OVER A CENTURY OF MANUFACTURING TECHNOLOGY INSIGHT

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Repositioning with the whole package p18

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New machines boosting capacity p26

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PIONEERING AM TECH

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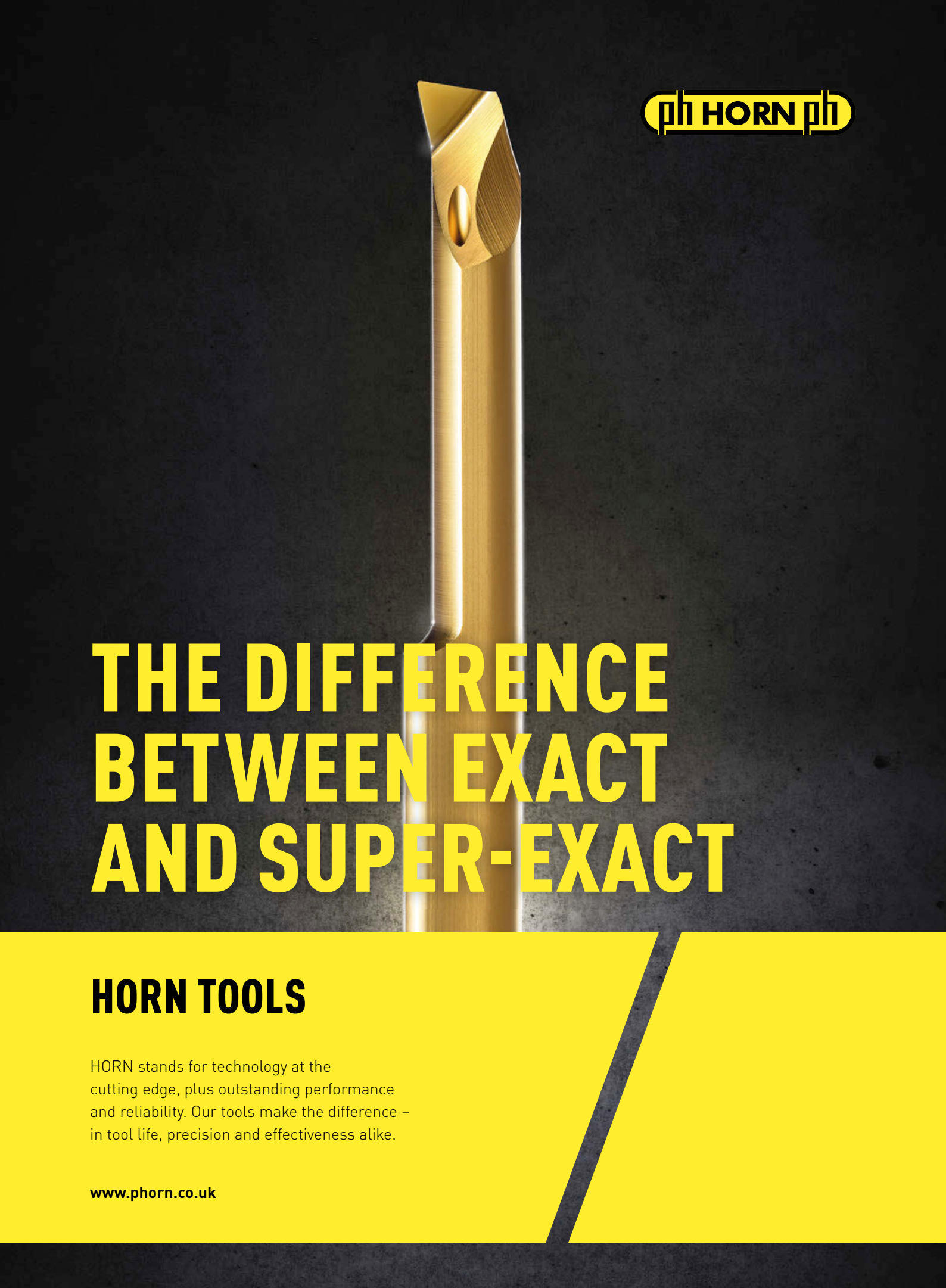
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Regular sections

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Aerospace Focus

- *Aerospace Industry Review, p38 – seeds of optimism of a recovery for the sector in 2021 as industry players and market analysers predict a slow, but steady growth in the calendar year*
- *Additive manufacturing gains, p42 - Airbus, Relativity Space and Marshall Aerospace reveal AM use at Formnext.*
- *Sector news, p46 – AE Aerospace (Mazak); Alloy Specialities (Hexagon); BEL Engineering (Kingsbury); Starrag; and more*

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Looking to the future

Additive manufacturing (AM) is increasingly being utilised across all sectors of manufacturing, notably in aerospace and automotive with investments in the latest machines high on the agenda, and the technology is bringing benefits to manufacturers by helping reduce lead times and save on costs.

The global AM market is estimated to have been worth around £11bn in 2019 and that is expected to triple in size over the next five years, and in this issue, our cover feature (page 10) takes a look at a new metal AM machine and process that has been developed by start-up Wayland Additive that will launch to the market in March, bringing a new innovation to the additive world.

The Huddersfield-based company has developed its innovative machine Calibur3 from the ground-up, utilising its self-developed NeuBeam metal AM process, which it says overcomes the stability issues many users of traditional eBeam AM systems experience, combining the best features of AM technologies and in turn conquers their traditional limitations.

Automation is another hot topic and investments in this area are high on the priority list for many businesses, and in this issue, we hear from Mills CNC (page 14) about how it has invested in a new Turnkey and Automation Centre to meet the needs and demands of the market.

The new centre provides the Leamington-based machine tools company with both an area to demonstrate its latest industrial and collaborative robot automation systems and solutions to customers, along with a focal point for the growing turnkey and process improvement business which, over the last few years, has grown significantly and it sees as key to its future success.

Last year, was challenging for most businesses due to the impact of the Covid-19 pandemic, and in this issue, we also hear from key machine tools industry player the Ceratizit Group (page 18), on how it used 2020 to reposition the company and lay the foundations for a successful future.

The UK is a key market for the company and we hear about the new Technical Centre that it is building, next to the University of Sheffield's Advanced Manufacturing Research Centre (AMRC).

Also featuring in this issue is our special Aerospace Focus (page 37), which looks what is in store for the aerospace sector in 2021 after a difficult period, while additive manufacturing also features, as despite it being a tough time for aerospace, the technology is a beacon of positivity for major industry manufacturers like Airbus, Boeing and Marshall Aerospace. ■

www.machinery.co.uk

News round-up

Kenilworth-based Whitehouse Machine Tools – the UK and Ireland sales agent for several high-profile machine tool manufacturers in the Far East and Europe – has appointed Peter Smith to the new position of sales and marketing director. *www.is.gd/lZTLhX*

The Manufacturing Technologies Association (MTA) has welcomed new president Andy Hodgson, strategic lead for digitalisation at Siemens. He will serve a two-year term. *www.is.gd/s84MDv*

Southern Manufacturing & Electronics 2021 will go ahead as a two-day event from 6-7 October this year at the Farnborough International Exhibition Centre. The organisers have also confirmed the 2022 show will return to its usual dates in early February next year. *www.is.gd/X3aQGP*

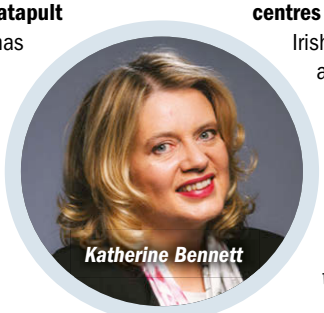
The Ceratizit Group has won the 2020 Innovation Award of the FEDIL business federation for the development of a new process for the additive manufacturing of tungsten carbide-cobalt. *www.is.gd/p7J4h0*

Mills CNC - the exclusive distributor of Doosan machine tools in the UK and Ireland – has appointed seasoned CNC machine tool sales professional Martyn Jones as business manager for the Birmingham and West Midlands region. *www.is.gd/kz5x7v*

Specialist moulding manufacturing company Midas Pattern Company has taken delivery of a new Haas CNC machining centre that will increase capacity at the firm's factory in Bedford. The Haas VF-11/40 machining centre replaces an older machine, the 2002 Midas VF-4 and it becomes the largest CNC machine the firm operates. *www.is.gd/8arIuS*

Renishaw has opened applications for a record 70 graduate positions, 51 apprenticeships and over 60 placement positions across its Gloucestershire and South Wales sites. This represents a major investment of its business, including roles in engineering and manufacturing. *www.is.gd/VoVly8*

The board of the High Value Manufacturing Catapult (HVM Catapult) has announced that Katherine Bennett – currently senior vice president of Airbus in the UK – will succeed Dick Elsy as CEO when he retires later in 2021. *www.is.gd/c2ViQW*


Katherine Bennett

High-tech engineering group Sandvik has acquired a minority stake in the privately-owned American company Oqton – a provider of AI-powered manufacturing solutions – that allow manufacturers to manage, optimise and automate their manufacturing workflows. *www.is.gd/USF0lN*

Citizen Machinery UK - which supplies Cincom sliding-head and Miyano fixed-head turn-mill centres into the British and Irish markets has opened a new dedicated solution centre at its Bushey headquarters. CMSolutions is focused on customisation. *www.is.gd/DMC0c6*

VDW (The German Machine Tool Builders' Association) which organises the METAV show has taken a minority stake in Munich-based Spanflug Technologies GmbH – a start-up dedicated to automating parts procurement in the manufacturing industry. *www.is.gd/2MjLjb*

SME manufacturers joining the Industry 4.0 revolution are driving demand for data science and software engineering skills, according to the Made Smarter digital technology movement.

Half of the 126 businesses adopting technology with the support of the Made Smarter North West pilot have put data and systems integration at the heart of their productivity and growth plans.

But while technology is solving business challenges, it is also highlighting a digital skills gap across industry and emphasising the need for existing workforces to be upskilled. *www.is.gd/NHpTry*

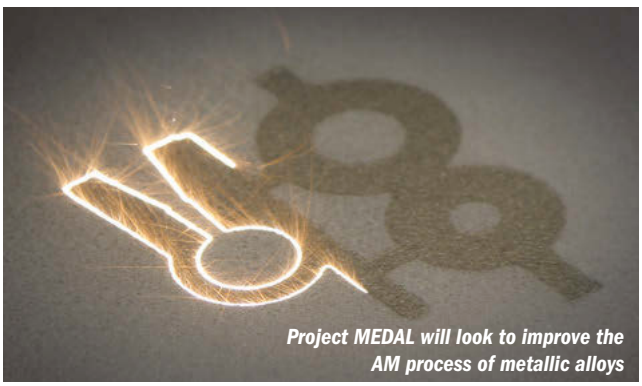
New project looks to boost AM in aerospace

Machine learning technology will be used to make the additive manufacturing (AM) process of metallic alloys for aerospace cheaper and faster, encouraging production of lightweight, energy-efficient aircraft to support net zero targets for aviation.

Project MEDAL – Machine Learning for Additive Manufacturing Experimental Design – is led by Intellegens, a University of Cambridge spin-out specialising in artificial intelligence, the University of Sheffield AMRC North West, and aerospace giant Boeing.

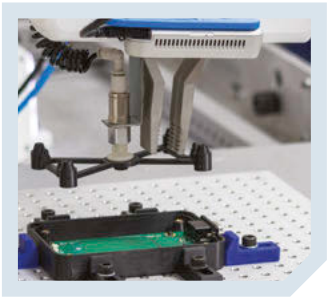
It aims to accelerate the product development lifecycle of aerospace components by using a machine learning model to optimise AM processing parameters for new metal alloys at a lower cost and faster rate.

The global AM market is worth £12bn and is expected to triple in size over the next five years. Project MEDAL's research will concentrate on metal laser powder bed fusion – the most widely used AM approach in industry – focussing on key parameter variables required to manufacture high density, high strength parts.


Project MEDAL will look to improve the AM process of metallic alloys

The project is part of the National Aerospace Technology Exploitation Programme (NATEP), a £10 million initiative for UK SMEs to develop innovative aerospace technologies funded by the Department for Business, Energy and Industrial Strategy and delivered in partnership with the Aerospace Technology Institute (ATI) and Innovate UK.

James Hughes, research director for University of Sheffield AMRC North West, said the project will build the AMRC's knowledge and expertise in alloy development so it can help UK manufacturers.



The Manufacturing Technology Centre (MTC) has developed a flexible industrial robot which it claims has the decision-making capability of a human operator. *www.is.gd/wWIJc0*

Japanese car manufacturer Nissan has told the BBC that its Sunderland manufacturing plant is secure for the long-term, giving a major boost to the North East. *www.is.gd/NqlkZk*

The Rolls-Royce factory in Barnoldswick, Lancashire, has been saved and with it 350 jobs after a deal was struck by Unite the union and the company's management. The facility will become a 'core manufacturing facility' and host a new 'centre of excellence'. *www.is.gd/uVjt7v*

BAE Systems is to hire more than 1,250 new trainees into its early career programmes in 2021 – with more than 850 apprenticeships and 400 graduate roles available across the UK, the highest number it has ever recruited in a single year. *www.is.gd/QxxsE7*

The Digital Catapult has announced that seven industry partners – including BAE Systems, Babcock International Group and Sainsbury's - have partnered with the match-funded Made Smarter Technology Accelerator programme and have set 14 challenges for companies to respond to. *www.is.gd/UPSGoF*

Belgrave & Powell Limited has launched a new robotics division within its Machine Technology Group division. Addison Robotics & Automation will focus on the growing trend for automation and robotics to improve productivity and manufacturing efficiency in the UK and overseas. *www.is.gd/NIA1pG*

Esprit – the CAM software for CNC programming, optimisation and simulation company – has announced the debut release to the general public of its on-demand training platform Esprit Learning Centre. *www.is.gd/N1Uvhx*

Ametek Precitech in conjunction with Micro-LAM, precision engineering firm Taylor Hobson and Zygo is setting up a Precision Advancement Centre of Excellence (PACE) at Taylor Hobson in Leicester. To improve capabilities

Ametek Precitech has suppled a 4-axis Nanoform X configured with the optimus laser assisted machining system from Micro-LAM. *www.is.gd/QYaRP1*

Gloucester-based Advanced Grinding Supplies Ltd has been appointed as the exclusive agents in the UK and Ireland for both Meister Abrasives and Alfons Schmeier Abrasives. *www.is.gd/g5rtuV*

The latest Contract Manufacturing Index (CMI) has shown that the subcontract manufacturing market showed resilience in 2020 – ending 1% up on the final quarter of 2019. *www.is.gd/qShtI2*

Product pick 10

DMG Mori launches M1

Global machine tool manufacturer DMG Mori has entered the vertical machining centre (VMC) market at the lower end of the price range with a new, nominally half-metre-cube model, the M1. *www.is.gd/qxfxeh*

New Ceratizit drill reamer

Ceratizit has launched a new product to the market – the WTX Feed BR drill reamer – which it says "ensures high accuracy with tight tolerances and perfect surface quality". *www.is.gd/vCTUNN*

ITC brings indexable insert drilling line to UK

Widia has extended their TDMX indexable insert drilling line to further boost stability, reliability and performance in drilling operations, which are available in the UK from Industrial Tooling Corporation (ITC). *www.is.gd/bnBUVn*

DAH82 and DAH84 arrive on the market

A new generation of milling cutters designed for machining at high feed rates has been introduced by German tool manufacturer, Horn. The DAH82 and DAH84 milling systems are available in the UK through subsidiary company Horn Cutting Tools, Ringwood. *www.is.gd/330FKQ*

GOM develops mobile measuring cobot

GOM – part of the Zeiss Group – has launched the GOM ScanCobot – a mobile measuring station with a collaborative robot, motorised rotation table and powerful software. *www.is.gd/5jVR6h*

Floyd introduces optimised universal boring tool

Floyd Automatic Tooling has introduced the new cost-effective MicroTurn eLine of boring tools from Ifanger in the shape of the new MicroTurn eLine MTEE, an optimised universal boring tool. *www.is.gd/0hiqnp*

Motoman range extended

Motion control and robotics specialist Yaskawa has continued to develop their Motoman range of robots with their newly developed Motoman-PL series. *www.is.gd/t95vT0*

New series released by Renishaw

Renishaw has launched the innovative FORTiS enclosed linear absolute encoder series, for use in harsh environments such as machine tools.. *www.is.gd/gamBUy*

Key range expanded by LK Metrology

LK Metrology has expanded its FREEDOM arm range of 3D articulating arm metrology systems (pictured left), or portable measuring arms, with the launch of five ultra accuracy models in both 6-axis and 7-axis variants. *www.is.gd/8TEdYo*

Diver by Guhring further evolves

Guhring has grown its Diver series of end mills with the launch of the new RF100 Micro Diver end mills. *www.is.gd/bLPWGC*

Innovative new metal AM process to be launched to

Additive manufacturing is growing in use across all applications and next month, Wayland Additive will launch a new metal AM and machine that uses its ground-breaking NeuBeam technology. Justin Burns investigates

The use of additive manufacturing (AM) is growing and West Yorkshire-based Wayland Additive (*www.is.gd/Dmtk9Q*) will add something to the market with the launch of a new innovative metal AM machine and process that is set to add value and opportunities to manufacturing applications when launched next month.

Machinery was given a look at the new AM machine Calibur3 that uses the firm's self-developed neutral beam (NeuBeam) technology – during a visit to the Huddersfield-based start-up last month.

After three and a half years developing the technology, the company was formed in August 2019 from a team that came from the semiconductor industry and looked at conventional metal AM processes and felt it could do better. The global AM market is estimated to have been worth £12 billion in 2019 and forecasted to triple in size over the next five years, meaning endless opportunities.

"Wayland wants to build long-term relationships built on dedication and trust, providing products that bring added benefits to customers," explains chief executive officer Will Richardson.

