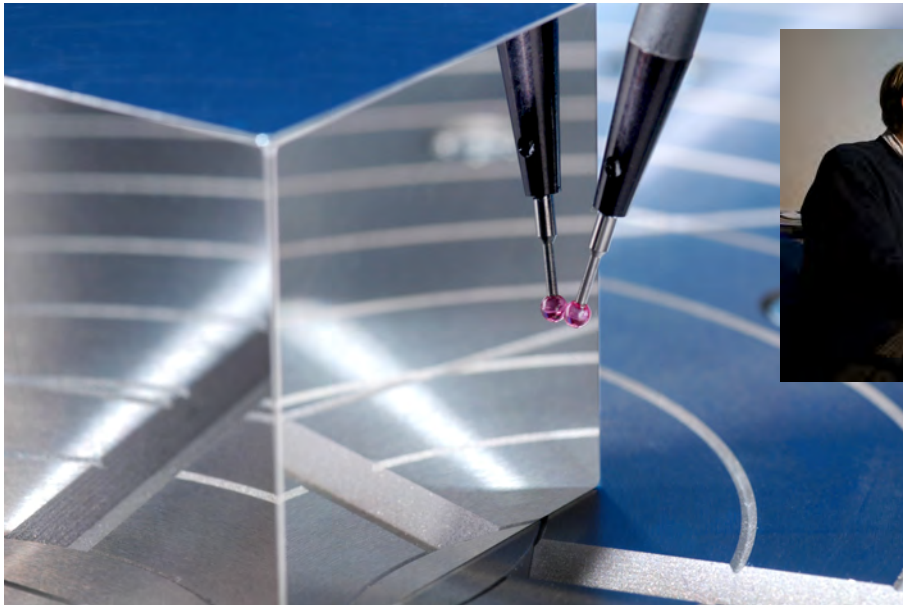
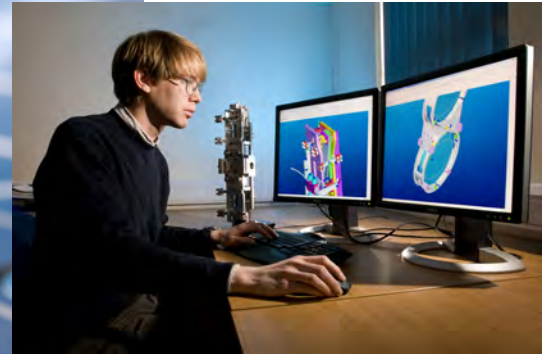




# Pioneering solutions to meet engineering challenges



Precision Metrology Credit: STFC



Using Modern Parametric Computer Aided Design tools. Credit: STFC

**Many economic and societal developments are a result of scientific breakthroughs underpinned by technological innovation and pioneering engineering.**

The Engineering Technology Centre (ETC) - part of the Science and Technology Facilities Council (STFC) – helps academics and businesses find cost-effective solutions to complex and often unique scientific and technical challenges, from accelerator technology for medical applications to custom made technology for airport security systems.

The ETC meets these challenges by bringing together highly skilled experts and world class science and engineering facilities at the Daresbury Science and Innovation Campus (DSIC) in Cheshire and the Harwell Science and Innovation Campus (HSIC) in Oxfordshire.

At both campuses, ETC staff work on large and small scale projects, from detector technology for huge particle accelerators like the Large Hadron Collider at CERN, Geneva, to complex micro technology projects for international space missions, each bringing valuable investment to the UK economy.

Collaborations involve universities, research centres and leading international companies such as VG Sienta, Optic Technium and Thermo Fisher Scientific, advancing research in areas as diverse as materials categorisation to the mechanical design of advanced lasers.

The Centre offers a 'one stop shop' approach providing multi-disciplinary expertise and engineering systems ranging from project management and feasibility studies through conceptual design and simulation to prototyping, manufacturing, installation and commissioning. This includes capabilities of mechanical design and analysis, vacuum technology, cryogenics, computer controlled (CNC) machining, advanced metrology, magnet and detector design, electrical systems integration and intelligent control systems.

Many of ETC's capabilities address key challenges facing society such as healthcare, security, energy and the environment, and also help scientists understand more about the Universe we live in:

- health and energy - ETC engineers helped design and build EMMA, a major part of the CONFORM project, funded by the RCUK Basic Technology programme. EMMA is a pioneering accelerator which paves the way for a new generation of

## The Science and Technology Facilities Council

low-cost, compact, high-performance accelerators with applications in fields as diverse as cancer therapy and power generation.

- security - ETC experts were involved in the development of new technology for Rapiscan Systems Ltd, a world leading provider of airport and port of entry security monitoring equipment. This included providing cleaning, bake out and assembly of many of the components, as well as manual handling equipment for manoeuvring the X-ray source and its associated components.

- understanding our Universe - ETC staff are helping international scientists to explore why the Universe consists predominantly of matter. The Muon Ionisation Cooling Experiment (MICE) is currently being assembled at the Harwell Campus' Rutherford Appleton Laboratory with ETC staff responsible for project management of the installation and design of many of the mechanical, electrical and control systems required. ETC staff have also designed and built key technologies for the Large Hadron Collider at CERN in Switzerland, the world's largest particle physics experiment

- energy and the environment – the ETC is working with industrial partners to explore alternative forms of energy generation, energy storage and carbon capture. Research into the clean use of biomass materials in power stations (torrefaction), sophisticated flywheel technology to store off-peak energy from wind farms, and the removal of harmful carbon from the atmosphere (carbon sequestration) are some of the exciting new challenges involving the ETC.

The ETC is continually pushing technical boundaries, testing ground-breaking concepts using the latest materials, methods and technologies. As a Centre of excellence with a unique integrated approach that brings together government, academia, business and industry, it is well placed to provide the next generation of skills development

and solutions to some of the world's most critical social and economic challenges.



Looking up inside the Advanced LIGO suspension. Credit: STFC

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