STFC Mechanical and Civil Engineering Meet the Buyer Event

21st November 2012, Hilton Hotel, London Heathrow

Preliminary Announcement

STFC is pleased to announce that it will host the Mechanical and Civil Engineering Meet the Buyer event with CERN, ESRF, ILL, the Diamond Light Source, the European Southern Observatory (ESO) and STFC Technology on 21st November 2012.

This event will be aimed at providing UK industry in Mechanical and Civil engineering with information and contacts to help them supply to large facilities such as the European Extremely Large Telescope (E-ELT). There will be presentations from the facilities on their mechanical and civil engineering requirements followed by networking and ‘one-to-one’ meetings with procurement and technical specialists from the facilities.

This is a preliminary announcement with detailed information on the facilities and the representatives attending together with registration details to be provided at a later date.

This promises to be a busy and informative day and we hope that you make good contacts to help your business. STFC External Innovations staff will be on hand to help you through the day.
CERN Computing for Earth Observation

Like Earth observation and large scale genomic analyses in biomedical research, big experiments in particle physics are constantly confronted with the issue of acquiring, analysing and storing enormous quantity of data. At CERN, in 2011 the data from the Large Hadron Collider amounted to roughly 20 petabytes, and this figure will grow with more data-taking in 2012.

“CERN’s computing capacity needs to keep-up with the enormous amount of data coming from the LHC experiments”, says Frédéric Hemmer, head of CERN’s IT department, “We are interested in promoting and joining collaborations with other institutes and with industry to meet the big data challenge.”

In March 2012 CERN, in collaboration with EMBL and ESA, and with leading IT providers, launched ‘Helix Nebula – the Science Cloud’, a public-private partnership to create a European cloud-computing platform.

“At CERN, we’re testing Helix Nebula using ATLAS simulation software and plan to expand the testing to more experiments in the future” – explains Bob Jones, head of CERN openlab, a public-private partnership between CERN and leading ICT companies for the development of cutting-edge solutions to be used by the worldwide LHC community. “It’s a radically new way of providing computing resources” continues Jones “Instead of procuring the hardware and then maintaining and managing it, we procure the service from a commercial infrastructure provider within the Helix Nebula partnership, providing network access, storage and CPU.”

In the framework of Helix Nebula, ESA, in partnership with the Centre National d’Etudes Spatiales (CNES) in France, and the German Aerospace Center (DLR) is collaborating with the National Research Council (CNR) in Italy, to create an Earth observation platform focusing on earthquake and volcano research. This undertaking is done in the framework of the Group on Earth Observations (GEO), a voluntary partnership of governments and international organisations. Volker Liebig, ESA Director for Earth observation programmes, said, “Helix Nebula- the Science Cloud is a partnership with the potential to support an utmost exploitation of ESA satellite data, as well as to bring other communities on board to better understand the geophysical phenomena of our planet.” More scientific organisations and service providers are welcome to join Helix Nebula– the Science Cloud.

CERN’s contribution to Earth Observation goes also through the well-established collaboration with UNITAR, the Operational Satellite Applications Programme of the United Nations Institute for Training and Research.
Since 2001, CERN hosts UNOSAT, a technology-intensive programme delivering imagery analysis and satellite solutions to relief and development organisations within and outside the UN system to help make a difference in critical areas such as humanitarian relief, human security, strategic territorial and development planning.

The information technology infrastructure used to store and process large amounts of data at CERN has created a robust and effective anchor for UNOSAT since its inception. Last year alone, the UNOSAT humanitarian mapping facility was activated 28 times.

An example of collaboration between UNITAR and CERN is the provision of the operational basis for the Citizen Cyberscience Centre, which is a crowd sourcing project focusing on humanitarian and development issues that are supported by fundamental science. These collaborations and the technical infrastructure which CERN provides have helped UNOSAT in performing satellite analysis, design integrated solutions in GIS and geopositioning for the United Nations, its member states, and communities in a variety of areas.

More information can be found at:
CERN IT Department
Helix Nebula website
UNOSAT
£0.75M Investment in New Earth Observation Instruments

The Centre for Earth Observation Instrumentation (CEOI) has approved funding for ten instrumentation projects to be carried out by teams from UK industry and academia. The overall investment is in excess of three quarters of a million pounds, including parallel industrial PV. In total, 16 academic and industrial organisations are involved.

