Innovations

**The Square Kilometre Array (SKA)**

STFC Knowledge Exchange Workshop Jodrell Bank Observatory

Over 110 people were registered for this oversubscribed event on The Square Kilometre Array held jointly by STFC’s Innovations Club with STFC’s Astronomy Programme group at Jodrell Bank Observatory on 20 March 2013.

This workshop aimed to pull together the interest from both the academia and industry in order to facilitate knowledge exchange between STFC funded researchers and industry with a view of exploiting technologies and advances being made through SKA. The technologies required for the SKA are at the core of the future ICT and communications industries and have the potential to be technology driver with impact far beyond the direct return via construction contracts for this £1.2bn radio telescope.

STFC has been funding the technical involvement in the SKA since 2006 focusing on R&D in phased array technology, signal transport and software and computing. On 1 February 2013 the Chancellor of the Exchequer announced further £11m investment for the SKA to develop software and techniques capable of handling unprecedented amount of data.

Professor Phil Diamond SKA Director General
From the technical presentations it was clear that industry engagement is central to the SKA and funding for the industry is available through TSB as well as STFC Innovation Partnership Schemes and direct government funding.

The Director-General of the SKA Organisation, Professor Philip Diamond gave a strategic overview of the current developments and world-wide involvement in the SKA. In particular, he highlighted that the SKA Office has issued a baseline conceptual design as part of Request for Proposals announced on 12 March 2013 to serve as starting point for design and to identify consortia to undertake the detailed design work needed for SKA, which will be approved by the SKA Board following the recommendation from the SKA Office (www.skatelescope.org).

STFC is currently coordinating the UK SKA community’s response to the SKA Office’s Request for Proposals to undertake work in the pre-construction phase and to secure a strong position in the various project work packages.

For more information on STFC’s astronomy programme in SKA please contact Dr Simon Berry (simon.berry@stfc.ac.uk) or Dr Vlad Skarda (vlad.skarda@stfc.ac.uk) for STFC Innovation Partnership Scheme funding.
STFC tender opportunities – Breakfast Meeting
Friday 12th April 2013, 08.30-11.00,
NETPark, Sedgefield, TS21 3FD

The Science and Technology Facilities Council is holding a breakfast meeting to introduce companies in the North East to the business opportunities at CERN and other international science facilities. This event is free to attend and aimed at companies who are less familiar with tendering to CERN.

STFC funds large international science facilities on behalf of the UK and we want to ensure that the UK gets a fair economic return from the tenders from these facilities. This meeting is aimed at companies from a range of sectors in the North East who want to learn about business opportunities at international facilities, such as CERN, ESO, ESRF and ILL. Attendees can meet the tender opportunities team, find out how to respond to tenders, what the requirements of the facilities are and hear from companies that have been through the process and won bids at CERN.

If you are interested in attending and would like to book a place, please email Allanah at allanah.bayliss@stfc.ac.uk or call on 01793 442056.
Major contract win for I-TAC firm, Byotrol

Pioneering high-tech firm Byotrol, which researched and developed its revolutionary hygiene technology at STFC’s Innovations Technology Centre (I-TAC), has clinched a major contract with retail giant Marks & Spencer.

Under the agreement, Marks and Spencer will use Byotrol anti-microbial sanitisers as its surface hygiene solution across its entire in-store operations, following a successful earlier adoption in its Deli operations.

This success is just the latest in a list of several major contracts for its patented technology, which includes Boots, Rentokil and Kimberley-Clarke, and it is already the main bacteria-killing ingredient in Tesco’s own-brand multi-surface spray.

Byotrol chief executive Gary Millar said: “Byotrol is very pleased to be adopted so widely by such a trusted household brand name. It is a further endorsement of the credentials of the Byotrol technology, and illustrative of the potential for the company.”

Byotrol’s patented technology is used in wipes, sprays and mousses to combat the spread of viruses and superbugs, including MRSA and Norovirus. In contrast to old technologies, it contains no alcohol or bleach so is gentler on skin and the environment and is significantly longer lasting than traditional but harsher cleaning products currently on the market.

Originally Manchester-based, Byotrol relocated its R&D division from Germany to STFC’s I-TAC at its Daresbury Laboratory in 2009 to develop and enhance its technology, where it became the first in a long list of companies to benefit from £3 million of cutting edge technology and laboratory facilities available to small businesses at I-TAC.

