

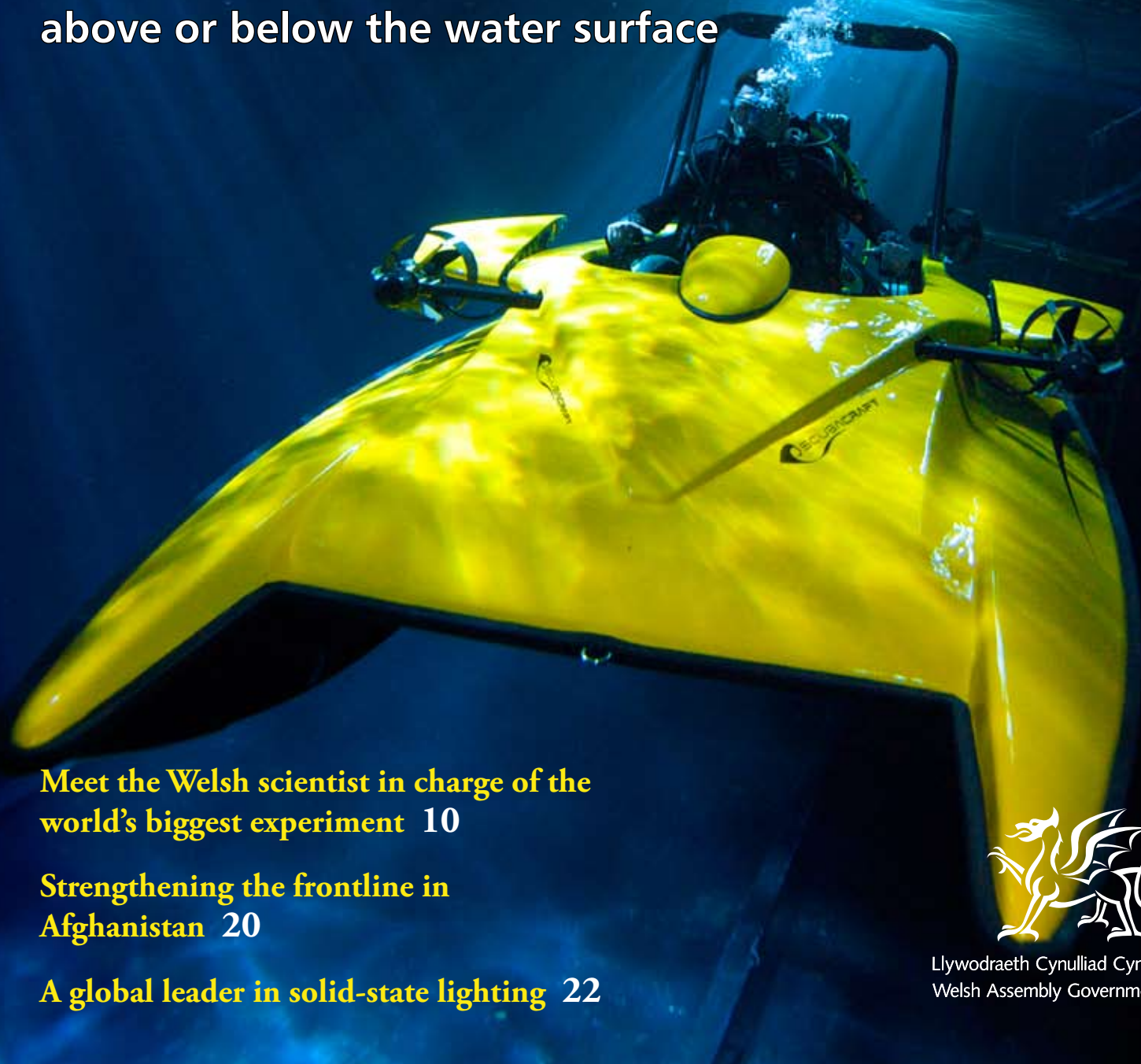
advances

THE JOURNAL FOR SCIENCE, ENGINEERING AND TECHNOLOGY IN **wales**

ISSUE 58 ■ WINTER 2008

Testing the waters

The innovative technology behind a new craft capable of travelling above or below the water surface












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Llywodraeth Cynulliad Cymru
Welsh Assembly Government

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If you ever doubted that Wales is a significant international player then read the features in this issue. Your doubts will disappear.

Read, for example, our features about pioneering Welsh scientist Lyn Evans at CERN in Geneva (p. 10), Halma Water Management in control of Beijing's water supply (p. 14), Concrete Canvas strengthening the frontline in Afghanistan (p. 20) and, in our news section, Hyder's winning design for a New Zealand bridge.

This international prosperity has occurred in parallel with success at home. This is best seen with Enfis (p. 22), a Swansea start-up and now a global leader in its field, whose innovative developments in electronics and lighting are, quite literally, on show all around Wales.

This effect, when external and internal successes combine to create something bigger than the sum of their parts, is often described as *synergistic* by the business press. In Wales we call it common sense. It takes years of consistent investment to develop the expertise required to thrive internationally. And international success in turn feeds back into the internal economy in terms of new skills and further investment.

At the SPIE seminar, First Minister for Wales Rhodri Morgan (see our news item on p. 6) said that Wales is a 'small, clever country' and can attract high-value inward investment by exploiting its size and ability to react quickly to change.

"We have people with the skills who are able to build close relationships, enabling us to cut red tape. That means we're good at constructing networks and we can get things decided fast, which helps hugely in the highly competitive world of inward investment.

We are rolling out our 'unique' Technium network, a series of centres throughout Wales that provide incubation and in-house technological and business support services, which are closely linked to academic centres."

In just a few sentences the First Minister has described what makes a successful economy, but this could equally describe the strategy for innovative business: develop close relationships with your customers, find out what they want, establish novel methods and products to provide it, and make sure that what you actually develop is in fact technologically superior.

It sounds like a simple formula and it is. But it is one that can often go wrong if the relationships don't work or the underlying investment isn't present. In Wales, this recipe for success is one that has demonstrably been applied, and continues to be applied – and we, and the wider world, benefit.

Catriona Vernal
Editor, *Advances Wales*

COVER IMAGE The prototype of Scubacraft, developed by Creative Worldwide, was recently tested under water at Pinewood Studios in England. Scubacraft is a new generation of water craft that uses innovative buoyancy technology to travel above and below the water surface (see p. 12).
Photograph by Phoebe Rudomino/Underwater Stage, Pinewood Studios.

PHOTOGRAPHY Sourced from organisations featured, their representatives and iStockphoto.

Advances Wales is a high-quality, quarterly 'transfer of technology' journal produced by the Welsh Assembly Government to showcase new developments in science, engineering and technology from Wales. Devoted to concise reports and commentary, it provides a broad overview of the current technology research and development scene in the Principality. *Advances Wales* raises the profile of the technologies and expertise available from Wales in order to facilitate collaborative relationships between organisations and individuals interested in new technologies and innovation.

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■■■ Investment for daffodil drug ■■■

A **MID WALES** biotechnology company which is pioneering the use of daffodils in the fight against Alzheimer's disease has received an investment of £850,000 to go into full production.

The money has come from Finance Wales, Cardiff-based Gambit Corporate Finance and a number of private investments.

Alzeim Ltd, based in Powys, farms daffodils for a natural chemical called galantamine, which slows the progress of the disease.



It is marvellous that the use of the Welsh national flower for treating this debilitating disease should be pioneered by a small company based in rural Mid Wales.

John Jenkins
Director

Gambit Corporate Finance



The company (featured in *Advances Wales* issue 48) will use the investment to expand production of its innovative drug, Galanthamine.

Although the drug is free on the NHS in Scotland, it is only prescribed privately in England and Wales because of its high cost.

However, having developed new ways of producing the drug at a significantly reduced cost, Alzeim is hoping that the National Institute for Health and Clinical Excellence will give it standard prescription list status.

www.alzeim-biotech.co.uk



New research centre to improve steelmaking in Wales

A **£1.2 MILLION CENTRE OF EXCELLENCE** has been launched by Cardiff University School of Engineering.

In conjunction with Corus, the centre will research Corus's energy optimisation and the management of process by-products to enable re-use in the steelmaking process, or alternative use.

Involving medium- and long-term research and the provision of training for their process engineers and technicians, the partnership will further improve the competitiveness of the steel industry in Wales, initially over a three-year period.

Lianne Deeming, Director of Process Development at Corus Strip Products UK, said: 'Waste management and energy optimisation are two of the

most critical technical aspects of the steelmaking industry.'

Corus Strip Products UK, based in South Wales, makes hot-rolled, cold-rolled and metallic-coated strip steels. Now part of Tata, the company is the sixth largest steelmaker in the world, with a production capacity of over 27 million tonnes.

The University's links with Corus were further strengthened in October with the announcement that a team led by School of Engineering student Matthew Wright won a prestigious Corus Structural Steel Design Award.

Challenged to provide a structural solution for a terminal building and a control tower at a new regional UK airport, Matthew was presented with first prize.



The latest collaboration builds on an already long-standing relationship between the University, the School and Corus. The Centre's research will focus on minimising the amount of waste material that leaves the plant for landfill, maximising the use of processes gases for on-site electricity generation, and raising the efficiency of the electricity generation plant and the distribution network.

Hywel Thomas
Head of the School of Engineering
Cardiff University



www.cardiff.ac.uk

... Sir Chris Evans to speak at BioWales 2009 ...

