EUREKA

THE MAGAZINE FOR ENGINEERING DESIGN

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THE 'APP' IN ENGINEERING

What can mobile applications offer the design engineer?

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Mixed messages for manufacturing

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

Anyone who has followed the news lately could easily be forgiven for a degree of scepticism as regards this Government's commitment to manufacturing industry. It is, after all, difficult to take seriously assertions about 'rebalancing the economy' in the light of large-scale job losses at BAE Systems – one of this country's flagship manufacturing companies.

Of course, these job losses have been on the cards for BAE ever since the Strategic Defence and Security Review. Nonetheless, their scale came as a shock, as did their apparent impact on highly-skilled workers of exactly the sort whose cause this Government has championed so vocally.

Of course it is not the Government that has made these job cuts, it is BAE Systems. And, while the news may be in large part a consequence of Government spending cuts, they have also come about because of a worldwide trend towards lower defence spending. Equally, of course, the news is not all bad for the sector: according to the Reed Manufacturing Job Index, manufacturing jobs are up 4% month on month, and up 32% year on year, according to the national report for September, while the Government's commitment to spending £195m on cutting-edge science and engineering projects is clearly to be welcomed.

Nonetheless, the BAE job losses are emblematic of the fine line this Government is having to walk between its laudible desire to cut the UK's public spending deficit and its desire not to hinder growth in key sectors such as manufacturing. Nobody is pretending that this is anything other than a difficult balancing act, but it is to be hoped that the need to cut spending does not blind us to the need to foster growth.

BRIEFS

SUCCESS FOR STRATHCLYDE AT SET AWARDS

The University of Strathclyde has been awarded three top prizes at this year's Science, Engineering and Technology (SET) awards.

Fifth year marine engineering student Peter Dowwas named student of the year at the prestigous ceremony, having already claimed the best maritime technology award. His success was boosted by his supervisor Professor Chengi Kuo taking the SET lecturer of the year award.

AUTODESK INCREASES CLOUD CAPABILITY

Autodesk is to offer high-performance simulation capability through a cloud based subscription service. It brings the potential to offer supercomputing data crunching power to anyone, over the web.

When simulation is carried out on a part or component through its Autodesk Inventor Optimisation service, users will gain multiple refined design options in quicker time. It will not only give more variations - in terms of different optimised variables such as material usage - but will also give better results in terms of resolution and ultimately accuracy.

The Autodesk Cloud includes a total of more than a dozen web-based capabilities that will be available to its subscription customers.

BLOODHOUND SEEKS DESIGN ENGINEERS

The team behind the Bloodhound Project is calling on UK design engineers to help ensure that construction of the 1,000mph supersonic car is completed by December 2012.

Bloodhound states that this isn't an offer for an internship or a training programme, but an opportunity for design engineers with passion and enthusiasm to work on a unique project. If you would like to offer your services, email a cv and covering letter to **engineering@bloodhoundssc.com.**

Government makes £195m science pledge

The Government is to invest £195 million in cutting-edge science projects with the aim of using hi-tech discoveries to boost economic growth, Chancellor George Osborne has announced. A £50 million global research and technology hub in the UK will explore how to commercialise the Nobel Prize-winning material graphene, discovered by scientists at the University of Manchester.

And £145 million will go into infrastructure for high-performance computing, with the potential to boost GDP by £25 billion and create 500,000 or more highly skilled jobs within 10 years.

Graphene - a flat layer of carbon atoms in a honeycomb arrangement - is the strongest material known to science and conducts electricity better than any other known substance. Professors Andre Geim and Kostya Novoselov were awarded the Nobel Prize for Physics in 2010 for their work on it at Manchester.

The new hub will aim to ensure that Britain reaps the benefit of the breakthrough in jobs and prosperity, by acting as a catalyst for the creation of new businesses and attracting global companies to invest in the UK.

It will develop the technology to allow the manufacture of graphene on a scale that would open up commercial opportunities, especially in the field of computing.

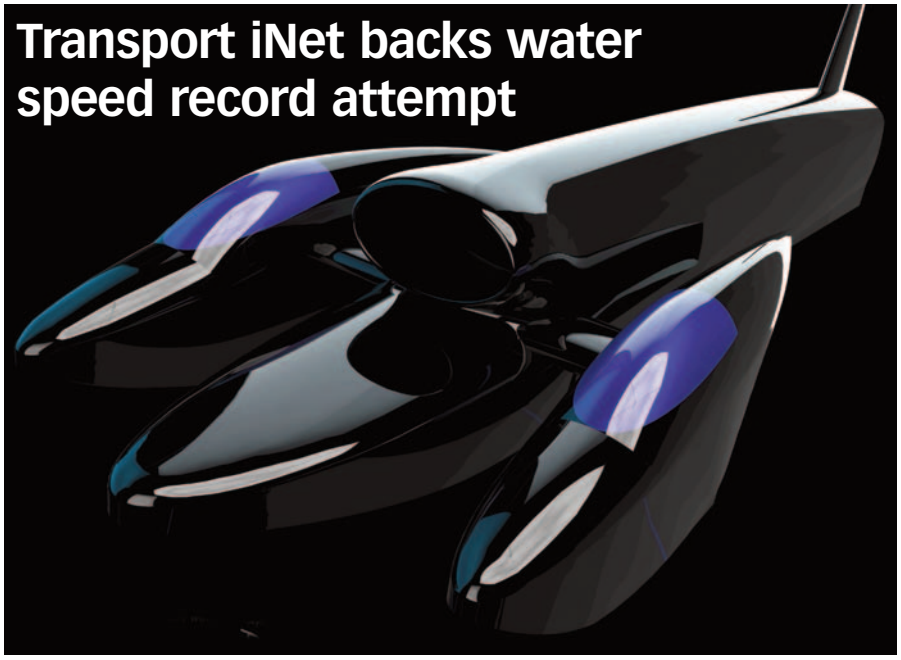
Semta nominated for WorldSkills UK Partner of the Year 2011

Semta, the Sector Skills Council for science, engineering and manufacturing technologies, has been nominated for WorldSkills UK Partner of the Year 2011.

This follows Semta's significant contribution to the engineering and manufacturing competition categories and driving an uplift in entries in these categories. Semta helped lead the development of a new competition category - Environmental Science - and is one of its official sponsors. The category is intended to raise skills and awareness in the science and engineering disciplines required to solve complex socio-economic issues such as climate change. It is aimed at those studying or recently completing relevant programmes in environmental science equivalent to S/NVQ level 3.

Since taking on responsibility for WorldSkills UK engineering competitions in 2008, sector skills council Semta has increased the number of registered competitors from 12 to 335. Semta works with WorldSkills UK to manage and facilitate the engineering categories within the competition.

Transport iNet backs water speed record attempt



Grantham based Quicksilver has received £10,000 in funding from the Transport iNet to help realise its ambitions of breaking the World Water Speed Record.

The investment will be used by the Quicksilver team to develop two essential parts of its boat; the trunnion hoop element of the upper hull structure and the air-intake for the engine.

"The support provided by the Transport iNet is about making innovative ideas a reality and in this case moving a project along to a point that it would have otherwise taken some time to reach," said Samantha Clarke, Transport iNet innovation advisor. "The boat that the Quicksilver team is developing is the definition of innovative, so it's been fantastic for the Transport iNet to get involved."

In common with all ultra high speed waterborne crafts, Quicksilver is designed to skim over the water rather than ploughing through it. The Quicksilver engineers are hoping it will achieve top speeds of 330mph.

The Record Challenge will take place on Coniston Water in the Lake District, the scene of the disaster which killed Donald Campbell in 1967 as he tried to break the 300mph barrier.

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"With the iNet's support we've tackled two key tasks in a fraction of the time it would otherwise have taken," commented Quicksilver founder, Nigel Macknight. "The Transport iNet has allowed us to push ahead further and faster than we ever could have done unaided."

http://www.eminnovation.org.uk/transport/

http://www.quicksilver-wsr.com/

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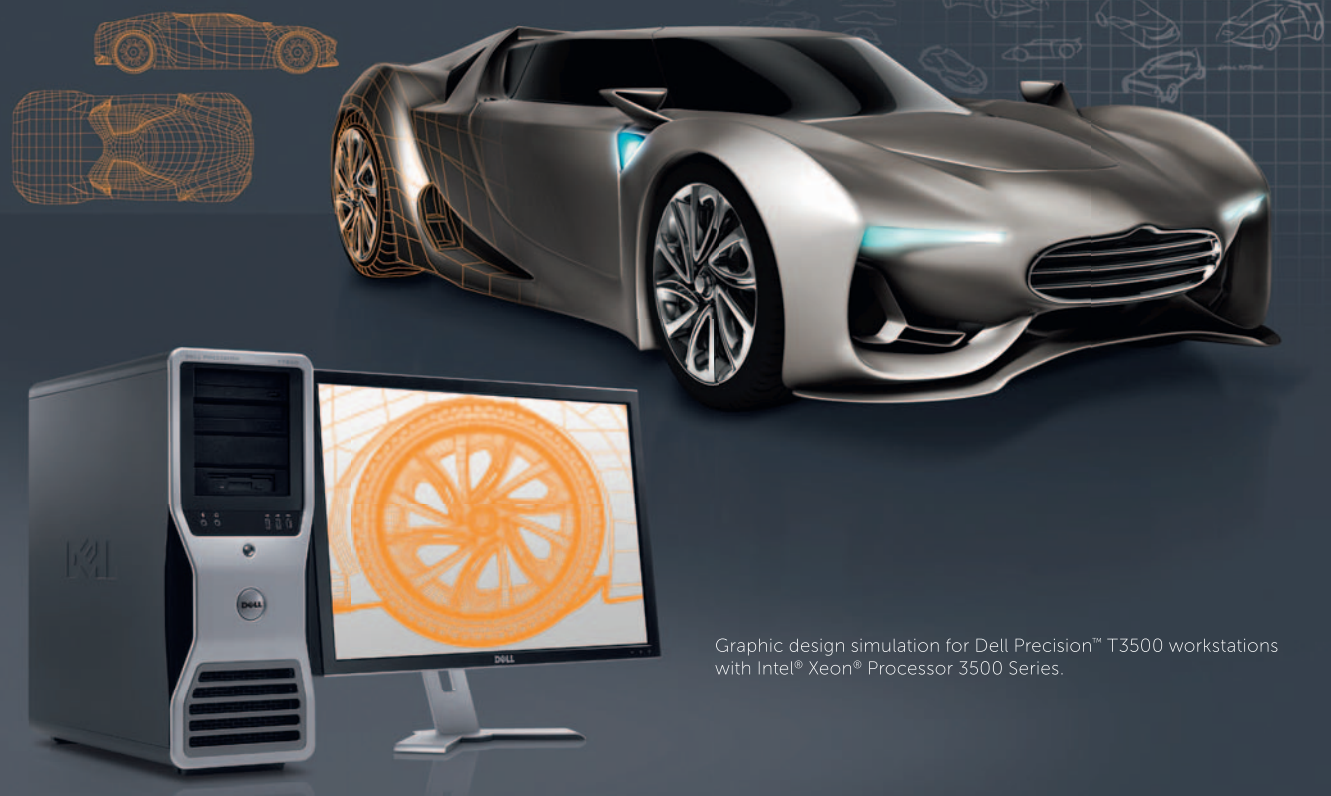

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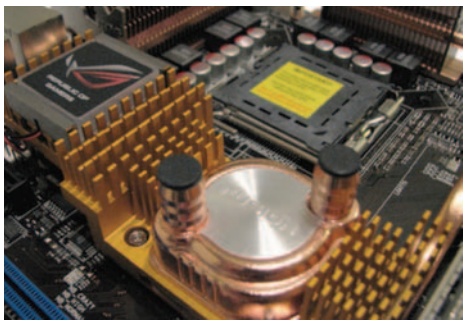
Metal foam triples cooling power

Versarien is launching a novel, patented, open pore, metal foam, developed by the University of Liverpool, which combines extremely high thermal efficiency with mechanical strength and reduced weight. Initially focusing on porous copper products, Versarien intends to extend the technology to other materials, including aluminium, in the near future.

Formed with a lost carbonate sintering process (LCS), metal and carbonate powders are mixed together, then pressed and sintered before dissolving to remove the carbonate mixer. The process can produce metal foam with porosity up to 85% and homogeneous and controllable pore sizes between 50 m and 5mm.

The open pore structure allows coolant fluid to pass through the material, and the greatly increased surface area produces heat transfer rates which are around 300% greater than is possible with current technology. The manufacturing method distributes the pores evenly through the material, ensuring the mechanical and thermal properties are constant throughout each component, and can be repeated for batches of parts – which has been a problem with metal foams up until now.



The Versarien technology allows for the moulding of components to a net shape during the pressing process.

www.versarien.co.uk

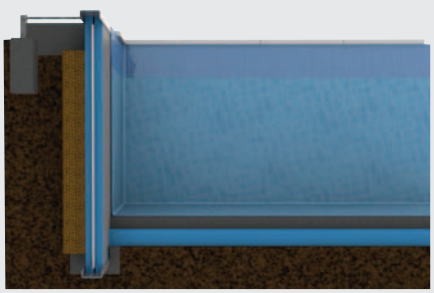
Solution to last month's Coffee Time Challenge

The solution to last month's challenge of how to retain heat in a swimming pool without applying an external heating source comes from Thermapool. Thermapool was conceived in 1997 after company founder and former builder Nigel Rose questioned why if lofts, walls, floors and basements have to be insulated why doesn't a swimming pool structure? Having questioned many senior swimming pool experts on why they didn't want to insulate swimming pools, Nigel was not content with their answers and saw a huge market opportunity to save this wasted energy.

After a great deal of research Nigel came up with a durable insulation panelling system specifically designed to clad the sides and bottom of a swimming pool - whether it is above or in the ground – it prevents an incredible 86% of heat loss (the heat that is still lost is unavoidably the result of evaporation and radiation from the water surface).

Nigel patented his technological system as Thermapool and today it is the insulation of choice for pool constructors internationally.

Amazingly it proved that on the inside the saving is 86% and on the outside it was only 41%. In 2006 he commissioned Kingston University to carry out a study of the market size for the swimming pool industry, showing the concurrent saving of carbon emissions which could be effected by insulating pools.



www.thermapool.co.uk

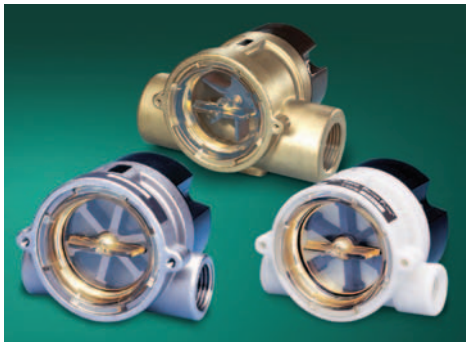
New pressure sensor family

BPS is a newly developed series of pressure sensors with IP 67 protection for use in gaseous and liquid media. The rugged devices feature a high-quality, long-term stable ceramic load cell and an especially attractive price/performance ratio, simple installation, high operating comfort and high precision. A large, bright and easily visible display ensures immediate status overview.

