

EUREKA

THE MAGAZINE FOR ENGINEERING DESIGN

In this issue: Drives, Controls & Automation • Sensors, Test & Measurement • Rapid Prototyping

Mind the gaps

How human factors engineering mitigates the 'Swiss Cheese Effect'



ALSO IN THIS ISSUE:

Engineering Design Show 2014 Preview

SOLIDWORKS 2015 LAUNCH EVENTS

INSPIRING INNOVATION

REGISTER FOR THESE EVENTS AT:
www.solidsolutions.co.uk/sw2015

ABERDEEN
30/10

GLASGOW
29/10

DARLINGTON
07/10

HUDDERSFIELD
14/10

GAYDON Warwickshire
06/11

Guest Speaker
RICHARD SEYMOUR
of **seymourpowell**

CAMBRIDGE
11/11

LONDON
10/11

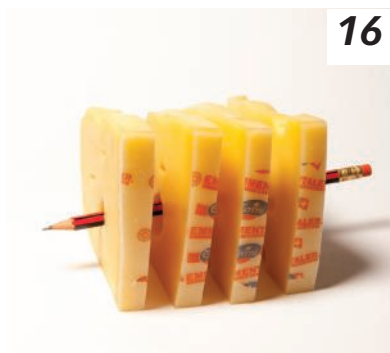
KENT
12/11

SOMERSET
13/11

SOUTHAMPTON
22/10

Register at: www.solidsolutions.co.uk/sw2015





16

16 Cover Story: The human factor

Human factors is a phrase often used in engineering circles, but one perhaps whose implications are not always clearly understood. Paul Fanning finds out more.

20 Interview: Dr Patrick Finlay

Engineering and medicine are increasingly indivisible, with biomedical engineering being at the forefront of this shift. Paul Fanning talks to one of the discipline's leading advocates.

51 Shifting the paradigm

Additive manufacturing is changing not only the way things are designed and made, but also the nature of the things that are being made. Paul Fanning reports.

55 Sensors – an integrated approach

In the search for ever more efficient automation, sensors have a major role to play. Here, Eureka talks to Omron about the value of increased integration.

57 Laser Tracker aids JCB

The FARO Laser Tracker Vantage helped JCB to generate traceable certificates for jigs and fixtures calibration procedures. Here, Paul Fanning reports.

61 Inverters turn it around

Inverters and VSDs can make a huge difference to the energy efficiency of virtually any company using electric motors. Paul Fanning looks at the latest developments.

64 Drives, Controls & Automation Briefs

5 Comment

Life-changing decisions

7 News

BEEAs 2014 shortlist announced

Planes to get 'smart skin' that can detect damage

11 Technology briefs

Hospital saves £15,000 using VSDs

A compact and robust offset drive

Subsea vibration suppression system

Smooth positioning with linear actuator

Maintenance-free couplings

High-res, low-cost IR thermal imaging camera

66 Coffee Time Challenge

This month's Challenge is to design a compact dryer that doesn't just work on the hands, but the entire body.



20



51



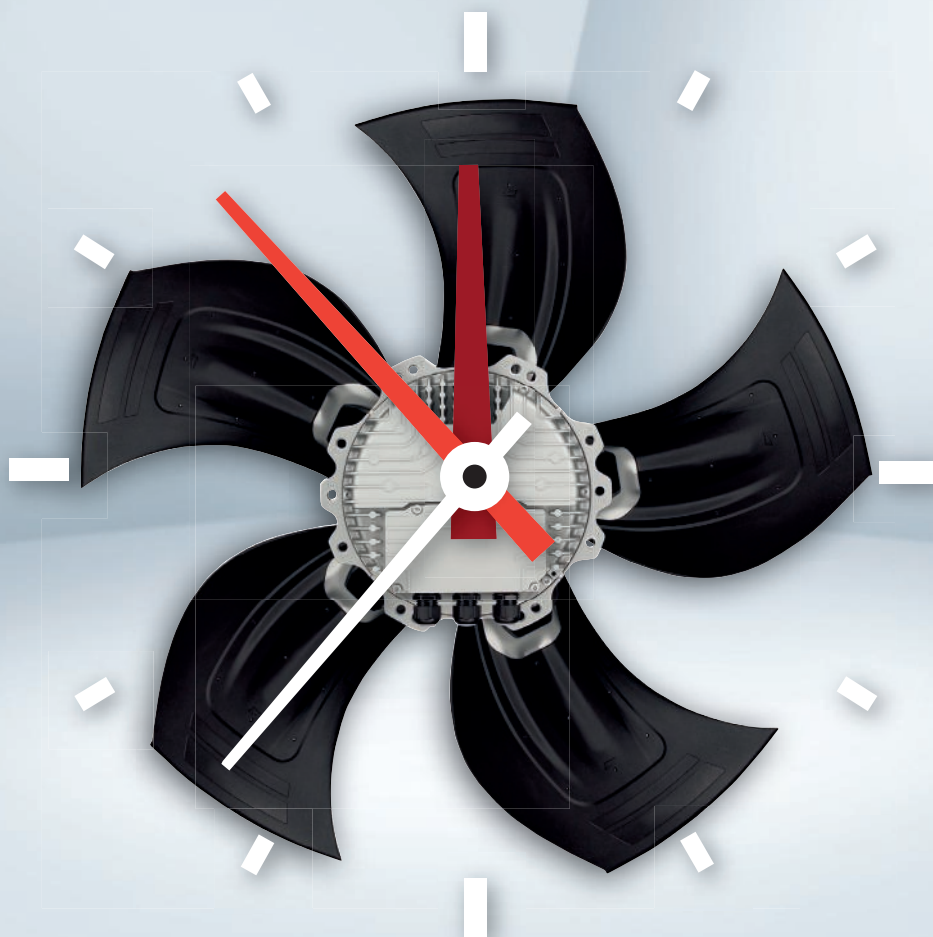
55

Engineering design show PREVIEW CONTENTS

Welcome	25
Ones To Watch	27
Conference Programme	28
Workshop Programme	30
Features/Innovation Zone	33
Electronics Design Show	35
Exhibitor Preview	37
Exhibitor List	49



2015 ErP fan compliance



Act now

The clock is ticking... the new ErP Directive on fan installations is nearly here. Thankfully, there is time to update your portfolio ahead of the January 1st deadline. With our compliant range of AC and EC fans we are able to deliver unrivalled expertise and market proven energy efficient solutions to meet your needs. Are you ready?

Call **+44 (0) 1245 468555** or visit us at **www.ebmpapst.co.uk/ECdoesit**

ebmpapst

The engineer's choice

Editor
Paul Fanning
pfanning@findlay.co.uk

Deputy Editor
Justin Cunningham
jcunningham@findlay.co.uk

Web Editor
Laura Hopperton
lhopperton@findlay.co.uk

Group Editor
Graham Pitcher
gpitcher@findlay.co.uk

Art Editor
Martin Cherry

Technical Illustrator
Phil Holmes

Advertising Sales
01322 221144

Sales Director
Luke Webster
lwebster@findlay.co.uk

Deputy Sales Manager
Simon Bonell
sbonell@findlay.co.uk

Account Manager
James Slade
jslade@findlay.co.uk

Sales Executive
Matt Santer
msanter@findlay.co.uk

Production Manager
Heather Upton
hupton@findlay.co.uk

Circulation Manager
Chris Jones
cjones@findlay.co.uk

Publisher
Ed Tranter
etranter@findlay.co.uk

SSN-0261-2097 (Print)
ISSN 2049-2324 (Online)

Eureka (incorporating Engineering Materials and Design and Design News) is free to individuals who fulfil the publisher's criteria. Annual subscriptions are £81 UK (£118 overseas or £153 airmail).

If you change jobs or your company moves to a new location, please contact circulation@findlay.co.uk to continue receiving your free copy of Eureka.

Origination CC Media Group
Printed in UK by Pensord Press Ltd

©2014 Findlay Media Ltd

Published by
Findlay Media, Hawley Mill, Hawley Road,
Dartford, Kent, DA2 7TJ
Tel: 01322 221144
www.eurekamagazine.co.uk



Findlay Media is a member of the Periodical Publishers' Association



Life-changing decisions



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

As a member of the judging panel for the British Engineering Excellence Awards, I am sworn to secrecy as to the details of our recent deliberations that resulted in the shortlist you can see on page 7 of this issue. Beyond saying that the competition was fierce, that some of the entrants were hugely impressive and that the debate raged back and forth, my lips shall remain sealed until the Awards ceremony on the 9th October.

One thing I can report from the judging, however, were the remarks offered by last year's winner of the Design Engineer of the Year award and Grand Prix Sebastien Cuvelier Mussalien.

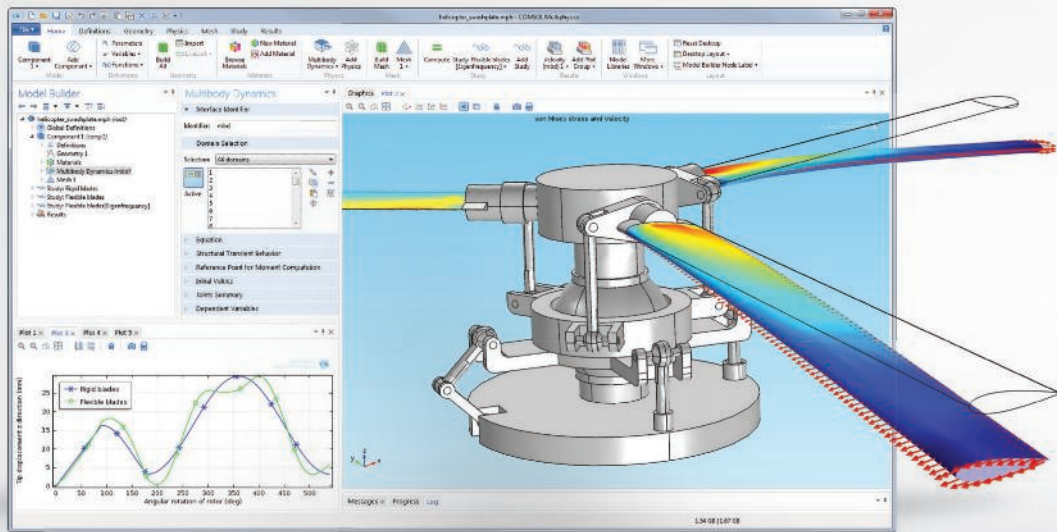
At the end of the judging, Sebastien, whose work on the OrganOx organ preservation system won him the awards, addressed those judges who had been present last year to thank them for their decision and to remind us all that the decisions we made in those few hours were not only important, but had the power to change people's lives. He then went on to explain that winning the accolades had given him the courage and confidence to give up his role with Team Consulting and set up his own business.

It was not only a touching moment, but also a valuable reminder to us – if such a thing were needed – that our work on the BEEAs does not exist in isolation, but has a very real meaning for and impact on the people whose work we celebrate.

The other wonderful thing about Sebastien's remarks was that they constituted a vindication of everything the BEEAs have ever purported to represent. The Awards began at a time of economic downturn amidst a need to rebalance the economy. Their raison d'être was to celebrate those achievements of British engineering that have spent so many years being undervalued. Equally, they offered an opportunity to raise the profile of a profession that is all too often ignored or misunderstood.

For a winner to offer proof that the BEEAs had changed his outlook and career in such a positive way was extremely gratifying from our point of view as organisers and judges. It also served to remind us that, on 9th October, a lot of other engineers' lives will change for the better. This fact that not only reminds us of our great responsibility as judges, but also serves to make us very proud of the awards themselves.

HELICOPTER SWASHPLATE MECHANISM: A swashplate mechanism is used to control the orientation of helicopter rotor blades.



VERIFY AND OPTIMIZE YOUR DESIGNS WITH **COMSOL MULTIPHYSICS®**

Multiphysics tools let you build simulations that accurately replicate the important characteristics of your designs. The key is the ability to include all physical effects that exist in the real world. To learn more about COMSOL Multiphysics, visit www.uk.comsol.com/introvideo

Product Suite

COMSOL Multiphysics

ELECTRICAL

AC/DC Module
RF Module
Wave Optics Module
MEMS Module
Plasma Module
Semiconductor Module

MECHANICAL

Heat Transfer Module
Structural Mechanics Module
Nonlinear Structural Materials Module
Geomechanics Module
Fatigue Module
Multibody Dynamics Module
Acoustics Module

FLUID

CFD Module
Mixer Module
Microfluidics Module
Subsurface Flow Module
Pipe Flow Module
Molecular Flow Module

CHEMICAL

Chemical Reaction Engineering Module
Batteries & Fuel Cells Module
Electrodeposition Module
Corrosion Module
Electrochemistry Module

MULTIPURPOSE

Optimization Module
Material Library
Particle Tracing Module

INTERFACING

LiveLink™ for MATLAB®
LiveLink™ for Excel®
CAD Import Module
ECAD Import Module
LiveLink™ for SolidWorks®
LiveLink™ for Inventor®
LiveLink™ for AutoCAD®
LiveLink™ for Creo™ Parametric
LiveLink™ for Pro/ENGINEER®
LiveLink™ for Solid Edge®
File Import for CATIA® V5

Contact: +44 (0) 1223 451580 info.uk@comsol.com



BEEAs 2014 shortlist announced

The shortlist for the 2014 British Engineering Excellence Awards (BEEAs) has been announced.

This year's potential winners were selected by an expert panel of judges drawn from a cross section of electronic and engineering design disciplines, including: Philippa Oldham, head of transport and manufacturing for the IMechE; Andrew Burrows, chief technology officer of i20 Water; and Ashley Evans, director of electronics for techUK.

Now in their sixth year, the BEEAs aim to promote the quality of engineering design within the UK and celebrate the British companies that are competing on a global stage and holding their own.

The awards ceremony itself will take place on Thursday 9th October 2014 at 8 Northumberland Avenue, London.



BEEAs 2014 shortlist

Consultancy of the Year

Bytesnap Design
DC White and Partners
Plextek Consulting
Product Partners
Romax Technology

Design Engineer of the Year

David Bourne, AGA Rangemaster
Mike Franklin, Crawley Creatures
Peter Greenhalgh, ARM
Benoît Labbe, Nujira

Design Team of the Year

Bowman Power Group
Crawley Creatures
FTDI Chip
Houlder
Nujira

Green Product of the Year

Controlled Power Technologies, LC
Super Hybrid
Direct Thrust Design,
ElectroPistons
Focal Fires, Catalytic
Flueless Gas Stove
Xylem, SR Pump

Materials Application of the Year

EC Electronics, Bike HUD
Nasmyth Group, Solid machining solutions
Nylacast, Low Friction Chock Liner
Nylacast, Electric Power Steering
Worm Wheel
Printed Light, Form Follows Function

Electronic Product of the Year

Agilent, S-Series Oscilloscope
Anders, DX-4
CSR, CSRmesh
FTDI, FT900
Metasphere, Point Orange

Mechanical Product of the Year

Bowman, XTG
Turbogenerator
Crawley Creatures, Porton Man
Dellner, Segmented Gangway
Connexion
Hepco, 1-Trak
IHC, Hi-Traq

Small Company of the Year

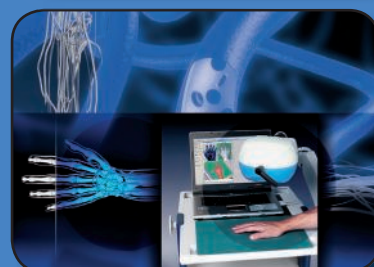
DC White and Partners
Lime Microsystems
Metasphere
Redux Labs
Remvox

Start up of the Year

Aeguana Digital
Remvox
Snap Ring Joint

Young Designer of the Year

Matti Coleman, Culham Centre for Fusion Energy
Joel Gibbard, Open Hand Project
George Lyle, Strainstall



High reliability, quality and performance are key for applications in the field of medical device technology.

FAULHABER drive systems are proven solutions for a wide range of applications in fields such as high-tech prosthetics, portable drug delivery, micro-dosing pumps, ultrasound and surgical robotics for minimally invasive procedures.

EMS

www.ems-limited.co.uk

0118 9817391

DC Micromotors
Brushless DC motors
Gearmotors
Low Profile Motors
Stepper Motors
Drive Electronics
Linear Actuators
Custom Solutions
Piezoelectric Motors

Industrial Micro-Hydraulics

Lee Products can now supply a full range of micro-hydraulic components such as check valves, relief valves, shuttle valves, flow controls, restrictors, screens and Betaplugs for high volume, low cost industrial and automotive applications.



Tel: 01753 886664 Fax: 01753 889588
email: sales@leeproducts.co.uk

For more information visit
www.industrial-microhydraulics.co.uk

Lee Products Limited, 3 High Street, Chalfont St Peter, Gerrards Cross, Bucks. SL9 9QE

ogle
MODELS + PROTOTYPES

WORLD CLASS MODEL MAKING & PROTOTYPING

OGLE ARE NOT JUST MODEL MAKERS.
WE HELP PEOPLE REALISE THEIR VISION.
IN MANY INSTANCES WE HELP THEM SURPASS IT.
TURNING YOUR DREAMS INTO REALITY IS OUR MISSION.
YOU COULD SAY WE ARE OBSESSED WITH IT.

INDUSTRIAL 3D PRINTING
BENCH MODEL MAKING
VACUUM CASTING
CNC MACHINING



RING ogle
and let the obsession begin



t: 01462 682661

Ogle Models & Prototypes Ltd, Birds Hill, Letchworth, Hertfordshire SG6 1JA

e: info@oglemodels.com w: oglemodels.com

Planes to get 'smart skin' that can detect damage

A so-called 'smart skin' – made up of tens of thousands of tiny sensors – could be fitted to future aircraft so that they can 'feel' changes in speed, temperature, physical strain and movement.

Engineers at BAE Systems are working to develop the technology so that aircraft health can be monitored in real time, before any big problems occur.

The idea is that sensory information is captured by the Smart Skin, transmitted wirelessly to a remote operator and displayed on the user interface. The panel on the user interface would then change with the physical panel, enabling areas of excessive heat and/or strain to be detected and displayed.

This in turn is expected to reduce the need for regular check-ups on the ground and enable parts to be replaced more quickly.

Measuring less than 1mm², the tiny sensors would, in theory, be smaller than a grain of rice – meaning they could be fitted to existing aircraft or even be sprayed on. Collectively, the sensors would have their own power source and when paired with the appropriate software, would be able to

communicate in much the same way that human skin sends signals to the brain.

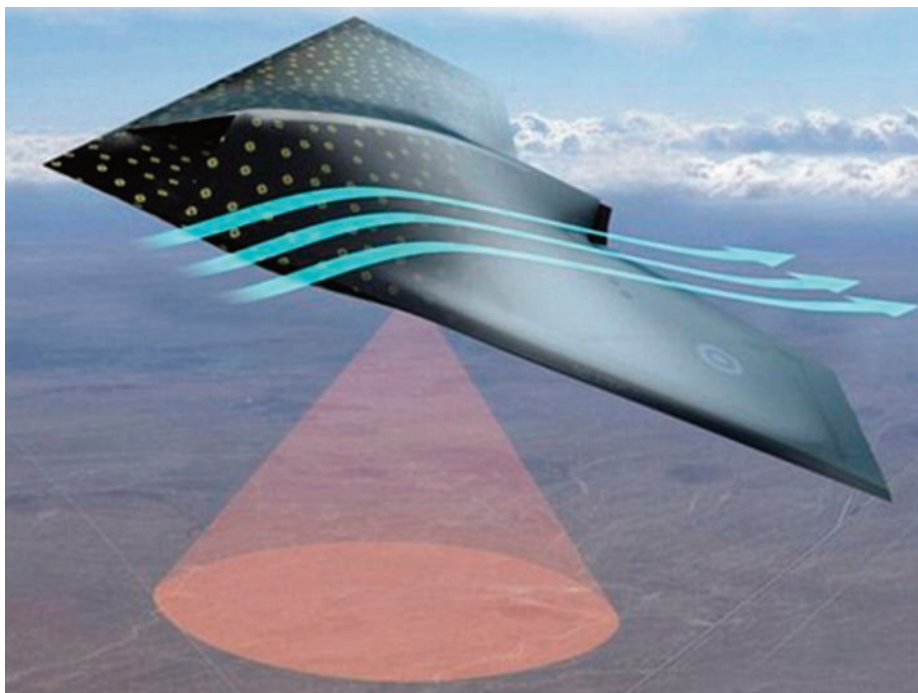
The idea for the smart skin came about when BAE senior research scientist Lydia Hyde spotted a sensor in her tumble dryer that prevented it from overheating.

She commented: "Observing how a simple sensor can be used to stop a domestic appliance overheating got me thinking about how this could be applied to my work and how we could replace bulky, expensive sensors with cheap, miniature, multi-functional ones.

"This in turn led to the idea that aircraft, or indeed cars and ships, could be covered by thousands of these motes creating a 'smart skin' that can sense the world around them and monitor their condition by detecting stress, heat or damage.

"The idea is to make platforms 'feel' using a skin of sensors in the same way humans or animals do."

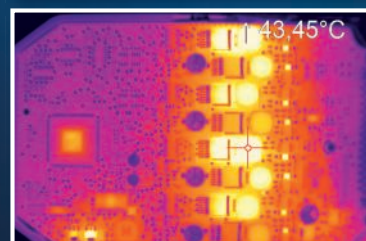
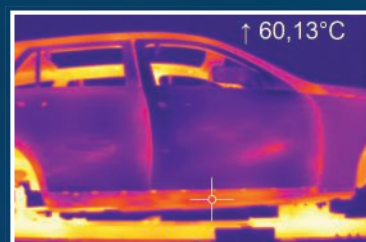
By combining the outputs of thousands of sensors with big data analysis, Hyde believes the technology has the potential to be a 'game changer' for industry.



640 X 480 THERMAL IMAGING CAMERA FOR £6800!

thermoIMAGER TIM 640

- 640 x 480 pixels
- Radiometric video recording at 32Hz
- Compact design with USB interface
- Measuring range from -20°C to 900°C
- License free software included with every purchase



www.micro-epsilon.co.uk

Micro-Epsilon UK Ltd.

Call +44 151 355 6070

Email: info@micro-epsilon.co.uk

established 1974



40th anniversary

AN EXCELLENCE IN ENGINEERING
2014

www.jbj.co.uk

The comprehensive service for the
mechanical power transmission & fluid power industries.

Product Specification

team of design engineers to assist in design process
simple or complex, standard or bespoke.

