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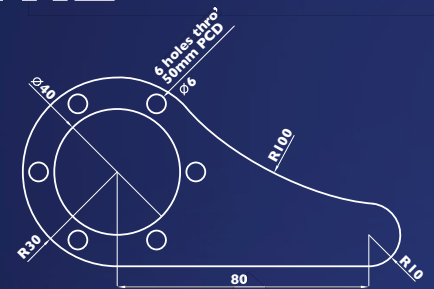
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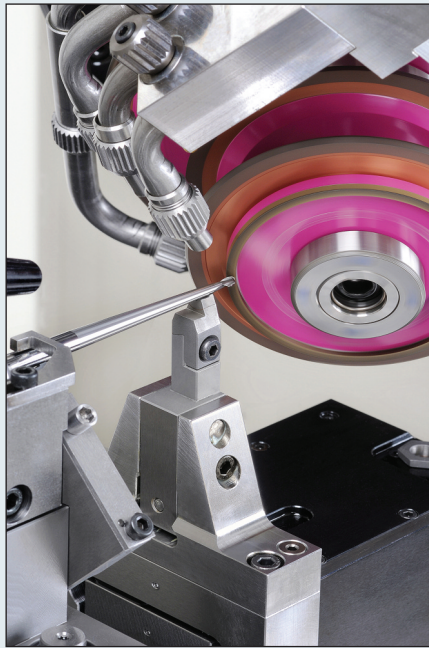


# GRINDING

## ADVANCED GRINDING & FINISHING SOLUTIONS FOR THE MEDICAL INDUSTRY

Advanced Grinding Solutions (AGS) has always been closely involved in providing the very best manufacturing solutions to the Medical industry and initially started off by selling grinding and polishing solutions for the production of artificial knee and hip joints in the 1990s and has gone onto becoming involved in answering industries needs for machines to produce a much larger variety of medical parts. As the medical manufacturing sector has changed, with new processes such as additive manufacturing being adapted, AGS has sought out new methods of grinding and finishing these parts.

Rollomatic, whose 5 and 6 axis grinding machines are widely used throughout the UK and Eire for the manufacture of more cutting tools than any other multi axis grinding machine, also offers machines for the production grinding of medical components of various kinds. Applications include the manufacture of medical drills, routers, burrs, saw blades, screws, reamers and surgical tools such as cranial perforators, anchors, Trocar points, guide wires, tweezers, forceps, scalpels, and rasps. The main advantage of these Rollomatic machines is the kinematic arrangement of the sixth grinding axis that is particular needed when looking to grind medical saw blades. The 6th axis enables the grinding wheels to be inclined and this makes it considerably easier to grind past the center line on a given part without damaging an adjacent tooth or feature. Even more importantly, the contact point of the wheel to the component remains constant over the entire grinding path



instead of it altering as the wheel travels around it which is the case on 5-axis grinding machines. The use of the 6th grinding axis also ensures that more freedom to use optimum grinding paths is made possible due to the angular inclination of the wheel and this allows medical parts with very complex forms to be ground. The surface finish of medical parts is also often critical and is improved by the use of linear motors on the grinding machines. The sealed for life/no maintenance aspects of the linear drives ensure that less or indeed no maintenance is needed and these factors help Rollomatic to offer their industry leading

unlimited hours 3 years parts and labour warranty that is free of charge on all new Rollomatic grinding machines. The Rollomatic machines can be viewed on Rollomatic's virtual exhibition event. See [www.digitalrollworld.com](http://www.digitalrollworld.com)

Gerber polishing and deburring machines, also represented by AGS, are used by companies such as the medical implant manufacturer Medartis AG for de-burring various titanium parts. Medartis was in need of a production method for rounding edges and deburring parts and the Gerber BP-MX brush polishing machine was shown to fulfill that need and create precisely-defined radii or contours on edges with high accuracy. The purchase of the BP-MX machine for the double-sided controlled de-burring of titanium blanks eliminated the previous laborious manual de-burring process. Medartis saw several benefits from the investment they made in the Gerber machines and apart from the labour saving the parts are now better defined, have a regular improved quality, and the process is both easy and automated. Due to its high toughness, parts made from titanium place high demands on machines when machining the parts and defining the process is important. The Gerber machine enables Medartis to produce a perfectly de-burred bone plate.

In 2019 AGS came across the GPA Innova D-Lyte polishing machines at an exhibition and after receiving demonstrations and meeting with the Innova team at their works in Barcelona, were appointed as a distributor for the UK and Eire. AGS subsequently took delivery of their own D-Lyte polishing machine for demonstration purposes last year.

This machine is unique and uses the world's first dry electro polishing process that was developed and patented by GPA Innova. The DLyte range of machines use the patented, single step automated process, for polishing metals by ion transport using free solid bodies. This is a revolutionary dry non-abrasive electro polishing process that does not use any liquid as the electrolyte. These new patented machines polish and deburr medical parts made from nitinol, stainless steel, cobalt chrome, and titanium etc. Typical applications include stents, bone screws, artificial hip and knee joints, cranial and other implants, and any similar medical component whereby fine surfaces finishes to under 0.09um Ra are required without altering the key part geometry after the previous grinding or milling process.

Unlike traditional polishing processes, the

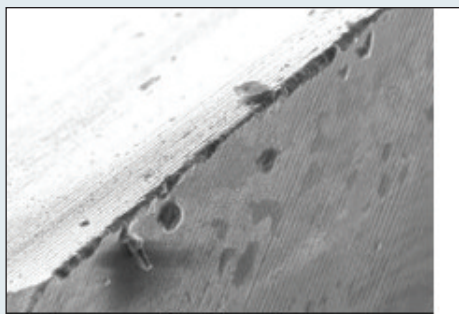


# GRINDING

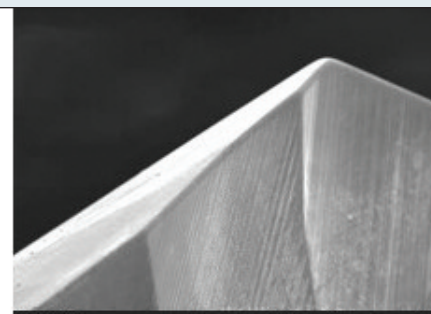


DLyte solution obtains a consistent finish avoiding generating any polishing marks on the surface, such as those generated by conventional machining, and is able to process complex geometries without generating any micro scratches on the surface which is the case with robot based belt polishing or machines using barrels filled with hard media. Chris Boraston, Managing Director at AGS, comments that after seeing the DLyte machine he immediately recognized just how unique and special it was and the many advantages that it brings for the polishing of a wide variety of medical parts; many of which are ground on the grinding machines already sold by AGS.

