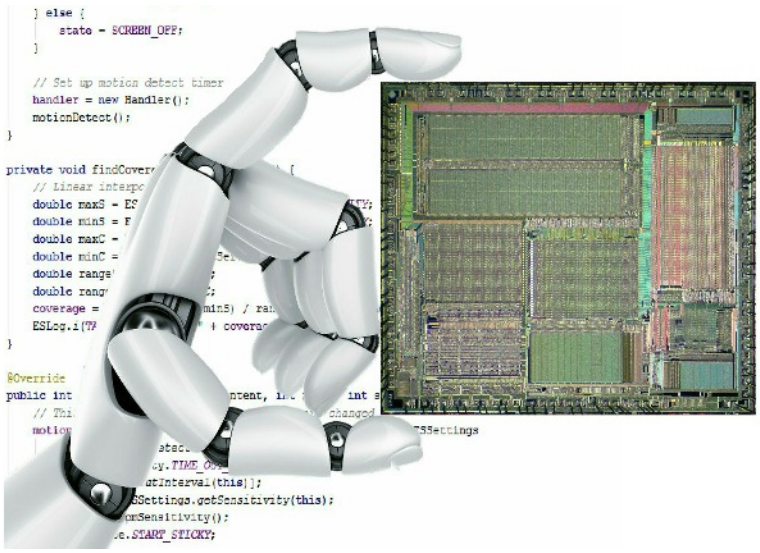


HIGH TECH NEWS

2015 VENTUREFEST

Welcome to VentureFest

Venturefest returns to Bristol & Bath this year, with a high profile event at the PassengerShed by Temple Meads station on Tuesday June 9th. Showcasing the wide range of technology and innovation, the event hosts a startup village, pitching competition and pavilions with the latest technology in Aerospace, High Tech and Creative and Digital. The programme for the day and more details are on page 4.

Bristol is also a hotbed of development for music technology, and there are five innovative new instruments and music-based software and hardware highlighted on page 6.

Quantum technologies are also becoming a significant capability for the cluster, and the launch of the Quantum Engineering Technology (QET) Labs at the University of Bristol on page 11 is a key step in this. The labs will take a range of quantum technologies from research through to production systems.

We say hello to Cray on page 2, setting up its European headquarters in Bristol and boosting the high performance computing expertise in the region, as well as the RBS Innovation Gateway on p4. And we say goodbye to the Microelectronics iNet on page 16, which, after working with over 400 companies in the last five years across the South West, has come to an end.

Discussions are on-going about how high tech companies can be supported in the future, and you can have your say in this and any other issues facing the industry - from finance to innovation - by joining the High Tech Sector group. The board meets every two months. Contact mike@testandverification.com or nick@flaherty.co.uk if you are interested - it's a very good way of getting more connected into regional activities.

In this issue

June2015

The High Tech News banner highlights the expertise in the region, from the robotics capabilities of XMOS, Infineon and the Bristol Robotics Lab, the chip design heritage of the Inmos transputer and live Android image processing code shipping in products today

Cray chooses Bristol for European HQ

Global supercomputer leader Cray has set up its new headquarters for Europe, the Middle East and Africa (EMEA) at Broad Quay in Bristol.

This will serve as a regional base for its EMEA sales, service, training and operations with 30 staff, and as an important development site for worldwide R&D initiatives, doubling to 60 over the next year. The new headquarters will also provide the company with a centralized location for business engagements with new and existing customers, enhancing Bristol & Bath's position as one of the world's leading technology hubs.

"The EMEA market is one of our fastest growing regions and as we continue to expand with new customers, partners and employees, and further advance our R&D programs in Europe, now is the perfect time to centralize our operations in Bristol and provide a platform for continued growth," said Peter Ungaro, president and CEO of Cray which is based in Seattle. "Bristol is a great city with leading universities, and is quickly becoming a technology hub with a number of large high-tech companies and startups and a skilled workforce. The city is an ideal fit for our growing company and we are excited to be a part of the Bristol community."

"Cray's decision is a testament to the fact that the Bristol and Bath area is seen globally as an economic powerhouse and the home of a world-class high-tech cluster," said Rick Chapman, high tech sector champion at Invest Bristol and Bath. "The region has a rich heritage and associated skill set spanning an array of disciplines including cloud computing, multi-core processor design and high speed communications, areas of technology integral to the development of cutting edge innovations such as super computers, autonomous cars and robots."

The news had a national impact. "It is exciting to see a recognised technology leader make the UK one of its global hubs," said Ed Vaizey, Minister of State for Culture and the Digital Economy, and a regular visitor to the region. "It sends a very clear message to international organisations about innovation and excellence in the UK technology sector and the benefits of using the support available from UKTI, and we hope more companies follow Cray's lead in this regard."

Cray's latest customers include the Met Office in Exeter, which is installing the largest supercomputer in Europe, as well as the European Centre for Medium-Range Weather Forecasts (ECMWF) in Reading. Other customers include the UK National Supercomputing Facility at the University of Edinburgh in Scotland; the High Performance Computing Center Stuttgart (HLRS) at the University of Stuttgart; the Swiss National Supercomputing Centre (CSCS) in Lugano, Switzerland.