With 11 pressure range versions, the BPS sensors cover all the important ranges from -1-0 bar up to 0-600 bar for monitoring process media in factory automation. Typical applications include hydraulics monitoring as well as pneumatics equipment. The new Balluff pressure sensors, available in the standard model with plastic housing and in the high-end version with stainless steel, offer either two switching points or one switching output plus analogue channel (0-10V or 4-20mA).

www.balluff.co.uk

Rotorflow gives accurate flow rate



Gems Sensors & Controls has introduced the new RotorFlow Output for its RotorFlow Series of fluid flow sensors. The RotorFlow's highly visible paddlewheel rotors and solid-state electronics provide accurate flow rate output with visual confirmation when monitoring dynamic fluid flow within fluid lines. This additional output function is compatible with most digital logic units for commercial and industrial machinery.

The RotorFlow Output (RFO) has been specifically designed for flow rate monitoring or metering applications. RFO type sensors provide a pulsed DC voltage output (between 4.5 to 24VDC), which is proportional to the rate of flow and easily integrated into most digital logic units. Digital rate meters, totalisers, and other electronic controllers can use the output signal. The RotorFlow's paddlewheel design with high visibility rotor sensors provides verification at a glance to confirm that fluids are moving within the fluid lines.

www.gemssensors.com

Motion controller features modular expansion

Yaskawa's universal standard motion controller MP2310iec features three additional free slots for option modules. Used in conjunction with mature multitasking functions, this enables the module to control and monitor complex functions in a complex automation environment. For example, the motion controller can be equipped with communication modules for superordinate control units (Siemens) or for various bus systems. It can also be expanded using additional counter, I/O or positioning modules. Yaskawa is presently offering nine different option modules.

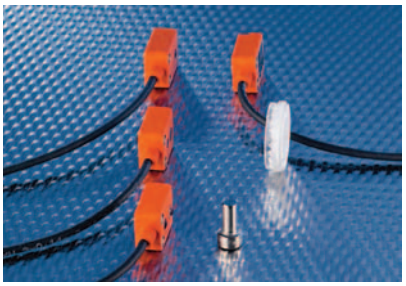
Motion controller programming is based on the international IEC 61131-3 standard, so that all automation functions planned and programmed on this basis are interchangeable. Pre-programmed software components from standard libraries help to shorten the time for planning and putting it into operation. Together with its MotionWorks IEC design environment, Yaskawa is providing a large number of PLCopen building blocks that ease efficient and standards-based planning and programming.

www.yaskawa.eu.com

More miniature sensors from ifm

Launched about a year ago, the O7 range of miniature photoelectric sensors, from market leader ifm electronic, was initially only available in PNP versions. This situation couldn't last and ifm has, accordingly, now released the NPN equivalents.

Already popular, this tiny sensor, measuring only 15 x 9 x 26mm, is nevertheless accurate and powerful. Naturally there are through beam, retroreflective and diffuse versions in NPN just as there are already in PNP. The sender/receiver version reaches up to 1500mm in range, while the retroreflective will cover 1000mm. The diffuse units are all background-suppressed and offer ranges up to 30mm, 50mm and 100mm. In each case the unit is sealed and fixed in function. Light-on or dark-on versions are made available separately. ifm electronic's O7 photocell makes easy work of fine sensing tasks in confined spaces.



www.ifm.com/uk

igus moves towards green bearings

Polymer researcher and bearings specialist igus UK has developed a plain bearing material that is based on 54% sustainable and natural raw materials. The basic polymer of the new iglidur N54 plain bearing is mainly made of castor oil, rather than finite crude oil. The company's mechanically and tribologically optimised biopolymer is suitable for universal use in the low-load range.

As with all igus iglidur polymers, iglidur N54 is a high-performance tribological plastic material that is both lubricant and maintenance free. In-house test results indicate excellent wear resistance properties with loads up to 2MPa, thus a green alternative for general purpose, low-load applications. As well as general industrial applications, igus sees possibilities for the biopolymer in consumer goods, for example furniture and other items of daily use.

The new bio-bearing fits well within the igus concept of developing environmentally-friendly alternatives for applications that currently work with lubricated metallic plain or roller bearings. iglidur N54 bearings are self-lubricating.

www.igus.co.uk

Cut CO_2 by cutting weight by a third

In today's automotive industry, every gram of CO_2 emission counts. That's why reducing vehicle weight is so important. But that's easier said than done for drive line components, where demands on performance and durability are high.

SKF product development engineer Paolo Re and his SKF team have a solution; the SKF Low Weight Hub Bearing Unit. By minimizing the use of steel and replacing it with light alloy, weight is cut by almost one third without compromising performance or bearing life. This innovative hub bearing unit suits premium cars equally well as light trucks and electric vehicles. The bottom line is reduced emissions and fuel consumption. This solution may also help automotive manufacturers avoid CO_2 fees.

It's another great example of knowledge engineering at work. Find out more at www.skf.com/poke

The Power of Knowledge Engineering

Wheel end solution

SKF Low Weight Hub Bearing Unit

Paolo Re, SKF

SKF®

Planet of

According to our last reader survey, about 52% of Eureka's readers have a smartphone of one sort or another. With all the benefits that they bring, one thing that does differentiate a smartphone from preceeding mobile technologies is the 'apps' that are available – purpose built bits of software that are designed to perform quite specific functions.

There is one for pretty much everything and anything. From maps to movie times, jokes to jogging, food to fundamental physics; it's all there in easy to use and understand apps. The popularity of apps has also been a catalyst for another emerging technology, tablet computers, the popularity of which has been quite unprecedented.

The two most popular platforms from which to get apps from are Apple with its App Store, and Android with the Android Market. Go to either and type in 'engineering', or 'design' or 'materials'. The result is hundreds of apps, which are often free, that can be downloaded and put to use in seconds.

While much of this is often dismissed as 'gimmicky' technology that only a 'yepper' (a nerdy yuppie) can find any real use for, there are some real benefits that the engineering community can, and should, make use of.

Of course, some apps are more useful than others, and it is worth bearing in mind that the market place is pretty saturated. That means there are a lot of mediocre and pretty useless apps out there. But don't let that put you off. There are also some real gems.

There are some great apps specific for engineers in terms of calculators, reference guides, training, and even for engineering job searches. Getting out your phone and launching an app in seconds to calculate units, get a material density or calculate inertias is quick, easy and useful. EngingeersCalc on the Android and Mechanical Engineer for the iPhone are two excellent examples of useful apps to have.

But as well as the general, real design is happening on both Smartphones and Tablets. CAD giant Autodesk has, to date, launched some 23 apps on the two most popular platforms, which are aimed at both professionals and consumers. But for the design engineer apps are increasingly being used to capture data in the field, digitise 'fag packet' sketches, or simply express ideas anywhere and at any time.

The key apps from Autodesk are AutoCAD WS, Inventor Publisher Mobile, and SketchBook. AutoCAD WS is essentially a mobile version of AutoCAD; allowing engineers to access and interact with 2D drawings.

Steve Bedder, manufacturing technical engineer for the UK and Ireland at Autodesk says: "Anybody that needs to interact with 2D data can access drawings directly on their mobile device and interact, redline mark-up, add or edit geometry. As soon as that is updated on a mobile device, it means the engineers back at the office who are using the desktop versions, can see those updates in almost real-time."

While AutoCAD WS covers 2D, Inventor Publisher Mobile Viewer

the Apps

The number of apps available for smartphones and tablet computers begs the question; what's in it for engineers? Justin Cunningham finds out.

allows 3D digital prototypes produced in Autodesk Inventor to be viewed. Although fairly limited (it only allows viewing, but not editing of a model) it shows potential for some useful applications.

"It allows you to reuse digital prototyping data so there is that link between a design that is still going on and also technical publications," says Bedder. "So if there is a change within a design it automatically updates the technical publication. That can then be accessed by people internally, or it could be your distribution network or even the consumer."

The graphics are good and, using simple pinch and pull movements on the touchscreen, it is easy to rotate, and zoom in and out of the model. By double-tapping on the screen, it allows a component to be selected to access information about its properties.

The viewer is probably most useful as an interactive maintenance manual. When 'Play' is pressed, the 3D model goes in to exploded view animation, accompanied by step-by-step text instructions that show the assembly or disassembly, along with text about whether to add grease or adhesive to bolts. All this can be, and should be, stressed by the design engineer at the frontend. And that is now directly being used to drive the maintenance of equipment and component parts through their life.

Since launching earlier this year, Autodesk WS has had over 2 million downloads and Autodesk Inventor Mobile Viewer has had over 1 million downloads. Although it is new, it is increasingly being discussed by engineers, at least around the water cooler, about possible applications for the future.

"The more people we talk to about apps, like Inventor Publisher Mobile and AutoCAD WS, the more that people are realising that actually they can do a lot more with their data than maybe they are doing at the moment," says Bedder.

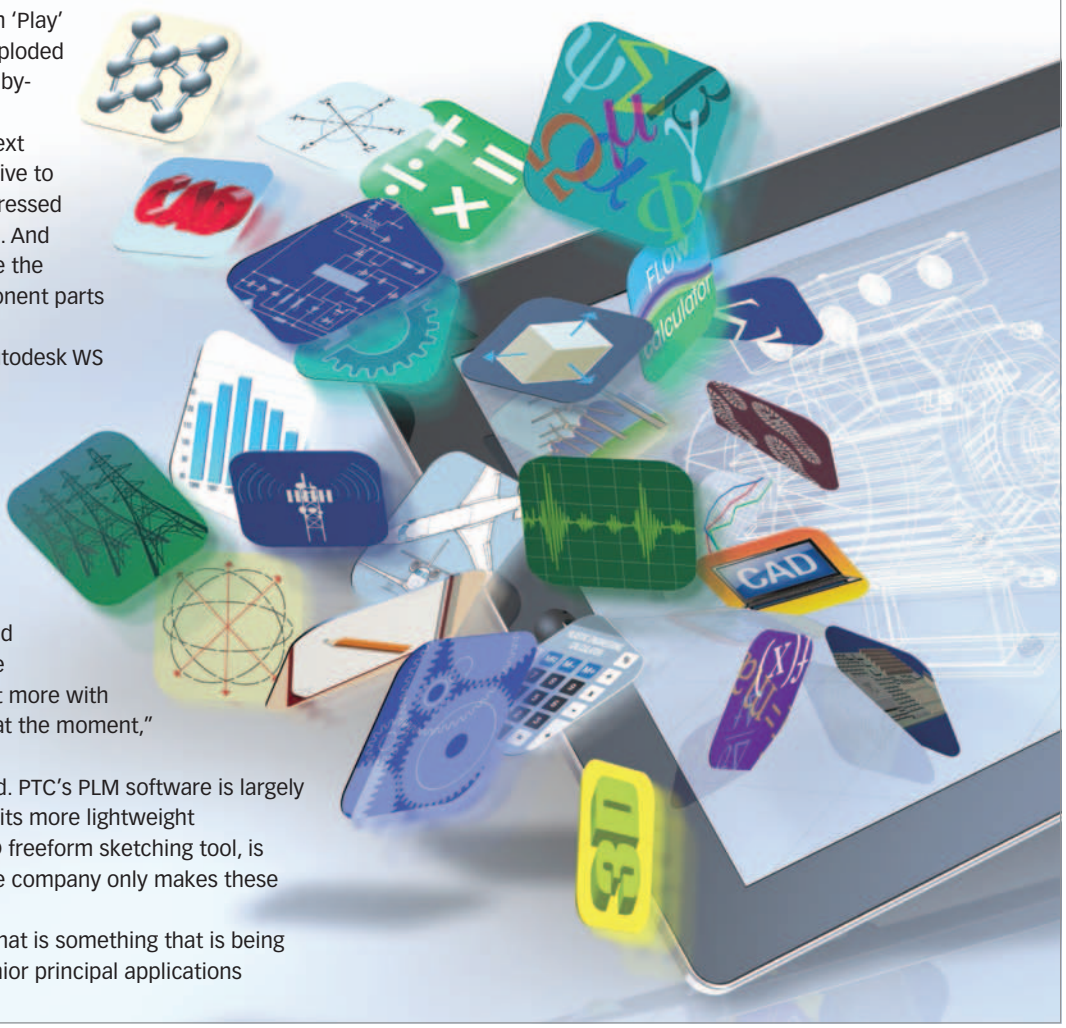
However, not everyone is convinced. PTC's PLM software is largely desktop driven, and although some of its more lightweight applications such as Creo Sketch, a 2D freeform sketching tool, is being used on the iPad and iPhone, the company only makes these available through licensing.

"We haven't got an app store and that is something that is being debated," says Phillip Darlington, a senior principal applications engineer at PTC. "Whether we could do a 30-day trial that will then expire and people can see if it works for them has been mooted. But the app store route is something that is up in the air at the moment."

Like other PLM and CAD companies, PTC is not convinced that a downloadable app specific for smartphones or tablets from Apple or Android is really going to make any significant contribution when it comes to producing the actual geometry of a design.

"From a design perspective you are always going to want to have a big screen so you can see as much at one time as possible," says Darlington."To bring that down to a smartphone I don't think is realistic.

"What is realistic is using them to input the data that will actually drive the design of our parametric solution. We can input parameters



and relationship to drive and evolve new designs. For example, Otis elevators would send site engineers out to jobs and they would put in design parameters into a smartphone. That text file would automatically come back and drive the design, so that it would generate a unique design based upon that a company's requirement."

The use of apps within the engineering space is a useful design tool that gives portability to sketches, drawings and hand calculations. But, there is also an important business opportunity here. Shaun Skilton, product manager within the filtration division of Parker Hannifin, specialises in providing analytical counting equipment.

Its product line counts how many bits of dirt, dust, metal, and fibre may be in a hydraulic system. After that it grades them in to different sizes and then gives them an international standard that the industry recognises. But, understanding and interpreting these results so to recommend an appropriate filter for individual systems is a frequent source of confusion for both service engineers out in the field and customers.

Skilton says: "I need to get information specific to a particular requirement or situation across and understood. So I needed something that would demystify the technology and that could be easily and quickly be used in the field. So we came up with the ConOne app to give engineers the answers."

At first Skilton found colleagues and peers to be sceptical of using this approach. "Now I have done it and it has got launched, the Parker people recognise it, and have said that it looks good. Some of it is a bit of fun, but some of it is real business stuff."

There are many considerations when developing an app; the fundamental one being what system to use. There are trade-offs to be made aware of. Apple uses an iOS approach which is typically bug-free, and provides a single, high level programming platform that can be used on an iPhone, iPad and iTouch.

Android is a cross-functional platform that is available on a number of manufacturers' devices, and enables five levels of programming software. The very complex high level software can run complex animations, but it is only available on its newer and more powerful smartphones. The lower level Android software, although much easier to program, does not enable a lot to be run on it.

"I decided to go the Apple approach," says Skilton. "We approached a designer, told him the specification, and he came up with the Parker ConOne App. Within that there are typical communication tools like Twitter, Email, and news which allow us to get information to people at the coalface within minutes of them downloading it."

The real heart of the app consists of two utilities; the ISO Generator and the Frequency Counter. Using industry standard algorithms and a series of questions and answers, the app is able to give filter recommendations for specific hydraulic systems.

Skelton was keen to adhere to the golden rule of simplicity when it comes to apps and wanted to include as many pictures and icons as possible. This also has the added advantage of being able to be used openly across the World without language problems. "Water is not permissible in a lot of systems, so we use icons of water droplets," he says. "So we have a sliding scale with lots of droplets at one end of the scale, and only one droplet on the other. We wanted to make it easy for people to interpret rather than have to read and write multi-lingual versions. So it's very intuitive."

The other utility is a prudency check, which works in a similar fashion to calculate the regularity that checks should be carried out. "Prior to this it would have taken days, if not weeks, to train people to understand this. But now they have it in their hands when they are in the field," says Skelton.