The largest of the projects – to prove the integration of highly sensitive receivers for future climate and meteorology missions, builds on existing CEOI work on passive microwave technologies. Here, STFC-RAL and STAR-Dundee are collaborating to advance development of a novel high-resolution wideband spectrometer and to undertake critical system-level design and breadboarding activities. This will lead to full integration of a sideband-separating receiver with high-resolution spectrometer into the MARSCHALS millimetre-wave airborne instrument, thus proving its suitability for future space missions. See the project page for more information.

Two projects are developing technologies for the next generation of the Eumetsat meteorology mission - ‘MetOp Second Generation (MetOp-SG)’. Astrium is leading a project to improve the technologies for the microwave sounder instrument, which will provide measurements of atmospheric temperature and humidity - see link for further information. In a second project for MetOp-SG, SEA Ltd is studying the implementation options for an Ice Cloud Imager instrument, which will provide measurements of cirrus clouds, one of the most important gaps in monitoring the atmosphere - see link for further information.

Other projects will help germinate ‘seedcorn’ ideas for space instrumentation. In one of these, Gooch and Housego – an optical technologies company, are working with SSTL to conduct an assessment of new low weight mirror fabrication techniques. Reducing the weight of mirrors for space applications, whilst retaining the required stability of surface form is important and the project aims to investigate alternate methods to achieve this. See the project page for more information.

The other funded projects will be conducting investigations into areas such as systems integration, radar developments and imagers and other mission critical technologies. Further information on the Seedcorn projects can be found via this link.

Since its inception in 2007, the CEOI has been responsible for many innovative and exciting technology developments in EO instrumentation. As well as serving mission critical needs, CEOI technologies help address important environmental issues, such as monitoring climate change and the environment. Additionally, many have spin-out potential into other industries, such as defence & security, telecoms, analytical instrumentation, healthcare and environmental.
Firms at Daresbury Science and Innovation Campus achieve sales pass £28m mark

Businesses based at the Daresbury Science and Innovation Campus in Cheshire achieved combined sales of more than £28m last year, a survey shows. The report, conducted by the campus, showed that sales at companies based there grew by 18 per cent in 2011 compared with the previous year.

Investment in Daresbury businesses also rose substantially last year, with companies securing a total of £75m, mainly from private equity sources, up £10.7m on 2010. A total of 62 full-time jobs were created last year, of which 72 per cent were for positions which required a degree or above. Campus companies are forecasting creating another 60 roles in 2012, with more than half for software development, engineering, specialist IT or sales, and marketing and business development positions.

The campus has more than 400 staff working in sectors including biomedical, advanced engineering and telecoms. Tenants include bug-busting technology specialist Byotrol, computer giant IBM and water treatment specialist Arvia.

John Leake, business development manager at the campus, said: “Being based at the campus allows companies to connect with local and international clients and suppliers, helping smaller companies, which may not naturally have international reach, to grow and develop their businesses within Daresbury’s positive culture of collaboration and open innovation.”

John Downes, managing director of Daresbury joint venture partner Langtree Group, said: “Companies at Daresbury are thriving despite the challenging economic climate and we are delighted with the positive results shown by the survey. "Now that Daresbury has Enterprise Zone status, we hope to build on this success and witness increasing levels of growth."

The campus is set to expand over the next 20 years to become a ‘technology village’ which will deliver as many as 15,000 highly-skilled jobs and attract new international technology businesses to the north west.
NuViews: A Miniature, Dual-Modality Camera for Medical Imaging Applications

Researchers at the University of Leicester’s Space Research Centre, in collaboration with the University of Nottingham, have developed a combined optical and gamma mini camera, called NuViews. The project, funded as part of the STFC 2011 CLASP Healthcare call, has the capacity to revolutionise current approaches to cancer treatment and surgery.

Cancer affects millions of lives every year. Pancreatic and breast cancer have worldwide incidences in excess of 277,000 and 1,383,000 respectively and treatment of these major cancers relies on surgical intervention. Imaging processes, for example to examine lymph nodes or to assess radioisotope localisation, are vital in allowing clinicians and surgeons to diagnose and treat patients effectively.