A key element in Cray's decision was the acquisition of staff and assets from Bristol startup Gnodal in 2013, and Gnodal founder Fred Homewood remains with Cray.

www.cray.com

2015 West of England LEP Skills Survey

The 2015 West of England Local Enterprise Partnership Business Skills Survey is now live and there are still two weeks left to complete it.

The LEP is seeking business input into their 2015 skills survey,especially from high tech companies, to ensure that local businesses have the right skills that they need both now and in the future. The results of the survey will be shared across schools, colleges, universities and other training providers in the region to ensure they are equipping future talent with the skills that your business needs.

Specific skills needs are particular to specific businesses in the West of England and this is why it is so important to develop a clear picture of where local businesses are now, where they would like to be and how they can be helped to get there.

The survey only takes 15 minutes to complete and will ensure that the West of England has the right strategies for skills and talent development to help the region sustain the highly regarded high tech, creative and digital cluster.

To complete the survey, get your voice heard, and be a part of setting the skills agenda for the West of England, take the survey here.

Bristol opens its Data Dome

The new 4K hemispherical Data Dome at the @Bristol Science Centre has opened to the public and business. The Dome, funded by Bristol City Council and Bristol is Open, connects via the terabit fibre network to the supercomputer at the University of Bristol to overlay data on high resolution video. This is being used for stunning astronomical fly-throughs in the Planetarium, and can be used for other applications.

To demonstrate the potential of the Data Dome there are also two development commissions being produced this month to showcase the capabilities, as well as plans for other long term projects. These are looking at original and creative approaches to using Bristol City Council open data plus other publicly available open data sets, as well as ideas on engaging with an audience with relevance to the locality of Bristol.

“By upgrading the Planetarium to create a state-of-the-art city data visualisation facility, we are developing something world leading and unique for Bristol citizens and businesses,” said Stephen Hilton, Director of Bristol Futures at Bristol City Council. “Data is increasingly an important city asset and being able to visualise it in new, highly dynamic and interactive ways will showcase the creative digital skills, which are one of the city's greatest strengths”

The Dome uses an Evans & Sutherland Digistar 5 full dome 360° digital 3D projection system from two projectors, and 7.1 surround sound, creating a fully immersive experience. Skypoint Planetariums, Evans & Sutherland’s European representative, is providing the new equipment and managed the installation.

www.at-bristol.org.uk

EngineShed chosen for Enterprise Bill launch

The importance of Bristol & Bath as a key technology cluster in the UK was highlighted with the launch of the Enterprise Bill for new Parliament.

The Bill includes new measures to support entrepreneurs and job creation. “Small businesses are Britain’s engine room and the success of our whole economy is built on the hard work and determination of the people who run and work for them,” said Sajid Javid, the new business secretary on his visit to the EngineShed business accelerator to announce the Bill. “As Business Secretary I will always back them and, in my determination to get the job done, one of my first steps will be to bring forward an Enterprise Bill that helps them to succeed and create jobs."

www.engine-shed.co.uk

Venturefest Bristol & Bath returns

The Bristol & Bath Venturefest returns on Tuesday 9th June at the PassengerShed next to Bristol Temple Meads.

The event, which was one of the first in the country when it started, celebrates the technology and innovation of the region. It brings together entrepreneurs, investors, technology specialists and a wide range of people to showcase and connect the capabilities of local companies, research labs and universities.

As a result, banking giant RBS will be launching its Bristol Innovation Gateway at the event. RBS is also sponsoring Venturefest Bristol & Bath as part of their support for entrepreneurship and innovation in the region

The Innovation Gateway initiative is looking for new ideas to reduce energy, water consumption and waste and winning entries will get the chance to trial their technology in RBS buildings in Bristol.

Two of the winners from the bank's inaugural Innovation Gateway scheme, which was open to applicants worldwide, will be at Venturefest to help launch the RBS scheme for Bristol. Syed Ahmed, MD of Savortex, and Bill Clee of Asset Mapping will speak about their experience of entering the competition and the benefits of piloting their innovations in the RBS estate.

There will be two presentations about the RBS Bristol Innovation Gateway at 10.10am in the Digital & Creative Innovation Zone presentation area and another at 2.25pm in the City Innovation zone presentation area 1.

The programme includes the Innovation Showcase, with the region's most exciting and innovative companies across four key sectors: advanced engineering; hi-tech, ICT and microelectronics; digital & creative and city innovation, will be showcasing their innovations. These include:

- Airbus with the latest electric aeroplane
- Renishaw with a 3D-printed titanium bicycle
- The VENTURER Consortium with the driverless Wildcat LandRover
- HP's Sprout 'immersive computer'
- Open Bionics and their 3D printed robotic hand using recycled plastic

The Start-up Village has 20 of the region's most promising and innovative early stage businesses that have been shortlisted to showcase their innovations, including the finalists in the Green Capital Digital Challenge. There is also a drinks reception at the end of the day in the Hi-Tech zone. Full details of the programme are on the next page.

Thought leadership is an important role for the event, and there is a great ine-up of speakers and thought-provoking panel sessions.

The Welcome Address Speaker, Leo Johnson, is the Founder of Sustainable Finance Ltd and a Bristol 2015 Ambassador, while the keynote speakers are Scott Wilcox, Director of SXSW Eco and Col Needham, Founding CEO of the IMDb movie database.

The Advanced Engineering pavilion will be covering topics such as electric-powered flights; alternative propulsion system including composite engines; advanced modelling moving towards zero prototyping; and biomimicry in composite materials for aerospace and other applications.