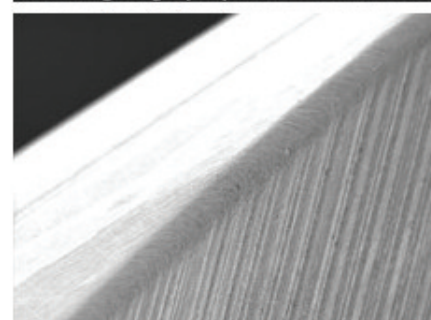
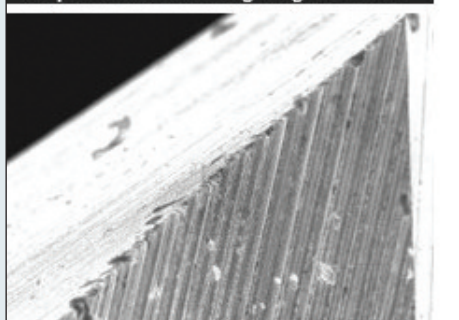
The medical industry was amongst the first to benefit from using the D-Lyte machines for polishing implants. The typical process to finish implants was previously based on using mechanical abrasive based processes like robotised belt polishing cells or vibratory bowl type polishing machines. These type of process's work by generating friction onto the workpieces surface from a generic abrasive belt or hard media. Although there are other procedures that involve dry polishing, this type of polishing primarily refers to circular bowl type vibrators. These may be used to round part edges and to polish the surface of implants.



Unprocessed cutting edge.....



Cutting edge preparation, brushed



Those processes tend to present issues as they can be error-prone and it's hard to certify a specific success-scale as they don't offer a true consistency of results. These processes are not usually as reliable as the DLyte process and often require additional manual rework to achieve the desired finishing results. D-Lyte machines achieve a

superior surface finish than abrasive polishing type machines and the process can be more than 5 times quicker than mechanical abrasive machines and for the Medical Industry, DLyte has proven the Biocompatibility of the medical products processed using the DLyte System.

The 3D additive manufacturing of implants and other medical components is becoming the norm and not only are the DLyte machines also suitable for polishing metal additive manufactured implants they provide superior results than existing surface finishing technologies. This is crucial as one of the main issues that additive manufacturing has is being able to achieve a good surface finish after the parts have been produced.

An independent surface finishing study carried out by the Fraunhofer Institute for Additive Manufacturing Technologies looked at the various machines and processes used for the surface finishing of titanium and stainless steel additive manufactured parts. It considered, amongst other criteria, the surface finishes obtained, erosion rates and effects, and the edge rounding of inner and outer edges. Various finishing processes were benchmarked against each other including abrasive blasting where a stream of abrasive material such as sand is propelled onto the surface under a high pressure, vibratory bowl finishing, chemical and electro polishing, and shot peening. The DLyte process achieved not only the best surface finishes but it was at least twice as good as the next best alternative process.

Anyone interested in any of the advanced solutions offered by AGS can view videos and download additional information from the AGS website.

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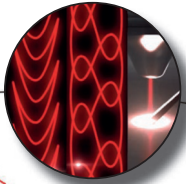
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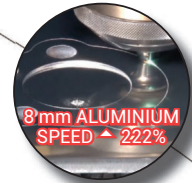
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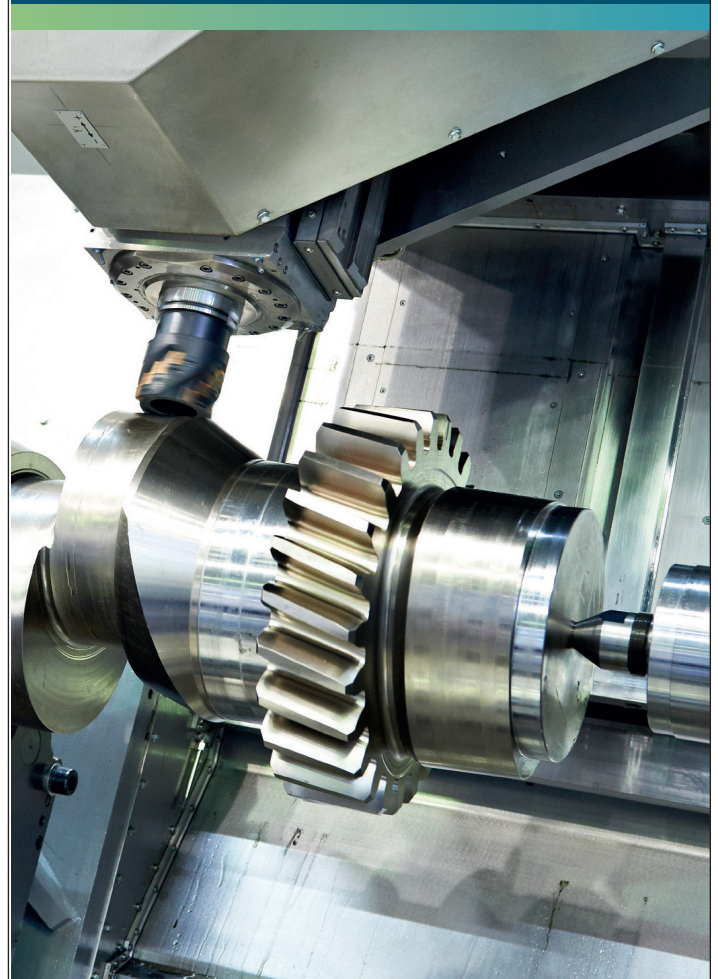