As the business went from strength to strength, Byotrol relocated its entire business operation into the wider science and innovation campus at Daresbury as it took on Enterprise Zone status as Sci-Tech Daresbury in 2011.

Dr Martin Morlidge, Manager at I-TAC, said “This is superb news for both Byotrol, I-TAC and indeed Sci-Tech Daresbury. I-TAC’s aim is to make it easier for small companies to carry out the essential research they need to enable them to thrive in a competitive and increasingly global business environment. Byotrol’s growth and continued track record in securing key contracts with major household names shows how scientific innovation through access to the facilities and the expertise available at I-TAC, partnered with the wider benefits of being located within the Sci-Tech Daresbury Enterprise Zone, can help forward thinking companies like Byotrol, achieve success in the global economy.”

To add to this success, in the last week Byotrol has also been recognised at the Greater China Awards 2013 by the UK Trade & Investment (UKTI), having formed an international partnership with Chinese company, Sunon, to launch pet grooming and hygiene products under the name of Carexpro. This new brand is expected to take a 15% market share in China and Hong Kong by the end of 2013 after only launching in June last year.
Advancing in-vivo imaging for stratified medicine

The Technology Strategy Board is to invest up to £7.5m in collaborative R&D, to develop in-vivo clinical imaging and non-invasive technologies that will enhance the detection and characterisation of human disease.

We will select projects with the potential to improve diagnosis and clinical outcomes by providing clinicians and healthcare workers with information which allows them to choose the most appropriate treatment or further investigation for patients.

Successful projects should lead to better stratification – enabling patients to be grouped according to their individual needs and probable responses to treatment. The competition will focus on areas where there is currently unmet clinical need (for example, in oncology and in neurodegenerative, cardiovascular, respiratory, rheumatic, ophthalmic and dermatological disease).

Projects must be business-led and collaborative, and they should last no more than three years. The amount of funding per project will depend on the type of participant and the type of research being undertaken.

We are primarily seeking to fund industrial research, with a business partner attracting 50% public funding for their eligible project costs (60% for SMEs). Where academic partners are involved, their costs must be no greater than 50% of the total project costs. We expect project costs to range in size from £500k up to a maximum of £2m, although we may consider larger projects – applicants should discuss this with us before making an application.

Open date: 25 March 2013
Registration close date: 15 May 2013
Close date: 22 May 2013
Email: competitions@innovateuk.org
Phone number: 0300 321 4357
Download the Competition brief
Science Minister launches first Higher Apprenticeship in Space engineering

The Science Minister David Willetts launched the first ever Higher Apprenticeship in Space Engineering at STFC’s Rutherford Appleton Laboratory (RAL) today (15 March 2013). The apprenticeship has been developed by Loughborough College in association with the National Space Academy. Students from Loughborough College and current apprentices from RAL were at the launch and had a chance to speak to the Minister. The party were also shown the RAL Space Precision Development Facility and were given a tour of STFC’s ISIS facility.

The Minister said: “The UK space industry is a major success story. To build on this achievement we need to maintain a good supply of talented scientists and engineers. This new Higher Apprenticeship is the first of its kind. It will provide people with the advanced skills and knowledge to drive growth and innovation in the space sector, keeping Britain ahead in the global race.”

The pioneering programme is set to lead the way in training across the country for a sector due to triple in size and be worth £30 billion in less than two decades.

Developed by Loughborough College in association with the National Space Academy, the apprenticeship will meet the demands of an industry which already employs around 30,000 and contributes over £9 billion to the nation’s economy, with work-based, top quality degree-level training.

Dr David Parker, Chief Executive of the UK Space Agency, added: “Space is big business for the UK and can offer our young people interesting and fruitful careers. Programmes like the Higher Apprenticeship in Space Engineering will help us to nurture the next generation of scientists and engineers, equipping them with the skills and knowledge needed to boost both our growing space sector and the whole economy.”

The Science Minister meeting apprentices at RAL Credit: STFC
Science Minister launches first Higher Apprenticeship in Space engineering

Dr Martin Killeen, Head of Engineering at Loughborough College, said “Delivered through partnerships between education providers including Loughborough College, the National Space Academy and the University of Leicester and the space industry companies employing the trainees, the programme will target locations across England where demand is greatest. The aim is to provide a national pathway for 250 Higher Apprentices by 2015. The two-year framework includes a 12 week delivery of the Foundation Degree each year with workplace training for the remainder of the time.”