For City Innovation, experts will share insights on how digital technology is transforming the physical world in cities and the lives of citizens from building innovation in design and construction of cities, smart infrastructure to how energy grids are integrated to offer smarter services.

High Tech will focus on the use of robots for good. With presentations on intelligent mobility, the VENTURER driverless car project and how 3D printing technology is providing low-cost robotic hands for amputees.

The Knowledge Transfer Network Landscape Talks will be connecting people to speed up innovation, solve problems and find markets for new ideas, while drop-in business support sessions running throughout the day with information on Access to Finance, Intellectual Property, EU Funding and trading internationally to finding innovative partners across the world.

TechSPARK Entrepreneurs Club will host a live Q&A with some of Bristol & Bath's most successful entrepreneurs who will share their frank views on the successes, challenges and lessons learnt from growing a technology business, and there will be advice from experienced technology lawyer and CEO of Stratology.com, Rupert Vernalls.

www.venturefestbristolandbath.com.

The sound of high tech innovation

Music technology is a key strength in the region, reflecting the strong heritage of music production, and recent months have seen a significant boost in activity. Nick Flaherty reports.

From brand new synthesizer and instrument designs to Bluetooth speakers and personalized streaming music apps, companies in the region are producing highly innovative systems.

Mix Radio made a splash last month in New York with the launch of its personalised music streaming app for Apple and Android phones. The Bristol-based engineers were part of Nokia, then moved to Microsoft and the software was only available on Windows Phones. Now, as part of a Japanese app company called LINE, they are supporting the rest of the phone market.

“For many people this will be the first time they have been able to experience MixRadio; we’re confident they will love the simplicity of the experience and the quality of the personalization we deliver,” said MixRadio CEO Jyrki Rosenberg. “We cut out the clutter between the listener and the music they love, helping them enjoy, discover and rediscover great music.”

MixRadio developed its own personalization engine and analyzed billions of data points from listeners around the world, allowing it to deliver an unparalleled personalization experience. The one touch ‘MyMix’ feature brings a highly tailored stream of music that learns the music listeners like, to bring them more music they love from a catalogue of 35 million tracks.

MixRadio also offers thousands of curated mixes created by a global team of music experts, and by international stars. As a mobile first music service, MixRadio understands the importance of off lining mixes. Unlike many free music streaming services, MixRadio lets users listen to offline mixes on the move.

This has led to a major co-marketing partnership with handset maker HTC to exclusively provide personalised music updates for HTC’s BlinkFeed. The company will maintain and develop existing partnerships with adidas, powering the music for the adidas MiCoach Smart Run watch, and Harman Kardon, being fully integrated into the Harman Kardon Omni speakers offering a seamless personalized home audio experience.

Meanwhile startup Modal Electronics has been expanding its range of synthesizers designed and built in Bristol with the latest rolling out this summer.

The 008 provides eight discrete voices of polyphony through its analogue architecture. Two 100% analogue voltage controlled oscillators (VCOs) per voice, with two sub oscillators, provide sawtooth, triangle, square with PWM and noise to produce an authentic sound. Each of the waveforms can be blended together to provide completely new complex wave shapes. Innovative and extremely flexible 15 multi-mode filter, consisting of traditional modes such as low-pass, band-pass and high-pass as well as more unusual notch, phase and combination modes, while filter overdrive enables the sound to be driven to sonic extremes. It also supports 11 modulation sources with unlimited destinations. Each destination can be set its own unique depth, a super smooth sample rate of 10kHz and all accessible from the front panel for ease of use, and the Modal Electronics Animator enables any control parameter on the 008 to be sequenced, enabling very complex filter transitions, wave form changes and modulation matrix changes to be sequenced. One key element of the design is that the analogue sound is combined with digital interfaces so that an Ethernet port connects the synthesizer to the network for updates via the internet and access to the Modal Electronics cloud features.

Desine announced a new, entry level version of its Alphasphere instrument back in January, and the first units are set to roll off the production line in the next few months. At £150, this takes the core technology that makes the AlphaSphere unique, and simplifies it around a core inner frame. It has less modularity than the nexus and elite series, but it retains the core technical features. That means fully responsive and tactile, velocity and pressure sensitive pads in an ergonomic spherical design, as well as an overhaul of the AlphaLive software to allow for this newly simplified user interface.

This new 2kg version has 32 tactile pressure and velocity sensitive pads in the same spherical design with a hexagonal lattice pad layout that allows for a series of notational arrangements. It has USB 2.0 connectivity and bus power and is fully compatible with any MIDI software.

Startup Jamp Technology is currently developing a portable electronics device for musical instruments. The device uses digital effects such as EQ to modify sound, affording all musicians the flexibility of a studio mixer. Effects are configured using a smartphone app; multiple devices can be linked and synchronised in a Bluetooth network. The devices utilise MIDI, so timing and effect data can be updated on the fly.

PASCE – Professional Audio SCience and Engineering - in Bristol has updated its Minirig portable speakers with the latest Bluetooth wireless technology.

The company was originally started as engineering sub-contractors for professional audio, underwater robotics, sonar, high-voltage industrial equipment and project management and now designs and manufactures high quality portable audio products.

All the products are designed and tested in the lab here, and all the manufacturing and assembly of parts is done by reliable UK based engineering companies, using PASCE's patented subwoofer design.