"All our machines that are delivered will be project-based, with specific targeted applications or material usage and the material development kit can be added to the production machine.

"Wayland engineers will be working closely with operators to ensure maximum benefit of the technology. Commitment will be required to be part of the program, with goals established, while educational placements will be accepted, but need to be application driven."

The company is funded through a combination of Innovate UK money and investment management funds.

Wayland Additive CEO Will Richardson

GROUND-BREAKING TECH

The team at Wayland believes the AM industry knows that completely new machine architectures are needed to enable true production and it has not just improved an existing technology – it has completely reengineered it - taking the workarounds out of AM by addressing the root causes, allowing users to focus on what really matters.

The NeuBeam process has been developed from the ground up in-house by a team of physicists that have worked for many decades with electron beam technology and industrial systems in the semiconductor industry. Wayland says the science, combined with extensive expertise and experience, has allowed it to develop a capable and reliable system, rather than imitating existing machines, or adapting off-the-shelf components and re-purposing them. By going back to the fundamental physics, it feels it has "re-written the rule book" on what a metal AM machine can do.

Director of business development Peter Hansford explains the NeuBeam metal AM process neutralises the electron beam (eBeam) powder bed fusion (PBF) process to offer greater flexibility than laser-based AM processes, overcoming the stability issues many users of traditional eBeam AM systems experience - combining the best features of existing AM technologies while overcoming

their traditional limitations.

In addition, the process enables metallurgical requirements to be tailored to application requirements, rather than the previous limitations of the process, which it claims produces "optimum results".

"It has long been recognised that electron beam-based power bed processes offer significant advantages over laser-based processes, as the energy transfer physics are more favourable for an electron beam than laser, enabling users to create stress-free parts with excellent metallurgy," says Hansford.

The existing electron beam process is limited by charge transfer instabilities, which are constantly balanced on a knife-edge and one wrong move can easily lead to catastrophic build failure for manufacturers.

metals. Aluminium and tool steels are yet to be tested.

The machine will be suitable for a range of applications across different industrial sectors, including aerospace, space, defence, motorsport, nuclear, medical imaging, turbo machinery, heat sicks, tooling, cutting, and mining.

Calibur3 and the NeuBeam technology have a range of benefits over other AM processes, according to Hansford. These include higher productivity, large build volumes, thermal management, rapid material development, microstructure management, good surface finish, fine powder capability, high powder recycling rates, easy part recovery and finishing, large hot parts without stresses and ultimately support free parts.

"NeuBeam technology lends itself to rapid application and material development, as users can monitor the full

flashmovie/stock.adobe.com

the market next month

The team at Wayland believes there is "fundamental flaw" with existing eBeam systems, and the biggest technical challenge is powder charging - the main cause of build failure that limits the amount of parameter variations available to end users. In this process, the beam transmits charge to the power before the particles become charged and then the charged particles semi-sintered together to prevent a repelling 'smoke event'.

Through the NeuBeam process, Hansford says it has solved the flaw with existing eBeam systems by freeing up the process, as users are no longer constrained and allowing for further expansion on parameters. This it says has created an ideal environment for material development and production. The beam no longer transfers charge to the powder, so the powder remains free around the parts, added in insulating the build.

RAFT OF CAPABILITIES

Calibur3 will have a build volume of 300x300x450mm, but an ugraded Calibur4 will arrive later in 2021 with a build of 450x450x450mm. It will also come with a material development kit build volume of 100x100x150mm.

Calibur3 has been built so that when any upgrades are developed, such as when the bigger build Calibur4 is launched, or software improvements are made, manufacturers can get them added to the machine.

Hansford notes the larger build area is something customers have asked for, while plans are also in the pipeline to develop a multi-point melt strategy, something not currently possible with current laser AM technology.

A range of materials can be used on Calibur3, including Ti64, Ti aluminide, tungsten, nickel based super alloys, copper, CM247, vibenite range/carbide allots, refractory

process, effect the cooling cycle, changing the microstructure to suit their needs," says Hansford.

PROCESS BENEFITS

Wayland Additive says Calibur3 will provide increased flexibility – giving users more complete open control in designing parts and materials due to a more tolerant and transparent process, control over material properties, freedom and tools for multi-materials, fully open parameters with no black box, design freedom, variable supports/sinter cake, parts are fully designed for production and a simplified post-processing.

This "complete stability" has aimed to eliminate process instability from electron beam-based AM to create a technology that will transfer directly from the lab to the production line. The NeuBeam process means there are no smokes, is a large stable operating window, more stability than eBeam or laser, no gas flow limitations on part size, advanced in-process monitoring and control, part traceability and qualification, no stress or distortion and easy machine calibration.

Better metallurgy is also achieved, as fully dense parts are created for users with tailored metallurgy, without the need to stress relieve parts post-process.

The process also ensures optimised energy output through power transfer from the beam to the powder bed, creating fully dense parts for a wide range of materials and layer thicknesses. Parameter control is also better, as users have complete control over melt parameters, enabling microstructures to be tuned and optimised for the applications. Users will also get powder integrity – as there is no need to sinter the powder, as the surrounding powder is not exposed to

Pictured above: Director of business development Peter Hansford

Pictured above bottom: Wayland Additive's newly–built showroom

high temperatures that result in oxygen pick-up.

Better metallurgy is achieved via a large stable operating window, fully dense parts, excellent cooling control, thermal history, fully grain control, stress free parts, very low oxygen pick-up, and powder recycling – helping with firm's with sustainability.

IN-PROCESS MONITORING

Designed specifically for production applications, Calibur3 incorporates fully embedded in-process monitoring capabilities that provide full oversight during every build, ensuring full traceability for every part.

An infrared camera gives real-time 3D temperature mapping via a single camera in the NIR, calibrated to measure temperatures from 600c to 1500c, giving absolute temperature measurements, cooling rates and identifying phases changes.

There is also a structured light system that can calculate z-height of build area and produce height surface map of powder bed, and any out of plane defect, such as powder spreading defects or part swelling. Calibur3 also features a backscattered electron detector (BSD) that detects primary electrons that have been scattered back from the nuclei of atoms in the target material.

Other big advantages for users lie in post-processes as in the laser AM process - fine de-powder, heat treatment and wire cut must be carried out, while in eBeam - powder cake breakout and fine de-powder must be done, but with the NueBeam process developed by Wayland, only fine de-powder is needed, saving valuable lead time in production processes and associated costs.

LONG-TERM STRATEGY

In 2021, Wayland Additive will make a limited number of machine placements to manufacturers with five delivered to customers, and geographic locations a big consideration. The start-up has had interest from manufacturers in the US, Japan, Sweden, Brazil, Germany, South Korea, but the UK is the focus market.

Hansford says it is not looking to sell 100s of machines, as that is not the goal and it is taking a "pragmatic long-term approach" and will work with specific customers. "We want to engage with the customer and work with them in partnership on difficult applications, and develop a process and production process allowing them to take advantage of the technology. We hope they then buy multiple machines to facilitate their needs.

"This is our journey and what we are trying to do, rather than market the hell out of the new technology and ship it and try and deal with it later.

"Our engagement is to try and engage with a specific customer, work with them, develop their process, help them on their way, let them run it and that way we should get high quality installations, good customer satisfaction and repeat business," he adds.

NeuBeam is the core technology, but Wayland Additive will continue developing and improving its capabilities, and by working closely with customers, will look to align the technology with specific industry needs.

The company will hold a virtual online event on 16 March to launch Calibur3 and a physical event on 19 May, when it is expected that Covid-19 related restrictions will be lifted. ■

Additive manufacturing news in brief

■ SLM Solutions Group AG - a German manufacturer of powder bed metal additive manufacturing (AM) machines – has launched the NXG XII 600 machine.

The Laser Beam Powder Bed Fusion (PBF-LB) Additive Manufacturing machine is equipped with twelve 1 kW lasers and offers a square build envelope of 600 x 600 x 600 mm. Gosport-based Kingsbury (*www.is.gd/jZg66Y*) will sell its products and services in the British and Irish markets.

The company reports that the NXG XII 600 is "the fastest AM machine on the market," offering build speeds 20 times faster than possible with a single-laser machine and equipped with technical features such as a zoom function to achieve the highest productivity and reliability.

It is designed to be used in serial production for high-volume applications, as well as for building large parts, thus opening up new applications in the automotive and aerospace industries and paving the way to industrialised serial AM. Materials like aluminium, titanium, nickel, cobalt, iron and copper alloys can be used.

According to SLM Solutions, the NXG XII 600 was designed from scratch for serial production and features a new optic system, said to be the most compact on the market. It enables large overlap and is based on a tailor-made laser scanning system to best fit the build area.

■ Stratasys – represented in the UK by Derbyshire-based platinum partner SYS Systems (*https://is.gd/BQBqTt*) – has signed an agreement to acquire 3D printing start-up Origin.

The $100 million business deal will allow the 3D-printing giant to widen its technological offering and the merger will enable Stratasys to expand its leadership through innovation in the fast-growing mass production parts segment with a next-generation photopolymer platform.

Stratasys expects Origin's proprietary Programmable PhotoPolymerisation (P3) technology to be an important growth engine for the company, adding up to $200 million incremental annual revenue within five years.

It will help fortify Stratasys' ground-breaking work in polymers and 3D-printing production applications in industries such as medical, tooling and select industrial, defence and consumer goods segments.

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The new Turnkey and Automation Centre has been developed to meet rising demand

Tony Dale, Technical Director at Mills CNC.

Meeting the needs of the market

Mills CNC has invested in a new Turnkey & Automation Centre, as this area of the business has been growing strongly and it believes will be critical to ensure future success

Mills CNC (*www.is.gd/OIjyom*) has opened a new state-of-the-art Turnkey & Automation Centre at its campus facility in Leamington to help meet demand from UK and Irish manufacturers for advanced turnkey and process improvement solutions - many of which include the integration of industrial or collaborative robot (cobot) technologies.

The centre is divided into two separate areas - the turnkey area, where projects are designed, developed, tested and initially passed off and a visitor demonstration area, where Mills SYNERGi cells and Doosan cobots can be presented. The turnkey workshop spans 8.5 metres by 27.5 metres and the showroom 8.5 metres by 14 metres.

The centre provides Mills with both an area to demonstrate its latest industrial and collaborative robot automation systems and solutions to customers, along with a focal point for the company's growing turnkey and process improvement business which, over the last few years, has grown exponentially.

The development of the centre, also provides a dedicated resource and environment at the campus for more turnkey and process improvement-type projects to taken on by Mills.

Technical director Tony Dale explains the new facility provides company with a dedicated resource, for these two advanced technology specialisms which, over the last five years or so, have become more important to Mills and are "central to its future growth and continued success".

ADDED BENEFITS

Mills CNC is the exclusive distributor of Doosan machines to the UK and Ireland markets, and is one of the fastest-growing machine tool companies in the UK, selling well in excess of 350 new Doosan machine tools to UK and Irish component manufacturers, year-on-year.

In addition to its successful machine tool business, Mills is at the forefront of developing and implementing highly customised and best-in-class turnkey systems and solutions for customers.

Dale says: "More and more manufacturers, as a route to improving their productivity and increasing their efficiency and effectiveness, are taking a much more holistic and comprehensive view of their manufacturing operations - and, rather than just acquiring a new machine tool to (say) increase capacity, are investing in turnkey solutions - many of which include advanced automation systems."

As well as a working area where customers' automation and turnkey projects are designed and developed, the centre also has a customer demonstration remit where customers can see Mills' automation systems in action and talk directly to Mills (automation) technical staff. The centre is in a separate part of the main campus - away from the company's machine tool demonstration area.

As automation and turnkey solutions are the direction of travel for many component manufacturers looking to improve their productivity and efficiencies, Mills explains it has taken the "proactive and unique step" in creating the dedicated resource. The centre in effect, recognises an aspect of Mills'

business that was already in existence - but elevates it to reflect future market dynamics and demand.

"At a time when many manufacturers were battening down the hatches, waiting to see-out the pandemic - we have been proactive. We are confident about its success and it will soon become the 'go-to' place for manufacturers looking to maintain their competitive edge," says Dale.

AUTOMATION IS THE FUTURE

In 2020, to help make automation more accessible and attractive to component manufacturers, Mills has launched its own SYNERGi automated manufacturing cells into the market.

The SYNERGi cells comprise three different 'types' based on capacity and complexity - SYNERGi Premier, Classic and Sprint and the centre provides a dedicated resource and environment for Mills' industrial and collaborative robot and cobot business. (see more on page 16)

The cells can be customised to meet customers' specific needs and requirements; integrated with more than one (Doosan) machine and, further customisation can enable other process requirements to be included in each cell's design and build such as inspection, parts' washing station, as well as addition of bespoke work loading/unloading racking systems.

Turnkey and process improvement solutions, often including and involving automation like workpiece loading/unloading systems involving robots; automated manufacturing cells, are not new to Mills. The company has a proven track record in their design and delivery - especially, and most recently, with OEM aerospace, defence, automotive, power generation companies.

In these cases, Mills CNC, as the supplier of Doosan machine tools adopts the project leader role - interfacing with the customers at all stages, designing the systems, managing and coordinating all third-party involvement and being responsible for proving out, signing off, installation, training and providing technical support.

Another key part of the automation side of business for Mills, is as UK and Irish distributor for global cobot manufacturer Doosan Robotics, a contract it took on in 2018. The centre will house these cobots and will be demonstrated to potential customers.

The high performance cobots comprise of A-, M- and H-series. Doosan cobots are designed to perform a range of tasks from machine tending, inspection and testing through to packaging, assembly and pick and place operations.

Dale explains interest and demand for Doosan cobots has been "steadily increasing" and this is the direction of travel in the future, as manufacturers look to improve their productivity, adopt lights-out and unattended operations (overnight and weekends), reduce labour costs, and redeploy staff from doing repetitive tasks to undertaking more value-adding ones.

However, he adds UK manufacturing is still slow at investing in automation: "There is still a big education programme required to convince certain manufacturers about the benefits of automation. The UK still lags well behind many of its European counterparts (and competitors) in automation investment.

"Cobot investment by component manufacturers where the emphasis is on machine tending will grow in future but cobot deployment in other areas like inspection, polishing, assembly, palletisation and packaging, in other industries and sectors is where the big growth opportunities lie."

LOOKING BACK AND FORWARD

2020 was a challenging year for all manufacturers and Dale says the pandemic did cause disruption to Mills' business, due to postponement of key exhibitions like MACH 2020 and some expected customer orders were delayed and cancelled.

In the first lockdown, Mills implemented a Covid-19 safe environment at the campus and still in effect - to keep staff, suppliers and visitors safe, strictly following government guidelines on social distancing, mandatory mask wearing, remote working for certain staff, and limitations of number of people visiting the Campus.

"Demand for new machine tools in certain sectors, such as oil and gas and aerospace saw a reduction but other sectors like defence and nuclear proved resilient," explains Dale.

"Machine tool sales especially for Lynx and Puma lathes and DNM machining centres remained strong. And sales of Doosan DVF 5-axis and SMX mill-turn machines were also worthy of mention."

Dale believes the reasons behind this are the good reputation of Doosan machines and Mills CNC's after-sales support in the market, along with good levels of machines in-stock, meaning customers could buy and get their machines quickly and efficiently, while the depth and breadth of Mills' Doosan machine tool range is "always a strength".

Repeat business from existing customers is so vital for the likes of Mills and it has continued to help meet their extra turning and milling capacity needs quickly.

Dale says new business start-ups investing in the first CNC machines have also selected Doosan lathes and/or machining centres as their preferred technology choice, while the SMART options rental scheme also helped it secure business.

In 2020, demand for Mills' turnkey solutions remained high according to Dale, as the company designed and delivered a number of "innovative and sophisticated solutions" in the UK and Ireland throughout

The centre showcases a range of turney and automation solutions

The Customer & Visitor Centre

Mills has launched its own SYNERGi automated manufacturing cells into the marketplace

the year, while it also saw the further development and launch of SYNERGi automated manufacturing cells.

Mills has a number of "big picture" aims and objectives in 2021, says Dale. These include increasing turnkey business and sales of SYNERGi systems and multi-tasking/multi-axis machine tools, and diversifying cobot sales into other sectors and industries.

He explains it is looking to strengthen relationships and partnerships with advanced technology research centres and to develop Training Academy's online training courses.

There will also be a focus on creating market-led, customer focused initiatives that endorse and substantiate the firm's corporate 'Mills CNC: Like No-one Else' positioning.

In addition to major automation-led initiatives, Mills will also be introducing a number of new Doosan machine tools into the market this year.

The first of these is a new range of Lynx 2600 lathes with Y-axis and sub-spindle capabilities, and a new range of large-capacity SMX mill-turn machines: the SMX 5100L series.

Dale believes that in 2021 demand for high quality competitively priced machine tools will remain constant (pre-pandemic levels). "Expectation is that demand for multi-tasking and multi-axis machines with integrated automation will rise as sectors 'bounce' back (aerospace), demand for sophisticated and large-capacity machine to increase: (nuclear energy, wind power) and increase in demand for industrial and collaborative robot systems and solutions - from all sectors." ■

Taking the complexity out of automation

Mills CNC's new Turnkey & Automation Centre will enable the company to present and demonstrate its own SYNERGi automated manufacturing cells that it launched last year.

The SYNERGi cells comprise three different 'types' based on capacity and complexity - SYNERGi Premier, Classic and Sprint and the centre provides a dedicated resource and environment for Mills' industrial and collaborative robot and cobot business.

Mills says the SYNERGi Premier, SYNERGi Classic and SYNERGi Sprint systems "take the complexity out of automation" and the systems are flexible and powerful but, "unlike many automation solutions on the market, are also simple to understand, program and operate".

SYNERGi systems can be integrated with Doosan lathes, machining centres and mill-turn machines – improving their productivity and efficiency. All systems are powered by Mills' own proprietary and sophisticated SYNERGi software.