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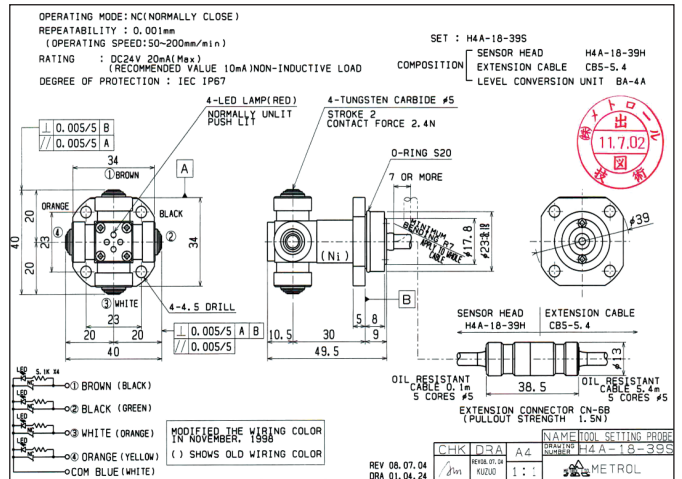
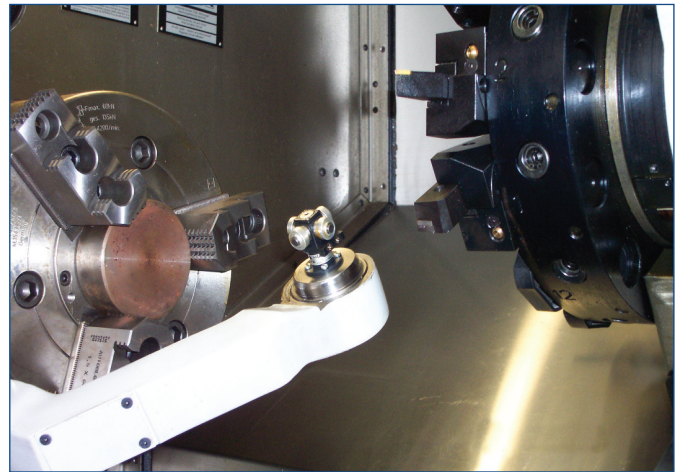
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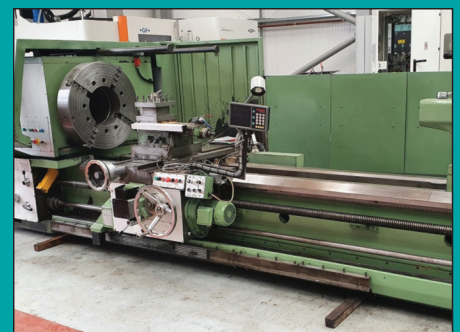
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# GRINDING

## REMOTE MAINTENANCE SOLUTIONS KEEP UNITED GRINDING CLOSELY IN TOUCH WITH CUSTOMERS

The potency of remote maintenance and customer assistance – especially harnessing the power of smart phones - has never been demonstrated more forcibly than during the past year when the coronavirus pandemic has forced lockdowns across the globe. However, the United Grinding Group has increasingly used technology to support its worldwide customer base and, in many cases, keep machines running with minimal downtime.

According to United Grinding Group company Walter Ewag UK, the Group's Digital Solutions embrace three main offerings for the users of member companies' wide range of grinding solutions; Production Monitor, Service Monitor and Remote Service. The first two help customers keep track of production - for example, highlighting when maintenance work is required and where/when problems may arise in production. Remote Service is designed to help support the help desk over a data connection. But why use this route rather than simply phoning the help desk?

Says Neil Whittingham, Walter Ewag UK's Sales Director: "Technical enquiries on the 'phone without image support can be very lengthy. That's why the United Grinding Group has integrated our established Conference Center into Digital Solutions. The Conference Center app has now been redesigned so that we can reach customers via their smart 'phones."

One example of Remote Service in action concerns the machine's backup battery. This maintains the power supply of a control system in the event of a power failure and it must be changed from time to time. The machine operator receives a notice on the operating panel in a timely manner, and the production manager would have seen this on the Production Monitor. The user manual



and installation instructions are available to both of them via the Customer Cockpit but they can also send a service request directly through the Digital Solutions app.

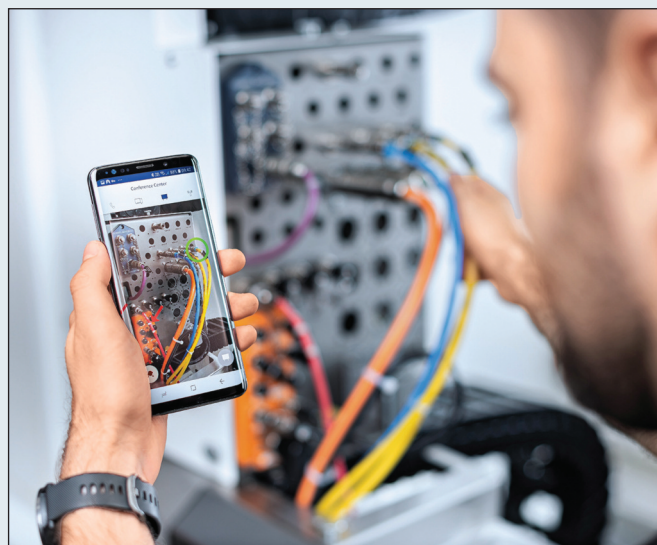
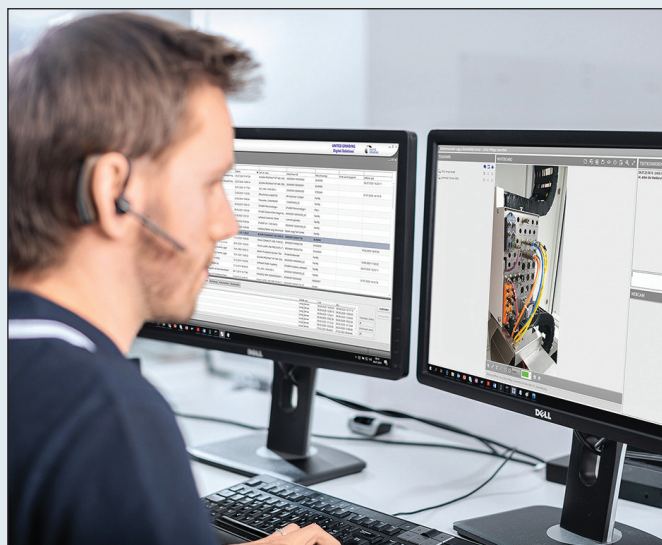
The service technician will be connected live via the Conference Center and will be able to be provided with tips and hints. Images can be sent via the whiteboard function and the helpline technician can draw markers directly into the images.