ONE OF EUROPE'S leading biotechnology entrepreneurs has been unveiled as a keynote speaker at BioWales 2009.

Port Talbot-born Sir Chris Evans, who runs Merlin Biosciences and who has established 20 science companies during his career, will speak at the event on 18 and 19 March, which will be staged at the Vale Hotel and Resort, near Cardiff.

BioWales was launched in 2002 to showcase the Welsh bioscience sector – an industry worth £1.3bn and employing 15,000–20,000 people – to an international commercial and academic audience.

BioWales 2008 brought together 450 delegates, more than 40 exhibitors, and 225 one-to-one brokerage meetings that gave rise to numerous fruitful collaborations.

Bioscience will be a key strategic industry for the future of Wales and is already an increasingly important part of the Welsh economy.

Rhodri Morgan
First Minister for Wales

www.biowalesevent.com

UK's first hydrogen demonstration centre opens in Wales

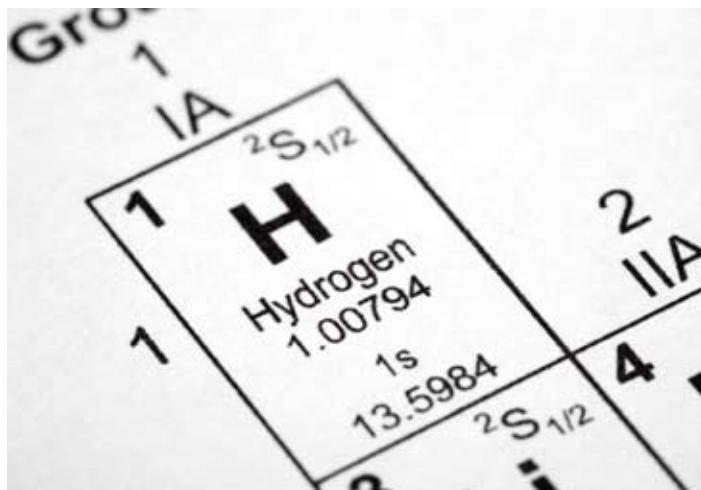
THE USE OF HYDROGEN as a renewable fuel source came a step closer in October with the opening of a pioneering hydrogen energy research and demonstration centre by the University of Glamorgan.

Based at Baglan Energy Park near Swansea, the £2.2 million 'Hydrogen Centre', part-funded by the EU, demonstrates the viability and safety of producing hydrogen from indigenous renewable resources in Wales.

Utilising renewable hydrogen as a fuel has the potential to address the increasingly prevalent issues of energy security, air quality and the reduction of greenhouse gases.

The centre will become a world-leading research facility and demonstration project, integrating renewable energy technologies (solar photovoltaic and wind) with hydrogen and fuel cell energy technologies.

Recognising the significance of the opening of the centre, car manufacturer Nissan Motor Co. Ltd brought its hydrogen-powered vehicle, the FCV X-Trail, to Wales for the very first time. During the launch event, First Minister for Wales Rhodri Morgan



took the opportunity to drive the vehicle.

Rather than an isolated one-off demonstration, the centre provides the basis for a range of hydrogen energy and transport activities, putting Wales at the forefront of European efforts to develop hydrogen communities. The new centre brings together technology and expertise and will provide a platform for new business development, growth and employment in the region.

Earlier this year, the University of Glamorgan launched the UK's first minibus to be powered by a fuel cell using hydrogen (featured in *Advances Wales* issue 57).

The University of Glamorgan's Hydrogen Research Unit also has a number of world-leading pilot-scale biohydrogen projects under way. Working with the University at the centre, companies will be able to research, develop and demonstrate hydrogen-related products and technologies. This has the potential to generate new, highly skilled jobs in an emerging hydrogen economy.

Hydrogen provides a potential solution to a number of the most significant energy challenges that we face today and can therefore help to address climate change and reduce our dependency on fossil fuels. Wales is one of the leaders in researching the development of technology, and I am most impressed at the level of technology and expertise in this field that exists in the centre.

Rhodri Morgan
First Minister for Wales

www.h2wales.org.uk

Model patient to assist in medical teaching at Cardiff

A SOPHISTICATED NEW simulation centre at Cardiff University is allowing School of Medicine students to learn, rehearse and perfect procedures in anaesthesia, intensive care and treating sick patients.

The Cardiff University Simulation Centre, sponsored by Welsh company Flexicare, includes an interactive human patient simulator, nicknamed Brad by students because of its American accent.

Teaching is video recorded, allowing students to review and develop their skills.

It was opened in July by the Welsh Assembly Government Minister for Health and Social Services, Edwina Hart.

Mrs Hart met with fourth-year university medical students, who demonstrated using the simulator to learn how to manage a patient with a major haemorrhage.



In addition to the huge advances that have been made in treatments and facilities, developments such as this one at Cardiff University show how the teaching of healthcare staff has changed over time. The increasing complexity of healthcare along with appreciation of patients' rights means that it is no longer acceptable to 'practise' on patients, and simulators will play a vital role in the teaching of all healthcare staff in the future.

Edwina Hart
Welsh Assembly Government
Minister for Health and Social
Services


www.cardiff.ac.uk

... Company collects prizes for monkeying around ...

A South Wales company has continued its award-winning trend with two new prizes

BAMBA, A CUTE TOY MONKEY who's encouraging babies to communicate by sign language, is helping his creators win a raft of awards.

Yvonne Bruton-Miller and Amanda Rees – experienced speech and language therapists from Carmarthen, South Wales, who together form The Baby Sign Factory Ltd – only launched their baby signing kits in May this year.

Recently, it has won them an Innovation in Business South Wales Business Award and the Playtime Product of the Year in the Baby and Child Retailer Awards.

Earlier this year, it won a special recognition award from the British Female Inventors and Innovators Network and a Practical Pre-School silver award.

Although Yvonne and Amanda have used signing professionally for the past 20 years to help people with communication difficulties, they have also seen babies without any difficulties reap the benefits from signing. Bamba's First Comforts has been designed to reduce frustration and promote talking and bonding between parent and child, with long-term educational benefits.

Teaching babies a co-ordinated hand movement entrains the related speech mechanism so that babies exposed to signing speak earlier. Babies naturally use signs from the age of four months (e.g. they raise their hands to mean 'pick me up'). They point to objects of interest from

nine months. Typically, babies will use their first spoken word at around 12 months whereas babies exposed to simple signing can say their first word at eight months while also using several more signs.

The Baby Sign Factory received support from the Welsh Assembly Government's Wales Innovators Network to turn its idea into a commercial proposition.

The signing kit comprises specially designed toys including a blanket,

mirror, flannel, spoon and bottle and Bamba the monkey, all made from soft fabric. A simple sign is used for each accessory (e.g. the blanket represents sleep and the corresponding sign would be a hand resting on the side of the face).

There has been a tremendous interest in helping babies learn to use sign language and it has become increasingly popular over the past

five years. There are over 200 baby signing classes in the UK to help parents, as well as numerous books and DVDs on the subject.



As therapists and parents ourselves, we know that signing with babies works. Babies are immediately captivated by signs and speaking skills emerge alongside. We like the idea that our toy is not just for play time but has benefits throughout the day.

Yvonne Bruton-Miller


www.babysignfactory.com



■ ■ ■ Welsh contribution to first global science park group ■ ■ ■

The Welsh network of Technium® centres has become part of the world's first international science park collaboration

IN A CEREMONY at Swansea's flagship Technium® centre, Technium® Director Dr Steve Davies met representatives from the German city of Ulm and the Korean enterprise city of Jeju to form an international collaboration project designed to promote the sharing of both technology expertise and business opportunities among the three countries.

The International Science Park agreement is an opportunity for start-up and inward-investing science and technology businesses at Technium® to widen global networks and develop a system that will help aid research and development, marketing, new market development, production opportunities and locating overseas partners.

The agreement will also look to

encourage educational institutions, such as Swansea University, to work closely with their peers in each partner region. Negotiations with science parks in other countries are also under consideration for the possible formation of a World Science Park Alliance.

Referred to as Germany's 'Science City',

Ulm is the birthplace of Albert Einstein. Jeju Development Centre is located on Jeju island, off the south-west coast of the Korean peninsula, and boasts a major science park with a world-class technology and business infrastructure.



The Welsh Assembly Government already works with Welsh companies, actively helping and supporting them to trade internationally. This Memorandum of Understanding is a further boost to this work, and will help to open doors for businesses looking to access new markets or find overseas partners for collaboration.

Ieuan Wyn Jones
Deputy First Minister for Wales
and Minister for the Economy and Transport



www.technium.co.uk



Wales has developed resources and networks ideal for enabling innovation in optoelectronics, First Minister for Wales Rhodri Morgan told attendees at conferences on remote sensing and security and defence, sponsored by SPIE Europe, at the University of Wales Institute, Cardiff, in September.

In his talk at the conference opening session, Rhodri Morgan told how Technium® OpTIC – 'one of the jewels in the crown' of Wales's Technium® business incubation and support centres – and the universities and industry throughout Wales have demonstrated the ability to work together and move quickly, to the benefit of industry and investors.

In all, 750 researchers and innovators from around the world attended technical sessions and an exhibition showcasing photonics applications developments for the defence industry.

SPIE Europe, headquartered in Cardiff, is a European-based extension of SPIE, an international educational not-for-profit optics and photonics professional society advancing light-based technologies. SPIE Europe annually presents several symposia comprising conferences, exhibitions, courses and workshops as well as other membership, educational and industry forums throughout Europe.

www.spie.org

Investment boost for medical learning

A **CARDIFF UNIVERSITY** medical learning spin-out venture has received an investment boost of £250,000.