"Mills CNC developed its own SYNERGi software platform in response to the needs of customers"

SYNERGi 'standard' automated manufacturing cells (Premier, Classic and Sprint) have a number of differences mainly concerning their size (floor space) and capacities (different size and configuration of their work loading and unloading stations).

All can be integrated with Doosan lathes, machining centres and mill-turn machines.

SYNERGi Premier: the largest system, features a five two-way drawer system (workpiece load/unload and storage system).

Also included is a Fanuc 6-axis robot, an inspection and parts' ejector conveyor, an air blast end-effector, locating plates, pneumatic 2- or 3- jaw grippers, integrated SICK safety systems, industrial robot fencing and an (optional) part turnover station.

The system, as in all SYNERGi cells, features an HMI with 17" touchscreen, powered by SYNERGi software.

SYNERGi Classic: the mid-range system features a loading pattern (tray) - 1400mm x 1000mm. The system used grid plates to ensure exact part location and typical part sizes range from 20mm to 400mm in size.

SYNERGi Classic systems feature a 6-axis industrial robot, a loading/unloading system, a 17" touchscreen HMI, locating plates, pneumatic 2- or 3- jaw grippers, integrated SICK safety systems and industrial fencing.

SYNERGi Sprint: SYNERGi Sprint cells are more compact and have smaller footprint than Premier and Classic cells and are ideal for the automated manufacture/processing of smaller parts.

SYNERGi Sprint cells have a loading pattern (tray) system (900mm x 900mm) that uses grid plates for exact part positioning and location. Recommended maximum weight per gripper is 10kg.

SYNERGi Sprint systems feature a 6-axis industrial robot, a loading/unloading tray system, a 17" touchscreen human machine interface (HMI), locating plates, pneumatic 2- or 3- jaw grippers, integrated SICK safety systems and industrial fencing, an interface for Heidenhain, Fanuc and Siemens control systems and a part turnover station.

All SYNERGi systems (standard and customised) are designed to help manufacturers improve their productivity and operational efficiencies: helping them to embrace and take advantage of unattended lights-out production and exploiting the productivity potential of their Doosan machine tool(s).

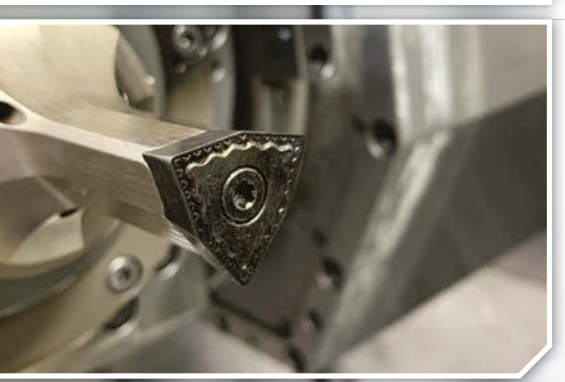
SYNERGi software is an intuitive platform designed to take the complexity out of automating machine tools. Accessed and controlled via a touchscreen HMI, simplicity and user-friendliness are at the heart of the software (think mobile smart phone).

By completing prompted information fields, the system is ready to run in a matter of minutes with no robot experience necessary.

Mills CNC designed and developed its own SYNERGi software platform in response to the needs and requirements of customers. A barrier to investing in automation the company says from the perspective of its customers, is the perceived difficulty in mastering, integrating and synchronising the machine tool with the/a robot.

Mills adds that the objective was to ensure that it designed a software system that was "easy for a machinist to use" without them having any previous robotics' knowledge or experience of using the technology.

The cutting angle of the dynamic FreeTurn tool can be adjusted 360° for optimal use in every position of the workpiece



Thierry Wolter, executive board member, says the UK is a "vitally important" market for Ceratizit

Positioning for future growth

The Ceratizit Group used 2020 to reposition itself, bringing together all the latest innovations and products it offers to customers. The UK also remains a vital market as shown by investments the company has made

Covid-19 has had a profound effect on every machine tool industry business and for the Ceratizit Group (*www.is.gd/ZWKM2n*) it was an opportunity to reposition the company for future growth.

The company's strategy of covering everything from how to use the tool, optimise the machine process and make sure it runs smoothly, is all falling into place, and it can now offer customers a whole package of cutting-edge of products with service, innovation, and digitalisation at the heart.

Speaking to *Machinery*, Thierry Wolter, executive board member, explains the UK is a "vitally important" market for Ceratizit and as part of this commitment, it has invested in a new Sheffield-based Technical Centre (see more on page 20) that is set to open in April, helping to make it more self-sufficient.

"We need to bring innovative new products to the market and customers need innovation, but they also need to know how to use them so this centre in the UK is very important for us, as to just have good products is not sufficient," he says.

2020 was a challenging year due to the pandemic and when Ceratizit's fiscal year ends at the end of February, Wolter says figures will be down 20 per cent on the previous 12 months, but it is looking forward to a strong 2021.

Ceratizit has used the pandemic to reposition the company for 2021 and the years. Wolter uses Winston Churchill's phrase 'never let a good crisis go to waste' as an example of how the company has approached business.

"After all the acquisitions Ceratizit has made in the past, we looked at how can we bring business to a new level and used 2020 for doing that," says Wolter.

"We are very strong financially and can do things right and with the right timing, which is very important."

THE FUTURE IS DIGITAL

In December, Ceratizit added another digital tool to its armoury when it launched LiveTechPro – an app that can be used for immediate and competent visual support to deliver technical assistance in case of machining issues, or can simply be used to help optimise processes.

The UK market is being used as a testing ground for the technology and it has come at a perfect time ,as with local and national lockdowns in force due to Covid-19, the need for technical support to maximise cutting tool performance remains high.

The LiveTechPro app provides the platform for Ceratizit's technical sales and applications engineers to have their eyes and ears there with manufacturers, helping to immediately solve any solutions remotely. Wolter calls it "the next best thing to actually standing next to a machine".

The technology features a live,

bidirectional video and audio connection between the customer's machine operator/ production engineer and the technical support team from Ceratizit. This ensures a reliable service that can be activated within seconds to ensure production continues to run smoothly.

Wolter enthuses about the product, as he says service, is and has always been a key focus for Ceratizit and for WNT previously, before the latter was fully integrated into the Group, so this product fits perfectly with what the company's ethos is.

"My dream which will soon become a reality is to have this 24/7 and that will be the next step. We are using the UK as a test market, but the end game will be 24/7 technical support - that would be wonderful," he says.

"That is what the end solution is and what we are working on, but there are some things we need to do. The fact we are doing it in the UK first, also shows the importance of the UK market for us as it is eager to get this technology."

Digitalisation is at the core Ceratizit's strategy and ToolScope – a state-of-the-art monitoring and control system which continuously records signals generated during the cutting process – is also growing in use and an important part of the strategy moving forward.

By visualising data, ToolScope can be used to monitor and adjust the machine tool, delivering measurable success, providing improvements in process security, cycle times and tool life.

ToolScope can be integrated with all types of machines and processes and manufacturers can link the system on all equipment operated on a factory shop-floor.

Processes can be optimised on machines with adaptive feed controls, helping detect any collisions, giving vital data to measure and check processes are working efficiently. The different ToolScopes collect data throughout a production factory.

"The advantage is you have every machine and then use data throughout your factory and you can use Toolscope data and put it in the cloud. Then, we can help the customer. By looking at the data we can look out how the customer can improve machining processes," explains Wolter.

TURNING TECHNOLOGY

Another core part of the future for Ceratizit, is its High Dynamic Turning (HDT) turning technology and FreeTurn tool system. By using the milling spindle in turn-mill centres, the attack angle of the dynamic FreeTurn tool can be adjusted 360° for optimal use in every position of the workpiece.

This creates several opportunities. First, flexible machining of almost any workpiece contour is possible. Also, chip breaking is optimal, and it is possible to achieve higher feed rates and tool life with maximum stability.

"The HDT process and FreeTurn tools really is a revolution to the market, as with turning for decades, everything was constant – and we really turned everything upside down, so it takes time. It was not like a new product you bring to the market and you just sell," explains Wolter.

Wolter says Ceratizit knew it would take time to take-off, as it was bringing such an innovation to the market, but the technology is now gaining real traction in the marketplace.

He believes Ceratizit introduced the innovation at the right time, as needed to get interest of the machine tool builders and CADCAM programmers to keep the ball rolling into the market, but now all parts of the chain are onboard.

"When we introduced it, we had to make people's minds ready for this innovation and we see it is coming more and more," says Wolter. "Machine tool builders like Mazak and DMG Mori are jumping onboard, along with CADCAM programmers and we are seeing increased demand for the use of FreeTurn."

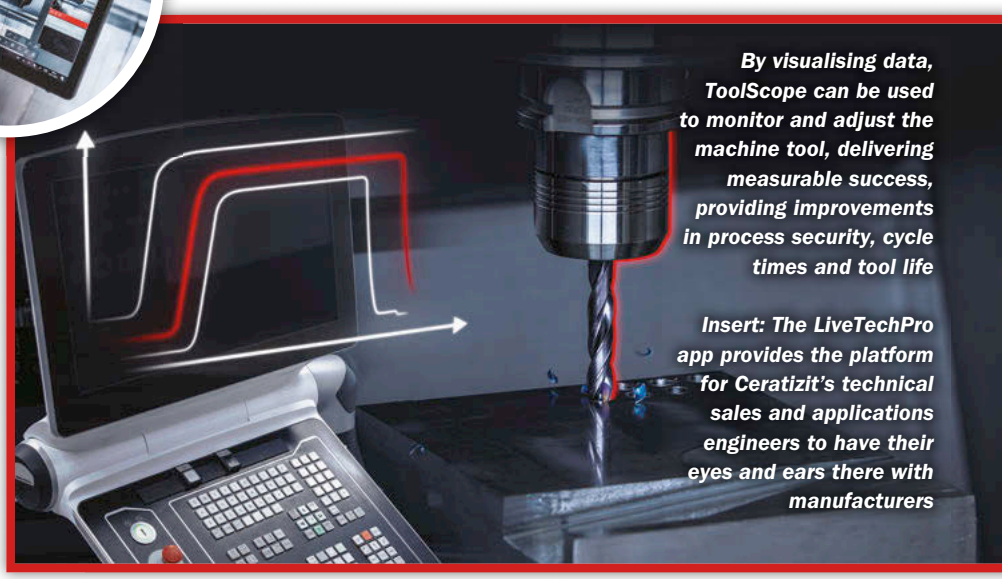
CAM companies like GibbsCam and Open Mind have invested into the programming and are ready, with GibbsCam now able to supply customers with a full post-processor controlling multi-task machine and include all machining operations including FreeTurn, along with conventional turning. CNC maker Heidenhain has also introduced at-the-control programming for HDT and FreeTurn tools.

"The overall result is amazing and we now for example – have a customer who is using FreeTurn, and before had to use three different tools in the conventional process, but now does it with one FreeTurn tool. The production time has been reduced from more than five minutes to two and a half minutes – so it is 50 per cent faster from one tool," he enthuses.

"The next steps, is that we will have in the UK for example, a Mazak machine that will be with smooth AI controlled, or Mazak control, as they have now included the FreeTurn programming into their system to make sure people can use the technology to its best."

WELL POSITIONED

The machine tools industry will see a recovery in 2021, how fast and at what rate is



By visualising data, ToolScope can be used to monitor and adjust the machine tool, delivering measurable success, providing improvements in process security, cycle times and tool life

Insert: The LiveTechPro app provides the platform for Ceratizit's technical sales and applications engineers to have their eyes and ears there with manufacturers

unknown, with some industries likely to return to pre-Covid levels slower than others.

The machine tools industry moves at pace and is driven by innovation, something Ceratizit is acutely aware of and the company's target is to have 50 per cent of its products younger than five years old.

"We launched a lot of innovations last year, like stainless turning programming that is very successful, and a new standard line for solid carbide drilling and milling.

"However, the market was not there, so we now must reap the fruits of innovations launched in 2020," explains Wolter.

Ceratizit will launch a new catalogue in July 2021, something that is still important to customers and it is working on some other niche products that it will bring to the market. Wolter emphasises the importance of providing a "complete package" to the customer, as it will "make the difference in the future".

He believes it needs to be prepared for a fast economic recovery in 2021 due to the sharp decline, but feels it is ideally positioned with how business will develop in 2021 and in the years ahead.

"One thing that will remain after Covid-19 is the digital push in the cutting tool industry. There will always be new products, grades, and coatings, but this digital and service push is so important. Covid-19 has really given a strong boost to this digital and remote, new way of doing things." explains Wolter.

"Ceratizit is well positioned, because we have a nice portfolio of digital solutions and apps, LiveTechPro and all this combined together will be very powerful and be the game going forward in 2021 and the future.

"Acquiring data, using the data and having a very fast service in delivering the tools to customers has always been our strength and is what we want to continue doing with digital tools like LiveTechPro further driving the service we provide our customers."

New UK centre to boost efficiency for customers

The UK is one of the key markets for Ceratizit and to help propel sales, investment has been made in a new 4,000 square foot Technical Centre scheduled to open in April 2021 that will be located next to the University of Sheffield's Advanced Manufacturing Research Centre (AMRC).

The centre will feature a range of the latest equipment, decided in close collaboration with various suppliers and cover different end-to-end machining processes.

It also brings together the different product innovations and technology that Ceratizit has introduced like ToolScope and KOmlife, while it will demonstrate HDT and FreeTurn.

Equipment on-site will include various machines such as an XYZ 320 LTY, XYZ UMC 5X, XYZ 800 HD, XYZ 500LR, XYZ 3500RMX, XYZ 425RLX, XYZ 2 OP, Mazak Integrex 250H and a Star SV20-RG.

Bilz Heat-shrink technology and LNS swarf and coolant management products will also feature at the new facility.

Tony Pennington, managing director of Ceratizit UK & Ireland, explains that the centre will boost the efficiency and productivity of its customers, while it will also generate additional cutting tools and services turnover.

"We aim to use the centre for customer training, our own sales engineer training, customer demonstrations on their components, customer process improvements, customer industry and application specific seminars, along with project work from drawing to first off prove out, off-site customer FreeTurn process improvement and prove out, to then implement in customer machine shops," he says.

The Technical Centre is like a number of Technical Centres that Ceratizit operates in Europe, such as one recently opened in Paris, where it not only shows customers the products it offers, but how they can be optimised through different programmes and machining processes. The investment also shows the importance of the UK market to Ceratizit and ensuring that it is self-sufficient.

The LiveTechPro app is being piloted in the UK by Ceratizit and Pennington is excited about the introduction of the technology, as it will add value to its offering, especially in these challenging times with lockdowns. Customers will be able to see how it works at the new centre.

A mock-up of how the new Sheffield-based Technical Centre will look

"We are able to be the eyes and ears in our customers machines without being on site, hence we can be there when we cannot be there, giving our usual high level technical support from our technical sales engineers when we cannot be on site," he explains.

"We are also using it to support our overseas colleagues when testing tools for customers and then being able to show the actual cutting performance remotely and allow interaction at the same time, think Sky Sports analysis tools, it's exactly the same, with engineers, us and the customer, analysing and assessing how to attack the component on both sides in collaboration."

The UK left the European Union (EU) at the end of 2020, securing a last-ditch trade deal and Ceratizit has opened a new warehouse in Sheffield to help it cope with any impact, as the changes have presented challenges.

"The first week was very challenging, but we are now getting the process to work better, with the Sheffield stock back up, and are still able to offer a 6.30pm cut-off for same-day despatch and next day delivery," explains Pennington.

"Ultimately, we aim to have the process completely back in our central distribution centre and back to our normal high level of service that customers have come to expect and rely on."

METAV reloaded

METAV will now take place as a digital event in March and the organiser, the German Machine Tool Builders' Association, says the format will become a permanent fixture in the future as part of a hybrid METAV.

The German Machine Tool Builders' Association (VDW) (*www.is.gd/qFen06*) has reloaded and reinvented industry event METAV as METAV digital – which will now take place in a new online format due to the Covid-19 pandemic.

At a press conference that was originally intended to pave the way for the METAV 2020 reloaded fair next March, it was announced that the event will be held from 23 to 26 March 2021.

Speaking at the online event in December, Wilfried Schäfer, executive director of VDW, explains: "If anything good has come out of this difficult time, it is the stimulation of creativity."

He adds: "Out of concern for our exhibitors, who need certainty for their planning, and bearing in mind the health of all those involved, we made the decision last week to cancel METAV 2020 reloaded as a face-to-face get-together and to replace it with a purely digital event.

"Given the stubbornly high infection figures issued by the Robert Koch Institute, and the fact that Messe Düsseldorf has cancelled all events in the first quarter of 2021, this was the only sensible option."

METAV digital set to become a permanent fixture as part of a hybrid METAV in the years' ahead, as Schäfer believes the VDW feels METAV digital offers a number of great opportunities – especially given the current market requirements and the situation of many companies, who now have to plan their marketing budgets carefully to ensure they obtain the maximum benefit.

He adds: "Hybrid trade fairs are the future. METAV digital will continue as a complement to the face-to-face event in the future." The hybrid concept is to be adopted from METAV 2022, which is scheduled to run from 8 to 12 March 2022 in conjunction with Messe Düsseldorf.

> **"If anything good has come out of this difficult time, it is the stimulation of creativity"**

THREE-PRONGED CONCEPT

METAV digital is one part of the VDW's three-pronged concept towards virtual events and in March it will include a virtual exhibition, intelligent matchmaking and the web sessions. The others are the monthly web sessions that have been taking place since June of this year and also the preview.

In the virtual exhibition, exhibitors can design their own three-dimensional digital trade fair stand. They can choose the size and variant of their stand, devise their own layout and fill it with their own digital content.

Intelligent matchmaking has been developed online for the precise matching of exhibitors and visitors. Personal profiles are used as the basis for matching interests, establishing contacts, arranging appointments and then allowing the exchange of business cards.

