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ENGINEERING DESIGN SHOW PREVIEW ISSUE

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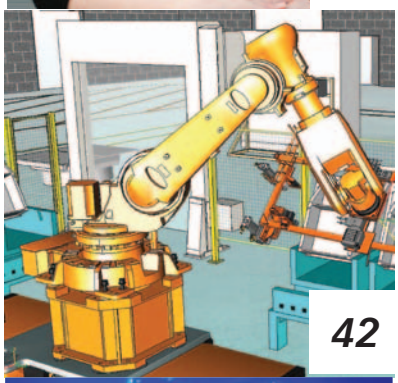

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Have we got a show for you!

Paul Fanning, Editor (pfanning@findlay.co.uk)

There is a strong chance that anyone reading this is either planning to attend the Engineering Design Show on the 10th or 11th October at the Ricoh Arena, Coventry or is actually reading this while attending.

I am aware as I write it that this assertion may sound presumptuous. After all, I know that the readers of *Eureka* are extremely busy people and that time to spend at exhibitions and conferences is a rare and precious commodity for them. These constraints on their time mean that any event they attend must be of tangible, practical value.

Even so, I remain confident that significant numbers of our readers will be at the show. Why? Because they are design engineers and will have known for some time that, while there is no shortage of exhibitions which may be of interest, there has not been one they could attend that is designed to cater specifically for their needs – until now.

'Designed for design engineers' has become the watchword of the Engineering Design Show and, while it may seem just a convenient piece of sloganeering, it is very much the principle that has underpinned the development of the show. From the beginning of the process, we have sought to remain focused on ensuring that the content of the exhibition, the workshops and the conference will be of direct relevance to those engaged in engineering design.

Of course, that has not been easy – the sheer diversity of industries in which design engineers work has made sure of that. However, as I hope the 20-page show preview that begins on page 19 of this issue will show, there will be something at the event that will be of value to engineering designers regardless of the market or markets in which they work.

Needless to say, we at *Eureka* are looking forward to the event and can't wait to see our readers there. We hope you can make it.

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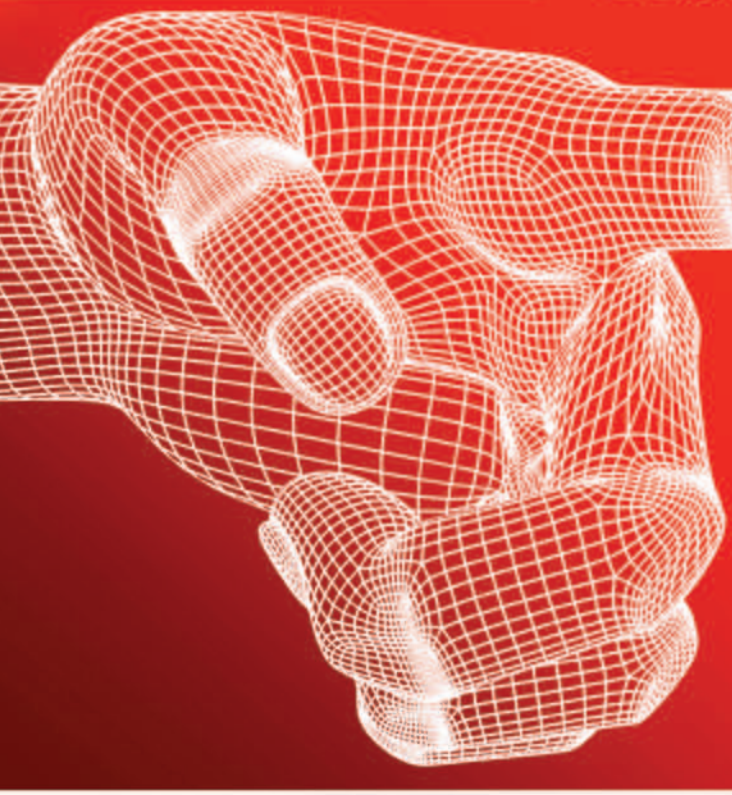

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23 October	SS Great Britain	Bristol
25 October	London Transport Museum	London

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Young engineers to shine at The Skills Show

The WorldSkills UK National Competition will take place between 15th-17th November this year at The Skills Show, to be held at the National Exhibition Centre, Birmingham.

The UK's biggest skills and careers event, The Skills Show is a unique annual celebration that will inspire the engineers of tomorrow with exciting opportunities in further education, skills and apprenticeships.

The Skills Show will play host to a range of competitions, awards and activities. Visitors will be inspired by 'skills in action' as the best of the nation's young talent perform at the WorldSkills UK Competitions; they'll have chance to Have a go at new skills, get up to the minute careers advice, access apprenticeships and real job opportunities from employers, to help them make that next important step.

For the very first time, The Skills Show will also bring together under one roof a range of key conferences from the annual skills events calendar. Set to be the skills event of the year, the show highlights the vital importance of skills to economic growth in the UK.

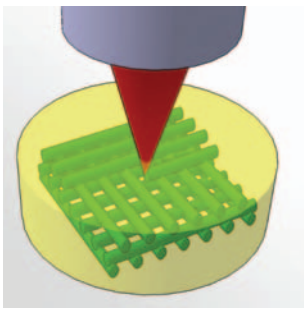
Engineering skills will feature heavily at the Skills Show, with WorldSkills UK National Competitions taking place in disciplines such as: Aeronautical Engineering; Avionics; Mechanical Engineering; CAD; CNC Milling and Turning; Industrial Electronics; Mechatronics; Mobile Robotics; Sheet Metal Technology; Welding; and Polymechanics.

The WorldSkills Competition is the biggest international skills competition in the world. It is held every two years in one of the WorldSkills member countries and regions. The UK also competes in EuroSkills, the pan-European equivalent.

Squad UK and Team UK are mostly selected from outstanding competitors who have taken part in WorldSkills UK. The UK will compete at EuroSkills 2012 (in Spa, Belgium) and at WorldSkills Leipzig 2013 (in Germany).

worldskillsuk.apprenticeships.org.uk

Researchers develop laser-based '3D painting' technique



A new laser-based technique has been developed by researchers at the Vienna University of Technology, which can fix molecules at exactly the right position in a three dimensional material.

Known as '3D photografting', the method could be used to grow biological tissue or create micro sensors and was created by two teams who had previously worked on 3D printing.

The method starts with a hydrogel – a material made of macromolecules, arranged in a loose meshwork. Specially selected molecules are introduced into the meshwork and then certain points are irradiated with a laser beam.

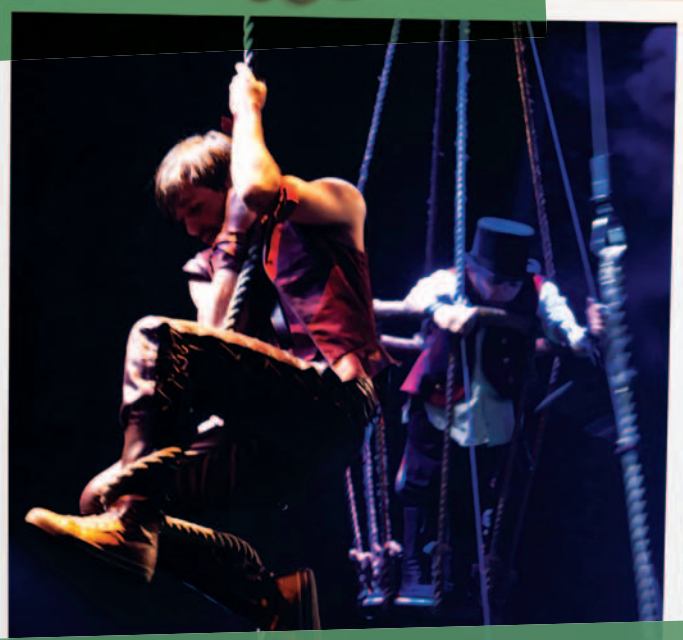
At the positions where the focused laser beam is most intense, a photochemically labile bond is broken, meaning highly reactive intermediates are created which locally attach to the hydrogel very quickly. The precision depends on the laser's lens system, with the teams claiming to obtain a resolution of 4µm.

"Much like an artist, placing colours at certain points of the canvas, we can place molecules in the hydrogel – but in three dimensions and with high precision," said Aleksandr Ovsianikov at the Vienna University of Technology.

The researchers say that depending on the application, different molecules can be used. As molecules can be positioned to attach to specific chemical substances and allow their detection, development of a microscopic 3D 'lab on a chip' could be a possibility.

www.tuwien.ac.at/en

“Control Techniques helped improve our performance”



Gill Stephenson
Senior Automation Engineer,
Royal Shakespeare Company

Gill Stephenson is rightly proud of the newly renovated Royal Shakespeare Theatre in Stratford-upon-Avon.

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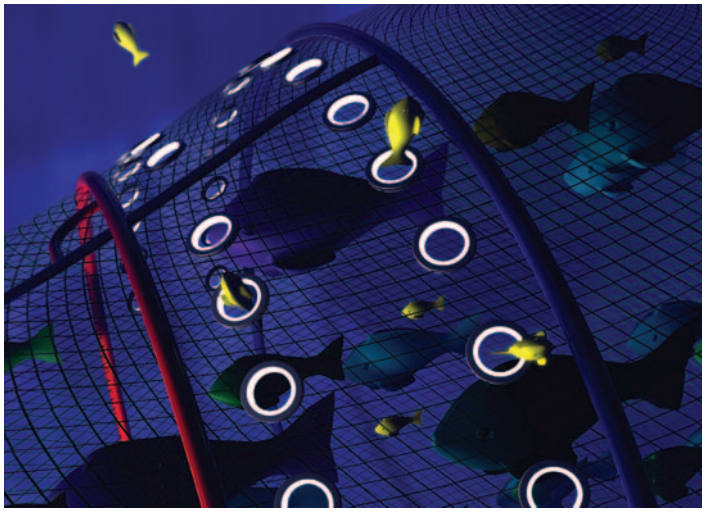
SafetyNet wins UK James Dyson Award



SafetyNet, a new device engineered to improve the sustainability of trawler fishing, has won the UK leg of the James Dyson Award.

The net is designed to solve the problem of young, unmarketable fish being caught and thrown dead into the sea, by providing them with an illuminated escape route.

Dan Watson, a recent graduate from the Royal College of Art, engineered a series of rings which can be retrofitted to a fishing net. These hold the meshes open when the net is under tension during trawling, with a light ring signalling a way out for the undersized fish.

"A key focus in the design of the escape rings is to make them as low maintenance as possible," said Watson. "The rings are illuminated, acting in a similar way to emergency exit signs for the fish, making it very clear where the escape routes are."

Most of the device's components are designed to be stored on standard hauling equipment. Battery and energy harvesting power sources for the lights have been tested and the rings will soon be trialled in conjunction with a UK Government body.

SafetyNet will progress to the international stages of the award, with Watson receiving £1000 from the James Dyson Foundation which will be used to refine the energy harvesting escape rings.

The judges have also selected eight more entries to go through to the award's international stage. Among these are:

• Alto, a new type of sewing machine that simplifies threading and speed control to improve ease of use for the beginner in which speed is controlled by pressing with the fingers through the fabric and the patented force sensor technology in a rubber foot underneath the machine allows the beginner to control the speed.

• ARTY, a small robotic wheelchair designed to give the freedom of independent mobility to children with disabilities. Using a combination of sensors and robotic technology, ARTY perceives its environment and makes control decisions to avoid collisions.

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New ProJet 5000 3D Printer

3D Systems' new ProJet 5000 large format professional 3D printer offers a 100% print speed increase and the highest print resolution available in its class. The new ProJet 5000 is equipped with 3D Systems' most advanced print-head technology, delivering higher print rates and print resolution to produce high precision, razor-sharp features.

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The ProJet 5000 prints durable, high-definition VisiJet MX plastic parts that stand up to the most challenging exposure environments and provide best-in-class functional performance for product development, testing, rapid tooling and casting applications.

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Part stacking and nesting capabilities combined with its oversized print volume provides high levels of productivity, giving users the flexibility to produce both larger parts and more parts in a single build.

www.3DSystems.com

Microstepping motor and intelligent drive

Applied Motion Products' STM range of microstepping motors with integrated intelligent drives now includes Ethernet communications. Available exclusively in the UK and France from Mclennan Servo Supplies, the new STM23 range covers stall torque ratings between 88 Ncm and 148 Ncm from a 12 to 70 VDC supply in a smart package that includes the motor, drive and control.

The new STM23 Ethernet range combines high performance motion control with 100 Mbps Ethernet communications which can be used for set up and configuration, streaming individual motion commands or upload/download and status monitoring of complete motion programmes using Applied Motions' powerful 'Q' programming language. In addition the models feature analogue positioning and encoder following components which can be usefully monitored over Ethernet.

www.mclennan.co.uk

Solution to last month's Coffee Time Challenge

The solution to last month's Coffee Time Challenge, to build a device which identifies and fills cracks in the road whilst on the move, comes from US university, the Georgia Tech Research Institute (GTRI). It developed a prototype automated pavement crack detection and sealing system which in road tests was able to detect cracks smaller than one-eighth-inch wide and efficiently fill them whilst on the move.

It utilised a stereo camera, light-emitting diodes (LEDs) of two different colours, and an assembly to provide a continuous supply of sealant to longitudinal and transverse axes. As the system travels along a road, the LEDs illuminate the road in two directions – parallel and perpendicular to the road – and the stereo camera takes two pictures of the road simultaneously, which are analysed using threshold and filtering algorithms. Within 100ms the onboard computer generates a 'crack map' specifying the location and shape of any cracks shown on the images. A master controller then instructs the sealant applicator valves to fire. To fill longitudinal cracks, a single dispensing nozzle capable of continuous operation is attached to a linear servo axis. The transverse sealant distribution system consists of 12 nozzles.

