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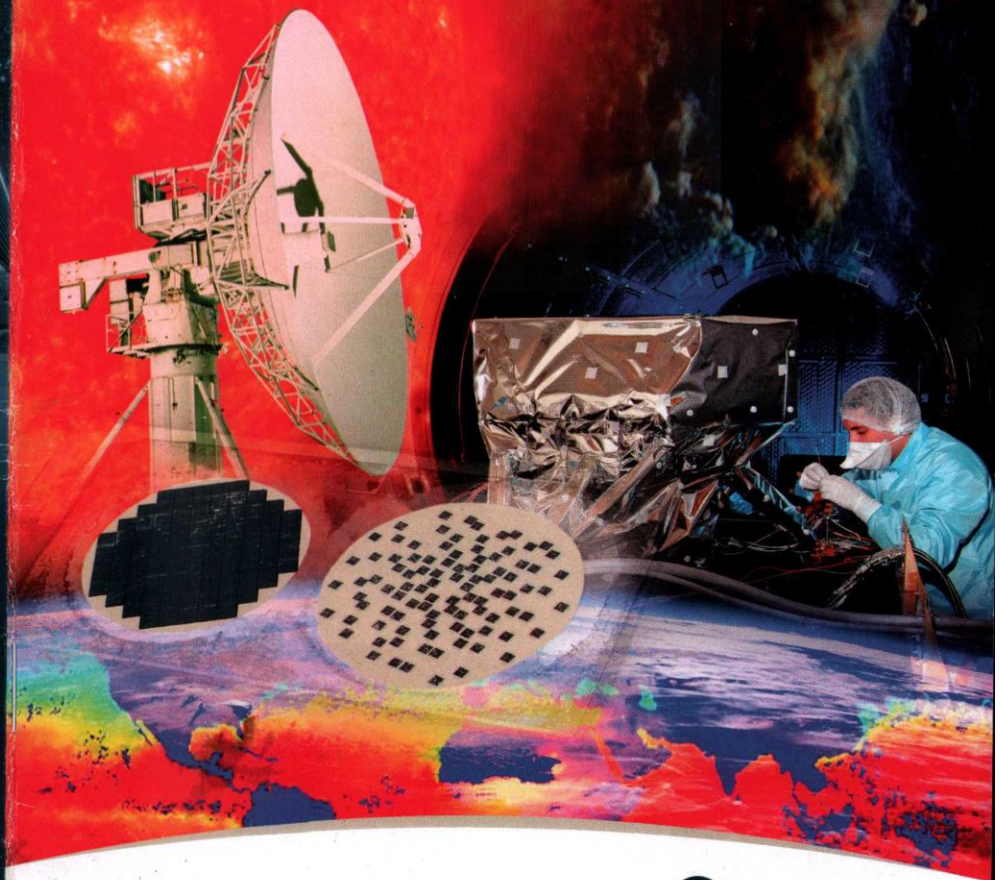
Science & Technology Facilities Council

RAL Space

Science driven, technology enabled



Science & Technology Facilities Council

Welcome

RAL Space is an integral part of the Science and Technology Facilities Council's (STFC) Rutherford Appleton Laboratory (RAL). It is a national resource for the benefit of the whole of the UK Space Community. RAL space is science driven, technology enabled and with over 150 collaborations with academia and industry and involvement in over 210 space missions.

RAL Space has over 50 years of experience and expertise in space programmes, and is unique in the UK in its positioning between industry and academia. Its strength lies in the broad mix of its highly trained staff, including activities from research, development and facilities, to data curation and analysis, programme management and the provision of strategic advice to external partners. RAL Space has always worked very closely with UK Industry and academia.

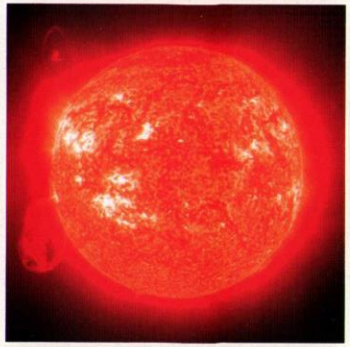
Our 240 staff are dedicated to supporting the programmes of the STFC and the Natural Environment Research Council (NERC), as well as undertaking a large number of space projects for UK and overseas agencies, universities and industrial companies. We work closely alongside the UK Space Agency who co-ordinate UK civil space activities.

RAL Space undertakes world-leading space and Earth observation research and technology development, provide space test and ground-based facilities, design and build instruments, analyse and process data and operate S- and X-band ground-station facilities, as well as lead conceptual studies for future missions. We work with space and ground-based groups around the world.