In the recent past, researchers, clinicians and manufacturers have explored the potential to advance the capabilities of combined imaging systems, whereby different modalities are exploited in conjunction within a single, multi-purpose hybrid system. Examples include the combination of Positron Emission Tomography and Single Photon Emission Computed Tomography with Computed Tomography (PET-CT and SPECT-CT). The use of combined imaging techniques has the capability to enable a more accurate and comprehensive diagnosis. It can also speed up the process; collecting information from a range of modalities simultaneously reduces the need to send patients for a number of diagnostic sessions. Existing systems, however, are inherently large and expensive and require both valuable hospital space and teams of trained operators.

By building on technologies originating in x-ray astronomy, the team at Leicester have used their expertise of device miniaturisation for space missions to develop the NuViews camera, which uniquely combines dual imaging modality, high resolution and portability. Expertise at the Queen’s Medical Centre, Nottingham, is making sure that NuViews is suitable for use in a variety of environments, including at the bedside of a patient as well as in the operating theatre. Through the superposition of multiple images, amongst other benefits, the device offers the ability to map the number and position of sentinel nodes to the anatomy of a patient, prior to the commencement of surgery. A successfully developed prototype has been used to produce dual-modality images from phantom simulations as well as patients undergoing clinical examinations. The collaboration has recently had ethics approval to evaluate Nuviews in the clinical environment.

In addition to prototype development, the project aimed to initiate steps towards commercialisation of the camera, with a view to widening its usage. These activities are currently being explored through the University of Leicester spin out company, Gamma Technologies Ltd. In extension to their NuViews camera, the group are exploring the possibility of expanding the hybrid concept into a two camera design, entitled ‘StereoScope’. StereoScopic imaging using multiple cameras offers the potential for depth estimation of a gamma emitting source and represents another exciting development in the field of cancer treatment. A paper, A Hybrid Camera for Simultaneous Imaging of Gamma and Optical Photons, which details the group’s work, has recently been published in JInst, the Journal of Instrumentation (Lees et al JINST 7 (2012) P06010, doi:10.1088/1748-0221/7/06/P06009).
Researchers using ISIS recognised for magnetic monopoles

The 2012 Europhysics Prize for condensed matter physics has been awarded to ISIS neutron user Professor Steve Bramwell (London Centre for Nanotechnology and University College London), Claudio Castelnovo (Royal Holloway University of London and ISIS Theoretical Physics Group) and their colleagues, for the prediction and measurement of magnetic monopoles in spin ice.

Advanced materials research depends greatly on having access to central research labs like ISIS, the Science and Technology Facilities Council’s (STFC) world leading research centre, allowing the UK science community to flourish and make exciting discoveries. Neutron scattering has been critical at all stages of this research giving unique information unmatched by any other experimental technique.

Steve Bramwell, and his collaborator Mark Harris in experiments at ISIS, first discovered and named the unusual magnetic material ‘spin ice’ in 1997, drawing attention to certain similarities found within water ice.

This laid the foundation for Claudio Castelnovo’s 2008 prediction of effective magnetic monopoles in spin ice, analogous to electrical charges, published in the journal Nature. Then in October 2009, experiments at ISIS and elsewhere by Bramwell and others proved the existence of these monopoles. Bramwell coined the term ‘magnetricity’ to describe this similarity of currents of magnetic monopoles to electrical currents.

“It’s not often in physics you get the chance to ask ‘How do you measure something?’ and then go on to prove a theory unequivocally. It’s early stages but who knows what the applications of magnetic monopoles could be in 100 years time,” said Professor Steve Bramwell.

The Europhysics Prize – one of Europe’s most prestigious awards in the field of condensed matter physics – is awarded every two years, in recognition of excellent work by one or more individuals by the European Physics Society Condensed Matter Division.
Freely drifting magnetic monopoles have been found in some magnetic materials.

**How it works**

Magnetism arises from spin, a fundamental property of atoms and fundamental particles. Spin can be understood by thinking of each atom as a tiny bar magnet that can turn in any direction.

Most common magnets have two poles – north and south – caused by all of the atomic magnets pointing in the same direction, north-south, to create a permanent magnetic field.