The researchers tested their crack detection algorithm on more than 100,000 images they collected of roads and found the program correctly identified more than 83% of the cracks.

www.gtri.gatech.edu

NEW FIRE-RETARDANT RUBBER COATING

Trelleborg has launched DragonCoat – a flexible fire-retardant coating – to protect rail components. It is considered the first to give significant fire protection to natural rubber suspension components, delaying the combustion of the main body of rubber. This allows passengers more time to escape in the event of a fire, an extra three minutes can be critical in protection of life and survivability.

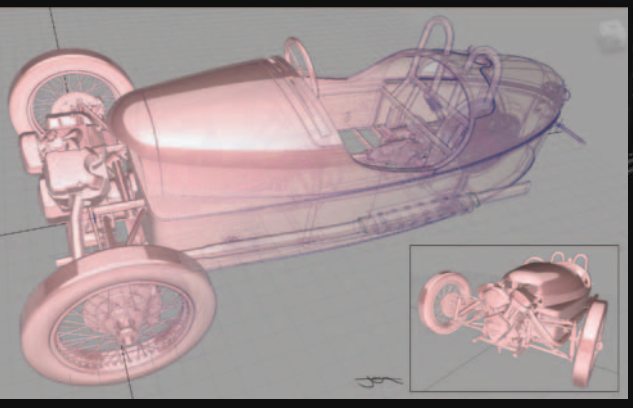
DragonCoat ensures natural rubber directly exposed to a heat source will not ignite as the coating provides a shield, thus delaying the onset of smoke, toxic emissions, and flames. It has the capability to flex and deform, whilst retaining all the natural elasticity of the material.

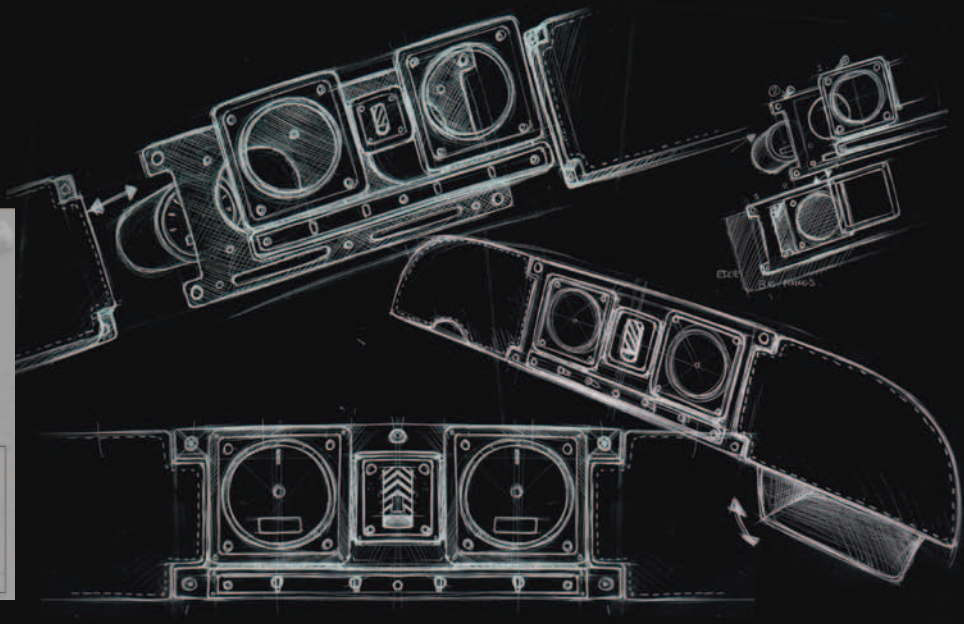
www.trelleborg.com

Morgan moves with

Morgan cars may have a classic – even old-fashioned – image, but, as Paul Fanning discovers, that is far from the whole story.

The popularity of Morgan's three-wheelers has come as a surprise to the company, with demand greatly exceeding expectations.





the times

Words that spring immediately to mind when the Morgan Motor Company is mentioned may include 'vintage', 'heritage', 'classic' or even 'iconic'. However, the truth is that the list is unlikely to include 'innovative'. A chassis famously made of wood, running boards and – let's face it – the long-term endorsement of Jersey's most famous TV detective have all contributed to an image of this Malvern-based car company that would suggest it looks more to yesterday than tomorrow.

Appearances can be deceptive, however. While extremely proud of its past, Morgan retains a keen eye on the the present and future. As the company's owner (and grandson of the founder) Charles Morgan puts it: "Although steeped in history, we are actually quite innovative as a company. That's particularly the case with the materials we use and the philosophies we have, which seem to coincide with what people want from the motor car at the moment."

Certainly, a brief glance at the company's product range leaves you in no doubt that there is now a great deal more to Morgan than the well-known 'Classic' range. The Morgan brand now either encompasses or will shortly encompass four-seaters, electric vehicles and an extremely successful range of three-wheelers.

Chief designer Matt Humphries outlines the main ranges, saying: "The three-wheeler is a really raw, very vintage-looking vehicle. It's a design that is self-evidently about getting out there and having fun. Moving over to the 'Classic' range, it's a bit more civilised, but it still has those 'DNA' qualities that you have on all the products, so the interior choices are still wood, leather and aluminium. And from that Classic range in the centre, you've got the Aero product range, which is a lot more futuristic and has a lot more technology in it."

This expansion and progress has clearly placed considerable strain on the design team to deliver desirable, modern, roadworthy vehicles while still conforming to the design priniciples that underpin the Morgan 'look'. These are outlined by Jon Wells, Morgan's senior designer, who says: "Every Morgan is going to have the classic proportions, whereby the driver is sat on the rear axle with miles of bonnet in front of them. Combine that with the Morgan 'Face' with the cowl and the headlights. You then look at the materials – leather, ash wood and aluminium – and the way those materials are worked entirely by hand. And then you have the essence of the wing line, the rear arches – if you put all those things in the pot, you're going to end up with a car that looks unmistakably like a Morgan – there's just all that DNA in there."

Matt Humphries concurs, saying: "You can jump from a three-wheeler straight into an Aero Coupe and they retain very similar qualities in terms of the way that you feel when you're in one."

"Although steeped in history, we are actually quite innovative as a company. That's particularly the case with the materials we use and the philosophies we have, which seem to coincide with what people want from the motor car at the moment."
Charles Morgan

Of course, a number of other constraints exist for the design team, not the least of which are practical, commercial and regulatory. Says Humphries: "At the end of the day, anything we design in here has to be manufacturable. We can sketch absolutely ridiculous ideas, but if they're completely unfeasible, then we're wasting our time. We're not Audi; we're not able to just build everything. So everything has to be designed at a feasible cost."

In fact, the use of sketch and rendering software has made a huge difference to the way in which Morgan now designs vehicles. Because Morgan offers buyers high levels of customisation, the ability to sketch surfaces in Autodesk's Alias and then quickly render them into Autodesk's Showcase allows the company to put realistic models in front of customers mere hours after discussions on specification have taken place. Indeed, in one case, this capability meant that that the company was able to secure 300 deposits for the car long before it was built.

The software packages also confer the ability to move the design process forward quickly. Jon Wells uses the example of a steering wheel redesign: "Because the airbag design is coming to the end of its life, we've still got to redesign the wheel to accommodate that. So it's quick sketches, then going from those and going through the Alias models and making quick surface models in Alias, spinning them around on screen in front of the directors, whizzing through the ideas and very quickly being able to make a decision."

This capability is crucial for a company that, as Charles Morgan says, has set itself the task of bringing out new models slightly faster than some of the big manufacturers. For this reason, he says: "We need the latest design software and equipment to keep making cars rapidly."

This type of innovative design is also present in terms of Morgan's use of materials and technologies. The Morgan AeroMax, for example,

The forthcoming Eva GT Coupé may employ magnesium in its chassis as a result of a TSB-funded collaboration

was the first car in the world to feature a body made entirely from superformed parts and the Aero Supersport, which is based closely on the existing AeroMax, also shares much of its superformed aluminium body. The superforming process uses heat and air pressure to force the sheet into a single surface form tool creating complex three dimensional panels in a single cycle.

Morgan was also one of the first car companies to see the advantage of a bonded aluminium chassis to give rigidity but also to save weight. Says Charles Morgan: "We want to be pioneering a number of new technologies. We've started with bonded chassis and before that we started with superforming, which was an aircraft technology we brought into the car industry."

One of the biggest challenges facing Morgan when designing a vehicle, of course, lies in ensuring that what is – superficially at least – a vintage-looking car is able to conform to modern standards of safety and environmental impact. Again, this has driven the company to innovate in terms of design and material use. For instance, in 2008, the Morgan AeroMax re-introduced wood laminates under the aluminium as 'meat in the sandwich' to increase durability and soften the intrusion pulse during crash tests. These innovations mean thatcurrent Morgan cars are typically 20 to 30% lighter than similar vehicles made from steel, yet the cars have comparable safety standards.

That said, however, there are regulatory requirements in certain countries that would so fundamentally alter the Morgan 'DNA' that it is simply impossible to comply. Says Matt Humphries: "There are massive challenges from regulation. They have an absolutely huge impact. For instance, we'd love to be able to sell the Plus 8 into America, but we just can't do that because of the fuel tank position. And if you move the fuel tank up, you can't have that flanked back anymore, so it affects absolutely everything."

Moving forward, there is no doubt that innovation will remain central to Morgan's future product offerings. It is currently developing an electric version of the Plus 8 called the Plus E, which is both all-electric and all-aluminium. Its Zytek 70kW (94bhp) electric motor develops 299Nm of torque for a car weighing just 1,250 kilos. Even more unusually, the car features a five-speed gearbox. This, says Humphries, offers "the best of both worlds: top speed; acceleration; and you've got distance out of the motors because of the gearbox. And it's still fun to drive!"

Materials remain a key area in which Morgan is seeking to innovate, with Humphries acknowledging that the company is looking into the use of composites in a number of areas. However, the most intriguing step lies in the development of the forthcoming EvaGT 2+2 coupé, which has had its launch delayed while the company investigates the use of magnesium in its chassis.

This came about because Morgan secured funding from the Technology Strategy Board (TSB) to allow it to participate in and manage a £1.4 million collaborative project to use revolutionary materials in a chassis application. The project (named MagMog) involves five partners who are all experts in their relevant fields. The project partners are Morgan, Penso Consulting, Superform Aluminium, Coventry University and Magnesium Elektron UK – the world's largest manufacturer of magnesium sheet.

The advantages that the use of magnesium alloy would confer include the fact that Magnesium is the lightest structural metal of all, being two-thirds the weight of aluminium and one quarter the weight of steel. In addition, as the eighth most common element and the sixth most abundant metal, it should present few supply problems.

The major objections to the use of magnesium, however, have traditionally been centred around its perceived flammability and tendency to corrode. However, tests have included burning a hole in the new material with a welding torch as big as the cone of the torch. There was no ignition of the surrounding area and the rapid heat conductivity of the magnesium ensured very rapid cooling around the hole.

The company has also undertaken tests to show that the corrosion resistance of its magnesium alloy is superior to steel and at least equivalent to high-strength aluminium provided that the component is designed to prevent galvanic corrosion issues.

Among other things, these developments make it clear that appearances can be deceptive. While Morgan Cars is proud of its history and maintains a number of aspects of design and manufacturing that hark back to an earlier time, any assumption that this means the company is anything less than innovative is seriously misplaced.

www.morgan-motor.co.uk
www.autodesk.com
www.superform-aluminium.com
www.magnesium-elektron.com

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Sustainable design

Sarah Krasley is sustainable manufacturing manager at Autodesk and is responsible for developing tools to help manufacturers create more sustainable designs. Prior to her work at Autodesk, Krasley was communications director at the US-based Center for Resource Solutions, a think-tank focused on renewable energy and carbon mitigation policies and market mechanisms.

Krasley has more than a decade of experience working in the convergence of business, design, and sustainability. She holds a bachelor's degree in design from the Pratt Institute and a masters of business administration degree from the University of San Francisco.

Influencing the mainstream

What are the challenges involved in taking the 'green' message out to the mainstream? Justin Cunningham asks Autodesk's sustainable manufacturing program manager.

There are not many people who make it their job to influence and encourage engineers from all sectors, countries and walks of life to work smarter and more efficiently. But this is a normal day for Sarah Krasley, sustainable manufacturing program manager at Autodesk.

Broadly speaking, Krasley's role is to help the engineering community design and manufacture what might be called 'green', 'eco-conscious' or 'sustainable' products, services and functions. In reality, though, she believes it is just about making good decisions.

"The products and material decisions you make right now require water, energy and other resources," says Krasley. "Even if you are not looking at it from an altruistic perspective, from a cost perspective you have got to deal with this stuff. There are going to be billions of new people in the world economy and if you don't have a proactive strategy for finding materials that are not impactful from a resource perspective, your cost of doing business is just going to go up."

The issue of sustainable engineering is complex, often counter-intuitive and always evolving. However, the more information engineers have, the more up to date it is and the more quickly it can be accessed, the more effectively it can be leveraged by decision makers.

"Every decision that a designer makes 'locks in' a material," says Krasley. "That locks in the supply chain, which locks in manufacturing processes, which locks in the way a facility is laid out, which locks in the type of transportation needed to take the product from one place to another. The designers are incredibly important, as they are the ones that are directing all that."

An example of where the best intentions can go wrong comes from the automotive sector. Full lifecycle assessments of some hybrid vehicles reveal that the manufacturing processes and materials used are actually more environmentally impactful than the assembly of traditional fuel injection engines.

