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COMMENT

As the Minister for Higher Education praises a university education, let’s celebrate an award winning partnership

NEWS

Tenable Research discovers a cyber vulnerability that would enable cybercriminals to hack video surveillance

Cypress announces its Bluetooth solution which relieves the ear ache of unsynchronised audio

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Boosted by a combination of technological innovation and a strong economy, Mouser continues to impress

SMART TRANSPORT

A transport revolution

Quality data, in real time, will be critical to making the concept of Mobility as a Service (Maas) a reality. By Neil Tyler

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Negative campaign

As the war with semiconductor physics continues, can a transient effect rescue silicon power scaling? By Chris Edwards

RESEARCH & DEVELOPMENT

An award winning partnership

ARM’s collaboration with the University of Southampton hits 10 years and we celebrate a decade of innovation

COMMUNICATIONS DESIGN

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NEXT GENERATION COMMS

IIoT collaboration

A new industry collaboration looks to deliver wireless communication solutions suitable for industrial IoT markets. By Neil Tyler

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As the maker-market thrives, a new breed of engineer arises - and one which needs some nurturing. By Bethan Grylls

MISSION STATEMENT

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The Higher Education Minister, Sam Gyimah, recently reiterated the point that, “going to university was worth it.”

Why he felt the need to say this is surely a sad indictment of the current level of debate in the UK, and follows comments by the likes of fellow Cabinet Minister, Michael Grove, that Britain has heard enough from experts.

According to Gyimah at a time when the UK is seeking to “unstitch a 40-year relationship with the EU, we need experts more than ever. This is not the time for our universities to shrink back and sulk.”

He continued, “I want the UK to be where current and future generations come to see their ground-breaking ideas come to life and truly make a difference to the world.”

And, as if to prove that point, in this issue of New Electronics we celebrate the 10 years ARM and the University of Southampton have been collaborating and developing solutions for mobile and embedded systems.

The ARM-ECS Research Centre has focused on advanced design methods, architectures and the validation of single and multi-core processor systems, and has succeeded in grounding academic research, by using the experience and requirements of an industrial partner to guide and focus research projects.

In fact, it’s ongoing success should be seen as a benchmark by which other collaborations could be organised and the collaboration has not only benefitted ARM, but made it easier to attract students to the university.

“It’s been a relationship built on delivery and trust and is a strikingly professional working relationship that is helping us to attract the brightest students from around the world,” says Professor Bashir Al-Hashimi, who is Co-Director of the Centre.

But not only that, the university’s relationship with ARM means that for students, with the prospect of an internship, they are able to add to their research and to their long-term employability – a win/win for both parties and also for the UK going forward.

As Gyimah said in his speech, “We need to think seriously about international students and researchers. Out there, somewhere in the world, there are people, young and not so young, with the ideas and the potential to send shockwaves through the status quo.”

Collaborations such as that between ARM and the University of Southampton provide a platform to do just that.

Neil Tyler, Editor (neil.tyler@markallengroup.com)
A zero-day vulnerability which would allow cybercriminals to view and tamper with video surveillance recordings has been discovered by cyber exposure company, Tenable Research.

The vulnerability, dubbed “Peekaboo”, would allow cybercriminals to remotely hack into cameras via a remote code execution vulnerability in NUUO software — one of the leading global video surveillance solution providers.

NUUO’s ecosystem of supported devices means that more than 100 brands and 2,500 different models of cameras could be vulnerable. Preliminary estimates show that up to hundreds of thousands of cameras could be manipulated and taken offline worldwide.

The vulnerable device, NVRMini2, is a network-attached storage device and network video recorder. Once exploited, Peekaboo would give cybercriminals access to the control management system. Using root access on the NVRMini2 device, cybercriminals could disconnect the live feeds and tamper with security footage.

Tenable Research disclosed the vulnerability, which affects firmware versions older than 3.9.0, to NUUO following standard procedures outlined in its vulnerability disclosure policy. NUUO has informed Tenable that a patch is being developed and affected customers should receive further information.

In the meantime, users are urged to control and restrict access to their NUUO NVRMini2 deployments and limit this to legitimate users from trusted networks only.

**MCU sales to reach record heights**

The microcontroller (MCU) market is expected to continue hitting record-high annual revenues through 2022 — after worldwide sales dropped 6% in 2016 due to a slowdown in MCU unit shipments — according to IC Insights.

After drawing down MCU inventories in 2016, systems manufacturers stepped up purchases of MCUs in 2017 with unit shipments surging 22% and strong growth continuing in 2018. IC insights has raised its projection for MCU shipments to 18% in 2018 with the unit volume reaching nearly 30.6 billion. MCU revenues are now forecast to rise 11% in 2018 to an all-time high of $18.6bn, followed by 9% growth in 2019 to about $20.4bn.

The ASP for MCUs fell to the lowest point ever in 2017 and prices are continuing to drop at about the same rate in 2018, says IC Insights. However, the annual rate of decline has eased in the last five years compared to earlier this decade.

A key factor in the 2017 recovery of MCU sales from the decline in 2016 was a turnaround in the smartcard MCU segment, IC Insights continues. About 40% of total MCU shipments are currently for smartcard applications. Excluding smartcard MCUs, sales of “general” MCUs for embedded systems, automated control, sensing applications, and IoT-connected things are forecast to grow 11% in 2018.
Accelerating IoT solutions

Semtech has launched its Design Partner Program that aims to streamline the time-to-deployment for LoRa-based IoT solutions. It will connect customers, system integrators and developers with experienced design services firms that understand LoRa devices and wireless radio frequency technology (LoRa Technology). LoRa is a platform for developers to build IoT solutions with long range, low power capabilities in either private or public networks.

The Semtech Design Partner Program debuts with 7 design services firms participating: Gaussian Labs, GND Solutions, IMST, Occam Technology Group, ProAnt AB, Technosphere Labs, and Virscient. Customers will be able access this technical expertise by contacting the firm of their choice and contracting directly.

Robust connections

CYPRESS REVEALS ITS SOLUTION TO RELIEVE THE EAR ACHE OF UNSYNCHRONISED AUDIO. BETHAN GRYLLS REPORTS

Stereo synchronisation has proven to be a difficult challenge in Bluetooth earbuds. As a result, Cypress Semiconductor Corp has launched its Bluetooth Audio Solution based on the Wireless Audio Stereo Synchronization (WASS) application and the CYW20721 Bluetooth and Bluetooth Low Energy (BLE) Audio microcontroller.

Featuring a link budget that is “6dB better than competing solutions”, the device can achieve up to twice the range and enables superior cross-body performance for an uninterrupted audio experience. “Our signalling mechanism measures the timing and takes into account the buffering of the audio profile within each device. When the direction is switched (e.g. a mobile is moved to a different pocket), it changes the way the audio signal streams to the two ear buds. In this solution, one of those two devices will take control of the connection and manage the timing, so the switch can occur seamlessly,” explains Brian Bedrosian, vice president of marketing for the IoT Business Unit at Cypress.

Moreover, the solution operates at “nearly 50% lower power consumption than competing solutions”, enabling twice the playback time or the use of smaller batteries in sleeker form-factors. The WASS application is available in Cypress’ WICED Pro software development kit which supports an ecosystem that includes multiple audio codec partners.

WASS software further benefits from advanced wireless error correction algorithms in WICED Pro, offering high-fidelity connections. While the multi-mode Bluetooth/BLE MCU includes essential consumer features such as voice commands and cloud-based voice services.

Nanowires on flexible substrates

Nanowire-transfer technology has been successful developed by a research team from the Korea Advanced Institute of Science and Technology (KAIST).

Using a material-independent mechanical-interlocking-based nanowire-transfer method, the researchers fabricated ultra long and fully aligned nanowires on a large, flexible substrate.

This method involves sequentially forming a nanosacrificial layer and nanowires on a nanograting substrate that becomes the master mould for the transfer, then weakening the structure of the nanosacrificial layer through a dry etching process. The nanosacrificial layer weakly holds the nanowires on the master mould. When using a flexible substrate material, the nanowires are easily transferred from the master mould to the substrate.

KAIST was able to fabricate a variety of metal and metal-oxide nanowires – all perfectly aligned on a flexible substrate. The team confirmed it can be applied to creating stable and applicable everyday devices by successfully applying it to flexible heaters and gas sensors.

Design photonic layouts in minutes

Mentor’s new LightSuite Photonic Compiler enables companies designing integrated photonic layouts to describe designs in the Python language, with the tool automatically generating designs ready for fabrication. The resulting design is “Correct by Calibre” – with the implementation precisely guided by Mentor’s Calibre RealTime Custom verification tool.

Specifically designed for photonic layout, engineers have complete control of their layouts and can use the tool to automatically perform the placement and interconnecting of both photonic and electrical components. Designers create a Python script that is used to drive the LightSuite Photonic Compiler. Initial placement can also be defined in Python, or come from a pre-placed OpenAccess design. The tool interconnects photonics components with curved wave guides. As some of the components might contain built-in electrical elements, the tool will route these electrical connections simultaneously along with the curved waveguides.

LightSuite Photonic Compiler uses Calibre RealTime Custom during the inner placement and routing loop, resulting in a layout that is design-rule correct. The tool enables designers to perform “what-if” design exploration for photonics designs.
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MA Business, publishers of New Electronics and Eureka magazines, has announced the shortlist for this year’s British Engineering Excellence Awards (BEEAs).

“For nearly 10 years the British Engineering Excellence Awards have been the benchmark for great British engineering design and set the standard to which many aspire. Every entry is scrutinised and assessed in great detail before the winners are decided,” said Eric Wilkinson, Chairman of the judging panel and CEO at Cambridge Consultants. “Once again, this year’s entries are exceptionally diverse, and it has been a pleasure to review and assess them and pare them down to the shortlist.

“From innovative Start-Ups and enthusiastic Young Design Engineers, to inspiring Engineering Ambassadors and cutting-edge New Products, the strength of the shortlisted entries demonstrates all that is great about British design engineering.”

The winners will be announced at a gala lunch to be held at etc Venues, County Hall, London, on 4th October.

**BEEAS SHORTLIST REVEALED**

**Consultancy of the Year**
- Bennett Engineering
- Design Solutions
- GRM Consulting
- Spacechips
- Stirring Dynamics

**Design Engineer of the Year**
- Andrew Dearnley, Industrial Spray Solutions
- Graham Fick, Zikodrive
- John Atton, Lascar Electronics
- Orla Murphy, Jaguar Land Rover

**Design Team of the Year**
- ByteSnap Design - ATS
- Focus Multimedia Player
- SMR UK - Eco Mirror
- on-systems ltd - Pebble
- Imagination Technologies - PowerVR
- Series2NX Neural Network Accelerator

**Engineering Ambassador**
- AESSEAL
- Orla Murphy, Jaguar Land Rover
- Rapid Electronics
- RS Components
- TDK-Lambda UK

**Materials Application of the Year**
- CLASS Tie-blade
- Knuckle, GRM Consulting
- Nylacast Check Liner, Nylacast Engineered Products

**New Product (Electronic) of the Year**
- BRB15/6 advanced graphic controller ICs, Bridgetek
- CUS150M series of medical KC-DC power supplies, TDK Lambda
- EL-MOTE, Lascar Electronics
- PDR IR-ES Micro, PDR Rework
- PowerVR Furian SeriesXT GT6525
- GPU, Imagination Technologies
- T-Contacts, Harwin
- RF System on Chip (RFSoC), Xilinx

**Small Company of the Year**
- Aerotech
- CircuitWorx
- JR Dynamics
- on-systems
- Synergy Environ Start Up of the Year
- Bridgetek
- Spacechips
- Tunley Engineering
- Zikodrive Motor Controllers

**Young Designer of the Year**
- Ahmed Zribi, Woodford
- Brent Brakeboer, Surrey
- Callum Bramley, National Instruments
- Polly Britton, Plextek

The companies shortlisted in each BEEAs category are:

**Next generation power analyser**

Yokogawa has unveiled a new generation of Precision Power Analyzers that are able to offer measurement accuracy of ±0.033%. Combined with improved levels of stability, noise immunity and the use of plug-in modules to provide greater flexibility, it’s intended for developers of energy-efficient systems.

Changing application needs and evolving international standards means that there is a growing need for custom measurements and consistent accuracy, and the WT5000 has been designed to provide engineers with a more versatile platform that can be easily upgraded to meet changing requirements.

The WT5000 accuracy of ±0.03% means that it is now possible to evaluate the power consumption, loss, and efficiency of electrical and electronic devices. In particular, its wide dynamic current range should make it indispensable for tests on energy-saving designs.

One of the essential elements for determining the performance of a power measuring instrument is the A/D converter that performs analogue-to-digital conversion. The WT5000 uses an 18-bit converter with a sampling frequency of maximum 10 MS/s. As a result, it becomes possible to accurately capture waveforms from the latest high-speed inverter devices.

The WT5000 has the same dimensions as existing models but also incorporates up to seven input channels, allowing it to support applications that previously could only have been measured by synchronising several separate instruments. Plug-in modular input elements can be swapped directly by the user.

With a 7 elements input capability, multi-system measurement is possible. For example, the WT5000 can carry out two harmonic measurement functions simultaneously, each at up the 500th order and up to 300kHz fundamental waveform. This makes it possible to measure the carrier frequency component from the rotational speed of the motor in the inverter drive and also to check the influence of the carrier frequency on the motor drive.

An increasing number of applications require the evaluation of larger-current devices, typical examples being electric vehicles and large-scale solar installations. In these cases, external current sensors are often used. An external current sensor input function is fitted as standard in the input element of both the 30 A and 5 A input elements of the WT5000.