The third element, the web sessions, gives exhibitors the opportunity to reach their global audience live and online. In 20-minute talks they present their product innovations and interesting examples of applications, backed up by multimedia content. A discussion platform also gives the chance for presenters to interact with the global audience.

TAKING CENTRE STAGE

During the preview in December, 40 companies who are exhibiting at METAV digital, were given the opportunity to take centre stage and present their company and product offerings, as a senior decision-maker from each gave 90 second presentation via an online video.

These included by Nico Hanke, chief executive officer of Roemheld (*www.is.gd/HE0bRm*) who gave a presentation focused on communicative clamping elements for modern productive operations and explained how the firm's products can benefit.

Others speaking were Philipp Dahlhaus, head of product management of Paul Horn GmbH – UK subsidiary is Horn Cutting Tools (*www.is.gd/DwrCXp*) – who talked about the bevel gear teeth and how economical it is in the small series, in relation to his company's products.

Larissa Herberger, business development and strategic of Agema Germany, also gave

METAV DIGITAL 2021
23 – 26 MARCH NETWORKING – three in one

an overview of the company's start hole drilling EDM machine she explains is focused on "providing precision and excellence".

Other companies giving presentations, included Wenzel Group GmbH & Co; Belki Filtertechnik; VBN Components; Datron AG; Vargus Deutschland; Di Piu Systems; E. Zoller GmbH; Spanflug Technologies GmbH; EWM AG; Seyi Presses Europe; Formlabs; Retosan Makina; Foxbase GmbH; Rego-Fix AG; GOM GmbH; Prototec GmbH & Co; Halter CNC Automation; OSG GmbH; HandlingTech Automations-

Systems; Oculavis GmbH; Muller Maschinetechnik GmbH; MTE Deutschland; Heinrich Kipp Werk GmbH & Co; and MHT GmbH Merz & Haag.

DIGITAL TOOLS

Automation and digitalisation are set to be key themes during the discussions at METAV digital in March, as they have further accelerated during the Covid-19 pandemic.

Automation experts from GE Digital, Open Mind and Siemens will be revealing their ideas and solutions for efficient and future-proof factories.

Speakers at a recent METAV reloaded webinar highlighted different ways in which production can be automated and digitalised. Bernard Cubizolles, senior global marketing manager of GE Digital, was among those recommending the use of digital tools: "They allow machine manufacturers and their customers to use data that was either not previously available or was not being used."

One of the questions asked by participants in the virtual conference was whether it is possible to integrate older systems and machines. "Most applications in Europe are indeed based on machines that were installed and set up a long time ago," says Cubizolles. "Most IoT technologies can integrate installations into a global information system combining new and old systems."

Digital transformation requires greater data analysis precision in order to proactively manage plants and machines. Of proven benefit in reducing these costs is the introduction of digital twins of machines.

GE Digital is presenting developments aimed at shortening the introduction process. These include 'rapid application development tools' which users can deploy for continuous improvement and streamlining of their production processes.

Siemens AG used digital twins in the development of a new control system. "For the first time, a new generation of CNCs has been developed, tested and optimised completely virtually before being ported to real hardware," said Josef Hammer, promotion manager for machine tool systems.

The resulting digital twin, in conjunction with the virtualisation of mechanical systems in machines, opens up new possibilities for the development, distribution and use of machine tools. The result is a family of digital twins which permits virtual mapping of the entire machine tool – from its mechanics and response through to its control.

"New intelligent motion control functions can yield significant increases in productivity," says Hammer. "But efficiency is also linked to operation, which is why March 2021 will also be about innovations in the user interface in combination with new machine control panels." ■

Above: METAV digital is one part of a three-pronged concept towards virtual events and in March it will include a virtual exhibition, intelligent matchmaking and the web sessions
Right: German Machine Tool Builders' Association (VDW) executive director Wilfried Schäfer

German market fall

During the METAV preview, Wilfried Schäfer, executive director of the German Machine Tool Builders' Association (VDW), gave an insight into how the pandemic has impacted the machine tools industry in Germany.

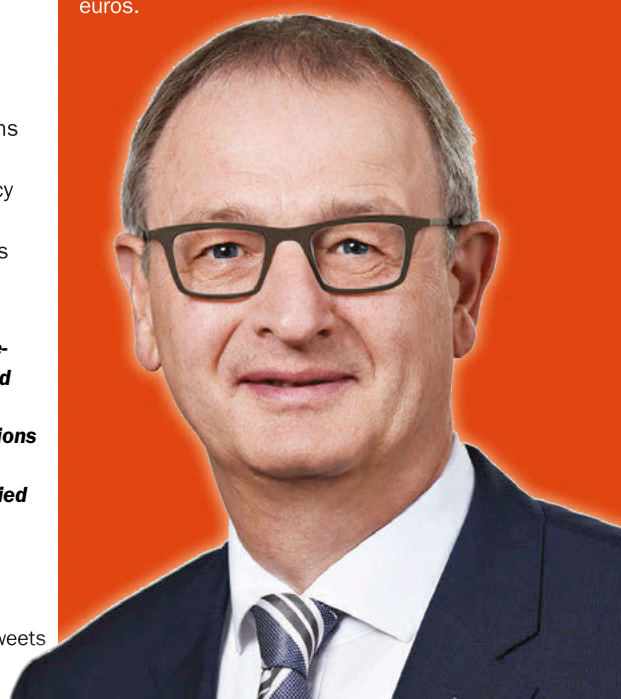
In November, VDW reported in the third quarter that incoming orders in the German machine tool industry fell by 29 per cent compared to the same period in 2019, domestic orders fell by 26 per cent and foreign orders dropped by 30 per cent.

The association also said incoming orders fell by 33 per cent from January to September, while domestic orders were 27 per cent below the previous year and foreign orders posted 36 per cent less.

Schäfer says: "The crisis has had an impact on our industry, but we had a drop in incoming anyway, due to certain cyclical developments in the automotive sector. This continued this year with the crisis this year and we lost another 10 per cent.

"In May and June, it was particularly down but demand picked up after that and if there is another lockdown that will have another impact. on the industry."

Speaking about the results previously, he said the "second corona wave has fully gripped the machine tool industry" and VDW has revised its production forecast for 2020, forecasting there will be a decrease of around 30 per cent, which in production volume, means a loss of about five billion euros.



The XYZ 1000 LR was delivered quickly enabling Shield Marquees to fulfil orders for Covid-19 testing facilities

Keeping the machines running

Investment in vertical machining centre drives productivity at Shield Marquee Manufacturing; three-machine package boosts Hopwood Gears; pair of machines ensure high precision for RDMS

In these challenging times, subcontractors have had to stay agile and keep the machines running as much as possible so they can boost production capacity and to has ensure this, many have added new machines to their shop-floors.

Atherstone-based Shield Marquee Manufacturing has diversified its business away from its usual customer base – the hospitality industry – which has been heavily impacted by the Covid-19 pandemic, as the company became part of the marquee industry's National Emergency Testing Stations Network (NETS).

NETS has been central in supplying the network of test centres with temporary structures and the demand for quick response, placed significant pressure on the company's manufacturing capability, driving investment in an XYZ 1000 LR vertical machining centre (VMC) from XYZ Machine Tools (*www.is.gd/69Xtie*).

"With every structure containing multiple machined components such as leg and ridge knuckles, we found that our existing machine capacity was limited, and the volumes we were asked to produce were leading to backlogs, which were not acceptable. Therefore, we needed to improve that, and very quickly," explains director Matthew Faizey.

While speed was crucial, Faizey was also cautious and carried out due diligence online of a select group of machine tool suppliers, with XYZ Machine Tools coming out on top.

After XYZ received the order on a Friday morning, the following Tuesday the machine was delivered, commissioned and ready for production, something Faizey says enabled the firm to keep up with the strong demand on this vital project.

"We are supplying between 20 and 30 testing sites per week and the associated volume of parts meant we had to improve efficiency," says Faizey.

"The XYZ 1000 LR is so much faster than our previous machine, allowing us to produce hundreds of parts/hour and, it also gives us much greater versatility to machine variations of those parts if required."

XYZ Machine Tools managing director Nigel Atherton explains while a two-day turnaround from order to delivery is "the exception", the company knows it can deliver any machine quickly, which has been fully tested and quality assured in the factory before despatch.

"In the current climate that is proving to be of greater importance to customers who need to react even quicker to constantly changing demands," adds Atherton.

MEETING DEMAND

Rising demand and a need to boost production capacity, prompted Oldham-based Hopwood Gears to sign a

Hopwood Gears' operations director Calum Baines using the Makino U6 H.E.A.T

three-machine package from NCMT (*www.is.gd/waoZPs*). In the last two years, turnover has doubled to £4 million, pressing the need for machine tool investment.

The family-run firm derives half of its turnover from the manufacture of steel, aluminium and plastic gears and the remainder from high precision subcontract work, particularly for the robotics and defence sectors.

In order to meet demand, Hopwood Gears has invested in a trio of Japanese-made machines. One is a Makino U6 H.E.A.T. wire EDM machine capable of long periods of unattended running, and the other two are from Okuma, a twin-spindle Genos L300-MYW CNC turn-mill centre and a Genos M560-V-e VMC.

The latest additions bring the company's tally of 4-axis VMCs to six, while there are now eight CNC lathes and two wire EDM machines on site. It also operates a raft of other CNC and manual machine tools, including a horizontal machining centre, water jet cutters, hobbers, rack cutters, broaches and grinders - a total of more than 100 in all.

The shortfall in production capacity lay in the prismatic machining of general subcontract parts, which is the remit of the Genos VMC, and in turn-milling of gears in one hit, mostly occupying the Genos lathe. The Makino is employed for 90 per cent of its time in gear production, mainly for wire-cutting keyways in hardened steel.

The VMC was supplied as standard with a 22 kW /15,000 rpm / 200 Nm face-and-taper contact, through-coolant spindle, whereas normally such a specification would cost extra. It helps to deliver the high productivity that Hopwood Gears demands, as do cutting feed rates of up to 32 m/min.

Hopwood Gears' managing director Cory Hopwood says: "We need our machine tools to make money so they have to run continuously. We therefore place great importance on machine reliability and after-sales back-up.

"As a result of our rapid growth, there was a shortfall of milling, turning and EDM capacity and we were constantly running behind with orders, but that situation has changed dramatically."

He adds the Makino U6 H.E.A.T. is 30 per cent quicker at cutting than the other EDM machine on-site and uses 30 per cent less wire. It is due to a combination of machine rigidity and the two large, high-pressure flushing pumps that are able to evacuate chips efficiently, allowing the wire to be pushed harder.

Favourable features of the Genos L300-MYW CNC lathe were the 15 kW / 570 Nm spindle, hand-scraped box ways, Y-axis travel of the turret and the provision of 12 driven tool stations, permitting one-hit production of complex components to reduce production cost and lead-times. The Genos M560-V-e VMC on the shop-floor in Oldham has a compact footprint of less than eight square metres.

Demand from the nuclear sector was the catalyst for investment by Burcas Ltd in a Doosan Mynx 9500/50 large capacity vertical machining centre from Mills CNC

"We need our machine tools to make money so they have to run continuously"

ACCURACY AND REPEATABILITY

Rapid Design Manufacturing Solutions (RDMS), a manufacturer of plastic injection production and rapid mould tools, has taken delivery of a second pair of high precision and speed, 3-axis, VMCs from German manufacturer, Roeders (pictured on page 25), supplied to the toolmaker's Oldham factory by sole UK agent Hurco Europe (*www.is.gd/Qf2Zn1*) – to help it cope with an increasing order book and reinstate ultra-high milling accuracy.

RDMS works closely with its customers to provide high-end, multi-cavity tools to a maximum of two tonnes in weight in short lead-times for producing the most exacting plastic components. Some of the more challenging applications involve in-mould labelling and multi-shot tool production.

Established in 1998 and run by co-owners Neil Richardson and Paul Ryan, medical work features significantly, including providing assistance to suppliers of hospital and laboratory equipment in the Covid-19 pandemic. In addition, the firm manufactures injection moulds for producing interior trim for the likes of Mercedes, BMW, Audi, and Porsche cars. The white goods and electronics sectors are also regular recipients of the company's tools.

A particular specialism is the machining of two-shot tooling, used to produce complex parts from two different materials, without the need for assembly, by overmoulding plastic around a preformed plastic or metal insert, often in high volumes. Extreme accuracy and repeatability of machining is required when producing this type of tool and RDMS says that is why it selected Roeders machining centres.

"We need to hold tolerances of less than 10 microns on nearly every tool we produce and these German high-speed machines have always allowed us to do that," explains Ryan.

The new Roeders RXP500 machining centre on the shop-floor of RDMS in Oldham

The new 3-axis machines supplement the two 20-year-old Roeders machines that RDMS operates, leaving a Roeders 600p VMC free to produce nearly all of the graphite electrodes in use in the factory, as well as mould tools, while the Roeders RP800 continues to be used.

The new RXP500 has a 500 x 455 x 240 mm machining envelope and 60,000 rpm spindle, while the new RXP801 offers 800 x 635 x 400 mm and 42,000 rpm. Both machines have spindle growth compensation.

All machining centres on-site are vertical-spindle models from Hurco, not only the Roeders but also several own-brand, 3-axis models fitted with the WinMax twin-screen control system. In addition to two Hurco BMC30s and the same number of BMC2416s, there is a pair of VMX42i machining centres.

They are all used for manufacturing bolsters, ejector plates, back plates and other less high-precision work. However, it is notable the latest Hurco VMX42i has linear scales rather than rotary encoder feedback of axis position to the control, making it accurate for finish-machining of dies.

"The future for us is more automation to enable us to remain competitive on price and keep lead-times short, this being one of our USPs over competitors, especially those overseas," explains Richardson.

NUCLEAR AMBITION

Birmingham-based precision subcontractor Burcas Ltd was searching for a large capacity, powerful VMC, so it invested in a new Doosan Mynx 9500/50 (pictured on page 24) with a Doosan-Fanuc control from Mills CNC (*www.is.gd/OIjyom*) - the exclusive distributor of Doosan machines in the UK & Ireland.

The privately-owned engineering subcontractor has had the machine installed at its 32,000 square foot facility and is using it, primarily to machine specialist tooling, prototypes and a range of high-precision components for the nuclear sector.

The Mynx 9500/50 has also been used, to a lesser extent, to machine high precision tungsten carbide and high-speed steel (HSS) sheeter and slitter knives and blades for Burcas domestic and internationally-based paper and packaging customers.

An increase in demand for Burcas machining services from customers in the nuclear sector was the catalyst behind the new machine tool investment. "To capitalise on the growing business opportunities in the nuclear sector we, at the beginning of the year, audited our existing machining capacity and capabilities," says owner and managing director Mike Burrows.

"The results of the audit combined with our knowledge of the sector (i.e. the type of components and parts required by our customers, the machinability of the materials being used for these components etc.), highlighted a need for us to strengthen our milling capabilities as a matter of some urgency."

"Although the new machine tool purchase was driven (almost entirely) by an increase in demand from customers in the nuclear sector, we never lost sight it would also become a major machining asset for our future aerospace and oil and gas business - when both returned to something resembling normality."

The Mynx 9500/50 is a large-capacity machine with a working envelope (X-axis 2500mm; Y-axis 950mm and Z-axis 850mm), and a large work table (2500mm x 950mm) that can accommodate parts up to 3,500kg in weight. The machine's 16m/min rapid rates on all axes make it extremely productive. ■

Bavarian upgrade

Subcontractors on the continent are also investing, including German contract machining firm Microart, based in Roding, Bavaria, which specialises in the production of components in small and large batches to very tight tolerances.

Founded in 2007, Microart has become one of Germany's fastest-growing subcontractors. It currently has 186 employees and an annual turnover of around €14 million.

Due to the high level of precision that needs to be achieved, much of the shop-floor is temperature controlled. To ensure that billet material is supplied to the machine tools efficiently and at a constant temperature, the company has invested in a Unitower tower storage system and two automatic KASTOwin A 4.6 bandsaws from German manufacturer, Kasto (*www.is.gd/WP7TNb*).

All three are adjacent to one another at one end of the factory and the roller door through which new material arrives is carefully managed to ensure it is opened only when necessary and for the shortest possible time.

The Kasto Unitower storage system and two KASTOwin bandsaws installed at microart in Roding, Bavaria

KMF Group finds the answer in a Yamazaki Mazak machine; a sixth Miyano for Merseyside subcontractor; Grayline Engineering turns to Dugard; plus machines upgraded and new ones launched

Staying ahead of the competition

Precision Engineering firm KMF Group is anticipating an increase in demand post Covid-19 and to meet orders, it has invested in a significant piece of equipment which will enable the company to double critical capacity.

The company has purchased a second Yamazaki Mazak (*www.is.gd/9JVWKH*) QUICK TURN 250MSY to complement its suite of Mazak equipment. The high performance turning centre is equipped with a smooth mill drive turret capable of machining a range of parts accurately and efficiently.

Materials such as standard steels, aluminium, stainless steel and more exotic materials, such as Inconel are easily machined to precise tolerances. Adding to the facility's capacity with this piece of equipment means the KMF Group can further support its clients in the aerospace, instrumentation, scientific and medical industries.

The BNE-51MSY turn-mill centre being programmed to produce the next batch run at Bryken

"The machine is co-located with an existing QUICK TURN 250MSY, effectively doubling our capacity to allow us to respond to increased demands from our new and existing customers," explains commercial director Keith Nicholl.

"Both machines are linked to our offline programming capability resulting in high levels of machine cutting efficiency, 24 hours a day and seven days per week and a quick response for short lead time or prototype needs."

He adds that as Covid-19 has affected many businesses and industry emerges from the worst of the crisis, KMF is positioning itself to ensure it is fully prepared to support customers across various sectors with immediate effect. "By investing now, and being business ready, we can proactively support our customers with their own revival," adds Nicholl.