The success of the ConOne app as a tool has been so successful that it has inspired Skelton to think about further apps. He says Parker want to continue to develop its apps and is looking to introduce a QR bar coding system to a lot of its products and literature.

Parker Hydraulic Filter Division Europe News

Parker Hannifin's Hydraulic Filter Division Europe launches the Parker ConMon App...

Now available to download to your iPad, iPhone or iTouch - FREE from iTunes.

A NEW app that will save you money - the app features 2 unique programs to help you ensure that your hydraulic oil and fuel systems are safe from contamination and the dangers and very high cost of equipment failure and downtime.

ISO CODE GENERATOR Program - Allows users to determine the ideal ISO code for their system.

FREQUENCY ANALYSIS Program - Allows users to determine how often their system should be sampled.

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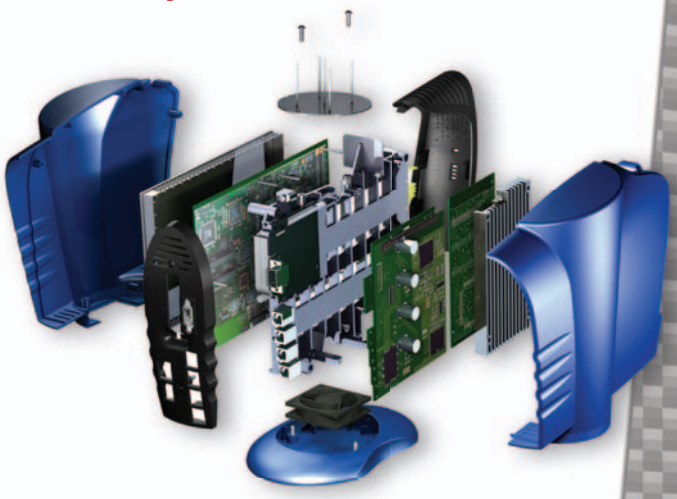

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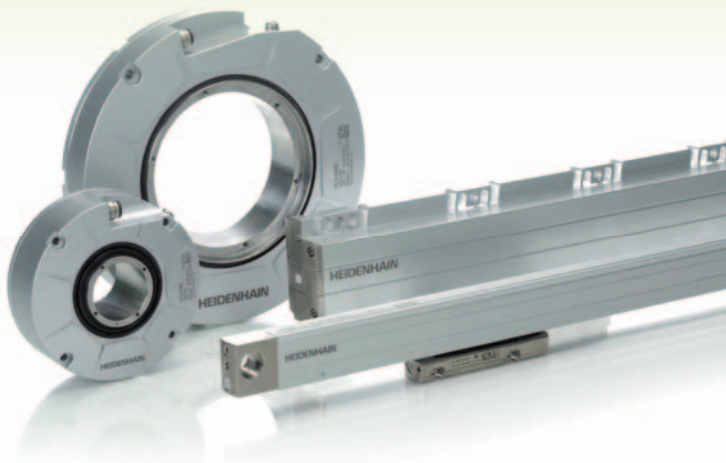

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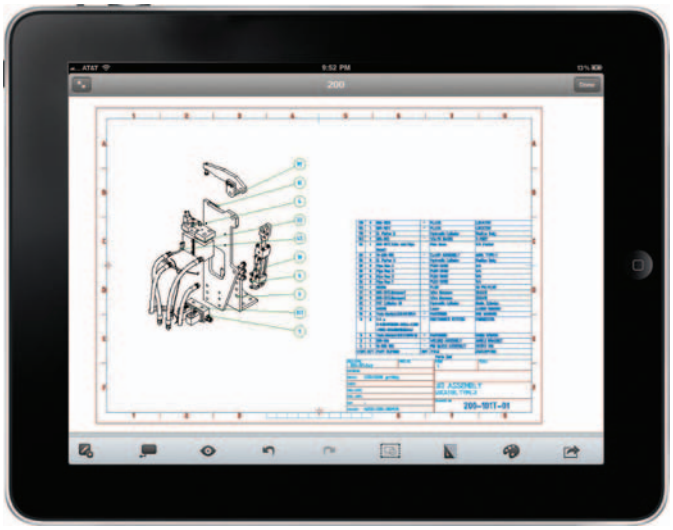


The idea being that you would simply take a picture of a QR barcode and that would take you to its appropriate electronic document without the user having to know what the part or component is called.

"You just pick up the phone, it connects to the wireless internet and the latest version can be downloaded immediately," says Skelton. "You will never be with an old version of a catalogue or manual, as the moment that it is updated in our facility it will be automatically downloaded to your device. So it is another way to ensure people have got the latest information when they need it.

"It is endless what we can do with it and put in to it, and it's making things simpler. Most people have this type of device in their pocket and it is increasing. And it adds a bit of fun and end user satisfaction."

ABB has also launched a free energy calculator application app for the Apple iPhone and iPad. The App allows, primarily, end-users to calculate the energy savings they can achieve by installing variable speed drives to control motors.

Although to some extent a marketing tool, it can be useful for doing quick comparisons with existing equipment. The app gives end-users the ability to make quick comparisons between motors controlled by variable speed drives and motors running direct-on-line without any speed control device. Users simply select an industry and the operating duty profile, the voltage, phase and motor power rating, running hours, and electricity cost. The app then estimates how much CO2, energy and costs can be saved by installing an ABB drive to control the application.

"Our app makes it simple for customers to calculate the potential savings they can achieve by installing variable speed drives," says Steve Ruddell, ABB's UK energy spokesperson. "The tool is free to download and makes selecting drives according to the needs of the application extremely accessible."

Once all the parameters have been applied and the savings worked out, the app displays a picture of the most suitable drive for the user's application. Simply click on the picture on the top half of the screen and a product summary will be displayed. The end-user can then place an enquiry or request more information.

Norbar Torque Tools is another notable engineering firm to see potential of using apps. It has release another app that is free for both Apple and Android. The app is largely an extension of Norbars online Torque Wrench Extension Calculator and essentially calculates what value you need to set on a torque wrench to achieve a desired level of torque when the wrench is extended. Last year, Norbar launched another free app that instantly converts a full range of SI, Metric and Imperial Units.

Philip Brodey, director of Norbar, says that providing apps relating to torque measurement and control gives engineers useful tools they can use anywhere and anytime. He says: "Flexibility of use is vital in many working environments and for projects in the field. Mobile devices have provided tremendous scope for the creation of apps to support business and industry."

While the use of apps in industry can be viewed with sceptically and seen as a slightly lightweight and limited technology in terms of actual use, times are changing. With an estimated 1,500 apps coming to market everyday, apps are the technology of the moment.

The result is tremendous opportunity; both in terms of using mobile tools to drive design and also in terms of connectivity. They also provide an opportunity for firms to have vastly better communication with all sectors and aspects of its business, which again will help drive and influence the design process. And there is also an opportunity for connecting with customers, giving them new and exciting ways to view products in the palm of their hands. One thing is for sure, this is not the last you will read about apps.

www.autodesk.co.uk
www.ptc.com
www.parker.com
www.abb.co.uk/energy
www.norbar.com

The right fit

How does a design consultancy make sure it is best suited to meet its clients' needs? Paul Fanning asks Frazer-Nash's Martin Concannon.

The ways in which design consultancies attract business and fit into industry are many and various. What is certain, however, is that there is no one right answer. This is something of which Martin Concannon, business manager for Frazer-Nash's recently-created industry sector is particularly aware. He says: "The big issue is focus. You have to be very clear about what you want to offer to the various sectors of the industry. You don't want to be offering conventional power generation market the same things as you offer automotive or medical – this isn't a one-size fits all business."

While Frazer-Nash has an illustrious history as a design consultancy, its industry sector is relatively new, taking in such diverse markets as conventional power generation, medical and pharmaceutical, automotive and downstream oil and gas and the chemicals industry.

This diversity, as Concannon admits, has its advantages and disadvantages, saying: "You could argue that it's the sector into which clients fall when they don't fit anywhere else. Some of the other business managers have a much tighter group of clients to focus on. That works two ways, though. They may only have to focus on a few different companies, but they may also have only a handful of people that they can actually go to because of the nature of that sector. By contrast, when I look at general engineering and manufacturing, I'm potentially looking at tens of thousands of clients and therefore for me it's a question of identifying the main players and attempting to establish dialogue and discussion with them."

The medical and pharmaceutical sectors, he feels, represent a particularly promising area for Frazer-Nash and one in which it has certain advantages. "Medical is very strongly focused on the design work we can do," he says. "In the medical area in particular, there tend to be two broad groups we work with. There are those who are technically expert in the medical area they work in, but aren't engineers. What we provide is that engineering discipline to what might be a very small team. They know they've got a good idea and they know it will work, but there's a big gap between a prototype in their office and them being able to make hundreds or thousands a year and have a successful business from it. We can bridge that gap."

This type of manufacturing expertise, Concannon believes, helps to differentiate Frazer-Nash from its competitors. He says: "We can do design, but we do design with something extra. There are a lot of companies out there who are very good on how something will look and they can put it together in such a way that it will work, but what we can do is build analysis and reliability into that design. Our understanding of material behaviour under various conditions allows us to build up an accurate picture of reliability and then build up for our clients a complete manufacturing specification. For instance, if a company is going to have the product built abroad, it's extremely important for them to be able to hand over a detailed manufacturing spec so that they will get back from their suppliers exactly what they expected."

"We can do design, but we do design with something extra"

Having only been in his role five months, Concannon admits that he is still learning, but is clear about where he wants his sector to be. "The role entails two or three aspects," he says. "One is having a strategy for the industry sector in terms of where it is now and where it's going to be in two or three years' time. It's a very diverse sector with at least six sub sectors within it. It ranges across different sectors, but also across different disciplines...There's plenty of work for us to go at out there."

www.fnc.co.uk

Photograph: Ken Wood

Background

With a degree and Ph.D. in chemistry, Martin Concannon began his career in the chemicals industry where he worked for Unilever and ICI for over ten years. He then made the move into consultancy where he took up the position of Operations Manager for Burgoyne Consultants Ltd, specialising in risk, safety and loss prevention and consulting with clients operating high hazard processes. Six years later Martin moved to Entec UK as Sector Development Director for Oil, Gas and Industry.

Control valve offers hygienic solution

The challenges of food and beverage industries are being met by an innovative new control valve.

The food and beverage industries present particular problems to designers, demanding as they do the highest possible standards of cleanliness.

Rust, corrosion, dirt, flaking paint, water ingress and external integrity impaired by aggressive products, would all be high up on any list of typical application problems for valves in the food and beverage industries. Many would say that these industries have, for too long, been plagued by these problems, to the extent that companies have learned to live with them.

With this in mind, a stainless steel, pneumatically-actuated control valve has been developed that will meet the challenges of such highly hygienic processes, while also satisfying the pressing industry need to reduce energy use. Thanks to intelligent internal design, the air consumption to actuate Element valves is up to 40% lower in comparison with conventional process valve systems

Designed to IP 65/67 protection class, the Element control valves from Burkert, with their heat and chemical resistant design, easily withstand the rinsing and cleaning processes required in food and beverage plants. The clean, sleek external lines ensure the valves are easy to clean and also stay cleaner for longer.

The Element control valves offer a number of innovations. First, high-gloss polished valve stems minimise friction and maximise the service life of the automatic self-adjusting seals. Secondly, the valve stroke position feedback transducer is not only integrated within the valve, but is also contact-less, meaning it never blocks or wears out and always remains accurate because it measures the linear stroke motion directly without conversion. Thirdly, because the feedback transducer is fully protected inside the valve, the requirement for external linkages, nuts, bolts and connections is eliminated. This innovation dramatically reduces the areas where product can accumulate and cause contamination. Fourthly, the control air is also routed internally, without the need for awkward external hoses.

A further innovation on the Element units is valve actuator control, which is achieved by means of the integrated pilot valves that can also be actuated manually for easy local operation. For each operation, clean and dry control air is deliberately flushed into all areas of the actuator. This ensures that, unlike traditional solutions, ambient air is never drawn into the spring chambers and surrounding voids, extending the valve's reliability and life, at the same time maximising process availability for the valve user. In addition, as no impurities or moisture are drawn into the actuator, there can be no corrosion of the springs inside the actuator. The same feature also prevents the risk of biological growth, which could result in contamination of the process environment as a whole.

The valve also protects against moisture ingress into the electronics of the control heads on the Element valves. Protection is required because small but naturally occurring changes in the control head pressure can lead to the penetration of moisture, particularly after a wash down cleaning process. Defence against this ingress is provided by diverting a small amount of clean control air into the control head, maintaining a slight positive pressure.

In addition to their many operational benefits, the valves offer optimised interactiveness with the user. The valves integrate a modern operator concept that is intuitive and user-friendly, despite the extensive range of relevant functions provided. To prevent data overload, additional functions are displayed only as required, and the configuration of positioners and process controllers is seamless and automatic. Local communication is achieved at a glance via a high-performance and highly visible, multicoloured LED display that illuminates the surrounding area, passing on immediate user information regarding the valve status. Finally, all important data logging information is displayed on a backlit graphic display.

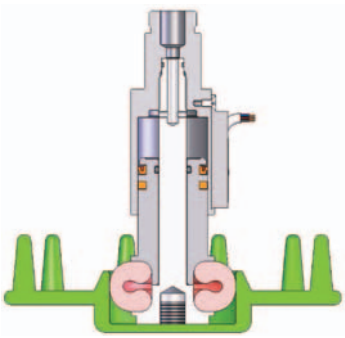
www.burkert.com

Air-hands enable grip and test

The new, patented "Air-Hand" concept type MFD/MFU provide consistent and smooth internal gripping from internal diameters 8 to 85 mm and are particularly suitable for handling delicate products such as glass or plastic containers preventing breaking, marking or scratching.

In addition the possible combination of leak or pressure testing during product transfer enables design engineers to create extremely economical application solutions.

Air-Hands are pneumatically operated single acting cylinders. Once positioned in the centre of the circular work-piece opening the downwards or upwards motion deforms, thus expands the plastic bellow for gentle gripping on the internal diameter.

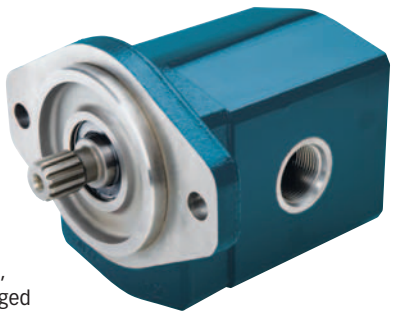


Air connections are made either at the side of the cylinder body or centrally from the top. The units with side air fitting come with a trough hole facilitating the additional function of product pressure or leak-testing during the gripping operation. Air-Hands with the two functions combined are simple but reliable and highly cost effective tools.

www.precisionmotion.co.uk

Concentric offers new hydraulic gear pump

Concentric AB has launched the FERRA F15 cast-iron hydraulic gear pump designed for robust, high-performance duty in construction and agricultural equipment, materials handling and other mobile/off-highway applications.



Like the FERRA F12 pump, Concentric's F15 features rugged two-piece construction: both the housing and the front cover are of cast iron, which has made it possible to eliminate the rear cover and integrate the bearings into the housing and the flange to make the whole unit more compact. The result is increased power density and better installation characteristics compared with conventional designs.

The gear and shaft are in one piece giving the drive and driven gear superior fatigue resistance and allowing the use of large-diameter journals with higher load-bearing capacity. Made of high-strength, heat-treated steel, the 14-tooth gears improve volumetric efficiency and reduce ripple/noise.