The company has spent the last three years investigating wireless technology for its speakers, and the latest Bluetooth 4.0 chips can now provide the same level of battery life as previously with the APTX high quality audio codec that allows for wireless streaming at high quality. The speaker now provides up to 50 hours of operation, up from 25, as well as stereo to two speakers from the dedicated Minirig app.

Region strengthens high tech links with China

An agreement between Bristol & West of England China Bureau and the Guangdong Provincial Government is set to help Bristol and West Country firms establish closer trading partnerships with counterparts in China.

The Memorandum of Understanding between the two will help businesses negotiate the unfamiliar trading procedures they will encounter in the populous Pearl River Delta area which is strong in electronics manufacturing.

Bureau chief executive Dianne Francombe said the legal document would work both ways – giving Chinese business people a clearer understanding of how business is done here and insights into all aspects of doing business in the UK. “Agreements such as these are very important as it can be difficult for individual West Country businesses to make inroads into China on their own initiative,” she said. “By forging these links with the Provincial Government the bureau is paving the way for any South West firm looking to take advantage of the fantastic trading opportunities waiting for them.”

The three-page Memorandum of Understanding was drawn up in conjunction with the Foreign Affairs office of Guangdong Provincial Government by the bureau’s company secretary, Paul Hardman from Bristol solicitors Gregg Latchams.

The main themes in the memorandum include greater cooperation on advanced technologies, creative industries, education and training, tourism and low carbon technologies. “The memorandum will build on the strong relationship already established between Bristol and its sister city of Guangzhou and hopefully persuade more West firms to explore closer trading partnerships on everything from tourism to high technology,” said Francombe.

www.chinabureau.co.uk

… and with Estonia

The region also hosted a visit from entrepreneurs in Estonia who are looking to build more links with companies in Bristol & bath.

Estonia has the highest number of startups per head of population in the world, although this is partly down to the fact that the population is just 1.3m, about the same size as the Bristol & Bath region. The success of Skype, coupled with a strong, new digital infrastructure, has led to an explosion in digital startups who are looking to the Bristol & Bath region for links that could lead to collaboration and co-development.

Blu Wireless demonstrates its prototype Lightning V Band phased array modem

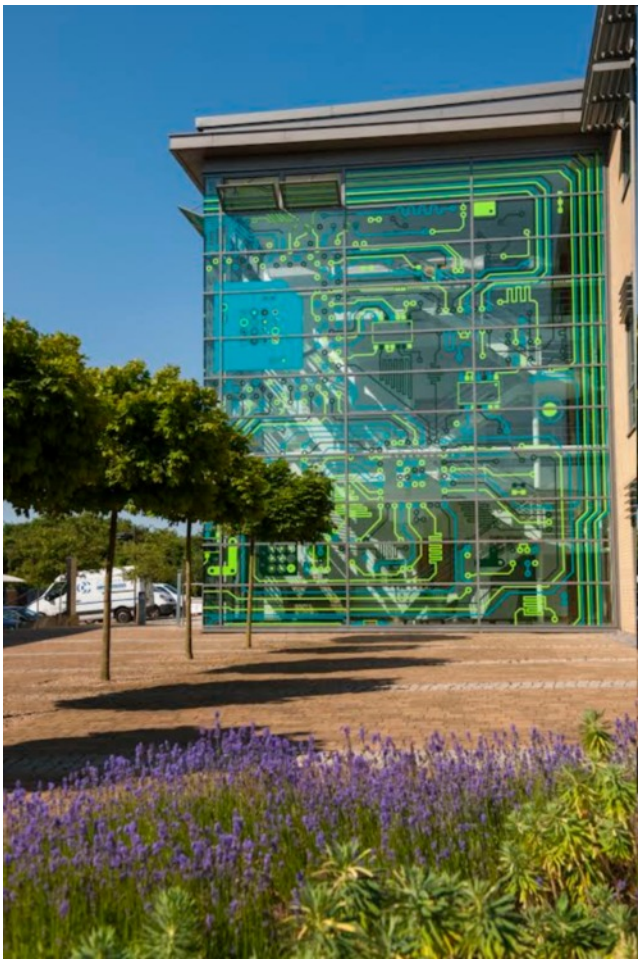
Bristol startup Blu Wirelesss Technology is making a key demonstration this week at the international Small Cells Conference at the ExCel London, 9-11 June. The Lightning represents the first physical manifestation in a development roadmap that will see the technology applied to WiGig and ultimately millimetre wave modems for the emerging 5G mobile standard for linking small cells together.

The Lightning demonstrator grade evaluation platform has been installed as part of the Bristol is Open experimental network in order to demonstrate gigabit-speed wireless mesh networking for dynamic data backhaul applications. This is the first mesh network trial in Europe to use 60GHz and OpenFlow software defined networking.

“Blu Wireless has attended the Small Cells Back Haul conference for the past three years and this is the first time we will be demonstrating our HYDRA baseband technology for backhaul and related applications. We see this as an important validation of our technology and are planning further enhancements and developments for release in the next 12-18 months,” said Mark Barrett, chief marketing officer, who will be speaking at the conference.

www.bluwirelesstechnology.com

Changing landscape of the electronics industry impacts the region



The last few months have seen some significant changes coming for companies that have a presence in the region. The takeover of CSR by Qualcomm is due to complete next month, potentially bringing Qualcomm to the region with a WiFi chip design centre. Another WiFi chip designer, Broadcom, is also going through changes as part of a $37bn takeover by Singapore-based Hewlett-Packard component spin off Avago. The combined company will still be called Broadcom, but what this will mean for the set top box chip embedded software and WiFi design in the region remains to be seen.