The space sector has a huge impact on everyday life, showing significant growth despite the economic downturn. The commercial sector is driven by increasing demand from consumers for satellite TV and radio, mobile phone services, GPS navigation and from government for emergency services and security, for air traffic management or to monitor climate change. This is predicted to lead to continued high growth – projected at 5% per annum in real terms to 2030.

The Government recently pledged an extra £60 million to the UK Space Agency for Europe’s space programme, bringing the UK’s total investment in the European Space Agency to an average of £240 million per year over the next five years. This will allow the UK to play a leading role in the next phase of European space collaboration and has secured the future of the ESA facility in Oxfordshire, including transferring ESA’s telecoms satellite headquarters to the UK and creating over 100 new high-tech jobs.

To find out more from 15 March 2013 visit: http://space.loucoll.ac.uk/
For media enquiries contact Elizabeth Udall, Loughborough College 07515 852690 or elizabethudall@btinternet.com
Glasgow spin out uses plasma to protect

STFC supported research at the University of Glasgow into a novel method for creating and handling ozone is being exploited by spin out company Anacail which has recently received over £750,000 of seed funding. Their revolutionary development provides an innovative way of sterilising packaged consumer goods.

The project was initially supported through the stages of intellectual property identification and protection by a jointly funded SUPA (Scottish Universities Physics Alliance) and STFC IPS Fellow. The team also secured follow on funding from STFC, proof of concept support from the Glasgow EPSRC funded knowledge transfer account, and a SUPA physical and life sciences fellowship.

Ozone is a highly effective germicidal sterilising agent but its toxicity has hampered its use beyond the classical function of large-scale water sterilisation. However, Glasgow’s novel concept is able to use ozone as a decontaminant of material inside sealed packages, by striking a plasma in a thin layer on the inside of the container. This plasma generates ozone, which circulates around the contents which acts as a sterilising germicide.

This approach allows for decontamination, without opening the packaging or compromising the seal. Unused ozone quickly decays back to conventional oxygen, leaving no toxic residues. Since the ozone is created on demand and in situ, there are no storage or environmental problems, making it ideal for deployment on production lines, initially focusing on the food packaging industry – a sector which it is estimated was worth £5.68bn in 2010.

More details at the University of Glasgow press release
Photonics for health

The Technology Strategy Board is to invest up to £3.7m in projects that apply innovative photonics technologies to challenges in the health sector. The funding is for collaborative R&D projects, and for collaborative feasibility studies.

The UK is already a significant player in the photonics market, with expertise in many areas relating to the manipulation of light, such as optical fibres, lasers and optical tweezers. These technologies have the potential for a wide range of applications in the diagnosis and treatment of serious diseases. Given its strengths in the life sciences sector, the UK has an opportunity to lead the world in the development and commercialisation of bio-photonics.

One of the challenges to overcome, however, is the difficulty that users such as the NHS and clinicians sometimes have in understanding the potential of next-generation photonic technologies. The aim of this competition, therefore, is to bring together multi-disciplinary teams involving academics, businesses and healthcare providers, to develop new applications of photonics in healthcare.

Projects must be business-led and collaborative.

There are two strands to this competition:

Strand 1 is a single-stage process for feasibility studies. Project must include at least one small or medium-sized enterprise (SME) and last between six and 12 months, with total project costs up to £175k. Projects may attract up to 75% public funding of eligible project costs. £1.5m will be allocated to this strand.

Strand 2 is a two-stage process for collaborative R&D projects. Projects should include at least one SME and last between 12 and 24 months, with total project costs up to £750k. Projects may attract up to 60% funding of eligible project costs. £2.2m will be allocated to this strand.

The percentage of costs that are met will vary, depending on the type of research being carried out and the type of organisation involved. Strand 1 will fund pre-industrial feasibility studies, while under Strand 2, we are primarily seeking to fund industrial research. This competition opens on 11 March 2013.

The deadline for registration for Strand 1 is noon on 24 April 2013 for completed applications is noon on 1 May 2013.

The deadline for registration for Strand 2 is noon on 17 April 2013. The deadline for completed expressions of interest is noon on 24 April 2013. The second stage for invited applicants opens on 13 May 2013, and the deadline for completed applications is noon on 19 June 2013.