Another instance of this comes from NASA, which, while building a satellite, opted for a type of tin solder over lead in an effort to be more health- and eco-conscious. Once in orbit, however, the satellite did not perform as well as it would have had it been lead solder and it eventually had to be pre-maturely decommissioned and brought back down to Earth.

"What that illustrates is the idea of looking at a material in context," says Krasley. "Is it going to require less energy, water or fewer processes to form that material into the component that you want it to become in your assembly and, critically, how will it perform in service?

"It is a vexing issue for many engineers who are trying to do the right thing to improve the environmental footprint of their products. Really all they are doing is choosing different materials and different ways of designing. But, when it is looked at in context from a 'whole systems' perspective, the environmental performance is not as good as first hoped."

To help engineers make sense of the complexity of sustainable design and manufacture, Autodesk has implemented an 'EcoMaterials Advisor' within its CAD software. The point of it is to act as a quick guide to let engineers know broadly the cost and embedded water, CO2 and energy consumption so that they can use this information during early design to make informed decisions about what is going to work, and more critically, what is not.

"We want the EcoMaterials advisor to illuminate different material opportunities for our users and then allow them the opportunity to perform simulation and testing to determine whether or not that material is something that would be a good swap for them," says Krasley. "So if you use a specific grade of vinyl, you have the opportunity to experiment virtually with different grades within that family. There may be subtle nuances in processing, or impacts that you have not thought of that would change the carbon footprint and how much energy it will take to produce."

Part of Krasley's job is to encourage engineers and manufacturers to think longer-term about the products they are designing or making and think in terms of holistic design – a concept that, while often dismissed as a buzzword, is based on a sound premise.

"There are many things designers can do that are straightforward 'low-hanging fruit' opportunities," says Krasley. "For example, look at ways to reduce the number of types of fasteners inside your assembly or opportunity for pieces to snap together to reduce the amount of time it takes to disassemble a product at the end of its life, so it is easier to recover those materials and get them back in to the supply chain for another product."

With the help of Autodesk's software tools, Krasley is determined to help to inform the engineers of tomorrow to get them working smarter. She says: "This is an important aspect of sustainability. A company can have the best intentions and perhaps use a natural material, but if those are not cost-competitive materials they are not going to stay in business and therefore they are not really sustainable. So it is important to consider things in context."

www.autodesk.com

Engineering design show

EXHIBITION • CONFERENCE • WORKSHOPS

PREVIEW

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Thursday 11th October 10:00 – 15:00

REGISTER NOW and use the code EU2012 to book conference sessions entirely FREE! Saving you £75!

On the 10th and 11th October, an event will take place at the Ricoh Arena, Coventry that – uniquely among UK exhibitions – will cater specifically for design engineering professionals. Or, to put it another way: an event 'designed for design engineers'.

Organised by *Eureka*'s parent company Findlay Media, the show will bring together a broad range of technologies, industries and expertise to create an event that will have something to offer engineering designers in every sector. This will be the case particularly because the concurrent conference and workshop programmes will provide insights that will include some of the biggest names and issues in UK engineering design as well as the latest hands-on practical and technical advice.

In terms of value, the key to the Engineering Design Show lies ensuring that we can help you to produce cost-effective, efficient and commercially-successful designs by offering access to the latest technology. This, of course, is a role that *Eureka* has successfully fulfilled for more than three decades.

However, while the written word can introduce you to an idea, only by having physical access to the people and products behind that idea can you really know if it's right for you. The Engineering Design Show therefore offers the perfect complement to Eureka's editorial content: allowing our readers a genuinely interactive forum in which to see, feel and discuss the ideas and technologies that will make their designs even better.

We at *Eureka* are certain that the Engineering Design Show offers an invaluable opportunity for design engineers to attend an event focused purely on their professional needs. With that in mind, we urge you not to miss out.

We look forward to seeing you there.

Paul Fanning, Editor

www.engineeringdesignshow.co.uk

Engineering Design Show Conference Programme

A valuable, informative conference programme is at the heart of any successful industry event and the Engineering Design Show 2012 will be no exception.

Featuring some of the biggest names in UK engineering – including **BAE Systems**, **McLaren**, **ARM Holdings** and **AgustaWestland** – and with sessions on everything from motorsport and medicine to intellectual property and defence, this two-day conference truly promises something for everyone.

As a brief glance at the programme will show, the conference offers delegates an unrivalled opportunity to hear about the latest technologies, techniques and strategies straight from the horse's mouth – with information from acknowledged experts at the forefront of their fields.

The delegate places for conference sessions are limited to 100 attendees per session. They are going fast, however, so if you are interested in attending one of the sessions and wish to reserve your place, then register now at **www.engineeringdesignshow.co.uk** to avoid disappointment.

The design of future defence platforms will be explored at the Conference by James Baker, managing director of BAE Systems

10th October – Legends Lounge

09.00 - 09.45
Why motorsport engineering and innovation benefit UK industry
Chris Aylett, chief executive, Motorsport Industry Association (MIA)

10.00 - 10.45
Palpatronix: haptics for tumour detection
James Chandler and Earle Jamieson, PhD students, Leeds University

11.00 - 11.45
Optimising the design development process
David Mills, managing director, Haughton Design

12.00 - 12.45
Designing future soldier systems and defence platforms
James Baker, managing director, BAE Systems Advanced Technology Centre

13.00 - 13.45
Panel discussion: IP – what is it worth?
James Baker, managing director, BAE Systems Advanced Technology Centre
Nigel Robinson, partner, D Young & Co LLP [PIC]
Jon Calvert, managing director, ClearViewIP
Paul Fanning, editor, Eureka Magazine

14.00 - 14.45
The ARM architecture: driving the transition to 32 bit systems
Richard York, director of product marketing, ARM Holdings

15.00 - 15.45
Designing and manufacturing an F1 engine control unit
Tim Strafford, business development manager, McLaren Electronic Systems

16.00 - 16.45
Making more sustainable materials choices
Dr Jamie O'Hare, eco design product manager, Granta Design

Chris Aylett of the Motorsport Industry Association will discuss ways in which motorsport technology has filtered into other areas of industry

11th October – Legends Lounge

09.00 - 09.45
Aerospace Keynote – aerospace and innovation: a vision for the future
James Godman, head of research and development, AgustaWestland

10.00 - 10.45
Heavy-duty engine design Keynote
More details to follow

11.00 - 11.45
Ten ways to make your software hard to port
Ian Willats, managing director, Pebble Bay Consulting

12.00 - 12.45
Utilising CAD and PLM
Siemens PLM

13.00 - 13.45
"It's got to be… like the iPod"
Nathan Wrench, associate director for Products and Systems Division, Cambridge Consultants

14.00 - 14.45
The strategic use of design in society and business
Sir George Cox, president, Institution of Engineering Designers

David Mills

James Baker

Nigel Robinson

James Godman

Tim Strafford

Sir George Cox

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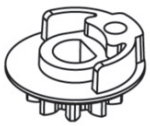

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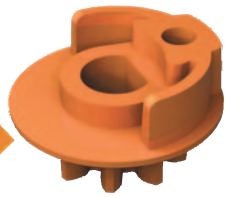

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The Conference – ones to watch

With so much to choose from at the Engineering Design Show Conference, Paul Fanning seeks to highlight just some of the presentations that promise to be of particular interest to *Eureka* readers.

Why motorsport engineering and innovation benefit UK industry

Chris Aylett, chief executive, Motorsport Industry Association (MIA)

10th October

9.00-9.45am

Far from existing in a bubble, motorsport creates innovative designs capable of being transferred into all manner of industries, making it an invaluable focus for innovation. Here. Chris Aylett will offer examples of how the cutting edge technology developed for motorsport has found its way into applications such as defence and suggests ways in which industry and motorsport can work together for the greatest possible mutual benefit.

Designing future soldier systems and defence platforms

James Baker, managing director, BAE Systems Advanced Technology Centre

10th October

12.00-12.45

As featured this year in *Eureka*'s April and May issues, James Baker and BAE Advanced Technology Centre have developed an approach to innovation that has entailed far greater levels of collaboration with the commercial world than has previously been the case.

Here, he will talk about the challenges of designing for a defence market that has become a far more challenging environment in the last few years and the strategies he believes will succeed.

Register for these sessions now at www.engineeringdesignshow.co.uk

Panel Discussion: IP – what is it worth?

Nigel Robinson

James Baker, managing director, BAE Systems Advanced Technology Centre
Nigel Robinson, partner, D Young & Co LLP
Jon Calvert, managing director, ClearViewIP
Paul Fanning, editor, Eureka

10th October

13.00-13.45

It's fair to say that everyone knows that IP is important, but very few would claim to be fully on top of the subject. What are the different types of IP? What is the best approach to protecting and exploiting them? Is jealously guarding IP always the best approach or can a more flexible approach pay dividends? This panel discussion will allow delegates to talk to the experts and offer some solutions and answers.

The strategic use of design in society and business

Sir George Cox, President of the Institution of Engineering Designers

11th October

14.00-14.45

Design needs to be seen in its wider context. Design – or rather the strategic use of design – holds the key both to the future health of the UK economy and to the solution of the major problems facing society. Here, Sir George – the former chairman of The Design Council and author of The Cox Review of Creativity in Business – will explain how the current economic climate has underlined this and the challenge it creates for nations, organisations and individuals.

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Engineering Design Show Workshop Programme

Running parallel to the Conference Programme is the Engineering Design Show Workshop Programme. The workshops are intended to be practical and 'hands-on' advice on a range of technical issues and technology subjects that delegates will find both useful and helpful on future projects.

The Engineering Design Show will feature two workshop theatres covering 20 sessions across the two days. Every one of these sessions will include highly relevant and valuable content such as case study presentations by leading technology experts.

The workshops are free for visitors to attend but space is limited to 50 attendees per session. If you are interested in attending one of the sessions below and wish to reserve your place, then register now to avoid disappointment at **www.engineeringdesignshow.co.uk**

10th October

Theatre 1

10.15 - 11.00
Innovative bearing and precision components for low carbon powertrain design
Stewart Davies, principal engineer, ***Schaeffler UK***

11.15 - 12.00
Functional plastics: a solution for future challenges
Dr Antti Helminen, research and development manager at ***Premix Oy*** *(on behalf of* ***Plastribution****)*

12.15 - 13.00
Intellectual Property Protection – a commercial perspective
Ian Harris, partner, chartered & European patent attorney, ***D Young & Co LLP***

13.00 - 14.00
Lunch and exhibition

14.00 - 14.45
Making the invisible visible – designing in adhesives during product development
Bob Goss, senior technology specialist, ***Henkel***

15.00 - 15.45
A vision on the future of additive manufacturing
Philip Hudson, managing director, ***Materialise UK***

16.00 - 16.45
Mobile measurements made possible with smart phones and tablets
Kyle Voosen, marketing director,
National Instruments

Theatre 2

10.15 - 11.00
Crowd sourcing and open engineering uncovered
Lauri Poldre, partner, ***GrabCAD***

11.15 - 12.00
ECAD/MCAD integration in the electronics design process: how to get the best out of both worlds?
Jörg Kaleita, technical account manager for EMEA,
Altium Europe

12.00 - 13.00
Lunch and exhibition

13.00 - 13.45
Better, more sustainable products through eco design and materials selection
Dr Jamie O'Hare, eco design product manager,
Granta Design

14.00 - 14.45
Integrating switchmode power for OEMs
Matt Smith & Keith Barclay, applications support managers, ***TDK Lambda***

15.00 - 15.45
Innovative material selection to add value
Andy Pilling, strategic account manager, ***Albis UK***

16.00 - 16.45
The benefits of piezoelectric sensor technology
Nick Gittins, sales manager, ***Kistler Instruments***

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October 11th

Theatre 1
10.15 - 11.00
Reliable long life bearings for high speed and harsh environments
Mark Pritchard, senior product engineer, ***The Barden Corporation UK***

11.15 - 12.00
Functional plastics: a solution for future challenges
Dr Antti Helminen, research and development manager at ***Premix Oy*** *(on behalf of* ***Plastribution****)*

12.00 - 13.00
Lunch and exhibition

13.00 - 13.45
PROFIBUS diagnostics and network monitoring
Andy Verwer, director, ***Verwer Training and Consultancy***

14.00 - 14.45
Next generation digital prototyping and simulation
Phil Read, sales director, ***Man and Machine*** *and Jonah Normand, simulation sales for Northern Europe,* ***Autodesk***

Theatre 2
10.15 - 11.00
Practical advice on the use of structural adhesives with composites, metals and plastics
Gavin Creech, senior applications engineer, ***Scott Bader***

11.15 - 12.00
How to get the right board manufactured without eliminating creativity
Jörg Kaleita, technical account manager for EMEA, ***Altium Europe***

12.00 - 13.00
Lunch and exhibition

13.00 - 13.45
The selection implications of data conversion components for the overall analogue signal chain
Gary Biggins, FAE, Anglia and Charles Akokhia, northern European FAE manager at ***Analog Devices***

14.00 - 14.45
Surviving in the extreme: motors for harsh environments
Gary Livingstone, managing director, ***LG Motion***

Show News Engineering design show

More than 80 exhibitors are due to appear at the Engineering Design Show. Here, *Eureka* offers a preview of some of the technologies, services and expertise to be displayed.

Abssac

Abssac is now the appointed United Kingdom distributor for the entire product range of ETP hydraulic clamping hubs and bushes and will be showing its complete range for the first time at the Engineering Design Show.

All ETP products consist of a double-walled hardened steel (in some cases stainless steel) sleeve, filled with a pressure medium. In the product flange there are one or more screws and a piston with seals for the pressure setting.