Other changes have made more of an impact. Graphics and processor designer NVIDIA is closing its software modem operation which was acquired as Bristol startup Icera. The operation has designers in Bristol, Cambridge and the South of France.

And yet another deal is promising to shake things up. Intel, which bought Picochip in Bath in December 2013 from Mindspeed, is now buying programmable logic chip designer Altera. Altera has a strong position in the telecoms infrastructure market and a tighter connection between the Picochip technology and Altera's FPGAs could result.

Just outside the region sees the integration of International Rectifier by Infineon, which also has a design centre in Bristol. IR took over the old Inmos chip making plant in Newport, Wales, to make power semiconductor devices, and this will sit alongside Infineon's power devices.

SPHERE designs its own Bluetooth low energy sensor

Digital health research group SPHERE has developed is own sensor using the Bluetooth Low Energy (LE) standard also known as Bluetooth Smart. The sensors are optimised for long term use with a small battery and will be the main platform for gathering data both inside and outside the research projects.

www.irc-sphere.ac.uk

The village that roared for broadband

Villagers in Claverton, just outside Bath, clubbed together to persuade Openreach to install fibre broadband in a (quite literally) ground-breaking project

The village of Claverton has just 70 houses and no broadband infrastructure, so it was not on the list for broadband access despite being in a valley just a few miles outside Bath and next door to the city's world class university. One of the reasons for this is the financial modelling used by infrastructure provider Openreach, which assumes a 20% takeup of services. The cost of installing fibre across 4km to reach the village for just a few houses was uneconomic.

The residents of the village didn't take no for an answer, and as this included several technology and telecoms executives and lecturers from the nearby University of Bath they investigated many different options over the last few years, including a mesh network over the hill to a connection point. Two years ago they started negotiations with Openreach, and part of this was to change the financial model. To do this, the village has partly funded the installation. All the houses in the village were part of the scheme, on the basis of paying what they could afford. Several home-based businesses contributed more, but access was not dependent on the contributions. Instead, this demonstrated to Openreach and service provider BT that the demand for the service was much higher than the expected 20% and as a result reduced the amount the village contributed. However, there was a clear argument that having high speed fibre broadband increased the value of their homes, and so far the uptake is 40% and rising.

Twelve fibres were installed on the aerial route alongside the copper phone cable, connecting to a new box in the village with Huawei's termination equipment (left). Just one fibre is lit for broadband, and as this is shared between just 70 homes rather than the usual 200 to 300 there will not be a problem with contention. This also leaves the village well placed for the next generation G.fast rollout of speeds of 400 to 500Mbit/s in 2016 and 2017.

"We realised the high costs involved meant Claverton would not be upgraded as part of BT's normal commercial fibre broadband roll-out for some time, so we set about working with the company to jointly solve the problem," said Dr Rodger Sykes, chairman of software startup Thalia. "It has been hard work over three years to get to where we are today both for the residents of Claverton and the BT people involved, but we have worked together very well. Claverton residents really appreciate the benefits superfast broadband can bring and are excited at the thought that this project provides everyone in the community with the kind of speeds we could only dream about having in the past. It is significant that almost every Claverton household has made a contribution to the village's superfast broadband fund. Because of the distance the village is from the local telephone exchange and a roadside cabinet, most residents were previously getting download speeds of less than 1.5 megabits per second (Mbps), but now our internet experience has been transformed." BT also invested in the project alongside Openreach. "The people of Claverton are true national trail-blazers and are setting the pace for rural communities through their collaboration with BT," said Bill Murphy, managing director of next generation access for BT "This is the first village to work with us on creating an entirely new broadband network for the local community. It is no wonder the Organisation for Economic Co-Operation and Development (OECD) Wellbeing report last year listed the South West as best UK region for household broadband access."

Bristol launches Quantum Engineering Lab

The University of Bristol has launched its new state-of-the-art Quantum Engineering Technology (QET) Labs. The QET Labs will provide unique world-leading facilities, bringing together industrial and academic collaborators to build devices that span numerous areas of quantum technology development from the nano-fabrication of quantum devices to a city-scale Quantum Key Distribution network.

The Labs will house over 100 researchers working to deliver quantum technologies whilst supporting the training of future quantum engineers through the EPSRC Centre for Doctoral Training in Quantum Engineering. Development is well under way and will be fully complete and open for business in September.

With significant new investment from the University of Bristol, the Labs will span research groups across both the Faculties of Science and Engineering to deliver a radically new generation of machines that exploit quantum physics to transform our lives, society and economy.

Potential applications include developing secure communication systems for individuals, corporations and government; precision sensors for environmental monitoring, biomedical applications and security; quantum simulators to design new materials, pharmaceuticals and clean energy devices; and quantum computers to tackle challenges in big data and machine learning.

“It seems fitting that we are launching a new venture that pays homage to such great historical figures as Dirac and Brunel,” said Professor Jeremy O’Brien, Director of CQP. “The QET Labs brings their contributions to humanity together binding quantum physics with engineering technology.”