For much higher currents (up to 2000 A RMS) dedicated high-current sensors are available.
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At the heart of intelligent sensing
Helped by a strong global economy and a positive industry outlook, Mouser is continuing to expand its global footprint and is well on course to becoming a $2 billion business.

According to Mark Burr-Lonnon, Mouser’s Senior Vice President of Global Service & EMEA and APAC Business, “We are continuing to see increasing demand worldwide which is being aided by a buoyant economy. Growth is ahead in every region and if we take Europe, for example, this year we have seen year-on-year growth up in Germany by 65 percent, in Italy by 58 percent, Spain up 67 percent and in the UK and France ahead by 50 percent.

“On a global basis OEM sales are up 38 percent, the small to medium EMS sector is ahead 47 percent and MRO up 29 percent.”

Burr-Lonnon talks of the company being in a ‘very robust and fortunate position’.

“We expect our growth to continue, at least for the foreseeable future.”

Mouser continues to invest in technology and with over 600,000 customers worldwide, is able to identify trends and shifts in demand. “We have invested heavily in inventory and now have over 700 lines in stock,” Burr-Lonnon explains. “Our website and how we manage our inventory is crucial, but in the past few years we no longer look to match ourselves against our direct competitors but have started looking at the likes of Amazon, when it comes to levels of service and the way it operates and delivers to its customers.”

Mouser now has over 2,230 employees globally with nearly 1,800 at its world headquarters and distribution centre in Mansfield, Texas.

Construction is under way to expand the company’s 610,000 square-foot distribution centre with an additional 125,000 square feet being added.

In May 2018 Mouser’s opened its first support centre in Canada which means it now has 23 support centres around the world.

Office expansions include new offices in Mexico, Shanghai and Bangkok as well as new offices across Europe. “Mouser expects to open additional offices later this year in the Philippines, Vietnam, Brazil and Poland,” said Burr-Lonnon.

Mouser now has more than 300 employees in its support centres, and that number continues to grow.

To further support its global business, Mouser.com now hosts 63 regional websites and also operates in 17 languages and 27 currencies. The majority of Mouser’s sales come via the web, and the majority of the online customers come from across EMEA and APAC.

In terms of products, Mouser has seen 53 percent jump in semiconductor orders, while passives are up by 59 percent and connectors are ahead 25 percent, but these are impressive and aided by the company’s approach to inventory management, Burr-Lonnon acknowledges that the increased trade tensions between the US and China could start to have an impact on the industry.

“The threat of further sanctions is concerning,” he concedes. “The connector industry, for example, where connectors are manufactured in China and then imported into the US are open to the 25 percent tariff. There has been less impact on semiconductors, because while the wafers may be produced in China most of the backend work is down elsewhere.

“It’s a huge issue for some and a growing number of businesses are looking to open new offices in Mexico or take ownership of product elsewhere in Asia. It’s an issue for a lot of people and is adding complexity to the trading relationship as well as to the price of components.”

According to Burr-Lonnon, Mouser has managed to avoid raising prices, at least in the short term, due to effective inventory management and buying significant amounts of components before the tariffs were enacted.

“Among distributors various approaches are being taken to address this challenge. Pressure is certainly growing and there is a feeling that ‘enough is enough’ but,” he conclude, “we’ll have to see what impact the US government’s trade policies will have on the industry over time.”
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With the emergence of 5G, mobile groups are beginning to edge towards network slicing as they look to provide differentiated services. By John Walko

According to network equipment provider Ericsson, which was one of the first to outline plans for network slicing, early user cases are likely to include high data rate mobile broadband to support video, massive machine-type communications with transportation monitoring and control; mass market personalised TV with big data analytics; and critical Machine type communications with remote control.

“We are well on the way into developing working solutions, having worked with partners - including other operators and numerous network infrastructure providers - on ability to integrate multiple services with wide-ranging performance requirements - for instance high throughput, low latency, very high reliability and fool-proof security. And all that in a single physical network infrastructure that provides each service via a customised logical network - that is a network slice.

“It is a very complex, exciting and fast moving area with a host of challenges, and it is vital that for it to succeed, the industry comes together as much as possible and work to make it a standardised reality,” argues Corston-Petrie.

More work is being carried out at BT into exactly how to slice the radio and backhaul domains, investigating where there will need to be partial slices as well as end-to-end slices (see Figure). There may also have to be slices for services that target administrative, security and regulatory domains.

Beyond that, industry needs to start addressing more advanced topics such as automation, machine learning, self-healing, self-optimising and real-time monitoring.

One of the initial conclusions that Corston-Petrie suggests is crucial to support the business case is that the benefits of slicing increase as the
number of service types an operator is looking to introduce grows. “So there is economy of scale in slicing”.

Another clear but maybe less palatable message is that significant investment up front will be necessary to automate to make a success of this at scale, otherwise complexity and operational challenges are likely to mount up.

These and other results have helped BT and Ericsson while working on a major economic study published late last year that attempts to quantify the benefits of slicing in the core network for both operators and users.

Slicing was compared and contrasted with two alternative scenarios for new service deployments: one was dubbed ‘one big network’, the other ‘separate specialised networks’.

The companies suggest that, over a five-year period, the slicing/automation scenario could generate 35% more revenue than the ‘one network’ would achieve. Compared with the idea of several networks with dedicated resources, an improvement in revenues of 15% could be expected over the same period. There are also significant benefits to be made with the deployment of slicing when it comes to operational and capex efficiencies, the report stresses.

R&D collaboration

The research within Corston-Petrie’s group will also link into a major R&D project into slicing announced in June in collaboration with one of BT’s major suppliers, Huawei.

He is also co-chair, with HPE’s Marie-Paule Odini, of research within the Facebook led Telecoms Infrastructure Project that focuses on End-to-End Network Slicing (E2E). Launched late last year, the project will deliver use case specific Proofs of Concept across multiple vendors, domains and operators, connecting elements of UE to radio/access networks, backhaul, mobile core and the application/service provider. One project aims to demonstrate the capability to support at least four simultaneous network sub-slices at the UE level ported across two 4G networks.

“We are looking to bring together ideas and projects that are currently not being followed within other collaborative research projects in the network slicing area,” said Corston-Petrie, again emphasising his view that collaboration is vital to make all this happen.

Other companies involved include operators Orange and NTT DoCoMo, Airhop Communications and Finnish start-up Cloudstreet.

Other projects, mostly backed by EU funds, includes the 5G Transformer activity, launched two years ago, which focuses on the management of network slices and includes companies such as NEC, Nokia, Ericsson, Telefonica and InterDigital and numerous academic institutions.

Another project, dubbed MONARCH, which started last July, focuses on cloud-enabled network protocols and includes Nokia, Huawei, Samsung and Real Wireless.

Bristol based Zeetta Networks, a spin-out from the local university, has already developed network slicing software and protocols, and its NetOS open source products are being used in an E2E slicing project at Bristol City’s Ashton Gate football stadium to manage high density mobile use. The slicing software is also being trialled within the Bristol is Open smart city test bed.

Also, in the mix is Mavenir (Richardson, Texas) with a slicing orchestration suite, dubbed CloudRange, that is basically virtual partitioning software that works across the radio and core networks and applications. And Affirmed Networks, (Acton, Massachusetts) is offering the Virtual Slice Selection Function to 4G operators. This software will steer traffic into slices over both legacy, virtualised and future multi-vendor networks.

Previously mentioned Cloudstreet (Espoo, Finland) - which even brands itself ‘the Network Slicing Company’ - has recently been awarded patents in both the US and Europe for underlying technologies said to be crucial in dynamic slicing and orchestration. The patents, applied for 5 years ago, were based on PoC demonstrators in conjunction with Finnish carrier Telia in Europe and the US Government’s unified public safety network FirstNet.

“We are reaping the benefits of early innovation in this exciting area, and we intend to build on this to pursue further advances and commercial deals.”

Mika Skarp

“IT is a very complex, exciting and fast moving area with a host of challenges, and it is vital that for it to succeed, the industry comes together as much as possible and work to make it a standardised reality”

Andy Corston-Petrie

“We are reaping the benefits of early innovation in this exciting area, and we intend to build on this to pursue further advances and commercial deals.”

Mika Skarp, Founder and CEO of Cloudstreet told New Electronics.

He stresses that network slicing is already deployed in some 4G enabled networks, some using the company’s Dynamic Profile Controller...
(DPC), basically a sophisticated virtualised application function. “We have identified IPTV as an important first use case application for network slicing, and we are in discussion with several carriers regarding the opportunity,” said Skarp.

The Cloudstreet founder, who previously worked for Nokia, maintains the biggest obstacle to significant rollouts of NS – and indeed the bigger picture 5G – is the mind-set of many carriers who are procrastinating on how best to transition from the core, SIM-card based business model to selling differentiated capacity products.

“Undoubtedly, this is a huge change, but they need to consider the bigger picture and start taking maybe early revenue-generating ‘baby steps’ on 4G networks to reap the benefits that will come in the 5G era”.

Many of the major carriers and equipment makers are, to be fair, taking more than simply ‘baby steps’ into the NS area. Ericsson and NTT DoCoMo have been working on network slicing since 2014 and demonstrated two years later a PoC dynamic network slicing technology that they suggest will work on 5G core networks.

The Japanese carrier designed the network slice creation and selection functions, while Ericsson developed the network slice lifecycle and service management protocols.

The Swedish group has also joined forces with SK Telecom in 2015 and have developed and deployed NS technology optimised for 5G services. The partnership also demonstrated ways to create virtual network slices specifically targeting services such as super multi-view and augmented reality/virtual reality, massive IoT offerings.

**Slicing automatically**

Elsewhere and more recently, Huawei and Deutsche Telekom (both also early adopters and designers of NS technology) started a project that demonstrated how different networks slices can be created automatically and in an optimised way on a shared Radio Access Network (RAN), core and transport network.

Anders Rosengren, head of technology and industry engagement at Ericsson’s Digital Services unit concurs that the real opportunity for NS will only emerge within true 5G networks, but suggests it’s in PoC projects and trials has been, and for a while continue to be, of vital importance.

He notes that collaborative projects, such as the one recently announced with “forward looking” carrier Swisscom, will prove the case as the partnerships anticipate” 5G like applications. The companies are testing RAN slicing and Quality of Service control, as well as Ericsson’s core network functionality to be able to configure dedicated slices for some critical use cases in the railways sector and public safety, as well as those targeting IoT and manufacturing.

“We are targeting, for instance, Gbit rate mobile broadband to be used in trains, as well as remote location. At the other end of the scale we have a set-up monitoring and remotely controlling machines that require extremely low latency but very high reliability,” Rosengren told New Electronics.

When asked if they were disappointed that such core network developments have received less attention than, for instance, the progress, publicity and standardisation efforts with the radio access side of the equation or mmWave links, all three interviewees concurred that the 5GNR emphasis was understandable since that had to be the catalyst that triggers other crucial 5G infrastructure advances.

And now that 5GNR specifications are up and running, not surprisingly, all three are keen that NS grabs the technological and business opportunity.

Not that this will be easy. There are, as suggested, many unanswered questions in the NS area, not least exactly how operators can – will – deliver the capability. There is a big debate and little consensus over just how many slices – whether horizontal or vertical – may be needed or sensible. And whether every vertical sector, such as healthcare, IoT, automation, automotive or entertainment will need or want its own slice.

And perhaps the biggest conundrum, for equipment makers, carriers and potential users, is exactly when all this is going to happen – since the opportunity clearly depends on everyone delivering on the promise of 5G.
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When it comes to encouraging more people to use public transport what can be done? Recent figures from Transport for London (TfL) suggest that people are actually making fewer tube, bus and train trips while traffic volumes are increasing, if only marginally, so what needs to happen to drive down this seemingly growing dependency on private vehicles?

According to Johan Herrlin, CEO, Ito World, the key to encouraging this is to provide good and accurate data, so that people will start to put their trust in alternative modes of transport.

“There’s a mobility revolution taking place in urban transportation which is being driven by the availability of smart phones,” explains Herrlin. “Smart phones have changed the way in which people engage with one another and has underpinned a shift from privately owned assets to shared forms of transportation, we’re seeing a move away from traditional forms to demand responsive forms of transportation.”

Ito World works with a variety of agencies and operators to align their real-time data to timetables, with the aim of delivering a single, integrated real-time service for cities and regions.

Go to a bus stop or a train station and there are running boards and countdown clocks that make a journey easier and apps have been developed that complement the physical infrastructure of the transport network.

“But while these services work, they could be vastly improved,” according to Herrlin. “Transport operators need to ensure that as more data becomes available it is used to provide more accurate and relevant information to the end user.

However, in cities like London, where specific rules dictate who can work and operate, there is a degree of complexity that is challenging to operators looking to access data to the benefit of the customer. With multiple operators customers need different apps to access different services. How many are required to provide an accurate service?”

In London, for example, there are at least four different apps for bike-sharing services simply to find out where these bikes are located.

When travellers know they can trust what their app is telling them they will be far more likely to take in the information they’re being provided with, according to Herrlin, and then they will be able to decide what mode of transport is best suited to them – whether a traditional mode of public transport, such as a bus or tram, or an on-demand service.

“People need seamless journey planning and in a fragmented market that’s hard to achieve. Transport is undergoing rapid change and fragmentation is a consequence. As more players move in to the market there will be consolidation, we’re seeing that already with the likes of Uber moving into bike sharing.”

It is critical that high-quality information is delivered in real-time and made available for all parts of a journey. That information informs decision-making but, as we increase access to data and more data is generated, its quality needs to be increased.