Stand C50

Alcoa Fastening Systems

Alcoa Fastening Systems (AFS) was established in 2002 with the intention of providing a complete range of fastening solutions for a wide range of industrial markets and customers. AFS will be exhibiting its extensive product range, which currently offers the greatest breadth and depth of fastening solutions available including: self-locking nuts, quick-release fasteners, draw latches, threaded inserts, lock-bolts, structural blind fasteners and installation tooling.

Stand B20

Anixter Component Solutions

Leading component and cable accessories supplier Anixter Component Solutions will be featuring its new catalogue at the Engineering Design Show.

As well as promoting the catalogue, Anixter will be using the event to feature its new ranges of terminal blocks, fuses, fuse holders, crimp connectors, indicators, push-buttons and DIN rail enclosures from CamdenBoss, including Camden's flagship products, fused terminal blocks and modular control switches.

Stand A45

Barden Corporation (UK)

Barden Corporation will be sharing parent company Schaeffler's stand at the Engineering Design Show. Visitors will have the opportunity to view a range of super precision ball bearings from the company.

Barden serves a wide range of industry sectors, including aerospace and defence, dental and medical, vacuum pumps, and critical industrial applications. As well as providing a range of super-precision deep groove and angular contact ball bearings, Barden also specialises in developing unique, non-standard bearing designs for demanding applications.

Stand D51

Centa Transmissions

As well as showing what is new and innovative in engine drives, mechanical power transmission expert Centa Transmissions will also be demonstrating its design capability at the Engineering Design Show, where engineers can see 3D modelling on a SolidWorks system.

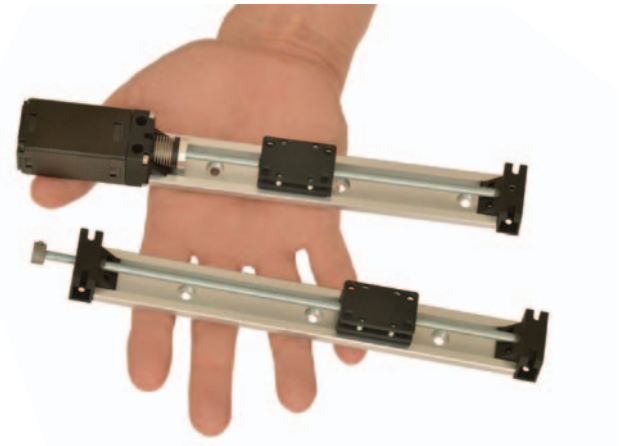
On display will be Centaflex-A, which the company describes as one of the most versatile flexible couplings available to design engineers today.

Stand B25

Data Plastics

Data Plastics claims to offer a solution to any design/custom moulding need as well as a broad range of standard parts. The company offers enhanced manufacturing capability following heavy investments in infrastructure.

These investments were aimed at making the company an extremely competitive choice for buyers seeking an experienced plastic injection



moulding company to produce medium- to high-volume disposable components.
Stand D90

Huxley Associates

Huxley Associates is a market-leading engineering recruitment company with a specialist team focused on the recruitment of design engineers since 1995.
Stand A35

Henkel

The Engineering Design Show will be the launch platform for Henkel's new range of hazard label-free cyanoacrylates, commonly known as superglues.

The main demonstration on the Henkel stand will be Macromelt. This is a low-pressure moulding process with hotmelt adhesives that is ideal for sealing delicate electronic components and cabling. At the show Henkel will be using this method to encapsulate pen drives that will be given to stand visitors.
Stand C35

Igus

One of the main highlights at the igus stand will be its new drylin SLN-27 miniature linear drive axis with polymer bearings. The high-performance drylin SLN-27 miniature linear axis has been developed specifically for simple handling tasks in confined spaces, and it offers design flexibility for positioning small loads.

Also on display will be a range of igus energy chains, which are made from high performance plastics.
Stand B10

The Institution of Engineering Designers

The Institution of Engineering Designers is the professional body for people working in engineering design. Visit its stand to find out how joining a body of like-minded professionals can help you in your career development.
Stand B103

IQD Frequency Products

IQD will be exhibiting one of the most comprehensive frequency product ranges available, from low-cost, commercial-grade products to those used in high-reliability military and professional-grade applications, including: quartz crystals; VCXOs, TCXOs and SAW filters.
Stand B80

Jet Press

Already providing the UK's only single source for the combined ranges of ITW, Raymond and TRW specialist fastening components, Jet Press will also be showcasing the very latest in ball bearing slide innovations from Accuride, Camloc Gas springs, Hummel Cable Glands, Lowe and Fletcher Locking Systems and Rencol Knobs, Handles and Levellers. Visitors will also be able to talk with Jet Press' application consultants.
Stand E40

Heidenhain (GB) – Headline Sponsor

As a headline sponsor at the Engineering Design Show, Heidenhain (GB), the world-leading supplier of angular, linear and rotary encoders, digital readouts and CNC systems, will be staging a display that focuses on the needs of design engineers and specifiers across all industry sectors.

On show will be world-class absolute and incremental linear and rotary encoders, length gauges and measuring systems for all types of measurement applications, as well as best-in-class torque motors, complemented by industry-leading experience and expertise that will help design engineers overcome any and every problem.

In particular, the show will also enable the company to demonstrate its newly-expanded product range from within the Heidenhain group of companies, including Etel torque motors, RSF linear and rotary encoders, and Numerik Jena measuring systems.

Visitors to the stand will see examples from the globally-renowned range of Heidenhain encoders – sealed and exposed linear, rotary and angle, as well as absolute and incremental models to suit every demand in both precision and 'hostile' application environments – including the just-announced LC 200 Series multi-section absolute linear encoder for measuring lengths up to 28m and boasting an accuracy of +/- 5 microns.
Stand C20

LG Motion

LG Motion will be exhibiting motion control components and system solutions that design engineers, involved in researching and developing ideas for new products and automated production systems, will find invaluable. LG Motion will be highlighting linear and rotary moving coil actuators from SMAC Europe as well as its own LG range of high precision linear, rotary and elevation slides.

Stand B55

Maxon Motor

At the Engineering Design Show, Maxon Motor will be presenting the latest products from its range. These include a growing range of very powerful motor controllers.

Maxon will also be showcasing the huge range of customisation it can offer to customers from its standard product. This includes bespoke cables, flanges, shafts, windings and whatever is required to fit the customer's application.

Technical experts will be on hand at the stand for designers who wish to discuss specific projects in more detail.

Stand C55

MiniTec

MiniTec UK will showcase its Profile System range of modular profiles and ancillary components for machine base and constructional framing solutions. Designers and engineers using the show to research and develop ideas for production systems and machinery design will find a comprehensive range that includes components and sub-system solutions for safety and guard screens, workbenches, conveying and parts handling, automated manufacturing and test equipment, special fixtures, display consoles, positioning systems and even complex automated production plant.

Stand C45

Muffett Gears

Manufacturer of gears, gearboxes, assemblies and components Muffett Gears will be exhibiting at the show. The company's policies of continuous investment in staff, equipment and machinery, together with reaching out to new markets have been elements that have proved fundamental to Muffett Gears' growth.

Stand A15

National Instruments

At the Engineering Design Show 2012, National Instruments will demonstrate a selection of new products, including LabVIEW 2012, new technologies for embedded monitoring and control, and a family of mobile applications for interacting with measurement and control systems from smart phones and tablets.

Stand C60

Nexus GB

Nexus GB will be exhibiting its extensive range of non-volatile keys, tokens and receptacles at the Engineering Design Show. Nexus will be using a custom-designed robot application to illustrate the potential of its products to design engineers.

Stand E30

Schaeffler UK – Headline Sponsor

Visitors to the Engineering Design Show will be able to view a selection of linear, rotary, ball and roller bearing ranges from Schaeffler UK. Schaeffler will be sharing the stand with another Schaeffler company, The Barden Corporation UK, a manufacturer of super precision ball bearings.

Experts from Schaeffler will be on hand throughout the show to provide advice and guidance on bearing and linear actuator selection, as well as to discuss specific application issues.

On the stand, Schaeffler will showcase a selection of linear actuators for multi-axis positioning and handling systems. Linear actuator options include telescopic and clamping actuators, linear tables, driven linear units and a range of linear accessories such as fasteners and connectors. These enable systems to be matched precisely with the application performance requirements of motors, gearboxes, sensors and controllers.

Schaeffler will also showcase its comprehensive range of ball bearings and roller bearings, including needle roller bearings, track rollers, bearings for screw drives, insert bearings and housed units, as well as X-life premium quality bearings, designed to provide increased load-carrying capacity, higher rigidity, lower operating temperatures and reduced noise levels.

Visitors will also be able to see how Schaeffler's online bearing calculation software program, Bearinx, can be used to optimise designs. Schaeffler engineers will demonstrate the power of this unique software program by inviting visitors to enter their own application-specific design parameters.

Another focus on the stand is the 'Glass Car', a software program developed by Schaeffler that demonstrates the mechanical moving parts on a typical passenger car. The software shows engine, chassis, wheel and powertrain components and how these interact. The software shows how Schaeffler components and systems on the vehicle are contributing to more compact, lightweight vehicle designs enabling reduced fuel consumption and CO2 emissions.

Stand D50

maxon motor

driven by precision

Encoder Technology from maxon motor on Board Curiosity

The landing of the Mars rover Curiosity took seven exciting minutes. Now it will be looking for signs of life on the Red Planet. maxon encoder technology will play a part in the successful excursion of the rover. This is the continuation of the success story of maxon products in outer space and on far away planets.

Mars Rover Curiosity examines Mars rock. Credit: NASA / JPL-Caltech

The new Mars rover Curiosity ended its six month long journey to Mars with a successful landing on August 6th 2012. As everything went according to plan, the control center at Jet Propulsion Laboratory (JPL; California) erupted in cheers. "It was a wonderful landing, everything looked extremely good" said Adam Steltzner, NASA engineer and lead scientist of the JPL landing team, enthusiastically at a press conference. This is the start of a new, exciting excursion on the Red Planet. In contrast to the rovers Opportunity and Spirit, Curiosity can travel further distances on its six wheels and run longer without solar energy as a radionuclide battery gives energy for years. The plan is that the rover shall explore the immense Gale Crater on Mars for signs of life, for two years. And this with impressive equipment on board - a gas chromatograph will hopefully uncover organic compounds; a spectrometer will analyze the composition of rocks which will be collected by the two meter long robot arm and a neutron source will look for hydrogen in the ground.

"From Mars via the International Space Station to the moon"
On its "Mission to Mars" Curiosity also has maxon products on board. The MR Encoder technology is built in to the electromechanic joints of the rover. The magnetic sensors are mounted on the drive shafts and are responsible for controlling the motors. Apart from that, maxon development services for the drive systems have also played a part in the 900 kilogram rover being able to carry out its Mars Mission successfully. Curiosity's little brother Opportunity is still on its journey on Mars; for the past 8 years the rover has been exploring Mars with the help of maxon motors. A further success for maxon motor is the SpaceX-Mission to the International Space Station (ISS). Amongst other things, brushless EC motors have been used to move the 2 solar panels which always have to be facing the sun in order to supply the Dragon Capsule with power. More flights to the ISS are already planned; the next in September 2012. In 2015 a further rover will be sent explore Mars for the Exomars Mission. The moon is also in sight - at least for the Chinese Lunar Exploration Program (CLEP) when an exploration rover will be sent to the moon. Numerous research satellites nearer to Earth will also be fitted with maxon drives. The next start of such a satellite its the ESA Sentinel 3 which will fly into space in 2013. Here maxon motors will be used, for example, in a possible emergency to control and secure the fuel valves.

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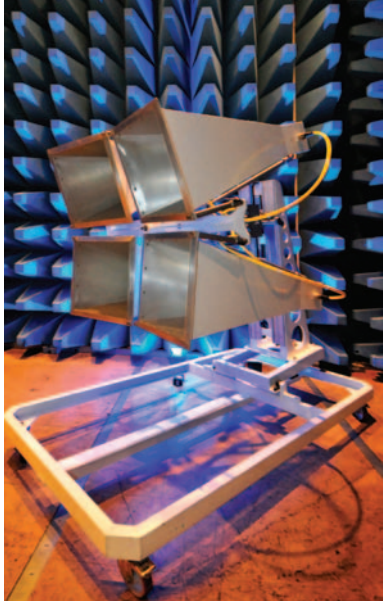


Pacer International

At the Engineering Design Show, Pacer will be demonstrating some unusual applications for optoelectronics, plus interesting new products including shape-changing, focus-variable lenses, miniature piezomotor drivers and joystick encoders, rotary encoders, RFID active tags, laser modules and LED drivers.
Stand C65

RUD Chains

RUD Chains will be presenting its products, latest innovations and expertise at the show. A main focus for RUD at the show will be displaying its latest technological innovation: RFID Radio frequency Identification Technology. This RFID technology is a revolutionary innovation and RUD has been nominated as a finalist for the British Construction Industry Product Innovation Award 2012 for its RFID technology.
Stand C30

SpaceClaim

SpaceClaim Engineer is a next-generation smart 3D tool that gives engineers the freedom and flexibility to capture ideas easily, directly edit solid models regardless of their origin, and to simplify designs in 3D for analysis, prototyping, and manufacturing.
Stand D95

StrainSense

Visitors to Strainsense's stand can see its full range of sensors for pressure, position, force, vibration, acceleration, strain, instrumentation, tilt and torque, as well as the latest Data Acquisition equipment. Its new Linear Potentiometers are ideal for the Industrial, R&D and Automotive markets.
Stand A57

TFC

Examples of TFC's Smalley products will be on display and can be produced to suit diameters between 6-2,000mm. They are available in a wide range of materials including carbon steel and exotic alloys.
Stand C40

TDK-Lambda UK

TDK-Lambda UK will be presenting its latest additions to its industry-leading power supplies at its stand. One of the many product highlights at the TDK-Lambda stand will be the new Z+ Series of programmable DC power supplies. These 200W and 400W 2U format units offer advanced features for ATE and OEM rack mounted or integrated applications.
Stand A30

TRW Conekt

TRW Conekt provides a range of design and support services that enable leading engineering companies to develop high-quality products and systems. By applying the knowledge and expertise gained in the aerospace, automotive, defence and energy sectors, Conekt is able to maximise the capabilities of its clients to create industry-leading solutions.
Stand D70

Altium and Premier EDA Solutions – Headline Sponsors

Premier EDA Solutions is the UK reseller of Altium electronic design software and its associated services as well as an electronic design skills and IPC training centre. The company is committed to the success of the UK electronics industry and recognises the need to put the "engineering skills agenda" high on the list of national priorities.