Prompt Product Supply

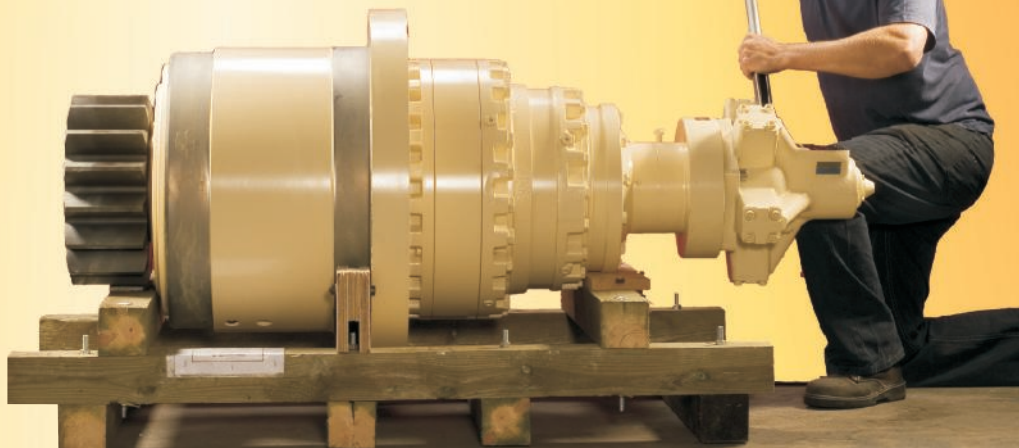
large stocks for next day delivery on many items.

Machine Shop

full machining services for bespoke designs.



from
Small
Individual Components
to
Large Combinations



quality products for mechanical & fluid power



01737 767493



info@jbj.co.uk



www.jbj.co.uk



jbj Techniques Limited is ISO certified,
committed to international coordination
& unification of industrial standards.

- registered in England No: 1185469 -

A range of products ATEX certified
to directive 94/9/E requirements



Hospital saves £15,000 using VSDs

A hospital is set to save around £15,000 a year on air handling costs following the installation of variable-speed drives (VSDs) by ABB authorised value provider Inverter Drive Systems (IDS).

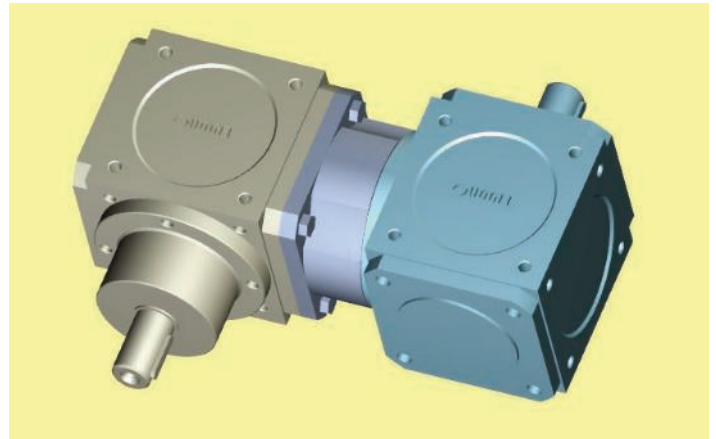
The project involved fitting ABB drives to a number of air handling units (AHUs) in Bedford Hospital's maternity and pathology departments, cutting air volumes to save on energy use.

Bedford Hospital NHS Trust is a 370-bed acute district general hospital serving patients in North and Mid Bedfordshire. IDS approached the hospital with a proposal to investigate its motor-driven fan applications with a view to using VSDs to cut energy use.

Previously, the AHUs were used direct-on-line, with no form of control. IDS proposed retrofitting four AHUs, two in each department. The solution involved four 11 kW drives and one each of 7.5 kW, 15 kW and 3 kW. All were three-phase, ABB HVAC drives, ACH550, with IP54 enclosures.

Before installation, IDS had predicted a speed reduction of 15 percent but achieved 20 percent. This equated to a saving in energy costs of £15,000 a year, with payback in only 11 months. As well as the energy saving, the motors will run quieter, also suffering less wear and tear and therefore reducing the maintenance requirement.

www.abb.com/uk



A compact and robust offset drive

In answer to a special customer requirement, Techdrives has supplied a customised assembly for two right angle gearboxes using mostly standard parts. The customer needed to offset the drive line on a mechanical handling application with an solution that was fully enclosed, efficient and maintenance free. With a target of 250mm between shaft centres, chain and belt connections were unacceptable. Techdrives was able to offer a customised assembly of two standard Vogel spiral bevel gearboxes rated at 300Nm and with a centre distance of 258mm.

Vogel spiral bevel gearboxes are robust right angle drives

available for torques from 10 to 8500Nm. Ratios of 1 to 6 are possible although in this case 1:1 was all that was needed. The selected gearboxes were size 250 rated at 300Nm. To simply achieve the offset by mounting the two gearboxes and connecting with a shaft coupling would require a shaft offset of at least 330mm. Therefore Vogel created a special assembly plugging a male shaft gearbox type K into a hollow shaft gearbox type H. The two gearboxes are standard and the casings are connected with a special flanged adaptor achieving a centre distance of 258mm.

www.lenze.co.uk



Subsea vibration suppression system

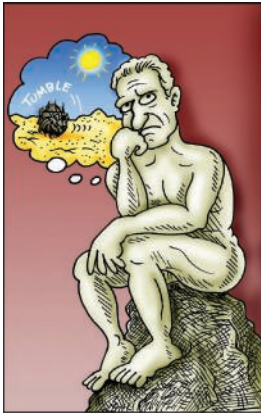
Trelleborg's offshore operation has launched an innovative new vortex induced vibration (VIV) system. The high performance T-Strake features a unique modular design enabling more efficient transportation and installation.

Each section of the system has been designed as a single component, ensuring it is quick and easy to pre-install onshore or install offshore. The design enables the system to be stacked during shipping, ensuring more efficient and cost effective transportation.

www.trelleborg.com

Think Like a Genius! Solve Problems Innovatively With TRIZ

OXFORD
CREATIVITY



Do you need creative solutions to difficult problems – FAST?

TRIZ helps designers, engineers and scientists go beyond their own knowledge and experience to access ALL the world's clever solutions. The OXFORD TRIZ systematic processes help engineers think clearly, understand difficult problems and develop creative solutions...delivering sustainable and reliable innovation.

Problem Solving Facilitation

Try TRIZ on your most difficult problem: if we don't help, you don't pay our fee!

Introduction to TRIZ Learn the full TRIZ Toolkit

9 Oct
29 Oct



29 Sept - 3 Oct at Beeston Manor
17-21 Nov at Oxford University

Contact us: lilly@triz.co.uk

www.triz.co.uk

TRIZ Online

Free webinars available at
<http://triz.webex.com>

01993 882461

TRIZ Book Available!

Buy Karen Gadd's
"TRIZ for Engineers"
On Amazon



**KINGSTON
ENGINEERING**

Specialist Power Screw Products

- ▶ Ex stock power screws & nuts
- ▶ Precision-machined components
- ▶ Self-reversing screws and followers
- ▶ Accredited by Aerospace, Nuclear & Chemical customers
- ▶ Specialist leadscrew & power screw products



Call 01482 325676

Kingston Engineering Co (Hull) Ltd,
Pennington Street, Hull, East Yorkshire, HU8 7LD, UK
Fax 01482 216438 Email: sales@kingston-engineering.co.uk
www.kingston-engineering.co.uk



**Packaging Supplier to
the Engineering Sector**

Extra Strong Protection

tough air cushioned pouches & padding
create air cushions on demand with Mini Air
instapak foam-in-place moulds around your product



Heavy Duty Boxes & Crates

extra heavy duty boxes in a wide range of sizes
strong timber cases approved for export
buy mixed pallets of our standard boxes



Innovative Packaging Solutions

improve efficiency with our new patented systems
discover our extensive range of bespoke packaging
read our engineering case studies online



Speak to our packaging experts:
024 7642 0065

open an account online:
www.kitepackaging.co.uk

Online Ordering | Stock Catalogue | Bespoke Packaging
Service Solutions | Packaging Regulations | Branches Nationwide

Smooth positioning with linear actuator

A new series of Linear Positioning Actuators featuring a lightweight yet robust, ball-bearing mounted lead screw and powered by a compact brushless DC motor with integrated positioning controller have been introduced by precision motion control specialist Dunkermotoren.

The LPA08 linear positioning actuator is a compact and modular drive system ideally suited to industrial and medical automation applications which require fast, precise and smooth positioning. For example, product placement and palletising, label printing and scanning, bottle filling, packaging, diagnostics and laboratory automation.

The feed movement, which is designed for loads up to 20 kg, maximum axial forces up to 150N and adjustment speeds of up to 0.6m per second, is driven by a Dunkermotoren BLDC BG45 motor (12 VDC and 24 VDC) with integrated 4Q-Servo controller and is able to be easily programmed with multiple positions, speed and force. The actuators stainless steel spindle is coated with Kerkote TFE (Teflon) which ensures maintenance-free, long-life operation and removes the need for additional lubricant, while superior damping properties, quiet operation and backlash free linear movement are optimised by a pre-loaded nut.

www.dunkermotoren.de



Maintenance-free couplings

Renold Hi-Tec's PM and RB ranges of rubber-in-compression couplings are not only maintenance free they also help to reduce maintenance and extend the working life of the machinery on which they are installed. Additionally, because of their design, they are intrinsically failsafe eliminating the problems that can occur as a result of coupling failure.

Rubber-in-compression couplings comprise two round metal sections fitting one inside the other with what looks like the paddles of a paddle steamer projecting inwards from the outer section and outwards from the inner.

www.renold.com

Sometimes it's OK
to put all your eggs
in one basket.



From variable-speed drives, electric motors, bearings and gearboxes to PLCs, HMIs, safety devices and controllers; having one company that can supply and engineer your complete drive-train leads to higher energy and productivity efficiencies. Backed by the UK's largest network of Authorised Value Providers, you are only ever 45 minutes away from the back-up and support your process line needs.

To find out more call **07000 ABB AVP** (07000 222 287) or visit www.abb.co.uk/energy

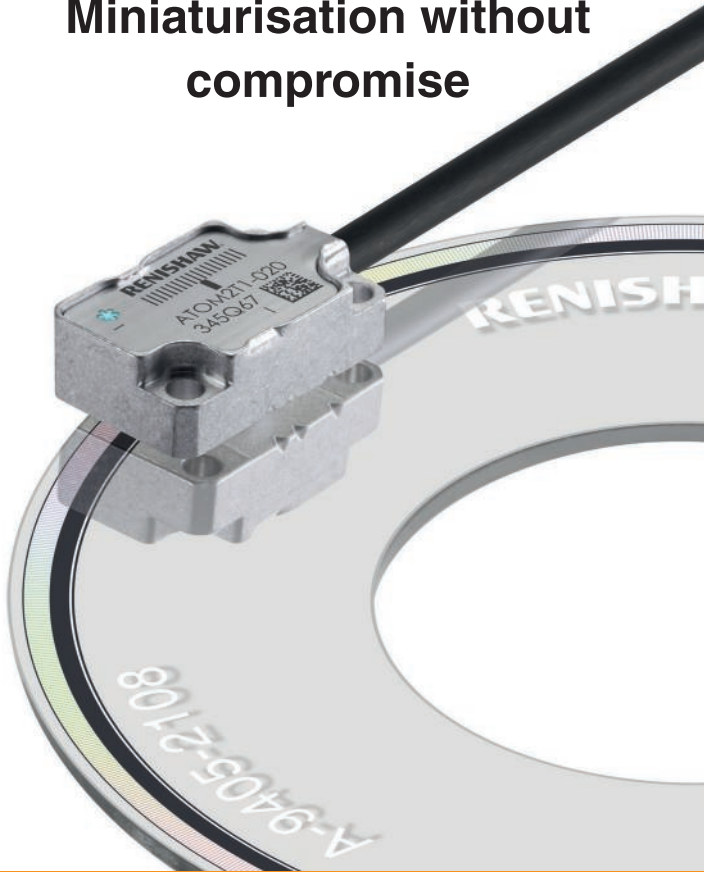


Power and productivity
for a better world™



ATOM™

Miniaturisation without
compromise



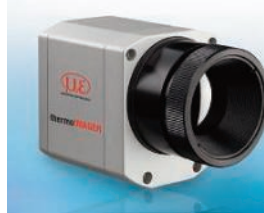
New! Miniature optical encoder system

The new ATOM optical encoder is the first to combine miniaturisation with uncompromised accuracy, leading-edge dirt immunity and long-term reliability.

- World first: miniature encoder with filtering optics for excellent signal stability
- Comprehensive range of linear and rotary scales: 20 µm and 40 µm pitch
- Ultra-compact readhead: only 6.7 x 12.7 x 20.5 mm for space-critical applications
- Quick, easy readhead installation: built-in set-up LED and auto CAL routine enable faster optimization
- Reduce your system cost: ATOM assures high quality, fast delivery and competitive pricing

For more information visit
www.renishaw.com/ATOM

High-res, low-cost IR thermal imaging camera



Micro-Epsilon's latest innovation in thermal imaging, the thermoIMAGER TIM 640, is an infrared thermal imaging camera that is able to record radiometric video at an optical resolution of 640x480 pixels – making it the highest resolution infrared camera available on the market today

for less than £6800.

With extremely compact dimensions of 45x56x90mm and a weight of just 320g (including lens), compared to other similar-size cameras, the TIM 640 is the only camera that enables the recording of radiometric video images at 32Hz and a VGA resolution of 640x480 pixels.

With a thermal sensitivity of 75mK, this camera can detect very small temperature differences, which is critical in many thermal analysis R&D projects and inline thermography applications. At ambient temperatures of between 0 and 50°C, the camera can measure object temperatures ranging from -20°C to +900°C.

By using thermal imaging cameras – in R&D, new product development and high volume production – hot spots and defects can be detected quickly and reliably, without influencing the target object. The TIM 640 is suitable for a wide range of quality control, process monitoring and inline thermography applications, including the monitoring of small components in high speed production lines and semiconductor manufacturing.

info@micro-epsilon.co.uk

Solution to Last Month's Coffee Time Challenge

The solution to last month's coffee time challenge of how to invent a doorbell that means you never miss a visitor comes from the UK in the form of the i-Bell. The i-Bell is a Wi-Fi enabled doorbell camera system that connects the front door to a smartphone, tablet or laptop. This gives occupants a bird's eye view of callers even when they aren't in the property.

Thanks to the intelligent Wi-Fi technology, i-Bell is able to nullify common front door frustrations. From missing parcel deliveries, being forced to stay within earshot when expecting visitors or simply being wary of opening the door to strangers, i-Bell offers users complete control over their doorstep traffic. Whether residents are in the garden, at work, at the shops or even on holiday, the cutting edge camera and app allows occupants to see and communicate with house callers from anywhere, at any time.

The exciting new product is the first of its kind to be manufactured in the UK. Featuring an internal rechargeable lithium battery, weather proof design, 1080p HD camera, voicemail, concierge service and cloud storage, i-Bell is packed full of high-tech features.

www.i-bell.co.uk

dataplastics

Injection Moulding Experts

Transforming bright ideas into saleable products

- 3D Prototyping
- Class 7 clean room
- Specific technical and tooling departments
- Capacity from 20-300 tonne
- ISO certification 9001/14001 and 13485.

We can help you during every stage of the production process from prototype and tooling, small batch runs through to full manufacture.

Contact us:

T. 01993 700777

E. sales@dataplastics.co.uk
Avenue Three, Station Lane, Witney,
Oxfordshire OX28 4BP

www.dataplastics.co.uk

OEM Pumps



Dose, dispense and transfer fluids with MSE Gear Pumps. We have the perfect pump for your OEM 'liquids' applications.

- Small, compact pumps which deliver accurate and smooth flows
- Sealless, leak-free Magnet drive designs for peace-of-mind pumping
- Flows from microlitres / hour to 40 lit / min
- High injection pressure / high viscosity capability



michael smith
engineers ltd

Freephone: 0800 316 7891
info@michael-smith-engineers.co.uk
www.michael-smith-engineers.co.uk

AB14-694

nt CAD/CAM **SOLIDWORKS**



Introducing POWER SURFACING for SOLIDWORKS

Do you struggle with free form/organic shapes?

Is it hard to create tangent/curvature continuous Class A surfaces?

Are you forced to use other software for industrial design?

Do you import polygonal objects in SOLIDWORKS?

Then Power Surfacing is the answer for you!

Power Surfacing for SOLIDWORKS is a revolutionary plugin product that will fundamentally change the way that engineers and industrial designers design parts in SOLIDWORKS.

No longer will you have to fight with patching a set of timed surfaces together to form complex curved shapes. Power Surfacing allows great flexibility and productivity in designing those difficult surfaces by pushing and pulling on the faces, edges or vertices of the part.

"As an industrial designer I have been dreaming of a tool like this for years."

Eric Lagman

"Power surfacing is a very useful tool that really improves the surface capabilities of SOLIDWORKS. More intuitive, faster and more fun."

Luc Spruyt, 3D Assist



nt CAD/CAM TOTAL SOLUTIONS FROM THE LEADING
SOLIDWORKS RESELLER

For more information call
NT CAD/CAM on **0800 018 6957** or visit our
website www.ntcadcam.co.uk/powersurfacing

The Human Factor

On one level, the concept of human factors engineering would seem fairly self-explanatory. Products and systems are designed to be used by or for human beings and therefore it would seem obvious that building the physical needs and requirements of the user into a design should be a basic facet of the designer's brief.

All too often, however, this is not the case. Of course, products and systems have always had to make allowances for the physical presence of a human user or occupant, but there is a lot more to human factors than simply treating the user as just another physical component that needs to be incorporated into the Bill of Materials.

Humans – by virtue of how they work – are often the single biggest point of failure in any system. IT professionals are painfully aware of this fact; to the point that they have devised the acronym 'PICNIC' to outline the problem. Its meaning – 'Problem In Chair Not In Computer' – is an amusing summation of the issue, but nonetheless points to a larger truth: human beings are a major problem facing anyone designing technology to cater for them.

The realisation of the negative consequences that can result from poor human factors engineering is what has given the discipline its impetus. Even so, many engineers do not necessarily understand what it is. Ryan Meeks, human factors engineer with leading engineering consultancy Frazer Nash, offers a definition: "It's the study of how humans interact with systems, products and environments. We try and look at systems from a human perspective, so we take physical, cognitive, organisational and environmental perspective on things. So we look at how those things will affect the human within the system."

Born of disaster

The discipline was born out of close investigation of historical industrial disasters where human failure was a major factor, such as Three Mile Island, Piper Alpha, Chernobyl, Bhopal and – in particular – air crash investigation, whose methods human factors engineers have borrowed extensively.

As a consequence of this history, human factors engineering is much more widely accepted in safety-critical industries than in others. Says Meeks: "We often work in high-hazard, high-risk industries. So you'll most commonly find human factors people in defence, oil and gas – anywhere you've got real safety implications, really."

According to Meeks, the single biggest problem when it comes to human factors engineering is understanding what human beings are and are not good at. He says: "As humans, we can offer semantic meaning to quite disparate bits of information. So if you've got several systems telling you different things, what humans are really good at is amalgamating that information and making something of it. Often systems use humans in the wrong way – so they might use us for

overseeing processes or in an observing role. We're really not good at those things, as we're prone to fatigue and boredom and demotivation. So we try and design systems that capitalise on our natural abilities."

So what form does this take? The first step is to define the human-related requirements of the system. "We sit down and decide what the systems need to do to aid decision making or situational awareness," says Meeks. "How big do the controls need to be? When does the user need to be presented with information in order to make the right decision? What's the environmental condition going to be in that vehicle and how is that likely to affect the user?"

End results

By taking account the physical, cognitive, organisational and environmental factors as subject headings and from them drawing up a list of requirements that the design has to adhere to throughout the whole of the design process. This ensures ultimately that you end up with a product that is useable.

The example of good human factors design to which many point is Apple. Says Meeks: "Good design is not an accident. It's all in the approach. HF [human factors] is not rocket science. If you assess the requirements of the human user at the earliest stage, then you're much better able to deliver a good final product. Apple do this well. Its 'design for all philosophy' involves engaging with the end user at the earliest possible stage of the design process."

Other admirable features of Apple's design, he believes, lie in their products to be both consistent and customisable. He says: "The format of how you navigate is always the same, which means you can't get lost in the menus. Equally, though, you've got the ability of individual users to



Human factors is a phrase often used in engineering circles, but one perhaps whose implications are not always clearly understood. Paul Fanning finds out more.

“OUR JOB IS TO PUT IN MORE ‘CHEESE’. THE MORE CHEESE YOU PUT IN, THE LESS CHANCE OF GETTING A PENCIL THROUGH IT. SO IF YOU THINK ABOUT A SOFTWARE SYSTEM, THAT MEANS PUTTING IN MORE LAYERS OF MITIGATION AND AUTOMATED SYSTEMS THAT WILL PICK UP HUMAN ERROR TO SUPPORT THE USER IN A MORE ROBUST MANNER.”

**RYAN MEEKS ON THE
‘SWISS CHEESE EFFECT’**



customise the product, while retaining the fundamental similarities in the system that allow everyone to use it effectively.”

Equally, says Meeks, a product such as the iPad offers a great example of how to keep users engaged. He says: “The ‘Homer Simpson’ example of a worker bored in a chair in an oversight capacity is the worst possible way of doing things. You don’t want passive users. One of the fundamental principles of human factors is to keep users engaged physically and cognitively. That way, if something goes wrong, they’re in the best position to have a mental model of what’s going on and act appropriately.

“Again, with the iPad, it’s all about keeping users engaged. Huge use of graphics, diagrams, colour – all of these things communicate messages without using words, thus crossing language barriers and getting information across more immediately than words ever can.

Of course, this is all very well for Apple and its products, but what relevance does that have in other contexts? Meeks draws the

comparison with the design of a nuclear submarine (a project with which he and Frazer Nash are familiar). “The human remains the same,” he says. “Apply principles in one area, you can apply them in another. The thing to remember about a complex system like a nuclear submarine is that it is ultimately one system, but consists of thousands of smaller systems. So if you approach the design of the smaller ones in the way I’ve outlined – engage users at an early stage and determine your human requirements nice and early – you can ensure that all those smaller systems are designed in the same way.”

Thus, control rooms on submarines now use software interfaces almost entirely now, so the iPad example of consistency and ease-of-use that allows users to move from one system to another while still intuitively understanding how each system operates is highly relevant here.

Equally, the increasing need to reduce the manning levels on submarines has made a level of interoperability between systems



“YOU CAN’T NECESSARILY HAVE ONE PERSON STARING AT A SONAR SCREEN ALL THE TIME, SO YOU MAY NEED TO DESIGN A SYSTEM THAT JUST GIVES THE USER THE MOST PERTINENT INFORMATION AT ANY GIVEN TIME, THUS FREEING THEM UP TO DO OTHER STUFF.”

whereby a system’s defences against failure are modelled as a series of barriers, represented as slices of cheese. The holes in the slices represent weaknesses in individual parts of the system and are continually varying in size and position across the slices. The system produces failures when a hole in each slice momentarily aligns, permitting ‘a trajectory of accident opportunity’, so that a hazard passes through holes in all of the slices, leading to a failure.

Says Meeks: “Our job is to put in more cheese. The more cheese you

necessary. Says Meeks: “Historically, people have had individual specialisms, but there is an increasing drive for lower levels of manning on submarines in particular, so universal interoperability is a long-term goal. That means smaller, more flexible teams and that might mean responsibility for three or four systems. That means the systems have to be automated more.