“This is crucial,” says Herrlin, “not only does it benefit the commuter but it will make it easier to distribute public services more efficiently.”

Mobility as a Service (MaaS) brings multiple modes of transportation Data will drive the smart transport revolution Quality data, in real-time, will be critical to making the concept of Mobility as a Service (MaaS) a reality. By Neil Tyler
together through a service app interface, removing all the points of friction from booking to payments, and ultimately reducing or eliminating the need for private ownership of cars entirely.

“Ito World has partnered with many cities and transport providers and by making more data available, people have been able to make better choices in how they move around their city. It is up to transport and city authorities, to share that data and put measures in place to guide the behaviour of individuals to drive wider societal goals,” Herrlin explains.

Ito World takes operational data from transport operators and city authorities and turns it into human navigable data, but not only that it enhances the quality of that information to ensure people have access to seamless experiences when travelling across cities.

“This involves us taking data that is operational in nature and designed to manage fleets of vehicles and delivering detail enriched data. We do this for the likes of Apple and Google, taking public transport data and ensuring that it is usable. To ensure the quality of the data we provide we make upwards of 130,000 changes to scheduled data as it passes through our systems.

“Those changes include updating the physical location of assets or compensating for the fact that no data is available in a specific area. Likewise, when maintenance work is taking place and disruption is expected, we take that into account to ensure that the apps we support don’t end up sending people to those locations. Essentially, we are taking scheduled data and overlaying it with real time data.”

Data from multiple sources

“Open data is a great source but insufficient for our needs, so we have access to proprietary data sets, although certain standards and regulations can cause problems.”

According to Herrlin, the company doesn’t just work with the likes of Apple or Google, but is increasingly working with the authorities themselves.

“The aim being to get the data right in the first place.”

Tech-driven disruptors such as Uber and Lyft offer a much more demand-responsive, flexible service for customers and, as such, traditional public sector operators are now having to adapt and look to data for some of the answers they need in order to keep up, and compete with, these new players.

Arriva and Go Ahead, two of the UK’s largest national bus operators, have invested in making their real-time bus data more accessible to potential consumers by opening it up to one of the largest journey planning apps in the world, Google Maps.

“That has meant they have been able to significantly increase their reach and ridership,” according to Herrlin.

The UK government has also recently launched a consultation to legally require operators to share their data so passengers can get real-time information on routes, timetables and fares to ensure that passengers have the information they need, regardless of their location and the company running the service.

“More open data is, without a doubt, key to making MaaS happen,” says Herrlin.

However, both governments and organisations have struggled when it comes to deciding which types of data are appropriate to share with the public and what risks might be associated with opening up access to data. There are some very real issues at play, relating to costs, privacy and security.

MaaS providers need transit accurate data that reflects the real-life customer experience as closely as possible, as well as to ensure the efficient operation of public services.

By working with data experts, such as Ito World, who can leverage open and proprietary data to improve and augment real-time data, authorities and operators will be able to deliver a single integrated real-time feed for entire cities across the globe.

“Our platform has been evolving over many years. We are able to aggregate and ingest the data supplied by our clients, remodel it to cover all forms of transportation, and then put it into a representation of our own design. Not many companies can do that.

“In a complex world schedules, or the intended outcomes or what is planned, do not always survive coming up against the real world. We look to reconcile the two to the benefit of providers and consumers.”

When asked about the accuracy of their data Herrlin says that they provide each user with a scorecard against which they measure the improvement, accuracy and consistency of the data supplied.

“Working with authorities we regularly outperformed their own engines, not only because of the sophistication of the algorithms underpinning our applications but because we are able to look at the entire system.

“People are willing to embrace alternative modes of transport,” says Herrlin, “so now it’s up to transport agencies and authorities to meet their expectations and deliver the accurate information needed for effective journey planning.”
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Can a transient effect rescue silicon power scaling? By Chris Edwards

The war with semiconductor physics claimed another victim at the end of August when GlobalFoundries decided it could no longer afford to continue work on a 7nm finFET process, or its successors, despite the efforts of teams that came originally from AMD and IBM. With deeper pockets, Intel, Samsung and TSMC are continuing but at some point even they will either run out of nanometres or the belief that they will find enough customers to pay for increasingly expensive wafers that may not justify the scaling benefit they achieve.

For more than a decade, there has been little movement in clock speeds. And power savings have been made through the use of exotic materials and transistor shapes. The next step after the finFET at 7nm is some kind of nanowire or nanoribbon that is even more difficult and expensive to produce. One answer may be to think again how transistors work to find other ways to build more energy-efficient circuits.

With conventional metal-oxide semiconductor (MOS) transistors, there is a lower limit on the energy used during switching that is imposed by thermodynamics. The problem lies in the way transistors rely on thermal excitation to move enough electrons into conduction bands to operate. One answer may be to think again how transistors work to find other ways to build more energy-efficient circuits.

Positive capacitance

A MOS transistor can be modelled as the combination of two capacitors in series: one is the total gate capacitance; the other is due to the semiconductor capacitance. Under normal circumstances, the combined capacitance is smaller than the value of either device. The gate voltage is divided across the two. However, if you can somehow introduce a negative capacitance into the gate electrode, the total capacitance winds up higher than the individual contributors. Not only that, the internal voltage between the gate electrode and the semiconductor capacitance turns out to be higher than the gate voltage.

Above: Positive capacitance. The top part of the figure highlights energy and charge, the lower, the shift that occurs in the polarisation of ferroelectric material as voltage increases determined by information theory and quantum mechanics.

One way to break the “Boltzmann Tyranny” is to move to a different type of transistor. During the 2000s, researchers looked at devices that explored side effects of quantum physics and processes that would damage conventional CMOS transistors with the tunnel-effect transistor (TFET) and impact-ionisation transistor. The TFET suffers from low drive current, which limits performance, although it has transconductance properties that may make it a good choice for ultra low-energy analogue circuits. The impact-ionisation device, as its name suggests, looks likely to suffer reliability issues. And it demands relatively high operating voltages. With either alternative, circuit designers would also be faced with the problem of coming up with topologies that are quite different to those used with CMOS.

Negative capacitance

A little over a decade ago, Sayeef Salahuddin and Supriyo Datta, then both working at Purdue University, came up with another option that would not throw away the massive design investment in CMOS. Their proposal was, at its heart, a form of circuit-design legerdemain: find a material that can introduce an effect that contradicts conventional electrical theory into the gate of the transistor. Their effect is negative capacitance.

A MOS transistor can be modelled as the combination of two capacitors in series: one is the total gate capacitance; the other is due to the semiconductor capacitance. Under normal circumstances, the combined capacitance is smaller than the value of either device. The gate voltage is divided across the two. However, if you can somehow introduce a negative capacitance into the gate electrode, the total capacitance winds up higher than the individual contributors. Not only that, the internal voltage between the gate electrode and the semiconductor capacitance turns out to be higher than the gate voltage.

With an operating voltage that is higher than the applied voltage, designers can drop the gate voltage into the sub-threshold zone but not suffer the normal consequences of
higher leakage and lower switching speed. It’s a free lunch for low-power circuit design: just as long as you can find an electrical Bigfoot. It is entirely possible to measure what looks like negative capacitance, but it’s generally a side effect of inductance in a circuit with very low resistance.

Although a material that exhibits negative capacitance sounds impossible, researchers claim to have found a true negative-capacitance effect, albeit fleetingly, in ferroelectric materials.

Rather than a parabolic relationship between voltage and energy stored, the shift in polarisation that occurs in a ferroelectric material as voltage increases follows a W-shaped trajectory. It’s during the short period when polarisation begins to switch that researchers believe it is possible to exploit the negative capacitance as a form of voltage amplification. But the device needs to be stabilised in some way to stop it switching polarisation states completely and introducing unwanted hysteresis.

In this model, the negative capacitance partially cancels out the positive capacitance in the rest of the gate stack while it is switching on, with the payoff of a reduced sub-threshold swing. That could potentially take it below the current hard limit of 60mV/decade.

**Ferroelectric memories**

There is further good news. For decades, work on ferroelectric memories focused on materials such as lead zirconate titanate (PZT), which proved to be tricky to move into high-volume manufacture. Even today, ferroelectric memories are far from common, though Texas Instruments succeeded in embedding them into low-power microcontrollers. But there is another contender in the form of the same hafnium oxide now widely used as the high-k dielectric in CMOS since Intel introduced its 45nm process. GlobalFoundries, for example, has been among those working to develop embedded memory cores based on modified forms of hafnium dioxide. Though its ferroelectric properties are not as good as PZT, modified hafnium dioxide is good enough to demonstrate the transient negative-capacitance effect. But there is a catch that is probably independent of materials choices.

Simulations by Borna Obradovic and colleagues at Samsung Semiconductor indicate that the negative-capacitance occurs over too long a timescale to be responsible for the results claimed so far of reductions in sub-threshold swing.

Their argument is that negative capacitance may prove to be useful in the design of a new generation of ferroelectric memories, but it may not be the circuit-design breakthrough it seems. The Samsung team saw effects taking place over the period of more than a microsecond. To be useful in an augmented CMOS transistor, the effect needs to take hold on picosecond timescales.

Obradovic said at the 2018 VLSI Technology Symposium, his team’s results point to the effect being unlikely to lead to a general-purpose negative-capacitance transistor (NCFET). But observers believe the idea is far from dead. There does seem to be an effect. It’s just not clear what is causing it.

One theory is that the negative capacitance effect appears when the ferroelectric starts to switch polarisations. Rather than taking place at once, tiny clusters of the opposite polarisation appear first and expand until they merge with their neighbours over the period of ten or more microseconds. However, some experiments have suggested that the negative capacitance takes hold faster than predicted by traditional models.

There may be interactions in the interfaces between domains of different polarisation states that can deliver a usable NCFET. Work by UC Berkeley presented at VLSI Technology Symposium alongside Obradovic’s paper suggested experimental results followed a compact model closely enough for the model to be a reliable guide.

The UC Berkeley model suggests it could lead to transistors that work better at 0.5V to 0.6V than their pure-CMOS counterparts. But the physics looks likely to puzzle researchers for some time to come and it’s far from clear that the NCFET is ready to come to the rescue of low-power silicon chips. If it does work, scaling may return to supply voltage even as it comes to a halt in terms of device density.
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ARM’s collaboration with the University of Southampton hits 10 years. Here we celebrate a decade of innovation in mobile and embedded systems. By Neil Tyler

ARM powers over 125 billion chips in devices around the world, and researchers at the global technology giant are constantly working with partners to shape a secure and connected digital world, with intelligence at the core.

An integral part of the ARM philosophy is to fuel technology transfer between academia and industry; and this autumn marks the 10th anniversary of an award-winning partnership with the University of Southampton.

The ARM-ECS Research Centre, based in the Russell Group University’s School of Electronics and Computer Science (ECS), focuses on advanced design methods, architectures and their practical validations for energy-efficient and dependable single-core and multi-core processor systems.

“Our researchers are creating the future of mobile and embedded systems,” ARM Research Group Leader, Stephan Diestelhorst, explains. “ARM’s technologies are demonstrating the Centre’s research findings: our test chips allow researchers to practically validate new designs and approaches, while our software tools are released to the community so that others can benefit from our results and methodologies.”

To date, the Centre has fabricated 12 new test chips, released 3 open source tools, collaborated on co-authoring 32 papers, graduated 6 co-supervised PhD students and completed 22 internships in Cambridge. The collaboration’s accomplishments have also been recognised with a University Research Group of the Year award from Techworks (formerly the National Microelectronics Institute) in 2015.

“One of the main objectives for the Centre is to ground academic research in a real-world environment – using the experience and requirements of an industrial partner to guide and focus research projects,” explains Associate Professor and Centre Technical Manager (ECS) Geoff Merrett. “Over the past decade ARM-ECS has become a model of industry-academic collaboration done well.”

Where industry and academia meet

The Centre, which is co-directed by ECS’s Professor Bashir Al-Hashimi CBE and ARM Director of Technology Professor David Flynn, requires input from both academics and industrialists on projects, with the nature of research steered by the expected needs and requirements of ARM. This covers shorter-term issues of concern, but also more ‘blue sky’ research, which might be harder to justify solely for a company.

The Centre has become one of ARM’s largest university research collaborations in the UK and contributed to Bashir Al-Hashimi’s recognition in the Queen’s Birthday Honours 2018, awarded for his services to engineering and industry.

“I think it’s crucial for academia to establish a relationship with an industrial partner,” says Prof Al-Hashimi. “ARM has recognised the quality of the research we undertake here at Southampton, Over the past ten years we have developed a regular internship programme, which has helped expose us to the latest and current thinking at ARM. My job is...
The ECS aims to ground academic research in a real-world environment, using the experience and requirements of an industrial partner to guide and focus its research. – Geoff Merrett

Collaborative research

The success of projects in the ARM-ECS Centre has also led to subsequent wider, collaborative research with a broader set of academic and industrial partners, across the UK and Europe. The EPSRC’s £5.6 million PRiME research programme is a collaboration of four UK universities and five industrial partners – Altera, ARM, Freescale, Imagination Technologies and Microsoft Research – researching methods to reduce the power consumption and increase the reliability of future many-core embedded systems.

The 10th anniversary of the Arm-ECS Research Centre was recently marked with a reception at Robinson College, Cambridge. The celebration, which followed the conclusion of the ARM Research Summit, showcased recent successes from the Centre. These included advances by PhD student Matthew Walker, whose involvement in ARM-ECS has innovated accurate and stable run-time power modelling for mobile and embedded CPUs.