Please note the differences in registration and submission dates between the two strands.

Email: competitions@innovateuk.org
Phone number: 0300 321 4357
Download the Competition brief
Call for proposals for the Projects Research and Development scheme

STFC has announced a call for applications to the Projects Research and Development scheme (PRD). The applications should be submitted by the deadline of July 9th 2013 and will be reviewed at a meeting of the PPRP Panel on September 18/19 2013. STFC intends to allocate a total of around £1.2 Million. It is expected that most grants will start no earlier than 1 April 2014.

The PRD scheme is intended to develop the capabilities needed to underpin UK science and technology leadership in future Science and Technology Facility Council projects and gives industry the opportunity, in collaboration with approved research organisations, to apply directly to the STFC for funding for research and development.

The PRD scheme provides funding for research and development projects which enable STFC to deliver the science programme objectives in the areas of particle physics, particle astrophysics, nuclear physics and astronomy. Please note that proposals for project specific R&D, or small upgrades for space instruments and missions, fall within the remit of the UK Space Agency.

More details of the STFC PRD scheme, including an updated guide for applicants can be found on the PPRP page.
Head start for UK companies

Finding new customers has never been more important for UK companies and a recent trade visit to CERN has enabled eleven businesses to introduce themselves, their products and services to CERN. At the same time, they were able to find out more about CERN’s requirements and its purchasing procedures.

The two-day trade visit was organised by UK Trade and Investment (UKTI) and STFC. Eleanor Baha is the Trade Attaché at the British Embassy in Switzerland. Her role is to help UK companies develop or increase their sales in Switzerland. Around 30% of her work relates to CERN.

“When we organise trade visits, we arrange everything - the companies can concentrate on promoting their products and services. The challenge of supplying CERN is the level of precision required for components, and the amount of technical information that companies need to provide. We work closely with STFC to match people at CERN who have specific buying requirements to British companies that can meet their needs – we’re a little like a dating agency!”

The visit included presentations on CERN activities and purchasing procedures to put the companies in the best position to be able to submit successful bids for contracts. The representatives were also given a tour to help them get a sense of the breadth and scope of activities at CERN. The most important part of the visit was the individual programme of one-to-one meetings that Eleanor and her colleagues arranged for the company representatives with CERN staff. There is no doubt that these personal contacts increase the chances of a company being invited to tender.

Colin Woolger, Managing Director of Magnetic Shields Ltd, has found the trade visit valuable, “With such a large organisation as CERN, it is extremely helpful that UKTI and STFC work with us to find the right contact partners within CERN. This is our second such visit and we are hugely impressed with the planning and organisation which enables us to focus totally on high quality meetings. We gained orders after our first visit and this visit looks even more promising with larger potential projects being discussed.”

The importance of the trade visit was underlined by the presence of HM Ambassador to Switzerland, Sarah Gillett, at the reception at the end of the first day, “Science and innovation are massively important to the British economy. CERN is not only one of the most exciting scientific frontiers in the world today; it also offers wonderful opportunities for collaboration between science and industry. The UK’s share of CERN business has increased from CHF20 million in 2011 to CHF30 million in 2012. I believe there is still plenty of scope for this to increase further, and I am most grateful for the way in which CERN’S top management is as keen as I am to see more British companies working with CERN. I found UK@CERN one of the most inspiring receptions I have been to this year, because it confirmed my belief that the UK has some of the world’s best companies, and that CERN wants more good British companies working with it.”

The next trade visit to CERN is scheduled for early 2014. For more information on becoming a CERN supplier, please contact Eleanor Baha, Julie Bellingham or Alan Silverman.
£2 million investment for North West materials and manufacturing R&D

£100,000 R&D funding could be available to advanced materials and manufacturing start-ups, companies and entrepreneurs in the North West through a £2 million launchpad competition announced by the Technology Strategy Board (TSB), in partnership with the Science and Technology Facilities Council (STFC). The competition opened to applications Monday 4 March.

Designed to accelerate new business projects and their commercial success, the funding competition will stimulate small start up businesses centred around the cluster of materials and manufacturing industries at Sci-Tech Daresbury and at the Knowledge Centre for Materials Chemistry at the Runcorn Heath Business and Technical Park.

