



midlands aerospace alliance

MIDLANDS

AEROSPACE

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MAGAZINE

LIFT FROM THE MIDLANDS

FARNBOROUGH 2016 ISSUE



**MAA MEMBER COMPANIES ON BOARD
NEWEST FIGHTER PROGRAMME - PAGES 9-10**

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MAA CONFERENCE BREAKS RECORDS

Industry experts map out future directions – page 2

VIEW FROM WESTMINSTER

Call for transparency in apprentice levy – page 11



INDUSTRY PRAISES NATEP BACKING

Project companies highlight business benefits – pages 12-13



NEWS

ON THE WEB

CLICK THROUGH TO THE MAA WEBSITE FOR CURRENT NEWS ON MEMBERS' ACTIVITIES:

→ The **Daher Group** whose aerospace division is an MAA member has confirmed its status as a leading equipment supplier by topping one billion euros in turnover for the first time.

→ Derby-based **Accrofab** has supplied equipment used to discover gravitational waves produced by black holes colliding.

→ Leading surface solutions provider **Oerlikon Balzers** has received Airbus accreditation.

→ **Dunlop Aircraft Tyres** of Birmingham has received FAA approval of its facilities in China and the USA.

→ **Gardner Aerospace** has posted a pre-tax profit of £6.7 million, reversing an £800,000 loss.



www.midlandsaerospace.org.uk/news



MAA BRINGS INDUSTRY TOGETHER



Rolls-Royce's Rosie Toogood presents a valuable point of view on a competitive supply chain. (Inset) Paul Kahn reviewed trends in global and UK aerospace. (Below) Flt Lt Jonny Downen talks delegates through his Typhoon display routine.

↘ The MAA annual conference this year set two attendance records: for the most delegates and the most speakers.

It was also the first MAA conference to end with a flying display, albeit on video, courtesy of the final speaker, Flt Lt Jonny Downen of 29(R) Squadron RAF Coningsby, last year's Eurofighter Typhoon display pilot and current display manager.

Supported by gold sponsor UTC Aerospace Systems, the April event – now in its fourth year – attracted an audience of 175 to the new Advanced Manufacturing Training Centre (AMTC) in Coventry, where they heard 12 speakers including two from small companies.

MAA operations manager Anne Esterson said: "We were very pleased to have Paul Kahn, the president of Airbus UK



and president of ADS, as a headline speaker."

Other presenters

shared knowledge and perspectives from leading UK and global companies including GE Aviation, GKN Aerospace, Rolls-Royce and UTC Aerospace Systems.

Delegates said the event was "very useful... well organised [and] a good balance of speakers and networking".

"Excellent location and organisation," said another. "Excellent idea to finish with the fighter pilot!"

MBO GIVES SIGMA NEW FOCUS AND DIRECTION

↘ Leicestershire-based Sigma Components is poised to take advantage of "exciting opportunities" following a management buy-out (MBO) backed by the private equity firm Silverfleet Capital.

Mark Johnson, Sigma's founder and chief executive, said the £65 million deal with former parent Avingtrans plc leaves Sigma in a good position "for broadening our manufacturing capabilities and developing our relationships with new and existing

customers [and] taking the business to the next level".

Long-time MAA member Sigma operates from four sites in the UK and two in China. It is a global leader in the niche markets of aerospace pipes, ducts, fabrications and precision surface finishing. Its customers include Airbus, BAE Systems, Bombardier, Rolls-Royce and Safran.

In March 2016, Sigma bought pipe-manufacturing sites in Nuneaton in the UK and Xi'an in China from Rolls-Royce, which

are complementary to its pipe portfolio.

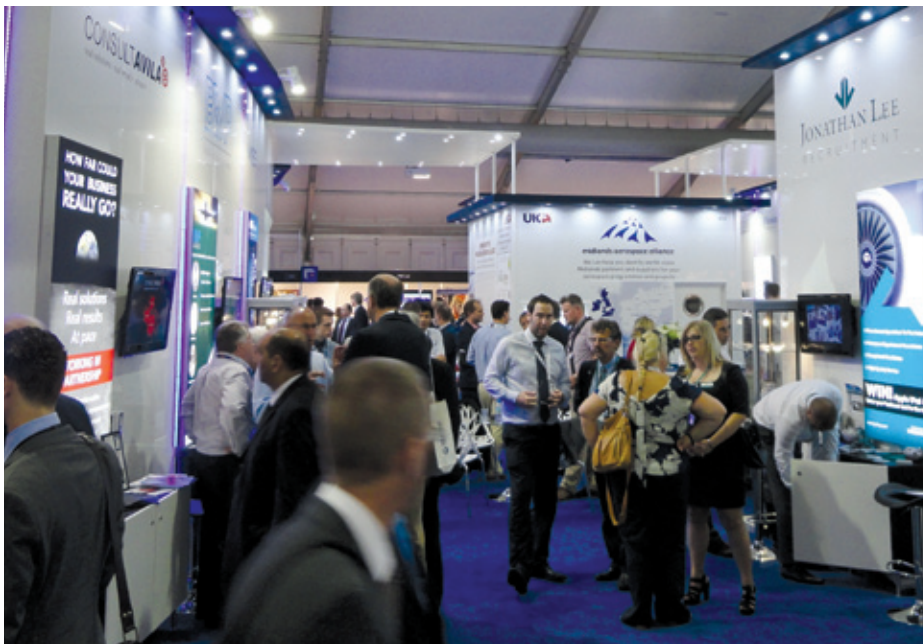
Silverfleet Capital partner David MacKenzie said the firm was "delighted" to be partnering with Sigma, which he described as "a market leader with excellent growth dynamics".

"We see an ideal opportunity to develop Sigma, which operates in a fragmented market, domestically and internationally."



www.sigmacomponents.com

FARNBOROUGH OPEN FOR BUSINESS



Prime Minister David Cameron, pictured (right) talking with Sigma's Mark Johnson (left) and Mark Lambert, was among VIP visitors attracted to the MAA stand at Farnborough 2014. This year, the stand's design again turns the space between pods into an attractive and inviting area to meet, greet and talk business, as visitors in 2014 discovered (above).