"There were 2,500 demands for remote service during 2020," says Mr Whittingham, who adds that United Grinding North America also performs preliminary machine acceptances remotely. "The application team produces videos of the required processes by mounting a GoPro camera in the machine, using a time code to document the duration of the relevant process cycles."

Other digital tools are also being worked on, including smart glasses. These offer a number of benefits including the fact that the technician at the machine can have his hands free while the help desk specialist also shares the same view. An extension of this would be the application of contextual information via augmented reality.

The use of technology to help customers remotely does not only apply to repair and maintenance; remote process optimisation is also a possibility, using data from the Production and Service Monitors. That would effectively create a full circle of digital solutions for the United Grinding Group and its customers.

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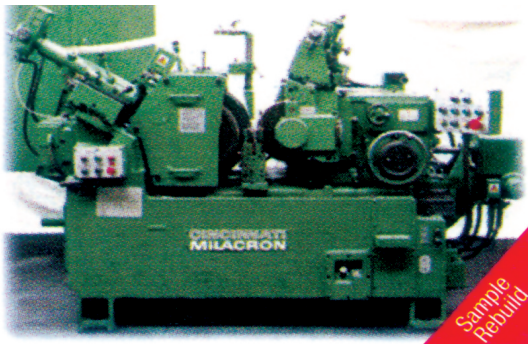
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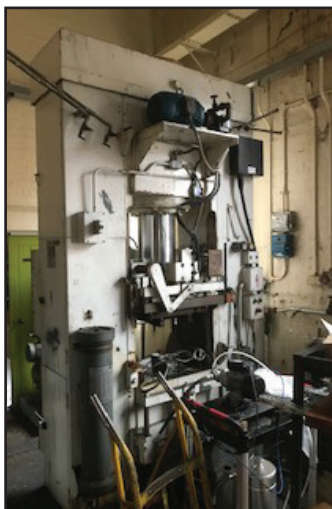
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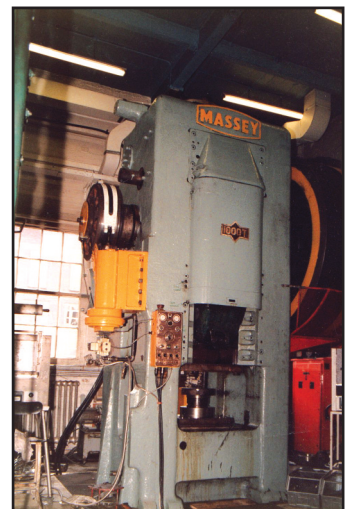
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## MODULAR PSL DATATRACK REMAINS THE HEARTBEAT OF DP ENGINEERING

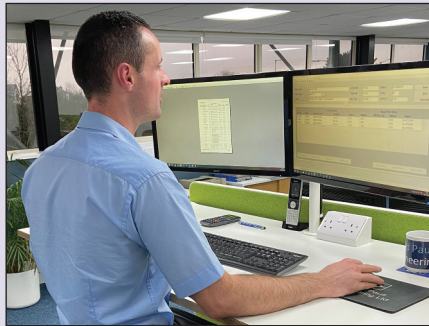
Redruth based DP Engineering has described itself as Cornwall's best-kept engineering secret and the longevity of the subcontract precision engineering company, established in 1952, reflects that accolade. Also not so well known is that for the last 15 years the company has based its success around the implementation of every module available within PSL Datatrack's production control software system. The company has described PSL Datatrack as the heartbeat of the business.

Over the first fifty or so years of its existence, DP Engineering relied on manual administration and spreadsheets to run the shop floor. That all changed in 2005 when, after a period of significant growth, the company recognised a new approach was needed to support its expanding customer base. That's when the initial investment in PSL Datatrack was made and since then there has been continual acquisition of modules so that today the company uses every one available. This has led to PSL Datatrack completely controlling production on a daily basis within a company that has risen from 10 to 40 employees.

This dependence on PSL Datatrack has been very advantageous for the company and allowed it to focus its efforts on retaining and developing its business with its customers in the aerospace and oil & gas industries which make up the largest proportion of the company's client base. The company is AS/EN9100 Series Aerospace and ISO 9001:2015 accredited. It not only manufactures components for customers, typically in batch production volumes from 5-500,000 pieces per annum, but also helps them to realise their own engineering ideas by offering high levels of support through its 'design for manufacture' service, whereby the company's skilled production engineers work closely with customers to optimise component functionality and expectations.

DP Engineering uses the latest CNC machining centres and lathes, supported by state-of-the-art metrology equipment. However, as Sales & Marketing Director Phillip Anthony recognises, the best technology means nothing if work cannot be produced efficiently with no bottlenecks - and this is where PSL Datatrack comes into its own. Modules covering the generation and management of quotations, sales/purchase order processing, process layouts, stock control, scheduling, shop floor data collection, non-conformance, gauge calibration and traceability are essential to the efficiency of the business. Through their functionality and adaptability, all the modules are seamlessly integrated and work together to form a robust platform for the business.

On one hand, the software allows the company to respond very quickly and simultaneously to requests for quotations, typically provided within 24-48 hours. On the other, once quotations have been converted into



firm orders, PSL Datatrack ensures the shop floor works as efficiently as possible with the Shop Floor Data Collection (SFDC) module managing the production of all parts passing through the factory.

DP Engineering's products are mainly safety critical parts for which traceability and visibility of the production process is absolutely vital. "Traceability is key for so many customers. When we ship an order we have it through the entire production process, from the very start when we receive the materials through to delivery of every product. Each one has a Certificate of Conformity delivery note with traceability right back to who booked material in, when it arrived, who supplied it and how it was used on the shop floor - every detail," says Phillip.

As an AS/EN9100 Series Aerospace accredited company, DP Engineering is the subject of regular external audits and through PSL Datatrack can immediately provide assessors with all the traceability information required with historic production data readily available for any job.

With so much importance attached to SFDC, each production section has its own terminal with access to PSL Datatrack. Users can also determine whether deliveries are running to schedule and whether targets in terms of delivery times and quoted pricing will be met. The shop floor variance reporting feature

monitors current costs against quoted prices and highlights variances, allowing decisions to be made to rectify any anomalies. The software provides more in depth analysis to see exactly what has happened and DP Engineering is then able to employ lean manufacturing tools that the workforce is familiar with in order to assess ways of improving processes and eliminating waste.