Every magnet has these two poles, and bringing two magnets together, they will repel if the poles are alike and attract if they are different. Break a magnet in half and each half remakes the pole it lost. It seems that no magnet can break the two-pole rule and that magnetic monopoles, poles without their twins, don’t exist.

In 1997, a strange magnetic state known as ‘spin ice’ was discovered by Bramwell and Harris whilst carrying out neutron scattering experiments at ISIS. In the material holmium titanate they found that the crystal structure forced the arrangement of magnetic holmium atoms onto a network of tetrahedrons. This arrangement prevents the atomic magnets from lining up and pointing in the same direction. Instead, a compromise is made in which two holmium spins point into the centre of each tetrahedron and two spins point outwards.

The spin arrangement in holmium titanate mirrors the way that hydrogen ions are arranged in water ice, so Harris and Bramwell coined the term ‘spin ice’ to describe what they had found.

Claudio Castelnovo and colleagues discovered another remarkable property of spin ice. In an elegant paper, they predicted that individual tetrahedra could develop a slight imbalance in their spins and act as tiny, localised north or south poles. Even more remarkable, they predicted that the poles could break free from their usual north-south binding and independently drift around inside the crystal.

The prediction of free magnetic monopoles was rapidly verified in a series of beautifully conceived neutron scattering and muon spectroscopy experiments by Bramwell and others at ISIS and elsewhere.
STFC’s ‘Joule’ in the crown is UK’s most powerful supercomputer

The Science and Technology Facilities Council’s (STFC) Daresbury Laboratory in Cheshire is officially home to the UK’s most powerful supercomputer, capable of more than a thousand trillion calculations per second.

The IBM Blue Gene/Q at Daresbury, named Blue Joule, has been ranked number one in the UK, and number 13 in the world, in this year’s Top 500 list of supercomputers, which was revealed this week at the International Supercomputing Conference 2012 in Hamburg.

Blue Joule, which is on average eight times more energy efficient than most other supercomputers, forms part of STFC’s new future software research centre at its Daresbury Laboratory in Cheshire. The facility was announced in March this year following £37.5m investment by the Department of Business Innovation and Skills (BIS) into High Performance Computing (HPC) in the UK, as part of its e-infrastructure initiative. One of the world’s foremost centres in software development, the facility was formed following the start of a three year collaboration with IBM as a direct result of this investment.

Blue Joule achieved its first major milestone this week as it became the first system in the UK to run a Petaflop application, where a Petaflop is one thousand trillion calculations per second, the equivalent of a million laptops. This milestone represents a thousand-fold increase in supercomputing performance in the UK in 10 years, since the last such milestone, the Teraflop, was first achieved back in 2002.

Breakthroughs in HPC could result in finding cures for serious diseases or significantly improving the prediction of natural disasters such as earthquakes and floods. Supercomputers will speed up the innovation cycle, enabling new products to be developed quicker and the time to market made shorter. They will also provide the ability to simulate extremely complex systems, such as modelling the Earth’s climate or the human brain, the data from which would overwhelm even the most powerful systems in use today.

Professor John Bancroft, Project Director of the Centre and Head of STFC’s Campus Centre Projects, said: “Blue Joule forms a major part of our brand new HPC facility at Daresbury. Supercomputers have become essential to the modern world, aiding research and innovation, and enabling companies to compete effectively in a global market. I therefore invite academic researchers and industry to come to STFC and to design and test their solutions to highly complex problems on what is now officially the UK’s largest supercomputer. STFC is one of only a small handful of owners in the world of this particular BlueGene/Q system, but by the year 2020 supercomputers will be thousands of times faster again. Therefore, as part of our new facility at Daresbury, Blue Joule will also play a key role in developing the software that will run on these machines of the future.”