“Also, this means you can’t necessarily have one person staring at a Sonar screen all the time, so you may need to design a system that just gives the user the most pertinent information at any given time, thus freeing them up to do other stuff.”

Of course, though, one area where an application such as a nuclear submarine is distinct from other systems is in the level of stress and fatigue to which its users may be subject.

Says Meeks: “You have to consider the context of use very early. Often it’s hard to find comparisons from other areas. But there are similarities between putting someone in the control room of a nuclear plant and putting them in the cockpit of an aeroplane - there are a lot of similarities between those high-hazard, safety critical industries.”

“The military has that unique issue of doing that stressful job 24 hours per day. So from an HF point of view that might just be a question of setting lower levels of tolerance, for instance – including more levels of mitigation to allow for stress and fatigue. What that might mean is that you have a lower tolerance for human error.”

To achieve this, Meeks refers to the ‘Swiss Cheese Model’,

put in, the less chance of getting a pencil through it. So if you think about a software system, that means putting in more layers of mitigation and automated systems that will pick up human error to support the user in a more robust manner.”

For all its advantages, however, human factors are still not widely incorporated into engineering design. In part, Meeks believes, this is due to a cultural issue whereby engineers are not trained and conditioned to think in terms of human use of products. He says: “Often I find there is resistance from engineers, who are often suspicious of the psychological, cognitive and almost philosophical ideas that underpin human factors engineering.”

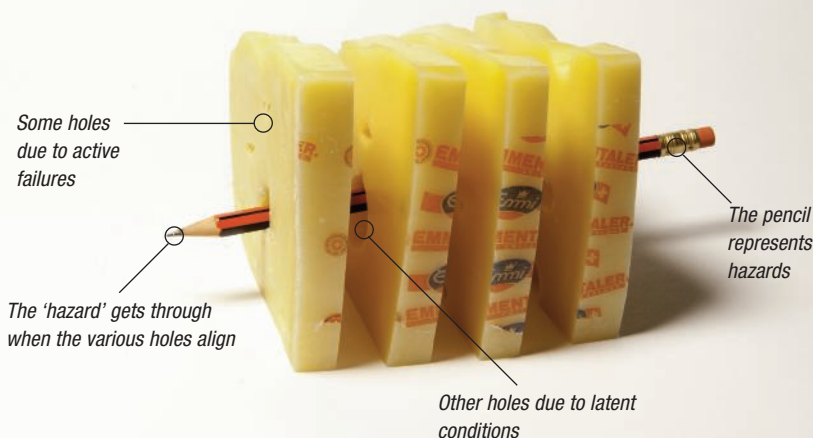
Naturally, Meeks makes it clear that human factors must be considered at the earliest stages of design, saying: “HF is often brought in late as a luxury. The problem with that, of course, is that they may then identify major problems or risks that, at a late stage, will cost you a lot of money to rectify. So the best practice is to get us involved early.”

However, it seems clear that there are huge advantages to good human factors engineering. As Meeks puts it: “Essentially humans don’t change.

Whatever system we are put in, our natural abilities are always the same. Obviously training can alter our levels of knowledge, but in essence it’s all about making the best use of the human by giving them the information and opportunities they need to make those all-important contextual and semantic decisions they’re good at.”

www.fnc.co.uk

The Swiss cheese effect



Communication made easy!



Multiple protocols and a broad range of equipment reduce integration issues.

Working with a **single automation supplier** who offers a selection of protocols and a large range of associated equipment **ensures** effective communication and **reduces** integration issues.

ASCO Numatics valve islands, solenoid valves, aseptic valves, air preparation equipment and cylinders are **proven-in-use** and combine to provide a **complete automation solution**, no matter what communications protocol you use.

To find out more communicate with us now

www.asconumatics.eu/valve-islands

**ASCO
numatics™**




EMERSON™
Industrial Automation

EMERSON. CONSIDER IT SOLVED.

Dr Finlay's Case

Engineering and medicine are increasingly indivisible, with biomedical engineering being at the forefront of this shift. Paul Fanning talks to one of the discipline's leading advocates.

Biomedical engineering may not be a term that is overly familiar to many, but Dr Patrick Finlay, chairman of the Institution of Mechanical Engineers' Biomedical Engineering Association is aiming to change that and is happy to offer a definition of the discipline. "Biomedical engineering is where engineering meets the human body," he says.

This definition covers an awful lot of ground, though, as Finlay is keen to point out. "It applies to sports, it applies to ergonomics, it applies to assisted living, healthcare – any number of areas." Equally, he believes, there may be many people working in biomedical engineering who may not even realise that that is what they are doing.

He says: "So an engineer designing a wheelchair, for instance, may just think of himself as a mechanical engineer, but in fact he's taking into account the pressures and forces that the human body can take and exert. He's dealing with how a person with limited mobility can get in and out of the wheelchair – so he's creating a bridge between engineering and the human body."

Finlay's interest in the area stems from a very personal experience. He takes up the story: "My interest in biomedical engineering began 29 years ago when my first son was born. I was in the delivery suite and the midwife announced that it was going to be a forceps delivery. As a young engineer, I thought this was an interesting prospect and I imagined a carefully-designed, pliant cradle that would grasp the baby's head firmly, but gently. But then the midwife appeared with what appeared to be a pair of salad tongs. If you go to Google Images now and put in 'delivery forceps', you'll see the same thing. And I thought: 'Really, an undergraduate could do better than this – it's appalling'. From that moment I knew that medical engineering was an area that would attract me."

Finlay's particular specialism is in robotics and in the 1980s, he got to lead the UK's medical robotics programme. He says: "What I learnt from that was that in the very early stages of a new technology, bringing together all the various actors from universities, medicine and industry to work together in teams to solve problems is hugely productive. By the end of that process the UK really was the lead country in the world in medical robotics – purely because we managed to get that critical mass together."

And true enough, when he has brought the various partners together, he has found the results extremely positive. "I've run a number of brainstorming sessions between clinicians and engineers," he says. "The clinicians describe the problem and the engineers come up with solutions. These sessions always end the same way, with the clinicians saying: 'I had no idea you could do that!' and the engineers saying: 'I

had no idea you needed it!'"

One reason for Dr Finlay's urgency in promoting this aspect of engineering is the fact that technology is playing an ever-greater part in all forms of medicine. Indeed, he makes the case that in certain areas, it is now as important – if not more so – than the skill of the medical professionals themselves.

"I've worked a great deal on neurosurgical robotics," he says, "And it's fair to say that most neurosurgery now wouldn't be possible without biomedical engineering. It relies on advanced medical imaging techniques, on robotics, micro-instrumentation and sensing. And the relative importance of medical skill and biomedical technology is very finely balanced, but more and more medical processes are becoming reliant on engineering."

There are obstacles to the promotion of the discipline, however, starting at the academic level. Says Finlay: "We graduate 200 students a year in biomedical engineering, although that number's going up. But, until very recently, graduates in this discipline had to choose to call themselves mechanical or electrical or electronic in order to join one of these traditional institutions. In fact, they're all these things and more." Funding for biomedical research also suffers from similar problems of fragmentation. "The funding in universities provided by research council does not recognise biomedical engineering as a category," says Finlay. "This leads to the trap whereby if you want to apply for funding in one area, you have to apply to one research council and for another part you need to apply to another. And that's ultimately not practical. Unifying those things would be a massive step forward."

For all this, however, Dr Finlay remains positive, saying: "It's an immense field and it's pleasing that the UK has a real lead in this field. We are second only to the US in biomedical technology. As an industry, it's worth £16bn per year and is a net exporter for the country. It's grown by 50% since 2009, but is only 5% of the UK's output and we could do so much better."

www.imeche.org/knowledge/industries/biomedical/about

Biography

In addition to his role with the Biomedical Engineering Association, Dr Finlay is the founder of MediMaton, a private UK company formed in 2005 to promote the development of medical robotics.

MediMaton arose as a result of work done by Patrick Finlay in the 1980s and '90s as project manager of the Medical Robotics initiative of the International Advanced Robotics Programme.

MediMaton offers a consultancy resource to medical robotics companies to encourage new applications of medical robotics. In recent years several European medical robotics companies have been founded with the assistance of MediMaton.

MediMaton also participates in national and international collaborative research programmes, either as a partner in its own right or as a subcontractor or consultant to another partner.





A little flexibility

One of the greatest advantages of the Original Helical Shaft coupling product is the ease in which it can be adapted from the standard shaft coupling into a cost effective, multi-functional bespoke design adding some innovative advantages along the way.

Uniquely, being able to simply alter the characteristics of the coiled beam area within the coupling, the Original Helical Shaft can affect the torque capability as well as the angular and parallel misalignment capability. In each case the flexure can be modified to suit specific specifications and or requirements. Abszac refers to the adaptable flexible Heli-Cal element (beam) in the product as the "Flexure" whose characteristics can be applied to both miniature and large rotary applications.

By simply allowing the development of innovative connection solutions from the standard Heli-Cal beam shaft coupling design, has opened up a plethora of opportunities to the design engineer over the years. The products pedigree is born from being the originators of the concept and proven in some of the most demanding applications in engineering.

Heli-Cal Beam Flexure Performance is characterised by the following parameters. Flexure outside diameter, Flexure inside diameter, Coil thickness, Material, Number of coils and Number of coil starts. By altering these characteristics, torque capacity, angular and parallel misalignment capabilities and torsional stiffness rates can be modified to suit specific specifications.

Flexibility = Reliability

In a rotating system, constant velocity refers to the relative rotational speed of the input and output shafts. In a constant velocity system the driven end of the coupling turns exactly the same rate as the driver end. When operating under a uniform load the helical flexure design provides constant velocity and can alleviate problems such as Backlash.

Torsional variations can induce differences in hub to hub velocity when subjected to dynamic loading and are minimal in steady state applications on the helical flexure. Concentricity can be an issue when there is a lack of it, particularly in the case of couplings with backlash or where production variation is difficult to prevent. The Helical flexure one piece integrity minimises sinusoidal variations and has zero backlash as well as having a constant spring rate at all points of rotation.

Misalignment Compensation – The flexing capacity of the flexure can compensate for a variety of misalignments including parallel, angular, axial and skewed shaft misalignment.

Optimised Torque Capacity – The basic requirement of a flexible coupling is to transmit torque loads without permanent distortion or damage and without imposing undue bending or radial loads upon the driver or driven components. Once the working torque rating of the flexure coupling is established, based on design criteria, the flexure's operational life is almost limitless.

Configurable Torsional Stiffness – Every Flexible coupling has some torsional flexibility. Torsional flexibility reflects the amount of twist in a system;

torsional stiffness the degree of resistance against twist. The flexure uniquely can be configured to provide the exact amount of torsional flexibility required in an application. The Helical flexure maintains a very constant radial and bending load at all points of rotation, providing exceptionally uniform and smooth bearing loads.

Once the performance dynamics of the flexure are decided, Abszac then looks at the way the shaft coupling attaches in the application as well how other parts of the total mechanism can be integrated into the single piece shaft coupling design. The hidden potential of expanding how a shaft coupling physically connects within an application, can enhance the overall efficiency of an application.

In many cases, the final shaft coupling design is normally an amalgamation of separate parts that include such items as external gears, splines, threads and tangs. However, most importantly, it enables the design engineer to achieve far greater usage from one item in the total machine which inevitably leads to greater efficiency. How the standard shaft coupling connectability is enhanced, is really up to the designer.

Utilising years of experience and flawless production techniques, the single piece construction totally eliminates any form of friction wear within its design, whilst also ensuring a zero-backlash and no torque loss operation.

Abszac is so confident of the product's success rate that in many cases it offers a free test sample for the customer.

See Abszac at the **Engineering design show** in October on Stand D10
Abssac Ltd, E1A Enterprise Centre, Enterprise Way, Vale Park, Evesham, Worcestershire WR11 1GS
T: 01386 421005 F: 01386 422441
www.abssac.co.uk E: sales@abssac.co.uk



22nd - 23rd October 2014
Jaguar Exhibition Hall ■ Ricoh Arena ■ Coventry



Welcome	25	Features/Innovation Zone	33
Ones To Watch	27	Electronics Design Show	35
Conference Programme	28	Exhibitor Preview	37
Workshop Programme	30	Exhibitor List	49

Headline sponsors





**You can count on us
for the parts you need.**

Choosing the right distributor is as important as choosing the right parts. RS Components has over 10,000 Phoenix Contact parts in stock and access to thousands more. No order is too small and we offer Next Working Day delivery* for orders of in-stock products placed before 8.30pm.

uk.rs-online.com

*See online for full terms and conditions.

Beating the curve



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



In the three years since its inception, exceeding expectations has become the norm for the Engineering Design Show.

In 2012, the target was to welcome 1,000 design engineers through the door. As it was 1,600 came. In 2013, it was hoped that more than 2,500 would arrive. In fact, 3,000 top-quality visitors made their way to the Ricoh Arena over the two days of the exhibition. This year, we are expecting at least 4,000 visitors, but on previous performance, no-one could be surprised if more attended.

Since its birth in 2012, the Engineering Design Show has come a long way. Not only has it more than tripled in scale, it has evolved to the point whereby it has come to encompass the Electronics Design Show, Engineering Materials Live! and this year the Embedded Design Show as well. This growth and these additions have also contributed to the Engineering Design Show last year winning a PPA Independent Publisher Award for Best New Exhibition.

Hand in hand with the shows, of course, have been the Conference programmes that have run alongside them. Last year saw two Conferences – one for the Mechanical design audience and one for the electronic design engineers. This will be the case this year as well, with the only change being that they will be running as the Eureka Conference and the New Electronics Conference respectively.

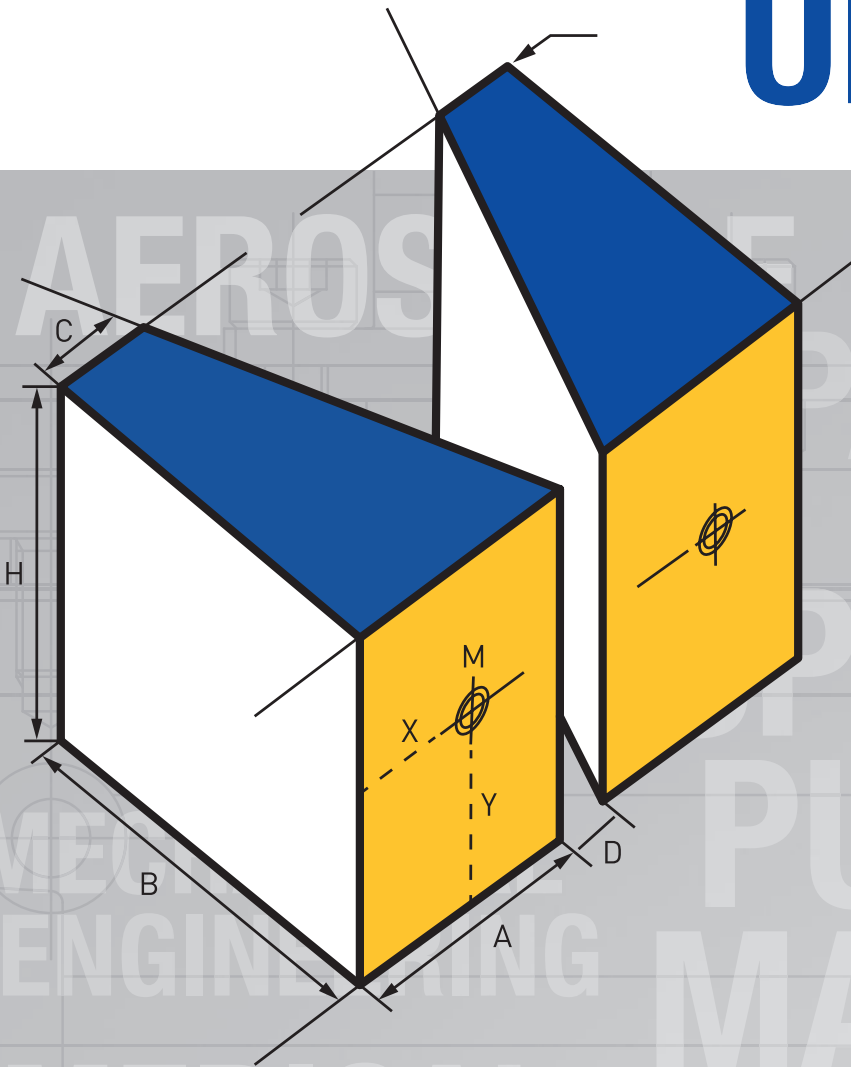
For all this success and growth, however, we have never lost sight of the principle that has underpinned the Engineering Design Show from the beginning: namely that is an exhibition designed for design engineers. The idea behind the Shows has always been to fill that fundamental need to meet your professional needs as a design engineering professional and one thing we can guarantee is that this year will be no different in that respect.

But there's only one way for you to find out for yourself.

I look forward to seeing you there.

Paul Fanning

MANUFACTURE YOUR MECHANICAL UNIVERSE



Visit us from the 22nd
to the 23rd of October
2014, at the **Engineering
Design Show**
Hall 1, Booth F20!



Global manufacturer of configurable
components in up to 0.01 mm increments
and fixed mechanical components



More than 9 million products of high
quality



Delivery from 1 piece



Free download of
3D CAD models



Same day shipment for stock
items



Engineering
design show



MiSUMi
www.misumi-europe.com



The Conference Ones to Watch

There will be no shortage of outstanding content at this year's *Eureka* Conference.
Here are just a few of the highlights.

Designing Team GB's Olympic winning bikes

Dimitris Katsanis, Composites Engineer
Metron Advanced Equipment

In this presentation, the man tasked with building the best bike in the world in just six months, gives a 'behind the scenes' insight into how Team GB's Olympic winning bikes were designed for optimal speed and performance.

Bringing a Formula One car to life

Al Peasland, Technical Partnership Manager
Infiniti Red Bull Racing

Infiniti Red Bull Racing is the current Formula One World Champion, having achieved consecutive driver and constructor world championship titles for the past four years. But race-winning performance on track is only possible with the dedication and commitment of a highly skilled team, coupled with the latest in technology and systems. In this presentation, Al Peasland, Head of Technical Partnerships for Infiniti Red Bull Racing, will give a 'behind the scenes' insight into this environment.

Testing vehicle design to the limit and beyond

Peter Stoker, Director of Vehicle Engineering & John Notman-Watt, Chairman
Millbrook

Millbrook is more than just a vehicle proving ground. It provides a complete range of design, release, development, test, validation and launch support for a wide set of vehicles



engineering solutions. Perhaps less well-known, however, is the company's capacity for vehicle engineering design. In this presentation, Millbrook's Director of Vehicle Engineering, will talk about his department's expertise in designing new vehicle derivatives from base platforms, exterior parts, specific vehicle systems engineering and a diverse range of vehicle conversions, from passenger cars to commercial vehicles.

Life-saving materials on the front line

Chris Davies, Technical Director,
Morgan Advanced Materials

Morgan Advanced Composites has developed, manufactured and fitted the body armour that has been protecting British troops in Iraq and Afghanistan for over a decade. At the heart of this success is the company's unceasing development of new material solutions. Chris Davies, Morgan's

technical director will explain the technical challenges such materials face and how the company continues to engineer solutions that offer lighter weight, but at the same time afford even greater protection.

Transforming organ transplantation with OrganOx

Philip Canner
Team Consulting

Over 370 patients are waiting for a liver in the UK at any one time, and there are around 30,000 patients on liver transplant waiting lists in Europe and the US. However, only 12,000 transplants take place per year in these countries and up to 15% of patients die whilst waiting for one. Hoping to change that, engineers from Team Consulting have designed and developed a revolutionary liver perfusion system called OrganOx, which they believe could double the supply of livers available for transplantation.



The Eureka Conference

A strong conference programme is a must for any successful exhibition and the 2014 Engineering Design Show will be no exception.

By offering the perspectives of leading engineers from across the industrial spectrum, the Eureka Conference will perfectly complement the more practical, day-to-day focus of the exhibition and Conference.

As the programme that follows over the next two pages makes clear, the Conference will offer delegates an unmissable opportunity to gain perspective on cutting edge technologies and strategies from some of the biggest names in UK industry. In addition, it will give a platform to some of this country's leading experts in fields ranging from Formula One to mainstream automotive and advanced medical devices.

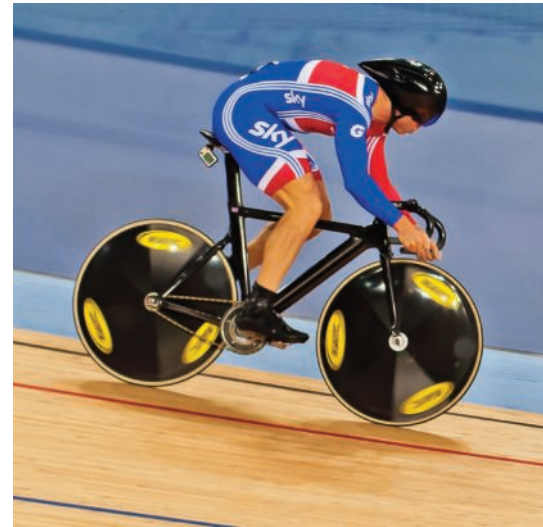
Some of the names to conjure with at the 2014 Conference include Rolls-Royce, Infiniti Red Bull Racing and Siemens. Meanwhile, the technologies discussed will encompass the very latest developments in sensors, composite materials, automotive and defence technology

The delegate places for conference sessions are limited to 100 attendees per session. That said, they are going quickly, so haste is advised if you want to register for them. If you wish to reserve your place, then register now at

www.engineeringdesignshow.co.uk

to avoid disappointment.

Potential for
robotics and
strategies for
innovation
Shadow Robot



23rd October 2013

Legends Lounge

09:15-10:00

Designing Team GB's Olympic winning bikes

Dimitris Katsanis, Composites Engineer
Metron Advanced Equipment



10:15-11:00

Bringing a Formula One car to life

Al Peasland, Technical Partnership Manager
Infiniti Red Bull Racing

11:15-12:00

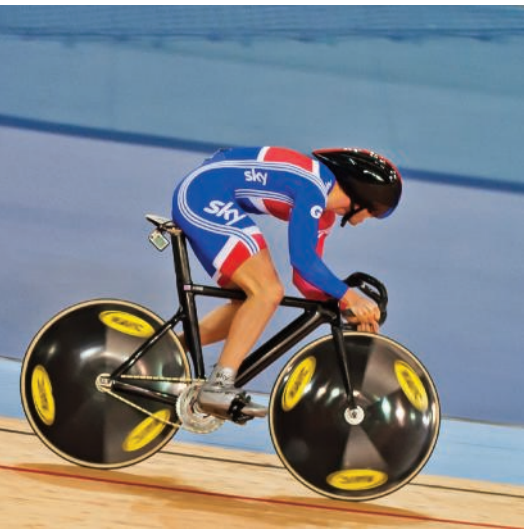
Connecting sensors to the industrial internet...