Fusion IP, the university intellectual property commercialisation company that turns university research into business, has co-invested £75,000 in MedaPhor Ltd, a spin-out company from Cardiff University that produces innovative training products for post-graduate medical professionals.

MedaPhor has also received £75,000 from Finance Wales and funding from the Welsh Assembly Government.

The company is developing a portable ultrasound simulator that enables ultrasound training of physicians to take place without utilising ultrasound machines, which are in heavy demand, or volunteer patients. The ultrasound simulator enables trainees to perform virtual reality gynaecological ultrasound examinations, using a virtual probe that conveys the realistic sensation of contact with a live body. This technology will



reduce the hands-on patient contact required to achieve full competence.

Roger Fickling, Chief Executive Officer of MedaPhor, said: 'There is currently a global shortage of trained ultrasound practitioners and, as a result, effective ultrasound training that doesn't require the use of a hospital ultrasound machine is in strong demand.'

The simulator is expected to be launched commercially into the UK and US markets in 2009.



MedaPhor is attracting significant recognition for its portable ultrasound simulator for physician training, and is a good example of the innovative technologies that are originating from Cardiff University.

David Baynes
Chief Executive Officer
Fusion IP



www.medaphor.com

■■■ Help for those who can't hold their drink ■■■

A South Wales-based company is launching a marketing campaign targeting its innovative product to the London market

FOLLOWING SUCCESS IN WALES, Guardian Drinks Holders Ltd is taking its innovative drinks holder to the London market to improve safety in pubs and clubs.

Cousins Dean and Luke Andrews designed and developed the Guardian Drinks Holder after Luke's drink was spiked when he left it unattended in a club.

The drinks holder can be fitted in restrooms in pubs and clubs, enabling people to take their drinks with them rather than leave them unattended.

Dean and Luke received support from the Wales Innovators Network (WIN) to develop their product commercially. It had previously won

a gold medal at the British Inventors Show 2005 and a silver medal at the Expo International Inventors Show in Geneva in 2006.

Strong and robust, the holders are injection moulded and made with a very specific blend of tough, fire-resistant, glass-filled nylon, PVC and ABS plastic, incorporating antibacterial technology developed by SteriTouch of Abertilly (also a WIN-supported project). They also offer an innovative advertising and marketing medium.

Their manufacturing unit in Cardiff has been set up to produce 6000 holders a week. Guardian Drinks Holders Ltd has already had considerable success in South Wales

and the West of England, where the holders have been adopted by J. D. Wetherspoons, Nexum Leisure and Novus Leisure, as well as a number of privately owned pubs and clubs.



It's taken us about three years to get from the prototype stage through a trials period to manufacturing, which is much faster than we anticipated. The help and support we had from WIN was very useful and now we hope to open an office in London to target that market.

Luke Andrews



www.guardiandrinks.co.uk

■ ■ ■ Swansea University in land speed record-breaking attempt ■ ■ ■

ENGINEERS AND RESEARCHERS at Swansea University have joined forces with a team of scientists led by Richard Noble OBE for a science and engineering adventure that will result in taking the world land speed record to 1000 mph.

Known as The BLOODHOUND Project, the partnership will result in three incremental world land speed record-breaking attempts over a three-year period from 2009.

It has been designed to inspire more young people across the UK to take up engineering, science, technology and mathematics subjects, thereby engaging a new generation of science and engineering talent.

The BLOODHOUND SSC (supersonic car) will be driven by wing commander Andy Green, who set the current world land speed record of 763 mph in 1997.

The new car, which measures 12.8m in length and weighs 6.4 tonnes, will travel at five times the speed of a Formula One car. It will feature 900-mm wheels required to spin at up to 10,000 revolutions per minute and which will be subject to 50,000 times the force of gravity at the rim when in motion.

Richard Noble OBE (pictured), Project Director, said: 'There has never been anything like BLOODHOUND SSC before. It is undoubtedly the most stimulating and challenging programme I've ever been involved with.'

Swansea University, through its multidisciplinary and innovative engineering technology, is at the heart of the project. BLOODHOUND SSC is being aerodynamically designed by Swansea's School of Engineering experts, who have pioneered computational fluid dynamics (CFD) software for this purpose. Research at

Swansea's School of Environment and Society has identified potential test sites for the record attempt, and staff members from the University's Institute of Innovation are working as BLOODHOUND design engineers on vehicle design and engineering management.

The CFD technology can simulate on a computer the aerodynamic flows that affect the vehicle at extreme speeds and can predict how it will perform under extreme conditions. These predictions will then be used to optimise the aerodynamic design of the supersonic car, thereby helping achieve the 1000 mph target.



Engineering has been strong at Swansea University since our foundation in 1920. We are delighted to be involved in promoting engineering and science through this challenging and high-profile project.

Professor Richard B. Davies
Vice Chancellor
Swansea University



www.bloodhoundssc.swan.ac.uk

Newport scientist warns of tsunami risk to UK

BRITAIN COULD BE AT RISK from tsunami, according to an expert in oceanography at the University of Wales, Newport.

Following publication in an international journal, Professor Simon Haslett's findings were recently presented on television in the BBC's *Timewatch* series.

His research, carried out with Australian tsunami expert Professor Ted Bryant, examined 21 events associated with earthquakes to hit Britain over the past 1000 years.

Professor Haslett is the director of the newly established Centre for Excellence in Learning and Teaching (CELT) at Newport's university. He has been researching British tsunami with Professor Bryant since they developed the theory in 2002 that a

devastating coastal flood that occurred in the Bristol Channel in 1607, killing around 2000 people, was caused by a tsunami.

He explained that these 'forgotten floods' may not all have necessarily been tsunami, but the association of many of them to known tsunami causes (e.g. earthquakes) supports the researchers' interpretation.



Tsunami strike British shores more frequently than previously considered. They have caused damage and loss of life in the past, and pose a future threat, particularly as a consequence of climate change.

Professor Simon Haslett



www.newport.ac.uk

■ ■ ■ Cardiff expertise for New Zealand bridge ■ ■ ■

A DESIGN SUBMITTED by a team including Hyder Consulting, which has an office in Cardiff, has been selected for the construction of a landmark bridge project in New Zealand.

The team, which also included Denton Corker Marshall and Kenneth Grubb Associates, celebrated as the design for the Te Wero Bridge won an international competition held by Auckland City Council.

The winning design is a twin-leaf bascule bridge. It comprises a mast structure, for which the Cardiff office

provided technical input, that houses counterweights and a control room.

Rod James, director of transportation from Hyder's office in New Zealand, said: 'We are delighted to be involved with what we believe will become an international icon for Auckland.'

The bridge will be located in a site surrounded by tall structures, so the winning solution required strong visual impact – large in scale, bold in form and clearly identifiable from its surroundings.

The bridge is scheduled for completion in 2011–12.



The judging panel agreed that this striking submission stood out from others in respect of its high level of design innovation and the unique way the twin leaves open.

Professor John Hunt
Chair of the judging panel
Auckland University School of
Architecture



www.hyderconsulting.com

At a glance...

Technology venture **IQE** has reported a boost in sales and profits in the first half of the year. The South Wales-based supplier of advanced wafer products and wafer services said its sales in the first six months of 2008 were up by 27% to £30.2m. IQE said that growth was largely down to continuing focus on high-speed wireless communications.

A year-long online festival that will showcase the work of digital artists worldwide has been launched by the **University of Wales, Newport**. The International Festival of Digital Arts will celebrate the best the world has to offer in the fields of audio, video and photographic excellence. It will culminate in an awards ceremony in October 2009.

Six firms from Wales, and others with close ties, have been featured in the latest 'Clean Tech 100' survey of the top 100 companies in Europe for clean technology. Bangor-based **DeepStream Technologies Ltd** was second overall in the list, and **Atraverda Ltd** was placed tenth.

South Wales-based **Atraverda Ltd** has made a key appointment to its senior management team, with Dr George Brilmyer coming on board as Vice President, North American Business Development. He joins Atraverda, an advanced materials company which is developing the world's first commercially viable bipolar lead-acid battery using its patented Ebonex® technology, from Daramic, with over 28 years' R&D experience in batteries, fuel cells, electroplating and corrosion engineering.

Ninety delegates from 16 countries headed to Cardiff in September for the World Intellectual Property Organisation's annual two-day forum, hosted by the **Welsh Assembly Government**. The forum has only been organised outside of Geneva on two previous occasions and it is the first time it has been held in Wales. Delegates were welcomed by First Minister for Wales Rhodri Morgan and heard an opening address by Baroness Morgan of Drefelin, parliamentary under-secretary of state for Intellectual Property and Quality.

Deputy First Minister for Wales and Minister for the Economy and Transport, Ieuan Wyn Jones, recently visited South Wales-based medical research company **GE Healthcare** (featured in *Advances Wales* issue 57). He engaged in active discussion about the economic benefit resulting from activity at the site, and also learned about GE Healthcare's vision for a broader, more efficient model of healthcare, based upon understanding, diagnosing and treating disease at the earliest possible point in time.

A carbon-neutral power station that would provide electricity for 50,000 homes is being planned in Newport, South Wales. **Welsh Power Ltd** has submitted the proposals to build the £140m power station to Newport Council. It would use biomass fuels comprising a mix of primarily wood chip and energy crops.