PSL Datatrack is scalable and this was important to DP Engineering at the outset. The company has gone on to purchase all additional modules as and when the business deemed the investments were needed in order to take even closer control of specific production functions. The software is not a one-size-fits-all off the shelf product and the close working relationship between the two companies has often seen the customisation of new modules to meet DP Engineering's exact needs. This has included the adaptation or creation of bespoke management reports and other functionality including scanning of completed works order job packs that are saved to the company's cloud-based intranet and accessed by management.

The Wishlist programme allows PSL Datatrack customers to propose amendments and improvements to the system, which could be of potential benefit to other customers too. PSL Datatrack has proven very reactive to such ideas from DP Engineering who say that many of their proposals have been taken on board.

"PSL Datatrack is a very customer focussed supplier. They help us to look at our own operation and improve what we do for our customers. We have close control and management of what is now a much larger business than in 2005. We wouldn't be where we are without PSL Datatrack's expertise and support. They understand what we are trying to achieve and help us to get there," concludes Phillip.

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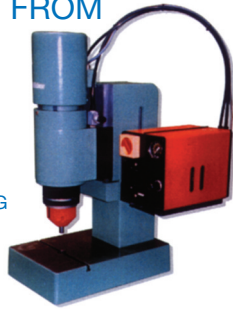
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# CASE STUDY

## VOLLMER DELIVERS A PALLET FULL OF BENEFITS FOR SAW MANUFACTURER INTEGRITY SAW & TOOL

Wisconsin based Integrity Saw & Tool Inc. has purchased a VOLLMER CHX 840 circular saw blade sharpening machine with the VOLLMER HS automated loading station to provide capacity for a significant order the company has won from a new pallet manufacturing customer. The VOLLMER CHX 840 has increased productivity by 60%, permitted unmanned running and improved blade quality – without the VOLLMER CHX 840, fulfilling the new order ‘would have been impossible’.

It’s a familiar story when an engineer leaves his job and sets up a business from his garage. In the case of Integrity Saw & Tool Inc, the foundations were laid in a basement in 1986 for this saw sharpening, HSS drill and end mill regrinding company that soon outgrew the basement, moved into the garage and employed family members to support the growth. It wasn’t until the turn of the century that this Wisconsin business really stepped out of its comfort zone to drive growth and expansion to another level.

It was the move to a 13,000sq/ft factory in 1998 followed by the appointment of Paul Reetz as the fresh-faced sales engineer and the investment in its first VOLLMER CNC sharpening machine in 2000 that set the company on a new growth trajectory. Now the owner of Integrity Saw, Paul Reetz recalls: “I was paid on a commission basis to bring in new business and for five years, we won 40 to 60 new customers every year. A lot of this was small family businesses such as cabinet manufacturers, construction companies and the Amish community, all within a 2-hour radius of our Fond du Lac facility on the edge of Lake Winnebago.

“With 13 staff and an output of 100 saw blades a week back in 2000, this output quadrupled to almost 400 blades a week by 2005. During this period, the ISO:9001 certified company realized that its predominantly manual saw sharpening equipment had to be upgraded for current CNC technology. Recalling this period, Paul says: “We had two older CNC machines and several manual machines for HSS saws – all of which were struggling to cope with our increasing demand.



We looked at the available machines and we chose the VOLLMER Akemat machines as they were in a different class. Back then, VOLLMER Akemat machines had a great reputation for build quality and performance. We bought our first machine in 2000, a VOLLMER Akemat B4 and over the next eight years, more machines followed as the Akemats clearly lived up to the reputation that preceded them.

“In fact, the company acquired a further three machines with an Akemat U10 and B10 arriving in 2005, followed by an additional Akemat U10 in 2006. The VOLLMER Akemat machines were bought for sharpening TCT saw blades whilst existing manual machines were manufacturing and servicing HSS blades. This completed the purchasing of VOLLMER machines for almost a decade, until the May 2019 arrival of the VOLLMER CHX840+HS.

Alluding to this period, Paul continues: “The saw sharpening side of the business had grown for almost 10 years, but unfortunately the 2008-09 global recession wiped out a lot of small businesses. Many of our circular saw blade customers witnessed the collapse of their businesses as fewer people invested in their homes and real estate. However, the production of round tools such as drills, end mills, router bits and special tools for the manufacturing industry weathered the market conditions far better. Round tooling for industry currently accounts for 80% of our business. With the COVID pandemic, there are fewer people

buying cars and flying around the world, so our round tooling business for the manufacturing industry has naturally slowed down. However, as more people are confined to staying at home, people are investing in their homes and the saw division of our business is once again benefitting from this.

### ENTER THE NEXT-GENERATION TECHNOLOGY

The COVID situation has seen people confined to their homes all around the world, as we all spend more time and money on groceries and eating at home. This has delivered a unique opportunity for Integrity Saw & Tool. With millions of wooden pallets in circulation in the US food industry, Integrity Saw has partnered to regrind TCT saw blades for a leading pallet manufacturer. This new customer has ambitious plans to build multiple manufacturing facilities across Canada, the US and Mexico – each plant capable of producing a pallet every minute.

“We knew we needed a new machine with automation to meet the demand. The VOLLMER Akemat machines have been amazing and aside from regular preventative maintenance, they have run every day since they were bought. The quality of the machines is amazing! It really is fortunate that we bought VOLLMER and didn’t have to worry about it, because we knew they were going to be running. So, once you have experience with VOLLMER, it doesn’t make any sense to look elsewhere. When it came to a new machine, VOLLMER was the only place to look.

COVID may have temporarily slowed the growth timeline for pallet production, but Integrity Saw is well placed to support its new customer with its new 5-axis VOLLMER CHX840+HS for machining the tooth faces and tooth tops in a single clamping operation. The CHX840 is complete with the HS automation solution that enables Integrity Saw to load and process 28 blades unmanned. With a customer that will run its operations 24/7 and will require a new saw blade for every shift at every facility, the opportunity for Integrity Saw & Tool is considerable.