His statistically sound approach to run-time power estimation was nominated as an Institute for Electrical and Electronic Engineers (IEEE) Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD) Best Paper and provided the foundation for the publicly available, free and open-source tools PowMon and GemStone.

PhD research projects are a key aspect of the ARM-ECS relationship, with each early career researcher supported by one or more industrial mentors from ARM in addition to the academic supervision from ECS. This unique research experience includes the opportunity to intern with Arm in Cambridge.

Current PhD student Ben Fletcher is exploring low cost 3D integration for the IoT and is now based at ARM’s Cambridge office, having spent the first half of his study in Southampton.

“Three dimensional integrated circuits are a new breed of silicon chips that contain multiple layers of silicon stacked up vertically,” Fletcher explains. “Integrating multiple layers will mean that they can incorporate more diverse functionality and also function quicker, whilst consuming less power. My research is specifically looking at innovative ways of communicating data between the layers within these new stacked 3D-ICs using wireless communication through inductive coupling.”

The success of the ARM-ECS Research Centre has demonstrated a model that could be replicated by other universities and prospective industrial partners across the UK says Prof. Al-Hashimi.

“It’s been built on delivery and trust and is a strikingly professional working relationship, that is helping us attract some of the brightest students from around the world and which adds to the value of their research and their long-term employability.”
"If you build it, they will come."

It’s a line best known from the 1989 movie, Field of Dreams, but applicable to many facets in life, including urbanisation. Cities are increasingly looking for ways to evolve and modernise as their population booms.

As cities evolve so there is a constant search for new ways in which technology can help build a proficient and sustainable infrastructure that adds value and reduces operating costs.

The goals of implementing smart city technologies are to improve quality of life for the public, to create efficiency, to reduce response times, address service needs, and to more efficiently use city resources. With real-time, data city officials and residents can more easily assess the efficiency of city initiatives and make improvements as necessary.

The Internet of Things (IoT) is proving transformational and with 5G on the tip of every developer’s tongue, the assumption is that it is a natural solution. But what if it wasn’t? What if there was another technology option that made more sense for certain use cases in smart cities?

We think there is - LoRa, a long range wireless data communication technology, enabled by semiconductor chips that power very long-range transmissions with extremely low power consumption. A wireless transmitter’s battery can last for years, because the chips use such low amounts of power, reducing the need for maintenance and battery replacements.

LoRa networks operate on unlicensed spectrum that delivers secure, bi-directional communication, without the regulations and auction costs. But that doesn’t mean there aren’t protocols in place to ensure consistency and safety. The LoRaWAN protocol is a unified protocol supported by the LoRa Alliance, an open, non-profit association of more than 500 global members including Alibaba, Cisco, IBM and Google – using an open, unified protocol to expand its reach.

LoRa at work in your city

LoRa Technology offers both technical and business benefits for smart city applications.

Smart city technology is one way that governments and cities provide sustainable services required to meet urbanisation demands. LoRa and LoRaWAN provide a highly flexible smart sensing and control infrastructure, which allows cities to collect and analyse data from thousands of connected devices in a streamlined manner. They can be installed in public, private, or hybrid networks, indoors or outdoors. And LoRaWAN signals are able to penetrate deep in urban installations.

Boston, Massachusetts, has more than 67,000 electric streetlights, the resources needed to provide consistent and constant light to its residents are significant. With over 1,600 control boxes and 32,000 manhole pull boxes, maintaining this type of infrastructure is expensive. Streetlamps represent a large portion of a city’s allocated energy budget, in some cases reaching upwards of 40 percent. Studies of energy grids estimate that a smart grid IoT solution using sensors, gateways and LED bulbs would provide large financial returns as well as valuable data.

Having the ability to better manage these lights allows for reduced energy consumption, greenhouse gas emissions, and costs.

Through the LoRa network, sensors can be embedded in each street light, having the ability to control light functions as well as track usage data.
The LoRa technology in the sensor connects the street light to a LoRa-based gateway, which aggregates data from all nearby street lights. The gateway sends information to a public or private Cloud server, where data is analysed by an application server that can ultimately control lighting and automatically send maintenance alerts for burnt out bulbs and other issues when needed. And all of this can be done on public or private networks as they desire thanks to the bidirectional communication that LoRa technology offers.

LoRa Technology can be implemented in a variety of ways, including:

- Smart parking monitors that show parking spaces available in a city to help reduce the traffic congestion created by people looking for a parking space.
- Traffic congestion, implementing smart traffic systems that can monitor traffic to better route automobiles and pedestrians. This is taking place now through smart traffic lights that sense traffic and coordinate light timing, but in the future, smart traffic systems could also include communication from lights to sensors in automobiles.
- Smart building systems provide data that ensures structures are maintained properly by providing a predictive maintenance system.
- Smart waste management systems can help detect garbage levels in containers to optimise the waste collection routes to maximise efficiency, cost effectiveness and cleanliness.

As more people move to cities, noise and air pollution become a bigger challenge. Smart noise and air pollution monitoring can provide data that can improve citizens’ well-being and detect systemic health issue correlation.

**LoRa and LEDs: A case study**

Harbours are a prominent feature in port cities around the world. Recently, the yacht harbour of Tallinn, on the Baltic Sea, put the LoRa technology to the test.

Haven Kakumäe provides pontoon docks, a vessel hotel, administrative building, catering establishments and a children’s sailing school, making it a complete and modern maritime centre.

The LoRa installation is being tested throughout the port’s luminaires, controlled remotely through a LoRaWAN network and using Luminaire controllers installed on 45 outdoor lamps. The Luminaire Controllers were connected to the LoRaWAN Gateway over the radio, which is situated at the harbour, but the connection is also supported by other near gateways. The fully secure IoT Hub platform visualises encrypted data from the end-nodes via LoRaWAN backend.

Connecting lights via LoRa allows for autonomous operation based on configured lighting profiles, enabling the marina to take a low energy consumption and low-cost approach to its lighting system. Although the harbour is still testing the full solution, the LoRa-powered controllers are already providing better real-time control and consistency over lighting. The ability to monitor light intensity, work mode and movement means that unnecessary over-lighting can be avoided.

Implementing this latest lighting design allows Haven Kakumäe to set the stage for what future ports could ultimately look like. More so, safety is not compromised. In addition to transmitting data over the fully secure platform, the marina’s access control systems allow for flexibility and real-time notifications and alerts for any possible unauthorised activities. To address security concerns, Semtech’s technology ensures that no one person has access to root keys, devices cannot be copied, and device owners are the only entities that have access to sensor data. It also can run on a private network to give providers more control, visibility and security over data.

**A good idea**

LoRa can be especially helpful in increasing value and reducing investment in infrastructure and maintenance thanks to its flexible low-power technology, as well as building public or private networks over long ranges.

Imagine thousands of sensors that have been implemented in streetlights, then imagine the nightmare of having to replace the batteries in those sensors multiple times per year. Due to LoRa’s low power draw, batteries on sensors can last for years – significantly reducing the investment of time, cost and manpower needed to perform that maintenance.

Beyond that, LoRa’s flexible and scalable architecture that runs on the unlicensed spectrum means you can build a long-range public or private network quickly and easily. This reduces the amount of investment required to build out necessary infrastructure for a network to support IoT technologies. And with the bi-directional communication and OTA updates that LoRa enables, changing a network from public to private, or vice-versa, can be done with a simple push update.

Combine this with long-range sensors that can connect up to 30 miles in rural areas, or across miles of densely populated urban or deep indoor environments, and the potential value of LoRa becomes readily apparent.
Earlier this year Advantech, Behr Technologies (BTI), Hitachi Solutions America, and Microsoft, announced that they would be collaborating on delivering wireless communications solutions for private industrial internet of things (IIoT) networks.

While they acknowledged that no single technology provider can enable the IIoT alone, this group effort is thought to be one of the first that looks to provide a mass-market, end-to-end wireless gateway solution to ensure connectivity with sensors for production-level industrial and commercial applications.

“What we are looking to deliver is much greater scalability, the deepest possible building penetration, integration and interoperability with legacy systems, together with a much longer battery life for nodes,” explained Tze Chiew, Product Sales Manager at Advantech.

“As separate businesses we have had to focus on different areas of the IIoT,” Chiew said. “The industrial market is maturing and is being driven by the need to raise productivity and reduce costs.

“That’s being achieved by collecting more data, ensuring improved levels of connectivity and providing real time analysis to support the decision-making process.”

The adoption of communication technologies in manufacturing has evolved over several decades, explains Chiew, with protocols such as Ethernet/IP, EtherCAT, and Profinet serving as the backbone for time-sensitive automation and control applications.

While industrial Ethernet and classical fieldbus technologies tend to be suited for real-time automation and process control, they can be cost-prohibitive and too cumbersome when connecting huge numbers of sensors for remote monitoring to the cloud.

“The increasing prevalence of sensors connected via the industrial internet of things (IIoT) to provide information for data-driven applications like predictive maintenance are, however, now driving the need for a complementary communications infrastructure,” Chiew explained.

According to Chiew, “Most companies in this space are having to look at retrofitting existing machinery to optimise production processes. Few, I would say under 5 percent, are customers looking to invest in new production lines.”

That brings with it particular challenges when it comes to installation and opens up the possibility of installing wireless solutions, which are particularly suitable when it comes to retrofits.

“That’s due to the ease of installation and supporting any future expansion,” explained Chiew.

“We are seeing more wireless solutions being implemented in production environments to provide an additional layer for efficient sensor communication.”

These types of wireless solutions however, require industry-grade robustness, the ability to integrate massive end-points across the entire factory, network longevity, low power requirements, and cost-efficiency.

Chiew suggested that developments in the industrial space were less revolutionary, more evolutionary.

“What is truly revolutionary in this space is what Cloud providers are able to do with the data that’s collected. And we’re seeing an industry in flux as more manufacturers embrace the Cloud, while Microsoft, for example, appears to be moving towards developing hardware.

“The middle part of the market, where Advantech is located, is where things are converging.”
The collaboration between Advanotech, BTI, Hitachi Solutions and Microsoft is intended to meet a growing demand for robust and comprehensive out-of-the-box wireless IIoT communications solutions.

“Underpinning this joint effort is BTI MIOTY, a low-power, wide-area network (LPWAN) communications solution, that uses the ETSI standard telegram splitting ultra-narrow band (TS-UNB) technical specification for low throughput networks,” Chiew explained.

Telegram Splitting – Ultra Narrow Band (TS-UNB) has been developed and recently approved as a global ETSI standard for low throughput networks (TS 103 357). Transmission of a telegram (data packet) is divided into short radio-bursts (sub-packets), which means that the new Low Power Wide Area Networks (LPWAN) standard avoids problems such as interference and avoids the issue of long on air time, which can impact power usage and overall performance.

“By using industry-standard Advanotech gateways, BTI MIOTY is able to transmit up to 1.5 million messages per day, within a radius of five to 15 kilometres, with no carrier requirements.”

As we’ve already seen, the retrofit market is dominating this space and wireless instrumentation can be easily deployed without interrupting functioning processes, while at the same time, satisfying demanding industrial requirements.

In terms of range, power, and costs, LPWAN are expected to be the standard IIoT communications infrastructure, covering the entire industrial facility and supporting a multitude of use cases, from simple temperature monitoring in a manufacturing plant, to condition monitoring, energy consumption tracking and worker safety.

LPWAN is able to address a number of major drawbacks associated with other short-range radio technologies (e.g. Wi-Fi and Bluetooth) and cellular connectivity in large-scale IIoT deployments.

With a range varying from a few metres to more than 10 kilometres and deep indoor penetration, LPWAN enables effective sensor communication in remote and underground industrial complexes, and fills other cellular coverage gaps

The potential for IIoT in manufacturing facilities is seen as being ‘boundless’.

For example, when coupled with a powerful analytics platform, sensor networks will be able to provide inputs that will enable condition monitoring and analysis of past equipment failures to detect causes and anticipate fault probabilities in the future.

IoT Service Hub
Hitachi Solutions’ IoT Service Hub will enable organisations to connect and monitor devices and analyse the data in real time.

“The IoT Service Hub, customers will be able to aggregate and analyse equipment telemetry data in real time. The actionable insights provided will allow them to be more predictive and proactive, ensuring a safer and more productive environment with more efficient and cost-effective operations,” according to Chiew.

IIoT is a “team sport” and Advanotech, BTI, Hitachi Solutions and Microsoft have come together to build a scalable, mass-market offering which includes deep building penetration with extremely long battery life, which is a signature of LPWAN networking approaches.

The Edge Intelligence Server provides a device-to-cloud solution at the edge. With WISE-PaaS EdgeSense IIoT software built into Advanotech’s gateway, it is able to provide connectivity and manageability at the edge to simplify IIoT applications.

Microsoft’s involvement comes with the Azure Cloud. The company continues to reach out to the very edge of the IoT and IIoT, a market

Microsoft is clearly seen as valuing as it continues to expand its enterprise strategy.

The combination of Azure services and BTI MIOTY, means that customers can implement cost effective and highly scalable solutions to facilitate the “last mile” of communication for messages delivered from sensors to the Cloud.

The first application resulting from this collaboration is a new and, what some consider, unique approach to workforce safety using the BTI MIOTY LPWAN wireless solution on an industry-standard gateway.

Using a wearable device to monitor the heart rate of workers in industrial high-risk environments, data on the health of hundreds of workers can now be transmitted over unlicensed, sub-gigahertz frequencies via BTI MIOTY to a single Advanotech base station.

From the base station it is communicated to the Microsoft Cloud, where Hitachi Solutions’ IoT Service Hub can provide actionable insights on workers’ health and send alerts when workers are in danger.