Why this will determine the future of your business

Lynn Baranowski, Programme Manager Products & System Division
Cambridge Consultants



Team GB's Olympic winning bikes
Metron Advanced Equipment



12:15-13:00
Potential for robotics and strategies for innovation

Rich Walker, Managing Director
Shadow Robot

13:15-14:00
Product design in a virtual environment

Dr Joseph Darlington
Technology Manager, MTC

14:15-15:00
Future composite solutions

Speaker
Gurit

23rd October 2013

Legends Lounge

09:15-10:00

Designing a state of the art 3T MRI magnet

Simon Calvert, Director of R&D
Siemens Magnet Technology

10:15-11:00

Designing in quality from the start

Mick Carlisle, Chief of Engineering
Transmissions, Rolls-Royce

11:15-12:00

Advanced manufacturing technology and its impact on future aircraft design

Ian Chatting, VP Technology
GKN Aerospace

12:15-13:00

Testing vehicle design to the limit and beyond

Peter Stoker, Director of Vehicle Engineering & John Notman-Watt, Chairman
Millbrook

13:15-14:00

Life-saving materials on the front line

Chris Davies, Technical Director
Morgan Advanced Materials

Team GB's Olympic winning bikes
Metron Advanced Equipment



14:15-15:00

Transforming organ transplantaation with OrganOx

Philip Canner
Team Consulting

Bringing a Formula One car to life
Infiniti Red Bull Racing





Learn from industry's best

When it comes to innovation and product development, design engineers want practical demonstrations: the ability to see, touch and understand how a technology or process works.

The 20 practical sessions provided within the two show floor workshop theatres do exactly that. With a diverse range of topics and technology areas, these free to attend seminars will allow engineers to understand how a new or existing technology, material or process can help them in their design projects.

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

www.engineeringdesignshow.co.uk

23rd October 2014 **Workshop Theatre 1**

10:15-10:55 **Funding innovation for business growth**

Dave Pepper, Director, The MPA Group

Engineering businesses that innovate each have a set of issues that they face in today's economy. These range from securing valuable funds and planning innovation activity, through to retaining and finding a skilled workforce.

During this workshop, we will look at each of these issues in turn, what the future holds for the industry, and uncover the support there is in place (today and in the future) for the industry to help drive Britain to the forefront of innovation.

11:15-11:55 **Fast and accurate bearing design calculation using powerful software packages**

Greg Jones, Applications Engineer, Schaeffler

Design engineers working on a variety of engineering design projects involving bearings can now access sophisticated yet user-friendly calculation software online. Schaeffler's suite of design software packages offers designers a quick and easy way of performing complex calculations in a fraction of the time it would normally take. Supported by additional product selection tools and comprehensive technical handbooks, Schaeffler will demonstrate how you can cut development times and improve calculation accuracy whilst retaining good product visualisation from PC-based software packages. Real case study scenarios will

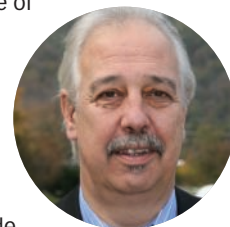
clearly illustrate the benefits to users whatever application or industrial sector they work in.

12:15-12:55 **Lightweight parts without compromise**

Horst Heckel, Dipl.-Ing, Product Manager - LFT, EMS Chemie

EMS Chemie is the leading manufacturer of Speciality Polyamides and has over 40 years of successful experience of enhancing functionality, reducing cost and adding value through metal and glass replacement.

Complementing this broad range of polyamide materials is 'Long Fibre Technology'. Long fibre reinforced materials extend the capabilities of materials to new levels: enhanced properties at elevated temperatures allow polymers to be used in new, more demanding applications. EMS Tape Technology uses a local and oriented high performance reinforcement to increase competitiveness versus metal. Materials properties achieved are beyond any experience with thermoplastic materials so far.



13:15-13:55 **Design protection**

Jonathan Jackson, Partner, D Young & Co LLP

14:15-14:55 **Break Free from Design Limitations**

Stijn De Rijck, Marketing Manager, Materialise

A product is only as good as the applied production technique allows it to be. In general, this means your product design will be limited by the boundaries of existing techniques. 3D Printing – also known as 'Additive Manufacturing' – eliminates those restrictions so you can focus on the optimal functional design, and thus, a better product. This workshop shows the real advantages of clever design for 3D Printing.



**Workshop Theatre 2****10:15-10:55****TBC****11:15-11:55****The evolution of design
RS Components**

The design process and the speed of design – especially within electronics – has never been more critical. The demand for shorter design schedules and faster development from concept to production reality touches all engineers regardless of their area of expertise. In this workshop we look at the products, tools and software solutions that are removing the barriers of cost and complexity from electronic & mechanical design, and have the potential to accelerate the design journey.

12:15-12:55**Drilling in extreme
environments**

Julius Rix, Ice Core Drilling Engineer, British Antarctic Survey

Scientists at British Antarctic Survey (BAS) have been working on discovering how the climate has changed over many thousands of years by drilling holes in one of the most untouched landscapes on the planet. As the work can only be carried out when the environment allows this can take many years. maxon motor uk have been working with BAS on the next mission – to excavate one million year old ice.

13:15-13:55**Advanced adhesive and sealant
solutions for the lighting industry**

Bob Goss, Senior Technology Specialist, Henkel

Adhesives and sealants have been used by the Lighting industry for many years and this

seminar will introduce new technology products developed for this industry. Designed to reduce manufacturing costs and improve the environmental impact of lighting devices, adhesives can manage gaps and thermal expansion and provide water and dust ingress protection.

14:15-14:55**The fundamentals of engineering
material selection**

Jody Walker, Nylacast

23rd October 2014**Workshop Theatre 1****10:15-10:55****Breaking down the boundaries to
advanced simulation design techniques**

Craig Norrey, Head of Design (EMEA), DuPont

This workshop will offer a brief history of simulation techniques used by the thermoplastic design engineer including moldflow, stress analysis. Good simulation requires good material data and a historical approach to allowing factors of safety. It will go back to basics and examine the Influence of fiber orientation, sharp corners, internal weld lines, poor processing on mechanical props of the material. Other topics to be covered include improving precision and discussing the new techniques to emerge, Digimat, linking moldflow to stress analysis, the step change in simulation precision and advanced material data needs. There will also be case studies presented to illustrate the topic.

11:15-11:55**Design and manufacture of bearing
solutions to reduce TCO**

Nick Dowding, Business Development Manager, Barden Corporation

Although special design precision bearings are inevitably more costly, often they can be better value. The increased performance, reliability and longer life can be used to improve product performance and by carefully assessing manufacturing and logistics they can be shown to add considerable value. In addition the low volume nature of the product can often lead to highly adapted solutions. By using a series of case studies, we will show how by design we can optimise solutions to reduce cost in

application. We will also use examples to show how optimising the supply chain can also help in this respect.

12:15-12:55**Lightweight parts without compromise**

Horst Heckel, Dipl.-Ing, Product Manager - LFT, EMS Chemie

EMS Chemie is the leading manufacturer of Speciality Polyamides and has over 40 years of successful experience of enhancing functionality, reducing cost and adding value through metal and glass replacement. Complementing this broad range of polyamide materials is 'Long Fibre Technology'. Long fibre reinforced materials extend the capabilities of materials to new levels: enhanced properties at elevated temperatures allow polymers to be used in new, more demanding applications. EMS Tape Technology uses a local and oriented high performance reinforcement to increase competitiveness versus metal. Materials properties achieved are beyond any experience with thermoplastic materials so far.

13:15-13:55**TBC***Speaker***14:15-14:55****TBC***Speaker***Workshop Theatre 2****10:15-10:55****TBC***Speaker***11:15-11:55****Break free from design limitations with
3D Printing**

Stijn De Rijck, Marketing Manager, Materialise

12:15-12:55**TBC****13:15-13:55****TBC****14:15-14:55****TBC**

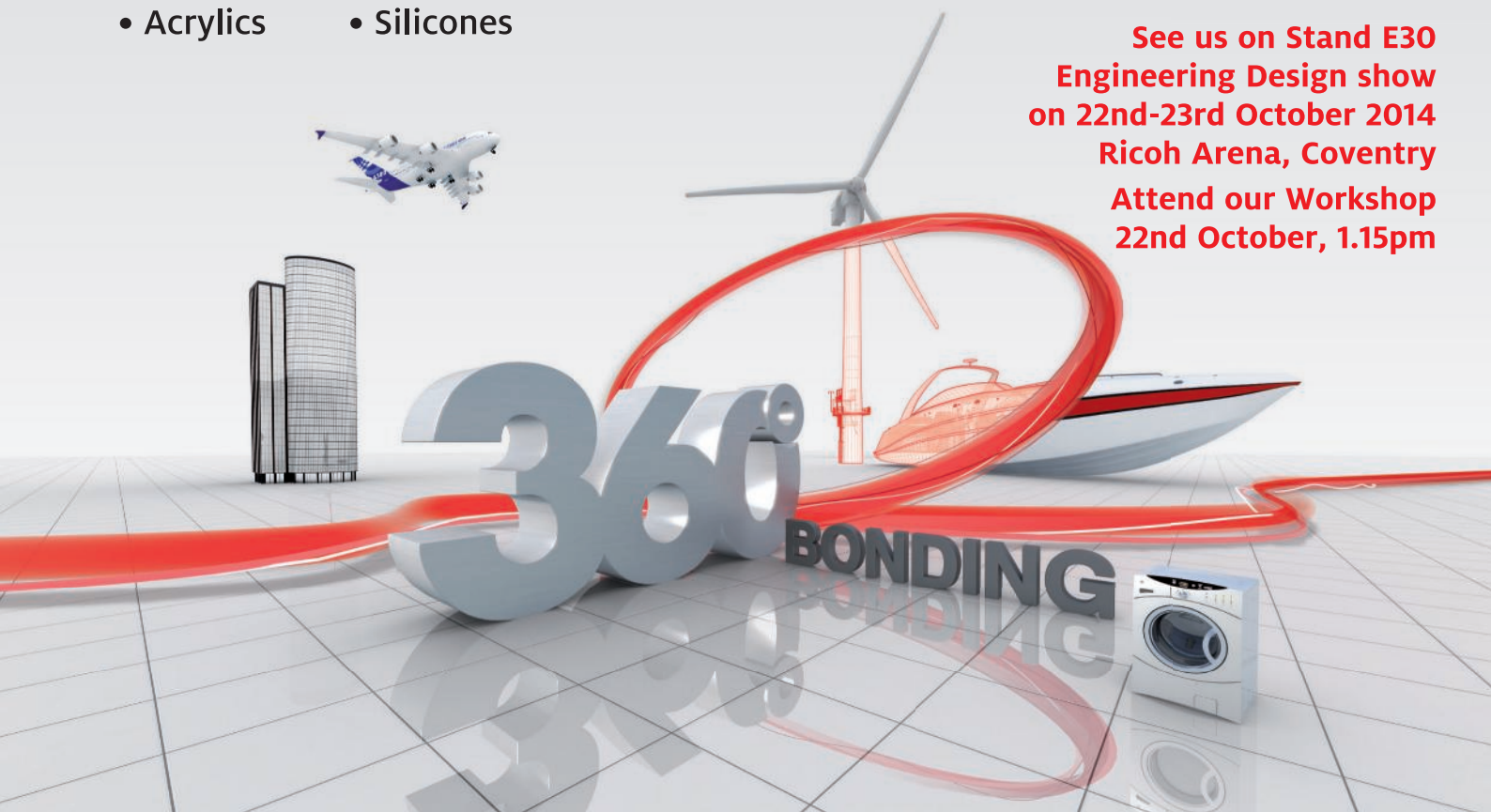
Discover new structural bonding solutions

Reliable and durable 360° bonding.

One reliable partner, five technologies – unlimited possibilities.

- Epoxies
- Polyurethanes
- Silane modified polymers
- Acrylics
- Silicones

**See us on Stand E30
Engineering Design show
on 22nd-23rd October 2014
Ricoh Arena, Coventry
Attend our Workshop
22nd October, 1.15pm**



Visit **www.360bonding.com**
for more information and
an interactive product selector.

Henkel Limited

Wood Lane End, Hemel Hempstead,
Hertfordshire HP2 4RQ
Technical Helpline Phone: 01442 278100
Fax: 01442 278071
E-mail: technicalservice.loctite@henkel.com



Excellence is our Passion



Features and Innovations

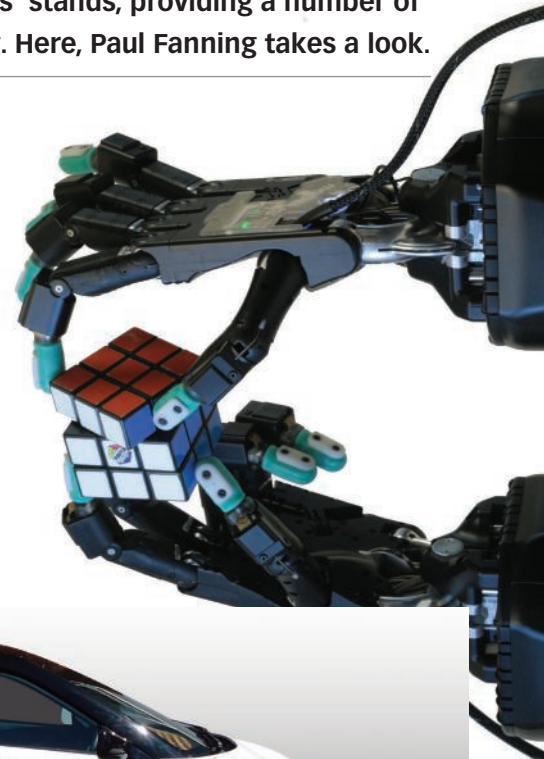
The 2014 Engineering Design Show will offer a lot more than exhibitors' stands, providing a number of features and innovations demonstrating the best of British Engineering. Here, Paul Fanning takes a look.

One of the most successful innovations at the Engineering Design Show 2013 was the introduction of the Innovation Zone. Situated near the entrance to the Show, this featured a range of exciting technologies and allowed visitors to get up close and personal with some of the leading British design engineering achievements.

From being able to shake hands with the Bebionic prosthetic from RSL Steeper to getting an insight into what's behind some of Dyson's greatest innovations, 2013's Innovation Zone proved a tremendous attraction and created an immediate buzz around the Show.

With this in mind, the 2014 show will also host an Innovation Zone sponsored by Cambridge Consultants. It will be complemented this time around by other features placed strategically around the show floor.

Cambridge Consultants, sponsor of the Innovation Zone, will offer a Basketball challenge for visitors, which will use cameras to analyse ball trajectory, speed, angle and arc. The Potenza iPad-controlled electric sports car will also feature.



Cambridge Consultants Innovation Zone

- Composites expert Gurit will demonstrate some of their latest achievements, including the rear section of the London Routemaster Bus and the front section of a leading sports car.
- Cambridge Consultants, sponsor of the Innovation Zone, will offer a Basketball challenge for visitors, which will use cameras to analyse ball trajectory, speed, angle and arc, as well as an exhibition of the company's highly-successful DropTag technology. The DropTag platform is a family of connected sensors, smartphone apps and back-end data analytics systems that can be applied to a range of industries. It can be

used, with ease, to monitor the condition of a 150ft wind turbine blade, when parts of it are moving at up to 150mph. The tiny DropTag puck fixed to the surface of a blade can tell you, in real time, what is happening – how much twist or vibration the blade is experiencing, without incurring any downtime.

- The iPad controlled two-seater all-electric sports car from Potenza Technology.
- An interactive demo from Bf1systems of its highly engineered road bike
- An example of the new Raspberry Pi B+ model.

OVER 9000 LINES OF INJECTION MOULDED AND SPRING STEEL INDUSTRIAL FASTENERS AND COMPONENTS

Moulded trim & panel fasteners • Automotive parts
Furniture insert nuts & components • Cable & pipe clips
Circlips, spiral retaining rings & wave springs



**WE STOCK THE LARGEST RANGE OF FIR TREE
BUTTONS, SCRIVETS AND TRIM CLIPS IN THE UK**



SD Products Limited
The Broadway
Great Central Road
Mansfield
Nottinghamshire
NG18 2RL

T: +44 (0)1623 655 265
F: +44 (0)1623 420 689
sales@sdproducts.co.uk
www.sdproducts.co.uk
Follow us @SDProductsLTD



FireFox® 1

**The new
hydro-pneumatic
setting tool for
blind rivet nuts**

NEW

Available as from
mid of 2014



HANDY, RELIABLE AND SAFE!

The easier-to-handle little brother of the FireFox® 2 has been developed for precision setting of small blind rivet nuts at high rate in serial production environment.

Advantages

- Handy and extremely light with only 1,96 kg
- Precise and fast setting of pulling force
- M3 to M6 steel
- Automatic drill-on function
- Option of replacing the threaded mandrel by a cap screw with hexagon socket DIN EN ISO 4762
- Wide range of accessories



NEW + COMFORTABLE

With fast and easy setting force adjustment by use of a new colour coding

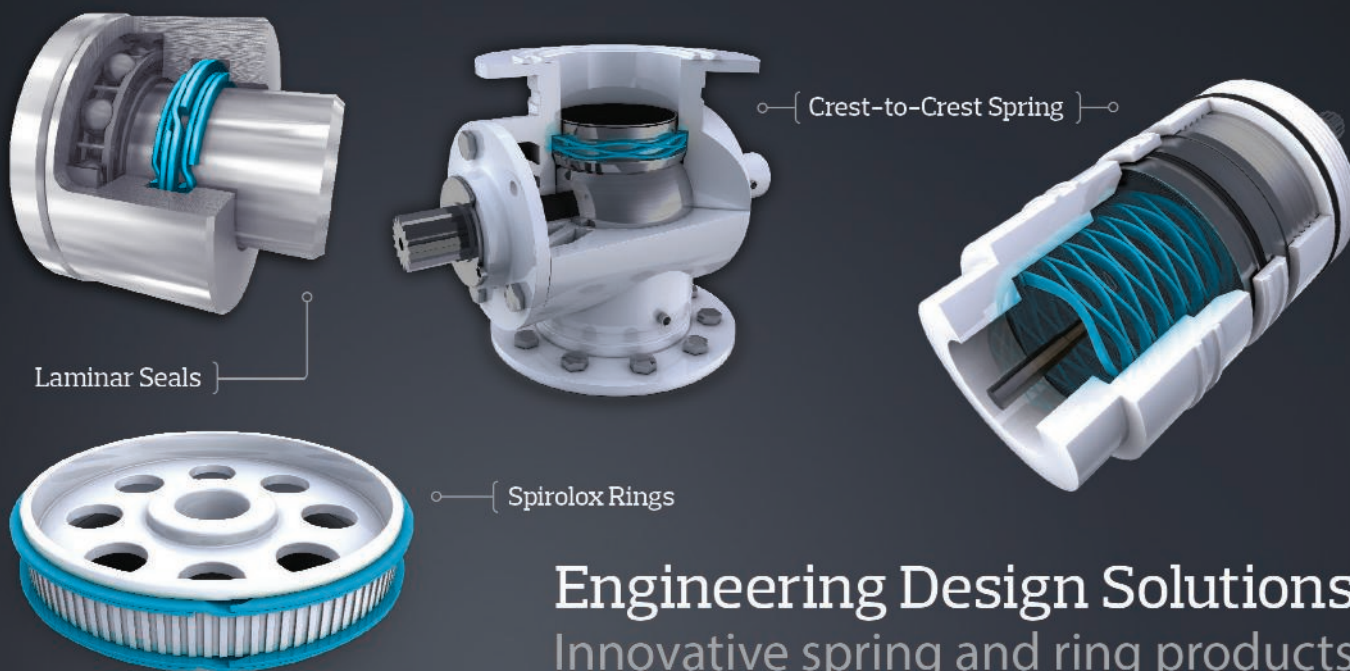
The experts in blind riveting



GESIPA Blind Riveting Systems Ltd
Dalton Lane, Keighley
West Yorkshire
BD21 4JU

T + 44 (0) 1535 212200
F + 44 (0) 1535 212232
info@gesipa.co.uk
www.gesipa.co.uk

A company of the **SFS** group



Engineering Design Solutions
Innovative spring and ring products



call now to speak to our expert team
+44 (0)1435 860333
www.tfc.eu.com



Electronics Show grows apace

Launched last year alongside the Engineering Design Show, the Electronics Design Show will be bigger and better in 2014.

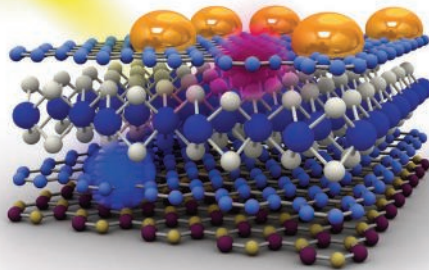
It may take a while for the majority of British engineers to believe that an event in the UK will prove to be a worthwhile day out of the office, but that belief is building amongst a significant number – and the electronics sector is an example of where interest is growing.

Last year, Findlay Media launched the Electronics Design Show alongside the Engineering Design Show. This year, encouraged by the reception for the Electronics Design Show from visitors and exhibitors alike, Findlay Media is launching the Embedded Design Show. Both shows will have their own identity, their own conference and their own workshop programme.

"We didn't decide this was what British engineers needed," said Ed Tranter, executive director. "We asked them what they needed and have built an event to meet those needs."

Filling a gap in the growing embedded electronics market, the Embedded Design Show will offer a focused event for the industry. Embedded specialists will be able to visit exhibitors and attend technical sessions tailored specifically for their interests. Meanwhile, workshop theatres will host technical and application based presentations designed to provide attendees with a combination of solutions and latest technical options.

Phil Mayo, managing director of headline sponsor Premier EDA Solutions, said: "We see the Electronics Design Show as a superb platform for highlighting innovation from the UK electronics industry. We share a common



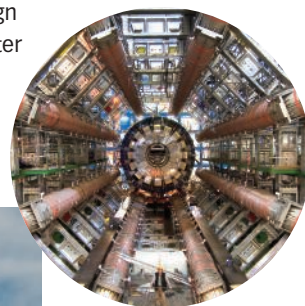
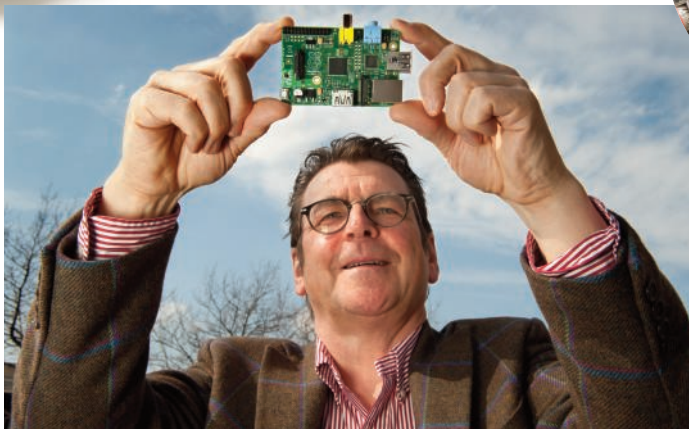
passion with Findlay Media for the success of UK engineering and are very much looking forward to showcasing some of the fantastic technology designed using our products at the exhibition."