↙ The Farnborough International Airshow bills itself as 'the world's greatest airshow'. This year, the arrival of four examples of the world's newest fighter, the fifth-generation Lockheed Martin F-35 Lightning II Joint Strike Fighter (JSF), will help make sure Farnborough remains exactly that.

Away from the JSF showstoppers, however, visitors can expect Farnborough to fulfil its promise by providing one of the best events in the aerospace calendar to meet customers and suppliers and do business – and the MAA is once again in the thick of it.

The alliance and its exhibiting companies have their usual excellent location in Hall 1, within the UK Pavilion. The MAA stand, which covers 304 square metres, will be the home of 23 companies for a week – see the following pages for their details.

The jury is still out on whether the MAA will retain its unofficial title for the most companies exhibiting with a regional alliance from anywhere in the world.

"Those who exhibited with us or visited in 2014 will remember how the MAA stand was brimming with business meetings for days on end," said chief executive Dr Andrew Mair. "We have every reason to believe our stand will have the same level of activity this year, which can only be good for our companies."

The show opens on 11 July for seven days. The first five days are trade-only; the weekend of 16-17 July are public days.

VISIT US AND OUR EXHIBITORS IN HALL 1, STAND B90

FARNBOROUGH 2016

SEE US IN **HALL 1, STAND B90**

AN OVEN FOR EVERY NEED

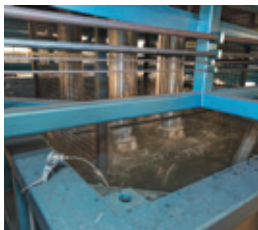
Aluminium alloy heat treatment specialist **AHT** is in its element at Farnborough.

The biggest occasion of the global aerospace community is "a fantastic opportunity to meet potential new customers with the aluminium sector," AHT director Ian Perks said. "Being a week-long event, it will allow me to spend time with existing customers and offer help with regards to any current and future projects."

AHT offers various sizes of heat treatment ovens with a process capacity of five tonnes to cater for the needs of the sector, ranging from very small items all the way through to large structures such as landing gear.

A Nadcap accredited company with more than 40 years' experience as a subcontractor, AHT prides itself on being the preferred supplier to many aerospace primes.

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EXCELLENCE AND FAST TURNAROUND

Midlands-based **Alloy Wire International (AWI)** is a critical partner to the aerospace supply chain, supplying precision, drawn, flat and shaped wire in more than 50 nickel 'high performance' alloys.

The company, which celebrates its 70th anniversary this year, provides its global client base with access to a comprehensive range of high corrosion resistant and high temperature performance alloys commonly used in aircraft fire detection, engine retaining rings, fasteners, high temperature seals and engine compression springs.

Approved by BAE Systems, Raytheon Jets and Westland Corp, AWI produces 0.025mm to 21mm bespoke wire in exotic alloys, including Nimonic 90, Inconel 600, Nimonic 75, Waspaloy, Titanium Grade 5 and Monel 400.

Sales executive Tom Mander said: "We've built our business on quality and fast turn-around. Our manufacturing policy is AS9100 'Aerospace & Defence' accredited and, with our 'no minimum quantity' policy, it saves customers money and helps them meet fluctuations in volumes."

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NEW ALLOYS GET AIRSHOW LAUNCH

Aluminium Special Products (ASP) is introducing a range of advanced, ultra-high performance aluminium alloys at Farnborough. Produced by Powder Light Metals GmbH, the range features low and controlled thermal expansion alloys for aircraft and space applications.

For more than 30 years, ASP has supplied bespoke aluminium alloy raw materials and components for aerospace, automotive and general engineering applications. It sources raw materials from specialist global manufacturers for demanding and specific applications.

In addition, ASP offers a full range of processing options in-house with a network of local sub-contract sources for finishing, testing etc.

The company has developed expertise in machining tubular components to exacting dimensional tolerances as required for aircraft seating, military and commercial. It offers deep hole drilling to achieve variable wall thicknesses, shaped internal chambers etc, backed up with the latest CMM measuring and process control technology.

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MAJOR INVESTMENT BOOSTS CAPABILITIES

Columbia Precision is at Farnborough this year to promote its enhanced capabilities following its investment of several million dollars in modern plant and human resources.

The Birmingham-based firm has recently added two Matsuura 5-axis prismatic CNC machines, a Mazak Megaturn and Studer twin-spindle CNC grinder, all of which add to Columbia's unmanned state-of-the-art manufacturing capability.

Columbia has been supplying complete precision engineering solutions to demanding markets including aerospace and defence for more than 35 years.

Operations director Ted Yarnall said the firm "is committed to ongoing investment into NPI, new technologies and training to meet engineering and customer requirements. This enables us to cater for existing and new clients' requirements while still competing with low cost economies."

The company's specialist skills include the development and production of complex prismatic parts that can be supplied in kit form and as complete tested sub-assemblies.

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BREAKTHROUGH FOR INVENTORY HANDLING

A new Visual Inventory Optimisation System (VIOS) software demonstrator is the highlight of **ConsultAvila's** stand at Farnborough.

The demonstrator, developed with the help of a NATEP grant, displays part stock levels, replenishment and consumption on a management 'dashboard' using data visualisation to facilitate dynamic inventory planning and control.

ConsultAvila director Dudley Wood said the VIOS "is based on concepts we've been working on for many years, such as segmentation, trend analysis, forecasting and alerting.

"Inventory is a big issue for many businesses in this sector, particularly if they have complexity, variety and volume, and aged stock. In our experience, business can release more than 15% of the working capital while maintaining and even improving service levels.

"We've talked to a lot of people, shown them early demonstrators and found exceptional interest."

ConsultAvila and its partner CANDA Systems expect to have a market-ready package within six months.

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FORUM GIVES ITS MEMBERS A BOOST

Returning to Farnborough after previous successful airshows are members of the **Coventry and Warwickshire Aerospace Forum (CWAFF)**.