The competition aims to draw investment and people with innovative ideas into the area, encouraging networking and strengthening this growing cluster of businesses. It is open to applicants who are either located in, plan to move in to or start up in one of the clusters, or who are collaborating with a company already in one of the clusters.

Each cluster has a ‘Cluster Champion’, chosen by the TSB, which will be responsible for delivering business support to successful applicants.

As its chosen Cluster Champion, STFC, through its Daresbury Laboratory, will deliver business support services to those applying for the North West Materials and Manufacturing launchpad. As part of its support to these businesses STFC will:

- Deliver an investment readiness programme to ensure projects are ready to attract funding, culminating in a pitching event to investors
- Work with applicants to look at what technology gaps they have and identify whether these can be filled via STFC or other research institutions
- Identify what facilities they will need to access to take forward their concept to market
- Provide training and mentoring on key business issues
- Provide access to a comprehensive network of campus and innovation partners

As part of the scheme, successful applicants will be required to secure match funding within a 12 month period to receive their grant from TSB, and they will be supported throughout this process by STFC.
Paul Vernon, Head of Campus Development at STFC, said: “Using our own business support expertise and research facilities, we will be working with organisations across the cluster to ensure that entrepreneurs and small businesses are in the best possible position to accelerate the growth of their project or idea. A key part of this will be delivering an investment readiness programme and funding event to provide an opportunity for entrepreneurs to pitch their ideas to potential investors. Importantly, for applicants that have not been successful, we will also be identifying how we can help them accelerate their business ideas to ensure maximum impact from STFC’s capabilities and expertise.”

Nigel Walker, TSB’s Access to Finance Lead, said: “Many innovative ideas for high-tech products or services fail early on through lack of either funding or access to the necessary facilities and business expertise. Partnering with STFC and others enables the TSB to not only provide the much-needed funding to bring these innovative business ideas closer to market, but to ensure they get the additional support and skills they need to make their commercial idea a success and contribute to economic growth and job creation in the UK.”

STFC has a clear track record in supporting early stage businesses through its Innovations Technology Access Centre, as well as its management of both the CERN and the European Space Agency’s business incubation centres in the UK and its own innovation vouchers and funding schemes.

Sci-Tech Daresbury is a national science and innovation campus regarded as one of Europe’s leading centres for innovation and business. It assumed official status in April 2012 as one of the UK Government’s flagship Enterprise Zones and is now home to more than 110 thriving start-up businesses, several of which have chosen to relocate to Daresbury from overseas. The Knowledge Centre for Materials Chemistry coordinates, develops and exploits cutting-edge research in materials chemistry, providing fast track industry access to world leading research facilities knowledge, and has delivered more than 60 collaborative projects with STFC and other leading research institutions in the past 4 years.

The materials and manufacturing Launchpad builds on the success of the TSB’s £1.25 million investment in London’s tech and digital hub, Tech City in 2011, and there are plans for a series of digital and creative clusters across the UK. This includes a Space Cluster at Harwell Oxford, which is already underway, in which STFC is also the Cluster Champion.

The competition for the materials and manufacturing North West Launchpad opens on 4 March and closes on 17 April 2013.

Interested applicants need to complete a short form and submit a two-minute video describing their project idea.

There will be a briefing session for interested parties at Daresbury Laboratory on 19 March.

For more information please visit the TSB’s Connect website or contact STFC’s Martin Morlidge at 01925 603614.
RAL research to support UK Catalysis Hub

ISIS, the Science and Technology Facilities Council’s (STFC) world-leading neutron and muon source and Diamond welcome the announcement of a £12.9M investment in a UK catalysis hub which will make extensive use of RAL facilities including ISIS and CLF. Catalysis science is critical for the country’s chemical, energy, pharmaceutical, food, personal care and materials sectors. ISIS has a track record in catalysis providing manufacturers of industrial catalysts with unprecedented atomic-scale insights into their key products. Find out more on the ISIS website.

This UK-wide research programme in catalytic science is being funded by the Engineering and Physical Sciences Research Council (EPSRC) and the Hub will be based at the Research Complex at Harwell (RcAH) on the Rutherford Appleton Laboratory (RAL) site. ISIS scientist Dr Stewart Parker is a co-investigator within the Catalyst Design theme of the Hub which is being led by Professor Richard Catlow of University College London. This theme – awarded £3.7M within the overall Hub award – will involve state-of-the-art in-situ characterisation of catalyst materials, enabling the structure and evolution of catalysts to be probed at the molecular level during their operation.