Employers, such as mining site operators, can deploy this end-to-end solution to protect their workforce with a much improved level of responsiveness, at a fraction of the cost of previously available technologies.

“BTI MIOTY has been specifically developed for massive and lowest-cost LPWAN communications and is poised to be the commercial standard for wireless IIoT connectivity,” said Chiew and, “the use cases are endless. We think that it will deliver a wireless IIoT solution that is unique in the market.”

According to Chiew, “By working with our broad partner ecosystem, I believe we are now ushering in a new era of IoT communication that will enable organisations to better realise the promise of industrial automation in ways that were not previously possible.”
Cultivating innovation

As the maker-market thrives, a new breed of engineer has appeared, and one which needs some nurturing. By Bethan Grylls

Fuelled by the rise of the Internet of Things (IoT), hobbyists are presented with a breadth of opportunity that previously never existed. This has given birth not just to likes of maker-aimed companies like Raspberry Pi and Adafruit, who focus their efforts on teaching the art of electronics, but also to solution providers whose clients mostly comprise start-ups and hobbyists.

In fact, Studio Graphene, a company that specialises in digital product design, app development and IoT solutions, claims at least 70% of its work comes from start-ups. “They tend to be ones who build things from scratch,” says founder Ritam Gandhi. “We’ll work with anyone, but it just so happens that in the world we live in, a lot of corporates are scared to innovate.”

This fear derives from the unknown. Businesses which are doing well enough without innovation have no need to take the additional risk that comes with it. It’s not that these companies lack the talent, resources or finances, but the larger the company, the more there is to lose. “They’re scared of failing,” Gandi confirms. “Innovation is inherently risky and corporates are often too nervous to take a risk that may harm their reputation or harm them financially. But, if they want to innovate, they need to be open to taking these risks and feel that they are free to fail.”

He believes that up until now the UK has restricted innovation because there was no company delivering the services Studio Graphene does. “Start-ups couldn’t afford to develop, build and test their ideas.”

Gandhi’s background is in consultancy, and it was this that inspired Studio Graphene’s offering. “I wanted to bring a more advisory delivery approach,” he says. “I couldn’t find any company that provided start-ups with product management, a strategist, someone who had experience of building products – a whole suite of everything needed to make an idea a reality at a sensible price point.”

Fen Technology sits within this service bracket, delivering what its Managing Director, Patrick Nicholson, calls a 360-degree development offering, from design and planning, to product execution and support. Recently, the Cambridge-based company was acquired by the development consultancy Inspiralia, headquartered in Spain, in a strategic move to exploit the university town’s location.

“We saw a huge opportunity for growth,” Nicholson says. “Accessing Cambridge has given us a cutting-edge resource capability in electronics. We are now in a position where we can compete with anyone worldwide.”

Nicholson explains that it utilises Cambridge’s location to pull in any expertise the company may not have. “We don’t shy away from accessing the rich eco-system. There are so many vertical markets, it’s impossible to have all of that knowledge under one roof.”

He points to one example of a client wanting to create the best amplifier in the world. “The client had a background in engineering and knew exactly the specification that the amp had to respond to in order to reach this target. But it just didn’t seem possible to do with current technology, so they came to us.”

“Fen Technology leveraged an existing signal processing and hardware design developed for electron microscopes that focuses its electric beam and keeps it coherent. However, in order to confirm their theory that a similar technology could be developed and used to create such a high performing amplifier, Fen Technology interacted with a retired acoustics professor. “You have to be able to predict your position. You might be competitive today, but by the time you get your product commercialised, the market will have evolved” Patrick Nicholson

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Managing IP

A worry for many – particularly start-ups – is IP. To combat this fear, Fen Technology takes no ownership of the product. “The IP is the clients. The underlying know-how stays with us, but anything that can be patented or protected is the clients.” And Nicholson believes this not only builds trust and encourages customers to work with them, but it also brings back customers. “We’re more likely to be hired again because we know the IP back to front and we can further extend it easily.”

Apart from IP, he explains that customers also value an honest opinion. “It’s not in our interest to develop a product that won’t sell. If a customer succeeds, they’re happy. If they’re happy, they’ll use us again. I’m keen on challenges, but if, for example, the price point or market isn’t right, then it’s not going to be a good product.

“We always try offer ideas to make a product work, but it depends on our level of involvement,” he contends. “We do like to get involved though and ask our customer ‘why are you doing this?’ It’s all about listening to your clients and being able to adapt.”

He explains that Fen Technology works around its clients, either acting as an independent unit where it completes the work for the customer, or embedding itself into an existing team.

Fen Technology has become a “good listener” in its 16 years, Nicholson says, looking at the customer’s needs – such as market size, trends and time-scales, as well as ensuring a product is pitched at the right price in respect to customers and competitors. “When you’re in the sector for long enough you develop an intuition as to how the market is evolving.”

Nicholson also reveals that Fen Technology has, what he thinks, is a unique advantage in that it gets insights from suppliers, for example if a component is going to be replaced. “We can suggest to a customer to get an alternative because we know the one they want will be substituted.”

Both Nicholson and Ghandi stress the importance of time-to-market and suggest speed is an added benefit of a technology provider. “We’re lower risk,” says Nicholson, “we’re more likely to be able to assemble a dedicated team and pull in resources quickly, meaning we can deliver the work faster.

“We’re small and flexible and that means we can move very quickly. We recently beat our own record, designing and delivering new boards in just four days.”

However, despite the end-to-end support technology providers like Fen Technology aim to deliver, Nicholson emphasises the importance of a customer asking themselves some same questions Fen Technology will ask them, before approaching it with an idea. This includes not just the ‘why’ and whether the price-point is right, but also determining if a product can be differentiated from the competition, and whether it’s possible to deliver such a product in the time-scale required. “You have to be able to predict your position,” he explains. “You might be competitive today, but by the time you get your product commercialised the market will have evolved. Are your budget expectations and time-scale realistic? Ask yourself: ‘can it be done?’”
Bar Type TFTs

Currently the mainstream aspect ratio of TFT Display panels in the market is 4:3 or 16:9 but for some applications a Bar Type shape would be more appropriate.

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Step into the future
Returning this October, the Engineering Design Show continues to evolve

The Engineering, Electronics and Embedded Design Show returns to the Jaguar Exhibition Hall, Ricoh Arena, Coventry on the 17th and 18th October.

The UK’s only event for engineering, electronics and embedded engineers it aims to provide the ideal environment for design engineers with access to the latest products, services and innovations.

In its seventh year EDS continues to evolve and looks to provide visitors with a fully immersive experience, combining innovation, inspiration, interaction and insight.

The 2018 show will once again look to provide 4,000 visitors with access to expert speakers exploring best practice, new design techniques and industry issues.

A brand-new feature at this year’s show is EDS TV, an exclusive TV channel for the event, that is intended to provide visitors with a fully immersive experience.

Broadcasting throughout the show on screens positioned around the exhibition floor, as well as on a giant screen projected on to one of the walls, it will show previews for the various conference and workshop sessions as well as live interviews and highlighting some of the standout exhibits for you to visit.

The pace of change and the complexity that confronts today’s design engineers continues to have a profound impact on suppliers, customers and colleagues and visitors to this year’s show will be able to meet with over 220 suppliers, offering new technologies and design engineering solutions.

In addition, high quality practical workshops will be taking place across both days within three theatres on the show floor. The subjects covered are varied but will focus on software design and rapid prototyping, among others.

With over 25 conference sessions the Electronics Design Show conference will look to address some of today’s crucial technology trends and issues.

A particular highlight is Ken Munro, a Partner with Pen Test Partners, who will be looking at how we protect our privacy and maintain the safety and security of planes, trains and automobiles. He’ll be exploring the segregation of systems, networks and endpoint devices, sharing research gathered from manufacturers and network operators and use hack demos to illustrate how the security in today’s transport just isn’t ready for the IoT.

Other companies speaking at EDS include: Fulham, ADI, ARM, Cadence Design Systems, Altium, Phononics and the Small Robot Company.

Go online for a full list of exhibitors, conference speakers and workshop sessions.

So, if you are visiting for the first time or returning again, we look forward to welcoming you to this year’s Engineering Design Show.
Expansion of High Tech Facility solves Optoelectronics Manufacturing Headaches for UK OEMs

Finding expert resources for niche optoelectronic design and assembly is challenging, as there are very few companies in the UK with the right skills and experience to tackle such demanding requirements. UK-based Pacer International is well positioned to offer OEMs a cost-effective outsourcing option for projects involving photonics, optics, sensing or displays.

Further expansion of their state-of-the-art design and production engineering facility in Dorset now enables Pacer to offer even better engineering services. With a proven track record in providing the quality and reliability needed for military, medical and scientific applications, Pacer’s team can address the design and pre-production of modules, assemblies or complete systems.

Pacer’s team benefits from over 40 years of die attach and wire bond experience, and the new addition of this technology at the company’s Weymouth site greatly enhances their manufacturing capability. The skills and experience of Pacer staff add real value to projects – working closely with customers, Pacer’s engineers frequently advise on product and manufacturing enhancements which result in better yields, higher performance, increased reliability – and in many cases, reduced project costs.

Extensive expertise in production engineering and Design For Manufacture (DFM) enables the smooth transfer of products from research and development prototypes into real-life production. The multi-disciplinary team in Weymouth offers electronic, optical and mechanical design capability, and can address a wide variety of projects – from assembly and test of a simple optical switch, the alignment of boresight optics over long distances, touchscreen calibration or display alignment, through to full design and production of complex analysers and illuminators.

The recent expansion of Pacer’s ISO14644-1 class 7 cleanroom enables the manufacture of complex optoelectronic assemblies involving extremely precise alignment of optical components and lenses to very tight tolerances. Pacer has developed a world-wide network of strategic manufacturing partners, offering high quality, competitive manufacturing solutions with ISO 9001-2000, QS9000, ISO/TS16949 and ISO 13485 approval.

Visit us at EDS 2018, stand no. M20

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WEDNESDAY 17 OCTOBER

Thermal efficiency in a F1 hybrid power unit
9:15-10:00
Ben Hodgkinson, Head of Mechanical Design, Mercedes-AMG

Opening keynote.

Smart IoT in lighting - The Promise, Reality and Challenges
10:15-11:00
Mike Welch, VP Controls Business Development, Fulham Lighting Co.

Fulham’s mission is to design and manufacture clever, innovative lighting components to enable providers of energy-efficient lighting solutions to be successful and grow into the ever-evolving world of lighting needs. This presentation will provide an overview of the company’s ‘Clever’ product strategy for lighting and delegates will hear about a new generation of solutions for buildings, addressing issues of sustainability, health and wellness as well as the company’s unique approach based upon interoperable standards and channel partner empowerment.

Eliminating thermal constraints for high density analogue output modules and other Industry 4.0 challenges
11:15-12:00
Albert O’Grady, Senior Industrial Systems Applications Manager, Analog Device

Industry 4.0 promises factory owners greater productivity, flexibility and control of costs, but these insights require real-time comprehensive data and control of the factory or process flow. More data means more sensors and actuators so more IO, but space is often at a premium. So how do you fit more output channels into smaller modules without compromising performance through de-rating or adding expensive and space prohibitive cooling? When semiconductor suppliers with strong domain level expertise take a system level approach to semiconductor design it is possible to “have your cake and eat it” by achieving target performance and optimising cost.

PCB implementation within an electronic hardware system
12:15-13:00
Gary Hinde, Product Engineering Architect, Cadence Design Systems

With multiple fabrics available during the design of an Electronic Product, the need to consider several requirements becomes necessary. The presentation will provide an overview of these needs, along with techniques for successful implementation.

Securing our planes, trains and automobiles
13:15-14:00
Ken Munro, Partner, Pen Test Partners

The Internet of Things (IoT) is set to revolutionise our transport networks with data flowing from sensors, devices and vehicles, but how will we protect our privacy and maintain the safety of these systems? This session will look at the security of methods currently being used in our planes, trains and automobiles. We’ll explore segregation of systems, networks and endpoint devices, share research gathered first-hand through working with manufacturers and network operators, and use hack demos to illustrate how the security in today’s transport just isn’t ready for the IoT.

Three small robots and their dream to save the world
14:15-15:00
Catherine Pratt, Head of Delivery, Small Robots

Meet Tom, Dick and Harry. Three small robots with big plans for the way we produce food. Farming is in trouble. It’s reliant on very old tech, including tractors, which damage the soil, burn energy, and waste chemicals. Robotics expert, Catherine Pratt, will explain how Small Robots is reimagining farming in the robotic age to save the environment and feed the world. Catherine and the team is using robotics and artificial intelligence to deliver this dream. They are building technology that will digitise farming, making it more profitable, more efficient and more productive.

Fundamentals of Thermal Management Using Thermoelectric Coolers
15:15-16:00
Alex Gulchard, Ph.D., Senior Product Marketing Manager, Phononic

Thermal management in electronics design can sometimes be treated as an afterthought relative to other end user design requirements. As such, it is common for thermal requirements to trap designers in a corner, leading to compromises on thermal system size, noise or performance. This workshop will explore fundamentals of how thermoelectric coolers can be most effectively used in thermal management and cooling of electronic and optical components to avoid such compromises.

THURSDAY 18 OCTOBER

Getting IoT-Ready
10:15-11:00
Mike Bray, Vice President: DesignSpark & Richard Curtin, Vice President: Single Board Computing and IoT, RS Components

As the spread of IoT products and solutions available in the market continues to grow, making the right choices is getting more and more challenging. This session will explore various boards and kits available to design engineers looking to create IoT devices, and the tools and services offered by RS that are enabling engineers to quickly and confidently move from design to prototyping.