In July 2015 we opened the doors of the STFC RAL Space Integration and Test Facility. This brand new facility builds on our heritage of test expertise. The facility has been created to meet the comprehensive and exacting needs of RAL Space customers and collaborators, providing capability for the needs of the next generation of spacecraft and instruments, and to contribute to the growing community of space focussed business, capabilities and skills located on the Harwell Campus.

Our areas of expertise include:

Solar Science



RAL Space has a long heritage of solar space mission involvement, mainly through the development and operation of spectroscopic instrumentation in the extreme-UV and X-ray wavelengths, but also in coronal and heliospheric imaging. We use observations of the solar atmosphere to determine the Sun's plasma characteristics, study complex processes of energy release in big, violent flares and ubiquitous tiny nanoflares, and track huge mass eruptions all the way from the Sun's corona to beyond the Earth's orbit. Our aim is to understand and predict how the Sun works and affects the solar system and the Earth's environment.

The near-earth environment

The near-Earth environment has a critical impact on our modern technological lifestyle that depends heavily on radio propagation and satellites for communications, global positioning, timing and remote sensing. RAL Space is actively involved in developing ground and space-based instrumentation and the scientific use of these assets in order to study the near-Earth environment all the way from the heliosphere to the Earth's ionosphere. We focus both on the impacts through an active programme of Space Weather projects and taking advantage of the near-Earth environment as a wonderful natural laboratory for studying fundamental phenomena in the physics of plasmas.

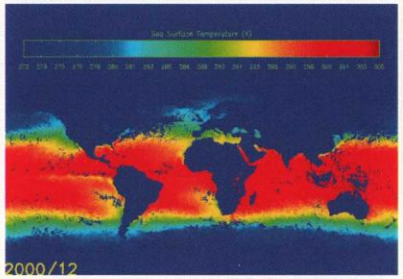
Earth Observation

RAL Space scientists contribute to and underpin UK and international programmes in environmental science through the provision of research expertise, services and facilities in support of the UK science community. Making observations of the land, sea and air from space allows scientists to monitor our environment, improve their models and so better understand our planet. Space instruments provide continuous, global measurements for many years at a time and so provide information on both immediate and longer term changes in the environment.

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.

Data Services

RAL Space has considerable experience in the processing, analysis and archiving of scientific data. This covers the fields of climate and environmental science, Earth Observation, ground and space-based astronomy, solar terrestrial physics, and ionospheric science. We are often involved in the early stage processing of data from instruments that we have built. In addition, we work closely with scientists who are gathering data to ensure that those data are described in an unambiguous manner and properly archived so they can be used in decades to come. We run data centres for the environmental science community and operate petabyte scale analysis infrastructure for users to process and analyse the data for scientific research.

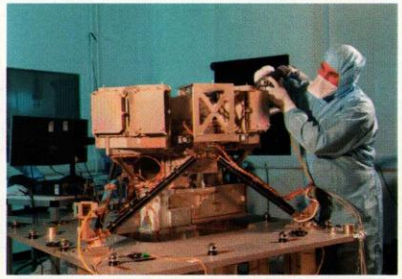


Astronomy

RAL Space supports astronomers using instruments in space and on the ground, with a wide range of expertise in design, building, testing and calibration. We also participate in astronomical research using data from these and other instruments to further our understanding of galaxies and the formation of stars and planets.
RAL Space is at the heart of the UK's infrared/microwave astronomy programme, with past involvement in the IRAS and ISO missions, and more recent missions such as ESA's Herschel and Planck spacecraft, and currently the NASA/ESA James Webb Space Telescope (JWST), the successor to the Hubble Space Telescope. We are also involved in the operation and development of radio astronomy facilities, such as LOFAR and SKA.

Research

RAL Space undertakes pure research in solar physics, solar-terrestrial physics, atmospheric physics, planetary and magnetospheric physics, astronomy and fundamental physics. Our research encompasses a wide range of interests, running in close harmony with the space hardware projects and involves collaboration with many university groups in the UK and abroad.



Planetary Science

RAL Space has a very strong instrument programme, including missions to all the inner solar system planets, as well as comets and the Saturnian system. These missions continue to yield a wealth of science and help us to understand the Earth and the solar system as well as the planetary systems of other stars.

Operations

RAL Space has a proven track record, recognised internationally, in the areas of satellite mission planning and payload science operations, providing ground-station services and software for the precision control of a wide variety of telescope systems.

Technology

RAL Space has a number of internationally-important technology groups, each specialising in a specific technology associated with cutting-edge space instrumentation. This expertise is backed by RAL Space's extensive engineering capability, and allows us to play a leading role in defining novel scientific instrumentation.

Design

Our experienced engineers use the latest tools to design and build space and ground-based instruments. RAL Space adopt an integrated approach and support projects throughout the full life cycle, from requirements analysis and conceptual design through to flight and commissioning.