Alongside a wide range of technologies, being exhibited by more than 80 companies, visitors to the Electronics and Embedded Design Shows will have the opportunity to access best practice learning and practical design ideas through

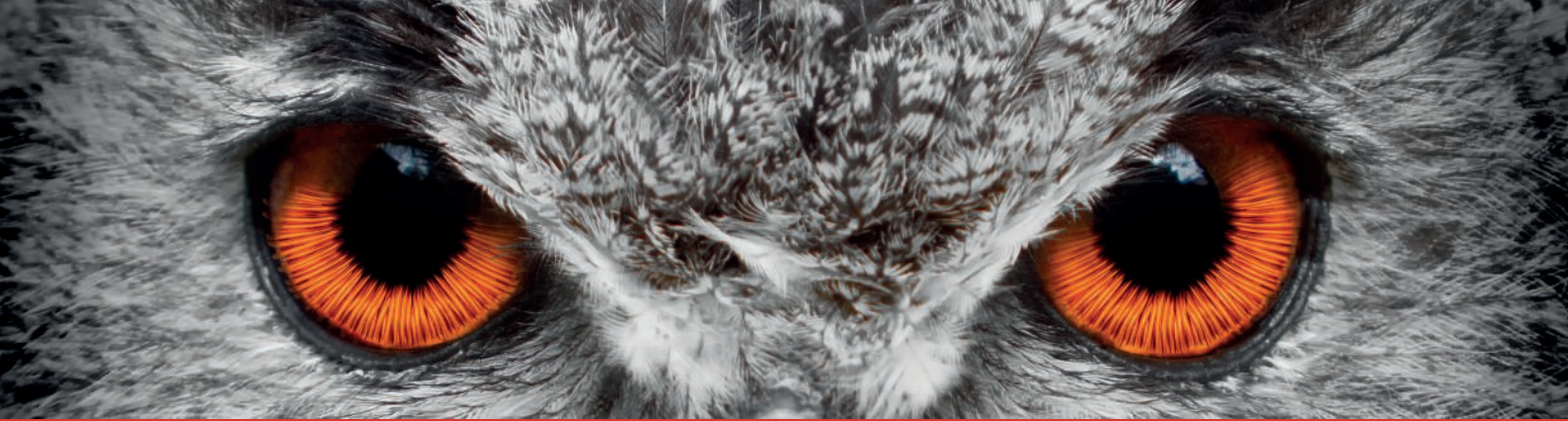
conference and workshop sessions. The conference will focus on the requirements and realities of design electronics within the UK. With a wide ranging agenda, the conference will bring together high profile speakers from industry and academia.

Topics being addressed in the Electronics Design Show conference include electronic systems for jet engines, the route to graphene commercialisation and the future for driverless cars. Pete Lomas from the Raspberry Pi Foundation will give attendees an update on progress with the credit card sized development system, while the innovative electronics at CERN will be explored.

There should be something for everyone at the Electronics and Embedded Design Shows and Tranter concluded: "We look forward to seeing you there!"



*Clockwise from top:
The route to Graphene
commercialisation
National Graphene Institute
Building a supportive
framework of collaboration
with SMEs
General Dynamics
Raspberry Pi – creative
concepts to commercial
products
Norcott Technologies*



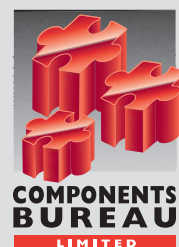
Precision

A new vision for wound components

The wound components you have been looking for are here and available to meet your precise specifications, in just 4 weeks. With the flexibility to suit your changing volume requirements, however fast they happen. It's a vision of the future, that's happening now.

- Precision brand wound components
- Manufactured for speed, quality, flexibility and value
- Samples available in just 14 days
- 4-week delivery
- Rapid volume adjustment easily accommodated

For more information please visit our website.



www.precision-range.com



Same Pressure in a Narrow Profile



Lee Spring®

leespring.co.uk

VISIT US AT
**Engineering
design show**
STAND D60

SKINNY & STRONG

NEW! High Pressure Compression Springs

Very high spring rates without the bulk.

These slender, low index, **High Pressure Compression Springs** are manufactured in passivated and shotpeened 17-17 Stainless Steel to provide a great balance of corrosion resistance, high strength and toughness in a reduced footprint.

This line is ideal for anyone in need of firm but not rigid springs with thinner profiles, suitable for small spaces.

New Series 20 Catalogue

- Over 200 pages of Stock springs, including
- New High Pressure Compression Springs,
- Metric Bantam™ Mini Compression Springs
- Expanded Heavy Duty Die Spring line.

Call or email us today for your FREE copy.



Call: +44 (0)118 978 1800 | Fax: +44 (0)118 977 4832 | www.leespring.co.uk



Stand and deliver

**Intro: What will be available for visitors to see at this year's Engineering Design Show?
Here, Eureka offers a taste of what's to come.**

Abssac

Stand D10

Now in its third year at the Engineering Design show Abssac is using the event to focus on the 30 years of experience in supplying precision ball screws. Typically, Abssac supplies ball screws with outside diameters in the range from 1.8mm to 25mm for the precision ranges and up to 80mm on the transport ranges, each with a range

of leads per diameter can be supplied.

Whether your requirement is for a precision rolled or precision ground ball screw, Abssac can assist you in specifying the right part for the application

and welcome the opportunity to develop linear solutions within tight cost budgets.

Put simply, the rolling process forms a thread for less cost than a ground one. Ball screws that have been cold rolled formed are ideal for applications that do not require the finite accuracy of the ground ball screw equivalents, but are still required to reliably transmit an axial load with a high degree of accuracy. Using the traditional recirculation of the balls within the nut housing, a typical ball screw may be 90 percent efficient, versus 50 percent efficiency of a lead screw of equal size. Precision rolled ball screws

achieve accuracies of C7-20 (that's 50 microns per 300mm of cumulative lead accuracy - 20 microns of axial backlash).

Ball screws that have been formed by a grinding process are used where acute linear accuracy is paramount within the application. We offer a quality program of diameter and lead combinations with a variety of ball nut styles. Precision ground ball screws achieve accuracies of C0-0 (that's 0 microns per 300mm of cumulative lead accuracy - 0 microns of axial backlash).

Alrad

Stand D50

Alrad will show various industrial cameras and lenses, including:

Panasonic GP-MH310: 1MOS Full HD Module 10x Zoom Camera with 4M Pixel. The Single Chip Full HD Module Camera from Panasonic brings you outstanding broadcast quality HD resolution and superior colour performance at the right price, and the right size for a wide variety of medical & industrial applications.

Panasonic GP-MH330: 1MOS Full HD Module C30x Zoom Camera. The Single Chip Full HD Module Camera from Panasonic brings you outstanding broadcast quality HD resolution and superior colour reproduction at the right size for a wide variety of professional AV, industrial

and medical applications.

The WiDy SWIR camera, which integrates an ultra-wide dynamic range InGaAs sensor operating from 900nm up to 1700nm. WiDy SWIR uses a 320x256 pixels InGaAs photodiode array sensor coupled to the NSC0803 wide dynamic range read out circuit from NIT. The InGaAs photodiodes provide a high QE signal response from 900nm to 1700nm.

Cambridge Consultants

Stand B5

What turns a smart system into a brilliant one? Accurate measurement is vital – but the key to success is more information, not just more data.

That's where a combination of high-tech, low-cost sensors and clever algorithms comes in – and you can see it in action on the Cambridge Consultants stand in the Innovation Zone.

The product design and development firm will be showcasing DropTag – a family of connected sensors, smartphone apps and back-end data analytics that can be applied to industries ranging from parcel logistics to machinery condition monitoring.

Also on display will be the ArcAid basketball training system, which demonstrates how low-cost sensors such as cameras can be combined with a smartphone app or laptop for advanced performance monitoring and technique teaching.



D Young & Co LLP

Stand G42

D Young & Co has a proud history of supporting pioneering companies in emerging technologies. From SMEs to global businesses, whatever your invention, technology or brand, we will help you get the best protection for it. Our specialist teams provide guidance on using IP rights efficiently and effectively to businesses from Europe, America, Asia and around the world. We are delighted to be sponsoring the



Engineering Design Show and will be on hand during the show at stand G42 to answer your IP questions. On Wednesday 22 October, patent attorney Jonathan Jackson's workshop asks: 'Are you protecting your products and designs? This workshop will provide a straightforward and practical guide to protecting your designs and innovations. Using case studies to illustrate the topic, Jonathan Jackson will deal with the practicalities of product protection and enforcement, from the early stages of product creation to launch and commercialisation. You'll find out what IP is most appropriate to protect your product, the importance and benefits of registered design rights and practical steps to take to obtain and enforce design protection.

Elesa **Stand E2**

At the Engineering Design Show, Elesa UK will be showing its MP series of folding handles recently announced by Elesa come in two formats – the surface mount MPE and the MPR with recessed tray. Both types feature comfortable design of handle with integral return spring. This makes them suitable for application on flight cases and other luggage/packing type



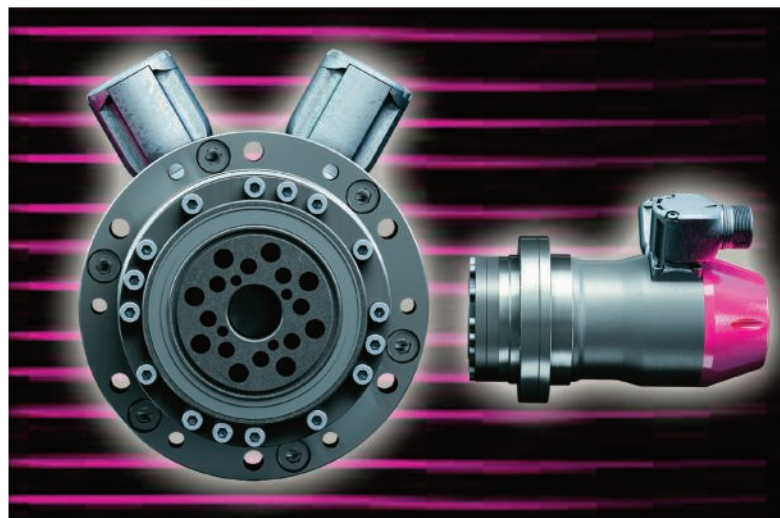
situations where they may be used as lifting handles or pull handles.

Also on display will be the company's new range of IP65 quarter-turn, quick-fit latches are suitable for enclosures, cabinets, machine guards, access panels etc. in industrial environments, both indoor and outdoor. The range features an integral pull handle and quick insertion design (removable with a simple tool). Multiple closing levers (tabs/cams) are offered to accommodate door to frame depths of between 16-32mm.

EPLAN **Stand D5**

EPLAN will celebrate its 30th Birthday at the Engineering Design Show. Over the past 30 years EPLAN has gone from strength to strength and this is particularly true here in the UK. In the past 3 years alone EPLAN UK has grown 8-fold, winning awards for 'Top Company Performance' and 'Highest Company Growth in 2013'. Now with over 40,000 customers and 100,000 applications in over 80 countries, the market leading electrical CAE Company is set to further its expansion – but this is not before celebrating how far it has come.

As the show encapsulates current developments in



engineering and manufacturing innovations, EPLAN are keen to showcase some of their latest software products and features. Primarily focusing on the integrative capabilities of EPLAN software, the company will be showing how users can pick components directly from the EPLAN Data Portal. From what started as a small catalogue of select manufacturers is now an extensive library of 490,000 device drawings controlled and maintained by leading manufacturers such as ABB, Rockwell Automation and Schneider Electric.

Harmonic Drive **Stand G50**

Precision drive technology manufacturer Harmonic Drive is going to use the forthcoming Engineering Design Show at Coventry's RICOH Arena to exhibit its new range of servo actuators.

The Staffordshire-based precision gear and servo actuator specialists have over forty years of experience in manufacturing innovative and high quality products for a range of clients, including leading brands in the aerospace, military and automotive industries.

The centrepiece of Harmonic Drive's exhibition will be the company's new range of compact

and hollow shaft servo actuators – The LynxDrive, the CHA-14 and CHA-17 lightweight hollow shaft models. Each actuator in the LynxDrive range features a synchronous servo motor, feedback sensors and a high precision Harmonic Drive HFUC Series Gear Unit, lowering both energy consumption and running costs. "When we developed the LynxDrive range, we focused our efforts on creating the most compact design possible, without compromising on quality," explained Graham Mackrell, managing director of Harmonic Drive.

Also included in Harmonic Drive's exhibition will be the versatile HFUC series component sets, the new, smaller FHA Mini range of actuators, and the new lightweight Torque Drive series.

Henkel **Stand E30**

Structural bonding adhesives are increasingly replacing traditional mechanical joining methods, particularly in industries where uniform stress distribution and light weight are important design criteria. Henkel is a leading innovator in this field. The originator of anaerobic adhesives under its Loctite brand, the company has continued to



Precision with Vision

Barden bearings are renowned worldwide for their high reliability and long operating life in challenging applications.

Every bearing we produce is manufactured to precise tolerances and the thousands of bearing variations we offer are used in virtually every sector of industry where there is a need to meet stringent quality standards, high speed and performance under demanding operating conditions.

These include key components for aerospace, defence, medical, robotics, nuclear power, emerging automotive technologies and high performance vacuum pumps.

Where necessary our expert engineering team work with customers to create and deliver unique solutions that meet an application's exact requirements.

Call +44 (0)1752 735555 or visit www.bardenbearings.co.uk for more information.



Visit us at the
Engineering Design Show
22 - 23 October 2014 • Stand C45



John Guest®
The Push-fit People

INNOVATIVE PUSH-FIT SOLUTIONS FOR OEMS

MADE IN THE UK.

OVER THE LAST 50+ YEARS, JOHN GUEST HAS WORKED CLOSELY WITH OEM DESIGN ENGINEERS TO OFFER HIGHLY INNOVATIVE AND HIGH QUALITY PUSH-FIT TECHNOLOGY SOLUTIONS TO THEIR PRODUCTS, ADDING GREATER VALUE BY SIMPLER INSTALLATION



Considering Technical Ceramics?

Just ask Alex!

You certainly should be – we're supplying engineers and manufacturers with a whole host of designs that make things run faster, smoother, longer...and smarter.

Our high alumina and silicon carbide components are light in weight and yet strong. Excellent thermal performance and high wear resistance combine to deliver top performance.

Let's see if we shape up.

Questions, concepts, drawings, quote request, technical queries for us?...



...ask Alex a.painter@ipsceramics.com

www.ipsceramics.com

Engineering
design show

Stand B65



Experts in tape engineering



tesa® double sided tapes bond permanently and securely to a variety of substrates and include products with UL and TÜV approval. Our Heat Activated Films have a bond strength of up to 5 times that of normal pressure sensitive tapes and superior resistance to chemicals, temperature and ageing.



Our R&D experts file an average of 70 patents every year. This results in half our sales deriving from products developed in the last 5 years and ensures tesa® are a leading supplier of new solutions to many industries.



A tesa Company

tesa UK Ltd
Yeomans Drive Blakelands Milton Keynes MK14 5LS
tel: 01908 500235
www.tesa.co.uk
www.tesacohesion.co.uk





develop its products to offer new attributes and improved performance such as increased temperature resistance. Several of these products will feature at the Engineering Design Show.

Another unique development is Loctite 4090, a cyanoacrylate/epoxy hybrid that gives the user the speed of an instant with the durability of an epoxy, opening up completely

new application areas for instant adhesives for load bearing structural bonding.

Visitors to the Engineering Design Show will also learn how Henkel engineering adhesives used in overmoulding are making an important contribution to product reliability. Henkel TECHNOMELT® moulding is highly cost effective and fast. As low pressures are

involved, typically 2 – 20 Bar, lower cost mould tools can be employed. The method is perfect for encapsulating and enclosing delicate components to provide advanced protection in tough environments.

igus

Stand D20

The Engineering Design Show is fast becoming the UK's 'debutante's ball' for the unveiling of new, technological innovations to industry; at this year's show igus (stand D20) will be showcasing a range of new products, including robolink D, tribo-tape, tribo-filament, e-cord micro, and the CRC clean-room chain.

Available in three sizes, robolink D is an articulated directly driven arm that allows for up to 6 degrees of freedom. Visitors to the stand will

be able to see a demonstration of a full robolink D system in action; "robolink D is a different approach to the problem of creating lightweight, cost effective configurable robotic systems," says Justin Leonard, director at igus. "unlike the wire driven standard robolink, this system is built on a series of directly driven joints, allowing higher payloads to be carried."

On the igus stand will be one of the latest developments, introducing tribo-tape; made from self-lubricating, iglidur A160 material, it is blue for easy identification in the food industry. "Thanks to its excellent wear characteristics, it is well-suited for lowering friction in a wide range of applications wherever there are sliding surfaces," explains Robert Dumayne, director at igus.



an EnPro Industries company

The Global Leader in High Performance Bearing Solutions



Visit us at the Engineering design show

Ricoh Arena, Jaguar Hall, Coventry UK
Booth G65 • 22-23 October 2014

GGB UK
Wellington House • Starley Way
Birmingham International Park
Birmingham B37 7HB
Tel. +44 -121 767 9100
Fax +44 -121 781 7313
greatbritain@ggbearings.com



©2013 GGB. All rights reserved.

DAVALL

Precision Gears



Tel: +44 (0) 1707 28 31 00

Military & Aerospace Gearing For Demanding Applications....



Spur | Helical | Bevels | Splines | Spiradrive | Spiroid
Hypoid | Worms & Wheels | Racks & Pinions | Toothed Pulleys

Davall are an approved supplier for
Aerospace, Military, & Commercial Products.
Design, Prototypes or Make to Print to production schedules.

Email your drawings now to info@davall.co.uk

www.davall.co.uk

Driven By Quality

High Speed Cameras for Machine Vision

e2v Linescan cameras offer high speed solutions in machine vision

- More than 20 different models available across 3 distinct product ranges
- CCD and CMOS sensors
- Up to 16000 pixels wide
- CameraLink and GigE Vision outputs
- Ideal for a wide range of high speed machine vision applications



e2v EliiXA+ line scan camera. Just one of a vast range of machine vision cameras

LightWise Allegro Camera family offers a fast USB3.0 solution for machine vision

- CCD and CMOS sensors
- Resolutions from 1 to 12MegaPixels
- On board fast FPGA and memory
- High frame rate capability



Allegro USB3.0 cameras offer a low cost solution for machine vision

See us at PPMA Stand K62

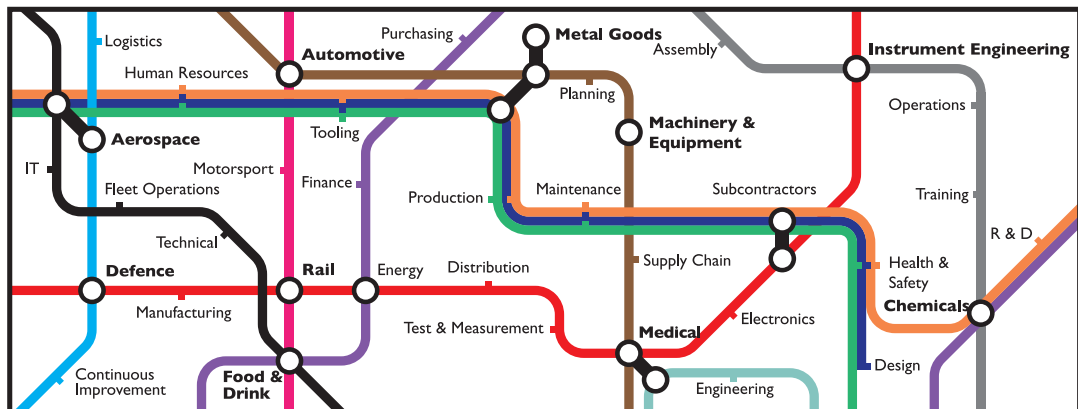
**ALRAD
IMAGING**

Tel No: 01635 30345

Email: sales@alrad.co.uk

Web: www.alrad.co.uk

The most comprehensive map for reaching UK manufacturing and engineering



**Findlay Direct Marketing –
providing the perfect route to new business**

findlaydirectmarketing.com

01322 221144

directmarketing@findlay.co.uk





IPS Ceramic Stand B65

IPS brings a ceramic solution to meet the demands of today's engineering design community. We understand the materials involved because our team has, collectively, over 150 years' experience in designing, manufacturing and supplying ceramics.

We could list a whole host of items – and the many samples at the show as well as our drawings display will do this job – but what is just as important is the potential for component design offered by this remarkable family of products.

Technical ceramics are not only cost competitive, although of course this is crucial, but also through various material compositions and shaping technologies they are readily manufactured into precision, tough, high performing, long lasting, chemical and heat resistant engineering parts.

IPS has an in-house rapid prototyping facility.

Laser Lines Stand G70

During the Engineering Design Show Laser Lines Ltd will have live demonstrations of both the Stratasys FDM and Polyjet 3D Printing solutions. In addition Laser Lines Ltd will showcasing a varied and comprehensive range of samples to help illustrate the broad spectrum of applications for which 3D printing technology is being applied.

Materialise Stand G45

With its headquarters in Leuven, Belgium, and branches worldwide, Materialise is a provider of Additive Manufacturing (AM) software solutions and sophisticated 3D printing services in a wide variety of



industries, including healthcare, automotive, aerospace, art and design and consumer products. Materialise has been playing an active role in the field of AM since 1990, through its involvement in AM for industrial and medical applications, by providing biomedical and clinical solutions such as medical image processing and surgical simulations and by developing unique solutions for its customers' prototyping, production, and medical needs.

The Additive Manufacturing services at Materialise use a wide range of revolutionary technologies, including Stereolithography, Laser Sintering, FDM and Vacuum Casting. In total, Materialise runs over 100 machines, printing more than 400,000 parts per year. This makes us one of the largest Additive Manufacturing plants in the world. In addition, a team of specialized designers and CAD engineers supports customers with dedicated design for Additive Manufacturing.

Micro-Epsilon Stand C25

Micro-Epsilon's latest innovation in



thermal imaging, the thermoIMAGER TIM 640, is an infrared thermal imaging camera that is able to record radiometric video at an optical resolution of

640x480 pixels – making it the highest resolution infrared camera available on the market today for less than £6800.

With a thermal sensitivity of 75mK, this camera can detect very small temperature differences, which is critical in many thermal analysis R&D projects and inline thermography applications. At ambient temperatures of between 0 and 50°C, the camera can measure object temperatures ranging from -20°C to +900°C.

For a demonstration of our Thermal Imaging Cameras or to discuss our other measurement sensors please visit stand C25.

Midas Pattern Co. Stand E115



Midas specialises in producing large, low-volume,

high-quality, polyurethane mouldings as well as offering customers the facility to create large prototypes – in production materials – in very short timescales.