"In contrast to our rather long-winded name, we are a group of unusually forward-thinking aviation industry manufacturers who are key suppliers to global aerospace companies," said spokesman Jason Aldridge, managing director of Arrowsmith Engineering.

"By harnessing our vast engineering knowledge and experience, together with our diverse production capability, we are able to offer innovative and cost-effective solutions to many aerospace manufacturing challenges."

What makes CWAFF so unusual is the way its members help each other find solutions to problems regardless of whether they have a financial interest in the outcome. This gives CWAFF members access to the expertise and R&D of companies 10 times their size. For their clients, it brings the benefit of finding optimum production solutions far more quickly and cost-effectively than might otherwise have been achieved.

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WORLD-FIRST IN JET TRAINING SYSTEMS

DART is at Farnborough to promote its end-to-end jet trainer system – a world-first.

DART responds to the challenges of cost and fleet diversity that military flight training operators face in taking students from Basic to Advanced flying training and finally Lead-In Fighter Training (LIFT) and Operational Conversion on a front-line fast jet.

"Our family trainer concept of different wing and engine options based around a common fuselage, cockpit and ground-based training system will meet the requirements of all flight training phases, specifically for lower-cost and export customers," said director Tristan Crawford.

Uniquely, DART can amortise the development costs of the system across sales to basic, advanced and LIFT jet trainer markets. This in turn will allow DART to reduce the acquisition cost of the system.

Ninety-per-cent commonality across DART airframes will significantly reduce the spares count, instructor training and technician training costs across the fleet.

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DELCAM PREPARES FOR INDUSTRY 4.0

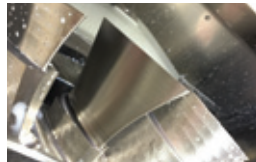
Delcam Professional Services (DPS) is at Farnborough to promote its enhanced range of products and services.

DPS has been offering customised products and services for aerospace manufacturers and MRO companies for more than 15 years. Its capabilities now extend to the factory-of-the-future to automate, integrate and optimise workflow with technologies including generative design, materials technology and simulation as well as advanced manufacturing methods such as robot programming and additive manufacturing (AM).

DPS services range from supplying extra design, programming and machining resources to developing software to automate manufacturing or establish new processes for novel designs.

Recent projects from DPS include partnering with Technicut to revolutionise blisk machining efficiency, delivering a 51% saving in cycle time and 45% reduction in milling cost. This 804mm diameter, 31 bladed Ti-64 blisk took just 35 hours to rough and finish mill using PowerMILL and Technicut's barrel tooling technology.

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ANSWER FOR EXOTICS, DELICATE STRUCTURES

Electro-discharge machining (EDM) specialist **Electro-Discharge** is at Farnborough to talk about the benefits and advantages of its wire and spark erosion capabilities.

The company subcontracts its services to Tier 1 companies in aerospace, where its competitive advantage lies in the ability to process exotic materials and delicate structures such as honeycomb.

Electro-Discharge runs a busy operation with more than 30 machines installed. Its latest wire-cut machine can handle rings up to 1.2m in diameter and 700mm thick, which makes it ideal for segmenting or profiling, including honeycomb diameters.

Four-axis CNC die-sinking machines are used for angled holes, slots, stepped honeycomb diameter or complex hard-to-machine features.

"EDM doesn't need a lot of clamping force," said general manager Rupin Vadera, "which makes it ideal for processing easily-damaged structures like honeycomb."

"The more exotic or harder the material, the better. As long as it's conductive, we'll cut it."

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CUSTOMER BENEFITS FROM VALUE STREAM

CW Fletcher is at Farnborough to showcase the benefits to customers of its new Value Stream approach to manufacturing.

The shift to a Value Stream structure builds on its engagement with the Sharing in Growth programme and CW Fletcher's commitment to focusing on its core product groups: machined from solid, machined fabrications and actuator unison rings.

In addition, CW Fletcher is keen to talk about its new partnership with an experienced Indian engineering company which business development manager Richard Phillips said "places us in the enviable position of being able to provide high-quality machined fabrications, incorporating machined components at a significantly reduced cost base, should our customers choose this."

CW Fletcher operates in a wide range of material types and up to 2m in size, with customers including Kawasaki Heavy Industries, GKN Aerospace, Siemens and Rolls-Royce.

"We're a safe partner for any customer," said Phillips.

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Hall 1 UK Pavilion
STAND No.1/B90

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CREATIVE THINKING YIELDS SOLUTIONS

IPI Solutions celebrates more than 10 years of innovation in 'Computer Aided Quality' within the aerospace, defence and other high-integrity manufacturing sectors. IPI's approach is simple, through creative thinking and working closely with customers to solve industry-wide issues.

Recognising a need within the electronics industry, IPI developed a solution to manage the complexity of PCBA Printed Circuit Board Assembly FAI AS9102 reports.

Working with an OEM supplying multiple industry sectors globally, IPI integrated a web solution to receive, evaluate, and efficiently manage their supplier PPAPs.

IPI has a comprehensive range of applications to manage APQP/NPI, PPAP, FMEA, SPC, Inspection Planning/ Control Plans and Gauge R&R processes.

CEO and founder Brian Harvey said: "Our solutions bring significant benefits to individual suppliers through entire supply chains, from extracting and auto bubbling inspection requirements from 3D models or 2D drawings and importing results from; CMM, digital tools or even importing handwritten results, captured and digitally imported."

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SPRING CHALLENGE: ANY TAKERS?

G&O Springs is once again extending an invitation to all Farnborough visitors and exhibitors to bring them any spring design or technical problems they may have.

It's an extension of the company's free design and technical advice service that has helped make G&O the 'go-to' name for anything to do with springs.

"We have our technical team on hand to solve any issues you may have," said managing director Steve Boyd. "If you bring along a problem they cannot solve on site, we'll give you a free bottle of champagne."

G&O has a slightly different approach to the manufacture of springs. Boyd said: "All the springs we produce are mandrel coiled by skilled operators to the tightest of tolerances." When you visit the stand, he'll explain the benefits of this approach.