# CASE STUDY



## ACHIEVING THE IMPOSSIBLE WITH VOLLMER

With the arrival of the VOLLMER CHX840+HS, Integrity has been able to rapidly ramp-up to the stress-relieving and re-grinding of 400 TCT blades every week from May 2019 through April 2020 – an impossible feat without the VOLLMER CHX840+HS.

Integrity Saw did feasibility studies on the blades with VOLLMER whilst it was simultaneously commencing the contract with its existing and ageing VOLLMER Akemat machines. The 18inch (457mm) diameter TCT blades have 70 teeth per saw and each saw blade can be re-ground up to seven times before being replaced or re-tipped. Before the arrival of the VOLLMER CHX840+HS, Integrity Saw was conducting 4 operations on 3 machines to complete a saw blade in 75 minutes – a machining time not inclusive of set-ups and changeovers. This process chain included stress relieving, then transfer to an Akemat tooth-face grinding machine and subsequently a tooth-top grinding machine and then the grinding of the 'kick-back' radius to reduce cutting forces on each tooth.

"When the opportunity came to work with the new pallet manufacturing customer, we knew we could not have even dreamed about doing that if we didn't know that there was a VOLLMER machine that can handle that workload. We make big decisions because we know with VOLLMER we're going to have great service, great training and we don't have to know everything because we know we can ask VOLLMER to get the answers so we can grow our business.

"When it came to programming time and repeated set-ups, it was approximately 90 minutes for each blade. The VOLLMER CHX840+HS has cut this time by more than 60% to 35 minutes with just one stress-relieving operation before the CHX840 completing all tooth and face grinding in a single set-up. We only did a couple of stacks of blades with the older VOLLMER Akemat machines, but the time study demonstrates the difference," says Paul.

For the 27-employee company to have just two skilled operators running four VOLLMER Akemat machines and the VOLLMER CHX840+HS; the new machine has doubled the weekly output with the same number of staff. As Paul continues: "The two operators previously had the capacity to do 40-50 TCT blades a day on the Akemat machines - adding the VOLLMER CHX840+HS means we can now re-grind over 100 blades a day. We work from 5 AM to 3 PM and the HS automation system allows us to set the VOLLMER CHX840 machine in the afternoon and it will process up to 28 saws unmanned throughout the evening. If we worked a shift pattern, we could run the VOLLMER CHX840 24 hours a day to gain more capacity. However, we are already looking at our next VOLLMER purchase.

## MORE THAN PRODUCTIVITY

Whilst the new VOLLMER CHX840+HS has increased productivity and capacity; the benefits reach much further. Integrity Saw has recognized the facility to grind tooth tops and faces in a single operation has the potential to make single-purpose machines redundant in

the future. With a single 'compact-footprint' VOLLMER machine, Integrity can significantly increase output whilst reducing machine inventory and running costs, maximizing its 18,500sq/ft of factory space.

From a programming perspective, the operators undertook 2.5 days of training on the CHX840+HS and this was more than sufficient. As Paul continues: "Whilst the older machines have all the programs stored, the VOLLMER CHX840+HS didn't initially have that luxury. However, the easy-to-use CNC interface means our operators don't have to program every blade from new – they can simply edit one of the hundreds of stored program templates within the software to rapidly generate a suitable program. This means a stack of 28 saws for unmanned running can be programmed in just over 5 minutes.

We are continually adding more saws and programs to the CHX840 and this will help us as our production of saws for the metal cutting industry expands.

" Additionally, the operators no longer have to be concerned over grinding wheel offsets as the CHX840+HS automatically compensates for wheel degradation, ensuring that the precision and quality of the final saw in an unmanned batch run is as impressive as the first saw. The combination of probing, automated wheel offset calibration and the intelligent software on the CHX840 also eliminate the potential for operator error and collisions.

## LOOKING TO THE FUTURE

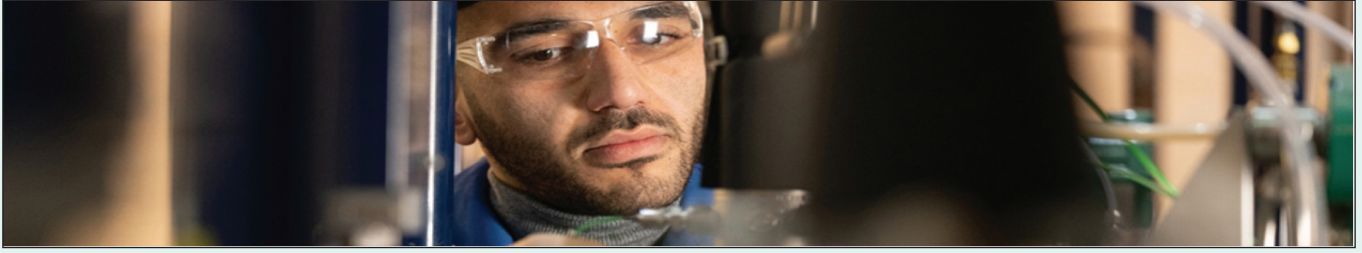
When the pandemic gradually subsides, the VOLLMER CHX840+HS will eventually reach capacity in line with the customer demands for saw blades for pallet production. Integrity Saw already has its sight set on a second VOLLMER TCT saw sharpening machine with automation to meet these production demands - as and when they arise. Furthermore, the company has been so impressed with the VOLLMER CHX840+HS that it is now considering the latest generation of VOLLMER machines for its rotary tool division.

With regards to the TCT saw department, Integrity Saw is seeing increased demand from the metal cutting industry from solid bar steel stockholders and the VOLLMER CHX840+HS will also have a part to play in developing this business. "We are moving more steel industry saw blades to the CHX840, as 10 to 12-inch (250 to 300mm) saws can be produced much faster. The production time for grinding the outside diameter and chip breaker can be more than 25 minutes on the Akemat machines, while the CHX is doing this in less than 15 minutes. Also, some 80 tooth saws can be finished on the CHX in 8 minutes as opposed to 15 minutes on the Akemat with the chip breakers being added manually afterwards. The potential for savings is considerable and this is a rapidly growing part of our business. The VOLLMER machines have proven themselves to be 'bullet-proof' and they are built to last. More than this, the technology and innovation are helping to drive our business forward," concludes Paul.