“QET Labs will be an international node for collaboration with industrial and academic world-leaders,” Professor Nishan Canagarajah, Pro-Vice-Chancellor for research, said.

The Labs aim to be a global centre for research, development and entrepreneurship in the emerging quantum technology industry with world leading facilities and core expertise in photonic quantum technologies and quantum systems engineering. Further information

The Labs will deliver secure communication systems for individuals, corporations and government as well as precision sensors for environmental monitoring, biomedical applications and security. Quantum simulators will be developed to design new materials, pharmaceuticals and clean energy devices, while new quantum computers will be built to tackle challenges in big data and machine learning.

www.bristol.ac.uk

Reach Robotics moves to San Diego

Gaming robot startup reach Robotics is re-locating to San Diego in California after having won a place in Qualcomm’s dedicated robotic incubator programme.

The four month programme will see the team of 6 move to the US to further develop the hardware and software technology for a series of robots that compete in competitions.

www.reachrobotics.com

Local coding with Digimakers and Bristol & Bath SIGs

The Special Interest Groups (SIGs) under High Tech Bristol and Bath (HBB) are taking off with a series of events around education and skills, high performance computing, embedded systems and health technology.

This month sees the launch of Digimaker <local>, in association with HBB to run coding workshops across Bristol using Raspberry Pi boards donated by RS Components. This is a version of the Digimaker scheme that runs four times a year at @Bristol that is backed by the University of Bristol and the British Computer Society. Digimaker <local> will support the workshops at sites across the two cities, with the first at Cadbury Heath later in June.

The SIGs are a great way to allow people working in similar fields to connect up, and Dr John Bradford is working at HBB to set up the activities for organisations in the Bristol and Bath area. The SIGs are open to individual and corporate members anywhere in the world, bringing together expertise in a wide range of technologies. There are already members with interests in wireless, multicore, embedded software and education and skills. There are meetings of the High Performance Computing SIG and the Digital Health this month.

The Year ahead - 2015

June - Venturefest 2015 highlights all the innovation in the region from Brunel's PassengerShed with Startup Village and Investor Showcase

July - Qualcomm's takeover of CSR expected to complete

September - the Multicore Challenge Conference brings the world's leading processor researches and developers to Bristol

October - Discovering Startups 2015. The national event hosted by SETsquared and Cambridge Wireless takes place in London

November - the Advanced Engineering show at the NEC in Birmingham covers flexible electronics and 3D printing

December - Bristol hands over as Green Capital to Ljubljana, capital of Slovenia

Bristol shows two does go into one

A patented technique allows a full duplex two way link in a single channel for the first time

A pioneering team of researchers from the University of Bristol's Communication Systems and Networks research group has developed a new technique that can estimate and cancel out the interference from its own transmission, allowing a radio device to transmit and receive on the same channel at the same time.

This means only one channel is needed for full duplex, two-way communication, using half as much spectrum compared to the current technology.

Leo Laughlin, a PhD student from the University's EPSRC Centre for Doctoral Training (CDT) in Communications, together with MSc student Chunqing Zhang, supervisors Professor Mark Beach and Dr Kevin Morris, and industrial mentor, Dr John Haine at u-blox, have designed and built a novel full-duplex transceiver architecture, which combines electrical balance isolation and active radio frequency cancellation. Their prototype can suppress interference by a factor of over 100 million and uses low-cost, small form factor technologies, making it well suited to use in mobile devices such as smartphones and tablets. U-blox has close contacts with the region, having acquired 4G technology startup Cognovo in 2012.

This important change in radio design could offer a range of benefits. In Wi-Fi systems this would double the capacity of a Wi-Fi access point, allowing more users and higher data rates. For cellular systems, full-duplex operation would also deliver increased capacity and data rates, or alternatively the network operators could provide the same total network capacity with fewer base station sites, giving obvious benefits in the cost and environmental impact of running the network.

"Until now there has been a fundamental unsolved problem with radio communication. Since the radio spectrum is a limited resource, and with network operators paying billions of pounds to access the spectrum, solving this problem would bring us one step closer to the faster, cheaper and greener devices of our connected future, said Laughlin, who is in the first cohort of students in the CDT in Communications.

In today's mobile devices, a separate filtering component is required for each frequency band, and because of this, today's mobiles phone do not support all of the frequency channels which are in use across the world. Replacing these filters with the research team's duplexer circuit would create smaller and cheaper devices, and would allow manufacturers to produce a single model for the entire world. This would enable global roaming on 4G and would further decrease cost through greater economies of scale.

The Centre for Doctoral Training (CDT) in Communications received its first intake in 2011 and will host 80 new PhD students over eight intake cycles. As well as producing innovative solutions to key emerging research challenges, the Centre is helping to provide a coherent advanced training network for the communications community nationally, and develop the skilled and entrepreneurial engineers needed to underpin the future of the industry.

www.bristol.ac.uk

Ultrahaptics welcomes Google Soli project

Google has demonstrated technology that can sense the position of a hand in free space to be used as haptic, or user interface, control. The technology uses radar chips from Infineon, which has a design centre in the region, and was welcomed by ultrasonic user interface startup Ultrahaptics in Bristol.