Professor John Womersley, Chief Executive at STFC said: “This calibre of cutting edge technology is essential to provide industry and academia with the tools needed to drive innovation growth. It is also essential to the UK in maintaining its position as a global scientific research leader. I was therefore thrilled to hear that Daresbury hosts the most powerful supercomputer in the UK, but also that STFC’s laboratories are home to two more supercomputers ranked within the top 200 globally, and that the University of Edinburgh’s DIRAC, also a BlueGene/Q and funded by STFC, is at number 20 in the world.”
BaBar data hint at cracks in the standard model

Recently analysed data from BaBar, a high energy physics experiment in the US, may suggest possible flaws in the Standard Model of particle physics, the reigning description of how the universe works on sub-atomic scales. The data from BaBar, a particle accelerator at the U.S. Department of Energy’s (DOE’s) SLAC National Accelerator Laboratory, built by ten countries including the UK, show that a particular type of particle decay, happens more often than the Standard Model says it should. The UK, through Queen Mary, University of London, was part of a panel to internally review the result that has been presented at a conference in China.

The data refers to a particle called the B-bar meson that decays into a D meson, an anti-neutrino and a tau lepton (B to D-star-tau-nu). This particular decay of a B meson should, theoretically, only happen in one in every 100 cases, but the new results from BaBar show it is happening too often. While the level of certainty of the difference, or excess, (3.4 sigma in statistical language) is not enough to claim a break from the Standard Model, the results are a potential sign of something amiss and are likely to impact existing theories.

“The excess over the Standard Model prediction is exciting”, said BaBar spokesperson Michael Roney, Professor at the University of Victoria in Canada. “The results are significantly more sensitive than previously published studies of these decays”, said Roney. “But before we can claim an actual discovery, other experiments have to replicate it and rule out the possibility this isn’t just an unlikely statistical fluctuation.”

“This result is very interesting, and if confirmed could be a sign of physics beyond the standard model”, said Adrian Bevan, from Queen Mary, University of London and UK spokesperson for BaBar.

Fergus Wilson, one of the analysers of data from Babar who is from STFC’s Rutherford Appleton Laboratory, added: “Our current theory about the fundamental forces of the Universe, which has been around for nearly 40 years, is beginning to show signs of failure. Just as exciting, our new measurement indicates that any replacement theory will need to be more exotic and complex than we could have hoped or imagined. Although we must not jump to conclusions based on just one measurement, this new result is one of the most compelling yet. It follows on from previous indications recently reported by us, all of which point in the same direction.”
The BaBar experiment, which collected data from 1999 to 2008, was designed to explore various mysteries of particle physics, including why the universe contains matter, but no antimatter. Data from the collaboration which includes 75 institutions from Canada, France, Germany Italy, Norway, Russia, Spain, the UK and the US helped confirm a matter-antimatter theory for which two researchers won the 2008 Nobel Prize in Physics. At its peak, some 90 British particle physicists and engineers from eleven institutions took part in the experiment.

Researchers continue to apply BaBar data to a variety of questions in particle physics. Adrian Bevan said: “This result will help guide teams of researchers looking for potentially related new physics effects at the Large Hadron Collider and at other particle physics labs around the world.”

“If the excess decays shown are confirmed, it will be exciting to figure out what is causing it,” said BaBar physics coordinator Abner Soffer, associate professor at Tel Aviv University. “Other theories involving new physics are waiting in the wings, but the BaBar results already rule out one important model called the Two Higgs Doublet Model. We hope our results will stimulate theoretical discussion about just what the data are telling us about new physics,” added Soffer.

The researchers also hope their colleagues in the Belle collaboration, which studies the same types of particle collisions, see something similar. “If they do, the combined significance could be compelling enough to suggest how we can finally move beyond the Standard Model,” said Professor Roney.

The results have been presented at the 10th annual Flavor Physics and Charge-Parity Violation Conference in Hefei, China, and submitted for publication in the journal Physical Review Letters. The paper is available on arXiv in preprint form.
Ultra fast supercomputers at UK lab will better prepare us for severe weather and save millions of pounds

Severe winter weather experienced in the UK over the last couple of years reduced the UK’s GDP by 0.5%, and resultant travel disruption cost the UK economy £280 million per day. The weather has a huge impact on our lives, affecting transport, agriculture, energy use and leisure.

The Science and Technology Facilities Council (STFC), the Met Office and the Natural Environment Research Council (NERC), have together embarked on a project to design and build a next-generation weather forecasting model for the UK that will exploit advanced ultra-fast supercomputers and provide a boost to the effectiveness of forecasts that can not only save money, but also save lives.