The QUICK TURN 250MSY has a 500mm bed capacity and is equipped with a 10inch chuck on the main spindle and a six-inch chuck on the secondary spindle enabling part sizes up to 380mm to be effectively machined.

The Mazak's capability enables most components to be machined completely off the machine, which in turn improves efficiencies. It is also equipped with a Hydrafeed Multifeed magazine barfeed enabling unmanned running of small to medium batch quantities.

Nicholl explains that the 250MSY complements KMF's collection of other Mazak machines, which includes two HCN 5000-III horizontal machining centres served by an 18 station PALLETECH system, a VTC-800/30SR vertical machining centre and a VARIAXIS i-500 simultaneous 5-axis machining centre, with the machinery providing capabilities "suitable for any of our customers' machining requirements".

Meanwhile, vintage aeroplane restorer Kennet Aviation has increased its capacity and ability to produce challenging bespoke parts by investing in a new turning centre from Yamazaki Mazak. Kennet specialises in the renovation and servicing of historic aeroplanes.

With the aim of enhancing in-house manufacturing capacity and growing existing business, the company has invested in a state-of-the-art Mazak QUICK TURN 250MSY CNC turning centre.

The new machine has enabled Kennet to quickly produce high accuracy, bespoke aircraft components, and significantly reduced the time taken to restore the aircraft to the highest standards.

The investment has also opened up new business opportunities for Kennet by enabling the firm to subcontract its capability to manufacture rare parts for vintage aircraft restorers and collectors worldwide.

RECEIPE FOR SUCCESS

It is a similar story at Merseyside subcontractor Bryken, which has taken delivery of its sixth Miyano BNE-51MSY fixed-head turn-mill centre, having bought its first

as recently as June 2018, supplied by Citizen Machinery UK (*www.is.gd/X2aUTF*).

Operations director Phillip Taylor says regular investment in new plant is key to thriving in a competitive global marketplace and he makes sure no machine tool stays on the shop-floor for more than 10 years.

The company, which has 95 employees and a £10 million annual turnover, derives 40 per cent of its business from the oil and gas industry and is also a major supplier to the high-voltage power sector, amongst others.

Citizen Machinery UK is also the source of four Cincom CNC sliding-head lathes currently on site, which have been in use at the Prescot factory since the mid-90s.

A dozen older models, which took over from six times as many cam autos, have all now been replaced. It leaves three 32 mm capacity Cincom sliders installed since 2014 and a more recent 20 mm capacity model that uses Citizen's proprietary LFV chipbreaking technology.

Taylor says: "90 per cent of our turnover comes from producing precision turned parts, many of which require a lot of prismatic machining as well, so choice of turn-mill centre is crucial to our success.

"We started to upgrade our fixed-head lathes by replacing them with Miyanos in 2018 in response to an upturn in demand, which gathered pace at the beginning of this year when we bought three more BNE-51MSYs in the space of two months. The 51 mm bar capacity, twin-spindle turning centre with its two 12-station live turrets, the upper one with a Y-axis, is ideal for our needs.

"It is highly efficient at balanced machining of complex routines at both spindles, so we can take chunks out of cycle times, which are between 20 and 40 per cent faster than on previous lathes. It meets the increasing demand for the supply of high added value parts at competitive prices."

He adds the BNE-51MSY offers the quickest TAKT times and was also much better value for money than other options considered. The lathes were also shown to hold 20 microns total tolerance easily on machined dimensions.

One reason for the lathe's impressive speed is Citizen's superimposition control technology, which allows the sub spindle to track the upper turret for cutting reverse-end features while the same turret is performing front-end operations on bar at the main spindle.

If the lower turret is operational at the same time, three tools are in cut simultaneously, delivering the performance of a triple-turret lathe for a significantly lower capital outlay.

CAPACITY CRUNCH

Suffolk-based Grayline Engineering Ltd has turned to machine tool specialist Dugard (*https://is.gd/fhueZ9*) once again, as it also needed to invest in additional turning capacity to meet demand and has added a SMEC SL2000ASY turning centre with a Hydrafeed 65 barfeed unit, complementing the firm's current Dugard 32 sliding headstock machines.

The majority of work undertaken by the Suffolk company generally comprises of small dimension batch and production runs of turned parts with a mix of larger parts in small quantities.

The subcontract machine shop was founded five years ago and started out with two Dugard 32 machines. As Dugard's previous sliding headstock CNC offering with a twin spindle, twin-turret Y-axis configuration with 11 driven tools and nine turning tools, the machines have performed impeccably.

Managing director Graham Chattenton says: "I spoke to engineers that I have known as friends from many years and asked them what machines they would suggest. They give me a range of different machines, but they all reported the same thing with regards to the SMEC brand, it's a great machine that never goes wrong - and as a small business, that is exactly what you want; machines that never go wrong and are extremely reliable. I bought the SMEC SL2000ASY machine, I've had it for two years and it has never missed a beat."

From a specification perspective, the Dugard SMEC SL2000ASY is sub-spindle turning centre with Y-axis machining capabilities. With a swing over bed of 650mm, a maximum machining diameter of 395mm and a maximum machining length of 450mm, this 8-inch chuck machine with a Hydrafeed 65 bar feeding unit provides exceptional rigidity, performance, capability and flexibility.

The machine works perfectly alongside its existing Dugard 32 sliding head turning centres. With a larger machining capacity than the sliding head machines, the SMEC SL2000ASY has a powerful 11/18.5kW spindle motor with a maximum spindle speed of 4500rpm and a 5.5/7.5kW spindle motor on the sub-spindle.

Offering impressive material removal rates with effective swarf removal from the slant bed design; this is complemented by the driven tooling unit on the SMEC SL2000ASY that achieves a spindle speed of 5000rpm from the 3.7/5.5kW continuous live tooling motor. ■

See overleaf for Turning news and products ▶

Grayline Engineering managing director Graham Chattenton operating the new Dugard SL2000ASY machine, which complements the firm's existing Dugard 32 sliding head turning centres

Turning news and products in brief

■ Following the launch of the new brand of Vulcan machine tools, the Engineering Technology Group (ETG) (*www.is.gd/0PHXhL*) has launched the new TC200 turning centre – the most compact machine in the TC range of seven variants with a 200mm diameter chuck size.

Developed to increase speed and precision, the model is a single spindle and single turret lathe with a 45-degree slant bed construction to ensure maximum stability whilst ensuring swarf is effectively removed from the work envelope.

This ergonomic design allows users to maximise the heavy-duty cutting potential of the machine whilst undertaking uninterrupted batch or series production without continually opening the envelope to remove chips.

The TC200 is the smallest and most compact machine in the expansive TC range

The TC200 is available in four variants to meet the needs of small component turning operations. The base model TC200 is the entry-level solution with a single spindle and single turret.

As a base model, the TC200 has a swing over bed of 460mm, a maximum turning diameter of 280mm, a spindle speed range of 25 to 4200rpm and a spindle bore of 61mm diameter; that when combined with the ETG bar feeding solutions can deliver a cost-effective production cell.

For manufacturers looking to reduce secondary operations, ETG can supply the TC200M variant. This machine provides the opportunity for live tooling stations on the turret for engineers looking to increase their capabilities.

The TC200 is also available with an 'L' variant, the TC200L – the long bed version that extends Z-axis travel from the standard 490mm to 740mm. ETG is offering the TC200 Series in four variants – the TC200, TC200L, TC200M and the TC200ML.

■ Mills CNC (*www.is.gd/0Ijyom*) - the exclusive distributor of Doosan machine tools in the UK and Ireland - has introduced a new range of large capacity, multi-tasking mill-turn machines into the market.

The Puma SMX 5100L series, the largest in Doosan's SMX range, has been designed and built to handle large, heavy workpieces found in the aerospace, energy and oil and gas sectors - and machine them to completion in a single set-up.

There are four different models in the SMX 5100L range with the largest machines having chuck sizes up to 21", a maximum turning diameter of 830mm and a maximum turning length of 3050mm.

The Puma SMX 5100L series has been designed and built to handle large, heavy workpieces typically found in the aerospace, energy and oil and gas sectors

SMX 5100LS and SMX 5100LSB machines are equipped with high-torque, built-in (left and right) spindles (up to 37kW/2400rpm) with 0.0001° resolution on their C-axes for high precision contouring. SMX5100L and SMX 5100LB models feature a programmable, servo-driven tailstock for precision machining.

All four models are supplied with a powerful and versatile B-axis milling head (+/- 120° stroke) that features the Capto C8 quick-change tooling system and is powered by a 37kW motor that rotates at 10,000rpm. The roller gear cam mechanism that drives the B-axis eliminates backlash and is highly rigid, capable of outputting torque of up to 2700N-m.

SMX 5100L machines' productivity and performance are further optimised by their fast rapid rates (40m/min), their (520mm) Y-axis capability and their heavy-duty high-precision roller LM guideways.

The machines are also equipped with servo-driven tool changers (up to 120 tools), with the machines' ATCs also having their own touch screen operation panel for ease of use, efficient job set-ups and improved process reliability. Long boring bar and long tool magazines are available.

■ Japanese CNC mill-turn centre manufacturer Citizen Machinery has announced improvements to three of its Cincom sliding-head models, all designed to shorten cycle times and raise productivity when producing components from 32 mm diameter bar and larger. They are available in the UK and Ireland through subsidiary company Citizen Machinery UK (*www.is.gd/X2aUTF*).

The company's flagship M32 model, which can produce parts from bar up to 38 mm in diameter with cutters in a gang toolpost with B-axis, a 10-station turret and a back tool post with Y-axis, has gained the manufacturer's low frequency vibration (LFV) chipbreaking capability on the main spindle.

In line with Citizen Machinery's systematic rollout of LFV on all its Cincom sliding-head turn-mill centres, as well as on one fixed-head Miyano lathe, the 32 mm bar capacity L32 slider has also benefitted from the chipbreaking technology. It already had LFV on the 3.7 / 7.5 kW main spindle but now boasts the same on the 2.2 / 3.7 kW sub spindle.

Turn-milling of components up to 32 mm diameter bar with the extra productivity benefits of LFV is now also possible on the nominally 25 mm capacity Cincom D25-VIII, as an expansion kit is being offered to enable the lathe to machine the larger size of bar in both guide bush and non-guide bush modes.

The machine is equipped with 12 CNC axes including independent Z2-axis movement in addition to X2 and Y2 on the rear gang toolpost. A 135-degree swivelling B1-axis has also been added to the X1 and Y1 motions of the front tool post.

GAME CHANGER

The **SX Series** is the latest innovation from Star, representing years of machine tool research and development to produce the next generation of sliding head technology.

Delivering superior metal cutting performance within a modest footprint, the ergonomic SX-38 Type A is a breakthrough model ideal for complex mill-turn parts.

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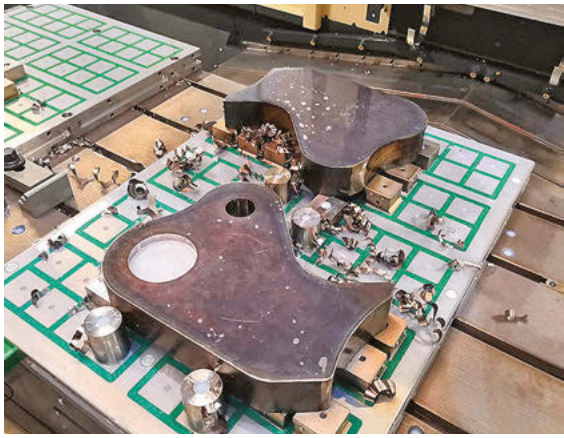
Magnetic workholding using a Walmag Mastermill on a vertical machining centre



A jaw being removed from a Kitagawa QJR quick-change chuck

Productivity and efficiency gains

1st MTA takes on a range of electro-permanent magnetic workholding and handling equipment from Walmag; the Irish Manufacturing Research (IMR) facility places workholding technology from Hainbuch at the heart of an installation; and new products arrive on the market

Improvements in productivity and efficiency are essential for industry in the UK and Ireland now and post-pandemic, as businesses need to save on lead-time and costs in order to maintain competitiveness in a global marketplace.

Salisbury-based workholding and automation specialist 1st Machine Tool Accessories (1st MTA) (*www.is.gd/VtADPt*) is taking on the challenges facing industry – and looking at them as though they are opportunities.

The company has taken on a range of electro-permanent magnetic workholding and handling equipment from Walmag, which the manufacturer believes bring a range of benefits.

The Czech Republic-based firm has the view that swapping from the use of conventional vices to a magnetic solution allows five sides of a components to be machined in one hit, typically raising output by a quarter for no increase in production cost.

Further benefits of the technology include shorter lead-times, allowing jobs to be invoiced more quickly, and no deformation of workpieces while they are being held for milling, drilling or grinding.

COST SAVINGS

Walmag has calculated the comparative cost benefit of producing a part in one operation using magnetic workholding rather than in two operations using compressive clamping. The analysis is based on milling a 400 x 600 x 20 mm component on a vertical machining centre in a 30-minute cycle. The company said it makes a saving, derived from being able to fixture the billet once in one minute instead of twice in a total of eight minutes.

1st MTA offers a portfolio of workholding equipment for securing components on machining centres during 3- to 5-axis machining operations from across the globe, including Tecnomors (Italy), Chick (US), Leave (Taiwan), Abbott (US), OK-Vise (Finland), BEST (Germany).

Another example of monetary savings in manufacturing through reducing job set-up times, this time when turning or turn-milling, comes from the use of quick-change chucks by Kitagawa, supplied by 1st MTA, who is the sole agent for distribution.

Switching from hard jaws for a first operation (op one) to soft jaws for a second (op two) requires removing them, cleaning the serrated interface, bolting on the soft jaws, inserting the boring ring and skimming the jaws. It all takes time, during which the spindle is not turning and production stops.

A quick-change chuck, on the other hand, has the ability to eliminate a majority of this wasted time, decreasing the delay between the end of op one and the beginning of op two by as much as 90 per cent. Instead of wasting 20 minutes, changeover typically takes just two minutes.

Apart from the significant financial advantage, 1st MTA points out that secure, high quality workholding is an essential facet of cost-effective turning and can enhance a lathe's performance, whereas poor retention of a workpiece can reduce output, lower quality and compromise safety.

THE HEART OF MACHINING

In Ireland, the Irish Manufacturing Research (IMR) facility in Rathcoole has recently installed a new Doosan Puma 2600SY II turning centre with workholding technology from Hainbuch (*www.is.gd/5WopYk*) at the heart of the new installation.

IMR was Developed as an independent applied-research centre to act as a conduit between academia and industry in 2014, and borne out of an industry-led initiative that was initially formed in 2010 to pilot a new research model in Ireland.

The new Doosan Puma 2600SY II is a 10-inch chuck multi-tasking lathe with Hainbuch collet chucks specified on both the main and sub-spindle. To optimise productivity, flexibility and ease of use for the Irish research centre, Mills CNC (*www.is.gd/0Ijyom*) supplied the machine with a Hydrafeed servo-driven bar feeder, Filtermist extraction, Renishaw optical workpiece inspection probe, an LNS swarf conveyor system and also an FSE filtration system.

However, it is the Hainbuch collet chucks that are really taking flexibility to a new level for users of this new installation.

Working in collaboration with Mills CNC, Hainbuch installed its Spanntop mini quick-change dead-length chucks on both spindles of the Doosan machine with an 80mm chuck on the main spindle and a 52mm system on the sub-spindle.

The Spanntop mini incorporates a chuck with a dismountable end-stop plate that ensures precision workpiece clamping without the pull-back effect.

The Spanntop mini permits the quick change-over from outside to inside diameter clamping or 3-jaw clamping through the remarkable flexibility of the modular system.

When asked about the Hainbuch system, IMR's machining applications specialist Chris Judge said to be able to demonstrate the full technical capability of the Doosan Puma "you need to be using the best workholding and tooling systems available" and he was delighted to see the Hainbuch system selected.

CLAMPING FLEXIBILITY

The Spanntop mini is an ideal partner for turning centres with its innovative design that significantly reduces interference contours and improves tool accessibility which is ideal for limited space work envelopes. With a compact design and a lower mass than alternate systems, the Spanntop mini minimises inertia loss when compared to 3-jaw chucks.

The dead-length variant installed on the Puma machine converts to a fully functional 'bar chuck' when the end-stop plate is removed. Providing workpiece clamping without axial movement of the clamping head, the Spanntop mini clamps workpieces with a short collar or shoulder, even providing part pick-off without the pull-back effect which is ideal for this twin-spindle turning centre.

Hainbuch UK supplied the Spanntop mini complete with machine adaptions, changing guns and a complement of 10 clamping heads on each spindle for holding a complete variety of components.

Hainbuch UK managing director Nick Peter explains: "We have installed a solution that provides an unparalleled level of clamping flexibility with secure high-clamping forces for machining any component or material that is put on the machine.

"The Spanntop mini is perfect for the medical industry and we are hoping that having this system at a leading research centre will showcase our system in Ireland to the continually expanding medical market. We already have a substantial level of enquires for 'add-on' mandrels for the chucks to do specific research jobs."

The Hainbuch Spanntop provides fast changeovers and flexibility for IMR

MAKING A DIFFERENCE

Investment in new accessories can also make a difference on shop-floors in terms of helping relieve cramped conditions, and that is the case at German automotive components manufacturer ElringKlinger, which has received a compact RWA 1600 transport cart from Roemheld (*www.is.gd/HE0bRm*) - whose subsidiary in Hitchin supplies similar equipment into the UK market.

Space is particularly limited where two automated injection moulding machines are operated over three shifts. They are located in an enclosure and mould exchange can only be carried out by entering a comparatively narrow, low door.

The two machines, which are positioned at an angle of about 120 degrees to each other, require a mould change every eight to nine days. As there is no overhead crane in the factory, the machines cannot be loaded from above. Instead, until recently operators used one of a number of standard transport carts.