"This is a very promising development, moving towards a world where our devices watch and interpret us rather than us learning how to use them," said Tom Carter, chief technology officer at Ultrahaptics. The technology spun out of the University of Bristol and uses beams of ultrasonic sound to provide feedback in freespace, so the the two approaches could potentially be combined.

"Soli will be particularly useful for small devices, such as wearables and opens up a big interaction space above the device. You get some natural haptic feedback, as your hand is often touching itself for the interactions, and this could be augmented by Ultrahaptics to create richer sensations," said Carter.

www.ultrahaptics.com

Team looks at handheld robot opportunities

A team of researchers from Bristol University are working on the design of handheld robot prototypes as well as in understanding how best to interact with a tool that “knows and acts”. In particular, they have been involved with comparing tools with increasing levels of autonomy.

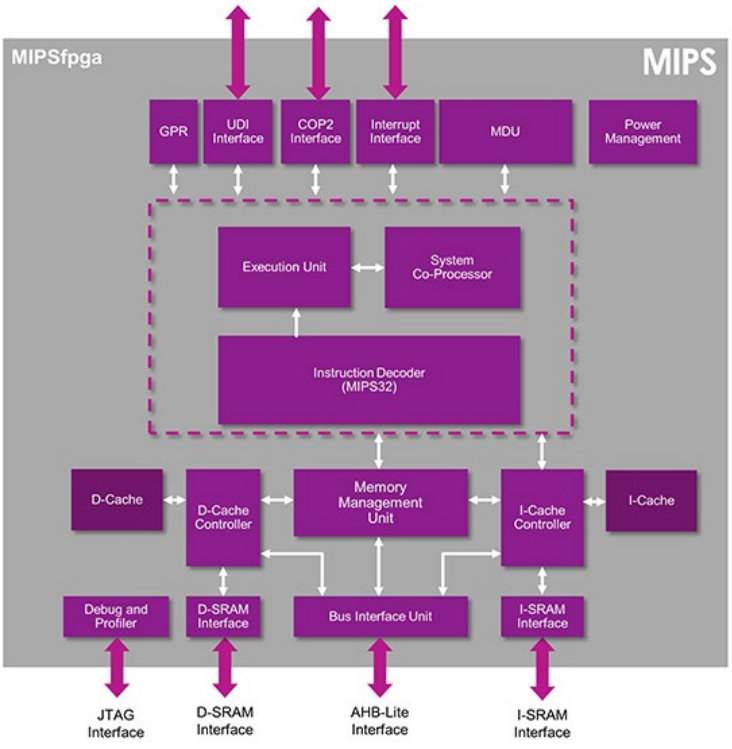
Compared to other tools such as power tools that have a motor and perhaps some basic sensors, the handheld robots developed by Dr Walterio Mayol-Cuevas and PhD student, Austin Gregg-Smith, from the University’s Department of Computer Science are designed to have more degrees of motion to allow greater independence from the motions of the user, and importantly, are aware of the steps being carried out. This allows for a new level of co-operation between user and tool, such as the user providing tactical motions or directions and the tool performing the detailed task.

Handheld robots, aim to share physical proximity with users but are neither fully independent as is a humanoid robot nor are part of the user’s body, as are exoskeletons. The aim with handheld robots is to capitalise on exploiting the intuitiveness of using traditional handheld tools while adding embedded intelligence and action to allow for new capabilities.

“There are three basic levels of autonomy we are considering: no autonomy, semi-autonomous when the robot advises the user but does not act, and fully autonomous when the robot advises and acts even by correcting or refusing to perform incorrect user actions,” said Dr Mayol-Cuevas, Reader in Robotics Computer Vision and Mobile Systems.

The Bristol team has been studying user’s task performance and user preferences on two generic tasks: pick and drop of different objects to form tile patterns, and aiming in 3D for simulated painting.

www.bristol.ac.uk



MIPS opens up to Universities

Imagination Technologies, which has two design centres in the region, is opening up its MIPS architecture to universities with the RTL implementation of a simplified microAptiv design.

MIPSfpga gives universities around the globe free and open access to a fully-validated, current generation MIPS CPU in a complete teaching package that can be run in a low cost FPGA. The core is already popular in the PIC32MZ microcontroller from Microchip Technology but access to the detailed RTL – the code that implements the core – can be tremendously helpful for teaching.

RTL code is often hidden, or obfuscated, to prevent it being copied and used in other designs and until now, what’s been missing from courses is access to real, un-obfuscated RTL code that will enable students to study and explore a real CPU. The MIPS CPU is being offered as part of a complete free-to-download package for universities, together with a Getting Started Guide, teaching guide for professors, and examples designed to enable students to see how the CPU works and explore its capabilities. With the materials, students can develop a CPU and take it through debug, running on an FPGA platform.

This MIPS CPU configuration is designed to run on a low-cost FPGA platform, with guides available for the Digilent Nexys4 platform with a Xilinx Artix-7 FPGA, and the Terasic DE2 platform with an Altera Cyclone FPGA.

community.imgtec.com/university

Bath develops unmanned systems of the future

A team of students from Bath University is developing a new unmanned drone that could change the way humanitarian aid is delivered.

Team Bath Drones, a multidisciplinary group of students from the Aerospace, and Integrated Mechanical & Electrical Engineering (IMEE) degree programmes at Bath, is developing an unmanned aircraft system (UAS) - commonly known as a drone - with the latest technological capabilities that could play a major role in the future, helping those in need around the world by tackling key problems of communications and flight range.