Leading us into a new era of science



Fabrice Coffrini/AFP/Getty Images

From humble beginnings in Aberdare, South Wales, physicist Dr Lyn Evans hopes to unravel the mysteries of the universe as he oversees the most complex scientific experiment ever



The giant magnet, weighing 1920 tonnes (equivalent to five jumbo jets), which forms part of the LHC (Jean-Pierre Clatot/AFP/Getty Images)

Dr Lyn Evans is the project leader of the Large Hadron Collider (LHC) at the European Nuclear Research Organisation (CERN) in Geneva, in other words the figurehead for the world's largest scientific experiment. But the LHC is not just one experiment – it's a facility for the next 20 years – and Dr Evans has been with it all the way, from conception to construction.

CERN's LHC is a huge global investment. It is funded by and built in collaboration with over 10,000 scientists and engineers from over 100 countries. So far, its cost has been equivalent to one-quarter of that required for the 2008 Beijing Olympics. Dr Evans calls it 'a tremendous responsibility and honour' to be in charge, and is extremely excited that the universe will be explored like never before. 'The LHC project will be at the forefront of science for the next 20 years,' he remarks. 'It is the real frontier of our knowledge.'

Discovering the unknown

The LHC particle accelerator collides opposing beams of protons, each moving at just under the speed of light. It is all contained within a huge 27-km-long tunnel underneath the Franco-Swiss border near Geneva. Dr Evans has hailed the LHC as 'the most sophisticated scientific instrument of our time'.

It is hoped that the collider will produce the Higgs boson, a previously unobserved particle, which will help to answer questions that have eluded physicists for years,

“Science has always been my passion. I used to be able to recite all the Nobel prize winners – now I know 10 of them in person.”

Dr Lyn Evans

as well as discovering, for example, the number of space dimensions in which we live and the nature of dark matter.

Dr Evans compares the importance of the LHC, in terms of its contribution to scientific discovery, to that of the Hubble space telescope – the facilities complement each other as they both look back in time to ascertain how the universe was created. The LHC does this by recreating miniature big bangs, while the Hubble is establishing the prevalence of black holes in galaxies and determining the rate of expansion of the universe.

When the first beam of the LHC was activated in September, the experiment created headlines, with apocalyptic critics proclaiming that it would bring about a tremendous big bang and end the world. But, far from being a ‘doomsday professor’, Lyn Evans is a prominent and inspiring Welsh scientist who, even only 18 months away from retirement, has put no limits on what he hopes to achieve.

Making history

Dr Evans, 63, hails from a coalmining family from Cwmbach, South Wales. He attended Aberdare Grammar School, then studied a degree in physics at Swansea University. Following that, he gained a PhD in physics, also at Swansea, on the topic of high-powered lasers. In 1969, he visited CERN in Geneva as a fellow for three months – and has remained there ever since.

It wasn't until 1971 that he became involved in particle physics, when he worked on the super proton synchrotron project at CERN. Particle accelerators then became his chosen specialty. In the 1980s, he was a key participant in the proton and antiproton collider project, which was instrumental in forming the groundwork for work led by the winners of the 1984 Nobel Prize for Physics.

Dr Evans's work at CERN has given him tremendous opportunities. He has now overseen the LHC experiment for 14 years, involving a variety of work, including international travel to source funding, commissioning, management and, now, lecturing.

Team players

First Minister for Wales Rhodri Morgan has praised Dr Evans for being an inspirational figure who represents Wales internationally. ‘I believe his success at CERN will be an inspiration to young Welsh scientists and engineers,’ he remarks. ‘I'm proud



First Minister for Wales Rhodri Morgan signs CERN's Golden Book, accompanied by Dr Lyn Evans (left) and Robert Aymar, CERN Director General (right)

that Wales is playing such a key part through Dr Evans. He has a brilliant scientific mind, which I'm delighted to say has been nurtured throughout the Welsh educational system.’ Dr Evans

“Welsh people are pragmatic, easy to get on with and have a great team spirit. This puts us in good stead for being involved in international collaborations and organisations such as the LHC at CERN.”

Dr Lyn Evans

himself is in high praise of the education system in Wales. ‘Wales has an excellent level of education, and always has done,’ he says.

So what would Dr Evans's advice be to young scientists in Wales today, who hope to achieve what he has? ‘You have the education,’ he assures, ‘now believe in yourself.’ Evans is concerned about the lack of scientists in Europe, particularly in industry, and hopes the LHC project will help to bring about a change by exciting young people about science.

Working in an organisation like CERN, involving people from numerous countries, nationality loses some significance; but, says Dr Evans, his Welsh identity has never been lost completely, and he is proud to represent Wales internationally. He praises the Welsh for being great team players (as demonstrated by, for example, rugby and choral singing) and believes this can lead Wales to success in science and beyond.

He is an honorary fellow of Swansea University, which, apart from a free dinner every year, allows him to keep in touch with the university, and with Wales generally. It is a connection that Wales should never want to lose; after all, it is a Welshman who is key to bringing science into an exciting new era in the 21st century. ■ ■ ■

www.cern.ch

A crafty piece of work

Is it a boat? Is it a submersible? Scubacraft is a new generation entirely of water craft, developed by North Wales-based Creative Worldwide

All present-day leisure submersibles are designed specifically for underwater operation; they all require specialist facilities to be operated and none has the ability to plane at speed on the surface.

However, a new water craft designed and developed by Creative Worldwide Ltd, based in North Wales, has the ability to do both. Scubacraft is capable of travelling at speed on the water surface, directly to a dive location, where it can transform into a free-flooding, self-contained hydrodynamic flying machine.

Scubacraft is a 'wet submersible'; that is, it fills with water before submerging. This reduces the complexity and overall



weight of the craft, therefore allowing it to be light enough to travel at speed on the surface.

Scubacraft combines high performance on the surface with the ability to submerge under water, and features patented technology that enables multiple dive capability with full hydrodynamic control. It has been designed to greatly enhance self-contained underwater breathing apparatus (scuba) diving freedom, range and endurance.

The scaleable technology allows for future developments of both smaller and larger variants of Scubacraft. Creative Worldwide has outlined a £1 million investment proposal to take the product to market and has already identified half of the investment required.



Testing under water

The company has just completed an industrial research project, supported by EU Objective 1 funding from the Welsh Assembly Government, in which a full-scale prototype was built and tested both on and under water. The prototype is seen pictured here for the first time.

The underwater testing phase was completed in association with Pinewood Studios in Buckinghamshire, England, at the Underwater Stage, providing an unrivalled facility to capture Scubacraft in its element. The craft successfully demonstrated its hydrodynamic control and ability to transform from a boat into a submersible by controlled inflation and deflation of the main hull tubes.

Buoyancy technology

Creative Worldwide has developed a highly efficient, robust, lightweight, low-cost and scaleable buoyancy system that overcomes the barriers to commercial success of present-day submersibles by using innovative buoyancy technology, which involves the unique application of inflatable tubes

inside a ventilated rigid hull structure. These tubes can be seen in detail in the image at the top of this page: each yellow tube that runs up the length of each outer hull is made of two chambers, which are inflated and deflated as required.

In order to submerge Scubacraft, the tubes are deflated, water enters the open transom and ventilations, and the craft sinks down into the water, where underwater propulsion is provided by the electric thrusters. In order to resurface Scubacraft, the main hull tubes are inflated, and, as they inflate, water is evacuated through the hull openings, raising the craft back onto the surface. The hull is designed as an active structure, with the tubes providing tremendous structural rigidity when inflated to pressure, allowing the craft to race along the water surface.



Photograph by Phoebe Rudomino/Pinewood Studios

Scubacraft is powered by a 1498 cc engine that produces 165 hp. This power is harnessed by the advanced twin-tunnel hull that provides low-speed stability and high-speed dynamic lift for a jet-powered, air-cushioned ride at speeds of over 50 mph.

Diving and more

Wherever there is scuba diving, there is an application for Scubacraft. For recreational diving, it makes getting under water easier for the older generation, the less able-bodied or those wanting to experience scuba diving for the first time. People can relax as it transports them under water, and, due to its unique technology, it is not limited to the range normally associated with operating submarines because it can achieve high speeds on the water surface. Within scuba diving clubs and groups, Scubacraft offers

a quicker way to get to the dive location, enabling divers to swim off and explore a wreck whilst Scubacraft is parked outside. Hotel and diving resorts have already seen an opportunity to gain competitive advantage and generate revenue by offering underwater adventure tours on Scubacraft.

Scubacraft also allows marine biologists greater access to recording and monitoring marine ecosystems. When fitted with a downward-facing camera, it is possible to record large areas of marine habitat in a single outing.

It also presents a platform that will meet the requirements for undersea inspection and maintenance, reducing turnaround times when inspecting underwater facilities and allowing greater flexibility in transporting equipment and tools.

The craft can assist in achieving the increased security levels in shipping ports as prescribed by the International Maritime Organization. It has become necessary to inspect both harbour facilities under water and also to scan visiting ships' hulls beneath the water line – this can be done easily and safely with Scubacraft.

Creative Worldwide has developed Scubacraft from concept to reality, and aims to become a world leader in water craft technology. ■

“Superyacht accessory, undersea inspection and maintenance, shipping ports, marine biology and conservation, coastal patrol and enforcement are all potential markets where the benefits and advantages of Scubacraft are clear. There is simply no competition.”