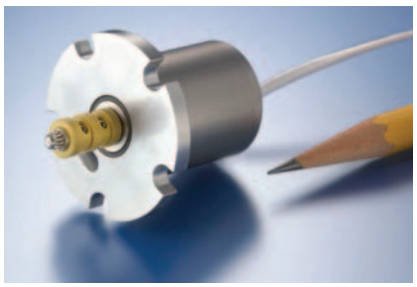
www.concentricab.com

Solenoid valve brings flexibility

A new CB (Cartridge Bobbin) solenoid valve has been added to the established range of miniature fluid control valves available from Lee Products. This option has been developed specifically for high-volume aerospace applications and incorporates a 5 bolt flange, providing users with the option of either a 3, 4 or 5 bolt connection.

The CB valve utilises a cartridge bobbin coil which is coupled with Lee Products innovative MultiSeal technology. The patented MultiSeal feature ensures a radically simplified port layout and allows total porting flexibility 360º around the seal, without the need for O-Rings or anti-extrusion rings.

This tough, durable valve, which weighs just 73g and measures only 45mm in length with a diameter of 32mm, is designed for applications with a temperature range of -54ºC to +135ºC. It is a normally closed design that is available in both single coil and dual coil configurations with the lead wires exiting either end of the valve. Other features and benefits of the CB solenoid valve include; low leakage (2 cc/mm maximum at 3000 psi, zero external), a potted coil and an integral safety screen.

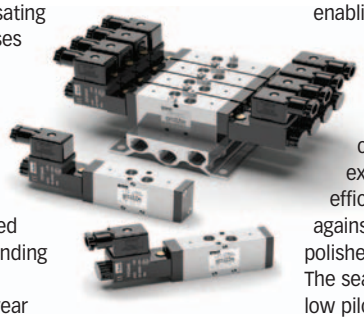


www.leeproducts.co.uk

Pneumatic control valve is smaller and faster

Parker Hannifin has launched an advanced new range of Viking Lite directional pneumatic control valves that combine high flow rates and fast response in compact, lightweight and robust bodies. The new Viking Lite also features a specially developed valve spool wear compensating system. This minimises friction, to reduce both breakaway forces and actuation pressures, and enables operating life to be dramatically increased by up to 250%, depending on application.

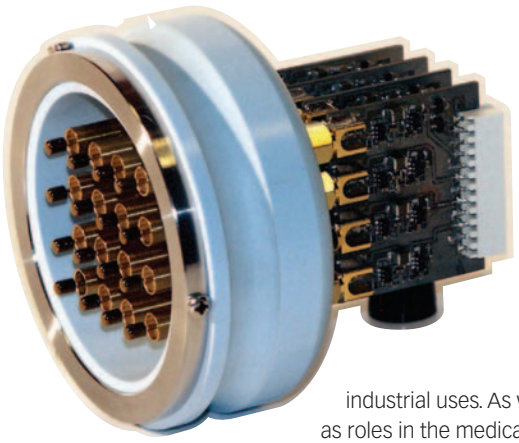
Parker's unique wear compensating system (WCS) is a key feature of the new Viking Lite directional control valves. The WCS uses dynamic nitrile bi-directional spool seals that, unlike conventional static or o-ring seals held in a fixed position, are free-floating within specially machined grooves, which effectively form the land areas on the spool. Each seal has a narrow profile enabling it to expand radially with ease when air pressure is applied, and creating an extremely efficient seal against the highly polished valve bore. The seal is formed at low pilot pressures, helping to minimise the energy required.



www.parker.com

EPS shows potential

An electric potential sensor originally designed for the world of quantum physics is finding increasing use in industry. Justin Cunningham reports.



A non-contact sensor developed for use in fundamental physics is finding increasing application in industry. The sensor was spun out of the University of Sussex last year and has since been licensed to Plessey Semiconductors, which have found a diverse range of applications in numerous industries.

The non-contact sensor, known broadly as the electric potential sensor (EPS), is a wideband (quasi-DC to 200MHz) ultra high impedance sensor capable of detecting spatial potential, electric fields and charge. Essentially, the EPS is able to make use of disruptions in the Earth's electric field, caused by human movement, enabling it to track position and motion.

The EPS technology works at normal room temperatures and functions as an ultra high, input impedence sensor that acts as a highly stable, extremely sensitive, contactless digital voltmeter to measure tiny changes in an electric field down to mV.

Most places on Earth have a vertical electric field of about 100V/m and as the human body is mostly made up of water it interacts and disrupts it. The EPS technology is able to then detect these changes, and transpose position, movement and other information, even at a distance or through a solid wall.

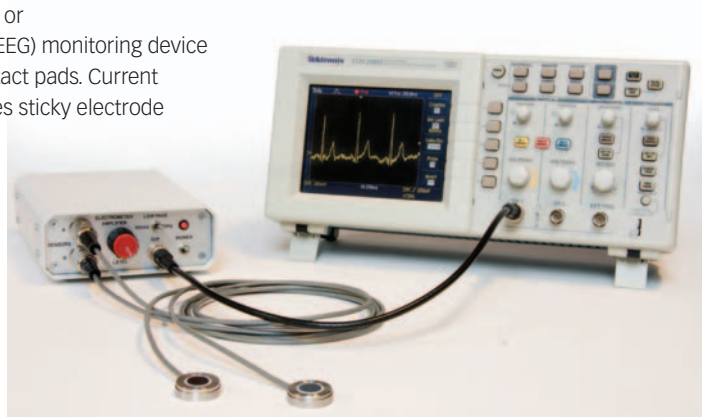
One of the biggest areas of development is in medical monitoring, where it can be used to detect the electrical activity of the heart. This makes it ideal for use within an Electrocardiography (ECG) or Electroencephalography (EEG) monitoring device as they do away with contact pads. Current monitoring equipment uses sticky electrode pads that are taped to the surface of the body. EPS offer a non-invasive sensing alternative, which also opens up the potential for continual monitoring in home health sectors.

The technology was developed and patented by Professor Robert Prance and his team at the Centre for Physical Electronics and Quantum Technology at the University of Sussex. He says: "We created this technology initially as a non-invasive, non-contact sensor for measurements in fundamental physics research. However, we quickly realised the many important applications for which this technology could be used.

"Our Research Council's UK Basic Technology programme has allowed us to develop a generic Electric Potential Sensor and we have been able to demonstrate its application in a number of areas where the non-contact detection of electric fields can be used to deliver new innovative solutions and products. For example, these include medical diagnosis and imaging, security, and the human-machine interface."

The technology has also shown potential for more obscure applications such as detecting movements, and even the heartbeat of players in computer games. Motion based interfaces such as the Xbox Kinect are gaining massive popularity, and already use a suite of sensors and proprietary software to interpret the movements of gamers. The ability of the EPS to detect movement and acquire biophysiological signals without contact offers numerous exciting possibilities.

But, for the time being Plessey Semiconductors and Prance are eyeing more industrial uses. As well as roles in the medical industry, they are also being developed for non-destructive testing of composites. The sensors have the particularly useful ability to detect the location of faults and voids, inclusions, disbanding and delamination on poor conductive materials such as carbon reinforced plastics.



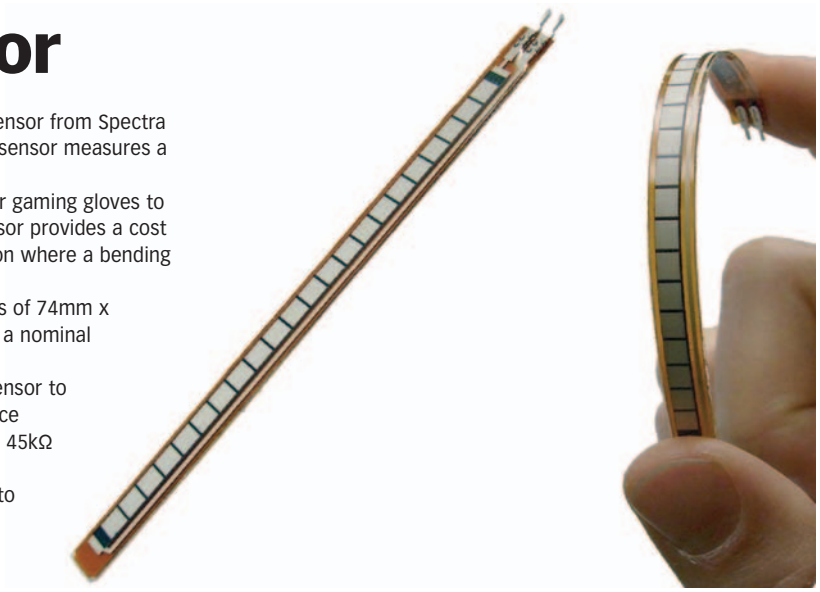
As composites become more widely used in all manner of industries, so does the need to non-destructively test the internal structure. Composites can have impurities form during curing or have damage to their internal structure that significantly weakens their properties. However, they often have no visible cracks, marks or damage on the structure's surface, making it difficult to assess properly. This is an issue particularly for safety critical industries such as aerospace.

EPS-based technology allows the detection and location of such damage or faults by using a non-contact version of the AC potential drop method (the product of the current and impedance of the circuit) giving it the ability to sense variations in local properties over a range of length scales from 5 m upwards.

A similar technique enables the sensors to measure the local dielectric properties of insulating materials. The sensor electrode size may be designed to suit the application and spatial resolution required. This flexibility allows variations in local material properties, including the electrical conductivity of metals and carbon composites and the dielectric properties of insulators to be sensed. As with conventional techniques, the sensors will operate through insulating surface coatings including epoxy resin or paint.

www.plesseysemiconductors.com
www.sussex.ac.uk

Membrane provides low-cost measurement sensor



Variohm EuroSensor has introduced a low-cost angle displacement sensor from Spectra Symbol, the USA-based leader in membrane sensing technology. The sensor measures a resistance change depending on the amount of bend radius induced.

Currently used in applications as far reaching as finger location for gaming gloves to displacement sensing in fitness equipment, the single-piece Flex Sensor provides a cost competitive, compact and altogether elegant position sensing solution where a bending motion is applied to a device.

The sensor is less than 0.5mm thick and with footprint dimensions of 74mm x 6.35mm, the standard Flex Sensor has an active length of 55mm and a nominal 25kΩ resistance when in a flat position.

Normally fixed by an integral self adhesive backing to allow the sensor to bend freely through a typical angle of 90°, the sensor's bend resistance increases in correlation to the bend angle to an upper value between 45kΩ and 125kΩ. Other versions with longer active lengths are available.

With added external control the resistive output can be arranged to provide a simple voltage divider with sensitivity adjustment or other output state features such as threshold switching.

www.variohm.com

Compact draw wire sensor measures up to 5m

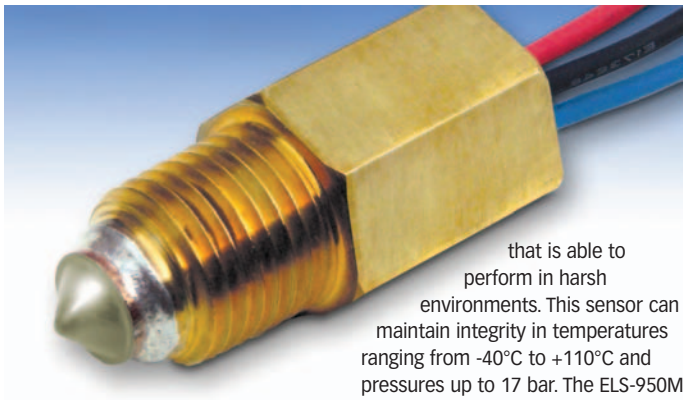
Micro Epsilon has launched a range of draw wire sensors that offer compact, low cost and large measuring range. The sensor was developed specifically for high volume OEM applications such as mobile cranes, fire rescue vehicles, mobile working platforms and scissor lifts.

The WireSensor MK88 weighs 400g and measures 88 x 90 x 90mm. The sensor can be supplied as a mechanical-only option for mounting to the user's own encoder; a universal encoder mounting plate is used to mount the sensor to the encoder.

The MK Series of draw wire sensors all benefit from a PA-coated stainless steel wire and a high strength, glass fibre-reinforced plastic housing. This results in an extremely robust sensor that is suitable for all outdoor applications, with a maximum protection class of IP65. Operating temperature is from –20°C to +80°C, although a special version can be requested down to –40°C.

www.micro-epsilon.co.uk

New tough electro-optic liquid level sensor



Gems Sensors & Controls has introduced a new compact, durable, and low cost Electro Optic Level Sensor (ELS) for liquid level sensor applications. The ELS 950M expands on the existing ELS 950 Series and will benefit OEMs and end users in a wide range of industries and environments.

Encased in a brass housing, the new ELS 950M liquid level sensor features an over-moulded electronics insert, TPE insulated wires, and a fluorocarbon O-ring seal to create an air- and watertight resistant assembly that is able to perform in harsh environments. This sensor can maintain integrity in temperatures ranging from -40°C to +110°C and pressures up to 17 bar. The ELS-950M has been rigorously developed to meet the demands for a wide range of industry applications and is approved to UL Recognition, CE marked to EMI standards, shock and vibration tested to MIL standards, ingress protected to IP66/67 and is RoHS compliant for hazardous materials.

These robust sensors are available in 5 or 12VDC models with mounting size options of 1/4" NPT Male, 1/2"–20 UNF-2B or M12x1.8 straight thread.

www.gemssensors.com

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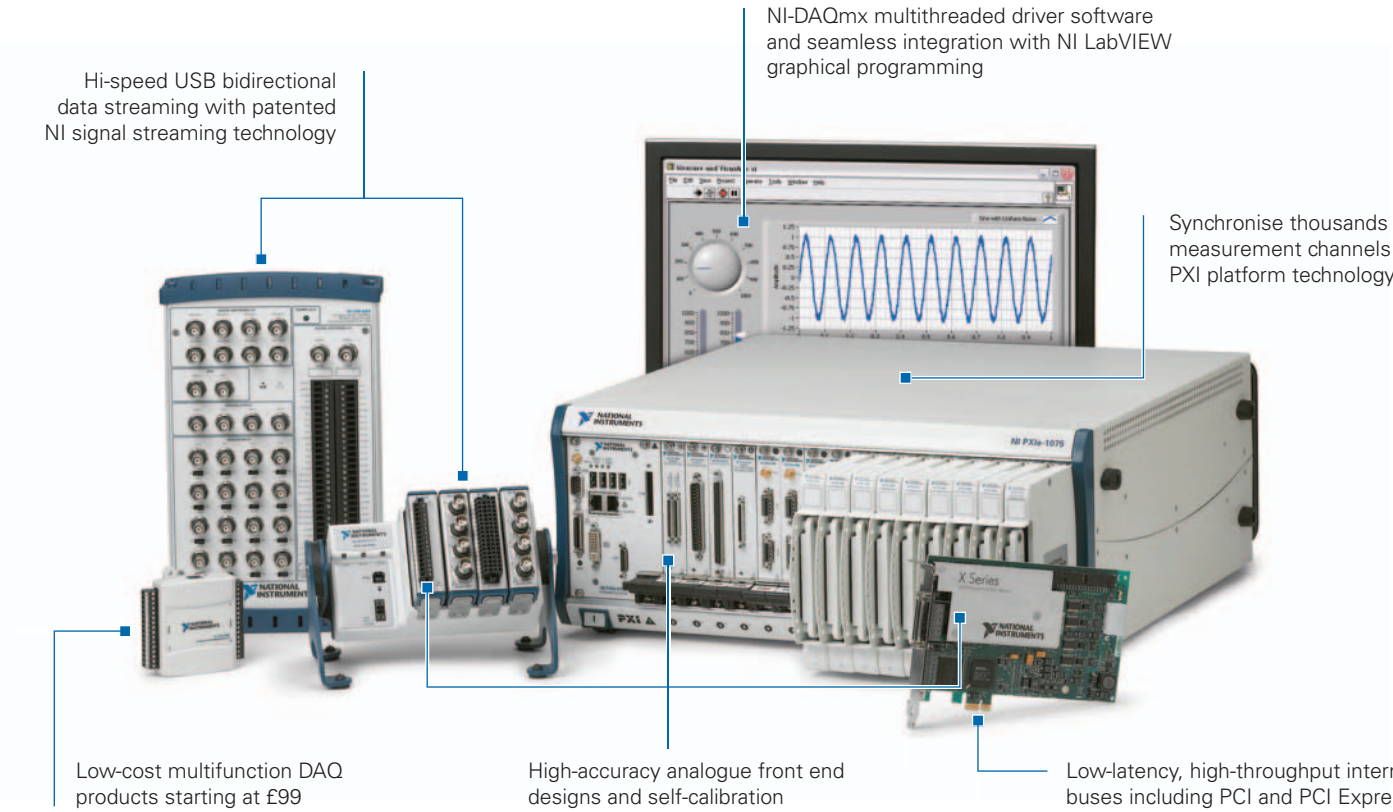

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Materials drive bearing advances

Materials are at the heart of any bearing's success or failure. Paul Fanning looks at some recent developments.