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TOP SOLUTIONS FOR MACHINING

ITC, a leading UK manufacturer, stockist and distributor of precision cutting tools and associated equipment, returns to Farnborough on a mission to help its customers produce their products faster, more reliably and better.

In addition to manufacturing its own Cyber Series range of high precision carbide and PCD tooling, and special-to-product cutting tools, in its state-of-the-art manufacturing unit, ITC is also the main UK agent and stockist for Widia solid carbide and indexable cutting tools, and for the world-renowned BIG KAISER range of boring tools and tool holders.

"We keep over 100,000 tools on the shelf for immediate despatch," said IT coordinator Simon Horseman. "We are confident our range of world-class tooling, combined with our expertise, can improve any machining process."

"We believe good customer service is vital, and our staff are trained to provide expert support, whether you know exactly what you need, or need guidance from start to finish."

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PRODUCT DATA INTEROPERABILITY

To remain competitive, aerospace manufacturers are implementing model-based enterprise, advanced simulation and PLM initiatives supported by best-in-class engineering systems. However, data interoperability issues can impede progress.

ITI solves complex interoperability problems, supporting key aspects of PLM and MBE including: design, analysis, change management, certification, long-term archival and technical data packaging.

"Aerospace customers demand that their engineering and manufacturing technologies enable interoperability from design to sustainment. ITI is in a unique position to offer CAD migration, validation, and integration solutions that can be applied across the product lifecycle," said Andy Chinn, commercial director, ITI.

"No other company has the level of experience and focused approach to solving interoperability issues."

ITI is using Farnborough to meet customers and discuss how it can help integrate design and analysis processes, facilitate greater collaboration, and provide validation to ensure companies can trust the integrity of their CAD data.

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SECTOR INSIGHT MEANS TOP RECRUITMENT

Jonathan Lee Recruitment has been supplying the aerospace, defence and aviation sectors with exceptional people for more than 38 years.

Offering 'Solutions through Understanding', the consultancy provides best-in-class recruitment and talent management services to clients globally. With many of our consultants having direct experience in the sectors for which they recruit, we take pride in our in-depth understanding of the skills, experience and attributes that clients require in an increasingly competitive marketplace.

Operating with professionalism and integrity through a partnership approach, we provide true consultancy to our clients and candidates alike.

Managing consultant Matthew Heath said: "We are fully committed to supporting our clients in meeting the demands of increases in build rates and passenger growth. Finding and retaining the best people is more critical than ever to success in this skills-short market."

Come and talk to our expert team at this year's show.

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CHOICE IN YOUR CERTIFICATION NEEDS

Kiwa UNAVIAcert is at Farnborough spreading the message of choice in who you work with for your aerospace and defence certification needs.

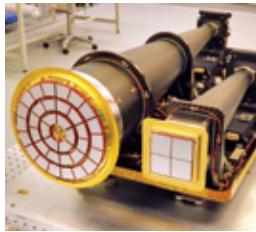
A benchmark for the aerospace certification market, Kiwa UNAVIAcert originates in Italy but now is active throughout Europe and used by 130 companies for 91xx series of standards.

"We operate best industry practice and the highest levels of client service," said UK marketing coordinator Karen Stageman. "We have comprehensive experience in safety and mission-critical systems as well as component manufacturing and processing. We're here to help."

The company provides assessment and certification for AS/EN/JISQ9100: Quality Management Systems – for Development, Production, Installation and Service Organisations; '9110 Quality Management Systems – for Aviation Maintenance Organisations; '9120 Quality Management Systems – for Aviation, Space and Defence Distributors.

European NABs have agreement to allow other CBs to operate abroad. UKAS has an agreement with Accredia, permitting UNAVIAcert to operate in the UK.

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DISTINGUISHED RECORD IN SPACE SCIENCE

The **University of Leicester** is at Farnborough to promote its long and distinguished record of discovery in space science: every year since 1967 has seen a Leicester-built instrument operating in space.

Space-related work at Leicester covers upstream: hardware, instruments, missions and applications. Our Space engineering expertise makes us the home to a wide-ranging expertise in design of mechanical, thermal and optical systems, power electronics and embedded systems. We develop systems which can operate in extreme environments for extended periods without the need for servicing.

We are conducting research into radioisotope power sources for future European space exploration missions, such as NUCLEAR power sources.

Our specialist research in solar winds and space weather are conducted with spacecraft and ground-based facilities; Leicester is also a destination of choice for planetary material analysis, understanding of planetary environments and Earth Observation and its associated applications.

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TWO CASTING OPTIONS FROM ONE LOCATION

Maycast-Nokes Precision Engineering is a leading supplier of fully finished, machined precision castings. The company is one of the only UK foundries capable of offering precision sand and investment/lost wax castings from a single location.

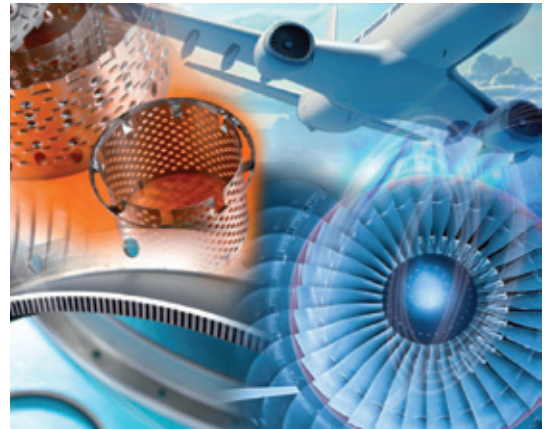
Using rapid prototyping techniques, it can supply castings on short lead times for initial trials or fit, form and function tests. "We can then supply production quantities, from hard tooling, of machined, finished and assembled castings," said sales director Dave Blower.

Maycast-Nokes complements its extensive on-site casting, machining and testing facilities with comprehensive finishing and assembly capabilities.

"We are well versed in most surface treatments associated with aluminium components," said Blower. "We also offer mechanical assembly work."