Directly in front of one machine there is hardly any space for manoeuvring a cart, however, so previously mould change was challenging and physically exhausting, and the RWA 1600 cart has transformed the workspace.

The RWA 1600, is characterised by a compact design, an electro-hydraulic lifting platform and a shuttle table equipped with hydraulically actuated ball bars. The cart is also able to be customised to meet specific requirements.

With ball bars set into the support surface of the table, dies can easily be moved manually in any direction. A special safety mechanism ensures that during mould transportation the ball inserts are lowered into the table surface so the die is prevented from moving. Removable front and side bars provide additional safety.

Roemheld offers three versions of the 1,600 kg-capacity cart with either four, six or eight ball bars, but ElringKlinger had a special version with nine bars. It ensures that even the smallest moulds used by the manufacturer are securely supported by at least two bars. ■

See overleaf for workholding, accesories, barfeeds news and products ▶

Workholding, accessories, barfeeds news and products in brief

■ Ceratizit (*www.is.gd/ZWKM2n*) has introduced to market – the WNT X5G-Z - a new, efficient, and highly precise, clamping system for machining centres. The WNT X5G-Z 5-axis clamping system was launched with the new Ceratizit Up2Date catalogue, is optimised access from all sides, allows components to be machined with five or even six axes.

The lean, tapered contour of the two (mobile) fixed jaws with the WNT X5G-Z , provides the spindle head/tool with optimum access to the workpiece. The jaws also contain elastomer elements which damp vibrations, thereby playing a role in improved surface quality and increasing the service life of the tool and spindle.

Ceratizit offers 14 different jaw styles with widths of 40, 65, 80 and 125 mm, of which two 125 mm jaws are already included in the scope of supply of a new X5G-Z as part of the basic equipment. The quick change jaws have a classic L-shape and designed as indexable jaws. The open angle means they can be used inwards or outwards – a feature which opens up additional options.

The WNT X5G-Z comes in five models and two heights, which differ in the length of their base bodies. The shortest measures 330 mm; while the other models are 430, 500, 630 and 800 mm long.

The new Ceratizit clamping system is allows components to be machined with five or six axes

■ The Triag International triGEL range of freeze clamping plates are now available in the UK and Ireland from REM Systems (*www.is.gd/EzGYUY*) – providing efficient workholding solutions for components that would be challenging to fixture any other way.

Freeze clamping is a clamping technique primarily used for bulky parts made of metal, most mineral materials as well as engineering plastics. Ice offers excellent adhesion. When using the triGEL system, cold gas is run through the worktable's labyrinth of cables and cooled to the working temperature of -8oC.

The workpieces and the worktable are coated with a fine water film, which clamps the parts in place after freezing in approximately 60 seconds. The process is reversed to loosen the workpieces. The device functions as a heating pump. It allows the thawing point to be reached quickly, which releases the workpieces.

There are two different methods of achieving the cooling of the machine table or working surface. First is the Peltier Effect for thermoelectric refrigeration, and the second is the use of a cooling medium such as those commonly applied within a deep freezer.

The Triag International triGEL range of freeze clamping plates provide efficient workholding solutions for components that would be challenging to fixture any other way

■ Norelem's (*www.is.gd/IK7kbQ*) new range of mandrel collets are designed to hold workpieces in a precise, locked position – and to offer support for engineers when working on turning, milling, polishing, tooth cutting and measurement workpieces.

The mandrels are tightened with a clamping nut or clamping screw as the diameter of the clamping collar is always concentric to the clamping diameter, ensuring a high level of precision.

Norelem's range of mandrels with side clamps are particularly suited to the secondary processing and rework of turned and milled pieces with blind holes. These mandrels are made of mild steel due to its weldability and machinability, providing engineers with flexibility when it comes to reshaping components.

This range has mandrels both for drilling holes right through and for blind holes with side clamping, in 11 different sizes, from 4.1 to 175 millimetres. Depending on the size and model, Norelem mandrels can achieve tightening forces of up to 44.5 kilonewtons.

■ Elesa (*www.is.gd/wCRF9F*) has signed a partnership with Misati - whose pneumatic clamps offer clamping action in workholding, or transport of assemblies in manufacturing operations.

The clamps are designed for robotic use, being easy to install, robust and well proven, with fast and reliable operation supported by simple power and control connections which enable rapid installation and setup. This easy installation with high quality design and manufacture is derived from wide experience of the industry and means that customers can quickly connect and go.

Typical applications may be found in warehousing, welding stations, framing and assembly stations, special machines, tooling, jigs and fixture manufacture, dies and mould making.

Pneumatic clamps from the range are specialised to match various industrial applications such as punching, welding, fastening/assembly and painting, with modular accessories that are convenient and readily interchangeable.

Misati pneumatic cylinders feature a double acting operation in diameters of 20mm, 32mm, 40mm and 50mm with three arm configurations dependent on the clamping arrangement required.

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1st MTA MACHINE TOOL ACCESSORIES

The MecWash MWX400 has resolved the issues at Vixen CNC with washing and drying brass components with small threads

MecWash's MWX400 at Vixen CNC's Llanberis plant.

Upping their games

MecWash provides precision engineering plant Vixen CNC and Meditech with new machines; Cleentek appointed as a distributor for Italian firm Novatec Srl; and Acp Systems further develops its quattroClean snow-jet cleaning technology

Welsh precision engineering plant Vixen CNC has "upped its game" following the acquisition of a MecWash (*www.is.gd/jynuN1MWX400*) at its plant, located at the foot of Mount Snowdon, in Llanberis.

Continued expansion at Vixen CNC, has been supported by the acquisition of MecWash's MWX400 system, resulting in mark free, high cleanliness and unrivalled surface finish of machined components.

The MWX400 arrives following an investment in Vixen CNC's inspection department, which features new machines dedicated to vision measuring, including a flat bed and optical shaft scanner.

Vixen CNC supplemented the MWX400 by also purchasing MecWash's Aqua-Save machine, designed for the continuous treatment and recycling of industrial waste water, removing the need for expensive off-site treatment and disposal.

Vixen CNC managing director Jake Wood, says: "The nature of our business is now in high precision bespoke applications, where surface finish and cleanliness are both important factors.

"As we continue to move forward with the growth of the business, we decided it was time to up our game and go for the MecWash machine.

"We have recently broken into the sensors market, particularly for the automotive sector. The MWX400 is excellent for us as the stainless steel sensor bodies needed to be absolutely pristine.

"The intricate nature of the machined components that Vixen CNC manufactures means that washing and drying is a complex process. This cleanliness requirement was achieved and the system exceeded our expectations."

Wood adds: "We produce products with small blind threads or small bores. Previously our cleaning of these involved a lot of manual work, and the drying was completed with an expensive tool air process. The compressed air used for this was expensive, ineffective, and the drying process was labour intensive.

"The MecWash MWX400 resolved the issues with washing and drying brass components with small threads. They're now cleaned with impeccable quality, resembling that of an item dried by hand."

MecWash were able to work around the constraint of Vixen CNC's factory's limited power network and avoid costly reconfiguration of the electrical supply. This was done remotely using the built in router which enables remote reprogramming for diagnostics and upgrades,

Meanwhile, MecWash has supplied Essex-based Meditech with a new AVD ultrasonic washer. The company supplied medical oxygen equipment to the Nightingale hospitals during the peak of the Covid-19 pandemic and turned to MecWash, following a sharp increase in demand.

The medical equipment specialist markedly increased production of medical gas regulators, flow metres and resucitators throughout 2020, and the requirement to upscale their cleaning capabilities resulted in the purchase of the machine.

The requirements for cleanliness for parts in the industry saw Meditech turn to MecWash to aid removal of machining swarf and oils from the production process.

PANDEMIC IMPACT

Wirral-based Cleentek (*www.is.gd/ey0atP*) provides industrial cleaning and degreasing machines in the UK and to the global market including ultrasonic cleaning equipment has been appointed distributor for Novatec Srl of Italy, a specialist in the manufacture of ultrasonic cleaning machinery and special chamber cleaning machines.

Despite this positive development, head of sales and marketing Kevin Whittle, explains that business has been difficult since the pandemic started in March last year. He says it started manufacturing in the UK, and in normal circumstances, this would have been supported with visits from Danish colleagues.

"Due to travel restrictions, all support had to be delivered virtually. Also, plans we had for participating in trade shows and continuing with expanding our network of international distributors have had to be postponed. Sales of equipment and consumables are definitely down in the aerospace sector," says Whittle.

Founded in 1999, Cleentek offers an extensive range of standard and custom made component cleaning machines, which includes both spray wash systems and ultrasonic cleaning equipment. All the company's industrial cleaning machines are fabricated from stainless steel.

There have though been advantages for Cleentek that have come out the pandemic, similar to what is being seen at other businesses, the opportunity to take a step back and look at where investments need to be focused in the future.

"The positive aspect (of the pandemic) is that after years of being very busy, we have had more time to consider the business structure and put systems in place which should help us to be more efficient in the future, when business hopefully bounces back following the pandemic," explains Whittle.

Cleentek's most popular industrial cleaning machinery is high volume through feed cleaning machines based on aqueous spraywash technology, but this and other products Whittle explains, have suffered in a supressed market.

The company provides industrial cleaning machinery to various sectors, including automotive, aerospace, defence, energy and medical, all of which have been heavily impacted over the last 12 months.

The company's main market is Germany, which continues to remain strong, but it supplies machines to global markets, which have been heavily impacted.

Whittle is hopeful that 2021 will be a more successful one for the industrial cleaning and degreasing sector. "Hopefully, there will be a large bounce back following a successful vaccine programme and a return to more normalised ways of business," he says.

Innovation, innovation

Stuttgart-based Acp Systems (*www.is.gd/QQMoxC*) has developed a new two-component ring nozzle for a pulsating jet on its quattroClean snow-jet cleaning technology, which it claims enables further cost savings and technical advantages in CO2 cleaning operations.

According to the company, their technology is an "economical and reliable process" for the partial and full-surface cleaning of a wide range of parts, while the trend is increasingly towards dry cleaning processes, regardless of the product, manufacturing phase, and next process in the production chain, such as coating, joining, assembly or packaging.

The environmentally friendly alternative to wet chemical processes also offers advantages if only specific areas of a part require a defined level of particulate and/or filmic cleanliness, such as bonding, welding or sealing surfaces, or when it comes to cleaning ready-assembled components. The technology can also be used to clean and deburr hard and brittle plastics like PEEK and PPS simultaneously.

The cleaning medium used is liquid, non-corrosive carbon dioxide, which has an unlimited shelf life. A by-product of chemical manufacturing processes and biogas energy generation, this cleaning medium is environmentally neutral.

The core of the cleaning system is a wear-free, two-component ring nozzle through which the non-flammable and non-toxic carbon dioxide is fed. On exiting the nozzle, the carbon dioxide expands to form fine CO2 snow, which is then bundled by a separate jacketed jet of compressed air and accelerated to supersonic speed.

When the easily focused jet of snow and compressed air impacts on the surface to be cleaned, a combination of thermal, mechanical, sublimation and solvent effects occur. The interaction of these four mechanisms of action reliably removes particulate and filmic contamination.

The aerodynamic force of the compressed air carries away the detached contamination, which is then removed by an integrated extraction system. Since CO2 sublimates instantly under atmospheric pressure, the parts are dry at the end of the cleaning step and immediately ready for further processing or packaging.

The new nozzle generates a pulsating jet with a frequency of 25 to 30 Hertz

With the aim of increasing cleaning efficiency even more and broadening the range of application, Acp has further developed its nozzle technology. The result is a nozzle technology that generates a pulsating jet with a frequency of 25 to 30 Hertz.

The company also believes the technology means shorter cleaning times in many applications and the pulsating jet can also reduce the consumption of carbon dioxide and compressed air, thus cutting cleaning costs per part and contributing to higher economic efficiency.

AEROSPACE Focus

www.machinery.co.uk February 2021

Seeds of optimism for a recovery in 2021

This year will be challenging for the aerospace industry, but there is optimism that there will be a rebound, although pre-pandemic levels are still likely not to return until around 2024

Pictured below: A Rolls-Royce jet engine being worked on (Picture credit: Rolls-Royce)

2020 was an incredibly tumultuous year for the aerospace industry, as it was one of the industries most impacted by the Covid-19 pandemic with air travel coming to halt and the crisis has had significant impact on the entire aerospace supply chain.

ADS (*www.is.gd/a7ZW0p*) – the UK trade organisation representing the aerospace, defence, security and space sectors – forecasts there has already been around 15,000 job losses in UK aerospace manufacturing that are linked to the impact of the pandemic on industry, while 30,000 job losses have also been announced by UK airlines.

The pandemic has been devastating to the global commercial air travel market as passenger numbers have fallen significantly, at first as much as 90 per cent in March last year before recovering a bit, grounding thousands of aircraft and plunging demand for parts and components, with the entire crisis having a profound impact on every part of the chain.

In response, the world's biggest aircraft manufacturers Airbus (*www.is.gd/Xvnnih*) and Boeing (*https://is.gd/hc2lFo*), both immediately reduced production rates last year on their different aircraft models, as demand fell to levels not seen for years.

As such, both manufacturers' figures reflect this, although Airbus reports it made 566 commercial aircraft deliveries to 87 customers in 2020, but 34 per cent fewer than in 2019 and received 383 new aircraft orders. The French aircraft maker performed better than Boeing, who delivered 157 aircraft over the entire year, making it the company's worst year on record since 1977 and it also saw 640 aircraft orders cancelled in 2020, due to the problems from the pandemic and the 737 MAX.

On a positive note and although it is not pre-pandemic levels, Airbus reported last month it was increasing the production rate planning for its A320 Family aircraft in response to the market environment. The manufacturer will up the production rate from the current 40 per month to 43 in Q3 and 45 in Q4 this year. The A220 monthly production rate will increase from four to five aircraft per month from the end of Q1 2021 as previously foreseen.

Airbus says it expects the commercial aircraft market to return to pre-Covid levels by 2023 to 2025, something also forecasted by the International Air Transport Association (IATA).

Assuming that the Covid-19 vaccines are rolled out globally by mid to late 2021 – as seems likely – global commercial air travel will though return to some level of pre-pandemic normalcy, but when and how that recovery occurs can only be speculated about at this stage. It will certainly be welcomed by all parts of the aerospace supply chain and boost all sectors.

In the UK, ADS, Airlines UK and the Airport Operators Association (AOA) have joined forces in calling for a recovery plan in response to the problems caused by the Covid-19 crisis with new travel bans now in place after all air corridors were suspended in January.

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In a letter to the government, they have called for measures including financial support for companies affected, swift delivery of a more resilient testing system to support a resumption in international travel, and relief from levies, duties and charges.

2021 REBOUND

Despite the uncertainty and challenges that the aerospace industry is facing, 2021 is still forecasted to be a much improved year on 2020 and will slowly return to pre-pandemic levels over the next few years.

A 2021 aerospace and defence industry outlook report by consultancy Deloitte, sees commercial aerospace rebounding in 2021, but not to pre-pandemic levels and says it will remain challenging, forecasting travel demand will return slowly and not to previous highs until 2024.

The report says the defence sector will remain stable and continue to weather the pandemic's disruption, while the spacecraft sector will be strong, fuelled by the different space programmes taking place globally.

The report predicts that in 2021, commercial aerospace manufacturers are likely to focus on restructuring and cost reduction to position themselves for profitable growth in the long term.

"The industry is also likely to take advantage of the pandemic and its subsequent drop in demand to transform supply chains. A&D companies could also pursue M&A opportunities to build scale and capture greater value. Long-term growth prospects for the A&D industry remain strong.

"The space sector, together with technological developments such as advanced air mobility, hypersonics, electric propulsion and hydrogen-powered aircraft, are likely to drive future growth for the industry," the report adds.

In 2021, the report estimates that global commercial aircraft deliveries will be 900 aircraft, a decline of 44 per cent from 2018, the peak year for deliveries with new orders "likely to remain subdued" and airlines continue with order cancellations, aircraft backlog could decline further.

Commercial airline deliveries are being driven by still depressed air travel and passenger travel is expected to rebound, with 75 per cent year-over-year growth in 2021, but that will still be about 40 per cent below pre-pandemic levels, the report explains, using figures from IATA.

900

aircraft are forecasted to be delivered in 2021

UK AEROSPACE ATTRACTIVENESS

There is still optimism for aerospace manufacturing in the UK, as highlighted in the PwC 2020 Aerospace Manufacturing Attractiveness report that assesses the attractiveness of aerospace manufacturing investments, which ranked the UK 7th out of 100 countries and as the top performing European nation.

The report assesses a range of aspects such as cost, economy, infrastructure, labour, industry, and tax policy. Crucially, it also analyses geopolitical risks such as Brexit. The UK and EU signed a last-ditch trade deal that was welcomed by the aerospace industry, but uncertainty remains and how that evolves remains to be seen – but alongside Covid-19 - that has been a factor in the UK's drop from 4th position in 2019.

The top three spots in 2020 were held by the US, Singapore (3rd - 2019) and Canada (2nd - 2019) with South Korea, Japan and Australia leapfrogging the UK to take 4th to 6th positions respectively. Germany, the Netherlands and Hong Kong complete the top 10 nations.

The pandemic exacerbated a rash of challenges earlier this year, including cash flow and liquidity, resulting in proactive government support, supply chain disruptions and, naturally, unprecedented revenue shortfalls.

The report notes that while the return of air travel demand could take as long as three to five years, defence infrastructure investment, as the Deloitte report says, has been more resilient during this period.

Roland Sonnenberg, head of UK aerospace and defence at PwC, is adamant that despite the uncertainties ushered in by these challenges, the UK remains an attractive hub for aerospace manufacturing.