More and more materials are being developed that allow bearings to cope with the issues facing these products. Of these issues, probably the most significant are friction and the resultant temperatures. Traditionally, of course, this problem has been overcome with the use of lubricants.

Keeping bearings properly lubricated in high temperature environments represents a serious challenge, however. Product surface temperatures can reach temperatures as high as 900 °C, while the effects of cooling water, scale, and chemicals all contribute to an extremely tough operating environment and present a lubrication challenge. Ultimately, the consequence of bearing failures often leads to equipment downtime, often damaging both equipment components and the end product. This all leads to increased costs in repair, affecting productivity and profitability.

To deal with high temperature applications, bearings are typically lubricated with a centralised lubrication system to counteract lubricant loss and prevent bearing failure.

However, these systems drive up energy costs, consume excessive amounts of costly, high temperature greases, and are prone to pipe blockages caused by burnt grease. Even when working optimally, centralised lubrication systems must apply large amounts of lubricant to compensate for heat-induced grease degradation. This can pose significant fire and safety risks, as excess grease can accumulate outside the bearing housings, creating dangerous working conditions, including slippery floors and a higher risk of fire. Water cooling systems are also sometimes used, adding to high investment and operating costs.

Oil-air lubrication is sometimes used as an alternative to grease lubrication, but is also not ideal due to the difficulty to form a good lubricating film, especially at low speeds. It requires a significant capital investment and leads to increased costs for both energy and maintenance.

These problems have led to a rise in the popularity of self-lubricating bearings. One of the latest examples of this breed is SKF's DryLube, a bearing solution that contains a specially-engineered graphite mixture that eliminates the need for grease re-lubrication; delivering reliable, improved performance and allowing significant cost savings to be made in reduced maintenance and downtime. The SKF Drylube Bearings will benefit equipment, such as rollers, which are repeatedly subjected to extremely high temperatures in applications such as bakeries, food processing, mills, foundries, or other heavy industries.

By filling the empty space inside a bearing with an engineered graphite mixture, SKF provides an efficient and cost effective alternative to the use of grease in hostile environments. Almost any SKF bearing type can be supplied as an SKF DryLube Bearing, providing very low and constant friction, and an extremely high temperature limit of 350°C. SKF DryLube Bearings do not require re-lubrication, eliminating the cost and environmental consequences of conventional greasing programmes.

An even more fundamental use of materials to eliminate lubrication and maintenance issues can be found in the use of polymer bearings such as those offered by igus. Its iglidur range of polymer bearings are claimed to lower costs and raise service life by eliminating lubrication

and lowering maintenance works. Many engineers persist in the belief that plastics cannot handle the tough applications or environmental elements. Plastic bearings, however, can endure extreme temperatures, heavy loads and high speeds.

Self-lubricating polymer bearings such as iglidur contain solid lubricants embedded in millions of tiny chambers of the fibre-reinforced material. During operation, the bearing transfers lubricant onto the shaft to help lower thecoefficient of friction (COF). Unlike a sintered-bronze bushing, polymer bearings release solid lubricants as soon as the bearing or shaft is set in motion. The fibre-reinforced materials inside the bearing withstand any high forces or edge loads.

Obviously, the major benefits of such plastic bearings are that they are lubrication and maintenance-free, but they are also designed to maintain a low COF consistently over the lifetime of the bearing and offer corrosion and chemical resistance. Some of the latest materials from igus offer properties such as high wear-resistance, low deformation characteristics and a temperature resistance from -40 to +200°C.

But friction and temperature, of course, are far from being the only obstacles to effective bearing performance. Another recent material advance for bearings comes from Federal-Mogul, which has developed an innovative polymer coated bearing shell that can reduce fuel consumption and CO_2 emissions by withstanding mechanical loads produced by heavily boosted engines. Called IROX, the new technology addresses the lubrication challenges associated with frequent engine re-starts found in hybrid and other future stop-start engines by protecting both the crankshaft and the bearing shells from damage where metal-to-metal contact would otherwise occur. It is estimated that the IROX bearing overlay can help increase the life of crankshafts and bearing shells by more than five times in more extreme applications, such as direct-injected engines and engines with stop-start systems.

As engines are downsized but maintain their output through turbo-charging, the specific loads on the bearings increase. When hybrids operate in electric mode or when drivetrains using stop-start strategies switch off the engine, the crankshaft speed drops to zero. Without rotation, the crankshaft settles into contact with the bearing shells and the oil pump stops providing lubrication, allowing metal-to-metal contact and causing wear when the engine restarts.

The lubrication conditions at start up are very different from those that exist during high-speed, high-load operation. While solid lubricants or dry bearing materials are effective at preventing metal-to-metal contact at low running speeds, these conventional solutions are not suited to higher speeds, which require journal bearings with a generous lubricant supply. Federal-Mogul's new system combines the best features of both these established technologies by introducing a polymer coating for traditional metallic bearing shells, integrated with solid lubricants and wear inhibitors to produce a cost-effective, robust and production-ready solution.

NSK has developed TL (Tough and Long Life) bearing material to address the trend to higher operating temperatures in the dryer sections of paper making machines. Today, with the moves toward higher performance equipment, the temperatures in the hollow cylinder of the dryer section, through which steam or oil passes, can reach 180°C; and sometimes on newer machines, even 200-250°C.

These temperatures cause high thermal stresses, which can lead to fracture of the inner rings of the spherical roller bearings used in the dryer sections. During the drying operation, thermal expansion of the cylinder takes place. This increases the tensile stress on the bearing inner ring due to the temperature difference between the cylinder and the ring. Under these conditions there is a greater risk of failure due to inner ring fracture.

NSK has analysed the mechanism of inner ring fracture and established a strength evaluation method that has resulted in the development of the TL specification material. The TL specification is a special surface treatment of an original steel type. It attains both high raceway surface hardness and dimensional stability under high temperatures (up to 200°C), while at the same time having the same level of compressive residual stress at the raceway surface as conventional carburised steel.

The latter feature increases the strength against fracture performance commonly experienced with conventional spherical roller bearings. In fact TL specification bearings have higher strength against inner ring fracture than bainitic steel (austempered high-carbon chrome bearing steel) and bearing steel (hardened high-carbon chrome bearing steel) units.

The raceway surface hardness of TL material also exceeds that of bainitic bearing steel and carburised steel. This means that TL specification steel achieves a longer life, when foreign debris is present, than any of the other bearing steels.

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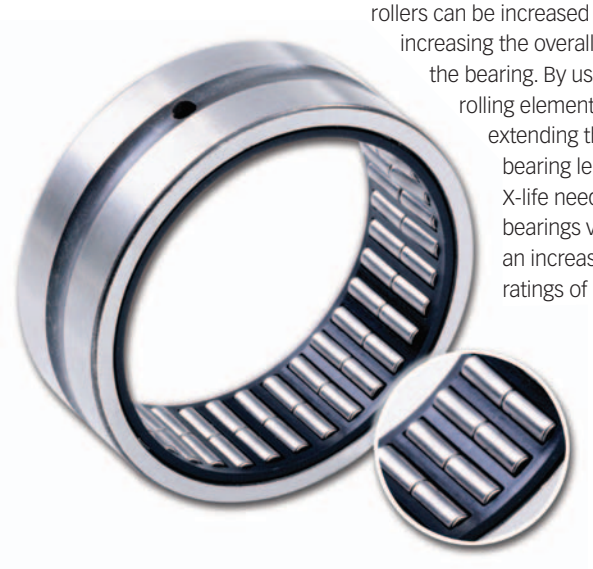
Needle roller bearings improve efficiency

***Eureka* looks at three high precision needle roller bearings that reduce friction and provide new downsizing options.**

Three new needle roller bearings unveiled by Schaeffler at this year's Hanover Fair include the X-life machined needle roller bearing version D; the X-life machined needle roller bearing with TWin Cage; and a slimline drawn cup needle roller bearing, which has a radial section height of just 1.5mm.

The new X-life machined needle roller bearings version D benefit from a new profiled steel cage.

This new cage provides a significantly higher load carrying capacity and is designed so that the number of needle rollers and the length of needle rollers can be increased without increasing the overall dimensions of the bearing. By using more rolling elements and by extending their load-bearing length, the new X-life needle roller bearings version D offers an increase in load ratings of up to 25%.



The new machined needle roller bearings with TWin Cage are manufactured in plastic and provide higher efficiency as a result of lower friction. Rather than a single long length needle roller, this new bearing uses two short needle rollers, which are inserted next to one another in a single cage pocket.

The third innovation is the new slimline drawn cup needle roller bearing, which also makes a significant contribution towards lowering friction and improving energy efficiency.

The radial section height of the new bearings is just 1.5 mm – a radical reduction in terms of slimline drawn cup needle roller bearings. For a drawn cup needle roller bearings with diameters from 15-50mm, a section height of 1.5mm is the current limit in terms of how small the bearing and cage can be manufactured. Currently, the smallest section height available from most other bearing suppliers is around 2.5mm.

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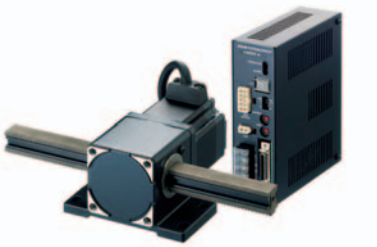

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Fuel economies of scale

Low carbon vehicles are increasingly going to market, with much of the innovation led by UK engineers. Justin Cunningham reports from the Low Carbon Vehicles Event.

It's an exciting time for the automotive industry. Many of the global OEMs are experiencing periods of rapid development and are continually rolling out new technology in an effort to reduce the tailpipe carbon emissions of their vehicles.

The industry has come under immense regulatory pressure in recent years and is currently working toward an average of 80g/km of CO_2 produced across a given OEM fleet of vehicles by 2020. This is couple with a demand by customers for more fuel efficient cars as the price at the pump continues to escalate.

At the recent Low Carbon Vehicles Event, it was clear that most of the OEMs are improving aerodynamics, lowering rolling resistance and using lighter materials. However, the most significant improvements are going to come from powertrain technologies. Most of the OEMs are working on three main areas of technology – internal combustion, hybrids, and electric powertrains – but there is far from a unified consensus about the best way to proceed.

Ford has committed much of its commercial effort to developing more efficient internal combustion engines. This, it says, will deliver low carbon vehicles to the masses – millions of customers – which will result in a greater reduction of emissions compared with the roll out of thousands of hybrids or hundreds of electric vehicles.

Ford has made considerable commercial efforts to develop more efficient IC engines.

"You can have any colour, as long as it is green," says Graham Hoare, executive director of powertrain engineering at Ford, deliberately misquoting the famous words of Henry Ford. "At its heart, Ford is a volume manufacturer and we believe that only by offering high volume affordable solutions to millions of customers are we going to make a difference."

Its ECOnetic range of vehicle technologies don't rely on different fuels, batteries or 'bolt on' hybrid motors to improve efficiency. Instead the refinement of the internal combustion engine, improved aerodynamics, lower rolling resistance, stop start technology, and an overdrive gear (effectively allowing a vehicle to cruise at sustained speed with reduced engine rpm) have yielded very impressive results.

"The new diesel Focus will achieve 89g/km of CO_2 - that's 83mpg, 3.4l per 100km - and the Fiesta 87g/km," says Hoare. "That effectively puts those products right into the heartland of all the hybrids. So you can get hybrid level function with conventional technology that is affordable and available to the masses."

The company has recently announced that it wants to do the same with its petrol engines. It has developed a small direct-injected, turbocharged 1.0litre 3-cylinder engine which Hoare hints will in the near future take the petrol engine in to the sub-100g/km of CO2 category.

The engine developed at Ford's Dunton Technical Centre in the UK, uses a compact turbocharger that is capable of reaching nearly 250,000rpm, which results in virtually no lag. The engine also features an

exhaust manifold cast into the cylinder head, which lowers the temperature of the exhaust gases and in turn enables the engine to run with the optimum fuel to air ratio across a wider rev band. The engine's bearings are also replaced with lower-resistance versions.

"Those changes will result in half of our vehicles by the end of 2012 being equipped with those technology features, and by the end of 2013 two-thirds of our vehicles sold in Europe will have those features," says Hoare. "That is a major step forward."

Ford is, however, continuing to develop both hybrid and electric vehicle technology and do plan to begin to roll it out toward the end of the decade when the market is more developed. However, smaller niche markets will serve as an important area to gain experience, and it plans to roll out a small electric commercial vehicle – the Transit Connect – next year, as well as gradually introducing various other plug-in and hybrid versions of its C-Max.

"The important thing is we must make these vehicles affordable," says Hoare. "We have a high volume opportunity here because we can use common platforms with the different powertrain technologies. That just about works for us at the moment, but as we go to the middle of the decade we think it will start to make a far more viable business case."

Nissan has opted not to use a common platform on its hybrid and electric vehicles

While Ford is opting to use a common platform on its hybrid and electric vehicle developments, Nissan has opted to develop a unique platform for its all-electric Nissan Leaf so it could package the batteries and other components of the electric vehicle perfectly. But it also wanted to give a clear message to the user that it is an all-electric vehicle, not a hybrid or electric variant of an existing internal combustion model.

"Clearly going forward we cannot sustain unique platforms," says Jerry Hardcastle, vice-president of vehicle design and development at Nissan. "The huge investment required for a platform means you need to use it for as many vehicles and as many powertrains as you can. As you watch Nissan models be introduced and developed in the future you will see platforms which can take diesel and gasoline engines as well as hybrids and electric versions. But that is for the future and not for today."

Just like Ford, Nissan is doing much of its innovation and design engineering in the UK. "We do the design from the sketching to the model making of the cars, in the UK," says Hardcastle. "You can already buy this car in the UK where it has been imported from our Oppama plant in Japan. But from 2013 we will start production of the Nissan Leaf in UK, including the batteries as well."