Robin Harris
Managing Director
Creative Worldwide Ltd

Profile

Product Scubacraft underwater and surface water craft
Applications Diving, marine conservation, port inspection, rescue services
Contact Robin Harris, Managing Director, Creative Worldwide Ltd, Caernynach, Rhosgoch, Anglesey LL66 0AY, UK
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For more information please circle 5801 on the reader reply card

Listen closely to save water

Halma Water Management, based in South Wales, is developing the latest technology to use acoustic noise logging for managing leakage in water networks

We all know there's nothing more annoying than the sound of a dripping tap. But the noise made by water escaping through underground pipes has come in very useful for one South Wales-based company that has developed an advanced solution to the unnecessary and costly problem of water leakage – much to the delight of city authorities all over the world, including those in Las Vegas and Hong Kong.

Halma Water Management (a division of Palmer Environmental Ltd) is a global supplier of leak detection and pressure control technology. Its Permalog® series of acoustic noise loggers enables water suppliers to reduce leakage costs effectively, and to maintain these low levels at minimal cost. They are now considered standard pieces of equipment for leak detection.

Permalog+® is the latest incarnation in the Permalog® range. It is the company's most advanced intelligent noise logger yet, designed for deployment to survey large areas of water network quickly and effectively.

Since its launch, 40,000 Permalog+® units have been sold, bringing the total number of Permalog® noise loggers monitoring water networks throughout the world to over 200,000.

Noisy leaks

Permalog+® units are deployed in areas

of the distribution system to provide continuous monitoring of leakage. Easily installed on pipe fittings, they are retained in place by a strong magnet and are battery powered for up to five years. They can be placed permanently or moved from site to site, and cause no interruption to water supply. Loggers are immersion tested and will continue to operate even in flooded chambers, requiring no maintenance.

Each logger listens for leak noise, and as soon as a possible leak is detected the unit enters an alarm state and transmits a radio signal to indicate a 'leak' condition, using a unique mathematical algorithm. Permalog+® features a special mode called 'Aqualog' that records noise at preset

intervals over an extended period of time. Noise trends identified can then be presented in graph format, enabling the user to distinguish clearly between leak and non-leak noise.

Following a rise in unaccounted-for water, or at standard intervals, a leakage patrol can be carried out in the area using the accompanying 'drive-by' module, which identifies the location of units in 'leak' mode and thereby the approximate position of the leaks. Permalog+® can also be used with the company's PermaNet



Profile

Product

Permalog+® advanced leak noise logger

Applications

Leak detection and water management

Contact

Justin Robinson, Business Development Manager, Halma Water Management, Ty Coch House, Llantarnam Park Way, Cwmbran NP44 3AW, UK

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For more information please circle 5802 on the reader reply card

system – a permanent, fixed network of loggers in which leak data are automatically transmitted to an office computer or mobile phone via radio or low-cost SMS technology.

Data from those loggers in 'leak' mode are printed out or downloaded, enabling correlation to be concentrated on areas of interest. Halma Water Management also designs and manufactures a wide range of accompanying correlators designed to pinpoint the precise location of the leak (in fact, the company designed one of the world's first correlators back in 1979). The correlator measures the time taken for the leak noise to reach two sensors positioned on different parts of the pipe and processes these data through a mathematical algorithm to determine the exact location of the leak.

More effective

Much of the innovation with the Permalog® system is focused on improving the efficiency of leak detection, in addition to functional performance enhancements such as the innovative 'Aqualog' mode. As a result, leak detection is more effective and faster than ever, at a time when it is most needed.

Recent developments have also led to the introduction of low-cost automatic meter-reading technology that transmits data to the same 'drive-by' patroller equipment used to receive information from the Permalogs. This innovative step of combining leak detection via noise logging with automatic meter reading will enable water companies to read every meter on a street and simultaneously identify leaks simply by driving down the road.

Beijing Olympics

Recently, Halma Water Management was contracted to supply a leak detection network in the mains water system of the Chinese capital of Beijing. Many of the city's water pipes are large, metallic systems that can suffer serious problems if any

bursts occur. The company's system, however, helped to prevent any pipe bursts or flow problems during the prestigious Olympic Games this summer.

Part of this project involved installing over 3000 Permalog® loggers throughout Beijing's municipal water

“The Permalog® water network leakage detection system is a leading system in the world... this project is helping to make Beijing's water network as advanced as any other city's in the world.”

Wang Yaowen
Chief Engineer
Beijing Water Group

supply. In addition to Olympic locations, Tiananmen, Zhongnanhai, Wangfujing and other key regions are now within the monitoring zone.

This water management system has enabled the local water authorities to dramatically reduce leakage in the area, a strategy that is in line with national policies to aid water conservation. The network has enabled the engineers to pinpoint leaks quickly, so they can be fixed before developing into major incidents. The drive-by feature also means that water companies can greatly reduce the time taken to investigate areas of the distribution network, which has proved particularly effective in the busy metropolis of Beijing.

As the Chinese proverb goes, constant dripping wears away the stone. Halma Water Management's technology will soon put a stop to that. ■



They will rock you

Intellection's laboratory in North Wales provides sophisticated automated mineral analysis technology for the oil and gas industry

Mineralogy – an earth science focused on the crystal structure, chemistry and physical properties of minerals – has advanced quickly over recent years, with new experimental techniques and more sophisticated technology in use and development. Mineralogy is of particular benefit to the oil and gas industry, as the analytical data produced are fundamental for use in decision-making by related companies, interest groups and government bodies.

Intellection UK Ltd provides solutions for the quantitative analysis of minerals, rocks, metals and other compounds. The company has been able to develop its innovative technology through a better understanding of the challenges of mineralogy in exploration, rehabilitation, environmental monitoring and process control.

The company's automated mineral analysis laboratory in Abergele, North

Wales, is home to its flagship technology, QEMSCAN® automated mineralogy instruments, which provide unique insights into rock texture, type and mineral content from cuttings, cores or polished thin-sections. Based on a combination of advanced computer-controlled scanning electron microscope and energy-dispersive X-ray spectrometer technology, QEMSCAN® measures and identifies thousands of points in a sample in just seconds, providing statistically sound results unmatched by any other analytical technique. QEMSCAN® is a non-destructive analysis process that complements other approaches, providing an unparalleled level of information for geoscientists working in the upstream oil and gas industry.

On-site analysis

A significant development of Intellection's QEMSCAN® technology is the new



'ruggedised' system, launched earlier this year. QEMSCAN® can now be used on location (e.g. at oil and gas exploration camps, mine sites, quarries and coal-processing facilities), improving processes and productivity. On-site technicians can carry out routine sample measurements and produce a set of standard reports,

“We are a technology company with a unique product, but technology must evolve and adapt. We want QEMSCAN® not only in purpose-built laboratories around the world but also closer to the action, out in the field, allowing our clients to make the right decisions even faster.”

Dr Wendy Kitson
Business Development Manager
Intellection UK Ltd



while data are still available for further detailed processing back at head office.

Strong but sensitive

The new 'ruggedised' QEMSCAN® is the only automated mineralogy system in the world that is specifically made for industrial applications in production locations. It is fully transportable – the entire system folds and packs into a series of tough road cases. The industrial-strength design of the electronics and software allows for unattended measurement, 24/7.

At the same time, it is capable of locating grains and particles as small as 0.25 µm and providing quantitative results on grains or particles as small as 1 µm. It is able to analyse minerals and particles from a wide range of applications including coal, base metals, precious metals, metallurgical products and lithotyping from drill cuttings.

Other uses for mineralogy

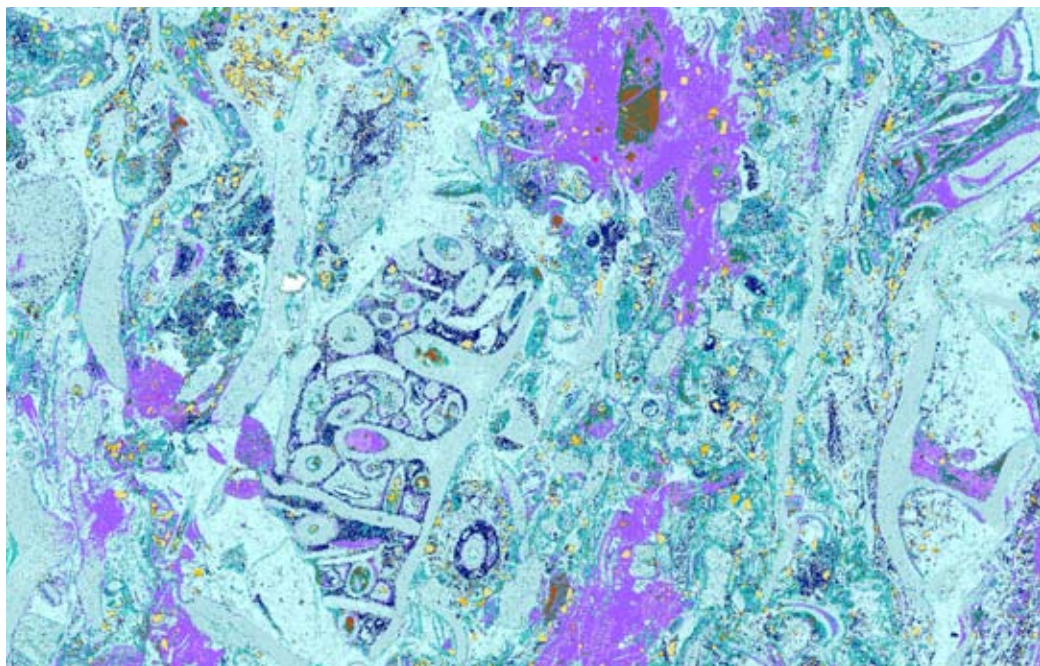
At Intellection's North Wales laboratory, QEMSCAN® is used to characterise hundreds of cuttings particles in a matter of minutes, a process which is difficult, time-consuming and expensive using traditional techniques. As the system matches mineralogy with rock textures for each cuttings grain, a process called lithotyping, populations of particles can be identified and quantified – all from material that is routinely collected but which is often undervalued. As Dr Wendy Kitson, Business Development Manager at Intellection, says, 'We can offer our customers a real alternative to cutting core when drilling a well, saving them time and many thousands of pounds.'