With this in mind, visitors to the Show are invited to Stand B5, where the company will be hosting a series of technical presentations relating to PCB design skills and technologies.

These presentations will introduce industry expert and author Martin O'Hara who will demonstrate invaluable techniques that may be used to avoid EMC problems at component selection and layout stages as well as give insight into how embedded software can create EMC issues.

Jeff Punch from the Stokes Research Institute at the University of Limerick will also present, focusing on the problems of designing PCBs for the thermal environment. Using practical examples, he will show how solutions to these can be achieved.

In addition to these presentations which will be useful for any electronics design professional, the various capabilities of the Altium Designer electronics design toolset will be featured. Presentations illustrating the advantages of design reuse and using 3D within an integrated design environment will also take place on booth.

The company is also hosting a free workshop session on each day of the Show. Jörg Kaleita, technical account manager for Altium Europe will cover 'ECAD/MCAD integration' on day one and 'How to get the right board manufactured without eliminating creativity' on day two.
Stand B5

Variohm Eurosensor

Variohm EuroSensor is a specialist supplier of industrial sensors and systems. Its products include position sensors, including rotary and linear potentiometers, cable extension transducers and inclination sensors.

Also available are systems for weighing and force sensing, pressure transducers and switches to measure absolute, differential and gauge pressure up to 5000 Bar, as well as Thermistors and probes.

Stand C70

Wilde Analysis

Wilde Analysis will be presenting its comprehensive range of manufacturing

simulation, FEA, CFD and reliability engineering solutions for polymers, composites and other materials. As both an engineering consultancy and a value added reseller of analysis tools, Wilde helps companies optimise design, manufacturability and reliability.

Stand D25

• For additional, materials-based exhibitor news, see the Engineering Design Show Preview on p12 of the latest issue of Engineering Materials.

EXHIBITORS

Exhibitor name	Stand No
Abssac	C50
Agentdraw	E15
Albis (UK)	B75
Alcoa Fastening Systems	B20
Altium	B5
Anglia	B65
Anixter Components	A45
Aucotec	A55
Beta Layout	A50
Black Stick	E45
Brownell	B70
Centa Transmissions	B25
CGTech	D30
CRDM	D10
D Young & Co LLP	B105
Data Plastics	D90
Distrupol	B60
Electro Mechanical Systems	B15
Elesa (UK)	D60
Eureka Magazine	B115
Engineering Materials Magazine	B115
Findlay Media (Organisers)	B115
Gabriel Chemie	D80
Gardner Denver - Thomas Division	B95
GGB UK	A40
Heidenhain (GB)	C20
Henkel	C35
Huxley Associates	A35
igus	B10
Institution of Engineering Designers (IED)	B103
IQD Frequency Products	B80
Ixthus Instrumentation	C70
Jet Press	E40
KD Feddersen UK	A59
Keller (UK)	A20
Kistler Instruments	C10
LG Motion	B55
Laser Lines	D35
Laser Prototypes Europe	E5
Lee Spring	A5
M Buttkereit	A10
Man and Machine	B110
Materialise UK	D5
Maxon Motor UK	C55
Metool Products	C5
Micro Epsilon UK	C36
MiniTec UK	C45
ML Electronics	A25
Muffett Gears	A15
National Instruments	C60
Nexus (GB)	E30
New Electronics Magazine	B115
Nord Lock	D75
Ogle Models & Prototypes	E6
OPS (Objet Printer Solutions)	B90
Pacer International	C65
Plastribution	B45
Positronic	B35
Premier EDA Solutions	B5
Product Assessment & Reliability Centre	B82
Proto Labs	D40
Prototype Projects	E35
Renishaw plc	D85
Review Display Systems	B85
RUDChains	C30
Rutland Plastics	A60
Schaeffler (UK)	D50
Scott Bader Co	D65
SpaceClaim	D95
Springmasters	E20
StrainSense	A57
Strand7 UK	D45
TDK Lambda UK	A30
TFC	C40
The Barden Corporation	D51
Transdev	B50
TRW Conekt	D70
Variohm-EuroSensor	C70
Wilde Analysis	D25

The Eureka Team looks forward to welcoming you to the Engineering Design Show. Visit www.engineeringdesignshow.co.uk to register now.

Q&A

Designing for injection moulding

Q **Why should I consider injection moulding?**

A The two main reasons are weight and cost reduction. For example, material selection and good product design can produce a moulded part that can replace a metal equivalent. Plastics also provide for a wider variety of shapes and colours.

Q **How do I start designing for injection moulding?**

A The best starting point is the end use requirements. These fall into functional, aesthetic and manufacturing related. Are any special strength characteristics required? When considering loading, for example, it is vital to be clear on the type of load, the rate at which the load may be applied, duration and frequency. The same approach can be applied to environmental factors such as exposure to very high or low temperatures, chemicals and UV light.

Q **Isn't injection moulding just for large numbers of parts?**

A Not necessarily. Although mould tools are relatively expensive alternative manufacturing methods may result in much higher part prices than an injection moulded part. Also, a number of parts can be combined in a single injection moulding so reducing or eliminating assembly.

Q **Is there a limit on wall section?**

A General guidelines for wall sections are 0.5mm – 5mm but do not be misled into thinking these are hard and fast rules. There are occasions where thick sections are necessary and Rutland Plastics has moulded parts with sections in excess of 100mm.

Gas Assisted Moulding can be used to hollow out thick sections so producing a very strong box section effect.

Q **How do I know what polymer is best?**

A Again, this depends on the end use requirements. Strength can be provided by part design, material or a combination of both. Depending upon the part and type of strength required it may be better to use a more expensive material in a part with thinner sections and fewer ribs than a cheaper material where the reverse is true.

Modular joint advances robotics

A new development may represent a significant breakthrough in lightweight robotics. Paul Fanning reports.

The need for UK industry to increase the number and dispersal of its automation and robotics systems is well-documented. For some years, voices from government and industry have called for greater adoption of automation equipment with a view to improving productivity.

However, such calls also require simple, lightweight and cost-effective robotic systems to be available. This is a need igus believes it may have helped to meet with its development of strong, lightweight robotic joints integrated these with a central drive system.

Called robolink, the system is a multi-axis joint for humanoid robots and lightweight automation applications. A completely modular system, robolink combines enormous design freedom with simplicity and is particularly well-suited where mass, cost and complexity are to be kept as low as possible.

The initial concept came about during the company's involvement as sponsor to teams competing in the Robot football World Cup (RoboCup) from 2006-2008. RoboCup attracts teams of engineers and computer scientists from around the globe, where they pit their wits against each other on the football-field of robotics and artificial intelligence. igus' team of engineers set about creating a robotic joint design with good transferable torque characteristics between the articulated joint and rod, low cable friction and optional integrated magnetic sensors to measure and transfer the position of the articulated joints.

Prior to launch, several igus beta-testers were provided with robolink prototypes for use in trial applications ranging from maritime robots for use with underwater vehicles to mobile robots on the ground, used for handling contaminated or explosive materials. Other examples include humanoid robots, camera guidance equipment and systems for facilitating interaction between man and machine. Further trials were carried out in the medical industry, as well as in the field of animatronics.

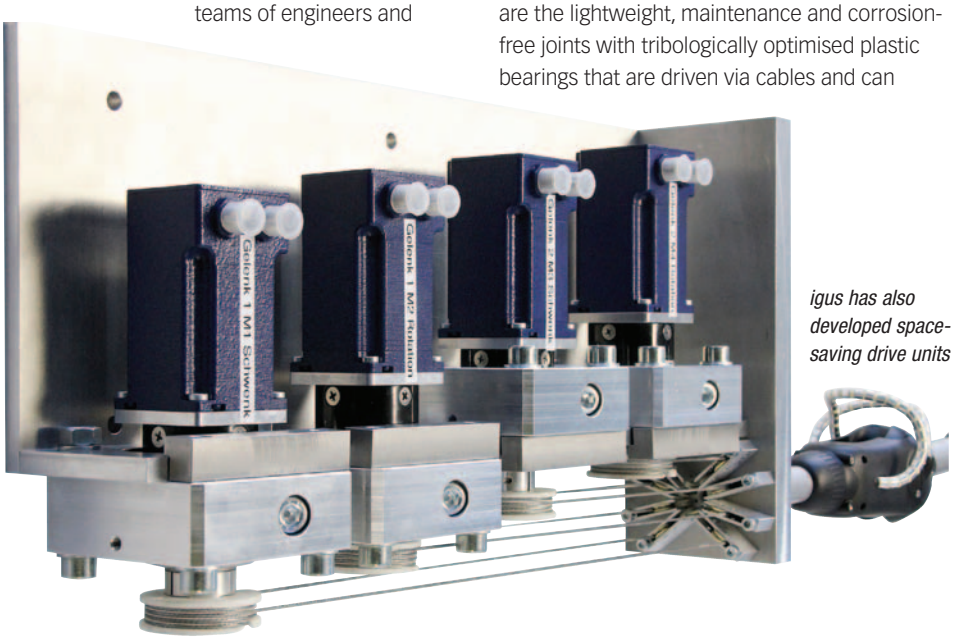
At the heart of the robolink modular system are the lightweight, maintenance and corrosion-free joints with tribologically optimised plastic bearings that are driven via cables and can rotate and swivel freely. To articulate the multi-axis joints, igus has developed flexible Bowden cables with high-performance polymer jackets that combine low friction values with a long service life. The cables have extremely small bending radii, making highly flexible movements possible and are suitable wherever frequent relative movements take place.

The robolink's core consists of lightweight plastic joints that are controlled via cable pulls that transfer tensile forces — similar to how tendons function in human muscle actuation. At the same time, cable sheaths hold steady while the inner cables move — similar to the way a bicycle's brake cable operates. Cable pulls run through the joints and arm tubes, from one joint to the next, with just two cable loops necessary to enable each joint to rotate and swivel freely.

The robolink accessories also include mounting plates, angular encoders, various drive wheels and pulleys. Also, the supplied arm tubes can be made of aluminium (the standard), glass fibre or carbon fibre reinforced plastics to save weight and decrease operating power consumption.

Electro-mechanically, igus has developed space-saving drive units, available in different performance classes, with four or five drive motors provided in a housing. In addition, the drive wheel can be attached to a wide range of different motor or gear shafts and then connected quickly and easily to the wear-resistant cables. Tensioning of the cables can also be achieved simply using a split drive wheel with a torsioning tool. Simple control software to programme and store all the movements of a four-axis jointed arm intuitively is in early development.

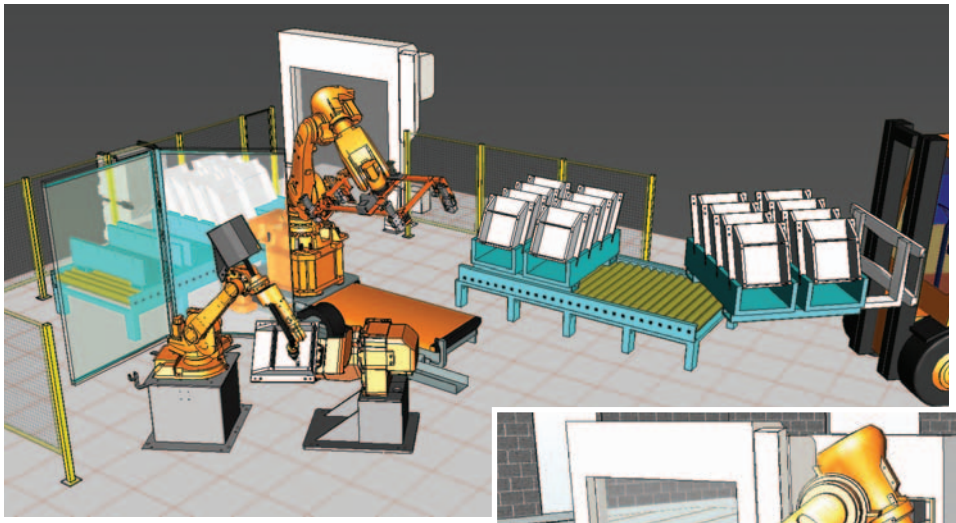
www.igus.co.uk

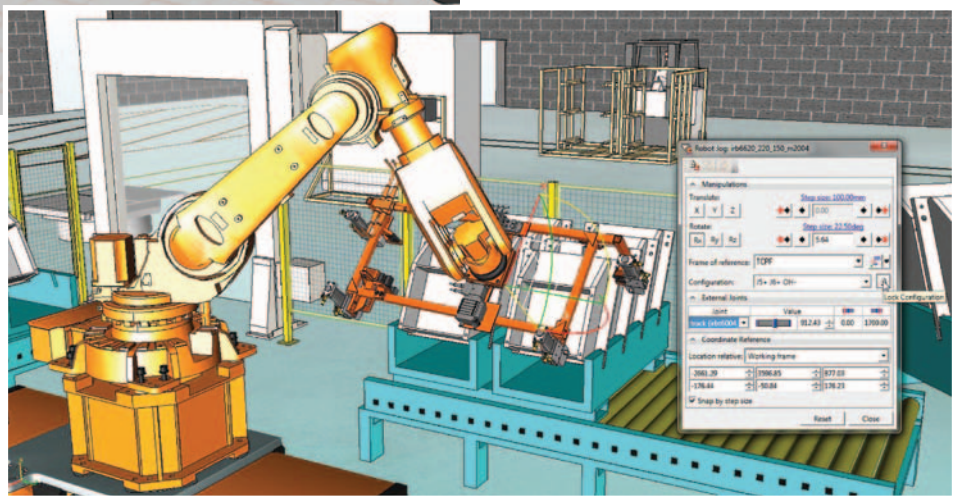


igus has also developed space-saving drive units

Robotics simulation made easy

Laura Hopperton reports on a new 'out of the box' software solution for robotics simulation and programming.