Team Bath Drones' design, Stingray, has been designed with the primary focus on speed, range and autonomy as the team look to win the IMechE Unmanned Aircraft Systems (UAS) Challenge.

The UAS competition is designed to get students thinking about the contemporary needs of the rapidly evolving drone industry. The Bath students, who are currently in the testing and assembly stages, are one of 14 university teams to be participating at this year's competition. The teams will compete in a 'fly off' on 1 and 2 July at Bruntingthorpe Aerodrome where their drones will be challenged to fly between a number of pre-determined points and deliver a small package, mimicking the humanitarian use of drone technology in real world scenarios.

Team Bath Drones is a group of final year students at the University of Bath, led by Wojciech Wasinski and supervised by Dr Pejman Iravani, Dr Jon du Bois and Dr David Cleaver, working to create the ultimate autonomous Unmanned Aircraft System (UAS) to be competed at the IMechE UAS Challenge.

The team at Bath has embraced the full mission requirements, designing a rugged, efficient aircraft capable of long-range communication and with a 50 kilometre round-trip range. The drone uses modern composite materials with a cutting-edge monocoque construction and an efficient blended wing-body design, to provide a lightweight but robust vehicle. Long-range communications including telemetry and video feed are provided by a directional antenna at the ground station which tracks the aircraft's location, and state-of-the-art 'sense and avoid' systems are being investigated to ensure safe autonomous operation in shared airspace.

Lecturer in the Department of Mechanical Engineering and one of three supervisors of Team Bath Drones, Dr Jon du Bois said: "This event is a fantastic opportunity for the students – they're working on a challenging and highly relevant topic in modern aerospace engineering, pushing the envelope of the industry's capabilities – and they're getting hands-on, practical experience with design, build, certification and test processes.

"The team brings together a truly multidisciplinary group of students from our Aerospace and Integrated Mechanical & Electrical Engineering degrees. The University's Faculty of Engineering & Design has always encouraged this integrated approach and it is something that is not only valued by industry but is also hoped to give the team the edge in the competition.

"This cross-discipline collaboration offers our students the opportunity to design not only the airframe but also to build a custom autopilot tailored to the tasks in hand, with the potential of unique capabilities amongst the competition craft."

www.bath.ac.uk

Microelectronics iNet comes to an end

After five years of helping companies across the South West develop innovation, the Microelectronics iNet is coming to an end. The most successful of the original pathfinder projects, the Microelectronics iNet was deliberately set up in the Southwest s a result of the technology expertise here. In the last five years it has assisted 385 companies directly and connected up over 1000 from the £2.1m funding.

The iNet was originally one of five looking to support aerospace, cleantech, biomedical and creative technologies in different ways.

"It's definitely the end of this iNet and we finish at the end of June," said Rick Chapman, director of the Microelectronics iNet. "There are ongoing conversations with the LEP about future funding programmes of which the iNet may be one. Clearly it was a great success. Through the iNet we know what works and what doesn't work quite so well and that knowledge would be used in a future programme. But it depends on the objectives of the LEP and the kind of programme they require. For example whether we would have the five individual sectors or one big iNet is all up for discussion. The LEP has published their prospectus for European funding but it's very broad and within that there is certainly an element of SME support. The LEP is still establishing the framework for future programmes overall."

The programme will see over 400 jobs created and a further 300 jobs protected. "They haven't all happened yet as products haven't reached the market yet," said Chapman. "So far there are over 100 that have already been created, so it proves that jobs do flow from innovation. We also have over 150 jobs that have been safeguarded and another 150 jobs helped. That's way ahead of our targets. Even there innovation is playing a role in helping companies survive tough economic times. The southwest region has seen additional economic growth of £13m as a result of those products coming onto the market."

Cubik Innovation in Bristol was one of the companies supported. It enables other companies to build prototypes and used Microelectronics iNet funding to build an optical inspection test unit. The support allowed them to ensure the quality of the prototypes they produce for other SMEs in the region.

In a high tech environment, monitoring quality is crucial and the new unit allowed the company to inspect quality before shipping to customers. The unit provides a better service for their customers and a greater profitability for the company.

"Over the last two years the company has grown massively from just me, to 18 employees altogether. The Microelectronics iNet funding enabled us to go on a huge journey – not just us. It has also directly influenced many of our customers too," said Paul Mullen, managing director.

The project has worked with startups such as enModus and Surepower, research labs such as the machine Vision lab at UWE, and business accelerators at the EngineShed and University of Bath, as well as assisted living prototypes and growing companies such as chip and software verification specialist TVS.

"We have managed to crystallise the message for SMEs – that innovation is a very practical strategy that leads directly to sales and jobs growth," said Chapman. "There is clearly an ongoing market need and my belief is that this model would work again and could continue to deliver economic growth and new business and a very very healthy return on investment."

About the West of England Local Economic Partnership

The West of England Local Enterprise Partnership supports business growth and is working to attract new jobs to Bristol, Bath and Weston-super-Mare. The structure supports the LEP Board in making it happen, backed by multiple Sector Groups including the High Tech Sector which meets once a month. More information on the vertical and cross cutting sector groups is here. For more information or to get involved join the LinkedIn group and sign up for the High Tech Sector Newsletter at SW Innovation News for news of events and Special Interest Groups

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