Jaguar Land Rover also has its own take on the future of low carbon motor and again agrees that the UK is a great place to do it, having had a number of successful innovations to talk about. Among them is the Range-E, a plug-in hybrid Range Rover capable of 89g/km of CO_2 and almost 700miles with the help of the 3.0 litre V6 diesel engine.

The Range-E will form the basis of the next-generation of Range Rover, due out in 2013, and will be the first car from Land Rover to go hybrid. One of the clever things about it is that the electric motor is housed within the eight-speed ZF automatic transmission.

But all of these developments are overshadowed by the C-X75 which is brimming with technology, from lightweight composites and aluminium, range extended battery technology, and plug-in diesel parallel hybrid technology. It also continues to research and develop the use of micro jet turbine engines developed by Bladon Jets.

Bob Joyce, group engineering director at Jaguar Land Rover, says: "The C-X75 will be the most powerful electric vehicle in the world and it will be manufactured in the UK in two years' time."

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The Range-E (above) will be the first car from Land Rover to go hybrid, while the Jaguar C-X75 (right) will, it is claimed, be the most powerful electric vehicle in the world

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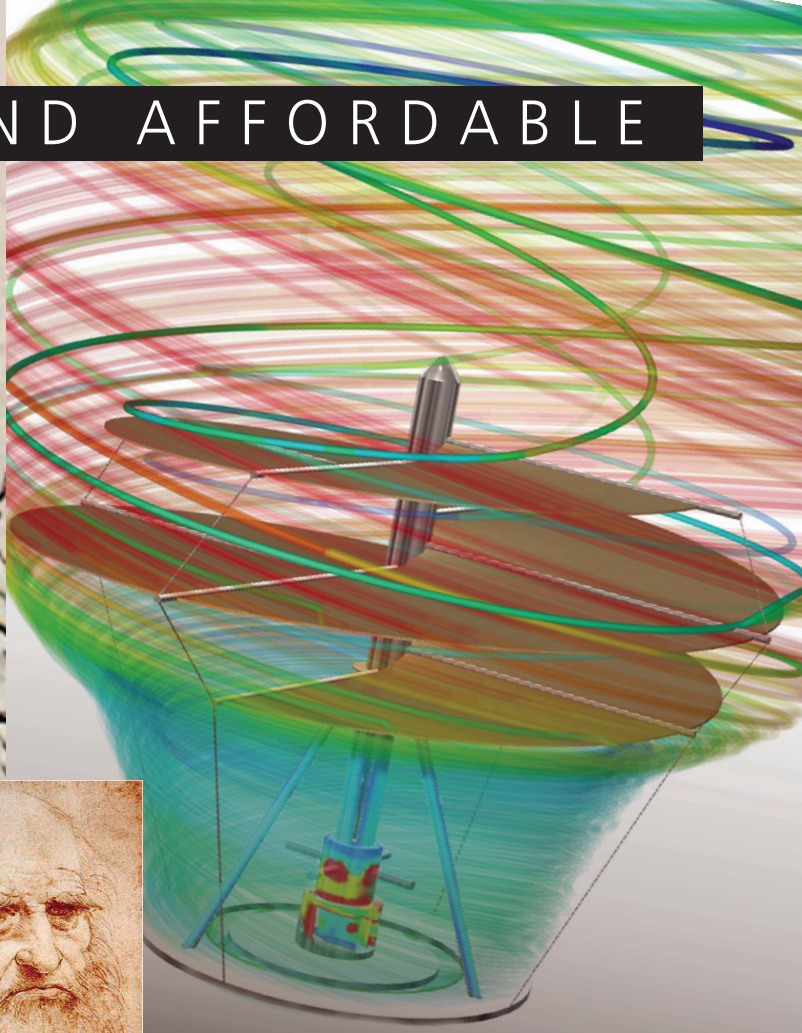

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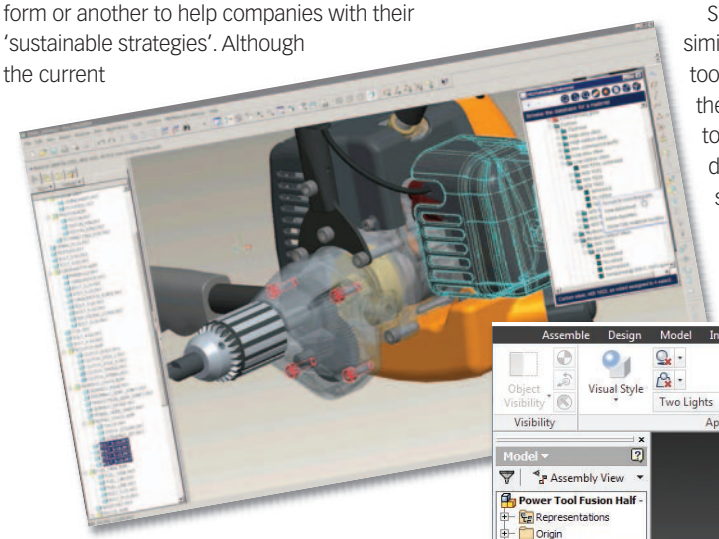
Better tools for conceptual design

Is sustainability something software can help designers achieve? Justin Cunningham finds out.

Balancing environmental impact with economic considerations is a difficult and constantly shifting trade-off. Sustainability is becoming an increasing driver and constraint for many designers and engineers. More and more legislation, regulation and compliance pressures affect which materials can be used, energy efficiency ratings, and disposal considerations.

To help design engineers, most of the software companies are adding functions in one form or another to help companies with their 'sustainable strategies'. Although the current buzzword of sustainability is being thrown around, it is at present more about compliance and minimising environmental impact in terms of CO2, material usage, energy efficiency, and making products safe and easily disposable. For most, true sustainability is more of a design ideal than a practical option.



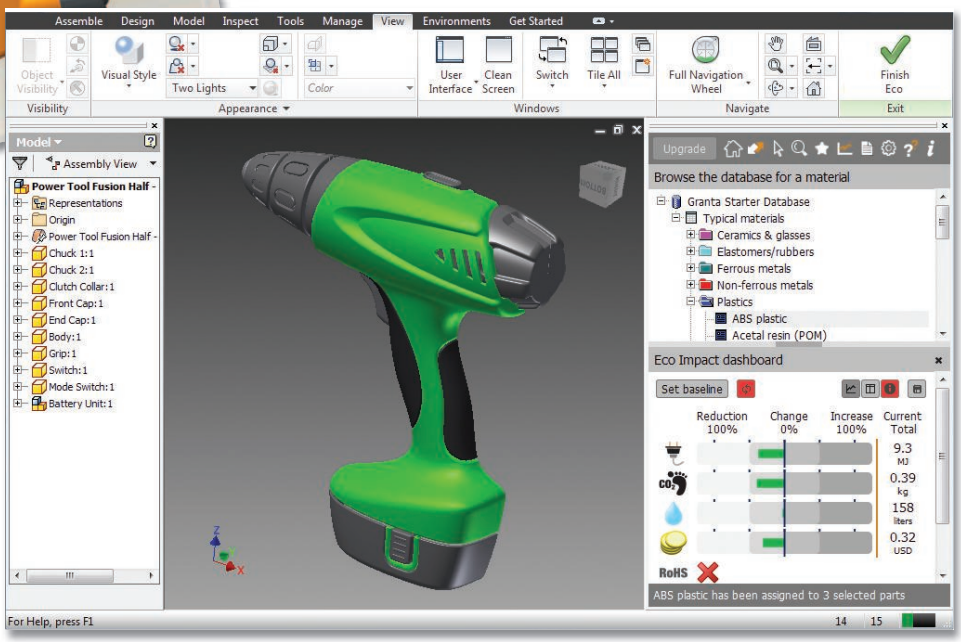
Eduard Marfa, EMEA marketing director at Siemens PLM, says: "About 60 to 70% of your product's environmental impact comes from decisions made in the planning stages. So if you choose the right materials and right supply chains at that time then you will end up building better products that are more environmentally friendly."

To date, much of the effort by design engineers has been in minimising the amount of material in a design, without sacrificing the mechanical properties a component might need. This has predominantly been done through finite element analysis (FEA), which has allowed different materials and geometry to be assessed for a level of optimisation. Other simulation tools can help to assess friction, optimise bearings, and other moving and mechanical parts.

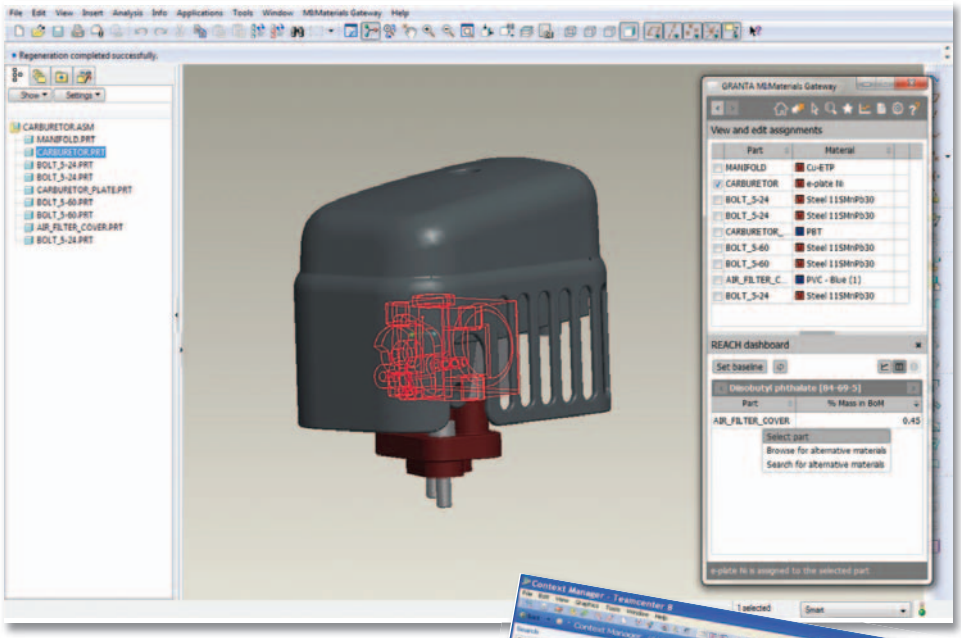
Siemens PLM, like many similar systems, has a lot of tools to help audit parts and the bill of materials (BOM) to make sure products don't contain prohibited substances and, if they do, make sure they can be tracked as this impacts manufacture and disposal. Increasingly, standards such as RoHS, mean companies must track not just four or five dangerous substances, but over 3000 different materials.

One shift that has been seen and given a lot of help from CAD companies has been the use of all these design tools right at the front end, as part of the conceptual design phase. Autodesk vice president of suites and web services, Andrew Anagnost, says: "These things have always existed but have become much more important. They are being used much earlier in the design process as disposal and energy standards have become more and more rigid. Material selection is also very important. There are all sorts of things in terms of compliance and life cycle considerations when selecting materials."

Autodesk has recently announced that it is to include an 'Eco Materials Adviser' in its 2012



A number of software companies have inclided sustainability modules in their offerings

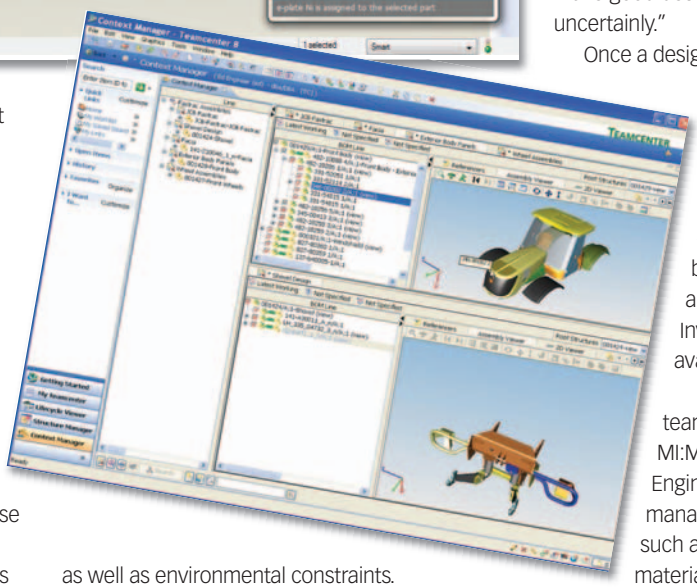


version of Autodesk Inventor. This will allow designers to quickly view information about not just the mechanical, thermal and optical properties of a material, but also detailed information on its environmental properties. It can be used on both individual parts and full assemblies and is accessed on an easy-to-read dashboard display that shows key indicators such as energy usage, restricted substances, CO2 footprint, water usage, and materials cost.

The software has been developed in partnership with Granta Design, which was spun out of Cambridge University in 1994. Its material database – called the Materials Universe includes data on ceramics and glasses, fibres, composites, foams, natural materials, all classes of metals and alloys, all plastics and elastomers and is continually updated and by a team of material and lifecycle assessment professionals developing and improving it.

Dr Jamie O'Hare, eco design product manager at Granta Design, says: "The unique thing about this database is that for all the 3000+ materials in this database there are a complete set of engineering attributes including Young's Modulus, tensile strength, yield strength, thermal properties, and optical properties.But now we have added environmental properties, so embodied energy to produce a kilogramme of a material, CO_2 footprint to produce a material."

The result is the ability for engineers to specify all the important constraints in a design specification both in terms of physical properties as well as environmental constraints.



You can search for materials for which are food-contact compatible and RoHS compliant, the amount of recycled material routinely included in 'virgin' material t or CO_2 emissions per kg of material produced.

"So if you search for materials with a recycled content of over, say 5%, you know that it is technically feasible to recycle, and also the infrastructure must be in place to actually do the recycling," says Dr O'Hare. "We think this is more valuable than a simple tickbox which says 'recyclable' because there are many materials that can be recycled but it is not economically feasible or practical to do so."

The environmental data provided is pretty accurate, but is generic, and will also be quoted as a range alongside a percentage that represents the degree of inherent uncertainty of the data. It does not, for example, go to the plant or country level where a raw material might originate but will give an average account of what, typically, a given material has in terms of environmental impact properties.

"That is still good enough because of where it is being used in the design process," argues Dr O'Hare. "The difference between materials made in China or Europe is relatively small. But the difference between a steel and aluminium may be orders of magnitude. Therefore, in the early stages when you are assessing entirely different concepts, differences of ±20% should not be considered significant as there is a degree of inherent uncertainly in environmental data anyway, you simply can't provide that level of detail in environmental data. But it is possible to make good design decision even with that uncertainly."

Once a designer has assigned materials and processes, an initial assessment can be run via the dashboard in Inventor. Once the baseline calculation is set, the materials can be changed and the difference can be assessed. The base version is being shipped as an integrated part of Autodesk Inventor 2012 with the full version available as a paid for upgrade.

Last year, Granta Design also teamed up with PTC to develop its MI:Materials Gateway for Pro Engineer. The software aims to manage a firm's material information such as results and analysis from material tests, research, and previous project experience. Again, it is hoped this can then be used for better early design assessments; economic and environmental data on materials; and information on the restricted substance status of materials.

These tools are helpful first of all as a means of enlightening engineers about new possibilities in terms of the structure or material of a given design brief. In addition, they are increasingly giving engineers an insight in to Life Cycle Assessment of conceptual designs which should act as a guide to inform them, at the early stages, how to make 'sustainable' decisions.