“The opportunity to be involved in a UK-wide project for world-class catalysis is very exciting” Stewart said, “Neutrons at ISIS will provide essential atomic-level information on catalysis operation, enabling new, advanced catalytic materials to be developed.” Also involved in the UK Catalysis Hub are ISIS users Professor Chris Hardacre (Queen’s University Belfast), Dr David Lennon (University of Glasgow) and Professor Matt Rosseinsky (University of Liverpool). The RcAH is well placed to be the Hub’s location – RcAH researchers work across the boundaries of traditional research disciplines, and it is uniquely placed to benefit from the variety of scientific facilities on the RAL campus. The full Diamond response can be seen on the Diamond website.
Future business – new digital sustainability tool launched


Horizons is a free digital tool designed to help businesses identify sustainability issues, risks and opportunities, and integrate them into strategy, commercial decisions, and innovation.

The world is changing fast.

The pressures of climate change, population growth, food and energy security, and social inequality are increasing daily - and these issues are changing the operating environment for business.

Pioneering businesses are responding to those challenges and seizing the opportunities they present. Companies like Caterpillar, Unilever and PepsiCo are developing new business models, products and services, and changing their relationships with consumers.

Horizons is open access, and is made up of a number of ‘cards’ which outline the issues and trends driving the development of our future economy – like access to information, levels of pollution, public trust and energy security.

Detailed information on why each issue is important is available, plus links, films and case studies to bring each issue to life.

Horizons is open access, and currently in beta.

Commenting on the new tool, Dragons’ Den business woman Deborah Meaden said: “Despite the challenges of these difficult economic times, I believe there is a genuine desire amongst UK businesses to embrace sustainability. Growing numbers are seeing the business case of understanding the big trends coming their way and working for the long term, and Horizons is a great resource to help them do that.”

Jonathon Porritt, Founder Director of global sustainability non-profit Forum for the Future, said: “We can’t predict the details of our future economy. But we do know the trends driving its development – like the rolling IT revolution, climate change, public trust, food security. These factors shape markets and disrupt business models. Businesses need to address the risk that presents. But crucially, there’s a huge business opportunity there for the taking.”

Richard Miller, the Technology Strategy Board’s Head of Sustainability, said: “The sustainability challenge that the world economy faces represents a fantastic opportunity for smart and innovative businesses to create new products, services and business models. Bring sustainability thinking into mainstream business activities is the most important thing we can do to make that opportunity real.”

We hope that you find the Horizons tool useful. It will continue to develop, and so any feedback as to how we can make it easier to use in companies and workshops will be very welcome.

If you have any suggestions for facts, case studies or links to extra resources, or any other enquiries or feedback, please email horizons.innovateuk@gmail.com
UK invests £88 million in world’s largest ever optical telescope

The UK research base and industry will play a leading role in one of the biggest global science collaborations in history, after the UK government confirmed long-term investment in the European Extremely Large Telescope (E-ELT) to be built in Chile.

The E-ELT will make huge strides toward our understanding of the Universe, the effects of dark matter and energy and planets outside of the solar system. Its 39 metres in diameter mirror will collect 15 times more light than any existing telescope and it will produce images 16 times sharper than the Hubble space-based telescope.

The £88 million investment will ensure UK scientists and engineers, supported by the Science and Technology Facilities Council (STFC), will be heavily involved in the construction and operation of the telescope and its instruments, set to be the most advanced of its kind. UK industry has already won £9 million worth of contracts, and that figure is predicted to increase as much as ten-fold before 2023 when construction is expected to be completed.

Minister for Universities and Science David Willetts said: “This significant investment reaffirms the government’s commitment to cutting edge science. It will ensure the UK plays a leading role in a ground-breaking international project and our world-class research base has access to the latest equipment. Not only will this new telescope considerably increase knowledge of the universe, its construction will drive growth and innovation for UK industry. This is why space is one of our eight great technologies. To top it off, the advances in technology that will result from this hugely challenging project will be a real asset to the UK and have knock-on effects for other sectors and areas of research.”
UK invests £88 million in world’s largest ever optical telescope

In addition to significantly enhanced worldwide scientific knowledge, the E-ELT will benefit the UK in other ways. Technology developed for astronomy is already being applied across many sectors, including extending the life of artificial knee joints, diagnosing eye diseases, improving the performance of industrial lasers and laser fusion research.