While the use of industrial robots has increased exponentially in recent years, creating and implementing efficient manufacturing lines is an expensive and time consuming process. For this reason, Siemens PLM Software has developed RobotExpert; a new, easy to deploy robotic simulation and programming solution that allows users to create virtual mockups of manufacturing cells in order to create the most suitable and efficient combination of equipment in the shortest possible amount of time.

Targeted at small and medium sized manufacturers, RobotExpert is an 'out of the box' solution that offers the application of a number of iindustrial machines, including pick and place, arc welding, polishing and glueing. The platform is optimised to minimise downtime and increase throughput for shopfloor robots, as well as to enable the design, simulation, optimisation and offline programming of robotic applications to maximise speed, flexibility and operation.

Featuring an intuitive 3D environment, the software combines the ability to optimise robotic paths and improve cycle times with the option to simulate virtual mockups of complete manufacturing cells and systems. RobotExpert can be used to generate the most suitable combination of equipment to meet specific manufacturing needs, supporting faster product introduction as well as early evaluation of manufacturing times.

While industrial robots often have to be programmed manually, the software provides an offline programming and simulation tool to help minimise downtime by allowing the majority of the programming work to be done virtually. Simulation capabilities have also been implemented to help reduce hazards to shop floor personnel and equipment.

"Manufacturers are under a great deal of pressure to maximise return on capital investment, and production line automation provides an excellent opportunity to help increase efficiency," noted Zvi Feuer, senior vice president, manufacturing engineering software, Siemens PLM Software. "Small and mid-size manufacturers need an intuitive and easy to deploy solution that removes the complexities involved with implementing a robotic simulation and programming solution. That is why we have developed RobotExpert as an independent software solution.

"We have taken more than two decades of experience delivering robotic solutions for some of the most complex applications and created a simple intuitive solution which will help small and medium size manufacturing companies across industries build better products by making smarter manufacturing decisions."

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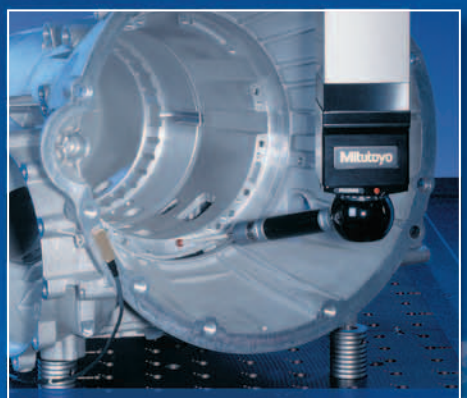
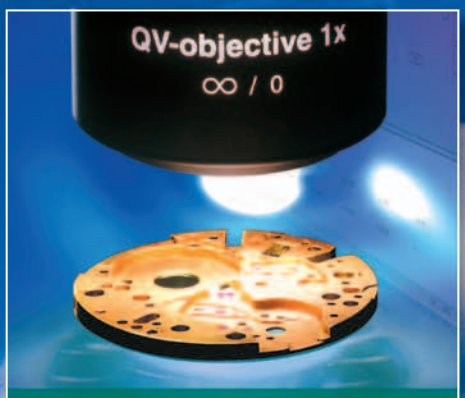


Coordinate Measuring Machines



Vision Measuring Machines

Form Measurement

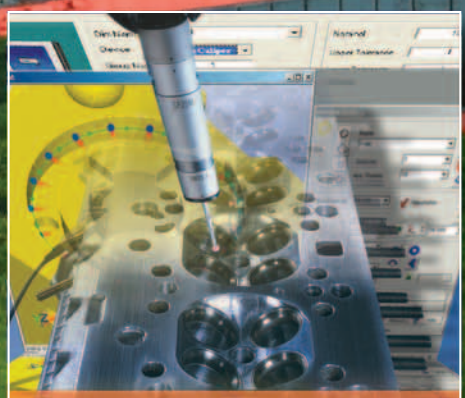
Optical Measurement

Sensor Systems

Test Equipment and Hardness Testers

Digital Scale and DRO

Small Tool Instruments



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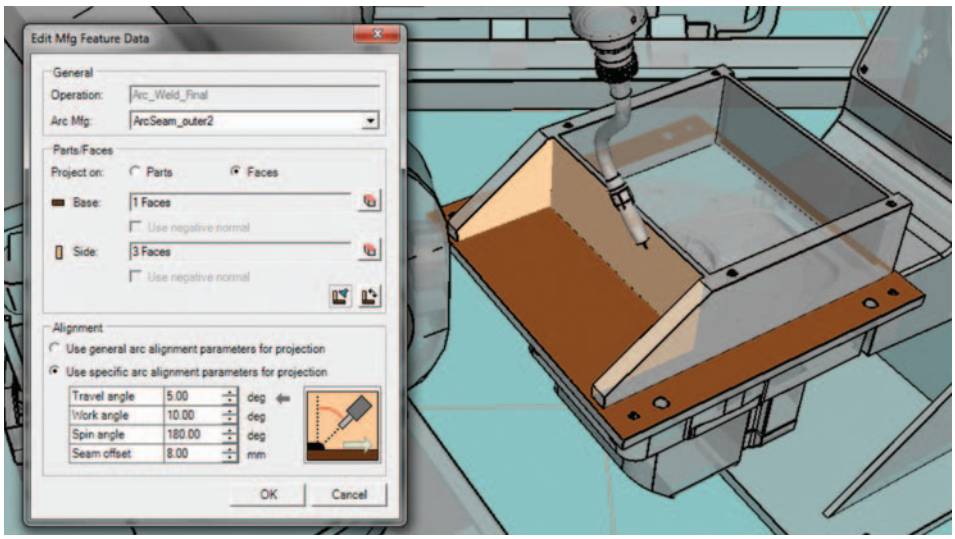

Utilising the JT file format, RobotExpert includes a comprehensive library of robotic and automation equipment and is designed to provide smooth 3D data integration with a number of different systems. Users can create 3D models from scratch using RobotExpert, or import 3D models from other CAD tools or formats. The import is supported by a number of CAD translators, including NX software, Solid Edge software, SolidWorks, Catia and Pro/Engineer, as well as native formats such as IGES, STEP and Parasolid.

According to Siemens, the software helps detect collisions during robot simulation and motion, improving shopfloor workers' safety and preventing damages to equipment. It also has a collision detection mechanism so that any collisions or near misses can be analysed. A Gantt chart is used to represent operations and tasks, which are performed with production resources such as robots and automation equipment. This lets users visualise and easily optimise the entire workcell cycle.

Another benefit of the software is that it allows users to upload existing robotics programmes from the shopfloor, enabling re-use and optimisation. Users can customise their own offline programming commands in a parametric fashion and maintain commands and macro libraries, ensuring programme standardisation. If a special robotics application requires specific syntax through programmes, users can also easily build this syntax into libraries, which can be re-used whenever needed to avoid extra engineering effort.

www.plm.automation.siemens.com

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The particular shape of the patented Elika® profile eliminates the phenomenon of air encapsulation typical of normal gear pumps, curing the source of the main cause of noise and vibrations.

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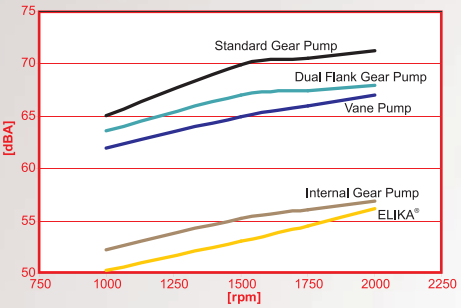

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The direct route to 3D CAD

Far from operating in a niche, SpaceClaim's CEO believes it may have opened up whole new markets for 3D CAD. Paul Fanning reports.

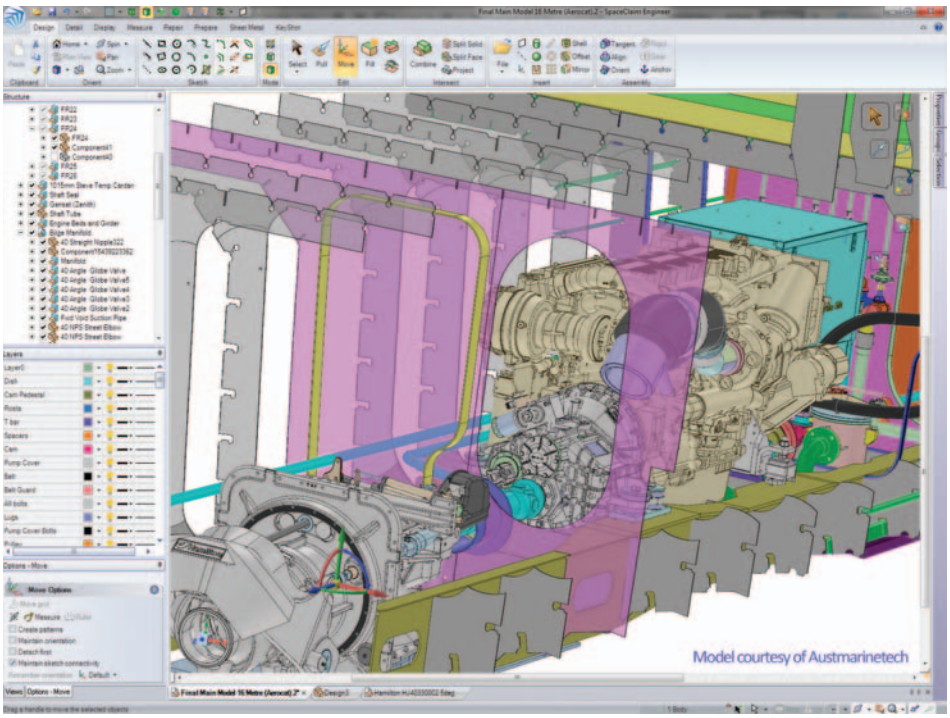
Over the last few years, the name 'SpaceClaim' has become more and more prominent in CAD and engineering circles. This prominence has reflected the success of the company in identifying and exploiting a niche in a CAD market that had long been thought too mature for any such opportunity to exist.

SpaceClaim's innovation was to produce a relatively inexpensive, easy-to-use direct modelling package that allowed those not trained in the use of CAD access to 3D modelling technology. First announced in 2007, SpaceClaim Engineer was launched in 2008. Today, it has sold as many as 25,000 licences to 2,500 customer companies and has shown a compounded growth rate of between 80% and 90% per annum. No wonder SpaceClaim's British CEO describes the last few years as "a wild ride".

This success is cast into particularly stark relief by the fact that, when SpaceClaim was launched, the prevailing belief among the major CAD vendors was that 3D mechanical CAD was a mature technology and there were no more markets left to exploit. Says Randles: "I think the most interesting thing is that what was considered to be quite a mature category has proved to be anything but."

The extent of the market, Randles believes, is potentially vast. He says: "It's almost 27 years since PTC invented modern CAD and after 27 years there are about 1.2 million seats of 3D CAD under maintenance and in active use. You'll hear numbers from CAD companies saying they've sold millions of seats, but they're including all their educational seats and all that sort of stuff. So there are at least 25 million or so degree-educated engineers around the world and there remains a huge opportunity to democratise 3D."

This potential and SpaceClaim's success in exploiting it, did not go unnoticed, however. As Randles notes: "When we came out, everyone said 'No-one needs a new CAD system' and then within a year or two Siemens released a new product called Synchronous Technology, Autodesk introduced Fusion and PTC have revamped their whole CAD strategy around direct modelling. So I think that the industry has clearly acknowledged that the way to expand the use of 3D in mechanical design and discrete manufacturing is via direct modelling, which is the forest fire that we ignited."



This trend towards direct modelling from other companies has "pluses and minuses", according to Randles. "I think the benefit overall is that they've recognised and said to the world that this is the way that a larger group of users is going to interact with 3D models. But, of course, it's competition," he says.

Of course, SpaceClaim's products have evolved considerably since its launch, with the addition of various capabilities and expansion into other markets. Some capabilities, such as the recently-announced free implementation on SharePoint that allows users to store and share their information – have come about organically. However, other developments have taken place by the identification of particular market segments and strategic partnerships with players in those areas.

One such partnership is between SpaceClaim and reverse engineering software specialist Geomagic, whereby it has become possible for users to directly integrate reverse engineered data from Geomagic Studio 2012 into SpaceClaim. The 3D Direct Modeling

capability of SpaceClaim enables power editing to data from Geomagic without the overhead of traditional CAD, which enables changes and refinements to be easily and quickly made to models. Says Randles: "We partner with them to create a complete solution, because we can take STL models and enable the user to turn them into solid models – something that traditional CAD systems can't do."