A new age of documentation
11:15 – 12.00
Tony Folan, Senior Field Application Engineer, Altium UK

In today’s world of advanced technology, providing a complete documentation package for the PCB manufacturer is paramount to realising a properly manufactured product. In this session, you will learn the requirements to comprehensively document your design. Detailed fabrication and assembly documents are so much more than gerbers and BOMs. Every aspect of the design must be called out directing the PCB manufacturer to the desired result. If the design is not properly documented there is no recourse when a substandard product arrives.

Importance of Understanding Requirements
12.15 - 13.00
Ben Arlett, Head of Engineering and Kerry Briggs, Head of Medical at Kinneir Dufort

A discussion on how great requirements lead to great products.

The Route to Power Efficient, Optimised, Custom Silicon
13.15-14.00
John Reilly, Senior Partner Manager, ARM

The market is changing – product suppliers are now enhancing their products and providing differentiation by using custom silicon. With the availability of low-cost silicon manufacturing, expert design service companies, and easy access to low-cost chip technology, a customised chip is now more possible than ever. This presentation will outline how you can reap the cost, size, power and reliability advantages of having a chip designed specifically for your needs. The
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Conference Programme

presentation will explore the process of getting a custom chip – how to select the technology/IP to put in it, the manufacturing (foundry) process, the help that is available, and the various programs (such as Arm DesignStart) that simplify this process.

Workshop Programme

17TH OCTOBER
Workshop Theatre 2 – Embedded
10.15: Digilent – Textbook example of handwriting recognition using hardware-accelerated deep neural networks
11.15: Solid State Supplies - Microsemi Polarfire FPGA System Solutions
12.15: Future Facilities – Why cutting-edge electronics needs state-of-the-art thermal simulation
14.15: Avnet Silica – Yocto Project – The Embedded Linux build framework

Workshop Theatre 3 – Electronics
10.15: Harwin - tbc
11.15: Altium UK – Conquering multi-board design challenges to create next-generation electronics
12.15: Zuken – Engineering requirements for IoT applications
13.15: Samtec – System optimisations and high speed connectivity solutions
14.15: Beta Layout - tbc

18TH OCTOBER
Workshop Theatre 2 – Embedded
10.15: CST – Engineering electromobility of the future: EMAG simulation for smart, safe and connected vehicles
11.15: Greenhills Software - tbc
13.15: Xi Engineering – How to accelerate your product development with virtual prototyping

Workshop Theatre 3 – Electronics
11.15: Altium UK – New age of documentation
12.15: Zuken – Engineering requirements for IoT applications
13.15: Farnell element14 – Distributors supporting design

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What to see at this year’s show

There will be more than 120 exhibitors at the Electronics and Embedded Design Shows; here’s a flavour of what visitors will be able to see.

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Electronics Design Show

Altium: Stand K2
Altium UK will be presenting two workshops for modern circuit board designers at EDS. The New Age of Documentation workshop will highlight the requirements needed for providing a comprehensive documentation package for the PCB manufacturer.

The Conquering Multi-Board Design Challenges to Create Next-Generation Electronics workshop will illustrate how to properly manage board-to-board connectivity in multi-board designs. Ensuring that connector locations on different boards physically align is a challenge. Understanding how to create, align, and verify system-level connectivity for your multi-board design in a system-level PCB environment is critical. This will not only help to avoid connectivity errors, but will also mitigate the need for additional time-consuming iterations.

Altium will also be offering individual demonstrations on its latest innovations, including a sneak preview of the upcoming Altium Designer 19 release.

binder UK: Stand M12
binder UK will be showcasing examples from its range of circular connectors including its Harsh Environment Connector (HEC) UL approved, industrial connectors at this year’s show.

The Series 696 HEC connectors are resistant to UV, temperature fluctuations, acid rain, salt spray, ozone and other pollutants and feature a secure, three-point fast locking mechanism with a robust coding system that prevents incorrect orientation. They are manufactured from a tough UL 94V-0 rated polyamide, are waterproof and dustproof to IP68/IP69k, and the use of crimp contacts makes for vibration-proof terminations.

The latest addition to the HEC Series is a power connector capable of handling up to 32A at a rated voltage of 600V. The power connector is available in both cable and panel mount formats with 4+PE silver plated male or female contacts and, according to binder, are good for more than 1000 mating cycles.
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- **56%** of attendees had joint responsibility for purchasing at the event
- **36%** of attendees had sole responsibility for purchasing at the event
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BCD-Atlantik: Stand E12
Register for BCD-Atlantik’s workshop event and you’ll come away understanding the key elements, requirements and benefits of an IoT Gateway. BCD will be discussing the architectural choices and the device and connection management options; security of these connections from the IoT network and that of data transported to the Cloud will also be considered.

Visitors will also be able to view a selection of the latest Gateway products, from BCD’s key suppliers, including the new xPico 200 Series Module from Lantronix: an industrial-grade high performance Wi-Fi, Bluetooth, and Ethernet connectivity solution with enterprise security. From Digi, it will demonstrate the Digi Connect Sensor+, a roll-out ready, battery-powered cellular gateway solution. The Qualcomm QCA4020 will also be displayed, a complete tri-mode system-on-chip with support for dual-band Wi-Fi, Bluetooth 5 and 802.15.4-based technologies, including Zigbee and Thread.

ByteSnap Design: Stand L22
Embedded systems consultancy, ByteSnap Design, will be highlighting a number of new developments at EDS, including the launch of a new version of its SnapUI development tool for QNX, a V2G project update and a demo of motor control design skills.

SnapUI is a lightweight user interface (UI) development tool which streamlines the UI prototyping and building process, enabling QNX users to edit an application’s UI independently from the core of the application itself.

ByteSnap’s consultants will also be showcasing their experience in developing products for the electric vehicle charging market. Earlier this year, the company and a consortium of partners were awarded a two-year collaborative project, VIGIL (Vehicle-to-Grid Intelligent Control), under a Vehicle-to-Grid (V2G) competition, funded by the Office for Low Emission Vehicles (OLEV) and the Department for Business Energy and Industrial Strategy (BEIS). The V2G project will see ByteSnap developing an OCPP module and companion Android app.

While an overhead cable car demonstration will show how ByteSnap’s engineers use their motor control design skills to optimise product development. The 3D-printed cable car houses a 360-degree camera (with architecture built by ByteSnap) which will send data to a PC, which will then display stitched-together footage.

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No.1 for Samtec
congatec: Stand H6
congatec has released its first SMARC 2.0 Computer-on-Module based on the 64-bit NXP i.MX8 multi-core ARM processor family: conga-SMX8, and will be showcasing this latest launch at EDS.

This device is designed to provide high-performance, multi-core computing along with extended graphics capabilities for up to three independent 1080p displays or a single 4K screen. Further benefits include hardware-based real-time and hypervisor support, and broad scalability, as well as resistance against harsh environments and extended temperature ranges. All these features make the SMARC 2.0 module meet the recent performance and feature set needs for low power embedded, industrial and IoT, as well as new mobility sector.

DAU Components: Stand Z59
DAU Components, the distributor with 35 years of experience in low cost IEC60320 and EMI/EMC components and connectors, will be at stand Z59, where visitors can cast an eye over its inlets, outlets, power entry modules, ganged outlets and rewireable connectors and plugs, filtered inlets, and much more.

Whether you are looking for a cost down on your BoM, or help with a new project, the DAU Components team will work closely with its manufacturing engineers and partners to provide customers with design, sales and logistics support, along with reliable cost effective pricing and high service levels.

EuroQuartz: Stand F2
EuroQuartz will be exhibiting its latest frequency control products, including high speed current steering logic (HCSL) versions of the company’s ultra-low phase jitter EQJF clock oscillator range; oscillators from Statek; and a range of switchable crystal oscillators offering users the ability to provide four different frequencies.

Offering a range of frequencies from 50 to 700MHz, ultra-low phase jitter EQJF clock oscillators with HCSL outputs deliver a less noisy solution compared with static logic type and has a phase jitter of 150fs typical, 300fs maximum.

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Corintech: Stand E50
Visit stand E50, where Corintech, a leading UK Electronic Product Design & Manufacturing Partner with operations in the UK and Hong Kong, will be demonstrating examples of its assemblies.

Its design and development teams offer services including electronic design, PCB layout, product design concepts, mechanical CAD, firmware and software development. While its manufacturing services include PCB assembly, thick film hybrid microcircuits, electro-mechanical assembly and full product assembly, along with competitive component sourcing and Kanban supply.

Experts will also be on hand to discuss the potential cost savings Corintech can offer.

Hitaltech: Stand L48
Innovation, interaction, inspiration and insight are the themes of this year’s expo, and Hitaltech is aiming to display all of the above with its Conex-it brand of PCB-mounted screwless terminal blocks and connectors.

Since Hitaltech last appeared at EDS, the company has introduced a range of added-value service, such as full colour printing, loom assembly and kitting.

Hitaltech also tailors bespoke component kits for each client, with every bag containing a pre-defined set of terminal blocks and connectors, coloured and printed to the customer’s requirements.
LEMO: Stand H52
At LEMO’s stand, visitors can expect to see its new, compact, lightweight, sealed connectors, specifically designed for outdoor applications. LEMO will be highlighting a range of reliable connectors and cable assemblies with prominence given to the T Series push-pull self-latching multipole connector. This rugged, sealed connector features IP68 rating and is ideal for applications ranging from medical, to test and measurement and industrial controls.

Lascar Electronics: Stand H45
Looking for a genuine one-stop-shop for your product design and manufacturing requirements? Or perhaps you need just one element of the product mix? From electronic and mechanical hardware design to full custom Cloud platforms and smartphone apps, Lascar brings your test and measurement ideas to life. Lascar have a broad scope of disciplines encompassed by its Engineering Design and Development team, including electronic, mechanical, display and software design. It offers an extensive range of prototyping options from one off space models, to small run PCB and display assemblies.

If you’re ready to take your test and measurement instrument into the IoT arena, the Lascar team can assist with multiple disciplines, including Cloud, app and software development. Visit Lascar at Stand H45 to chat about your custom requirements and demo some of its unique display and IoT solutions.

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*Where:* Workshop Theatre 2

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*When:* Thursday 18th October 13:15 – 13:55
*Where:* Workshop Theatre 3
Education, education, education

Why we must train young engineers for he ‘fourth industrial revolution’

With the world on the cusp of the “fourth industrial revolution”, and such rapid change that driverless cars have gone from science fiction to government policy in under a decade, the engineering sector needs new approaches to more - and more diverse - graduates to meet the growing demand for engineering expertise.

Launching in Hereford next year, the New Model in Technology and Engineering (NMiTE www.NMiTE.org.uk) plans to tear up the rule book on how engineers are trained in the UK, implementing a curriculum that will deal with real world rather than theoretical problems.

We want to help end the engineering skills shortage through adopting a radical approach, and with our doors expected to open to the first undergraduates in 2019, we are looking for engineering companies to get involved to help shape our curriculum, hire our students and let us work on your knotty engineering challenges.

Set to be the boldest, most radical start-up in higher education in Europe and, perhaps anywhere in the world, there will be no lectures, no formal textbooks, no exams, with real-time assessment instead. Most radical of all in the UK, but not elsewhere, there will be no requirement for students to have Maths or Physics at A level either.

For us at NMiTE, the dogmatic insistence on A Level Maths and Physics is at the heart of the problem to attracting more people, particularly more young women, to take up a career in engineering and the figures speak for themselves: Engineering UK’s Brand Monitor (EBM) survey found that while more than 59% of 11 - 14 year-olds would consider a career in engineering, by the age of 19 that number fell to 39%.

Engineering UK asserts that girls are deterred from an engineering career because of a lack of understanding in the subject. Girls, it says, are not only less knowledgeable about engineering and how to become an engineer, but also less likely to seek careers advice from others. It shows that repeated attempts to change this by Government and trade bodies have sadly failed so far.

The time has come for new approaches. Rather than catching young women at 14 and 15 we will instead catch talented people once they seriously start thinking about careers in the sixth form.

NMiTE is taking away the draconian demand for a Maths or Science A Level, and in doing so, will immediately open the course to those who may not have considered engineering before.

Rather than lowering standards our aim is to drive them up.

Such entry requirements in England and Wales have been out of step with much of the world for more than 50 years. Outside England and Wales the A Level equivalent courses are less specialised and produce highly-respected world-class engineers.

Despite their different approach, in most countries the engineering profession is respected on the same level as other top professions, such as medicine and law. Not in the UK, where it is sadly often seen as grimy and manual - often confused with being a mechanic.

NMiTE is following the lead of our partner, America’s innovative Olin College of Engineering (www.olin.edu), which has a 50:50 male to female student and faculty balance. In doing so we are making a statement that the engineering profession is open for business to EVERYONE with the intellect and determination.

Our whole approach will be about delivering future engineers with the skills, knowledge and creativity to deal with the monumental challenges facing our world, whether helping tackle global food production as our population continues to grow to 8 billion and beyond, or ensuring the transport, heat and entertainment we use as part of our daily is not causing harmful climate change.

With almost every aspect of life becoming interconnected and digitised, our graduates will be at the vanguard of the fourth industrial revolution. Helping to engineer it, but also at the forefront of considering the commercial and ethical aspects too, not just the mechanical.

With this revolution, electronic engineering companies have never faced bigger opportunities and bigger questions.

If you are interested in learning more about NMiTE and how we are building a curriculum that inspires undergraduates and works directly with employers, then please get in touch as I would welcome the chance to tell you more jeff.webb@nmite.org.uk
Lumberg: Stand L40
In addition to its existing IP67 Circular Din Connector range, Lumberg has recently introduced its all-new IP67 series, QuickLock. The connector’s quick snap latch feature facilitates the connection and disconnection of the mating half. The easy mating and UL approved connector is available in 2 to 12-pin.