As testament to its versatility, another application area of the QEMSCAN® system is forensic geology, in which it is used to assist in solving crimes. For instance, soil material transferred to a suspect's footwear can be mineralogically characterised in detail and compared with soils from the crime scene and control sites, allowing an evidential link between the suspect and the crime scene to be established or discounted. ■

Profile

Product	QEMSCAN® automated mineralogy instruments
Applications	Mineral analysis, primarily for the oil and gas industry, forensic geology
Contact	Dr Wendy Kitson, Business Development Manager, Intellection UK Ltd, North Wales Business Park, Abergele, Conwy LL22 8LJ, UK Tel +44 (0)1745 833950, email wendy.kitson@intellectioncorp.com, web www.intellectioncorp.com

For more information please circle 5803 on the reader reply card



Images of rock samples generated from QEMSCAN® analysis. The colours represent different minerals. Above, bioclastic limestone; below, mixed clastic and carbonate

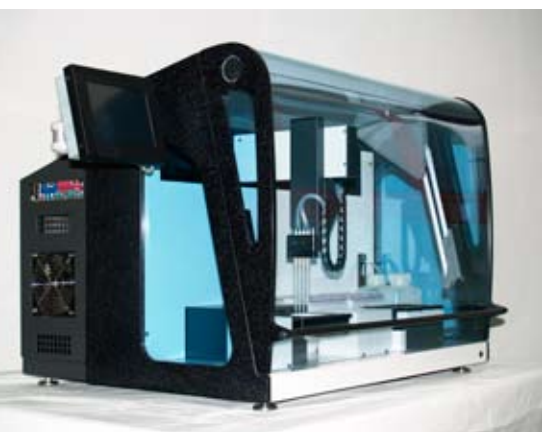


Eliminating human error from biotech

A North Wales-based company is using state-of-the-art electronics and computer-aided design software to develop innovative robotic instruments for biotechnology laboratories around the world

In 1999, a small electronics company in North Wales was asked to develop a robotic instrument to automate a DNA-based test to aid the matching of donors in a potential transplant situation.

As the company grew over the years, so did its collective expertise in developing innovative robotic instruments. To date, Bee Robotics Ltd has supplied over 700 advanced robotic instruments worldwide for the biotechnology and molecular field, for applications including histocompatibility testing, allergy testing and detection of infectious diseases.



The automated microplate processor

Automated microplate processor

In microtechnology, there has been a movement towards using microarrays, so that more information can be available for a particular test performed on patients. Fewer or smaller quantities of reagents are also used, which means that less waste is produced during the assay procedure. Several diagnostic kit manufacturers are looking at microarrays as their next platform for automating their diagnostic kits.

In keeping up with this advance, Bee Robotics' latest product is an automated microplate processor, which has been designed to automate the processing of microarrays in a standard microplate well. With previous technologies, the interpretation was often done by eye, leading to potential problems resulting from human error.

The automated microplate processor offers an innovative dispense tip collection and ejection system for sample and reagent processing, with aspiration to deal with removing waste reagent. Using state-of-the-art electronics, several stepper motors are controlled using custom-built microstepping control boards, based on

“This product is a showcase for our ability to develop advanced instruments for the biotechnology and molecular market. Using the most advanced computer-aided design software and innovative electronics, we are well positioned to keep up with the developing microtechnology market.”

Steve Jones
Managing Director
Bee Robotics Ltd

the reliable CANbus system (an industrial network which allows microcontrollers and devices to communicate with each other) for precision movement of the mechanical components. The instrument has a highly accurate heating and cooling system, which controls the temperature of each well within the microplate to within 0.5°C. There is also an integral high-resolution camera system for automatic interpretation of the patient sample at the end of the assay. The instrument can be controlled via a user-friendly touch-screen.

DNA extraction

As part of its current product range, Bee Robotics has developed a high-throughput DNA extraction instrument and associated extraction kits for extracting DNA from whole blood, both of which complement the microplate processor, where DNA needs to be extracted for use with diagnostic kits processed on the new instrument. A smaller version for automating up to eight samples will be available in 2009, capable of automating difficult extractions from viruses and bacteria. ■

Profile

Product	Automated microplate processor
Applications	Accurate processing of microarrays
Contact	Steve Jones, Managing Director, Bee Robotics Ltd, Unit 32/33 Cibyn Industrial Estate, Caernarfon, Gwynedd LL55 2BD, UK Tel +44 (0)1286 672744, email steve@beerobotics.com , web www.beerobotics.com

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The future for vehicle oil filters

South Wales-based Futurgen has developed reusable polymer-based oil filters which benefit the environment by being five times more efficient than existing filtration products

Vehicle owners who are told that they should change their oil filter in their car whenever they change their oil (recommended every 10,000–12,000 miles) would probably claim that this is just another unnecessary driver's expense.

“The design goals of the filters include an increased separation rate, longer vehicle service intervals, less structural space, ease of maintenance, environmental friendliness and the reduction of parts and maintenance costs.”

Sergei Botov
Managing Director
Futurgen Ltd

Unfortunately, changing the oil filter is vital. It is key to protecting a vehicle's engine. It reduces contamination by removing large particles of dirt and carbon, but if it is not changed regularly

it can become clogged and lose its efficiency.

However, vehicle fluid filtration is costly and wasteful. Current systems do not remove acids, sulphur dioxides or any moisture, and particles are removed to between 15 and 23 μm .

To add to this, 60 million spent filters are disposed of every year, with a negative impact on the environment and public health. No company has previously developed a different filter design that resolves these issues.

Exclusive technology

Futurgen Ltd, based in Cardiff, has produced an innovative polymer-based range of oil and fuel filters, created using post-consumer recycled products.

Named the 'Botovs' range, after Ukrainian-born managing director Sergei Botov, the exclusive filtration technology has been developed internationally over a 10-year period, providing advantages in cost, performance and size.



Environmental benefits

Futurgen filters are 98% porous, which enables them to trap all contaminants and moisture. Using the whole filter volume, they remove particles down to 5 μm , and can be re-used up to four times, reducing the price to the end user by 75% and significantly increasing the life span of vehicle oil. They can be cleaned for further use and are 100% recyclable.

The system reduces hazardous waste, spent oil and filters sent to landfill and incinerator plants, and reduces emissions pumped into the atmosphere from the use of spent oil in power stations. Replacing paper with recycled plastic also saves vital areas of woodland.

Ultimately, Futurgen aims to build a world-class research unit to further develop its products and, based on the company's original filter design, it is estimated that future research and development will lead to an element size reduction of 50%.

Futurgen is positioned to become the UK market-leading supplier of polymer-based oil and fuel filters for diesel and petrol engines, hydraulic systems and other industrial applications. ■

Profile

Product	Reusable polymer-based oil and fuel filters
Applications	Filtering of vehicle oil for maximum engine efficiency
Contact	Sergei Botov, Managing Director, Futurgen Ltd, Unit A9a, Garth Works, Taffs Well, Cardiff CF15 7YF, UK Tel +44 (0)29 2081 3977, email info@futurgen.co.uk, web www.futurgen.eu

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Success of pop-up shelter is set in concrete



A humanitarian approach has taken two students and their innovative new concrete material to the frontline in Afghanistan

In 2004 two postgraduate students in industrial design and engineering entered a competition sponsored by the British Cement Association to find new and innovative uses for concrete. Their original idea was to create rapidly deployable hardened shelters that required only water and air for construction, for use in disaster zones.

Now, following four years of research and development (including trips to sites of devastation caused by Hurricane Katrina in America and visits to aid agencies in Uganda), the concept has matured into a technology that has applications far beyond emergency shelter.

The two students from London's Royal College of Art, Peter Brewin and Will Crawford, have formed a company called Concrete Canvas Ltd, based in Pontypridd, South Wales, which is developing a range of groundbreaking products using Concrete Cloth, the core material technology behind the shelters. The material has a large number of applications, including rapid roads and landing surfaces, underwater boat ramps, tunnel lining and ground stabilisation.

Concrete Cloth

Concrete Cloth is an innovative material that combines the flexibility of fabric with the structural performance of concrete.

It has been trialled by the British Army in Afghanistan as a method of reinforcing sandbag defences and, as a result, the company has recently been awarded a contract to supply 5500 m² of the material to the frontline. It solves a problem the army had to constantly battle with: repairs to frontline defences. A harsh environment (including wind and extreme temperatures), sand and incoming fire leads to the degradation of sandbags. Concrete Cloth, however, can be used on the sandbag wall, providing

“It wasn't until we travelled to Uganda and spoke to aid agencies that we realised the full potential of Concrete Canvas Shelters.”

Will Crawford
Co-founder
Concrete Canvas Ltd



Inside a Concrete Canvas Shelter

a durable and hard-wearing surface.

