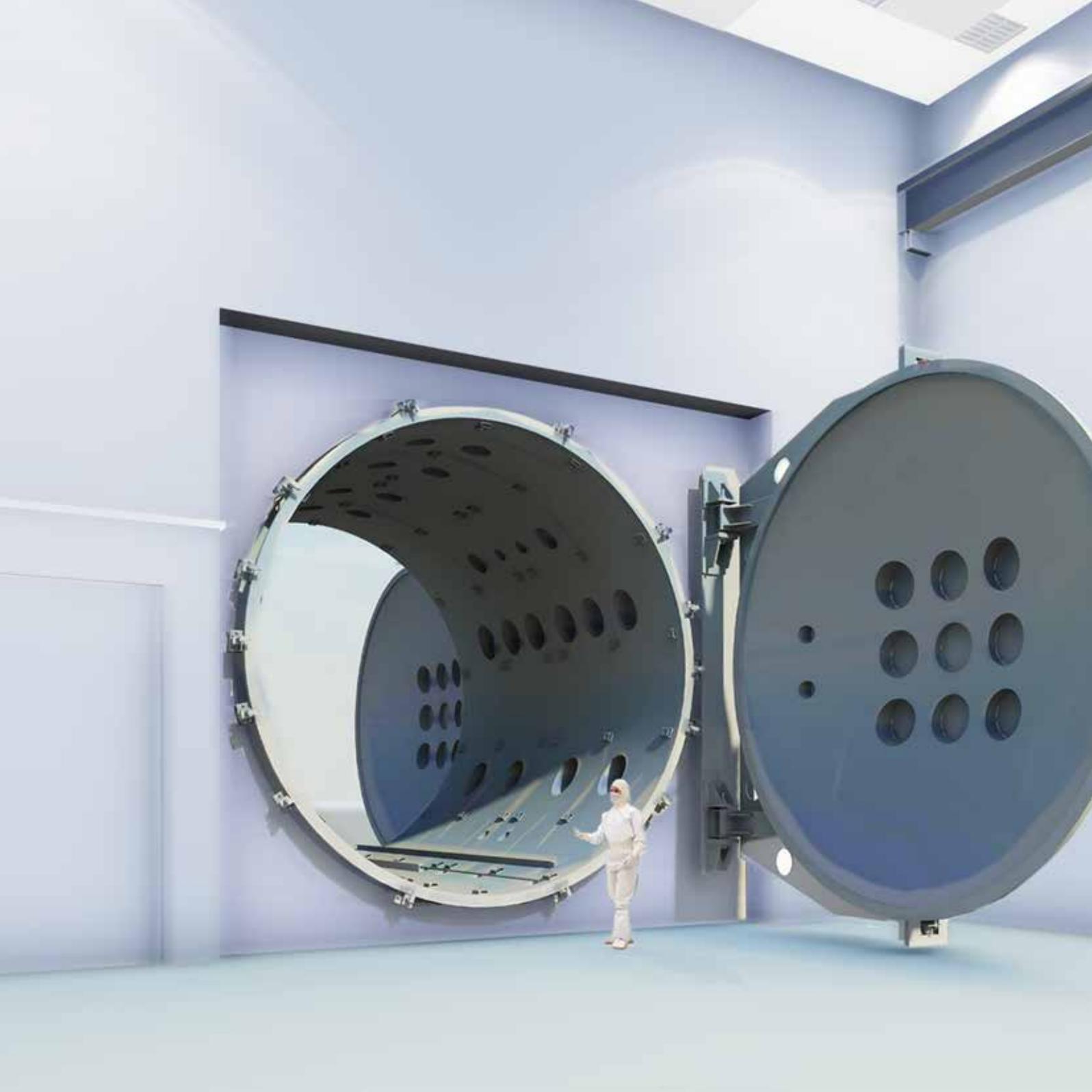
and climate change studies. The capabilities of the facility range from mixers and frequency multipliers, through photomixer sources and wire grid polarisers, to autonomous cryogenic radiometer systems. World class design, assembly and test skills are complemented by the Precision Development Facility and a dedicated semiconductor processing laboratory.

## **Precision Design Facility (PDF)**

The Precision Development Facility (PDF) (part of the MMT group) provides the very high accuracy machining required in the development of sub-millimetre wavelength receiver technology.

As well as providing close project support at RAL, the facility undertakes development work for industry and a variety of government institutions.

Investment in some of the very latest CNC (Computer Numerical Control) machine tools has allowed the group to enhance their capabilities, maintaining a position as experts in all aspects of precision machining and novel component prototyping.



# Notes

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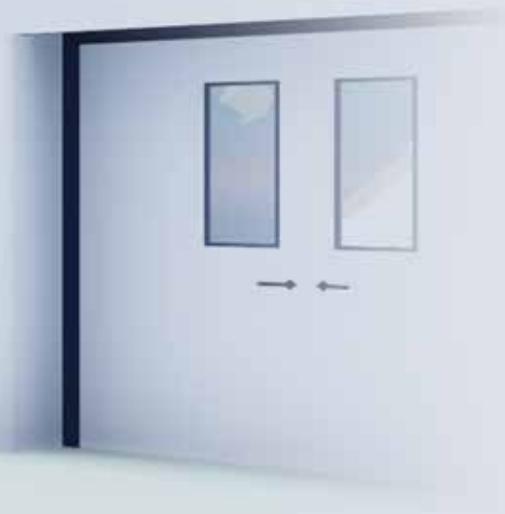
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