The large production mouldings are particularly suitable for use as equipment enclosures in medical, analytical and scientific applications, where valuable technology must be enshrined in large, complex, multi-part moulding assemblies.

Midas offers two tooling systems: FASTrim, a low-cost solution to producing even large

prototypes, in production materials in as little as 10 – 15 days; and MRIM, a high quality composite tooling system offering low set-up costs for high-quality mouldings in volumes from 1-2000 per annum, with a guaranteed life of 5000 off.

Misumi Stand F20

Misumi is a global manufacturer and leading supplier of more than 9 million mechanical components for special purpose machinery and assembly automation. A large number of products are individually configurable. We offer free download of CAD models and deliver from 1 piece. For 23,000 stock items same-day shipment applies.

Misumi offers you a wide portfolio of more than 100,000 configurable components. You can specify your desired components in up to 0.01 mm increments. Due to the precise configuration, there is no need for testing and redesign. Therefore, you gain time in your prototype construction.

For our stock items, Misumi provides a same-day shipment service. More than 100,000 stock items are ready for dispatch in 4 days. You can view the exact lead times in the online quote and order system.

Moore International Stand A26

The team at Moore International are excited to be showcasing a variety of innovations from their European partners, Eichenberger and Schneeberger. Swiss ballscrew and leadscrew manufacturer, Eichenberger Gewinde, have recently launched a revolutionary high helix aluminium leadscrew. While aluminium has been used before to make leadscrews, Eichenberger's innovation is the production of one with a high helix



angle, enabling rotary motion to be converted into very impressive linear speeds. Being considerably lighter than steel, an aluminium Speedy leadscrew is ideal for any application where weight needs to be kept to a minimum.

Moore International will also be displaying the latest measuring system by Schneeberger. The Mini-Scale Plus can be used in any application that requires a linear guide to make movements as small as 0.1µm in length. The most common areas of application are biotechnology, semiconductor equipment, laboratory automation, metrology and robotics. To see either of these products or to discuss your requirements for ballscrews, leadscrews or linear products, visit Moore International at stand A26.

MPA Group Stand F43

Engineering businesses each have a set of issues that they face in today's economy: from securing valuable funds and planning innovation activity, through to retaining and finding a skilled workforce. To ensure stability and growth the industry needs to understand the support and mechanisms that are available to them; tax reliefs arising from: innovation, R&D activity, patents and employee ownership schemes; private funding; grants... the list is long.

The MPA Group will be on hand at the Engineering Design Show to advise how innovative companies can secure valuable funds. They are also running a free practical workshop entitled 'Funding innovation for business

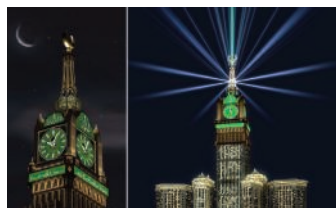
growth', where Dave Pepper will address what the future holds for the industry, and uncover the support there is in place (today and in the future) for engineering to help drive Britain back to the forefront of innovation.

Prototype Projects Stand J34

Prototype Projects is exhibiting at the EDS for the 3rd year running, and will be showing off a range of sample prototype and production parts made using SLA, laser sintering, FDM, CNC machining and vacuum casting technologies.

PULS UK Stand A28

When night falls in Mecca the green



dials of the largest clock tower in the world are still clearly visible at a distance of over 10 miles. Two million LEDs – and around 1000 PULS power supplies illuminate the four clocks mounted on each side of this colossal tower. During the daytime the clock dials are white and the hands are black, switching to brilliant white at night. The tower has been designed and tested to

provide a service life of 100 years during which it will have to withstand extreme weather conditions and hurricane-force wind. The PULS Dimension XT series, 48V / 20A power units deliver the one million watts required to illuminate the LEDs.

Quadrant Stand B85

From aerospace, to automotive, rail, medical, chemical, food & beverage, oil & gas or alternative energy production – these and many more sectors take advantage of Quadrant's leading range of thermoplastic materials & solutions expertise.

Our portfolio includes UHMW polyethylene, nylon, acetal and ultra-high performance polymers such as PEEK, PAI, PBI and PI, polymers that resist temperatures to over 425°C.

Quadrant's unique production technologies and capabilities, standards like ISO 13485, ISO/TS 16949, certifications and quality services such as AS9100C, NORSOK M-710 make us the partner of choice for demanding applications.

RDP Electronics Stand A4

RDP Electronics is a UK manufacturer, selling transducers and instrumentation measuring displacement, force, pressure and torque. We offer LVDT displacement transducers including submersible, high-temperature and custom designs. Our product offering is significantly extended by being sole UK distributor for Honeywell Sensotec/Lebow (load, pressure



and torque transducers) and MTS-Temposonics Industrial Series magnetostrictive displacement transducers. At The Engineering Design Show we will be demonstrating our strong capabilities in custom transducer design as well as launching our new DCV and DCC displacement transducers with user-friendly input/output characteristics.

Reliance Precision Stand F40

Reliance Precision is a specialist engineering company, with over 50 years' experience in providing custom-built, high reliability, precision instrumentation to customers from a diverse range of global markets. Reliance offers a complete engineering service, including design and development, prototyping, manufacturing, assembly and test. Service and products are complemented by an extensive online and printed catalogue of precision motion control components and electro-mechanical assemblies.

Royal Navy Stand D50

The Royal Navy will be looking for potential recruits at this year's show. As well as excellent technical skills, you'll need to develop the ability to make decisions about complex engineering problems quickly and carry out risk management while under pressure. Lives are at stake, so you will have to be extremely safety-conscious, whatever the situation. Above all,

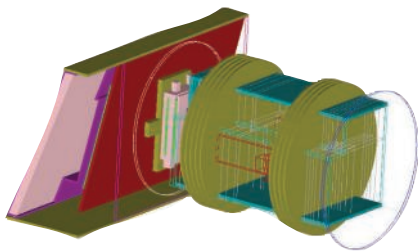


Open Up This Camera



You Won't Find a Heat Sink

Product systems such as thermal management need to be considered holistically for technology to advance. Join Aavid's mission to enable the world's technological advancements by designing and building the best solutions possible.



Download a case study
www.aavid.com

Visit Stand J38 at the
Engineering Design Show

Creativity Unleashed...
Aavid Design



**AAVID
THERMALLOY**

cut & dried



speedicut

VISIT US AT
Engineering
design show
STAND D20

Custom parts from iglidur® materials
delivered in 1 to 10 days.

igus.co.uk/speedicut

igus® (UK) Limited Phone 01604 677240 Fax 677242
speedicut@igus.co.uk order-service: Mon-Fri 8-8, Sat 8-12



HEIDENHAIN

The measure of excellence

Ultra-precise measurement and positioning from HEIDENHAIN

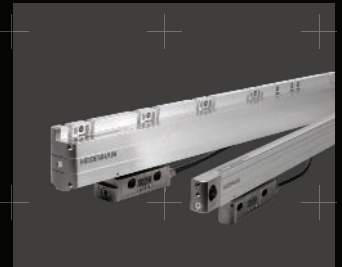
HEIDENHAIN's unrivalled range of linear, angular and rotary encoders provide the highest-quality measurement solutions for demanding positioning tasks. HEIDENHAIN encoders deliver increased productivity and efficiency in a wide range of industries and applications, from machine tools and automation to electronics manufacturing and telescopes.

See us at the
Engineering Design Show
22nd - 23rd Oct. 2014
Stand: E55

Contact HEIDENHAIN today to find out how we can help you:
01444 247711 sales@heidenhain.co.uk
www.heidenhaingb.com



exposed encoders



sealed encoders



angle encoders



rotary encoders

linear encoders + rotary encoders + angle encoders + length gauges + contouring controls + digital readouts



Tom Parker Ltd. Powering the Future

Pneumatic Cylinders | Solenoid Valves | FRL's



E·MC[®] has landed

Great value ranges available **exclusively** in the UK from **Tom Parker Ltd.**



Automation solutions for every application



Innovative technologies



Quality materials



www.tom-parker.co.uk | sales@tom-parker.co.uk | t: 01772 255109 | f: 01772 563475



you'll need to be concerned with the welfare, morale, training and development of the team of skilled technicians who'll look to you for expertise, management and leadership.

Stanley Engineered Fastening

F41

Spiralock has re-engineered the standard (female) internal thread form and added a 30° wedge ramp at the root of the thread. Through this unique design, Spiralock® thread form is exceptionally resistant to thread loosening and stripping, caused by transverse vibration. It is also free-spinning and reusable. Spiralock thread form solves thread loosening and joint integrity issues by changing the physics of how the threads interact. In traditional 60° threads, the gap between the upper edges

unique profile of Spiralock threads closes the gap that causes loosening, improving the integrity and reliability of threaded joints.

For more than 35 years, the Spiralock threadform has been used in extreme fastening applications where joint failure or loosening is not an option: from the main engines of NASA's Space Shuttle, the Saturn Cassini orbiter and Titan Huygens probe to deep sea oil rigs, military and aerospace vehicles, as well as medical implants, artificial limbs, and heart pumps.

Tata Motors European Technical Centre

Stand C5

Tata Motors European Technical Centre, based in Warwick, is a wholly-owned subsidiary of Tata Motors. Created in 2005, as a UK-based centre of excellence for automotive engineering, TMETC provides research and development principally for Tata Motors but also for selected partners in the automotive industry.

On display is one of Tata Motors' concept vehicles, the Tata Pixel that was displayed at the Geneva Motor Show and features patented 'zero turn' technology.

This technology is a unique system that enables a passenger vehicle with independent front suspension to rotate within the track of the rear axle, making it ideal for a city car with a small turning circle and nimble parking. Wheel hub rotation of 180° is facilitated via a conventional (centre tie rod) rack coupled to a two gear system mounted onto the upright.

Visit the stand to meet the engineers and designers behind this concept and find out the backstory of this fascinating, fully-engineered and working concept. You might be

surprised to learn that the transmission is from a lawnmower, but there is an excellent reason why it needed to come from such an unlikely source.

Tharsus

Stand C10

Tharsus is an award winning product design and manufacturing company specialising in creating new intellectual property and next-step products. We work with customers who require these capabilities but seek them as valuable, but outsourced, extensions to their core business.

Visit the company and learn how its proven Original Equipment Design and Manufacture process (OEDM) co-ordinates expertise and activities towards the needs of each project. An evolution to contract manufacturing, OEDM ensures your next generation product remains under your control while benefiting from instant access to our co-located team of project, design, engineering, and lean manufacturing experts.

Trumpf

Stand J50

Sheet metal offers tremendous scope for innovative design. It can make products lighter yet stronger and more economical to produce

by reducing time-consuming and expensive process steps. It also looks good. And at this year's Engineering Design Show, Trumpf will be showing visitors what can be achieved by thinking 'out of the box'.

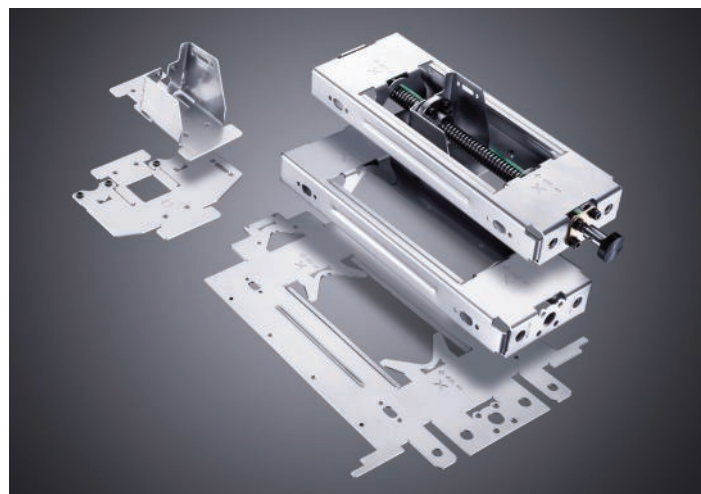
Trumpf software experts will be on the stand to demonstrate how the company's considerable and ongoing investment in research and development has created a range of software solutions for the entire production process; from innovative design and machine programming through to production control and custom development.

High resolution laser marking, another TRUMPF strength, will also be a feature. The process creates durable and indelible characters, images and data matrix codes with tempered colours in metal or by colour changes in plastic; the surface doesn't change. No other process can match it for its simplicity or flexibility.

The TRUMPF TruMark range includes models designed for high process speeds and marking on the fly. Many are plug-and-play and line integration ready and the TruMark 1000 that will be at the show is a good example. This highly compact laser marking system can be used as a static work table or as a mobile station.



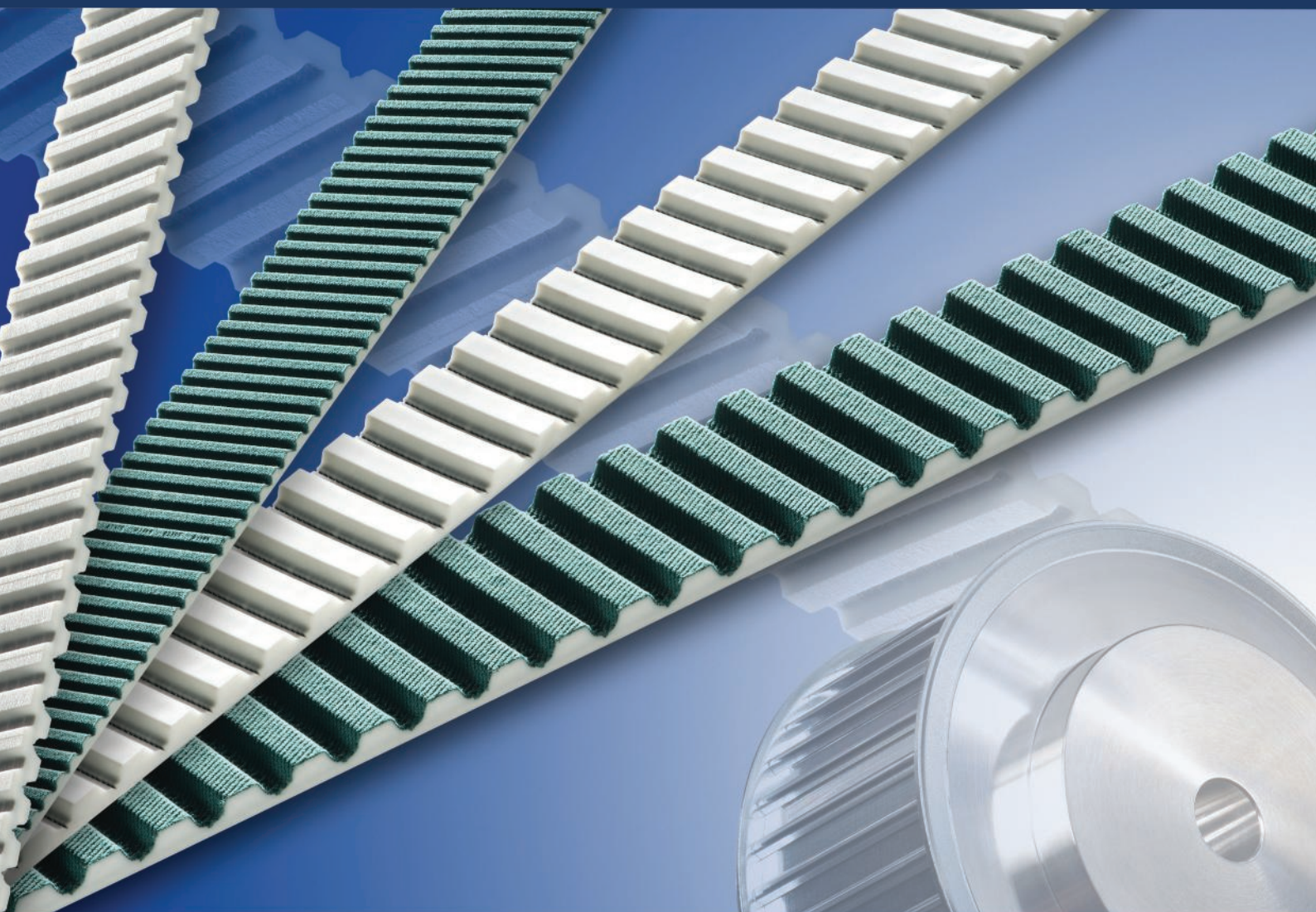
of the male and female threads can lead to shock, vibration, or temperature-caused thread loosening. Stress concentration and fatigue at the first few engaged threads is also a problem, particularly with softer metals. The





TRANSMISSION DEVELOPMENTS COMPANY (GB) LTD

BRECO AT Series polyurethane timing belts
NOW with 20% higher load bearing capacity
BRECO - THE ORIGINAL - THE BEST



Available in both BRECOFLEX® “truly endless” and BRECO® “joined” belts.
The new performance data has been included in the online Mulco belt-pilot calculation program
at www.mulco.de. PDF catalogues for the new BRECO and BRECOFLEX AT polyurethane timing
belts are also available for download there.

Dawkins Road, Hamworthy, Poole, Dorset BH15 4HF
Tel: +44 (0)1202 675555 Fax: +44(0)1202 67746 email: sales@transdev.co.uk

www.transdev.co.uk

MULCO
THE POWER OF A WELL-MESHED GROUP.



Engineering design show

Organisation Name	Stand No.	Organisation Name	Stand No.	Organisation Name	Stand No.
3D Generation	D55	GGB UK	G65	Prototype Projects	J34
AAV PD	F30	Gill Research & Development	E85	PULS UK	A28
Aavid Thermalloy Srl	J38	Goodfellow Cambridge	G80	Quadrant Engineering Plastic	
Abssac	D10	Graphite Additive Manufacturing	C75	Products AG	C65
Agentdraw	B55	Harmonic Drive	G50	RDP Electronics	A4
Albis UK	C15	Heason Technology	E10	Reliance Precision	F40
Alrad Instruments	B60	HEIDENHAIN GB	E55	Royal Navy	D50
Anixter Components	A22	Henkel	E30	RUD Chains	B30
Ansys UK	J30	HK 3D Printing	D65	Rutland Plastics	G58
Arup	G72	IED	A16	Schaeffler (UK)	D40
Assemtron (Assembled		igus Ltd	D20	SD Products	C20
Electronic Solutions)	A20	IKO Nippon Thompson	B40	SpaceClaim Corporation	G55
Barden Corporation UK Ltd (The)	C45	IPS Ceramics	B65	Springmasters	A14
Boddingtons Plastics	E26	Laser Lines	G70	Stanley Engineered Fastening - Spiralock	F41
Cadline Ltd	E25	Lee Spring	D60	Stevens Hewletter & Perkins	A6
Cambridge Consultants	B5	LG Motion	G40	StrainSense	F105
Canard Design & Coupland Bell	E28	Materialise UK	G45	Strand 7	E65
Carville	C80	maxon motor UK	G60	Tata Motors European Technical Centre	C5
Concurrent Engineering	G90	Micro Epsilon UK	C25	Taylor & Francis	B80
Cotsworld Plastics	A10	Midas Pattern Co	E115	Techni Measure	E110
Coventry University	E15	MiniTec UK	F46	Technotrans Graphics	A8
Curtiss-Wright Surface Technologies	C60	Misumi Europa GmbH	F20	tesa UK	E80
D Young & Co LLP	G42	Moore International	A26	TFC	F44
Develop 3D	J46	new Design/Engineering Magazines	D100	Tharsus	C10
Diametric Technical	E20	Nylacast	E70	The MPA Group	F43
EJOT UK	C85	Optris	B50	Tiro Associates	D70
Electro Mechanical Systems	D35	Patterson & Rothwell	B68	Tom Parker	C2
ELESA (UK) Ltd	E2	PCB Piezotronics	B35	Transmission Developments	C35
EMS-Chemie	E60	PD Components/Partner Electronics	G100	TRUMPF	J50
EPLAN	D5	PDR	J42	TRW CONEKT	G75
European Springs & Pressings	G85	Product Assessment & Reliability		Variohm	E5
Findlay Media	C50	Centre Ltd (PARC)	F42	WDS	C70
Future Facilities	J54	Professional Engineering	A24	WITTENSTEIN	B70
George Emmott (Pawsons)	D105	Proto Labs	E45	WS2 Coatings	A18

Headline sponsors



Profile Technology

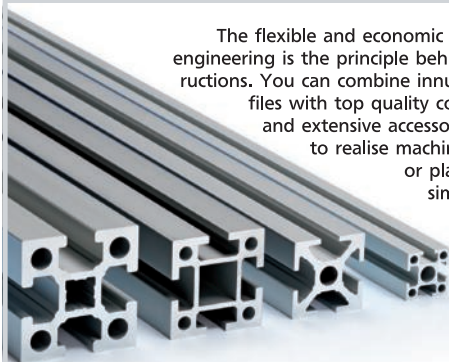
Conveyor Technology

Linear Motion

Factory Equipment

**WE FACE UP TO THE
COMPETITION – EVERY
SINGLE DAY**

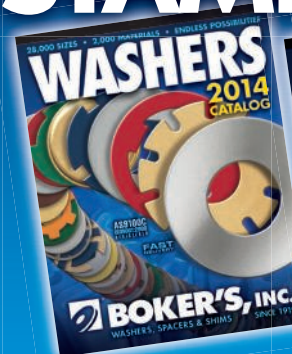
The flexible and economic design of mechanical engineering is the principle behind mk system constructions. You can combine innumerable system profiles with top quality connection technology and extensive accessories. These allow you to realise machine frames, enclosures or plant and equipment – simply, expandably and economically.



mk Profile Systems Limited
a company of the mk Technology Group
Unit 2 · Wolds Farm Business Park
Kinoulton Lane · Kinoulton · Nottinghamshire, NG12 3EQ
Phone +44 (0)1949 823751 · Fax +44 (0)1949 81270
www.mkprofiles.co.uk · info@mkprofiles.co.uk

FREE CATALOGUE & BROCHURE

**WASHERS &
STAMPINGS**



Call +1-612-7299365

FAX 612-7298910 • sales@bokers.com

BOKER'S, INC.
STAMPING & WASHER SPECIALISTS SINCE 1919

WWW.BOKERS.COM/EUR

www.fath.net
FUTURE FATH

A series of connectors
for D28 round tubes



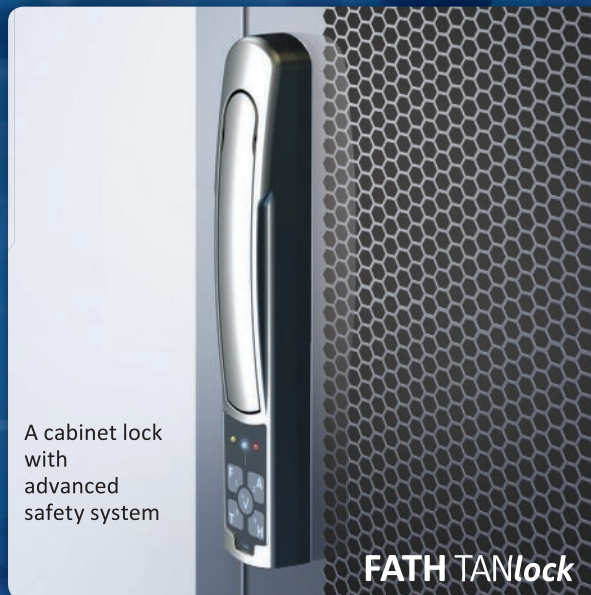
Components



A slam latch
with
electronic
safety feature

And many more...