Professor Colin Cunningham, from STFC’s UK Astronomy Technology Centre (UK ATC) who is leader of the UK E-ELT Project Office said: “UK teams of scientists and engineers have built strong positions over the last few years to enable them to make major contributions to the instruments, telescope engineering and optical systems. We expect to lead one of the ‘first light’ instruments and look forward to UK industry making competitive bids for contracts to supply optical devices, detectors, software and engineering services for this challenging project. This will culminate in UK astronomers having the opportunity to make breakthrough discoveries in exoplanet research and in understanding the origins and evolution of galaxies.”

The UK has already played a major part in the E-ELT project, leading the development of the science case, developing instrument designs, optical technologies and telescope systems, and developing manufacturing processes. The UK instrument programme will be delivered in close collaborations between Durham University, the University of Oxford, the University of Cambridge, the STFC’s UK Astronomy Technology Centre and RAL Space, together with leading international institutes.

The advanced manufacturing challenges presented by the project are providing UK companies with the opportunity to apply for contracts. A UK technology development centre based in North Wales is delivering prototypes for the primary mirror system, which will consist of 798 hexagonal mirrors each 1.4m wide. This development is aimed at securing a potential €100 million order for UK industry to manufacture the production segments.

STFC Chief Executive Officer, Professor John Womersley, said: “E-ELT is one of the highest priorities for STFC and the UK astronomy community. It not only has the potential for enormous benefit to UK industry but will be the world’s pre-eminent astronomical observatory for many years to come.”

More information on the UK role in the E-ELT can be found here
High energy opportunities

If you’re an entrepreneur looking for your next challenge or a small high-tech company looking for a technical solution that will help you bring a new product to market, imagine being able to access the IP or tap into the expertise at CERN.

STFC and CERN have launched a Business Incubation Centre (BIC) based at the Sci-Tech Daresbury campus in Cheshire. This innovative scheme will provide a supportive environment where technology originally designed for experiments that will help us gain a better understanding of our Universe can find new applications in sectors such as medical imaging, telecommunications, data management or security screening.

With a generous package of funding, business support and access to technical assistance, the BIC will help businesses to grow from technical concept to market reality, from small start-ups into thriving high-tech companies.

You do not have to have any previous relationship with either STFC or CERN to apply to join the BIC.

The process is simple; start by submitting an Expression of Interest. This brief form will help the BIC partners assess how they can work with you. If your area of interest fits with one or more areas of CERN IP, or CERN has the expertise to work with you to solve a technical challenge, you’ll be invited to spend a day at CERN and explore the possibilities further by talking to relevant scientists, engineers and technology transfer experts. From there, you’ll need to complete a more detailed application form. If you’re successful, you could be part of the STFC CERN BIC and on the fast-track to success by October.

More information is available on the STFC CERN BIC website.
Innovations
Newsletter

What has physics done for your company lately?

The Institute of Physics (IOP)'s Innovation Awards are now open for entries.

If your business – of any size and from any sector – has successfully addressed a commercial need using a physics-based innovation in either the UK or Ireland, it might be eligible for entry.

Winners of the award are presented their trophy at the IOP’s annual awards dinner and will also appear at a high profile annual exhibition, hosted by IOP, to showcase the companies’ winning innovations.

Professor Sir Peter Knight, President of IOP, said, “Examples of physics-based innovation addressing commercial need are ubiquitous but often overlooked. It’s easy to forget, for example, how different a supermarket shopping experience would be if you got to the checkout and there was no laser, originally an invention derived from fundamental physics research. This awards scheme, which is now in its second year, congratulates the innovators who are helping drive the UK economy forward by bringing cutting-edge technology to the real world.”

The innovations from last year’s four winners – Aurox Ltd, Naneum Ltd, Technology Partnership Plc and ZBD Solutions – have found application in a broad range of sectors, including retail, medical, environmental and academia.

On receipt of Naneum Ltd’s Innovation Award last year, after developing a portable ‘scanning mobility particle sizer’ for environmental monitoring, Robert Muir, Managing Director of the Canterbury-based company, explained what winning the award means to him and his colleagues.

He said, “As a small company striving to produce innovative instrumentation we are delighted to win an inaugural innovation award from the Institute of Physics. This award is a great motivation for our young researchers giving them wider recognition for their ground-breaking work. We hope to build on this achievement to gain greater exposure for our products.”