"The industry must double down to compete, continuing the investment in skills and technology, particularly with the aim of reducing our carbon footprint, if it is to continue to unlock the UK's capabilities and bolster its attractiveness as a trade and investment partner for the EU and other nations," he says.

Sonnenberg says organisations "must also take appropriate steps to ensure they are ready to move people, goods and data differently in 2021".

He adds: "Until the pandemic hit, the industry's principal focus over the last 20 years was growth - but now is the time for priorities to change.

"Businesses have an ideal opportunity to take stock, adjust their strategic priorities, and focus on their immediate cash flow and working capital challenges so they are in robust health and able to react swiftly when markets improve.

"Firms that build on their immediate response to the pandemic and shifting Brexit challenges, demonstrating market-leading innovation and agility, will be best positioned to outpace their competitors in the months and years ahead."

There is some hope and the beginning of Covid-19 vaccination programmes in the UK, Europe, and around the world provides the realistic prospect of a long-term sustainable recovery in the aviation and aerospace industries to begin this year. ■

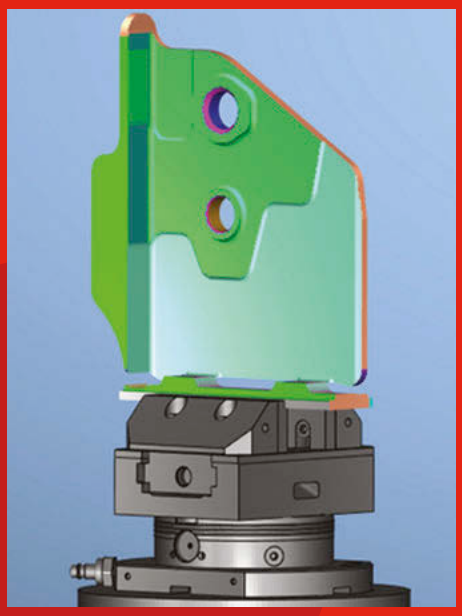
CGTech offers a commercial FORCE

The aerospace industry is having a challenging time, but VERICUT's digital NC simulation and optimisation software can help

The sharp downturn in travel caused by the global COVID-19 pandemic has resulted in the grounding of many aircraft and the largest contraction in the commercial aerospace sector's history, with most airlines around the world scaling back or cancelling orders. However, seen in the right context, the current challenges faced by the aerospace industry offer opportunities for commercial OEMs and suppliers to make needed changes. This is where the complete digital NC simulation and optimisation software solution offered by VERICUT can help.

According to a recent report by Glenn Brady, Global Aerospace & Defence Leader and Partner at PwC in America: "The next six to 12 months are a critical period in which to prepare for the recovery. Rather than simply focusing on cuts, we believe that OEMs and large suppliers should also make needed investments in the future, in five key areas: using technology as an accelerator, stabilising the supply chain, streamlining the workforce, focusing on sustainability and making a co-ordinated pitch for government support."

His report concludes: "The coronavirus has had a devastating impact on the commercial aerospace industry, but it can also be a catalyst for needed change. When the recovery finally comes, the winners will be those businesses that capitalised on this window and took the steps necessary to emerge stronger from the crisis."



TECHNOLOGY AS AN ACCELERATOR

The use of the digital twin and applying the digital environment to the manufacturing industry is becoming more critical than ever to access commercial business benefits. It will not only ensure that the industry will continue to operate and grow, but also that jobs within the industry are retained, further industry investment is made, and a sustainably reduced carbon footprint can be achieved.

Dedicated to supporting aerospace and other advanced manufacturers in improving processes, CGTech is the original CNC 'Digital Twin' developer with its VERICUT software. Using a digital environment with a range of innovative solutions, VERICUT combines the real world with the digital world to ensure manufacturer's processes are detailed, safe and efficient.

VERICUT uses the CNC digital twin to provide accurate in-process simulation, verification and optimisation of a true post processed NC file. The digital twin gives instant feedback on any errors or collisions and provides in-process cutting data. The product portfolio is further supported with the additions of VERICUT Composites and VERICUT Drilling and Fastening – both commonly used within the aerospace sector.

Technical Director, Gavin Powell, says: "With most already using advanced manufacturing technologies and equipment, many commercial aerospace companies still

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have the opportunity to apply digital techniques to unlock more value. OEMs and major suppliers should invest in digital throughout their organisation, such as upgrading how new aircraft are designed and developed. Digital tools such as VERICUT can dramatically accelerate the development process ensuring components can be produced efficiently and reliably. This makes organisations more agile and responsive when dealing with dramatic changes in order volumes.

"In addition, any digital investment will capture better data allowing the Commercial, Financial and Managing Director to derive clear insights from it, leading to better decision making. So, the case for making digital investments is clear and we believe the global application of VERICUT along with its FORCE module within the aerospace industry speaks volumes about the commercial benefits available."

FORCE is a software module within VERICUT that uses a physics-based optimisation method to determine the maximum reliable feed rate for a given cutting condition based on four factors. They are force on the cutter, spindle power, maximum chip thickness, and maximum allowable feed rate. FORCE calculates ideal feed rates by; analysing tool geometry and parameters, material properties of the stock and cutting tool, detailed cutting tool edge geometry, and of course VERICUT cut-by-cut contact conditions.

COMMERCIAL BENEFITS

FORCE excels in difficult to machine materials, especially complex multi-axis cuts such as 5-axis flank milling. Whilst the calculations undertaken within the FORCE module are complex, the commercial benefits are straightforward and easy to measure.

UK Sales Engineer, Scott Ravenscroft, explains: "Using the digital twin to simulate every important part of the CNC machine tool VERICUT covers the obvious and visible production concerns, such as crashes, scrap, gouges and prove outs. However, FORCE addresses the hidden opportunities for cost savings, such as inefficient programming and suboptimal feed rates caused by the CAM system's inability to adjust cutting feed rates for varying cutting conditions."

Using the football analogy of 'attack' and 'defence' he highlights how the software achieves its goals: "In attack - we create optimal cutting conditions by maximising chip thickness and keeping the chip thickness constant. Defence comes from setting limits to prevent failure, such as maximum feedrate, cutting force and deflection. All of which are done without altering the trajectory or path of the cutting tool."

Makino D200Z

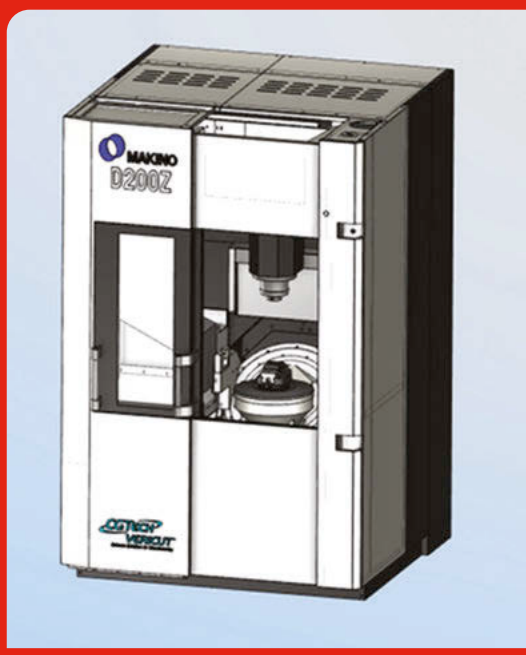
Any business can access the commercial benefits available from VERICUT FORCE. The software relies on proven technology to maximise program efficiency and productivity and typically achieves savings of 8 - 15 % on aluminium and more than 15% on difficult to cut materials. Return on investment can often be as little as one production component, with the opportunity to analyse cutting conditions, improve tool life, protect CNC machine tools and reduce operational costs.

This example of a typical aerospace component, an aircraft pylon produced from a titanium forging, has been FORCE optimised. The original cycle time for this component was 2 hours 47 minutes and the FORCE optimised cycle time dropped to 2 hours 12 minutes, a reduction of around 21%. Based on 500 parts charged at £100 per hour machine time, the optimised cycle would offer a £29,000 cost reduction over the batch.

And, FORCE is not only effective on exotic materials, as this example of an aerospace component that has been manufactured from aluminium billet shows. The original cycle time was 39 minutes and the optimised cycle reduced this by 17% to 32 minutes.

"Businesses don't need to fully understand how FORCE works to apply it, CGTech has a global technical team that can help any company unleash its commercial benefits. We know the savings the software offers are measurable and robust, so the results are sustainable. Cycle time savings of around 20% should not to be ignored. If your machine shop has ten machine tools running these parts using FORCE optimisation, then two of the machines are now potentially operating for zero cost. How the gains are applied to the bottom line of the business is an internal commercial decision, but with year-on-year cost down pressures across the industry, having such an opportunity to make these savings should be a 'no brainer'," Gavin Powell explains.

He concludes: "The industry finds itself in strange and unprecedented times. It is critical that manufacturers embrace new methods, strategies and technology to ensure that processes are secure and stable. This will reduce scrap and waste, as well as increase profitability and capacity. Digital data applications can improve performance internally by showing clearly what is happening in areas such as operations, production and assembly. The array of applications is wide and varied, but VERICUT and, more recently, FORCE, have proven track records of providing commercial success for aerospace businesses around the world. If you want your company to exceed its Key Performance Indicators (KPI) you need to talk to CGTech." ■



Additive manufacturing providing welcome boost to

A panel session at the Formnext Connect online event discussed whether additive manufacturing is giving a boost to aerospace, how it is being used and what benefits it is providing to the industry

Above: The Formnext Connect additive manufacturing in aerospace panel

Top left: AM will play a key role in development of Airbus' three zero-emission aircraft known as ZEROe

Manufacturers from across the aerospace industry are increasingly utilising additive manufacturing (AM) and in a session during the Formnext Connect online conference, panellists from companies at the forefront of using the technology discussed how it is being used instead of traditional techniques.

Since the outbreak of the Covid-19 pandemic in March last year, the number of aircraft flying has fallen significantly as air travel demand has dropped, while CO2 and climate change are more relevant factors and there are stricter safety regulations and a long certification process – all of which could slow down the advantages that AM brings to the table.

The panel heard though that the technology offers possibilities perfectly suited for aerospace manufacturing, as the industry is focused on small quantity parts and components, high production costs and, seeks anyway it can increase operational efficiency and reduce weight.

By using AM, it is possible that manufacturers can save vital storage space, time on-ground development time and costs and help overcome challenges.

Session panellist Hauke Schultz, AM roadmap leader at Airbus (*www.is.gd/Xvnnih*), explains the use of 3D printing has continued at pace during the crisis and is playing an "ever more important role".

This he says comes despite the significant impact that the pandemic has had across the company, due to aircraft being grounded and production assembly lines slowing. "AM is still a very suitable tool for aerospace and we keep running production and we keep investing in it through our research & development. It is providing a boost for Airbus," says Schultz.

"The crisis has shown a lot of benefits that AM brings, as it is clearly flexible technology so when we have supply chain disruption, like when we have missing parts in our assembly lines – AM can often jump in and supply these parts that we really need."

Schultz notes that in the maintenance of aircraft, Airbus has identified spares and after parts as a key part of AM and it has supplied manufactured a four-digit number of parts to its customers across the globe.

The use is ever-growing for Airbus and Schultz explains it has recently supplied a part to a US-based customer who was operating an A320ceo aircraft (more on page

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45). "The casting part went out of production, so the mould was not available anymore, but with AM by using metal part fusion, we were able to manufacture this part in quite a short lead time, without having to invest in the necessary tooling for the casting process again," he explains.

LAUNCH-OFF

An revolutionary project is being carried out by Californian start-up Relativity Space (*www.is.gd/WIbZ2s*), which is building a rocket – Terran 1 - to launch into low Earth orbit with 95 per cent of the rocket made from additive manufactured parts.

Relativity was recently selected by NASA to place CubeSats into low Earth orbit as part of its Venture Class Launch Services Demonstration 2 (VCLS Demo 2) contract where it will demonstrate its capabilities by launching Terran 1. It is scheduled to take place by 30 June, 2022, from Relativity's orbital launch site at Cape Canaveral Launch Complex-16. Relativity Space is building an 'entirely new value chain' to integrate AM, artificial intelligence (AI), and autonomous robotics.

"We see 3D printing as the tool enabling technology

aerospace

which will help us to build humanity's multi-planetary future. We have chosen AM as the method we are going to do that, via our fully 3D printed rocket Terran 1 which we will fly into space," explains senior engineer for additive technologies Eliana Fu, who was on the panel.

Terran 1 has a 100-foot-tall exterior and 11-foot-tall fuel tank. Relativity designed and built its own 20-foot tall Stargate machine, the largest metal 3D printer in the world, based on advanced mid-welding process - wire-arc additive. The start-up's 'factory of the future' uses a vertically integrated technology platform enabling the it build and launch rockets in less than 60 days, with 100 times fewer parts and simplified supply chain.

Fu notes Relativity Space is taking lessons from commercial aviation and aerospace but adds: "Spaceflight is taking it AM to the next level and thinking outside the box, as it is not constraining itself to only using the laser powder bed fusion process.

"With laser powder bed, there are lots of supply chain companies that can do it better than us, but no one out there that can do a wire-arc additive manufacturing process on a service bureau basis, and very few approaching the size that we are doing."

"That is the only way to get the large structures to have a 3D printing process that you can deposit quickly to get the size of the structure and overhang you want and what the whole process is doing, is giving you control of your part manufacturing and you are not dependent on the supply chain. By doing it ourselves, we are taking back control of our product we are sending to space."

Fu explains by using AM it is allowing customers who want to fly rockets into space, faster access. "We have signed a few customers, mainly commercial satellites, totally unmanned flights, but eventually we want to fly crewed flights and be part of space tourism."

"As we go into further space exploration in the near solar system and when you need spare parts, 3D printing is going to a key enabling technology to be able to do that. It is very difficult to take a 500-ton forging press on to the moon, for example," she says.

Relativity is not alone in using 3D printing to propel it into the elite of spaceflight, as the likes of Blue Origin, Virgin Orbit and Firefly are too, but not to the same extent, proving 3D printing is on par with – or even more reliable than – traditional manufacturing techniques.

65k

weight savings of 1.5kgs, results in saving around 65,000 litres of kerosene a year

SUSTAINABILITY DRIVER

Aerospace's contribution to carbon emissions is well-documented, but the industry is working to make flying more sustainable and AM is helping with this mission as can help reduce weight. The Formnext session heard that making savings of 1.5kgs in weight, results in saving an average of 65,000 litres of kerosene a year.

AM will play a major role in Airbus' plans to develop zero emission aircraft. Late last year, Airbus launched three concept aircraft that could enter service in 2035.

Schultz explains that AM will be used extensively in this programme, as it is very suitable in the development of these aircraft and Airbus is thinking "AM first time right", as it can focus on increased performance of the parts and weight saving.

"We are not only focused on waste savings on structure, but we also look at functional parts where AM brings in a unique solution – so parts like heat exchanges or manifolds, complex systems parts, which cannot be manufactured with conventional technologies," he says. "This is very interesting and it brings huge potential for scaling up the implementation of AM."

Airbus is reaping other benefits from AM, notes Schultz: "We want to improve our use of primary raw materials, so AM brings great benefits in production of net-shape parts, having lower buy-to-fly ratio. We are also looking to recycle typical material raised from other processes, like chips from machining into powder for AM parts. This helps bring down our CO2 footprint."

Jens Telgkamp, Professor for additive manufacturing at Hamburg University of Applied Science, who was also on the panel, says AM is providing a boost for aerospace in a difficult time for the industry, but it is "far from being fully exploited" and there are "a lot more future opportunities". ■

Relativity Space designed and built its 20-foot tall Stargate printer - the largest metal 3D printer in the world

GAME-CHANGER FOR MARSHALL AEROSPACE

Cambridge-headquartered Marshall Aerospace & Defence revealed at Formnext Connect it is using additive manufacturing (AM) technology in-house by utilising two polymer 3D printers.

Marshall is one of the world's largest independent aerospace and defence companies and operates a Stratasys (*www.is.gd/BQBqTt*) Fortus 450 and a Fortus 370 for prototyping, advanced tooling and final part production – including producing flight-ready parts.

The company looked at AM as a possible solution, to increase responsiveness, reduce production time and cost, and remain innovative, while helping it meet a need for quick, complex prototyping.

"The ability to go from a CAD concept for a physical item so rapidly helps us and enables us to provide an inclusive process for the customer," explains chief technology officer and engineering director Patrick Wood.

He says Marshall Aerospace uses AM for advanced composites and gave an example of how it has used the technology for a prototype mould tool for a fast jet helmet.

The initial tool process saw ply lay-up trials, development of pre-preg templates, initial cutting trials both in oven and autoclave, before customer acceptance and sales.

Wood notes the advantages of using AM to prototype a mould tool for a fast jet helmet, are it is 95 per cent cheaper to manufacture, the lead time is significantly reduced to two weeks from 16 weeks and it is easy to modify prior to committing to production tooling.

Marshall is also using AM in other ways, including for Land Systems, part of Marshall Aerospace, which uses the 3D printers to cost-effectively provide proof of concept to customers within a day, which previously took up to six weeks.

The company has also used AM to create a prototype ducting adapter, which are essential for providing fresh air to cool the aircraft avionics while it is on the ground.

"First, the prototype part is 3D printed to evaluate the concept, and the initial plan was to manufacture the final component in aluminum, and the AM part was prototyped as an alternative," says Wood.

The final component was AM manufactured from Nylon 12 material on the Stratasys Fortus 450 machine and helped to bring about advantages. The part was manufactured 63 per cent lighter as a result of using AM, leading to a 90 per cent cost saving and was completed in a lead time of two weeks, compared to eight weeks without using AM.

Other certified parts include a cockpit safety knife holder, a chaff and flare selector switch housing mounted to the pilot control column, and a custom cover to protect the coaxial ports of a laptop with plug-in diagnostics hardware.

Wood says the technology is also being using for system integration as new ducting added to existing aircraft and through a need for complex shapes and routing.