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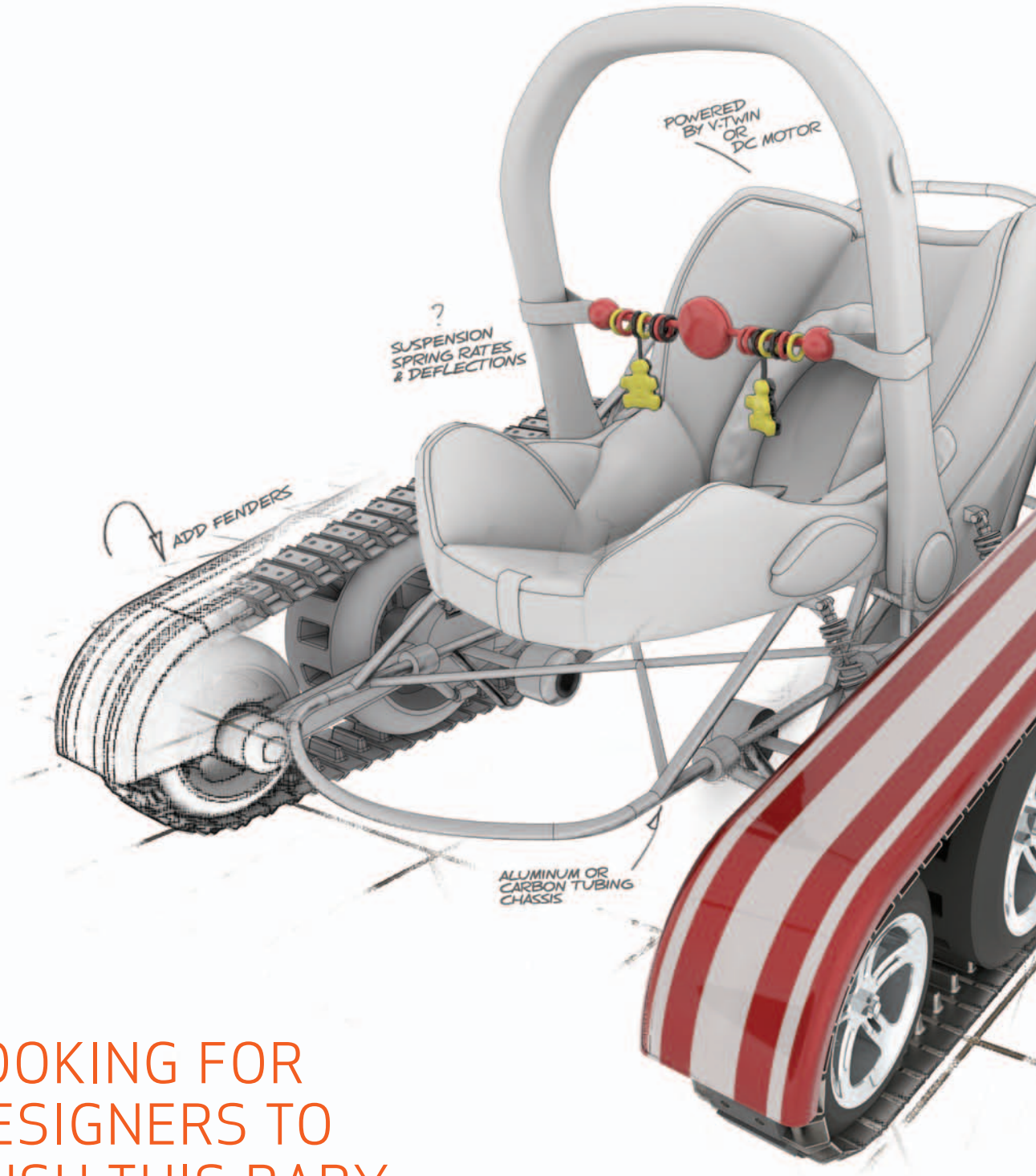

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SOLIDWORKS

New materials at Composites show

The Composites Engineering Show 2011 will be showing some of the latest developments in this exciting sector. Paul Fanning reports.

Hosted as part of the Advanced Engineering UK group of events at the NEC Birmingham on 9 – 10 November 2011, The Composites Engineering Show has doubled in size since the inaugural 2010 event. With a record take up of stands, the event will be the UK's largest and most comprehensive showcase for composites design and manufacturing, and supply chain capability.

This is the UK's only dedicated trade show for the composites industries. A number of new names are featured on the show floor including Euroresins, Evonik, Crompton Technology Group, AMRC, Dynabrade, AH Composites, Alpha/Delta Composites and Huntsman, to name but a few. The presence of more than 160 dedicated composites supply partners on the show floor, including such key sector players as epm:technology, Lola Composites, Norco, Formaplex, Atlas Composites, Composite Materials Ltd, Dassault Systemes supports event organiser Ian Stone's comment that "the outstanding uptake on stands at this year's event demonstrates the industry's appetite for a dedicated 'national' networking, business development, technology solutions & transfer environment that is geared to the UK's diverse composites user industries; from high volume consumer products through to high performance advanced engineered products."

International Innovative Technologies has pioneered new technology for the grinding of composites, raw materials and minerals into fine powders.

Attendees at the 2011 Composites Engineering Show will benefit from access to some 300 exhibiting organisations throughout the Composites and the co-locating Aerospace, Energy and Plastic Electronics events at Advanced Engineering 2011. Additionally, attendees can sit in on a hugely expanded programme of free to attend industry strategic and technology presentations from key industry stakeholder and supplier groups.

These include the Composites UK-hosted 'composites in industry' sessions with feature sessions on the show floor for energy & renewables, medical & healthcare, transportation, marine, construction, automotive and performance sport & leisure.

Further free to attend show floor programmes in the hall include daily NetComposites-hosted technology sessions and, in the separate Congress auditorium, the two-day parallel UK Composites Industry sector briefing, hosted by CompositesUK and providing a unique visionary and strategic overview of industry trends, the shape and direction of the UK composites industry, developing opportunity streams, challenges, technologies,

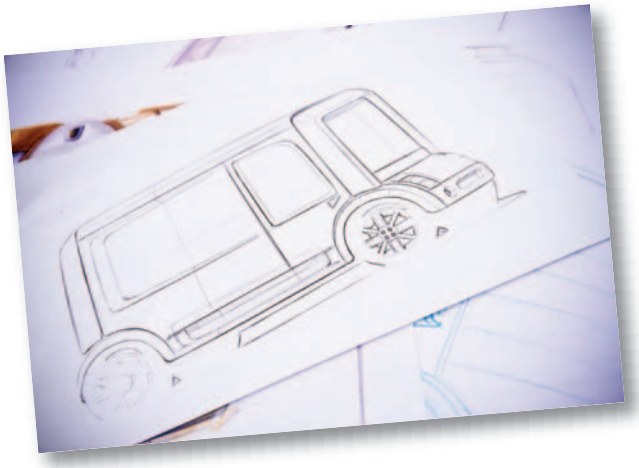
SGS Carbide Tool (UK), was first to the market with a dedicated carbon composite router

and skills requirements.

Composites UK is sponsoring the show again in 2011 and is working with the show organisers to ensure another successful UK Composites show. At the show Composites UK will be sponsoring the Industry briefing session, organising industry application forums over the 2 days and presenting a training review. In addition we will be presenting at the Aerospace and Energy forums.

Composites UK members exhibiting at the show will be highlighted in a special feature section in the show guide. An advanced engineering programme initiated by the Technology Strategy Board (TSB) is also set to be a highlighted theme setter for industry briefings at the show.

The UK is a world leader in many benchmark-setting engineering disciplines of the future, not least of



Huntsman's presentation will discuss the possibilities of building an electric concept car using environmentally sustainable components and processes

which is composites engineering. A great deal of that leadership derives from a national technology strategy that is not just supportive of work underway today but, as importantly, is prepared to invest in programmes to strengthen UK capabilities and to explore wider fields of application for those capabilities: in short, to establish leadership positions in the advanced engineering disciplines of tomorrow. One great example of this in recent times has been the £10 million i-Composites programme of collaborative research and development co-funded by the Technology Strategy Board (TSB) and 22 programme partners from a variety of market sectors, supply chain positions and scales.

During the year to 31st March 2011, partners in the i-Composites programme pursued research and development programmes across six main, and sometimes overlapping, activity streams in automation, energy reduction, materials, process time reduction, sustainability, and simulation. The overall intention with the i-Composites programme was to accelerate capability maturity across the Technology Readiness Level 3-6 band, from basic research to the point of demonstration using the collaborative nature of the programme to deliver rapid

technology capability advances; compressing into 12 months, work that might have otherwise taken years. And although all of the technology developments covered within the programme are rooted firmly in enhancements to current industrial processes, they are still just one step removed from being totally accessible to the composites value chain and hence are providing a very useful starting set of projects for the National Composites Centre (NCC) as they represent the current hot topics in composites within the UK

Programme partners included GKN Aerospace, leading the project; Bombardier Aerospace with Loop Automation and Kuka; Aircelle; Sigmatex; ACG; EPL Composite Solutions; Frazer Nash; and a dozen more. All have contributed to this powerful expression of UK engineering future-ready excellence, culminating in a presentation to the Composites Grand Challenge in Action event on 20th July 2011 at the newly opened National Composites Centre.

The marine sector is a key one for the composites industry

The Technology Strategy Board is now interested in using this Grand Challenge model in other areas of UK industry to stimulate the same sort of coordinated momentum that is evident within the composites sector.

Another aspect of the Advanced Engineering UK 2011 group of events is the bespoke online B2B Meetings Portal.

When pre-registering, attendee groups are asked for a few pieces of information regarding the nature of business – key sectors & key words. Attendee groups receive a link to the portal, enabling search and selection of up to 10 companies that they would like to alert to their presence & request a meeting.

The networking portal then alerts each pre-registered attendee from the selected companies with an email containing the requesting party's name and details, stating the request to meet them at the show. The way is then open for attendees to contact one another to meet.

No personal contact details are available (via the portal) and it is the prerogative of the 'contacted' parties to provide back personal contact information, should they accept the meeting request.

www.compositesexhibition.com

www.beeas.co.uk

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Diary date: 13th October 2011 - Shakespeare's Globe, London

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READER INTERVIEW

TRISTAN JONES, TECHNICAL MARKETING TEAM LEADER, NATIONAL INSTRUMENTS

Q How did you first get into engineering?

A I was always interested in Maths, Science, and Computing. But, there is definitely an aspect of being hands on with technology that I always found very engaging and exciting. I always found it fascinating to understand how things work and playing with technology. And that was cemented officially when I signed up to do my Master's degree in engineering at the University of Birmingham.

Q What are the most interesting projects and technologies you have worked on?

A My role as an engineer at National Instruments has certainly exposed me to a lot of fantastic projects that engineers have been working on in the UK. The Racing Green Endurance project at Imperial College was based on the SR8 petrol powered Supercar. It was converted to an all electric vehicle and then drove the whole length of the Pan-American highway. They used some of our tools as part of that and we were involved in helping them with part of the project.

David Kennedy from the University of West Scotland, worked on creating some solar and wind-powered clinics for Malawi for the provision of medical supplies to refrigerate vaccines and inoculations. We helped him maximise the efficiency of the plant and ultimately re-design it so it could be manufactured using lower tech, local materials.

Q Are there any technologies you see as being revolutionary?

A We are at a transition point when it comes to the way we access and consume information. We are now adopting different ways to interact with technology from the transition of the keyboard to more gesture based systems and touch screens. This will have an impact on engineers in the way that we consume information, expect to get information and also assess the tools we need to develop and design engineering applications.

Cloud based technology will lead us in to a petabyte age of data which will allow us to approach problems in a different way. Rather than modelling them, you would take huge amounts of data to simulate exact conditions. For example, a bridge might have a large number of sensors that could capture data over a large period of time and provide it to structural engineers who can then use that to significantly improve the way they simulate and model a structure's design in the future so it can be more resilient and structurally sound in deployment.

Also there is the concept of the 'Internet of Things'. For example connecting your fridge to your internet shopping, your oven and your heating system, so they are all automated and managed by a centralised computer system. The concept of having ubiquitous sensors in countless different locations which are accessible and published globally through the internet to cloud-based services opens up a whole different world of developing things.

Q What is the biggest issue facing your industry?

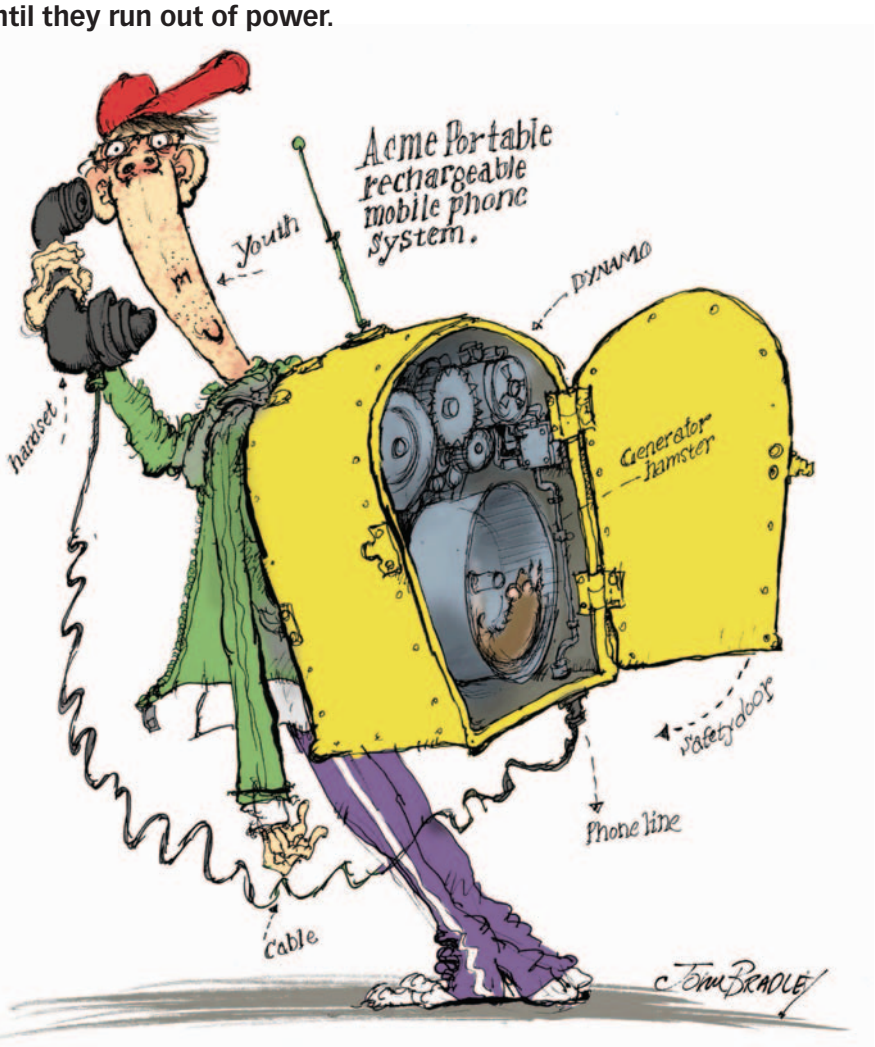
A The biggest issues in scientific and engineering disciplines is more socially stated; excitement about engineering and the requirement for more ambassadors. The Bloodhound team, Sir Richard Noble and Andy Green, are passionate about this cause, to actually build excitement around engineering and what it is really about, and getting the schools involved and teaching people about engineering. Elevating the excitement around these topics is a big part of what we need to do in the UK to retain people and build the next generation of that talent. Those are the people that are going to be able to realise solutions to the big engineering challenges that we face, like how are we going to feed everyone and where is our energy going to come from; making fission a reality and solar power efficient.