By the end of the decade, scientists will be using supercomputers that are thousands of times faster than any of today’s systems. Known as ‘exascale’ supercomputers they will contain millions of processors capable of performing a million trillion calculations per second. Harnessing the power of these computers for weather and climate prediction could mean much more accurate forecasts that will help us to live more easily with episodes of severe weather and also to adapt to climate change, maintaining UK leadership in environmental prediction.

This research will be one of the first major projects to benefit from STFC’s new future software research facility at its Daresbury Laboratory in Cheshire. This centre was announced in March this year following £37.5m investment by the Department of Business Innovation and Skills (BIS) into High Performance Computing (HPC) at Daresbury as part of its UK e-infrastructure initiative. It forms one of the world’s foremost centres in software development and is host the UK’s most powerful supercomputer, Blue Joule.

Minister for Universities and Science David Willetts said: “Supercomputers are fundamental to modern research, in particular very complex areas like weather forecasting. This project will harness the expertise of the UK’s excellent research base to ensure we remain world-leading in climate science.”
Andy Brown, Head of Foundation Science at the Met Office, said “The Met Office is at the forefront of scientific developments in weather forecasting and its forecasts are ranked in the top two national met services in the world. This project between the Met Office, STFC and NERC will ensure that the UK continues to benefit from the best science and advice available.”

Associate Director of STFC’s Computational Science and Engineering Department, Dr Mike Ashworth said: “Ever more accurate prediction capabilities will help the UK to be more aware, and consequently more prepared, for severe weather impacts in the future. There are many challenges to overcome, the main issue being that the models used to simulate the atmosphere today would be unable to take advantage of the processing power of the ultra-fast computers available within the next few years. We are working together to design and develop a next-generation computer program that will do the key job of simulating the winds, temperature and pressure. This, when combined with other processes such as cloud formation, will allow us to simulate the changing weather conditions.”

It is anticipated that the new code will, in time, replace the dynamical core of the Met Office’s Unified Model (UM), the principal UK tool for weather and climate prediction, also used by national weather services around the world including Australia, South Korea, Norway, India, New Zealand and South Africa.

Professor Stephen Mobbs, Director of NERC’s National Centre for Atmospheric Science, said: “Tomorrow’s ‘exascale’ computers represent a huge opportunity and a huge challenge for the science of weather forecasting. The opportunity to produce forecast detail down to the scales which affect specific human activities are beckoning. For instance, details on the scales of transport infrastructure – roads, rail, etc – or individual towns will be resolvable. At the same time, the computer software challenges of effectively using millions of processors open up new areas of computer science. There are also a vast range of physical processes which affect the weather on these fine scales, stretching our understanding of the atmosphere itself and our ability to represent it within models.”

BaBar data hint at cracks in the standard model
Self-steering Mars Rover tested at ESO’s Paranal Observatory

When ESA wanted to test concepts for future Mars roving vehicles they needed a landscape as similar to the surface of Mars as possible. The Atacama Desert at ESO’s Paranal Observatory in northern Chile fitted the bill perfectly.

Rovers on Mars cannot be driven directly from Earth — it takes radio signals up to 40 minutes to make the trip to Mars and back. Instead, they are given instructions to carry out autonomously. But current rovers can only move slowly and need frequent updates from Earth. The ESA team is testing concepts that will allow future rovers to travel much further on their own. ESO’s Paranal Observatory acted as host for the rover experiments and provided welcome respite for the team and its equipment during the cold and windy nights.

For two weeks the team put the prototype rover, called Seeker, into action within a particularly Mars-like zone not far from the VLT. Like anxious parents, they watched the rover wander carefully across the rugged landscape, maintaining only radio surveillance.

Seeker used its stereo vision to map its surroundings, assess how far it had moved and plan its route, taking care to avoid obstacles. Their daily efforts culminated in the final trial, when Seeker was programmed to perform a 6 km loop. It managed 5.1 km, a remarkable achievement for an early prototype under difficult conditions.

The rover platforms that are being used for Seeker include RoboVolc, a rugged terrestrial rover designed originally for working in volcano craters, provided by BAe Systems (UK).