"This means from a single purchase order, clients can source fully machined, finished and sub-assembled castings, which are ready to go straight to production."

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ENGINEERING INNOVATIONS IN SHEET METAL

First-time exhibitor **MJ Sections** is promoting its latest engineering innovation in sheet metal at Farnborough.

The company, a specialist in precision-formed sheet metal fabrications and machined components to the UK and global aerospace markets, is now able to replace traditionally expensive machined forgings with sheet metal rings – and hold critical tolerances where needed.

"The driving forces behind this are the significant lead time and cost reductions that are possible," said commercial manager Steve Cresswell. "The finished product could actually cost less than the forged starting ring."

"We look forward to showing you samples on our stand."

The innovation in sheet metal rings adds to MJ Sections' diverse range of special processes – all NADCAP approved – including welding, NDT, vacuum heat treatment, with brazing coming in 2016.

The company's current portfolio of parts includes rolled rings, rolled stringers for airframes, precision sealing rings/wires/honeycomb rings, pressed brackets and fabrications, machined parts made from turning and milling (3 and 5 axis).

"We're proud to include leading airframers and engine makers among our customers, providing a fast and proactive response to their needs," said Cresswell.

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GET INSIDE THE BIG FOUR EUROPEAN AEROSPACE MARKETS WITH THE MAA

The simple solution to taking your marketing message to the heart of international aerospace

Contact: emma.burgess@midlandsaerospace.org.uk

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FOCUS ON INNOVATIVE LIGHTWEIGHT COMPONENTS

Sigma Components returns to Farnborough with the latest innovations from a range of R&D programmes to develop lightweight aerospace components.

The Sigma Lite range is the result of Clean Sky, NATEP and AMSCI-funded programmes and includes Sigma's ground-breaking COMPipe technology – a composite pipe for aero-engines that offers up to 50% weight savings over traditional components – redesigned end fittings produced using additive manufacturing (AM) techniques, and composite drive shaft technologies.

Mark Johnson, founder and CEO of Sigma Components, said: "The team has been working hard over the past few years to develop new technologies to develop lighter, more fuel-efficient components and we're excited that several of these projects – which use both composite and metallic materials – are now moving into production stages. Investment in developing the next generation of aerospace technologies is paying dividends for our business and we're proud to be building a world-class new product introduction capability across the business.

"As the first show since our recent change in ownership, and also the first we've attended since completing the acquisition of Rolls-Royce's pipe business earlier this year, we're looking forward to talking with current and new customers about our increasing capacity, both in the UK and China, and our expanding capabilities, including the creation of centres of excellence for pipe, ducting and fabrication manufacture here in the UK."

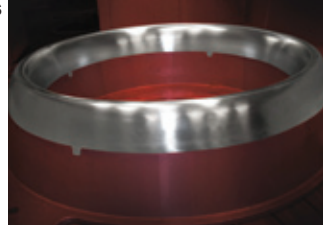
Sigma Components manufactures ducting, fabrications, sheet details, airframe sub-assemblies, rigid pipe assemblies, composite components, machined items, specialist fasteners, assembly and build fixtures, finishing and polishing services for aerospace OEMs and Tier 1s. With manufacturing facilities across the UK and in China, the business can also manage the supply chain on the customer's behalf, delivering lowest-cost, lowest-risk solutions at every stage of the product lifecycle.

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EXPANDING ROLE IN AVIATION MARKET

Spincraft and Enginetics are at Farnborough to showcase manufacturing processes and hardware components integral to their expanding roles in the aviation market.

Spincraft's current Airbus contract includes single-piece spun and machined lipskins for A320neo nacelles. This complements earlier A320neo awards of the geared turbo fan engine, and five-piece exhaust plug and nozzle sets.



Enginetics' extensive metal-forming and precision machining capabilities support a broad range of next generation engines including GTF and LEAP.

To support increased volume, a new 7,246 square metre Spincraft facility opens this

summer. The plant, located in the US state of Wisconsin, will specialise in aluminium close-tolerance aviation components.

Together, Spincraft and Enginetics make up Standex International's Engineering Technology Group. With seven facilities throughout the UK and US, the group provides global manufacturing solutions via collaborative engineering efforts. Precision metal forming technologies are supplemented with vertically integrated manufacturing processes to support aviation, defence and space system markets.

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STEEL FOR EVERY NEED IN AEROSPACE

Acciaierie Valbruna has been producing steel for more than 90 years and is at Farnborough to promote its work within the global aerospace and defence industries.

The company produces more than 180,000 tonnes of stainless steels, duplex steels, nickel alloys and titanium long products per annum from three plants, in Vicenza and Bolzano, Italy, and in the USA at Fort Wayne, Indiana. It offers more than 700 special steel qualities in a range of sections.

Valbruna's ISO-accredited quality systems, philosophy and expertise permeate every aspect of production. This ensures the highest quality steel which meets the increasing demands of its high-tech markets with improved performances, integrity, reliability and machining consistency.

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It has UK service centres in West Bromwich, Sheffield and Manchester.

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midlands aerospace alliance

At the heart of the Rolls-Royce LiftSystem is the fan capable of generating more than 20,000 lbf of thrust. [Photo: Rolls-Royce].

MIDLANDS UPLIFT

THE LOCKHEED MARTIN F-35 LIGHTNING II IS BOUND TO BE THE HIGHLIGHT OF ANY AIRSHOW IT ATTENDS, AND FARNBOROUGH 2016 IS NO DIFFERENT. WITH AS MANY AS FIVE EXAMPLES OF THE FIFTH-GENERATION FIGHTER EXPECTED ON THE GROUND AND IN THE AIR, ITS IMPACT COULD HARDLY BE GREATER.

➤ The global supply chains of prime contractor Lockheed Martin and its main partners Northrop Grumman and BAE Systems will be in a celebratory mood as the fruit of their efforts goes through its paces at Farnborough.

The F-35 programme began in earnest in 2001 with Lockheed Martin's selection as the main contractor for the Joint Strike Fighter. Teaming up with Northrop Grumman and BAE Systems, Lockheed Martin started development. Five years later, in 2006, the first production aircraft rolled off the assembly line in Texas.