Q What advice do you have for younger engineers?

A The young engineer needs to be passionate about what they do. That enthusiasm will undoubtedly work wonders along the career path and open up opportunities, but will also help fulfil that gap that we have in the UK in terms of ensuring that engineering continues to grow.

Staying power

Mobile devices are great – until they run out of power. How can this be prevented?



One of the less pleasant side effects of the revolution in mobile devices over the last two decades has been the all-too-familiar sense of dread that afflicts users when their MP3 player or mobile phone's battery indicator move into the red.

Of course, this problem is addressed in many environments. In our cars we now have chargers that keep our devices topped up, while in offices it is far from unusual for visitors to ask to 'steal' some electricity to charge their smartphone or tablet computer. There are even paid-for charging points available in places like motorway service stations and exhibition centres. Nonetheless, places remain where recharging one's device is not possible.

For this reason, a number of companies offer battery-powered emergency charger for various devices. However, these have the disadvantage that they must be charged themselves or use disposable batteries. This essentially just moves the problem of maintaining a charge from one place to another rather than actually offering a long-term solution.

Another factor militating against these solutions is their environmental impact, with fossil fuels being consumed by a mains-powered charger and chemical batteries having problems relating to disposal, it seems clear that something more sustainable is required.

The Challenge

Our challenge this month, then, is to device a means whereby your mobile device can be charged renewably and without recourse to another mains-charged device or to chemical batteries.

Several possibilities suggest themselves. Solar power, for instance, would seem like a good idea – but for the fact that it relies on there being sunshine, on the photovoltaic unit not being too heavy, cumbersome or – perhaps most importantly of all – expensive.

Perhaps another renewable power generation method is the answer, then? Wind power. However, tempting though it is to imagine people walking around with their phone or MP3 player hooked up to a miniature wind turbine kept somewhere about their person. However, it seems fair to suggest that such a solution would not only be rather awkward (and even dangerous), but that it will certainly present something of a challenge in terms of marketing to the general public.

A commercially-available solution does exist that uses some ingenious and innovative engineering to achieve this end and we will publish it in our November issue. However, in the mean time, see if you can come up with something better.

The answer to last month's coffee time challenge of how to keep a swimming pool warm without applying an external heat source is in our Technology Briefs section on page 9

Adhesives

Radically Improved Instant Adhesive

Loctite 3090 is a clear, two-part cyanoacrylate that increases the versatility of instant adhesives. Alongside traditional benefits, 3090 allows exposed adhesive outside of the joint to harden within minutes – removing the need for a post-assembly activator. Gap sizes up to 5mm are readily accommodated and the gel viscosity means it's suitable for vertical or overhead application.

It can be used on plastic, rubber, wood, stone, leather, fabric or metal and can withstand a force of 20N/mm². Easy to use, 3090 comes in a pack containing a dual syringe with seven mixer nozzles – and no application gun is required.

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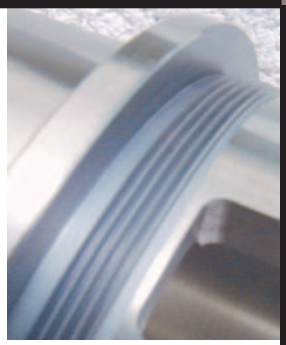
WS2 Stops galling of SS and Titanium



Stainless Steels and Titanium are both prone to galling and seizing. WS2 is a very low friction dry lubricant surface treatment, developed by NASA for use in deep space. It has been shown to provide a very cost effective solution, preventing both problems on threads and other sliding surfaces.

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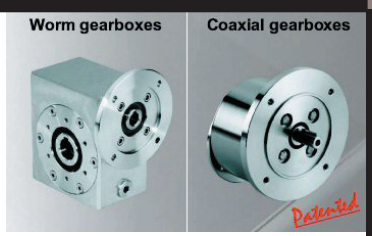
Gearboxes

Davall Stock Gears introduce two ranges of standard gearbox, specifically designed for harsh environments applications.



Constructed with a SMOOTH, FULL STAINLESS STEEL HOUSING (304), fully sealed, lubricated for life and pressure leak tested, and designed to be close coupled to a stainless steel AC motor.

The two styles of gearboxes have a large choice of reduction ratios available, worm series (right angle) from 7:1 up to a nominal 100:1, and helical series (co-axial) from 3:1 up to 60:1, with power ratings up to 4Kw.

@: dsg@davall.co.uk
✆: 01707 283131

www.davall.co.uk

Sensors

Miniature RH Sensor from Michell provides reliable measurements in high humidities

Many RH instruments installed in high-humidity applications suffer from poor reliability because the electronics are exposed to the harsh, damp environment.

The miniature PCmini52 probe from Michell Instruments overcomes this problem with electronics that are encapsulated in a protective resin and so are completely protected from the atmosphere. This gives the instrument an IP65 rating and enables the probe to provide reliable measurements no matter how high the surrounding humidity.

The PCmini52 humidity transmitter uses a capacitive thin-film polymer sensor which either absorbs or releases water vapor as the relative humidity of the ambient air rises or drops. These sensors, developed by Michell's Coreci division, offer both a fast response and excellent sensitivity to fluctuations in humidity.

@: uk.info@michell.com
✆: +44(0)1353 658 000

www.michell.com

Sensors

OEM Pressure Sensors Offer Excellent Media Compatibility and Many Custom Options

Sensortechnics' new KMA series measures gage pressures of corrosive and aggressive gases and liquids in ranges from 500 mbar to 100 bar. These pressure sensors utilise internal digital signal conditioning to deliver calibrated and temperature compensated 0.5...4.5 V output signals. The KMA sensors are based on very accurate and long-term stable ceramic pressure cells with excellent media compatibility. The small stainless steel sensor housing with a G 1/8 (BSP) threaded pressure port is ideally suited for space-saving integration into demanding OEM devices and machines.

@: uk@sensortechnics.com
✆: 01788 560426

www.sensortechnics.com/kma

Sensors

Minding the Labelling Gap with new Sick WFS Fork Sensor

The new WFS Fork Sensor launched by SICK (UK) brings new precision to label printing for packaging and other production operations. Designed specifically to be mounted at the outlet of the label dispenser, it accurately detects label location and interval on the substrate, allowing rapid adjustment to different label runs with exceptional repeat accuracy.

The SICK WFS's compact design provides edge detection of non-transparent labels on different web materials, and also double sheet fed incidents. The 50µs response time ensures rapid reaction at high web speeds, and fast response to adjustments.

@: andrea.hornby@sick.co.uk
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EUREKA JOBS

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Hardware Test Engineer - Oncology, Electromechanical

Location:Crawley,West Sussex
Type: Contract
Salary: £14-£16 per hour (neg)

This role requires a candidate who is a qualified Engineer with a degree in Electrical or Mechanical Engineering, or similar discipline. In this role, you will be joining an existing, well established and successful engineering team, developing cutting-edge medical technology in the oncology business area.
The particular project (developing an exciting, new and highly innovative electro-mechanical system for the treatment of cancer) is in the later stages of development, but still requires a lot of testing before it can be released as a medical device.

In general, you will be a highly motivated, methodical and organised person, who can work well under pressure and deadlines within a larger team of development engineers.

For full details online enter reference: JS788

Multiple Mechanical Design Engineers

Location: Birmingham area
Type: Contract
Salary: Very good – hourly

Multiple Mechanical Design Engineers are required by a leading automotive giant, based in the Birmingham area. The key requirements for this role are:

- **A minimum of three years' experience of Mechanical CAD**
- **Catia V5 experience**
- **Mechanical design experience in the automotive industry would be benefical**

Other skills and know-how relevant to this position would also be an advantage. The vacancy is for a duration of 6-12 months, with good hourly rates of pay. Start as soon as possible.

For full details online enter reference: JSMECH

Design Engineer/ Draughtsman

Location: Sheffield, South Yorkshire
Type: Permanent
Salary: £26,000-£30,000 pa

Located in Sheffield, this large engineering and design firm is looking to appoint a skilled Design engineer/Draughtsman, with experience of 3D, SolidWorks or Inventor. Reporting to the Technical Manager, the successful candidate will have experience of medium to heavy engineering environments.

Some of the key requirements for this role are as follows:

- Qualified to degree level/HND/HNC in Mechanical Engineering
- Genuinely competent on 3D Solidworks, Solid Edge or Inventor
- Must have medium to heavy mechanical engineering background
- Demonstrable background in layouts, design, assembly and detail drawing, using 3D package, including mechanical/electrical/hydraulic drive systems

For full details online enter reference: JS-.DESENGDREAFT

Mechanical Design Engineer

Location: South Devon
Type:Permanent
Salary: £28,000-£32,000 pa

A leading manufacturing company in South Devon is looking for a Mechanical Design Engineer to work within their design team.

The main function of the role will be to work on a variety of new and existing products, using SolidWorks. This will include using conceptual design work; speaking with suppliers to meet costs, quality and design requirements; and working with manufacturing to problem solve and partake in continuous improvements activities.

In order to be considered for the role of Mechanical Design Engineer, candidates will need to have strong 3D Design experience within a mechanical engineering environment.

For full details online enter reference: JSLS/HQ00044190

Lift Mechanical Design Engineer

Location: Cheshire
Type: Permanent
Salary: £35k per annum + Benefits

As a Mechanical Design Engineer, you will develop engineering and design solutions for both current and future projects, from feasibility through to production, using CAD systems (ProE Wildfire 3.0).

You will prepare illustrations for use in manuals, maintain technical files & documentations, and arrange prototype parts and materials. As part of a multi-discipline engineering team, you will run test programmes, analyse structures & mechanisms, and ensure all designs comply with current legislation and company standards. You will work closely with the engineering fitters to produce prototypes of your designs.

The ideal candidate will have a proven ability to generate innovative ideas and concepts, and be able to transform these into detailed designs, taking them through to manufacture. The successful applicant will also have 'hands-on' practical mechanical experience and knowledge of resolving engineering problems, such as repairing/restoring vehicles or other mechanical devices.

For full details online enter reference: JS-.1108-26

Mechanical Design Engineer

Location: West Yorkshire
Type: Permanent
Salary/Rate: £30,000-£38,000 pa

The requirements for this role include the following:

To produce high quality mechanical designs to given standards, ensuring Department/Project timescales are met; Ensure the mechanical components fulfil required technical specifications. This will demand good communication with all relevant departments, manufacturing or any relevant third party; Ensure any reported problems/queries from sources, both internal and external of the company, relating to mechanical components are addressed to ensure appropriate corrective action is taken, where required; Participate in, and contribute to, formal design and project reviews, which may require international travel to customer/supplier locations.

Also, to: Assist in the definition, improvement and promotion of defined quality standards and design guidelines; Assist in mentoring and developing other Mechanical Design team members; Provide technical expertise on Mechanical Design/Engineering technologies to all parts of the business; Collaborate with off-shore mechanical support engineering resource to achieve time-to-market targets.

For full details online enter reference: JS-.11-04342

Design Engineer

Location: West Midlands
Type:Permanent
Salary: £28k-£33k per annum + Benefits

This client, a leading UK defence and aerospace organisation, is looking to take on a mechanical design engineer as a result of continued capability growth. The successful candidate will be responsible for the design, development and qualification of hydro mechanical units and the mechanical packaging solutions for electronic control units.

Responsibilities: Production of concept designs, developed from information provided by performance engineers and design schemes; Provide support to both internal manufacturing engineers and external suppliers; Development of installation solutions to meet the needs of external and internal customers.

Skills and experience:

- Engineering degree in a relevant field or equivalent level of experience
- Previous experience of designing and detailing hydraulic, fuel control, pneumatic, pumping units or electronic enclosures

For full details online enter reference: JS-.J107016A00138522

IVVQ Assistant Manager

Location: Cheadle, SKP
Type: Permanent Salary: Negotiable

This position is for a self-motivated, innovative person, who is able to exercise initiative. The purpose of this role is to contribute to all aspects of coordinating site system integration and system testing, including writing of the test specifications, task briefs, method statements, conducting the testing, recording the test results and reporting defects.

Background: Thales will supply a new SCADA-based transportation control system and other associated systems in a programme extending over several years. The equipment to be integrated and tested includes SCADA, Radio communications, PLCs, RTUs, Passenger Information Displays, Passenger Address equipment, LAN/WAN equipment.

Essential experience: Production & execution of test specifications; Raising of defects; Full test cycle experience; Team Management.

For full details online enter reference: JS1104837

Engineering Project Manager SRMT

Location: Gloucestershire
Type: Permanent
Salary: £40k-£52k per annum + benefits

The Safety, Reliability, Maintainability and Testability Engineering Project Manager will demonstrate project management leadership in communicating business goals, programs and processes for an area or business segment. In this role, you will utilise your experience or expertise to solve problems, develop and execute objectives for self and others, and have the ability to effect short-term and long-term business goals.

Responsibilities: The SRM&T Engineering Project Manager will act as the technical authority on assigned projects, reporting directly to the Program Manager for the planning, execution and completion of assigned tasks. The SRM&T Engineering Project Manager is responsible for the technical completion, plan, schedule and control of a project that is compliant with established organisation policies and procedures. The day-to-day responsibilities for this position will be 50% project management and 50% technical work.

For full details online enter reference: JS-.J110005A00138450

Hardware Engineer

Location: South West
Type: Contract
Salary: Negotiable

This client has an immediate requirement for a Hardware Engineer to join their development team for a 3-month contract, based in the South West.

For this position, it is essential to have experience with Analogue Design, Digital Design, Serial Interfaces and Microcontrollers (ARM).

This is an all-round role, so knowledge of all of the above will be required. Experience with DC-DC converters or low-level power supplies would be an advantage, but not essential.

For full details online enter reference: JS-.HWSW1

Product Manager

Location: Peterborough, Cambridgeshire
Type: Permanent
Salary/Rate: Up to £50k + Benefits

As Product Manager for this highly successful electromechanical company, you will be responsible for the management of their wireless electronic devices, and ensuring that the development and implementation of company strategy is met. You will be developing product roadmaps, preparing product proposals and executing market introduction.

Candidates for the position will ideally be qualified to degree level or equivalent in electronics or similar, with proven experience in a Product Manager position. Knowledge of wireless devices, such as mobile devices, communication technologies, broadband or defence, would be beneficial, as would experience of software, hardware and device development.

On offer is a competitive package, including fantastic benefits. This role involves 20% European travel.

For full details online enter reference: JSMT/HQ00043994

Component Engineer

Location: Crawley, West Sussex
Type: Permanent
Salary: Negotiable

The successful candidate will be working within the Radio Communication Product business segment, within Defence Security/Air Operations domain for Thales UK. The primary purpose of the role is to technically support the RCP project portfolio, including new design work and maintenance of existing products and systems.

Principal Relationships: Line management by Hardware Manager (Crawley); Routine tasking by project manager(s); Routine oversight by technical lead(s); Work closely with other technical and non-technical staff on project teams.

Key Tasks: Electronic design: digital and analogue technical assistance to production; Preparation of design documents; Presentation at design reviews; Test and measurement; PC/Software skills: Word, Powerpoint, Cadence design tools, Excel.

Additional Information: Educated to degree level, with supporting experience of design and engineering; Ideally, already cleared to SC or able to achieve (full or partial) security clearance.

For full details online enter reference: JS1103218

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