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# THE NEXT GENERATION



## NEW UNIVERSITY OF NOTTINGHAM ELECTRO-MECHANICAL ENGINEERING DEGREE APPRENTICESHIP LAUNCHED

A new Electro-mechanical Engineering degree apprenticeship launched by the University of Nottingham is set to transform the way firms attract recruits and upskill existing staff – and ultimately produce apprentices who can solve business-specific problems with both mechanical and electrical engineering expertise.

The degree apprenticeship, starting in September 2021, develops technical skills in design, testing and analysis and the soft skills that enable graduates to be effective members of an engineering team. Employer-specific project work is a major theme throughout the blended learning and block release programme, empowering apprentices to foster skills, knowledge and behaviours by solving engineering challenges that are unique to their place of work.

For employers, degree apprenticeships provide a cost-effective approach to workforce development, and businesses which have a wage bill over £3 million can fund the programme from their apprenticeship levy. Businesses with a wage bill under £3 million can still access this programme for their employees, and may be eligible for 95% government co-investment. It also means they can invest in the technical skills of staff who will be driving the innovation abilities of their organisation for years to come, and attract and retain top talent by giving employees the opportunity to gain a world-class degree without paying tuition fees.

“This is a brand new degree apprenticeship standard and we wanted to be quick out of the blocks offering it,” said Associate Professor and Programme Director, Dr Rowland Travis. “It is for anyone looking to develop core analytical skills in electro-mechanical engineering, including the fundamental mathematical techniques they will need to utilise, concepts

of signals, analogue and digital systems, and later on in areas such as solid mechanics and dynamics, thermofluids, power and energy, electrical energy conversion, energy conditioning and energy sustainability. This expertise is sought after in industries spanning aerospace, energy and oil and gas, to mainstream engineering firms and equipment manufacturers. The transferability of skills acquired on this course will be a huge asset.”

With the University of Nottingham ranked second out of over 100 universities for electronic and electrical engineering in the Guardian University Guide 2021, employers are assured of access to high-quality training. Apprentices, who will be awarded a Level 6 Electro-mechanical Engineer apprenticeship certificate and a BEng (Hons) Electro-mechanical Engineering upon successful completion, will undertake an initial assessment to determine their existing level of skills and knowledge. The University will then build a personal plan for their learning. “The course is relevant for school leavers who are looking for on-the-job paid learning, as well as mid-career professionals seeking a skill-set top-up to support their career progression. It will fundamentally address issues around widening access to engineering careers, including those from non-traditional backgrounds,” Dr Travis added.

Adam Clare, Faculty Lead for Apprenticeships and Professor of Manufacturing Engineering at the University of Nottingham, said the Electro-mechanical Engineering degree apprenticeship would “deliver quality outcomes for employers”. He explained: “The challenge for many organisations is how to keep young people and train them to deliver value in their future. What the degree apprenticeship route offers is elite skills development for

everyone, providing an attractive path to recruiting new staff and a way to upskill current employees whilst solving workplace specific challenges in the process. Apprentices will have the opportunity to study alongside engineers from other leading businesses, developing their own contacts.”

Many businesses, large and small, are already on board. Lynn Morris, Graduate/Apprentice Co-Ordinator at Siemens Gamesa Renewable Energy, said: “Supporting an apprentice through the Electro-mechanical Engineering degree apprenticeship programme allows us to offer individuals an alternative route to obtaining a high level degree. We are able to offer the individual work experience, a salary and sponsorship for their degree. The main benefit to the company is that this bridges the gap between academic theory and practical skills learned in the workplace. The result is an individual who is work-ready with commercial awareness, high level workplace skills and a degree. Offering this type of apprenticeship we hope to attract enthusiastic, inquisitive students with a passion for renewable energy who might be looking for an alternative route to a bright career in engineering.”

Prospective apprentices should be working in a job role that provides opportunities to learn the skills, knowledge and behaviours outlined in the level 6 Electro-mechanical Engineer apprenticeship standard. This means they must:

- work a minimum of 50% of their time in England;
- be supported to undertake 20% off-the-job training;
- hold a minimum grade 5 or above in GCSE English and Maths;
- and, be a UK/EU/EEA national or have lived and have had a right to work in the UK for three years or more.

Employees with preceding level apprenticeships or alternative qualifications and relevant work experience may still be eligible for entry on to this programme. Businesses can contact the University of Nottingham’s Employer Engagement team to discuss their employees’ suitability for this programme at: [degreeapprenticeships@nottingham.ac.uk](mailto:degreeapprenticeships@nottingham.ac.uk).

For more information about the Electro-mechanical Engineer apprenticeship standard go to:

[www.instituteforapprenticeships.org/apprenticeship-standards/electro-mechanical-engineer-v1-0](http://www.instituteforapprenticeships.org/apprenticeship-standards/electro-mechanical-engineer-v1-0)

and for the Electro-mechanical Engineering degree apprenticeship please click here:

<https://www.nottingham.ac.uk/workingwithbusiness/campaigns/Electromechanical-Degree-Apprenticeship-2021.aspx>.

# CASE STUDY

## FIT FOR THE FUTURE WITH LASER CUT WEIGHTS

Proform Laser, situated on the Wirral, started out in business as a laser cutting subcontractor in 2016 when they purchased a laser cutting system and a press brake from Bystronic. With a successful and growing business, the company was confident to buy two more laser cutting machines, the most recent being installed in January. As a fully functioning laser job shop, certified for Aerospace to AS9100, Proform was also working on automotive parts for JLR and other industries at the time of the first coronavirus lockdown in March 2020.

As the lockdown started to bite, there was disruption to the normal level of incoming orders at Proform for a few weeks, owing to the shutdowns at various manufacturing sites (especially in automotive and aerospace sectors which responded to the travel bans and furloughed most of their employees).

The Proform Group is run by the Canner family, father Russ, daughter Laura and son Mike, who are all keen gym members and like to keep in shape. Seeing an opportunity with gyms closed and people unable to access the equipment needed to work out, they decided to make some standard products for weight lifting. To make these plates is a very simple and rapid operation using laser cutting, no bending or welding is required, only some minor finishing when they come off the laser cutter. In contrast a typical automotive chassis consists of 200 parts which need cutting, forming, welding and finishing. Plates are made from mild steel sheet of a thickness of 20 mm and have a central hole and some optional features like handles easily produced on the laser cutters.