F-35A deliveries started in 2011, with the short takeoff vertical landing (STOVL) variant, the F-35B, following in 2015.

The F-35B is expected to be well-represented at Farnborough; it is the variant that will be flown by the RAF and Fleet Air Arm. Thanks to the ground-breaking Rolls-Royce technology that gives it its STOVL capabilities, it will without doubt be



Dunlop manufactures main gear tyres for the F-35B.

the centre of attention for UK suppliers.

Derby-based **Rolls-Royce** is the first among many Midlands companies with important roles on the programme although its work takes place largely in Bristol and Indianapolis. A partial list of others, which includes UTC Aerospace Systems (UTAS), Moog, Dunlop Aircraft Tyres, Icon Polymer and ASP, reflects the diversity, capability and depth of the Midlands supply chain.

The F-35B's LiftSystem was developed and built by Rolls-Royce to a Lockheed Martin design. Rolls-Royce says this system is "the world's only vertical lift technology for fighter jets in production" and a "descendant" of the Pegasus engine. The LiftSystem comprises the LiftFan, driveshaft, three-bearing swivel module (3BSM) and roll posts.

The LiftFan is a 50in (127cm) fan capable of generating more than 20,000 lbf of thrust. It is connected by the driveshaft to the aircraft's Pratt & Whitney F135 engine to produce the forward vertical lift.

The other parts of the LiftSystem are the 3BSM which redirects main engine thrust downwards to provide rear vertical lift, and the wing-mounted roll posts which stabilise the aircraft in hover with up to 1,950 lbf of thrust each.

Rolls-Royce said the LiftSystem uses "the latest in digital control and fan system technology" to deliver the STOVL (*to page 10*)



THE VIEW FROM WESTMINSTER

“The lack of detail makes it difficult for firms and training providers to plan...”

Iain Wright MP, chair of the BIS select committee, urges members of the Midlands aerospace community to share their views with his committee.

After being elected to the chair of the Business, Innovation and Skills Select Committee by the House of Commons after the general election last year, my objectives for the work of the committee are clear. Our job is certainly to scrutinise, question and if necessary criticise government policies in business and skills.

But business doesn't want parliament to oppose simply for political purposes. So our role is to work to add value – to ensure that Britain has the policies and business environment which will allow more wealth to be created, with firms growing and winning more orders here and overseas and employing greater numbers of people with high skills, providing the knowledge and innovation which is essential to success for the UK in the competitive global economy.

The aerospace industry is one of the best examples of a successful and modern industrial sector for Britain. The Aerospace Growth Partnership (AGP) is a fantastic illustration of government and business working closely together to set the long-term goals of the industry in improving productivity, accelerating innovation, coordinating the supply chain and maintaining and raising skills levels.

The potential prize for the industry is huge. Something in the region of 29,000 additional aircraft are expected to be commissioned and delivered around the world in the next 15 years, with a potential value of almost £3 trillion.



“We have to remain vigilant and ensure that the aerospace industry in the UK remains innovative, highly skilled and ever more productive.”

However, other countries such as Brazil and China are eager to capture market share in the aerospace industry and are snapping at our heels. We have to remain vigilant and ensure that the aerospace industry in the UK remains innovative, highly skilled and ever more productive.

Clusters are important in this field. Firms collaborating as well as competing, and sharing knowledge and examples of best practice, can raise the productivity and profitability levels of the entire supply chain in an area. That's why I warmly applaud the work of the Midlands Aerospace Alliance, helping to give a coordinated voice to the firms in the sector in the region. We on

the select committee are very keen to listen to your views and act as an effective voice to government, amplifying as much as possible your concerns.

Our forthcoming inquiry into local economic devolution, with particular emphasis on the Midlands Engine and Northern Powerhouse initiatives, will need your input and I invite you to give us your thoughts as to whether the Midlands Engine actually has an impact – positive or negative – on your business.

In the end, however, success or failure of the aerospace industry in the Midlands will rest on the ability to secure the right skills. The government had placed apprenticeships at the heart of its skills policy, with the apprenticeship levy the means by which companies pay for those apprentices.


The industry has a good track record in securing apprenticeships but skills shortages remain, constraining the growth potential of the sector. We still have no detail on the levy, even though it will be deducted from large firms' payroll in less than a year. The lack of detail makes it difficult for firms and training providers to plan in a sensible and coordinated way. We on the select committee, working closely with our counterparts on the Education Select Committee, are investigating apprenticeships, and we would really value your experience and insight.



www.iainwrightmp.org.uk

LASTING BENEFITS

NATEP HAS NOW REACHED THE PEAK OF ACTIVITY WITH 100 PROJECTS LIVE. BUT WHAT LONG-TERM BENEFITS HAVE PROJECT PARTICIPANTS TAKEN FROM THE PROGRAMME? MIDLANDS AEROSPACE TALKS TO FOUR COMPANIES FOR WHOM NATEP HAS MADE A DIFFERENCE.

 NATEP – the National Aerospace Technology Exploitation Programme – is a modern success story that proves the wisdom of an old proverb: great things can grow from the smallest seeds.

By supporting research and development in the supply chain, NATEP has had a hand in the creation of innovative technologies and solutions across the breadth of the aerospace industry whose potential impact is huge. Along the way, it has helped small companies begin to understand how to realise their own creative potential in a tough market.

It was ATEP – a Midlands forerunner to NATEP – that demonstrated that “relatively modest, well placed grants seeded into the supply chain, and backed by expert help and mentoring, could produce remarkable results,” said Peter Knight, MAA technology manager for NATEP.

“In some cases these results had a transformative effect, particularly for smaller businesses.

“As the first tranche of NATEP projects now begin to reach successful conclusion,

it is very rewarding to see exciting and promising new technologies which are again helping our aerospace supply chain to compete globally,” he said.

Midlands firms are well represented among NATEP projects, with many acting as project leads.