The QuickLock cable connector, cable socket and chassis socket come in three different sizes: 12, 16 and 20mm. For maximum performance, the 20mm version can accommodate higher currents of up to 20Amps. These IP67 high performance connectors are designed to provide a reliable connectivity solution for a variety of applications in the test and measurement, medical, industrial and automation industries.

Alongside Lumberg, its sister company, Lutronic, will be showing its range of actuator and sensor wiring solutions. Lutronic focuses on manufacturing quality M8 and M12 circular connectors for customised signal, data and power applications.

OKW Enclosures: Stand J56
METCASE, manufactured by OKW enclosures, will be launching a new 19” mini-rack version of its TECHNOMET instrument enclosures at this year’s show.
These cases are designed for mounting standard 19” subracks, chassis and front panels. Applications will include test and measurement equipment, networking and communications devices, sound and studio systems, laboratory instruments, industrial computers and control systems.

These housings combine diecast aluminium front and rear bezels, a folded case body and chassis, and four snap-on cover trims to create a flush-fitting cohesive design with no visible fixing screws.
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25 September 2018 www.newelectronics.co.uk
Sourcing components

Why is there an electronic component shortage?
Steve Hughes explains

Since the launch of the Model 3, Elon Musk has been under significant pressure to scale up Tesla’s manufacturing capacity and overcome its current struggle with meeting demand. Currently, the electronic component supply chain is trying to tackle a similar challenge.

The need for electronic components is growing exponentially. In conjunction with our greater use of handheld devices and their relatively short product lifecycles, there is increased use of electronics in industries that did not traditionally use them.

The rapid evolution of the automotive industry and Internet of Things (IoT) are two key factors that have resulted in a stronger-than-expected demand for components, which manufacturers are finding difficult to keep pace with.

Like most modern electronic products, automotive systems use multi-layer ceramic capacitors (MLCCs) and traditional combustion engine cars can require approximately 3,000 capacitors, but as cars move from hardware driven machines to software driven machines, their infotainment, driver assistance and comfort systems require even more components.

For example, the requirements for display systems, LED lighting, sensors and artificial intelligence (AI) features have all contributed to the inflation of components required by this market.

As a result, forecasts suggest that the number of MLCCs could rise to 22,000, in just one car in the near future.

To add to this, annual production of Electrical Vehicles (EVs) is expected to reach 2.4 million units in 2021, compared to 409,000 in 2014. This substantial rise has been driven by new emissions regulations and incentives from governments and it doesn’t appear to be slowing down any time soon.

Similarly, IoT devices were nothing but a figment of the imagination 30 years ago, but smart devices are now adding a further burden to an already constrained market. In fact, forecasts show that IoT devices are set to grow to almost 31 billion worldwide and this alone has raised concerns among many manufacturers.

As explained, nearly every industry uses electronic components and we are finding that many customers are double-ordering components and panic-buying to try and eliminate further production delays along the line.

However, this does not provide a suitable long-term solution.

Instead, I would urge businesses to implement a more effective planning strategy and flexible ordering system for their projects, which can strongly protect against any unexpected supply chain issues, such as the current shortage.

As it stands, analysts’ predictions are varied, but it’s expected that the shortage will continue into the early months of 2020 at the very least and so businesses need to set realistic expectations and regularly update their customers to retain good relations. This has been the approach taken by Tesla, which even now is still trying to boost its production output and still generating orders.

This is not the first time there has been long delays for key components in industry and we expect that this will not be the last, especially as buying behaviour and purchase decisions can be so unpredictable. By implementing a procedure that allows for longer lead times, managers will be able to better manage operations to respond effectively to fluctuating lead times in the future.

Steve Hughes
is managing director of specialist components manufacturer REO UK.
Target markets for 32bit A/D converters include PLCs, such as the micro850 from Allen-Bradley.

Photo: Rockwell Automation

**Pulsonix: Stand H75**

Pulsonix will be introducing 3D PCB design capability with its Version 10.0 release that allows mechanical enclosures to be integrated into the native Pulsonix 3D environment for modelling and critical clash detection.

This 3D design environment is complemented by interactive functionality enabling dynamic Copper Pouring and shape healing. Automatic Pad Style Naming has also been introduced.

The integration alerts of Version 10.0, notifies engineers where items violate the rules defined. Once alerted, the offending item can be moved from within the 3D Editor and all changes automatically updated in the PCB design.

**SCHURTER: Stand L20**

This year, SCHURTER will be exhibiting its latest capacitive touchscreens, specifically designed for ATEX class 1 environments, along with its RTS fuse surface mount thermal fuse that protects against thermal runaway of power semiconductors.

SCHURTER will also be demonstrating its fully customisable Luminos key backlighting solutions and latest capacitive switch designs utilising PMMA as lens material instead of glass.

**Selectronic: Stand G35**

Selectronic will once again be at EDS, showcasing its expanding range of display products and solutions. A feature of this year’s stand will be a range of larger displays - including its square-aspect 22- and 33-inch TFTs panels and full-colour LED tiles for the video wall and large panel display market.

Other LED offerings will also include UV and automotive grade products, as well as Selectronic’s IR LEDs series which now feature light sensors for the expanding IR market in control function applications.

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A racing certainty
Who will win the autonomous race? By Bryce Johnstone

A
I has shaken the automotive industry to its core, inspiring a revolution. Every car manufacture wants to be number one and be the first to deliver an autonomous vehicle (AV). However, in 2018 designing a car isn’t just about getting people from A to B. It’s about safety, the experience, infotainment, Advanced Driver Assistance Systems (ADAS), the environment and reducing emissions, and so much more. But who will win the race and be the first to cross the chequered flag?

What is an autonomous car?
Before we can evaluate what car manufacturers are doing in terms of AV, it’s important to have a clear and consistent understanding of the different levels involved in the progression of autonomous vehicles. Industry experts have defined five levels, and at each, described the extent to which the car takes over the task and responsibility from the driver, and how the car and driver interact.

Level 1: Driver assistance. Driver assistance systems support the driver, such as automatic cruise control and automatic emergency braking, but do not take control.

Level 2: Partly automated driving. Driver assistance functions can control speed or steering but the driver must be hands-on at all times.

Level 3: Highly automated driving. In certain situations, the driver can disengage from driving for extended periods of time – some refer to this as ‘eyes off road’. The latest Audi A8 supports Level 3, for example.

Level 4: Fully automated driving. The car drives itself most of the time within specific areas such as cities or motorway. The driver must remain present and able to driver but can, for example, read a magazine.

Level 5: Fully automated. The driver can have “hands off, eyes off, brain off”. This means that there is no human driver and the people in the car are all passengers. There is no need for a steering wheel.

Numerous new car models are currently coming out with Level 2 functionality; however, as an industry, we have barely scratched the surface of ADAS functionality; far less full autonomy. Today, we are currently significantly ramping-up Level 2 capabilities in even mid-range cars and there are a few Level 3-enabled cars such as Audi A8, and the Tesla Model S and X.

Car manufacturers to watch
It is expected that by 2030, one in four cars on the road will be self-driving and currently, there is feverish investment and collaboration activity in the automotive community. Volvo (Geely) and Uber have a $300m deal to deliver driverless cabs, whilst General Motors (GM) has taken a $500m stake in Lyft but is also covering its bases by working with Uber too. In addition, the likes of Uber, Lyft and others are spending vast amounts on R&D making sure that they are early in the game.

We are also seeing a range of autonomous driving platforms, many of which are from China, such as Baidu Apollo, Tencent and Alibaba gaining momentum. In addition, Chinese Internet companies are building large software partnerships to be the preferred partner for those deploying autonomous vehicles.

Waymo (Google) and Ford are looking to deploy autonomous taxi services this year. Car manufacturers themselves are taking a position in rideshare companies, as well as looking to have self-owned car fleets for the Car as a Service (CaaS) opportunity. For example, Ford and GM have spun off their own independent carpooling companies to potentially take on the likes of DiDi and Uber.

In China, Baidu is testing autonomous vehicles in several cities and at least five Chinese car companies have licenses to test in the US. BMW and Toyota are both working with Chinese companies on early autonomous vehicles activity, while a Renault, Nissan and Mitsubishi alliance is working with DiDi on carpooling services.

Waymo is being very aggressive in its launch timescales of its robo-taxi and has received the right to run such a service in Arizona, USA, starting as early as later in 2018. Multiple trials are currently underway and will help shape not only the response of the technology to highly complex urban conditions, but also what infrastructure is needed to support a further rollout, and what is required in terms of government regulation and laws to ensure that the autonomous car has a smooth transition.

The winners
It is honestly too early to say who is winning the race to deliver the first autonomous vehicle, but it is fair to say that all major car manufacturers and new entrants are investing heavily and making a play for to be early to market. Certainly, we are in for a very interesting decade as we race headlong into what will ultimately be an autonomous driving world and enjoy the benefits that it will bring.
Simms International: Stand F5
This is the first time at EDS for Simms International, which will be showcasing a range of industrial grade products, including SD and microSD cards from manufacturer, ATP Electronics.

ATP’s range of industrial SD and microSD cards are designed for automotive, automation, networking, enterprise mobility and healthcare industries to name a few. Its cards are engineered with intelligent technologies which include: advanced wear levelling algorithm, bad block management, life monitoring and ESD resistance. Other features of ATP cards include System in Packaging, controlled BOM, advanced wear levelling, secure erase and -40°C to 85°C wide temperature operation and no MOQ.

Swindon: Stand H2
Swindon is giving visitors the opportunity to try its online chip size estimator, IC Builder. This device offers designers a new way to estimate the size of an ASIC solution designed specifically for their application. It enables the user to progressively add functions, such as memory type, communication protocols, power management and actuation device type, required for their intelligent sensing application and the capability to see what the resulting package could look like.

TDK-Lambda: Stand K30
TDK Corporation has launched five new models to the TDK-Lambda brand 5kW GENESYS+ series of high power density programmable DC power supplies, which it will be showcasing at this year’s EDS.

This expansion now provides incremental and seamless choices in output voltage and current ranging from 0 V/500A to 0 V/8.5A. Initially launched in 2017, the GENESYS+ is designed to provide users with higher efficiency and improved performance; and is functionally compatible with existing TDK-Lambda Genesys and Z+ programmable power supplies.
Increased Reliability for Industrial Applications

New 1.27mm pitch Archer Kontrol connectors in horizontal and vertical layouts with 12-80 pin combinations.

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**Wilson Process Systems: Stand K8**

With component shortages set to continue across MLCC’s and chip resistors, Wilson Process Systems with its newly appointed ISO9001-2015 has been proactive in its procurement plan and is looking to attract new customers at EDS by way of its large standard inventory.

Steve Cooke, Sales Manager, commented:

“Purchasing was able to secure inventory over and above our requirements across many typical values, allowing us that bit more flexibility when engaging with potential clients looking to overcome current issues.”

Today, Wilson Process Systems prides itself as a true supplier partner, offering a competitive manufacturing resource focused on industrial, commercial and medical sectors within the contract electronics market.

**Würth Elektronics: Stand L8**

If you would like to see one of Europe’s leaders in electronic and electromechanical components, visit stand L8 where Würth Elektronics will be exhibiting. External business managers and field application engineers will be on hand to answer any technical questions you may have.

Having become the latest member of the Würth Elektronics family, IQD will also be at stand L8, showcasing its range of crystals and oscillators, alongside worldwide leader in the development and production of transformers and custom magnetics, Würth Elektronics Midcom.

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New for 2018 is the EDS TV channel, an exciting new way for everyone to get the maximum benefit from attending the UK’s leading electronics, embedded and engineering design event.

EDS TV delivers an up to the minute experience for everyone attending EDS by creating a live content channel online and at the venue. It’s the ultimate way of experiencing the show buzz and enhancing engagement. There will be screens located around the show floor and a video wall to ensure you can find the information you need.

You’ll also find the production studio on the show floor. Look out for content including interviews with conference speakers, exhibitor promotions, conference and workshop reminders, and social media chatter around the show.

The Future Zone is also getting a face lift for 2018. This year it will feature a selection of young and start-up companies delivering exciting products and services for the design engineering community. Bookmark stand D61 in your schedule to meet these dynamic new companies.

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@EngDesignShow #EDS
Yokogawa: Stand F7
EDS will be the perfect opportunity to hear and see the latest from Yokogawa, the test and measurement manufacturer.

On the booth, it will be showcasing a selection of products from its range of measuring instruments, including “the world’s most accurate WT5000 precision power analyser” that offers measurement accuracy of ± 0.03% combined with stability, noise immunity and plug-in modular flexibility.

Zones at EDS
Along with an extensive and exciting range of exhibitors, EDS will also be welcoming back its popular Innovation Zone, where visitors can view the latest, cutting-edge technology to grace the engineering industry.

EDS will also be dedicating its Future Zone to young and start-up businesses - a brand new feature for 2018.

Furthermore, adventurer Chris Ramsey, the first person to enter the formidable 10,000-mile Mongol Rally in an electric vehicle (EV) with a maximum range of 155 miles, will also be joining EDS this year to discuss EV design in his ‘Plug-in Adventures’ session.

Ramsey will be exploring how EV design has changed in his 7 years in the industry, from mainstream manufacturers to concept cars in Silicon Valley.

With the perceived road blocks to EV being range, battery degradation, and lack of charging infrastructure, Ramsey will share insights into some of his adventures and discuss how the design of today’s EVs coped with the demands of traveling across two thirds of the earth.