The international team includes RAL Space, SciSys, BAe Systems, Roke Manor, MDA Space & Robotics, LAAS(F) and Oxford University. Seeker is a StarTiger campaign being conducted in offices and a robotics laboratory at the Rutherford Appleton Laboratory, also in the UK.
UK-Netherlands collaboration will build state-of-the-art neutron super-microscope

A new neutron super-microscope that will help pave the way for new high-tech materials is under construction at ISIS, the Science and Technology Facilities Council’s (STFC) world-leading neutron and muon source in Oxfordshire.

The new microscope, called Larmor, will be at the forefront of materials science for engineering, food, health and the natural environment. For example, knowledge gained could play an important role in the development of new high-tech materials for electronic equipment, or in speeding up charging speeds of lithium-ion batteries in electronic vehicles.

“You can also use the instrument in the study of new molecules that can transport medication to the exact location of a tumour, or for improving the composition of food, such as margarine,” said Professor Katia Pappas, Research Co-ordinator, Delft University of Technology (TU Delft).

Larmor will use beams of neutrons to see the exact positions and movements of atoms inside materials with unprecedented accuracy and resolution.

Additional funding to build the innovative neutron super-microscope at ISIS has been announced from the Netherlands Organisation for Scientific Research (NWO) and a consortium of Netherlands universities led by TU Delft.

The Netherlands funding complements previously secured UK funding for the Larmor instrument announced in March 2011 by David Willetts, the Minister for Universities and Science. Larmor is one of four instruments being built as a result of this funding for the Phase 2 instrument suite at the second target station at ISIS.

A number of industry supporters have already expressed a strong interest in using this new instrument, including, Tata Steel, SKF Group, NIZO Food Research, M2i (the Dutch materials innovation institute), Unilever, TI Food Nutrition and the Dutch Polymer Institute.

Over the next five years, ISIS will collaborate with the three Netherlands universities to develop this new and unique super-microscope. The £4.5 million UK contribution to Larmor will provide a high-intensity small-angle scattering instrument, whilst the Netherlands contribution will provide components that give state-of-the-art control of neutron beam polarisation. It is this additional apparatus that will significantly improve accuracy and resolution to levels previously unattained.

“By working closely together we have demonstrated that we are able to build the world’s most advanced neutron instruments and use them to develop a unique understanding of modern materials science,” said Dr Uschi Steigenberger, ISIS director.

“Recent collaborations between ISIS, TU Delft and NWO have already resulted in the construction of the Offspec reflectometer on the second target station at ISIS. The new Larmor instrument that we will build together will significantly extend the concepts used on Offspec to deliver new experimental capabilities to the scientific and industrial user communities.”
Harwell Oxford selected to host new centre for satellite applications

STFC welcomes the decision by the Satellite Application Catapult Delivery Team to locate the new Catapult Centre at Harwell Oxford. The news was announced by Science Minister David Willetts, at the Farnborough International Air Show on 10 July 2012.

One of seven new technology and innovation centres to be established and funded by the Technology Strategy Board (TSB), the Satellite Application Catapult will be a world class centre for the development of satellite products, services and applications for commercial exploitation, and is expected to be operational later this year.

The Catapult will strongly complement the growing Harwell Oxford Space Cluster, which already includes the International Space Innovation Centre (ISIC), STFC’s RAL Space, the European Space Agency (ESA) and the ESA Business Incubation Centre, each playing its part in the innovation required to advance space technology and develop new satellite applications and services.

Making the announcement, Science Minister David Willetts said: “I’m delighted that the Satellite Applications Catapult will be located at Harwell. The Technology Strategy Board are already committed to investing £10 million this year alone in innovation in technologies that make use of satellite and space infrastructure. The Catapult will give real impetus to commercial development in this area, where the UK can set itself ahead of the competition. With the international reputation that Harwell already enjoys, it makes it an ideal location for the Catapult.”

Dr Barbara Ghinelli, Executive Chair of ISIC said: “This decision is a major vote of confidence in the UK’s flourishing Space sector and the rapidly developing Harwell Oxford Space Cluster. It is also clear recognition that Harwell is the place for space within the UK and will make Harwell even more attractive for businesses interested in exploiting the massive growth potential identified in the Space Innovation and Growth Strategy.”

The full Technology Strategy Board press release can be viewed here.

Further information on the Satellite Applications Catapult Centres is available here.