A cabinet lock
with
advanced
safety system



FATH TANlock



Shifting the paradigm

Additive manufacturing is changing not only the way things are designed and made, but also the nature of the things that are being made.

Paul Fanning reports.

That additive manufacturing technologies are radically altering the ways in which products are designed and developed should perhaps not be seen as entirely surprising. However, not only are the ways in which this is happening instructive, but so is the fact that the technology is making possible products and designs that simply would never previously have been possible.

For instance, UAV start-up company, Helico, has successfully introduced AirDog, the world's first automated drone designed to track and video outdoor sports and activities, using Stratasys 3D printing technology.

Aimed primarily at the consumer market, AirDog is an innovative, yet simple-to-use, 'quad-copter' that operates via a wrist-worn tracking device and accommodates a standard GoPro sports camera. Users can automatically capture exciting live aerial video footage and still photography of themselves, having set distance, speed and height levels for AirDog to follow. Helico is specifically targeting the outdoor 'extreme' sports market and expects AirDog to be of particular interest to recreational participants of freestyle BMX, motocross and skateboarding, as well as water sports such as surfing, kite-surfing and wake-boarding.

"AirDog not only grants end-users their own affordable and personal aerial video crew, but goes one step further in providing thrilling footage from distances and angles previously inaccessible to such consumers," explains Edgars Rozentals, Co-founder and CEO of the Latvia-based, Helico Aerospace Industries.

Prior to investigating the use of 3D printed parts, Rozentals was trying silicon-molded designs through a supplier in China. However, not only did this entail a two-week turnaround time, but the resulting models proved to be too heavy for take-off and were ultimately scrapped.

"The benefits delivered by 3D printing compared to the method we trialled originally are numerous", says Rozentals. "Above all, turnaround time is significantly reduced and if we need to make last minute changes to a design, we can do so within a matter of hours, easily and cost-effectively. This was simply unachievable before as it necessitated time-consuming production of a costly new mold.

"In fact, I'm not sure how we would have arrived at the stage of having a functional part, were it not for Stratasys 3D printing technology. I founded the company two years ago and we're a staff of three, so for start-ups like Helico, this technology isn't just a game-

changer, but the ticket to the game itself," he explains.

According to Rozentals, AirDog might literally have not got off the ground, had it not been for the instrumental role 3D printing played during the prototyping phase. The company sought the expertise of Stratasys' Latvian partner, Baltic3D, who also worked with Polish reseller Bibus Menos to meet the requirements outlined by Helico's team. In order to produce fully-functional parts that could perform in the real environment, both Stratasys' FDM and PolyJet 3D printing technologies were employed for AirDog and its AirLeash tracking device, respectively.

The final AirDog drone was fully 3D printed using Stratasys' FDM-based ULTEM material, chosen thanks to its ability to provide parts of extreme strength and durability, with the lightweight characteristics vital for take-off and in-flight manoeuvrability. "We were particularly impressed by how far we could push the boundaries of the ULTEM material," adds Rozentals. "The material's functional stability enabled us to print very thin walls that further reduced AirDog's overall weight."

Conversely, the accompanying AirLeash was developed using Stratasys' PolyJet multi-material 3D printing technology. 3D printed in a

single pass, the wrist-worn device combines rigid and rubber-like materials to produce everything from the robust housing case to the soft buttons on the keypad.

"Airdog is a perfect example of how 3D printing is an enabler for inventors looking to turn their ideas into fully-operational parts quickly and effectively," says Andy Middleton, Senior Vice President and General Manager EMEA at Stratasys. "In this case, both our core 3D printing technologies have proved instrumental in producing a fully-functional drone and wrist device. With the exception of the advanced sensor technology, both parts have been created entirely using 3D printing."

A Stratasys 3D printed version of AirDog will preview this month, as Helico executives begin a month-long promotional roadshow in the US to generate interest among end-users within the extreme sports scene. If successful, and pending contractual agreements with relevant manufacturers, Helico expects to commercially introduce AirDog to the market at the end of October, 2014.



YouTube and enjoy music from around the world.

In a bid to receive funding, the first fully 3D printed Audiowings prototype was entered into Sir Richard Branson's 'Pitch to Rich' 2014 competition. The company has since been awarded the 'People's Award', receiving a prestigious mentoring program from some of the world's leading business minds. Audiowings is currently finalizing its plans to enter the retail market.

"When we were first

producing parts that combine high definition with a smooth surface finish, crucial in the development of high quality prototypes.

"Quality is paramount and is the driving force behind all of our projects," continues Mazur. "We printed the headphones in a durable rigid opaque grey material (VeroGrey), not only enabling us to perfect the look and feel, but also perform ergonomic testing with the user's comfortability- always integral to this development."

Ignitec's move towards Stratasys' PolyJet 3D printing technology aimed to increase the precision of its prototype parts, as well as reduce its prototyping costs and development cycle times. Equipped with a Stratasys Objet30 Pro 3D Printer from UK reseller Stanford Marsh Group, the company has since seen a significant reduction in the time required to 3D print and hand-finish its prototypes parts.

"Since introducing Stratasys 3D printing into our work flow, we have cut our finishing time by more than 50% due to the reduction of support material removal required compared to our previous SLA system," explains Mazur. "We have also seen a surge in client interest due to the fact that we can now produce prototype parts with a short turnaround time, while retaining the highest quality and remaining cost effective. Being able to offer end-use parts prior to manufacturing is something which is very valuable to our clients and takes away a lot of risk and guesswork."

www.stratasys.com

www.airdog.com

<http://ignitec.com>



Audiowings has developed a new generation of wireless headphones using 3D printing

Meanwhile in Britain, product design house, Ignitec, has designed and manufactured a new generation of wireless headphones for technology start-up and luxury goods company Audiowings, using its Stratasys Objet30 Pro 3D Printer.

Named after the company, Audiowings is a luxury audio headphone that synchronizes directly with online music services, such as Spotify, enabling users to listen to their favourite music on-the-go, without the burden of headphone cables. As well as featuring a built-in storage system, the device also connects wirelessly to the Internet using 3/4G or WiFi, giving users the ability to plug into



approached with the concept of Audiowings and briefed on its prototyping requirements, we instantly knew that 3D printing would be the answer," explains Ben Mazur, Director of Ignitec. "Our Stratasys Objet30 Pro 3D Printer was the obvious choice since it has the ability to produce products on demand that depict the accuracy and surface quality of injection molding."

Stratasys' PolyJet-based 3D printing technology features 16 micron accuracy,



Join us on 9th October at 8 Northumberland Avenue, London, to celebrate British Engineering Excellence

Now in their sixth year, the **British Engineering Excellence Awards** have given many products, people and companies the recognition they deserve!

To book a table, contact Julie Knox on 01322 221144
or visit www.beeas.co.uk



Headline sponsors



Gallery sponsor



Category sponsors





KELLER (UK) Ltd.

Dorset Green Technology Park
Winfrith Newburgh, Dorchester, DT2 8ZB

UK and Ireland: T. 0845 643 2855
UK and Ireland: F. 0845 643 2866
E-Mail: sales@keller-pressure.co.uk
Web: www.keller-pressure.co.uk www.keller-druck.com

KELLER pressure sensors

PRECISION PRESSURE TRANSMITTER SERIES 33X

- Ranges: 0...0.2 to 0...1000 bar, adjustable
- Output: 4...20 mA, 0...10 V, RS485 Digital
 - Mathematical, on-board error correction
- Total Error Band: $\leq \pm 0.1\%$ FS (-10...80°C)
- Optional enhanced precision to $\pm 0.01\%$ FS
- Flexible and modular mechanical construction

OEM PRESSURE TRANSMITTERS

SERIES 4 LC...9 LC

with embedded electronics

- Ranges 0...1 bar, thru to 0...1000 bar
- Signal 0.5 V...4.5 V, Supply 5 Vdc
- Electronics hermetically sealed inside
- Low cost sensor / electronics solution
- Total Error Band better than 1% (-10...80°C)
- Choice of materials



As Easy as XYZ
Leaders in high frequency multi-axis vibration testing solutions

Team Corporation offers high frequency, high performance hydraulic vibration test equipment.

- Multi Axis Vibration - simultaneous 2, 3, & 6 axis
- Compact designs
- Easy to install
- Simulate real vibration with simultaneous control of amplitude & phase of all 6 degrees of freedom

Tensor 18kN

The Cube

Team
corporation

+44 (0) 1424 777004
teamcorporation.com



Moisture Adsorbing Board

Moisture Adsorbing Board is a practical alternative to desiccant bags for applications with limited or restricted free space.

- Optional Shapes and Sizes
- Uniform Thickness
- No Loose Desiccant
- Printable sheet surface
- Flexible/ thermo-formable
- Long term adsorption characteristic
- Easy to fix by mechanical retention

Moisture protection is our business

BROWNELL LIMITED

Unit 2 | Abbey Road Industrial Park, | Commercial Way
Park Royal | London | NW10 7XF | T: +44(0) 20 8965 9281
F: +44(0) 20 8965 3239 | info@brownell.co.uk | www.brownell.co.uk



Sensors – an integrated approach

In the search for ever more efficient automation, sensors have a major role to play. Here, Eureka talks to Omron about the value of increased integration.

Although sensor technology and performance has advanced at an exponential pace during the last decade, and continues with ever increasing capability, the integration of a sensor often only ever results in a simple digital on/off signal. While many applications would find this adequate, there is so much more that is possible by integrating the operation and configuration of sensors into the machine control platform.

With the push for faster cycle times, easy integration and seamless data exchange taking increasing priority, the benefits of Fieldbus solutions are now widely recognised. Simplified installation and machine design, as well as improving machine performance and device monitoring, plus advanced functionality would all be very complex to achieve with traditional hardwired systems.

There are now countless Fieldbus solutions available, each with their own benefits and restrictions. Many Fieldbus technologies are dedicated to motion control or even specific to sensor technology, developed to support the unique requirements of the peripheral devices.

Whilst Omron supports a wide range of Fieldbus technologies, our primary offering uses EtherCAT which is widely recognised as the fastest Fieldbus solution currently available. It is also known for its flexibility to support the integration of a wide range of peripheral devices.

Integration of these devices into the Fieldbus network is extremely simple and can be configured with no more than a few clicks of your mouse, providing instantaneous data exchange with the machine control platform. This completely eliminates developing complex protocols or writing custom code, providing fast and seamless integration. Integrating sensors through a fieldbus platform also achieves a high speed distributed solution, and importantly unparalleled levels of accuracy when handling the most challenging sensing applications.

Currently devices such as logic control, I/O, servo drives, inverter drives, and safety control are all supported. More recently Omron has introduced a wide range of sensor solutions which have EtherCAT connectivity including fibre and laser sensors, vision sensors, vision systems and high accuracy measurement systems. These new solutions mean machine builders can develop a complete machine with all the necessary peripheral devices, all connected and communicating on a single Fieldbus solution. This makes development, installation, commissioning, device monitoring and fault diagnostics vastly more efficient and can provide immediate cost savings.

A further benefit to integrating peripheral devices on an EtherCAT Fieldbus is the degree of integration which can be achieved. Extensive

parameter and variable data exchange is possible between the machine controller and the peripheral device, allowing the peripheral devices to become an integral part of the control system. Taking the newly developed EtherCAT sensors as an example, with traditional hardwired solutions, integration with the sensors is limited to simple on/off status exchange. This is greatly expanded when these devices are connected to the EtherCAT Fieldbus, as well as basic I/O information, full parameterisation of the sensors is also possible, allowing re-configuration through the control system. This can vastly improve the efficiency of product changeovers, where the control system can batch configure all the sensors on the network completely automatically, eliminating the need for operator intervention.

Due to the depth of the data exchange between the machine controller and sensor units, complete device monitoring is also enabled. This provides immediate feedback of the status of the sensor, as well as sufficient data to verify the condition of the sensors, to detect whether they have a build-up of contamination or are misaligned. This information can lead to an advanced predictive maintenance function, which can improve the machine efficiency (OEE) and reduce costly downtime.

www.omron.co.uk



MSA
FOAMS LIMITED

F O A M
DOESN'T
HAVE TO BE
BORING

The UK's Fastest Growing Custom Foam Company

MSA.co.uk

Laser Tracker aids JCB

The FARO Laser Tracker Vantage helped JCB to generate traceable certificates for jigs and fixtures calibration procedures. Here, Paul Fanning reports.

In 2008, JCB Heavy Products opened a new £43 million factory, in Staffordshire. One of the biggest single investments in JCB's history, the impressive facility is one of the world's most modern manufacturing plants and employs a 350-strong workforce in the design and manufacture of the 25-strong range of JCB tracked and wheeled excavators, weighing from seven up to 46 tonnes.

Manned by 48 highly skilled teams, the new 450,000 sq ft plant is split into two main areas: fabrication and welding and assembly, a layout which is key to enhancing quality because it eliminates the potential for contaminants to infiltrate the assembly area from the welding and fabrication shop.

The Heavy Products plant has the capability to produce 8,000 machines a year and has taken quality standards to new heights. JCB's pre-delivery tests of machines have always been exhaustive, but the 'hot-test' at the new JCB Heavy Products factory has been increased from two to three stages. There is also a 200-point check on the machine's finish before it leaves the factory.

Part of the company's investment has been in new machining centres and extremely accurate jigs and fixtures, the use of which puts JCB in

direct control of component quality. The new machining centres are able to self-position and 'find' components to maximise machining precision, giving consistent quality to fabrications.

To help ensure the continued accuracy and quality of the company's fabrications JCB's Heavy Products plant administers a stringent policy of regular jig and fixture calibration.

Andy Young manufacturing engineering manager explains: "As the accuracy of our jigs and fixtures plays such a critical role in the precision of our fabrications and the eventual build quality of our products, we made a decision to establish a jig and fixture calibration regime with calibration time intervals based on the perceived requirements of each individual piece of equipment.

"Having decided to engage the services of an outside contractor to undertake our jig and fixture calibration procedures, mindful of the company's reputation and advanced capabilities, we awarded the contract to Manchester Metrology.

"The precision of the FARO Vantage Laser Tracker used by Manchester Metrology for calibrating our jigs and fixtures enables the generation of detailed traceable certificates. Also, on the rare occasion that any aspect of a jig or



fixture is highlighted as drifting from its nominal position, we are able to take the relevant corrective steps and re-calibrate the fixture to confirm its accuracy."

"Through these actions we are able to pre-empt any possible problems and further ensure our continued quality standards. Also, we have been able to fine-tune the calibration intervals of each of our jigs and fixtures based on experience and gathered data."

"In addition to calibration procedures, Manchester Metrology's use of the FARO Laser Tracker has proved invaluable in determining the

Condition Monitoring... ...Sensonics tick all the right boxes

- ✓ Accelerometers
- ✓ Velocity Transducers
- ✓ Eddy Current Proximity Probes
- ✓ Rugged & Reliable

Sensonics offer a range of **transducers / sensors** which are ideal for most hazardous area condition monitoring applications.

 **SENSONICS LTD**



MADE IN UNITED KINGDOM
PROTECTING WORLDWIDE



Tel: +44 (0) 1442 876833 sales@sensonics.co.uk
www.sensonics.co.uk



Andy Young, JCB's manufacturing engineering manager

accuracy of our first-off prototypes, prior to being signed-off for manufacture. Also, the advanced FARO equipment is used for generating initial sample reports on all new sub-assemblies."

Owner of Manchester Metrology, Paul Bulman

explained. "As our staff have considerable experience within the field of metrology and through our access to a full range of FARO equipment, we are able to make use of the most appropriate technology and apply the most

suitable measuring strategies to all prospective customers needs.

"We were able to formulate a suitable plan of action to enable the accurate and efficient calibration of the JCB's important jigs and fixtures. As the FARO Vantage laser tracker is portable and ideal for large scale measuring, we use this very accurate equipment for our regular on-site work at JCB. Having used the tracker and FARO CAM2 Measure 10 software to measure and capture the dimensions of critical features on a jig or fixture, we are then able to compare the data to CAD models and when necessary identify areas that could cause future concerns.

"In the same way, when involved in checking prototype fabricated parts or sub-assemblies, we are able to judge the gathered data against engineering drawing. As some of JCB Heavy Products' fabrications can measure up to 7 meters in length, the large capacity and high accuracy specification of the FARO Laser Tracker Vantage makes it ideal for this type of work."

www.manchester-metrology.com

Professional test and measurement technology

From sensor to software: The complete measurement chain from HBM

The requirements placed on sensors, electronics and software in terms of operation, acquisition and analysis are continuously increasing. Optimal matching of all components in the entire measuring chain is crucial.

We at HBM place special emphasis on this aspect. Worldwide, in all branches of industry: Automotive, aerospace, mechanical engineering, weighing technology and many more. For maximum quality and precision.

- Strain gauges
- Load cells, mounting aids and accessories
- Force, pressure, torque and displacement transducers
- Amplifier systems for test and process measurement technology
- Precision measuring instruments
- Software for acquisition, analysis and prediction

Further information: www.hbm.com/eureka-tm

Visit HBM on stand D24
At the Sensors & Instrumentation show, NEC
From 30th Sept to 1st Oct.





INSPIRING ANSWERS | Type 8905 – Online Analysis System

“Who’s to say that you have to constantly keep an eye on a number of different meters to guarantee clean drinking water?”



With our new Online Analysis System Type 8905, this is no longer just wishful thinking. Compact and modular, it meets all water sensor system needs from a single source – at a single glance.

www.inspiring-answers.com

Please call +44 (0)1285 648720,
email sales.uk@burkert.com or
visit www.burkert.co.uk



bürkert
FLUID CONTROL SYSTEMS

ifm electronic



A passion for
Quality



True 3D sensing

efector pmd 3D from ifm electronic is a true 3D sensor, measuring a matrix of distances from a single point.

- for volume, e.g. missing product
- for level, e.g. uneven bulk product
- to check distance and position

The first industrial 3D sensor that can detect objects in three dimensions at a glance. The opportunities are endless.

ifm electronic – close to you!

www.ifm.com/uk/pmd3d

Inverters turn it around

Inverters and VSDs can make a huge difference to the energy efficiency of virtually any company using electric motors. Paul Fanning looks at the latest developments.

Variable-speed inverter drives have done much to improve machine design since they became commonplace about 30 years ago. They have allowed operational optimisation through speed trimming and enhanced controllability, and contributed massively to saving energy.

With this in mind, it is clearly important to keep abreast of the latest innovations and developments in this fast-moving technology.

One of the newest entrants to the field is Atlas Copco, which has developed its first in-house designed inverter drive, called Neos. All of the company's GA 37-90 VSD range compressors will now be equipped with the new Neos inverter units, which will also be available as spare parts for retrofitting existing GA models in the field.

The new Neos inverter, developed and manufactured in Atlas Copco's plant in Antwerp has been tailored precisely to meet the current and predicted requirements of its compressors in terms of size, simplicity, robustness and reliability.

The launch is a response to the fact that only 5% of the off-the-shelf electric motors and inverters available to OEMs are used in compressors. The majority of these inverters are designed for a broad variety of applications, including pumps and fans, with less demanding torque requirements than those of heavy duty compressor operations. Atlas Copco has therefore designed and developed the first dedicated unit for this function, based on 20 years of experience

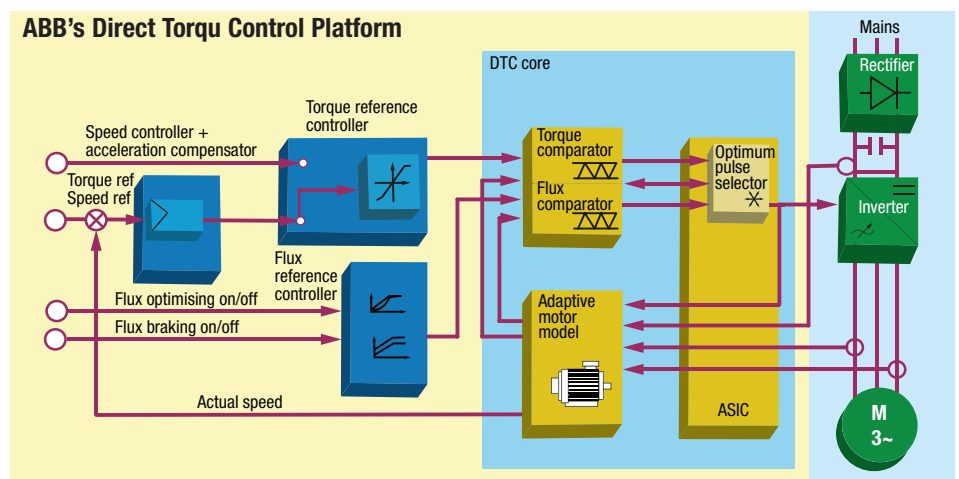
in manufacturing VSD compressors.

During the development of the inverter, an extensive programme of rigorous endurance field testing was conducted in a variety of hot, cold and dusty industrial conditions and involved running units up to 10,000 hours at maximum load. The performance of 16 drive units, installed on a mix of 55, 75 and 90kw standard and full-feature compressors, were compared in application sites as varied as Finland, Bahrain, Spain, Sweden, Germany and Belgium. These tests proved conclusively that the Neos unit is capable of operating in the the harshest working conditions at continuous full load from -20°C up to 50°C ambient temperatures, and is fully

protected against dust ingress by its IP 5X rated enclosure.

70kg lighter and less than half the size of the largest generic inverter, the compact Neos design eliminates the need for a control panel. All communication is achieved via CAN connection with the compressor's Elektronikon Mk 5 controller or, in the unlikely event of trouble shooting, via Ethernet connection to a PC. The only other inputs to the unit's control board comprise the motor temperature sensor input, relay output for the cubicle fan control, two digital inputs for the run-enable function and service switch, and the safe torque off function.

The motor control platform, direct torque



control (DTC) used extensively in ABB's variable-speed drives (VSDs) since 1996 are not of course new. However, they have been greatly improved to bring even higher accuracy in motor speed and torque control, as well as the ability to control more motor types.

This fourth generation DTC provides enhanced performance in open and closed loop and a higher switching frequency. Speed and torque control accuracy have been improved, for both dynamic and static values.

Support for high speed motors up to 500 Hz (as standard) and absolute encoder and resolver support are provided, while other improvements include more choice of identification (ID) set-up runs. These include highly accurate standstill ID runs, allowing the drive to identify the motor from its performance characteristics without the need to uncouple the motor from the load.

Drives equipped with the new DTC can now respond to changes in the customer speed reference much more quickly, with the motor shaft responding within 2 ms of a reference change instead of 10 ms.