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Würth Electronics UK

Come and find Würth Electronics at Engineering Design Show 2018! We will be exhibiting at stand L8.

Würth Electronics are one of the leading brands in the Electronic & Electromechanical Components market in Europe. At our stand will be some of our external business managers who look after each part range as well as a Field Application Engineer, on hand to offer technical support for any projects or products you may be working on.

WE have been expanding and our new Wireless Connectivity division will be added into our catalogue. IQD have also become the latest member of the Würth Electronics family and will be at the stand to show off their range of Crystals and Oscillators. Joining them will be our subsidiary, Würth Electronics Midcom, a worldwide leader in the development and production of transformers and custom magnetics.

Whether it’s for any design queries you may have, a quick chat or just to pick up some free gummy bears, come and say hello!
Smart IoT in lighting

Laying the foundations for the future. By Mike Welch

The LED lighting industry is contributing to the adoption of IoT for building communications and controls. Smart lighting systems coming to market supporting two-way communications are helping to revolutionise the convergence of building and lighting control, using the same infrastructure extensible to support the IoT and to manage other building systems.

However, successfully implementing a smart lighting infrastructure starts with smart components that can serve as building blocks for IoT.

Lighting manufacturers such as Fulham are transforming lighting and building controls in innovative ways by designing components that can be used to help OEMs build interoperable IoT systems helping global commercial building owners, developers, and facility managers conserve energy and save money.

At Fulham, for example, we are bringing together global light fixture OEMs and smart IoT building controls System Integrators to deliver smart IoT convergent lighting controls that are vendor independent, and based on interoperable open standards.

Convergence

What do we mean by convergent? In brief, convergence allows disparate products and applications to be integrated, often by adding a driver or controller, to enable two-way data flow even though the products don’t use the same platform.

Vertical convergence is the integration of software and smart devices (such as intelligent LED components) to provide a common platform for independent devices.

Horizontal or IT convergence uses IP technology (like IoT) to connect IP devices into a common physical network.

By applying convergence using open standards, lighting component manufacturers are creating the components needed to serve as the “building blocks” required by global light fixture manufacturers to create the next-generation of smart lighting products. They also are creating the software “building blocks” to integrate industry standard controls such as IoT.

For example, network interfaces that use the plus Digital Addressable Lighting Interface (DALI) can empower the global Niagara system integrator, distribution and OEM communities. DALI is the only open standard specifically created for smart lighting dimming and controls. Up to 64 DALI light fixtures can be connected into a single network for complete on/off and dimming control. By creating components to support open standards such as DALI, we can offer solutions for any Tridium Niagara Framework platform to create smart IoT convergent lighting control solutions that can be accessed both locally and remotely (i.e., “cloud based”).

The Tridium Niagara Framework was originally created by Honeywell and has become the de facto standard for convergent lighting and building controls based on IoT. The software was specifically developed to create device-to-enterprise applications and Internet-enabled products to control and manage smart devices across an enterprise network in real time.

Today there are more than 400 global OEMs delivering building management, automation, and energy management solutions based on Niagara.
By creating interoperable products for smart lighting controls, lighting component manufacturers are providing the convergent building blocks needed to create an extended ecosystem of IoT controls. Using IoT as a common, framework makes it relatively simple to incorporate additional IP-based communications. Once installed, the same two-way communications infrastructure can use IoT to manage building systems such as HVAC, emergency alarms, and building security.

More importantly, every participant in the value chain benefits with smart lighting systems. OEMs, distributors, and integrators can create customised, smart IoT convergent lighting control solutions that are extensible to support future IoT solutions.

**Partnerships**

Fulham controls.com became a Tridium Global Development Partner in 2005 and went on to create and release the first IoT DALI building block products in 2008 resulting in, everyone in the value chain winning.

OEMs and distributors win with smart technology that are:
- Extremely flexible
- Reduce equipment requirements
- Provided seamless access to all value data, both locally and in the cloud
- Offer continuous optimisation with the aid of analytics, machine learning, and AI
- Result in products that save energy, are sustainable, promote health and wellness
- Reduce cost of ownership

Partners in the delivery channel win by being able to deliver more with less:
- They can make the most of existing technology, knowledge, and experience
- They can build their business faster with reduced risk
- They can deliver additional, value-added smart services.

Component suppliers like Fulham win by empowering their partners:
- Creating new business opportunities for the future
- Offering more product with greater capabilities
- Developing new products built on open interoperable standards that deliver real value to channel partners and their customers.

IoT is the future, but it’s up to component manufacturers, OEMs, distributors, and installers to lay the foundation today. Innovation starts with the smart components that form the building blocks of IoT-enabled products. Once you have versatile components you can mix and match open standards to create new solutions that address real-world control challenges.

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**EXHIBITOR LIST**

**ELECTRONICS DESIGN SHOW**

- Display Solutions H42
- DVR Ltd C2
- United Electronic Industries M22
- Expiri Electronics L54
- Eurocircuits L46
- Metz Connect GmbH H42
- Molex Deutschland GmbH K48
- Motor Electronics Ltd L42
- Nemco Ltd K42
- Neus (GB) Ltd L46
- Nortek AB (UK) L30
- Olivetti (UK) L34
- Components Europe K32
- Pace M20
- Panasonic Electric Works UK Ltd H72
- Phase One Electronics K51
- Phoenix Contact M18
- Picotech J8
- Precision Manufacturing Ltd K5
- Pulsonix H75
- Rapid Electronics H70
- Rhopoint Components Limited K6
- RUS Electronics K40
- Rohde & Schwarz K40
- Scharfe Electronics L20
- Selectronic Ltd G35
- Seumac H60
- TDK Lambda G32
- Tektronik UK Ltd H80
- Teledyne LeCroy K31
- Telenic Instruments Ltd K31
- Thermal Issues Ltd H10
- Toby Electronics K50
- Tracks Laser & Electronics Ltd E85
- Waveform Electronics B40
- Wilson Process Systems K8
- Wurth Electronics UK Ltd L16
- Wurth UK Limited K50
- iBASE B40
- (TMC Technology UK Co Ltd) J10
- Ineltek G11
- Innomak Corporation H10
- ODU Connector Systems J16
- OSI Electronics UK J16
- (Union Four Electronics) J19
- Review Display Systems F6
- Simms International PLC J19
- Solid State Supplies J2
- Solid State Supplies G11
- Swindon Silicon Systems H2
- Tactiq Ltd H30
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**Dual-mission HF radars**

**STEMlab from Red Pitaya selected for new dense network of dual-mission HF radars**

Mult-function, open-source, reconfigurable test & measurement platform used for high resolution radar/broadband data processing

Red Pitaya, the company that is pioneering the move to low cost, open-source, reconfigurable instrumentation with its credit-card sized STEMlab platform, is proud to announce that its STEMlab test and measurement solution has been selected for high-resolution radar/broadband data processing in a new dense network of dual-mission HF radars costing only $3000 proposed by the well respected Electrical and Computer Engineering Professor, geospace scientist, and expert in remote sensing hardware/software, Michael Hirsch, Ph.D., from Boston, MA, USA.

The proposed F2Radar solution costs $35 less than contemporary radar nodes using the latest CO2504 technology and simultaneously offers polarization-sensitive ionosphere probing with 1.25 km range resolution and rebalancing of data over the horizon at 1.250 km/s rates. This enables the deployment of networks dense and distributed enough to make real-time 3-D images of the ionosphere at a much lower cost than traditional single-site radars.

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**EDT Smart Embedded Products**

**New modules enable the user to add a modern GUI with high - end graphics and smooth animation to any system without the overhead of a memory and power hungry operating system.**

The controller board is integrated with the display as one compact module. It includes all necessary circuits to control the TFT module, backlight, FPGA and the DSI application.

The graphic framework is based on Touch GFX and FreeRTOS. Three modules are available – 4.3 inches, 7 inches & 10.1 inches.

Evaluation kits are also available. For you tube video see: https://www.youtube.com/watch?v=coMSKr3n0pW

http://www.mansky.co.uk/products/embedded-solutions/

@ nw@mansky.co.uk C: 01344 307733

**New Flat/High DIN Rail Enclosures**

**New Flat/High DIN Rail Enclosures From OKW**

OKW’s new flat/ high RAILTEC B DIN rail enclosures can accommodate connections at different levels and offer extra space inside.

RAILTEC B is fully insulated, protected to VDE 4 and meets building-machine and matter industry regulations. It can be mounted on 15ESN DIN rails or directly on walls for applications including control equipment, notably lighting systems.

The cases are available in 2, 4, 6 and 9 module sizes, with or without ventilation. PCB terminal blocks, plug headers, USB and D-SUB connectors can be fitted. Different combinations of terminal guards can be used. The cases are moulded from light grey PC (UL 94 V-0) as standard.

RAILTEC enclosures can be supplied fully customised to customer requirements.

@ sales@okw.co.uk C: +44 1489 583858

**New six-slot modular USB/LXI chassis from Pickering Interfaces increases test functionality in space-restricted applications**

1U high 60-106 chassis accepts over 1000 PCI modules; remote control possible via USB 3.0 or LXI Ethernet

Pickering Interfaces, a leading provider of modular signal switching and simulation products for electronic test and verification, has launched a new six slot modular USB/LXI chassis that occupies only a small, 1U rack-height form factor, making it suitable for portable and space-restricted rack-mount applications. The 60-106 chassis accepts from one to six Pickering PXIe 3U modules; the user can choose from over 1000 module types including programmable resistors, matrices, multiplexers, general purpose relays, D9 switches and fault insertion units.

The chassis is USB 3.0 compatible and features a fully compliant LXI interface with the option of using a Wi-Fi dongle (sold separately).

@ sales@pickeringtest.com C: +44 (0)1255 687900

**Reliable Keyed SMA fibre optic connector system**

**OMC’s rugged, reliable Keyed SMA fibre optic connector system now available on all standard SMA diode housing styles**

“Fit and forget” system; new VSMAX (Vertical SMA) and HDMSA (high density SMA) device receptacles

OMC, the pioneer in optoelectronics design & manufacture, has announced that its Keyed SMA (KSMAX) fibre optic system launched last October is now available in all of its standard SMA diode housing. The KSMA connector and diode receptacle system for OMC’s fibre optic transmitters and receivers deliver the rotational consistency of a keyed connector combined with the security and reliability of the SMAX connector and is ideal for optically demanding and long life fibre applications. Thanks to the rugged, all-metal design, the connector system is robust and suits multiple applications, across many industry sectors, including industrial and consumer, transportation, medical, aerospace, petrochemical and power distribution.

@ heathw@omc.uk  C: +44-1209-215424

**Ultra-Fit Power Connectors**

**Molex high-density, Ultra-Fit Power Connectors occupy 50% less PCB space, provide up to 14A – now at TTI**

Eliminate same circuit size cross-mating; reduce terminal backout; low mating force, 3.55mm pitch

Now available at TTI, Inc., a world leading specialist distributor of electronic components, Molex Ultra-Fit Power Connectors have a streamlined design that enables smaller, more efficient packaging than similar power interconnects, yet still provide similar current density.

Ultra-Fit Power Connectors provide up to 14A, but take up less than half the PCB footprint of comparable devices, enabling electronics designers to solve challenges across a very wide spectrum of products.

Features of Molex Ultra-Fit Power Connectors include multiple mechanically-keyed colour coded options which enables same-circuit, multiple connector use with virtually no chance of cross mating.

@ sales@de.ttiinc.com  C: +49 8142 6680 – 0

**Seminarians and Electronic components**

**Mouser Electronics and Marvell Enter Global Distribution Agreement**

Mouser Electronics, Inc., the industry’s leading New Product Introduction (NPI) distributor with the widest selection of semiconductors and electronic components, announces a global distribution agreement with Marvell Semiconductor, Inc., a provider of storage, processing, networking, security and connectivity semiconductor solutions. Mouser will distribute Marvell® industry-leading Fast Ethernet and Alaska® Gigabit Ethernet physical layer (PHY) transceivers.

"Mouser is excited to offer our customers Marvell’s high-performance, low-power PHY transceivers," said Kristin Schuettes, Vice President of Supplier Management at Mouser. "Marvell has an exceptional history of delivering next-generation products that continue to revolutionize how customers move data."

"Mouser is a proven global partner with top-tier sales and customer support that reflect our own high standards," said Dean Jamac, vice president, Americas Sales and Global Distribution at Marvell. "With Mouser’s leadership in global distribution, we expect to significantly increase adoption of our Ethernet transceivers."

@ kevin@hess@mouser.com  C: (817) 804-3833

**Ultra-Low Power Lattice sensAI Leads Mass Market Enablement of Artificial Intelligence in Edge Devices**

**New FPGA Solutions Open Doors for Rapid Deployment of Machine Learning Inference Across Broad Market IoT Applications Demanding Milliwatt Range Power Consumption**

Accelerates deployment of AI into fast growth consumer and industrial IoT applications including mobile, smart home, smart city, smart factory, and smart car products.

Optimized to provide ultra-low power (under 1 mW - 1 W), small size, and production-priced (HS $10 USD) benefits of ASICs, with FPGA flexibility to support evolving algorithms, interfaces, and tailored performance.

Full-featured Lattice sensAI stack offers modular hardware platforms, neural network IP cores, software tools, reference designs, and custom solutions via partner eco-system.

"Lattice sensAI addresses the unmet need for reliable, low cost, ultra-low power AI silicon solutions suited for rapid deployment across a wide range of emerging, mass market IoT applications," said Deepak Boppana, senior director, product and segment marketing at Lattice.

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