Configurable double-sided cooled integrated power module

For the Leicestershire-based semiconductor specialist Semelab, part of the TT Electronic Group, R&D underpins its corporate culture as it seeks to keep ahead of the market and maintain its status as an expert in its field.

Under its 18-month NATEP project, Semelab and project partner Pre-Met are designing and manufacturing a demonstrator of a configurable power module for end-user Rolls-Royce.

R&D manager Liam Mills said the £254,000 project is at its halfway point and on track to finish next year.

The project’s objective is to achieve significant improvements in reliability,

performance and cost of power modules, improve standardisation and integration while reducing component size and weight. As an extra benefit, Semelab has developed the ability to produce four configurations of the device with one tool set, and in a single process.

“Our business is very much a niche area for aerospace, and volumes are low,” said Mills. “This is allowing us to gear up for higher-volume manufacturing and compete on that scale using our current equipment.”

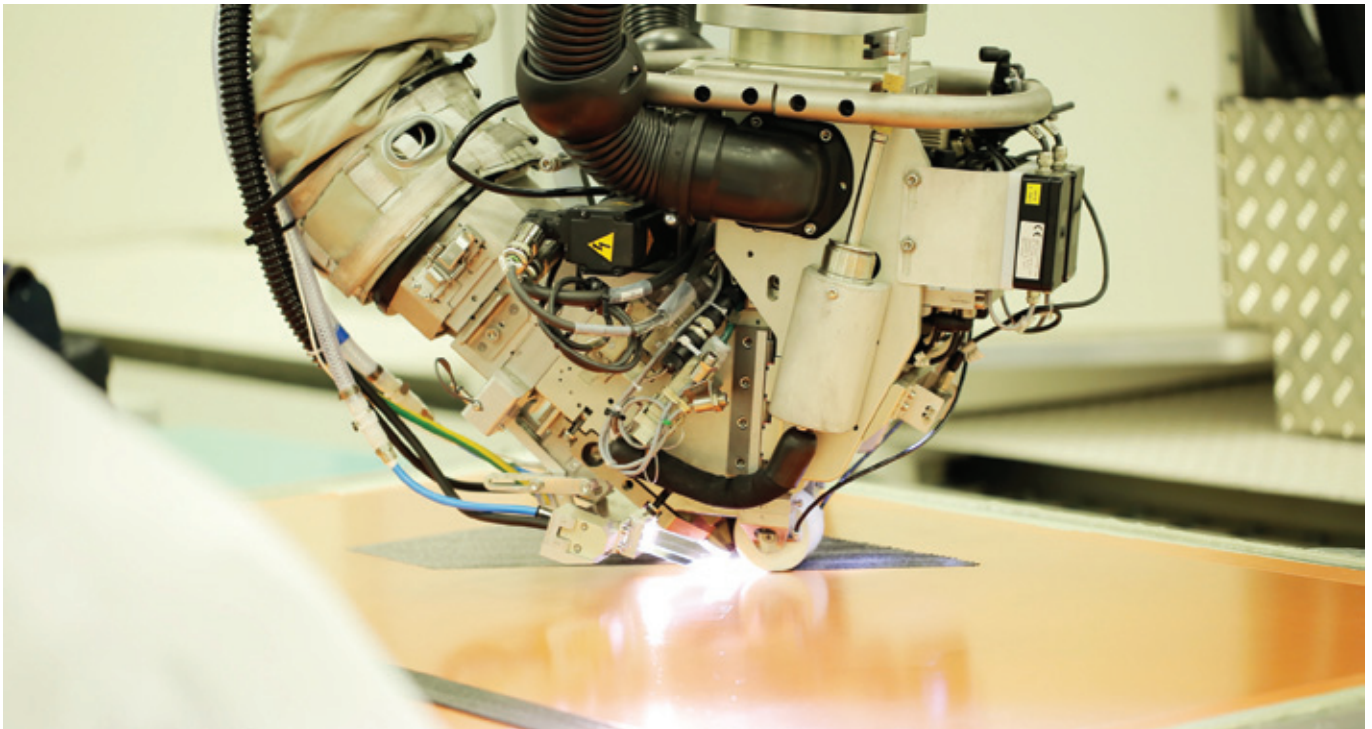
The NATEP approach brought unexpected business benefits to the company’s R&D capabilities. “One of the good things was the workshops they arranged,” said Mills, singling out sessions on intellectual property (IP) and roadmapping. “These types of business-level workshops are good, particularly for small companies.”

Process optimisation for aerospace alloys

ANT Industries was one of three small Midlands companies that formed a consortium to work with the Manufacturing Technology Centre (MTC) on process



Semelab and project partners (from left): Simon Turvey (Rolls-Royce), Prof Shankar Madathil (Sheffield University/Rolls-Royce), Adegoke Gbadeyan (Rolls-Royce), Liam Mills (TT Electronics Semelab), Steve Haynes (Pre-Met), Dr Graham Bruce (Rolls-Royce), Phil Peeler (Pre-Met), Ben Peeler (Pre-Met). Dr Bruce is no longer on the project team.



AFP technology offers potential cost and performance advantages. (Photo: Heraeus Noblelight).

optimisation for aerospace alloys. Its partners in the £180,000 NATEP project were Arrowsmith Engineering and Technoset, working with end-users Pattonair and ITP.

ANT's part of the project focused on the machining of large-diameter, thin-section rings for engines.

Managing director Shaun Rowley said the company was looking for a more generic understanding of how materials behave during machining. "With accurate measurement of the relaxation in the material during machining, we can apply calculated compensation error (CCE) – effectively machining incorrectly, knowing the part will be correct when it's completed," he said.

Though not a new technique, taking a scientific approach to CCE allows ANT to shortcut the normal 1-2 year product development process to a few months.

Rowley said ANT is applying the newly acquired information for metals ranging from aluminium to inconel alloys throughout its business to improve its manufacturing efficiency. An immediate result has been a long-term contract with ITP.