All four winners were helped to publicise their success. This included the commissioning and creation of short professional video profiles.

To watch the video profiles of the 2012 winners, for further information about the awards scheme, including eligibility criteria, or to enter, go to www.iop.org/innovation.

The opportunity to enter your company this year will close on 31 May.
Offshore and marine industries set to benefit from revolutionary space global navigation receiver instrument

A sensing instrument which can measure ocean parameters such as sea surface roughness has been developed by experts at Surrey Satellite Technology Ltd. (SSTL). In its more familiar usage, GNSS (Global Navigation Satellite System – also known as GPS) pinpoints the geographic location of a user’s receiver anywhere in the world. However, in this small satellite instrument, reflected navigation signals are used to characterise sea, ice and land surfaces. It offers a significantly improved performance compared with that currently available, providing data with higher temporal and spatial resolutions.

The instrument is part of a pioneering UK-led project that aims to improve forecasting of adverse weather conditions at sea. Using satellite data to measure ocean roughness has been an area of interest for SSTL since an experimental GNSS receiver payload was launched on-board its UK-DMC satellite. Since then, the GNSS receivers team, with Principal Engineer Dr Martin Unwin, has investigated the use of GNSS reflectometry and have obtained promising results. They have built a prototype instrument, known as the SGR-ReSI, which is a multi-channel receiver of reflected GNSS signals and is currently being developed into a payload for the UK TechDemoSat-1 technology demonstration satellite to be launched in Summer 2013.

Vital Early Funding

Although the instrument development has benefited from substantial industrial funding, early seedcorn funding from the UK government and more recently from the Centre for Earth Observation Instrumentation (CEOI) has proved vital. This early funding helped get the project off the ground and, through the CEOI knowledge exchange programme, stimulated academic partnerships and other industrial relationships. Other project partners include Surrey Space Centre, who undertook antenna design work, National Oceanographic Centre, the University of Bath and Polar Imaging Limited. According to SSTL’s Martin Unwin, “the external funding from the CEOI has helped open doors by giving the idea an impetus and an importance that has successfully led on to an upcoming demonstration in space.”

Clever Technology

Global navigational systems like GPS, have been used increasingly for remote sensing as well as navigation. Signals at L-band with a 2-20 MHz bandwidth are being broadcast globally from a 20,000 km altitude and can be used to measure a number of things. In this case, the GNSS signals reflected off the Earth’s surface can be detected and used to measure geophysical parameters.
The potential for GNSS reflectometry has already been demonstrated on the UK-DMC mission by SSTL and the University of Surrey in 2003. This experiment highlighted the potential that a microsatellite-compatible passive (receive-only) instrument may be able to make valuable geophysical measurements using the GPS reflectometry technique.

The SGR-ReSI instrument has numerous technical advantages over existing technology. For example it is able to store quantities of raw sampled data, can perform substantial amounts of processing in real time on board the satellite and enables a large number of reflections to be captured across the globe. Its low power and size lends itself for use on multiple satellites to increase the spatial and temporal coverage of the Earth.

Better Modelling and Forecasting for Industrial and Meteorological Applications

Marine operations such as offshore oil platforms and renewable energy projects, as well as shipping, are set to benefit from the data from this technology. These activities depend on high quality information on sea-state (wave height, period, direction, steepness) for economic and safety decision making. Measurements from the SGR-ReSI will enable more effective modelling and forecasting and reduce the need to use costly buoys to obtain information further away from the coast and shipping lanes.

The instrument will be demonstrated on TechDemoSat-1, due to be launched in Summer 2013. It has also been selected to provide measurements of cyclones (hurricanes and typhoons) on the NASA CYGNSS constellation of small satellites to be launched in 2016. Additionally, the Technology Strategy Board (TSB) has provided co-funding for the WaveSentry project.

Key outputs from the project include better measurements of wave steepness and the integration of multiple data sources into a single system. This will ultimately provide better services for meteorology, marine users and scientists.

Find out more

SGR-ReSI is an example of successful instrument development from concept to feasibility, from instrument to mission. It demonstrates the importance of early funding and collaborative support given by entities such as the CEOI. If you want to find out more, contact the Principal Engineer, Martin Unwin at SSTL at m.unwin@sstl.co.uk.