Concrete Cloth consists of a cement-impregnated fabric with a plastic backing on one surface. After the fabric is saturated with water (by being either sprayed or fully immersed in water), the material sets to form a hard, durable surface.

The material's strength stems from special fibres that form a reinforcing matrix within the cloth. These provide a stable failure mode, absorb energy and help to maintain the structural integrity of the concrete when impacted.

The PVC backing on one surface of the cloth provides a waterproof coating, but this is complemented by hydrophilic fibres on the opposite surface, which aid hydration by drawing water into the cement. As it is technically a ceramic, it is also fireproof. To add to this, it is easily portable, durable and chemically resistant.

Concrete Canvas Shelters

The shelters that provided the inspiration for developing Concrete Cloth are currently being developed in parallel



and the company hopes to have the production up and running in early 2009. There has been a huge amount of interest from the humanitarian and the defence sector alike and it is easy to see why.

Profile

Product	Concrete Cloth
Applications	Rapidly deployable hardened emergency shelters, reinforcing sandbag defences
Contact	Will Crawford, Co-founder, Concrete Canvas Ltd, Unit 3, Block A22, Severn Road, Treforest Industrial Estate, Pontypridd CF37 5SP, UK Tel +44 (0)845 680 1908, email will.crawford@concretcanvas.co.uk , web www.concretcanvas.co.uk

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The aid agencies and troops that help save lives in emergency situations require accommodation, field offices and medical clinics. Current solutions for these are either soft-skinned fabric tents (offering inadequate protection) or expensive, difficult to transport and time-consuming to assemble.

All of these disadvantages are overcome by Concrete Canvas Shelters. They provide much better environmental protection, increased security and improved medical capability. They can

be earth bermed (to protect against small arms fire and shrapnel), sterilised (for use as an operating theatre), secured with a hard shell and lockable door (protecting stores, equipment and personnel), insulated with earth or sandbags, or ventilated with windows cut out of the skin.

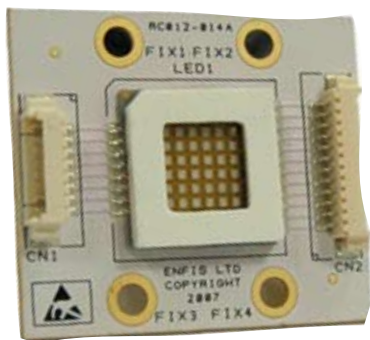
As a result, UNICEF, Médecins sans Frontières and ACTED (a non-governmental organisation in Afghanistan) are all interested in testing the shelters. ■



The leading light in energy efficiency

With its innovative LED technology, a South Wales-based company is leading the way in enabling smart, efficient solutions for solid-state lighting

Solid-state lighting (SSL, so called because it is made from a block of semiconductor material) is enjoying a surge in popularity in an energy-conscious world. Its use of light-emitting diodes (LEDs), rather than traditional fluorescent lamps or filament light bulbs, offers reduced heat generation and increased lifespan – and, ultimately, greatly improved energy efficiency. It is being used increasingly for display, entertainment and architectural lighting.



Enfis Ltd, a South Wales-based company which originally began as a spin-out of Swansea University in 2001, is a global leader in the design, development and manufacture of intelligent high-power LED arrays and smart light engines. That Swansea University has a long history of innovation in high-power devices and thermal management aspects of semiconductor devices makes it fitting that a successful company such as Enfis should evolve from this institution.

Enfis's unique range of plug-and-play 'straight from the box' light engine solutions are manufactured and sold around the world. The company's

“Enfis light engines and arrays are of a new breed designed to emit extremely high-power light from arrays of high-efficiency LED chips. Multiple wavelengths can be incorporated and controlled on a single array, making the Enfis LED light engine a truly differentiated concept.”

Shaun Oxenham
Chief Executive Officer
Enfis Ltd

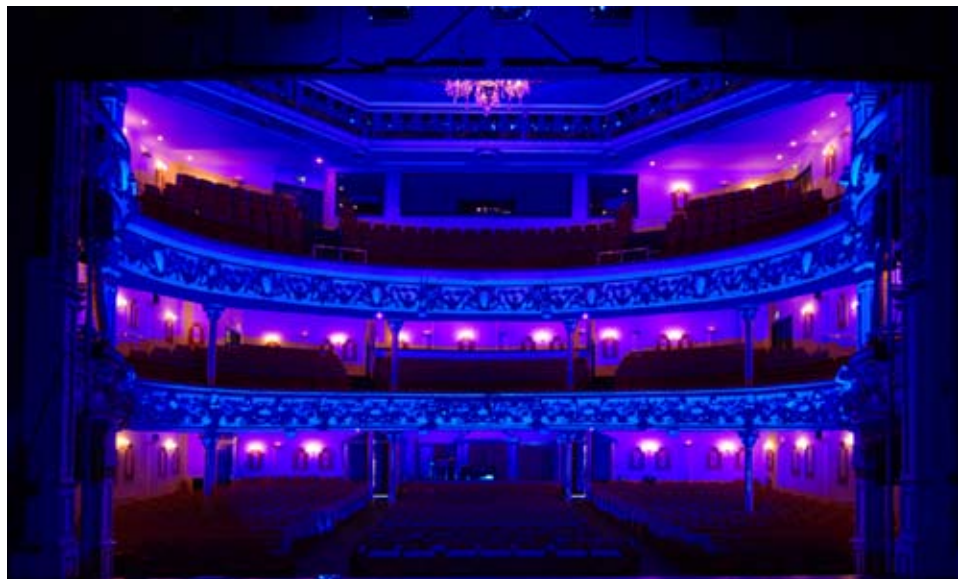


Enfis's products have illuminated (clockwise from top) Margam Castle, Oystermouth Castle, Swansea Waterfront Museum and Swansea Grand Theatre

patented technology has led to a number of contracts being awarded over the past year, accompanied by continuous financial success and growth.

Products: Uno and Quattro

Enfis's light engines are highly efficient. A complete system comprises an LED array, optics, thermal management, electronics and control software, and enables lighting designers to accelerate their time to market. The light engine provides a stable, intelligent platform for the design, development, testing and manufacturing of lighting systems.





Profile

Product Intelligent, high-power LED light engines and arrays
Applications Architectural, entertainment and general display lighting
Contact Enfis Ltd, Technium 2, King's Road, Swansea Waterfront, Swansea SA1 8PJ, UK
 Tel +44 (0)1792 485660, email info@enfis.com,
 web www.enfis.com

For more information please circle 5807 on the reader reply card

They are robust and lightweight, and billions of addressable light colours are available instantly. They come in two forms: Uno and Quattro.

The Uno has an emitting area of just 0.5 cm². Together with its four-channel variant, the Uno Plus, Enfis is already seeing significant demand for these products to satisfy requirements for specialist lighting applications, including lighting for entertainment and architectural applications together with requirements in the fields of industrial and medical illumination.

The Quattro and its compact variant, the Quattro Mini, fulfil the company's premium high-output product offering. Capable of running at power levels of 100–400 W and delivering unprecedented levels of light from a compact source, these products lead the world in the

field of high-power, efficient, flexible light sources. They can measure their own light output intelligently, taking into account the thermal load of the array to generate optimum performance and colour temperature. The unique combination of high-power, simple integration and smart array technology provides lighting designers with user-friendly, efficient, high-powered single- and multi-colour light sources. This product will enable a revolution in the market for architecture and entertainment lighting, in terms of both efficiency and capability.

The latest version of the Quattro is the world's brightest LED package – generating 12,000 lumens (the equivalent of 10 75-W light bulbs) from a single array.

Applications

Enfis has combined its patented thermal management technology with the numerous advantages of LEDs as light sources to



create highly efficient light engines for use in a number of challenging applications.

Enfis's light engines are particularly useful in medical applications. They are suitable for dermatological skin treatment devices, examination and surgical illumination, while in the dental environment they can be used in disinfection, dental curing, whitening and illumination devices.

The company's light engines have also been used in industry, in, for example, forensic sciences, adhesive curing, security and surveillance and non-destructive testing. They are also used for projection, and can be used in LCD backlighting for monitors in home, business, entertainment and military applications.

But the most exciting application must be in 'architainment' – the 'lighting up' of architecture for entertainment. Enfis products have illuminated a number of buildings across Wales (including, for example, Margam Castle and the Swansea Waterfront Museum) – visual proof that Enfis is lighting the way in Wales and beyond. ■



Taking the risk out of the roads



Imagitech's Roadmarque® system combines novel software technology with psychology research to measure risk factors in occupational drivers

Driving at work is an activity which has been shown to carry one of the highest risks of all activities that employees undertake. By 'driving at work' we do not just mean the 'white van man', but anyone who uses a vehicle in conjunction with their work.

Managing occupational road risk is an increasingly important business issue in light of new legislation that makes employers liable for the health and safety of those driving on work-related business. Around 1000 people are killed and 80,000 are seriously injured in work-related road collisions each year. In addition, 1 in 500 at-work drivers are driving whilst disqualified and 1 million drivers in the UK have nine points or more on their licence – facts which show the level of risk employers are facing.

A new software system, Roadmarque®, developed by software experts Imagitech Ltd, based in Swansea, South Wales, aims to

assess the road risk of employees who drive in connection with their work. It includes a psychometric assessment designed in conjunction with psychology experts at Swansea University, which aims to identify those drivers who are most at risk due to their attitude. Unlike any other driver assessment software available, this psychometric assessment is combined with a range of further assessments based on the driver profile, the vehicle driven and road knowledge, as well as abilities shown in the specifically designed test. The system also allows organisations to decide which assessments are most appropriate for their drivers – getting away from the 'one size fits all' approach.

