



# Fast facts - addressing the grand challenges



Today's society faces global challenges in energy, security, environment and healthcare.

Here are just a few examples of how STFC's science, technology and research are finding new and innovative ways to address these issues.

## Energy

- STFC spin-out, Oxsensis Ltd, has produced a sensor that can withstand hostile environments. This development is helping to improve the efficiency of gas turbines used in aircraft engines and power stations, and reduce greenhouse gas emissions, allowing more efficient use of traditional fossil fuels.
- STFC scientists are using the ISIS and the Diamond Light Source facilities at STFC's Rutherford Appleton Laboratory (RAL) in Oxfordshire to test samples of materials to identify those which are most efficient at storing and recycling hydrogen.

## Security

- Rapiscan Systems Ltd is one of the world's leading providers of security monitoring

equipment for airports and other ports of entry. By providing initial consultancy and subsequent design activities, the Engineering Technology Centre at STFC's Daresbury Laboratory in Cheshire has helped Rapiscan (through its subsidiary company, CXR Ltd) to realise world leading scanning technology which is already being trialled at UK airports.

- Supercomputers at STFC's Daresbury Laboratory are being used by researchers from Mexico to develop a better model to predict earthquake damage.

## Environment

- Scientists use sophisticated instruments at STFC's Chilbolton Observatory in Hampshire for essential weather and climate change research. Projects include investigating heavy rain and storms which lead to large flooding events; tracking wind using insects as wind tracers; and studying the properties and profiles of clouds and airborne pollutants.

- STFC's Space Science Department at RAL hosts the British Atmospheric Data Centre which has provided Google with data for its Google Earth application to increase awareness about climate

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change. Users can now view images of greenhouse gas emissions by region, as well as the expected consequences of climate change.

### Healthcare

- UK scientists, working with the USA, have made a promising breakthrough on a treatment for babies born with cleft palates – the most common birth defect in Britain. Studies relying on the advanced imaging solutions offered by STFC's ISIS neutron source have found a hydrogel material could offer treatment for severe cleft palates without the need for complex surgery.
- A team of researchers led by STFC has developed a novel process that could revolutionise the reliability and durability of surgical implants, such as hip and knee replacements. The process coats surgical implants with fibres that, for the first time, will encourage the implant to 'bond' with living bone and will last the lifetime of the patient. The technology used has wide applications for the medical sector including tissue regeneration and drug delivery.



Contact: Julia Maddock, Manager External Communications  
T: +44 (0)1793 442094 E: [julia.maddock@stfc.ac.uk](mailto:julia.maddock@stfc.ac.uk)

For media enquiries please contact +44 (0)1793 442094