Traditional methods would include blow moulding and injection forming, but both of these methods require expensive tooling.

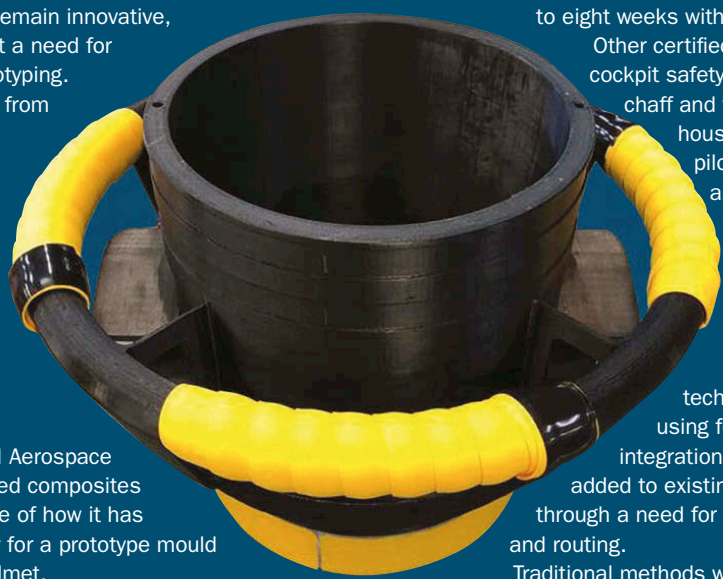
Marshall's solution was to use a combination of laser scanning and 3D printing to produce prototype parts for trial fit, meaning it could produce complex shapes, without expensive tooling and rapid prototypes and then production components.

Other Marshall Aerospace tooling applications that use AM include drill jigs, masking templates, bonded fixtures, composite mould tooling and sacrificial tooling.

3D printing technology is also helping the company to have a mix of employees on and off site, something that is helping with operational efficiency in socially distanced times.

Any halt in production presents difficult and often costly challenges, but through in-house AM, the company has been able to minimise tool replacement, improve responsiveness to engineers' manufacturing needs and create more innovative tooling solutions.

"AM is a truly exciting area from our perspective at Marshall Aerospace and we are really enthusiastic to carry on our journey and discover and see what else is achievable," says Wood.



Pictured middle: Final, 3D printed ECS duct adapter designed to cool aircraft whilst on the ground. 3D printed in Stratasys Nylon 12 on the Fortus 450mc

A flight-approved, ducting for air conditioners, 3D printed in ULTEM 9085 resin on Stratasys's Fortus 450mc

Karsten / stock.adobe.com

AEROSPACE ADDITIVE MANUFACTURING NEWS IN BRIEF

■ Satair - an Airbus services company - has provided one of its airline customers in the US with what it reports is the "first certified metal printed flying spare part" – a wingtip fence for the A320ceo aircraft.

The part was no longer procurable from the original supplier, but by using metal additive manufacturing (AM) to replace it, the firm has been able to reduce the likelihood of the aircraft being grounded.

The A320ceo's wingtip fences are installed in four different versions – starboard, port, upper and lower. According to Satair, the original spare parts supplier had difficulties providing the cast part, leading to a regular loss of the moulds and a potentially high investment cost to replace the moulds for individual orders.

The company studied other conventional options to replace the part, such as redesigning it for machining technology, but the cost and lead-time implications were not competitive.

Using a new certification process, Satair was able to re-certify the former cast part within five weeks and adapt it to titanium, which is a qualified airworthy AM material. The lead time for certification is expected to reduce even further in the future once the technology becomes more of a standard.

The wingtip fence parts were additively manufactured with four parts (full shipset for one aircraft) built simultaneously in a 26-hour build job, reducing the cost per piece and build time per part.

After AM, the part required post-processing to become an airworthy part, making it a one-to-one replacement for the original part whilst meeting the same safety requirements as the conventional part.

The shipset was delivered earlier this year – making the airline the first operator with an Airbus metal additively manufactured AM spare part. Compared to conventional solutions, total non-recurring costs were reduced by 45 per cent, while lead time was also reduced.

Bart Reijnen, CEO of Satair, says it has more than 300 part numbers certified covering every Airbus aircraft type and demand for additive manufactured parts is increasing. "We have already identified more titanium parts for which AM could as well become a more economical way of production, with higher flexibility and shorter lead times," he adds.

■ Stratasys (*www.is.gd/BQBqTt*) reports that Boeing has qualified the Antero 800NA thermoplastic to its repertoire of 3D printing capabilities, meaning the high-temperature material can now be used on flight parts for Boeing aircraft.

Antero 800NA is a PEKK-based polymer developed specifically for production-grade Stratasys FDM 3D printers. Boeing has released specification BMS8-444 and added the 800NA material to the Qualified Products List (QPL) after an extensive evaluation of the material's performance.

It is the first material from Stratasys qualified by Boeing for use in applications with elevated chemical resistance or fatigue requirements.

"Boeing has recognised the tremendous utility of Antero to meet applications that couldn't have been 3D-printed before," says Stratasys aerospace vice president Scott Sevcik. "Additive manufacturing has tremendous benefits for simplifying aerospace supply chains both in original equipment and MRO, but robust materials for meeting challenging flight requirements have been needed."

The Antero family of materials includes 800NA as well as Antero 840CN03, which is an electrostatic dissipative (ESD) variant. Stratasys provides these materials both for customers who use the Stratasys F900 and Fortus 450mc 3D printers.

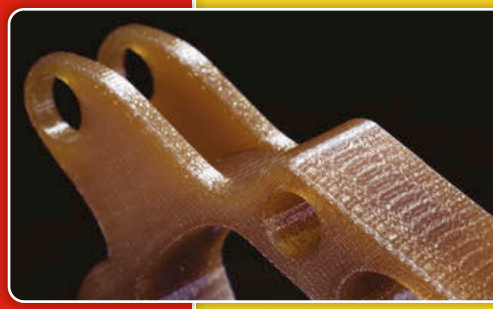
■ Silverstone Park-based Digital Manufacturing Centre (DMC) has announced a pioneering new partnership with high precision engineering expert Produmax (*www.is.gd/raC7AJ*) – an aerospace sector specialist.

The two will combine resources, talent and engineering expertise to drive the automated and digital future of additive manufacturing (AM). DMC is set to launch in March this year.

With AS9100 certification, Produmax brings a wealth of experience from working with leading aerospace companies.

As part of the partnership, it will operate a satellite site at the DMC, including extensive machining and inspection services supported by engineering expertise from its UK base.

Capable of providing full inspection reports, including Production Part Approval Process (PPAP), it will support DMC's extensive engineering talent and suite of leading-edge polymer and metal AM solutions.



***Pictured top:** Satair additively manufactured a titanium wingtip fence for an A320ceo aircraft to replace the original cast fence*

***Picture above:** A Stratasys' Antero 800NA thermoplastic aerospace part*

***Pictured middle:** A Stratasys 450mc*

AE Aerospace wins £3.6m Airbus parts contract

Machining for the Airbus parts will be carried out on Mazak machines

West Midlands-based AE Aerospace has won its largest order after securing a £3.6m contract supplying complex machined actuation parts for the Airbus A220 single-aisle aircraft programme, as part of a three-year deal.

The company says machining will be carried out on Mazak VARIAXIS machines *(www.is.gd/9JVWKH)*.

This contract will see AE Aerospace growing back to the sales levels seen in 2019 and ensure it can maintain employment for skilled staff, while providing additional supply chain work in the West Midlands. It expects the order book to continue to grow in 2021. The investment in improved machining resulted in a price reduction for the customer.

AE Aerospace has invested heavily in its people, technologies, and processes over the last 12 months. It is the first UK SME to deploy a 5G private network and will work with WM5G, W5G and its technology partner BT, on three new 5G use cases set to transform manufacturing productivity.

In trialling 5G, the firm hopes to attain significant benefits, including the ability to maximise machine time, provide more accurate assurance that parts have been machined to specification with increased speed and efficiency, as well as being able to eliminate the need to re-work or replace damaged components impaired in transit.

AE Aerospace says it aspires "to set a precedent" to bring the SME aerospace sector forward and into line in terms of on-time, in full delivery.

As part of the move, it is experimenting with 5G to improve 'Product Quality Assurance' by eliminating the need to re-work or replace damaged components. By utilising a private 5G network, real-time ultra-high definition image comparison can take place to ensure product quality assurance prior to shipping to customers.

Ultimately, the goal is to make the journey for customers as easy as possible and so it has also been working closely with The Advanced Services Group to develop a Glass Factory Model – meaning customers can see processes and the factory floor. It will offer machining by the hour, where customers take a long-term contract for the number of machine hours required per month, allowing them to have their own operating cells and directly influence the manufacturing sequence of their orders, safe in the knowledge that they will have sufficient capacity.

AE Aerospace has also invested in processes to facilitate the continual growth of the business through PowerMill - a 3D-CAM package - that allows offline programming of complex prismatic components. The introduction has enabled the firm to take on more complex designs, as well as being able to determine run times and improve our inspection process.

Alongside this, Fusion360 has also improved the engraving process and improved visuals. This has increased manufacturing efficiency greatly because it is able to visualise the machining route of parts in real-time, preventing possible collisions.

On the rise

A new chapter has been written at Summit Engineering Ltd after it introduced its first 5-axis Mazak CV5-500 machine (*www.is.gd/9JVWKH*).

The Birmingham-based firm says that the investment in the precision machining equipment, expands its capabilities and aligns with investments made last year in Mazak 250MYs and a Mazak VTC-760C.

Summit manufactures a range of components for the aerospace industry and for other industries.

Five high precision jig boring machines for aerospace

Starrag Group company (*www.is.gd/VsGcno*) SIP is assembling a series of high precision jig boring machines for installation by multiple customers in the aerospace industry.

The five machines – comprising a four-axis horizontal model and the remainder three-/five-axis vertical designs – are scheduled for commissioning during the second half of 2021.

Machines will be used to produce gearboxes, structural components and satellite guidance systems. SIP says they been chosen as they "consistently produce high precision, right-first-time results over many years, with no material wastage – even after resetting to suit different/redesigned workpieces".


The five machines under construction at SIP's Vuadens, Switzerland-based factory

The quartet of vertical machines under construction will accommodate workpieces weighing ranging from 2,500 to 4,000 kgs, and have clamping surfaces from 1,200 mm by 900 mm to 1,700 mm by 1,200 mm. The horizontal machine will handle components weighing up to 4,000 kgs on a clamping surface of 1,200 mm by 1,200 mm.

The standard spindle rating is 6,000 revs/min, but optional 8,000 revs/min spindles are available. All of the vertical models have automatic tool changers, and two have high-pressure through-coolant.

Karsten / stock.adobe.com

Hexagon's Tempo has enabled Alloy Specialties to improve productivity

Investment in Tempo paying off

Precision aerospace part manufacturer Alloy Specialties has become one of the first adopters of a new robotic quality inspection technology – Tempo - from Hexagon's Manufacturing Intelligence (*www.is.gd/diYwid*) division, enabling it to increase its production capacity and staff productivity through automation.

Tempo comes from a series of Hexagon products designed to help manufacturers begin automating their quality processes in a way that doesn't require large-scale investment and disruption. The part loading system enables teams to queue multiple inspection jobs and sort rejected parts, and easy operation means anyone can operate a coordinate measuring machine (CMM).

By using Tempo, Alloy Specialties can improve productivity by extending production time, improving labour efficiency throughout the day and aiding 'lights-out' operations.

President Dawn M. DiMauro says: "Currently, we are running one aerospace part exclusively on the Tempo system 24-hours a day, seven days a week. As a result, we have seen significant impact in reducing our backlog, increasing capacity, and freeing up other CMMs. We anticipate being able to add additional parts to the Tempo queue soon."

The use of Tempo is part of a continuous push by Alloy Specialties to increase automation and, along with program revisions, has contributed to 50 per cent faster quality inspection processes. This, in turn, is enabling Alloy Specialities to reduce costs and meet increased demand.

As a result, the company is considering investing in an additional Tempo System in 2021.

Tempo is helping Alloy Specialties free up their skilled professionals, enabling them to take on more work while keeping staff costs down.

Hexagon Manufacturing Intelligence division VP stationary CMM devices Ingo Lindner, says: "All too often quality processes are an afterthought when it comes to smart manufacturing investments. Yet, this is a critical element of the manufacturing process and there is much to be gained from employing automation where it adds most value."

Bouncing back

One of the Black Country's leading tooling experts is bouncing back from the impact of Covid-19 after securing a string of new aerospace contracts.

Cube Precision Engineering (*www.is.gd/3Wib1K*), can handle single op prototype tooling to complex multi-stage tooling suites, says it has picked up more than £675,000 of orders from prime and tier 1 customers despite the industry suffering from the effect of the pandemic.

The firm believes it ability to deliver "quality products on time" was key to the contract wins and its engineers are now offering additional support in improving the process.

Managing director Neil Clifton says the manufacturer has had to diversify machining in the pandemic and has been making face masks.

More aerospace work targeted at BEL after mill-turning capacity upped

BEL Engineering – which operates two factories in Newcastle-upon-Tyne and Cramlington to provide managed manufacturing solutions – has increased its 5-axis mill-turning capacity and is targeting more aerospace work.

Much of the metal-cutting activity involves turning on horizontal- and vertical-spindle lathes, but parts often have to be transferred to a prismatic machining platform for milled and drilled features to be added. Around thirty 3-axis CNC mills are available for this purpose.

To enable such parts to be produced more economically in one clamping, the subcontractor recently invested in a German-built Hermle C 62 UMT 5-axis, vertical-spindle machining centre supplied by sole UK, Ireland and Middle East agent, Kingsbury (*www.is.gd/jZg66Y*).

The Hermle C 62 UMT installed by Kingsbury at the Newcastle-upon-Tyne factory of BEL Engineering

The Hermle fits between larger and smaller 5-axis centres, extending the subcontractor's capacity.

In particular, following the company's accreditation in October 2019 to the aerospace quality management system AS9100, the machine is proving to be of ideal size to produce aero engine parts for a nearby customer.

Diversification from supplying predominantly the oil and gas industry to include serving the aerospace, defence and civil nuclear sectors is also a key pillar of BEL Engineering's growth strategy.

The investment is already bearing fruit, as the manufacture of fan shafts, discs and other rotational parts for aero engines, input and output shafts and bearing housings for gearboxes, and components for engine test rigs has increased the revenue from aerospace contracts from 10 per cent of the subcontractor's business to about a quarter.

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25 years ago

Changes in the German machine tool industry; Dugard Machine Tools develops a new showroom and office facility; MTTA reports trade deficit in UK machine tools industry; Ajax Machine Tool Co launches a new Premier range of manual/CNC centre lathes

february 1996

A two issue month, and in the first, our comment piece discusses the fundamental change in Germany, the world's second largest machine tool industry as measured by its production. We report that according to VDW, the German machine tool industry's representative body for the leading suppliers, the industry as a whole enjoyed an upswing in 1995 after a tough few years, and at the end of the first six months, production had risen by 21 per cent compared with the same period in the previous year. Despite this, the severe recession has caused a sea change in the industrial landscape and philosophy of machine tool companies in design, production and sales.

In news, we report how British-based Dugard Machine Tools has purchased a showroom and office facility in Coventry, while Derek Robinson Machine Tools, Midlands distributor for Colchester Lathe's turning machines, places an order worth over £1m for Tornado CNC Lathes, to meet strong demand, as it is forecasting sales of more than 100 machines in the Midlands by the year-end.

Meanwhile, machine too distributor William Watts has returned to British ownership; WDS Cutting opened its in-house manufacturing facilities to external customers; the 600 Centre is appointed as sole UK agent by Okamoto of Japan; and a new made-to-order broaching cutter service is launched by Universal Drilling and Cutting Equipment.

In feature articles, we have: a special focus on gear production and how a recent market report on the current position of the European mechanical power transmission industry indicates that production levels could be at the highest level for more than five years; and report on how software has cleared the path to an integration system developed by US machine builder Gleason, bringing together – design, production and inspection.

We also have a detailed international report on the changing face of the German machine tool industry, looking at three well-known lathe makers, discovering that new company groupings, design, production and sales philosophies are much in evidence.

In the second issue of February 1996, our comment piece reflected on the Machine Tools Technologies Association (MTTA) annual dinner in January, attended by Tim Eggar, UK Minister for Industry and Energy. In his speech, MTTA president Malcolm Taylor lauded the greatly improved UK consumption of machine tools for 1995, congratulating the machine tool industry on both its use and development of manufacturing technology, while also pointedly stating that manufacturing matters, and that a pre-requisite for its success is a strong machine tools industry.

In news, a trade deficit in machine tools was reported by the MTTA for the first nine months of 1995, as exports of machine tools increased by 21.7 per cent over the same period in 1994, reaching £319m, imports grew by 56.1 per cent to £386.7m – giving a deficit for the year so far of £67.7m; and Ajax Machine Tool Co launched a new Premier range of manual/CNC centre lathes encompassing five models offering centre heights from 165 to 310 mm.

Meanwhile, Northampton-based Reason & Pickles is saved from receivership by a £1m management buy-out that safeguards 67 jobs; Omega Dynamics and Lewis Automation merged to create Lewis Omega; and centrifugal pump manufacturer Stuart Turner has reduced its turning section from 20 machines to just over six in the last five years, but overall output has increased due to the installation of two Mazak Super Quick Turn 18 turning centres.

In feature articles, we look at the latest stories from the rebuilding sector; hear how Norwegian shipping company Ulstein has restructured its worldwide production sites, including moving all machine propulsion system manufacturing to Scotland; find out about four interesting and innovative machining centre applications that didn't make the shortlist for the 1996 Machinery Awards; and find out how CAM software player Pathtrace Engineering Systems is setting its sights on making acquisitions in the growing market. ■


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