For ANT, the NATEP project provided a gateway to the technology and experts at the MTC. "It's always a challenge for an

SME to find the time for R&D," said Rowley. "When you can sit with a team of experts, you get new ideas that challenge what you do. For us, that was a bonus.

"We would definitely go into a NATEP project again."

Xenon pulse technology in fibre placement

Heraeus Noblelight used its 18-month, £290,000 NATEP project to demonstrate the use of xenon flash technology as an intelligent heat source in automated fibre placement (AFP) for processing composite materials for aerospace applications.

'Xenon Pulse Technology in Fibre Placement', carried out with partner Hexcel Composites for end-user Rolls-Royce, concluded in March 2016 and is already attracting interest among OEMs.

AFP technology is widely used in aerospace, said technical director Jeremy Woffendin, and offers potential cost and performance advantages. "We see concrete commercial opportunities arising from the project work" with potential in other sectors as well, he said. "We're working with key OEMs to fully integrate our system into their products."

NATEP's involvement lowered the financial risk associated with developing a

new technology and "allowed us to invest to speed up the journey to a high technology readiness level," he said.

The long-term benefit of the NATEP project will be "UK jobs, created and secured for the future, putting the UK in the lead for this technology."

Novel Miniature Actuator

Engineering design specialist CNR Services International led this £300,000 NATEP project to design and demonstrate an actuator for first and business class aircraft seats.

CNR managing director Chris Reckless said success in testing the 'Novel Miniature Actuator' to aerospace specifications points to a potential game-changer in its class.

He said the new device is lighter, cheaper and uses less power. "Once this gets productionised, the weight saving alone will run into billions of dollars a year. It's a massive win for the operators."

NATEP gave CNR and its partner Midland Aerospace an opportunity to develop a difficult concept. "It's always a challenge to improve on a solution that's already out there." He would have no hesitation to run further projects under NATEP.



www.natep.org.uk

PROFILE

VIEW FROM THE MAA BOARDROOM

“I think the aerospace industry is unique... I like the untapped potential”

Klaidis Lafon de Ribeyrolles, executive vice-president, Infrastructure and Services Purchasing at Rolls-Royce, finds good relationships with suppliers can sometimes be more helpful than the contractual position.

DID YOU HAVE A CAREER GOAL WHEN YOU WERE A STUDENT?

I wanted to be a fighter pilot, passed the selection of Ecole de l'Air but changed my mind the day before joining (it's a long story). I never thought about a career in supply management but my path crossed those of two great men who gave me the procurement bug! Their influence is probably why I'm where I am today.

HOW IMPORTANT HAVE LANGUAGES BEEN IN YOUR CAREER?

I've worked in seven or eight countries over my career and I've always been fascinated by the breadth of knowledge you gain when immersed in a new culture. I only speak three languages (French, English and Russian) but they've been very important at different stages of my career. Speaking Russian can be a lifesaver when your plane is delayed and you arrive in the Ural region at 2am and the person who was supposed to welcome you is sleeping!

WHAT OTHER SKILLS DO YOU FIND USEFUL?

In procurement, 'soft' skills are as important as professional qualifications. Effective procurement is the art of bringing your internal stakeholders and your external suppliers to work together. This requires a lot of influencing, relationship building and convincing. I've always found that in times of trouble, having the right level of engagement and good relationships with your suppliers are more helpful than your contractual position.

WHAT HAVE YOU GAINED BY WORKING IN DIFFERENT INDUSTRIES?

One size does not fit all! I've worked in the nuclear, automotive, aerospace and defence industries – all manufacturing but so diverse. Flexibility, adaptability and forward-thinking are probably what



“[Globalisation] is inevitable. We need to embrace it and seize the opportunity rather than just focusing on the threat”

I gained from working in these sectors. You really have to understand and focus on the needs/aim of the business/industry before defining your procurement strategy. The best practices in automotive may fail miserably in aerospace or nuclear.

WHAT INSPIRES YOU ABOUT AEROSPACE?

I think the aerospace industry is unique. There are few sectors where your order book is guaranteed for years and you don't really need to worry about sales (this is over-simplifying). From a procurement professional standpoint, what I like is the untapped potential that I can see compared to other industries. There are so many cost and innovation opportunities around us that could benefit the entire supply chain if we can work them together. So my focus right now is to make it happen.

HOW DO YOU VIEW THE GLOBALISATION OF CIVIL AEROSPACE?

It's inevitable. We need to embrace it and seize the opportunity rather than just focusing on the threat. In the UK and the Midlands, we've developed an aerospace sector that we can be proud of and, with the right level of attention and investment, can still grow.

Beyond globalisation, we need to consider the role that disruptive technology or players can have in the future. Who would have thought 10 years ago that the rising space players would come from PayPal and Amazon?

WHAT DO YOU SEE AS THE BIGGEST CHALLENGES FACING AEROSPACE SUPPLY CHAIN COMPANIES IN THE MIDLANDS?

To stay ahead of the curve and gain market share, our Midlands companies need to address four areas:

- Productivity
- Supply Management
- Factor and Capital Costs
- Management Capabilities.

These were the opportunities for improvement I highlighted when I presented a side-by-side comparison of the UK and German supply chain performance at the first MAA conference in 2013. I think they're still topical today.

WHAT ARE YOU ABLE TO CONTRIBUTE AS A DIRECTOR OF THE MAA?

Having a unique position as a customer and supply chain executive, I can advise on market trends, customers' expectations and procurement practices. I think this helps the board make sure the MAA is supporting our members with a forward look and a customer perspective.



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ABOUT THE MAA...

The Midlands Aerospace Alliance (MAA) is the voice of companies in the British Midlands supplying global aerospace. Its 300 member organisations range from global aerospace players to SMEs. The MAA board comprises senior managers from Meggitt, Moog Aircraft Group, Rolls-Royce and UTAS Actuation Systems, elected



supply chain representatives and key regional partner bodies.

For additional copies of *Midlands Aerospace*, or to add your colleagues to the distribution database, please contact the MAA by any of the means below.

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The MAA welcomes the following new members

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If you have a query or suggestion that you would like to make, please contact the MAA.

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