“We have used our expertise in software development, combined with our knowledge of driver training, to produce a definitive and user-friendly risk assessment system. Roadmarque® offers the additional benefit of calculating an organisation's carbon footprint – a welcome addition as more companies look to improve their green credentials.”

Dr Gerhard Manogg
Director, Imagitech Ltd

Roadmarque® is designed to ensure that all drivers are fully risk assessed and appropriately licensed while driving at work. The system has been developed specifically for anybody who is responsible for workplace health and safety – in particular, fleet and health and safety managers. The combination of Imagitech's advanced software engineering technology with Swansea University's psychology research and an understanding of the issues surrounding the risks that individuals are exposed to in road traffic makes Roadmarque® a highly innovative and flexible road risk assessment solution.



Psychology

Together with psychologists at Swansea University, Imagitech conducted a study into the causes of accidents involving drivers at work within four key groups – delivery, large goods vehicles, occasional and sales. They aimed to identify the factors that predict overall road risk due to the personality of each driver. It is one of the very few studies that was carried out independently of a particular employer and which included a large cross-section of different drivers. The research was presented at the annual conference of the British Psychological Society in Dublin earlier this year.

The study resulted in the creation of a questionnaire which is both compact and scientifically reliable. One key result of this study was that the calculation of the overall risk differs between driver type. This means that, although every driver completes the same questionnaire, the results need to be evaluated differently, depending on the type of driver being evaluated.

Findings indicated that 'deliberate risk taking', a penchant for a 'risky lifestyle', a tendency towards 'venting anger' and 'inattention' were amongst the most important causes of collisions across the various driver groups. The resulting psychometric assessment was incorporated into Roadmarque®.

Software

Imagitech has developed Roadmarque® as an online system using the latest technologies, allowing users to log in from anywhere and sit assessments through a standard web browser. There is a complete administration and reporting facility designed for the management of the assessment process and the results can be accessed via a secure web interface. Different assessments can be set for different groups of drivers, ensuring that tests are as relevant and as appropriate as possible.

With Roadmarque®, Imagitech has created a new system for an entirely new market. The software covers aspects such as legal compliance, statistical analysis of the available data, a psychometric assessment and interactive video assessments of various driving scenarios, as well as multiple-choice tests on specific customer-defined driving policies.

Benefit

Roadmarque® assesses individual driver risk, completes a full DVLA driver licence check, measures all road risk areas, reviews driving history, and completes all administration and reports for any organisation whose employees use a vehicle on the road in conjunction with their work. Many factors are used to give a picture of a driver's risk profile including vehicle usage, work patterns, collision history and personal profile.

The resulting report gives employers the factual information needed to manage occupational road risk in a cost-effective way.

As a solution to occupational road risk management,

Profile

Product	Roadmarque® driver risk assessment package
Applications	Ensuring health and safety for occupational drivers
Contact	Dr Gerhard Manogg, Director, Imagitech Ltd, Ethos, King's Road, SA1 Waterfront, Swansea SA1 8AS, UK Tel +44 (0)845 053 0331, email gerhard@imagitech.com, web www.imagitech.com, www.roadmarque.com

For more information please circle 5808 on the reader reply card

Roadmarque® solves several problems: (1) risk assess drivers; (2) ensure that their driving entitlements are sufficient for the driving they do at work; (3) produce a risk-ordered list of drivers (from highest risk to lowest risk); (4) identify any measures that need to be taken immediately; and (5) create a list of priorities to implement the most cost-effective risk-countering measures possible.

Based on Roadmarque® reports, organisations can take reasonable steps to address any identified risks. Given that the overall cost of implementing the software is very low, this offers an ideal and affordable solution to a legal requirement that every organisation in the UK must now comply with.

Green credentials

The system is also the first of its kind in the UK to use data from the audit to calculate a company's transport-related carbon footprint by calculating the carbon dioxide generated by individual drivers. An analysis of these results over time permits organisations to assess their policies and measure the benefits derived. ■



Have computer, won't travel!

A South Wales-based software company has created a fully functioning video-conferencing facility for the internet that could eliminate the need for business travel



Business travel tends to engulf time and productivity. If meetings can be done remotely from the office, productivity can increase and there is the additional benefit of a decreased carbon footprint for the company. The need to drag sales people from around the country into a hotel seminar room could be eliminated entirely.

Writemedia, a South Wales-based creative technical agency specialising in internet communications and applications, is confident that its product, WaveComms, is the most innovative video-conferencing product that has been developed recently.

Shared assets

WaveComms is unique in that it is a multi-user web communications interface, which enables users to access and simultaneously manipulate shared assets such as video files, Powerpoint® presentations, Excel® spreadsheets, picture files and PDFs. There is no limit to the number of users at any one time.

Colleagues can converse in a multi-user web conference for an online meeting,

“We believe that people want to communicate on an unlimited user basis, without restriction, with a high-quality image source and a complete suite of presentation tools that uses all the documents produced in Microsoft Office®.”

Steve Penney
Writemedia Partnership

just as if they were together in a seminar room. Session members can stop or start a presentation, interact with the various assets, replay a video or stop and rewind to a particular point.

The system also provides the facility to bolt on and customise additional programmed modules, such as a whiteboard, for a truly bespoke interface. It also contains a full calendar synchronised to the database, so all assets can be controlled and accessed in date and time.

Enhanced capabilities

Other video-conferencing software packages do currently exist, but they are limited in their approach, with fewer user features. WaveComms allows users to share, for example, entire Microsoft Office documents. No other product currently has this facility. Other software packages are also limited by their constraining pricing structure – having over 10 concurrent users often incurs an additional cost.

Outwith the corporate environment

Although its obvious use is in the corporate office, Writemedia's software is also useful for general practitioners, who can communicate with consultants in live discussions, during which they can share medical data, pictures or video.

One particular area in which the software is developing is in sport. Organisations are able to run analysis video and data, so that no matter where they are in the world they can see and interact with each other, thus giving coaches and players the ability to communicate to ensure they are at the top of their game.

An example of this is in team sports, where a coach and players are distanced from each other and need to review individual performances continually and on demand. The coaching team is able to communicate with the players in an online browser with video-conferencing facilities and have the ability to pull up all related match video and data for shared viewing. ■

Profile

- Product** Two-way multi-user video-conferencing software
- Applications** Remote meetings for corporate environment, doctors and sports governing organisations
- Contact** Steve Penney, Partner, Writemedia Partnership, The Studio, Upper Eweston, Roch, Haverfordwest SA62 6JY, UK
Tel +44 (0)1437 710949, email steve@writemedia.co.uk, web www.writemedia.co.uk

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Getting their teeth into audio tours

How did these South Wales-based audio-visual experts bridge the gap between their technical hardware and creative software departments? By developing the Bluetooth Interactive museum tour guide

Blackbox-av Ltd, based in Port Talbot, South Wales, is a designer of innovative audio-visual solutions, including, for example, multimedia installations in the museum, heritage and attractions industries. The company has two divisions – research and development (of electronic hardware) and creative multimedia design – but a better connection was desired between them.

Knowledge transfer

A knowledge transfer partnership was set up, with assistance from the Welsh Assembly Government, and Ross Cuthbertson, a postgraduate student from the Faculty of Advanced Technology at the University of Glamorgan, was brought in to help bridge the gap between the company's two areas of development. His aim was to design and develop 'middleware': integrating new communication standards and software development methods utilising existing products to form the foundation for a new company product range. Much of this work involved wireless solutions, and the Maidstone Museum Bluetooth

podcast station is an excellent example of combining the expertise of the two departments.

Bluetooth is not new technology. Said to be named after King Harald Bluetooth, who was credited in the 10th century with uniting Denmark and Norway, it unifies telecommunications with computing. It is a short-range wireless communication technology, now available on virtually all mobile phones on the market, which allows files to be sent between devices quickly and safely, without wires. However, Blackbox-av has used Bluetooth technology in an innova-

“This project enabled us to integrate electronic design with multimedia-based interactives, providing a rich user experience and opening new doors for the company.”

Ross Cuthbertson
Software Developer
Blackbox-av Ltd



tive way to replace traditional museum audio tour equipment, taking advantage of the technology available in almost all of the young museum visitors' pockets.

Bluetooth-enabled touchscreen podcast

Maidstone Museum & Bentsley Art Gallery in Kent, England, created a series of podcast audio guides for young visitors to subscribe to and download at home from its website, which could be listened to as they toured the museum. Not all of the visitors, however, would be aware of these podcasts until they arrived at the museum. A cost-effective solution was required that would allow the podcasts to be downloadable on site.

Blackbox-av created a brand-new Bluetooth interactive software package on a modified touchscreen kiosk system. Visitors who may have missed website downloads at home can therefore still download them onto their Bluetooth-enabled mobile phones within the museum.

The novel aspect of Blackbox-av's Bluetooth technology is that users get to choose what they want to download rather than listen to something they don't want.

An additional feature of being able to copy the audio files to a USB MP3 device was also developed, enabling users who have an MP3 device with no Bluetooth to download the podcasts. ■

Profile

Product Bluetooth-enabled touchscreen podcast station
Applications Wirelessly downloadable museum audio guides
Contact James Churchill, Marketing Officer, Blackbox-av Ltd, 25 Aberafan Road, Baglan Industrial Park, Port Talbot SA12 7DJ, UK
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