DTC lets users of the latest ABB industrial drives, ACS880, control any motor type without a change to the firmware, making it practical to use squirrel cage, permanent magnet and ABB's advanced synchronous reluctance (SynRM)

motors, the latest motor control technology offering high

efficiency IE4 or high output compact motor variants. This widens the scope for engineers to use almost any motor to suit their needs.

The ACS880 drive offers fully functioning scalar control with its own ramps, fixed- and skip-speeds. Scalar is useful in multi-motor applications and can be used to test installations before switching to DTC; particularly useful when the test motor is not the same size as the motor to be used on site.

With DTC, field orientation is achieved without feedback, using advanced motor theory to calculate the motor torque. DTC uses the fastest digital signal processing hardware available and a more advanced mathematical understanding of how a motor works. The result is a drive with a torque response that is typically ten times faster than any AC or DC drive. This gives much improved process control and a more consistent product quality. The dynamic speed accuracy of DTC drives will be eight times better than any open loop AC drives and comparable to a DC drive that is using feedback.

Some applications require particular feedback devices, for either position or speed feedback. Although DTC negates the need for speed feedback devices, accuracy can be further improved with an extensive range of encoders, resolvers and tachometers. The ACS880 drives have option slots to allow these items to be fitted internally, making installation convenient and cheaper.

DTC was developed to bring the best motor control of induction motors and is now extended to control other industrial motor platforms, being one of the few to generate full torque at zero speed on standard induction motors. It can be applied to high dynamic or highly arduous applications and can tackle any industrial application.

High dynamic torque control means applications such as grinders and crushers can be managed effectively, whilst the ability to generate torque at low speeds means DTC can effectively handle mixers or start fully loaded conveyors. DTC can be operated in master follower modes, making winders and strip lines easier to control, as well as cross travel or long travel crane control.

WEG, meanwhile, has added the CFW100 mini frequency inverter to its line of frequency inverters. This compact inverter is available in three sizes (A, B



Atlas Copco has developed its first in-house designed inverter drive called Neos

and C) for rated motor power from 0,18 to 0,75 kW and rated current from 1.6 to 4.2 A. With a height of 100 to 126 mm, a width of 55 mm and a depth of 129 mm, the CFW100 units are among the smallest frequency inverters currently available.

The mini frequency inverters with integrated micro-PLC are particularly suited to simple technical applications in the commercial and consumer sector, such as swimming pool pumps, motorised hospital beds, lift doors and fitness equipment, as well as small fans or mixing machines and special-purpose machines. With its combination of extensive functionality and extremely small size, the CFW100 is easy to integrate into electrical cabinets and machines. This gives users an especially compact and cost-effective solution for controlling the speed of three-phase induction motors.

The CFW100 operates three-phase motors from single-phase 200 to 240 V supply (50/60 Hz). It has an overload capacity of 150% of rated current for an interval of 60 seconds every 10 minutes. Voltage vector control (VVC) and V/f characteristic curve control are supported for driving three-phase induction motors. The CFW100 has electronic thermal protection capability to prevent motor overheating and four digital inputs as standard, with possibility to increase by expansion plug-in module. The enclosure protection rating is IP20, and the mini frequency inverter can be used at ambient temperatures up to 50°C without derating.

www.atlascopco.co.uk

www.abb.co.uk

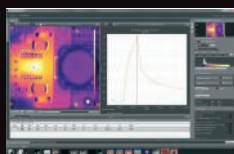
www.weg.net



The CFW100s from WEG are among the smaller frequency inverters currently available

FLIR T450sc & T650sc for IR Labs and R&D

- IR Detector 640 x 480 Pixel (T650sc) or 320 x 240 (T450sc)
- Multi Spectral Dynamic imaging (MSX)
- High Accuracy $\pm 1^{\circ}\text{C}$ or $\pm 1\%$
- NETD 20mK (T650sc) / 30mK (T450sc)
- Internal radiometric burst recording (SD card)
- Daylight camera
- Radiometric IR video streaming via USB



FLIR ResearchIR
(R&D Analysis Software)



FLIR Close-Up Lenses
(down to $25\mu\text{m}$ resolution)

For more information about FLIR Thermal imaging cameras:

FLIR Systems

Tel. : +32 (0) 3665 5100
email: research@flir.com
www.flir.com

The images displayed may not be representative of the actual resolution of the camera shown. Images for illustrative purposes only.

COLLABORATIVE ENGINEERING

Joined up solutions for your
complete engineering workflow

Learn more, visit us at:

TCT Show
NEC Birmingham
30 September - 2 October 2014
Stands A34 & A36

Advanced Engineering
NEC Birmingham
11 - 12 November 2014
Stands G64



WWW.MAJENTAPLM.COM
WWW.PHYSICALDIGITAL.COM



Pneumatics' Energy-Efficient Design

Technical designers always try to position pneumatic valves as close to actuators as possible because shorter tubing lengths reduce the required compressed air by up to 20 percent. However, common valves are usually too large and heavy for handling applications. With Rexroth's new generation of extremely compact and lightweight Advanced Valve AV03 valve systems; engineers now have a lot more freedom.

Rexroth has halved the weight of the new valves by using resistant high-performance polymers and reducing the number of parts. The required space has also been cut by 45 percent. Developers arranged the valve components at an angle and optimised the supply and exhaust channels, thus reducing flow losses. Users profit from a flow improvement of 40 percent, allowing them to substantially lower the supply pressure and



boosting their energy efficiency.

In addition, the new AV03 allows customised automation solutions. Starting with the second valve, the number can be increased step by step up to 40 single solenoid valves or 64 double solenoid valves. Nowadays, more users implement different pressure zones in a single valve system to achieve further savings. The new valve system offers them up to ten supply plates for this exact purpose.

www.advanced-valve.com

Developments in Spiradrive gearing

Investment by Davall Gears in advanced hobbing machine tools has allowed them to achieve unprecedented levels of quality and refinement in two key Spiradrive applications.

Spiradrive gearing is a derivative of worm gear technology which offers the potential for high quality, high accuracy drives with a minimum component part count.

Spiradrive gear combinations offer perhaps the widest range in ratio for any gear systems. The new CNC hobbing facilities have enabled ratios as low as 5: 1 to over 200: 1.

Precise control and adjustment of backlash is achieved by simple axial position adjustments of the gears and pinion. For specific applications that demand a true zero backlash performance, this is available from Spiradrive by preloading the gear mesh.

www.davall.co.uk

Cutting Edge Motion Control Solutions



Elmo Application Studio (EAS II)
The definitive motion control software, producing the ultimate in results

Applications:
✓ Industrial printing
✓ Packaging / Processing
✓ Robots & Automation
✓ Aerospace & Marine
and more.....

CANopen

Certified
EtherCAT
Conformance tested

Ethernet
TCP/IP, Ethernet/IP, ModBUS,
Telnet, FTP, DHCP



Elmo's Gold Line of Servo Drives (STO Certified)



G-Drum
Up to 150A/100VDC
Up to 100A/800VDC



G-Twitter
NANO Servo Drive
50A/100VDC
Up to 4 kW



G-Tuba
Up to 25 kW
40A/480VAC



G-DC Bell
For Stepper Motors
15A/100VDC
9A/200VDC



G-Whistle
20A/100VDC
9A/200VDC



G-Duet
Integrated Drive-Motor Solution



G-DC Trombone
16A/400VDC
12A/800VDC



G-Guitar
50A/100VDC
75A/60VDC
20A/200VDC



G-Basson
10A/230VDC

Elmo's solutions feature distributed intelligence for a broad range of industrial applications, while upholding global standards of quality and reliability.

MOTION
CONTROL PRODUCTS
Elmo's UK Distributor

www.motioncontrolproducts.com
Tel.: (+44)01202 599922
sales@motioncontrolproducts.com

Elmo
Motion Control

Precise Motion Control Solutions



The Reliance catalogue provides a one-stop-shop, from components and assemblies for rotary and linear motion to intelligent control and actuation products.

Products can be readily modified to suit individual applications.



Visit us at the
Engineering Design
Show, stand F40

www.reliance.co.uk
+44 (0) 1484 601002
sales@reliance.co.uk

Prevent damage caused by excessive pressure or vacuum

- Fully automatic
- Optional valve operated indicator
- Wide operating temperature range
- Low cohesion providing reliable opening
- Available in aluminum, brass, stainless steel and plastic

Pressure Relief Valves



Let us take the pressure

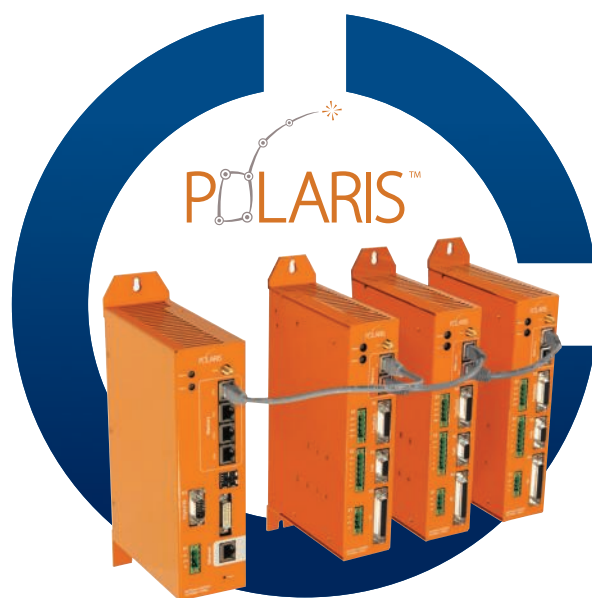


Unit 2 | Abbey Road Industrial Park | Commercial Way
Park Royal | London | NW10 7XF | T: +44(0) 20 8965 9381
F: +44(0) 20 8965 3239 | info@brownell.co.uk | www.brownell.co.uk

LG MOTION

UK MOTION
TECHNOLOGY
SPECIALISTS

WORLD'S BEST MOTION CONTROL PLATFORM



Polaris Motion Controller, for high-speed control and synchronisation of Servos, Galvos and Lasers. Ideal for advanced machinery and instrument markets.



AEROSPACE & AUTOMOTIVE



LASER MATERIAL PROCESSING



SOLAR TRACKING



ROBOTICS



DIAMOND MACHINE TOOLS



WAFER STEPPING AND SCANNING



To arrange a visit and meet the team call:
+ 44 (0) 1256 365600

LG Motion Limited

Unit 1A Telford Road, Houndmills Estate,
Basingstoke, Hampshire RG21 6YU
United Kingdom

T // + 44 (0) 1256 365600

E // info@lg-motion.co.uk



www.lg-motion.co.uk

Drying up

When it comes to drying oneself after washing, the towel may not be the best option. So what could replace it?

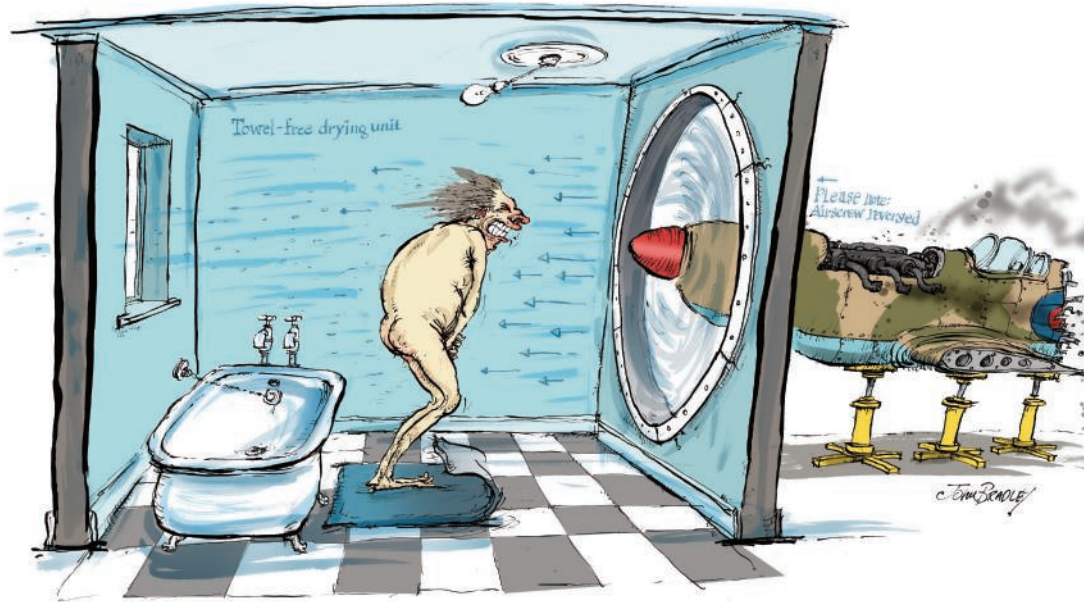
Drying one's hands after washing them is a function that has received a remarkable (indeed, some might say disproportionate) amount of attention from the technological community in recent years. Indeed, many of the greatest brains at Dyson seem to spend time thinking of little else, which has led to developments that have made the asthmatic wheeze of the traditional hand dryer a thing of the past.

However, while hand drying is now achieving ever-higher levels of sophistication, the rest of the human body (barring, perhaps, our hair) is sadly neglected when it comes to drying technology. Most of us, on emerging from the shower or bath, still fall back on the traditional bath towel.

This solution has, of course, been with us for years and some might argue that 'if it ain't broke, don't fix it'. However, there is considerable evidence to suggest that towels are less than good for us. This is because, whenever you use a washcloth, hand towel, or bath towel, skin cells slough off your body and stick to the fabric. Those cells serve as food for bacteria. Plus, bacteria thrive in the damp, densely woven material, which has lots of nooks and crannies for them to hide in. As you reuse towels, these bacteria can transfer back to you and cause skin infections.

Given this, perhaps it is time to call for a new means of drying one's body? And that is this month's challenge.

Of course, dripping dry and air-drying are options, but they take a long time and require



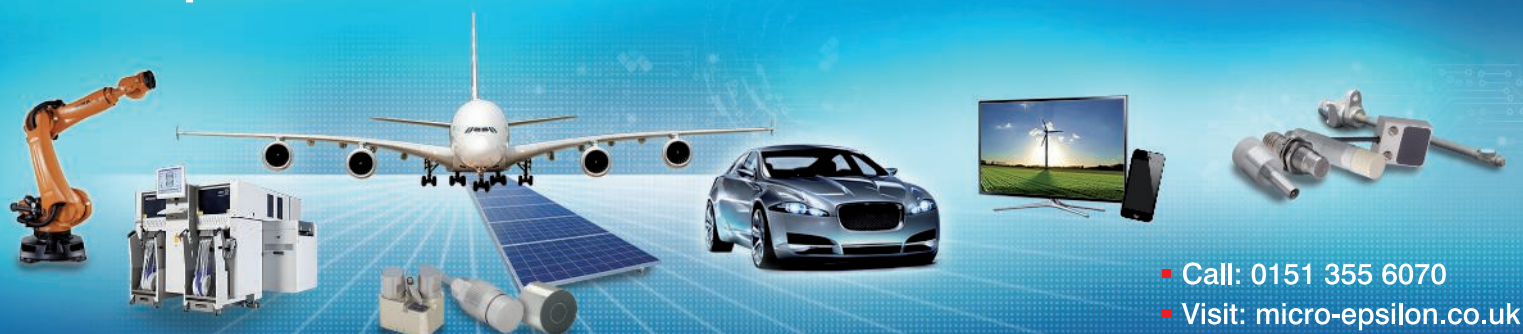
the dry-ee to be naked for considerable lengths of time – which can prove socially awkward and lead to difficult questions – particularly if undertaken outside.

Alternatively, one could use a large fan. However, this would be likely to blow moisture across the room, which in one sense just moves the problem from one place or another. Also, the prospect of standing near whirring fan blades whilst in the altogether is a rather alarming one, to say the least.

We have a solution in mind that is neat, takes up relatively little space, but is apparently effective. However, you may well be able to come up with something better. We look forward to finding out.

The answer to last month's Coffee Time Challenge to design a doorbell you cannot miss can be found in our Technology Briefs section on page 14.

Bespoke Sensors for all Industries



- Call: 0151 355 6070
- Visit: micro-epsilon.co.uk

Displacement • Position • Temperature • Colour

Coatings

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.

WS2 works well from -273° to 450° C and down to 10-14 Torr. WS2 has been applied to bearings and gears to extend life.

Design Out maintenance problems with WS2!



www.ws2.co.uk

@: sales@ws2.co.uk
☎: 01430 861222

Control Valves

Spirax Sarco introduces delivery within 48 hours for Spira-trol™ control valves

Spirax Sarco has introduced guaranteed 48-hour delivery for its Spira-trol™ modular control valves. Actual delivery times since the service's launch are proving to be much shorter with over 90% of valves reaching their destination within 24 hours of ordering.

Spira-trol valves leave the Spirax Sarco factory pre-commissioned for applications, enabling quick 'plug and play' installation.

With over 2,500 permutations available and delivered within 48 hours, it is possible to match almost any system's needs and bring it back into service as quickly as possible in the event of a breakdown.



www.spiraxsarco.com/uk

@: ukenquiries@spiraxsarco.com
☎: +44 (0)1242 521361

Large Bore Angle Encoders

Angle encoders for tough environments

Zettlex inductive encoders offer precision angle measurement in a large bore, ring format. Bearingless, non-contact design means easy installation, tolerant to misalignment, no wear and reliability in harsh environments.

Choose the one that's right for your project from more than 4 million options, including absolute or incremental measurement, resolutions of 1k to 2M counts per rev, digital or analogue outputs, bores from 25 to 200mm as well as an extended range for aerospace & defence applications.

See the Products page of www.zettlex.com for the full IncOder Product Guide.

@: info@zettlex.com
☎: 01223 874444



www.zettlex.com

Pumps

New Dosing Performance Pumps Launched

Wanner International has introduced two new Hydra-Cell® Dosing Performance Pump ranges with mechanical flow rate adjustment.

Because seal-less Hydra-Cell pumps are true positive displacement pumps, flow rate is directly proportionate to input shaft speed and virtually independent of system discharge pressures. Very precise, infinite adjustment of shaft speed is achieved through a simple manual adjust hand wheel. The variable speed gearboxes operate on the elasto-hydrodynamic principle, producing output torque by means of a traction fluid. This removes the possibility of mechanical slippage between input and output, potentially experienced with friction type variators. The Hydra-Cell G03/G13 dosing range accommodates repeatable, steady flow requirements up to 310 litres per hour at pressures up to 100 bar and flows up to 490 litres per hour at pressures up to 70 bar. The Hydra-Cell G10 dosing range accommodates repeatable flow requirements up to 732 litres per hour at pressures up to 103 bar and flows up to 1470 litres per hour at pressures below 50 bar.



www.wannerint.com

@: NHerrington@wannerint.com
☎: +44 (0)1252 816847

Rapid Prototyping



adam@agprototypes.com

www.agprototypes.com

Phone:
01707 391 120

<i>Rapid Prototyping</i>	<i>2D to 3D CAD Conversion</i>
<i>SLA & 3D Printing</i>	<i>Reverse Engineering</i>
<i>Silicone Tooling</i>	<i>Pre-Production Runs</i>
<i>Vacuum Casting</i>	<i>Product Modelmaking</i>

www.agprototypes.com

Rivet nuts

GESIPA®

GESIPA® designed an M6 square bodied rivet nut with a special chamfer and coating on the flange for easy side by side placement of three rivet nuts to mount the rear windscreen motor onto the tailgate.



A square bodied rivet nut is used in applications to allow extra security during the assembly process as it provides high torque-to-turn giving a highly secure joint. Also, when on assembly line there are chances of mistaking a set rivet nut with a weld nut. Thus a square bodied rivet nut helps to distinguish it from a weld nut hence resulting in minimal operational failures.

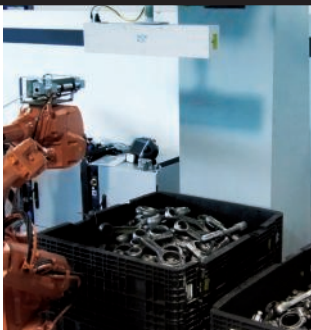
@: info@gesipa.co.uk
☎: 01535 212200

www.gesipa.co.uk

Robot Picking Applications

SICK's ScanningRuler boosts picking productivity

Vision-guided robot picking applications can be made more productive and cost-effective with the launch of the ScanningRuler, an advanced new 3D camera solution from SICK UK. The ScanningRuler's large field of view enables accurate 3D imaging of stationary objects, boosting the productivity of high-throughput robotics applications and making it easier for robot integrators to achieve volume picking in heavy industrial applications. By combining 3D and 2D measurements, the ScanningRuler offers unique new features to support fast and accurate picking of random machined parts.



www.sick.co.uk

@: andrea.hornby@sick.co.uk
☎: 01727 831121

Safety Accreditation

Major Safety Accreditation for Industrial Vision Systems Ltd

IVS has been awarded accreditation from Safecontractor for its commitment to achieving excellence in health and safety

Industrial Vision Systems Ltd (IVS®) (www.industrialvision.co.uk), a supplier of machine vision solutions to industry, are pleased to announce their accreditation by Safecontractor®. Safecontractor is a leading third party scheme which recognises very high standards in health and safety management amongst contractors and suppliers. The company's application for Safecontractor accreditation was driven by the need for a uniform standard across the business and will enhance the ability of IVS to attract new contracts and clients. Safecontractor is applicable to most sectors although it is particularly relevant to automotive, pharmaceutical and food manufacture, all of which are big users of contracted services. John Kinge, technical director of Safecontractor said, "Major organisations simply cannot afford to run the risk of employing contractors who are not able to prove that they have sound health and safety policies in place."



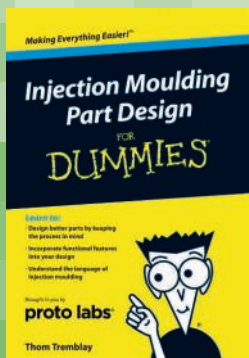
www.industrialvision.co.uk

@: sales@industrialvision.co.uk
☎: +44 (0)1865 823322

Others say they're FAST...



But do they have the
SCALE to deliver?



Injection Moulding Part Design for Dummies

Find out how to get better parts faster by understanding the basic principles of the injection moulding process. Request your free book at protolabs.co.uk/parts. Enter code EUEU14S



**Check out
our demo quote!**



© 2014 Proto Labs, Ltd
ISO 9001:2008 Certified



Proto Labs' entire operation is optimised to deliver CNC machined and injection moulded parts in as little as one business day. We manufacture parts every day for thousands of customers, many of whom come to us at the last minute with dozens of designs they need to test fast. Since 1999, we've produced tens of thousands of moulds and shipped tens of millions of parts to our customers all over the world.

Sure, it's our technology that allows us to make your parts faster than anyone else. We back it up with large-scale global manufacturing facilities with hundreds of CNC machines and injection moulding presses on three separate continents.

Whether your project calls for a few machined parts or thousands of moulded parts from 50 different designs—we have the scale to meet your needs. **Every time!**

Call +44 (0)1952 683047
or visit www.protolabs.co.uk

proto labs®
Real Parts. Really Fast.™