Closer to home, SpaceClaim also has an arrangement with UK company ITP Engines, which makes highly-specialised thermal analysis software for the aerospace sector. This involves ITP using SpaceClaim for cleaning, preparing and importing CAD geometry in its ESATAN-TMS product family. CAD data is generally too detailed or complex for thermal simulation and therefore creates bottlenecks in the process. ITP will enhance and customise SpaceClaim and provide it to ESATAN-TMS customers as 'CADBench'. By removing the complexities of traditional CAD and enabling analysts and engineers to prepare models without constraints, SpaceClaim believes it will give analysts in aerospace thermal applications the freedom and flexibility to create and modify geometries.

Analysis, believes Randles, is an area where SpaceClaim's technology really comes to the fore. He says: "Any simulation engineer – whether they're analysing a CAD model or doing downstream design – has to modify that model in some way. Not change its design, but often take out features, simplify the geometry so that the meshing and solving algorithms of their

"We give you everything you need and nothing you don't"
Chris Randles

structural or fluid dynamic analysis tool can make sense of the geometry rather than spending weeks crunching away at useless detail."

Randles estimates SpaceClaim's 'addressable' market at 7-8 million engineers,all of whom would benefit from access to 3D design software. Backing this up, he cites an automotive company with which the company works that has 5,000 seats of traditional, parametric, heavy-duty CAD, but 8,000 engineers in addition to those CAD users and around 15-16,000 users who interact in some way with 3D – be it in terms of visualisation or via a PLM system. Thus, he believes, the potential market for SpaceClaim could be as many as three times the number of CAD users.

"We're not really out to replace today's 3D CAD seats," says Randles. "Our largest sector is automotive, but we're not going into automotive companies and asking them to stop using the packages they've been using for ten years or more. What we say is 'How can you prototype more quickly? How can you get more engineers involved in simulation using 3D rather than having to depend on a CAD operator or draughtsman?'

As to the increased numbers of direct modelling products on the market, Randles believes that SpaceClaim's inherent advantages of independence and flexibility will hold it in good stead. He says: "The reason people are interested in what we have is that they finally have a lower-cost, but very capable package that can be put into the hands of people who aren't hardcore, day-to-day CAD users. This allows them to accelerate their work and time to market. With the competition products, you have to buy into the whole package. It's a bit like offering someone the small, 'runabout' car that they need, but only letting them have it if they also buy a huge caravan on the back...We give you everything you need and nothing you don't"

This 'democratisation' of 3D CAD is something Randles only expects to increase as time goes on. "There is a need for a broader range of people to be using 3D as it's easier to use and it makes sense for them not to be using 2D," he says. "There's still five times as much 2D in use in manufacturing as 3D. One reason for that is that 3D is so expensive and another is that it's so hard to learn. Traditional CAD providers have tended to keep their prices very high, knowing that they're a necessity for some users, but that has limited their expansion. We have made our software very affordable both in terms of purchase price and training…I do think that there's a huge, pent-up demand and I can't believe that we'll be the only company trying to push out into the broader market."

www.spaceclaim.com
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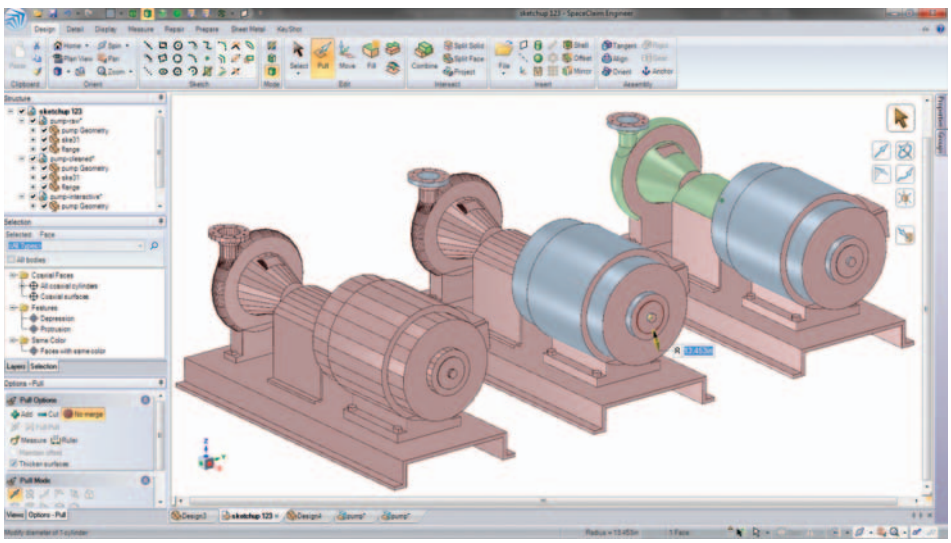

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New research drives additive manufacturing

The AlphaSphere is a new type of musical instrument developed by nu desine of Bristol with the help of CALM

UK additive manufacturing research is leading the field. Laura Hopperton reports on some of the latest academic developments and asks where the technology is heading.

The UK is setting the pace in the race to develop next generation, multi-material and multifunctional additive manufacturing technologies, and this looks set to continue with a number of dedicated centres appearing at universities all over the country.

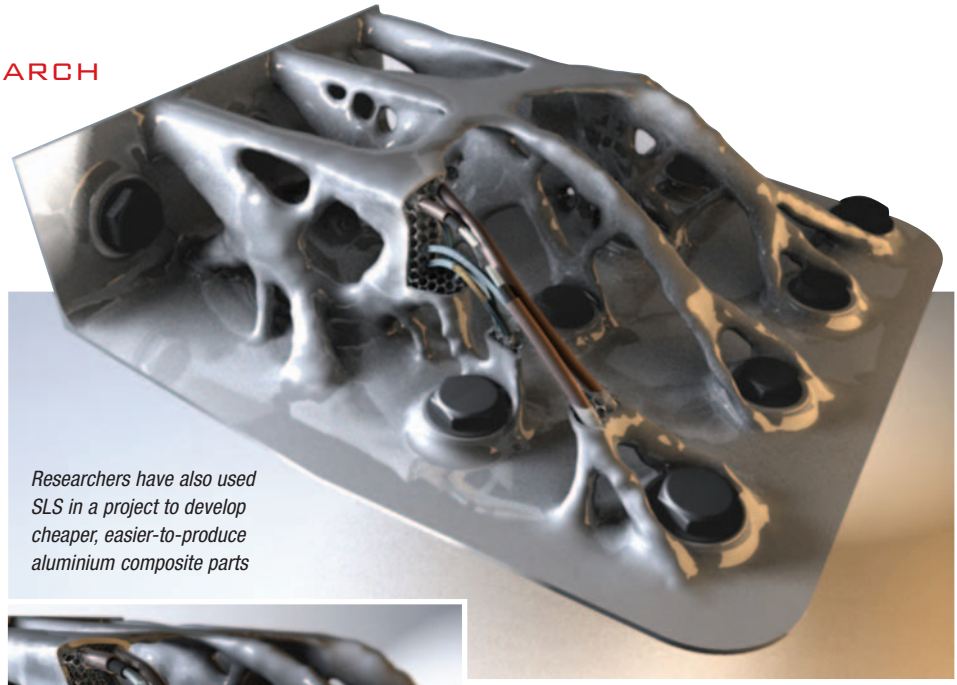
The most recent of these is at the University of Southampton, which has just opened a state-of-the-art rapid prototyping facility aimed at 'transforming engineering design', while 2011 saw the development of an EPSRC Centre for Innovative Manufacturing in Additive Manufacturing, which is led from the University of Nottingham with Loughborough University as a partner.

Another facility to open last year was the £2.6million Centre for Additive Layer Manufacturing (CALM) at the University of Exeter, reflecting a new emphasis for the University. "The University of Exeter has been involved in additive layer manufacturing for a number of years, but it's only in the last two that the technology has really been classified as a core focus for us," says James Bradbury, a research and application engineer at CALM. "Our main goal at the centre is to work with SMEs from different sectors to help them discover what they can and can't do with the technology and show them how they can apply it to better their product. We also want to work with industry partners across different sectors, primarily aerospace, automotive, defence and medical, to really explore what the technology is capable of."

CALM has already engaged with more than 300 businesses worldwide in the 18 months it has been operational, offering services such as 3D printing, laser sintering, laser melting and deposition/extrusion processes. Bradbury and fellow engineer Richard Davies also run workshops where companies can get a general introduction to the technology and see what other people have used it for.

In July last year, the CALM researchers grabbed headlines by developing the first ever 3D chocolate printer, while a more recent project saw them help Bristol-based start-up nu desine create a brand new musical instrument called AlphaSphere, which reinterprets the way users interact with sound. The instrument is made up of 48 pressure-sensitive pads which form a self-supporting spherical structure. Sound is triggered when a user taps the pad or applies more pressure so that they can mould and manipulate the sound further. Users can also supply parameters to the pad depth such as pitch-bend, volume, oscillations and interesting filters.

"We decided to create AlphaSphere using



Researchers have also used SLS in a project to develop cheaper, easier-to-produce aluminium composite parts

selective laser sintering (SLS) for a number of reasons," noted nu desine vice president and product design engineer, Richard De Lancey. "First, the layer-by-layer approach to building a model in a powder bed allowed for complete geometric freedom of design. With a complex structure such as the AlphaSphere, this allowed me to prove the concept without concerns for the geometric restrictions of other model building processes. Secondly was the speed of the process: we were able to get the finished parts in just over a week, which sped up the process of design iterations rather than waiting for the longer lead times of other processes. Thirdly, SLS is a fully-automated method, leaving no room for human error. The final factor was the cost. Although much more expensive per part than alternative methods, with SLS there are zero tooling costs. This worked out considerably cheaper during the R&D phase as we didn't have to commit any money to instantly redundant tools."

The CALM researchers also used SLS in a project to develop a new manufacturing process for cheaper, easier-to-produce aluminium composite parts for the aerospace and automotive industries. Bradbury believes the process has the potential to manufacture exceptionally strong yet lightweight structural components such as pistons, drive shafts, suspension components and brake discs. The method involves using a laser to melt a mixture of powders composed of aluminium and a reactive reinforcing material. A reaction between the powders results in the formation of new particles, which act as reinforcements and distribute evenly throughout the composite material.

According to Bradbury, the new materials have very fine particles compared with other composites, making them more robust. The reaction between constituents releases energy, which also means materials can be produced at a higher rate using less power. "This technique is significantly cheaper and more sustainable than other methods, which directly blend very fine powders to manufacture composites," he explained. "We believe the development has great potential to make high performance parts for car manufacturing, the aerospace industry and potentially other industries."

AlphaSphere is made up of 48 pressure-sensitive pads that form a self-supporting spherical structure

Bradbury envisions a time when everything from the complex aircraft parts mentioned above to customised jewellery and mobile phones can be created using additive manufacturing. "The industry has seen a big boom recently in low-cost 3D printers and that's because a lot of the original patents for the technology have run out," he says. "Most of the systems we currently use are still heavily patented, but that's all about to change. Once these expire, we expect the technology to hit the mainstream within the next 10 to 15 years. It's likely that the automotive world will catch on first, with the medical and aerospace industries following close behind."

Bradbury predicts that materials will be the biggest growth area in the industry. He also sees the industry moving towards more hybrid methods, whereby multi-material products can be developed as a single product. This view is shared by Dr Martin Baumers of the EPSRC Centre for Innovative Manufacturing in Additive Manufacturing and Professor Lee Cronin of the University of Glasgow, who both describe the technology as nothing less than "revolutionary".

Dr Baumers and his colleagues are currently working to create multi-material, multi-functional devices with amalgamated electrical, optical and structural properties, such as next-generation mobile phones – in a single manufacturing process. Professor Cronin, on the other hand, is currently working on a new 3D printing process that he claims could revolutionise the way drugs and other chemicals are made in the future, and even enable consumers to create customised medicines at home.

"3D printers are becoming increasingly common and affordable," he noted. "It's entirely possible that, in the future, we could see chemical engineering technology which is prohibitively expensive today filter down to laboratories and small commercial enterprises. Even more importantly, we could use 3D printers to revolutionise access to healthcare in the developing world, allowing diagnosis and treatment to happen in a much more efficient and economical way than is possible now.

"We could even see 3D printers reach into homes and become fabricators of domestic items, including medications. Perhaps with the introduction of carefully-controlled software apps, similar to the ones available from Apple, we could see patients have access to a personal drug designer they could use at home to create the medication they require."

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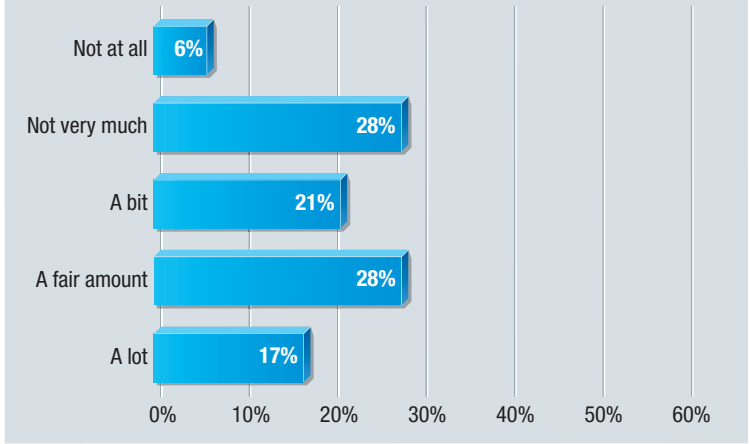
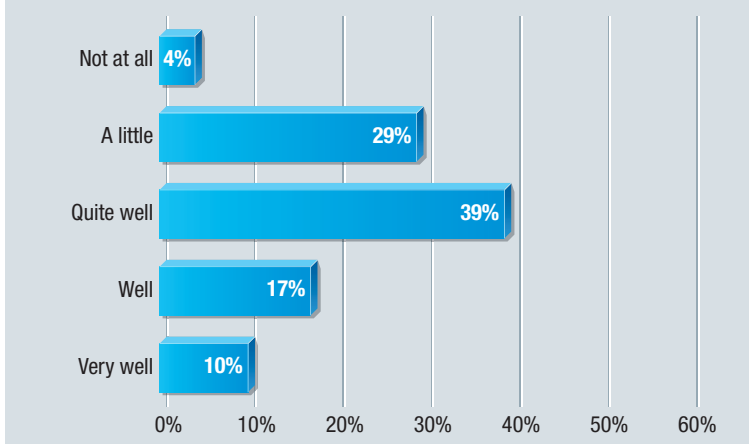
Valuing your Intellectual Property – Survey Results

Following a recent online survey on IP undertaken by *Eureka* and D Young & Co, Anthony Albutt, partner with the firm, gives his thoughts on the findings.

How often do you consider IP in your everyday design work?



How well do you believe you understand the issues relating to IP?



The key findings

We were delighted with the number of responses to our recent intellectual property survey conducted in collaboration with D Young & Co. Our sincere thanks go to all readers who participated and shared their thoughts and concerns with us.

The range of opinion from companies of all sizes was quite incredible. The results emphasised a number of common themes and concerns in UK industry about various aspects of intellectual property.

The sheer number of responses means that unfortunately we are unable to deal with all of the questions and concerns readers have raised in a single article. In order to maximise the value of the survey, from October, D Young & Co's website will contain a customised Question & Answer section dealing with specific questions and issues identified in the survey.

What you said…

The results highlighted that the majority of businesses regularly assess the value of their intellectual property assets (albeit at varying time scales). In particular…

92% 92% of respondents know what IP they own

83% 83% believe IP is of importance to their company

66% 66% consider IP when designing products

66% 66% consider that they understand IP issues

However, in spite of numbers which suggest a good level of knowledge about IP and the perceived value to the company, only 48% thought that their IP assets where adequately protected and only 55% thought they exploited their IP assets effectively.

It begs the question; if so many companies believe IP is important to them and that they know what assets they own, then why do so many feel that they are not adequately protected or are unable to exploit their IP assets effectively?

What can be the reason for the mismatch?

Companies answering the survey fall broadly into two categories:

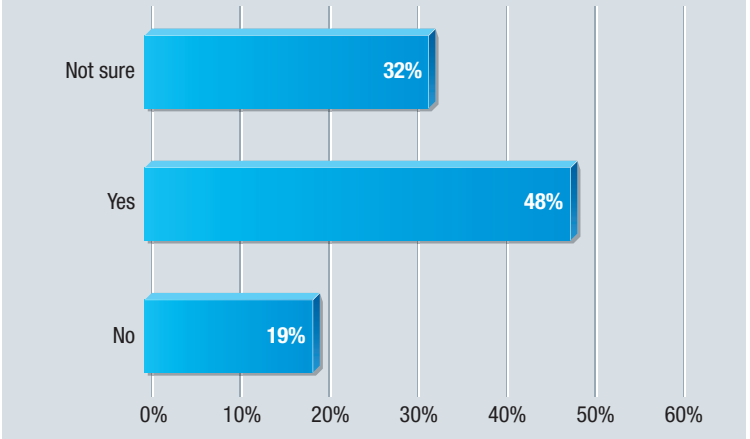
1/ Companies that actively try to protect their IP in some way

2/ Companies that take no action

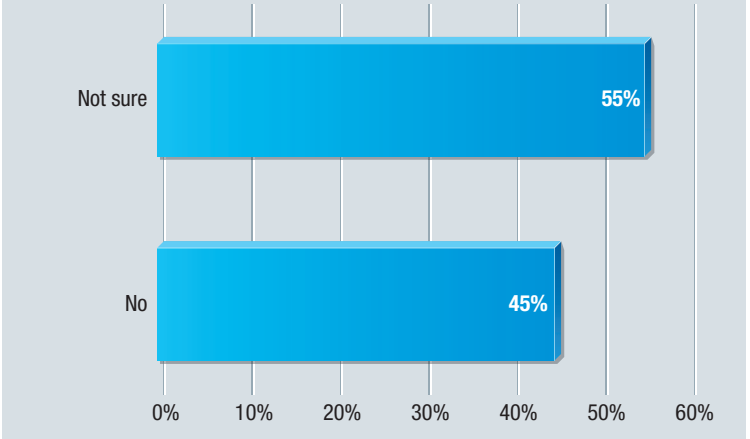
Looking at the first group, common concerns are cost, complexity and the perceived uncertainty of the IP system. Many respondents complained about the cost of obtaining patent protection in terms of legal fees paid to attorneys as well as government fees. There is no denying that protecting IP rights can be expensive, but remember that a patent is a legal document defining a monopoly for your company within a market. That monopoly can last for 20 years, giving your company an enormous competitive advantage.

That said, there are many ways to control costs and you need to be tactical in selecting the

Do you believe your company's IP to be fully (or adequately) protected?



Do you believe your company exploits its IP effectively?



elements of the IP that you seek protection for and how you do it. For example, registered designs are cheap, fast and cover all of Europe in a single application. They also allow you to prevent imports into the European Union. Perhaps this would provide the deterrent your competitors need? This is just one example and we will focus on strategy and cutting costs in our next IP article.

The issue of enforcement costs was also identified by a large number of respondents. High Court litigation is indeed expensive, but what many companies don't realise is that the Patents County Court was specifically set up to limit costs. It is proving a very popular forum which is fast, largely paper based and has caps on legal cost. It is ideal for SMEs. There is a misconception that enforcing your rights will always be expensive. Not so. We will deal with this issue and your options in a forthcoming article on enforcement.

In terms of 'uncertainty', there is a feeling among a number of respondents that patents are worthless because they can be 'broken' or bypassed. Again, there is some truth here. An invalid patent can be revoked and careful analysis of weak patents can sometimes allow you to 'design around' them. This is the skill of the attorney. There is a balance in drafting a patent: too broad and it is likely to be invalid, too narrow and it exposes you to the possibility of design arounds. Be clear with your patent attorney about your commercial needs; remember that a patent is a commercial tool and not an academic exercise for your attorney to 'claim the world'. If you think a patent is too good to be true, there is every chance it isn't valid.

Turning briefly to the second group of companies (those who do not seek any protection at all); the issues raised were mainly lack of enough knowledge or resource. Here, at least in terms of knowledge, we hope the D Young & Co article series is providing some assistance.

It is clear from the survey that in general, UK companies do understand and appreciate the value of protecting the IP assets they own. The results also highlight that many misconceptions and misunderstandings exist, particularly in terms of how IP assets can be efficiently and effectively employed in a commercially valuable way. This continuing IP series will hopefully bring down some of these barriers.

In summary, your patent attorney should be able to help you devise a sensible IP strategy for your business that fits within your legal budget. Be challenging. It's always good to remember that any strategy must always be aligned with the commercial interests and future direction of the business. By sharing this information with your patent attorney, you will better equipped to confront any future threats to your IPRs.

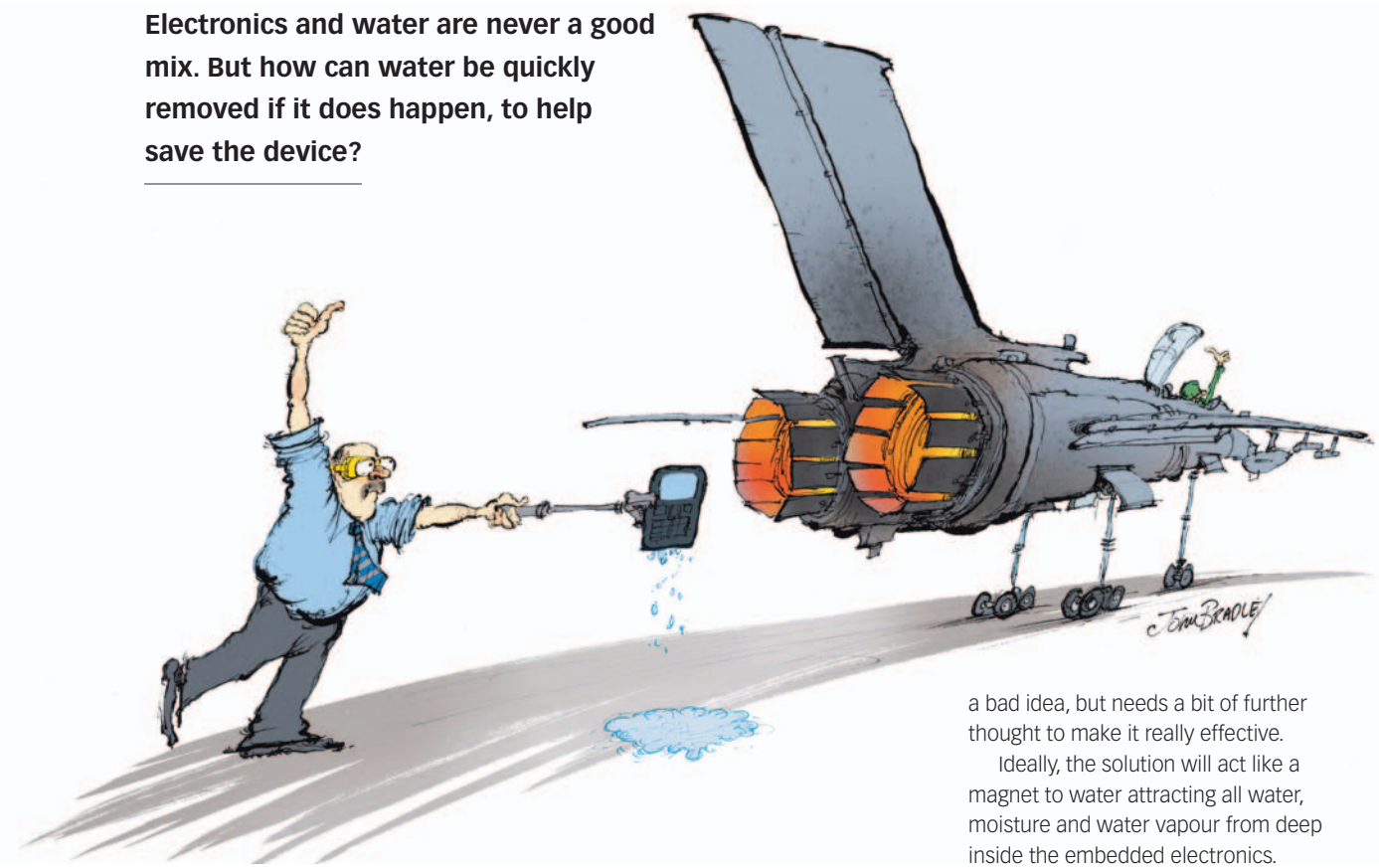
Finally, the lucky winner of the prize draw for the Archos Arnova 10b G" Tablet PC is Paul Palmer-Baker, Innovation & Development Manager of Micro Matic Ltd. Congratulations, Paul. We hope you have many hours of fun and enjoyment using it.

For more information, please contact:
Anthony Albutt, partner with D Young & Co
Email: aja@dyoung.co.uk
Website: www.dyoung.com

D YOUNG & CO INTELLECTUAL PROPERTY

Back from the dead

Electronics and water are never a good mix. But how can water be quickly removed if it does happen, to help save the device?



Mobile phones and particularly smart phones are embedded within our lives. They managed our calendars, tell us where to go when we are lost, access social media sites, listen to music, and what the latest with the news and weather is. They can also make phone calls. So it is no wonder that people feel lost and out the loop if they have to have to go more than just a few hours without their mobiles.

However, with their continuous use they obviously are subject to damage from outside elements and the environment. One of the most common forms of damage comes from water. Whether it is dropping your phone in a puddle, accidently leaving it in a pocket when putting trousers in a washer, using it in particularly heavy rain, leaving it in your pocket when you go for a swim or dropping it in the toilet (this happens far more frequently than you might think), then it can be goodnight for your phone followed by an overwhelming feeling of just how much of your life was contained in that tiny black box.

The Challenge

The challenge this month is therefore to come up with a way of drying out a mobile phone or similar electronic device once it has been saturated within water. Many people have tried using a packet of rice to soak out the water inside the devices, while others have turned to using a hair dryer.

The problem is the solution should not serve to cause any more damage than is already present. Crushed rice present in most packets is quite fine and dust-like and could find its way in to the phone's inner workings and congeal with water to make an even bigger mess. Similarly, using a hair dryer can cause as many problems as the direct heat could actually do more harm to the circuit board than good. Silica Gel is not a bad idea, but needs a bit of further thought to make it really effective.

Ideally, the solution will act like a magnet to water attracting all water, moisture and water vapour from deep inside the embedded electronics. Furthermore, it would be beneficial if users could see how much water is still inside so they can gauge how long until recovery is possible.

The solution we have in mind is a product that has recently been released. It has devised an intelligent solution to dry mobile phones and other electronic devices that have suffered from water damage.

The solution is quite simple and rather elegant. You may even consider it obvious. In the meantime, see if you can come up with a solution.

• Don't want to wait for the answer? Visit www.eurekamagazine.co.uk to see the solution now

The solution to last month's Coffee Time Challenge of how to mend cracks in the road can be found in the Technology briefs section on page 11

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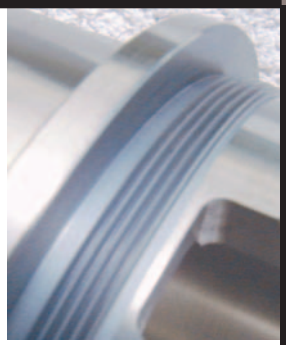

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