Initial production started in a low-key way with sales mainly to family, friends and by word of mouth. Realising the market demand for home equipment during lockdown the company re-arranged itself and launched the Pro Plates brand with a dedicated website for online ordering and started building a large following on



Instagram and Facebook. Recognising that enthusiasts love nothing more than to upload photos of their newly-purchased weights online and tag the company that supplied them, some of the best sales leads come from delighted customers.

Growth has been outstanding and the idea that they might make £10,000 out of the idea is now a family anecdote. During the past year, the company has employed an additional 50 staff and is finding that keeping pace with the order intake is a challenge. By January 2021, 6,000 orders had been received via the website and 5 staff are employed to look after the social media content, advertising and marketing. Another 5 staff are employed for customer service and two 40 tonne articulated lorries arrive daily to dispatch completed orders.

The numbers are staggering, and a truly good news story for UK manufacturing. Since May 2020, the business has quadrupled in turnover where many other subcontractors have struggled to keep busy. In one month recently, Pro Plates turned over more than a full year of revenue in 2019 for Proform Group. Each week the company turns 70-80 tonnes of steel plate into steel weights. The product portfolio continues to grow with the addition of powder coating, customised designs and accessories like bars, racks and powercages allowing the home user to kit out their garage or garden shed with everything they need to pump iron. An opportunity to fill a gap in the market, with Chinese weights held up in shipping containers around the world, has led to a quick delivery and lower price than gyms have traditionally paid for their equipment from traditional wholesalers, with some products 70% cheaper than historical competitors.

Plans to expand into shipping weights to Europe are on the back burner until they can keep pace with the UK demand. The added bonus of "buying British" is an added

attraction to set Pro Plates apart from other suppliers.

The whole factory workflow of Pro Plates and plans for a factory extension into the yard of the current facility are in hand. At present the factory is running at full capacity, including a night shift and a full sheet of 20 mm steel weighing 750 kg is cut in an around an hour on the high speed fibre laser cutting machines from Bystronic.

When asked about why she chose Bystronic for the equipment, Laura Canner said "We went on the UK study tour to the manufacturing site of Bystronic at Niederörs in Switzerland and were impressed by the Swiss expertise, the price point for the equipment and the smart red colour of the machines." Although other vendors were evaluated, Bystronic were chosen and the nesting software used throughout is the BySoft platform from Bystronic.

In a time of bad news stories around the world it is very satisfying to share the news of a UK manufacturing business supplying UK customers and growing to employ more people in a region where manufacturing has been hard hit for many decades.

[www.bystronic.co.uk](http://www.bystronic.co.uk)



# THE NEXT GENERATION

## HELPING BUDDING ENGINEERS GAIN SCIENCE CAPITAL

The science, technology, engineering and maths (STEM) skills gap in the UK is no secret, and it is also a hugely complex challenge to fix. To help address the issue, researchers have developed a model for increasing the uptake of STEM careers; science capital. So, how can we increase young people's science capital, and win their hearts and minds to consider a career in STEM? Here Rebecca Bound, Education Outreach Officer at global engineering technologies company, Renishaw, shares her guidance on how companies can help inspire the next generation of engineers, using the science capital model.

STEM has a leaky pipeline. Though many children report enjoying their science lessons, many do not see science as relevant to their lives or "for me". This is particularly apparent in women, minority ethnic and working-class communities, where we are still seeing under-representation. At least, that's what BP, King's College London and the Science Museum Group found in a ten-year longitudinal research project, ASPIRES, which tracked young people's career aspirations.

### WHAT IS SCIENCE CAPITAL?

Science capital can be defined as the sum of all science related knowledge, attitudes, experiences and resources that an individual has. Researchers describe science capital as a metaphorical rucksack, with each science experience adding to the volume of the individual's capital and the likelihood the child sees science as "for them" and chooses to follow a STEM career. With only five percent of students found to have high science capital, what more can industry do to increase it?

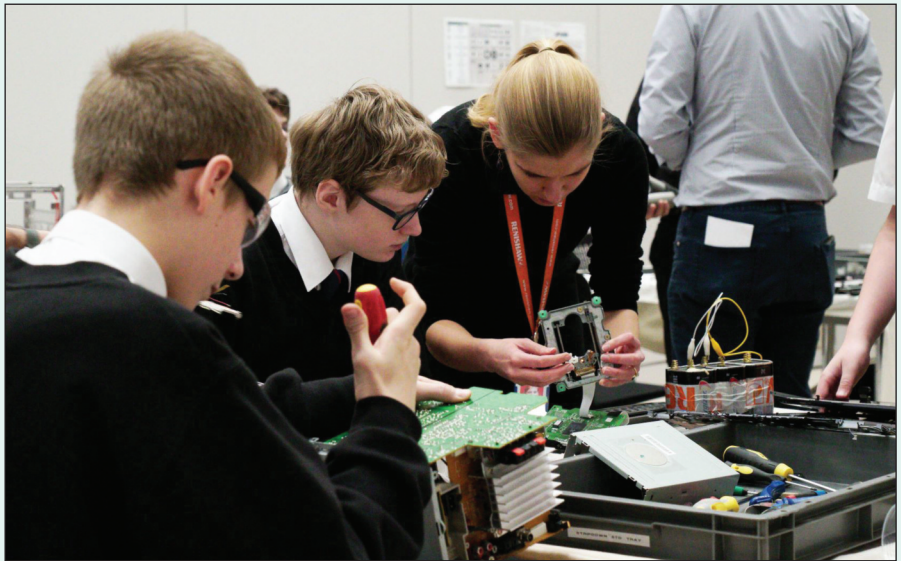
Programmes have already been set up to monitor the impact of regular STEM activities on groups of young people over time. The Future Brunels pilot programme run by the SS Great Britain Trust, for example, measures students' interest in STEM over five years, and the results show that participants recognised new possibilities for their own career aspirations and future selves.

Science capital comes from many sources; school, home, family, extracurricular activities, employer outreach and more. Researchers have developed a science capital focussed toolkit for schools to use, but engineering businesses also have a role to play in supplementing this.

### THE ROLE OF THE EMPLOYER

No employer can solve the skills gap single-handedly, nor can they be entirely responsible for a cohort's science capital. What they can do is provide young people with a positive experience of a STEM environment, to provide additional types of science capital from another influence.

Renishaw, for example, runs a STEM Outreach programme of activities, from school assemblies, to workshops and work experience, with children and young people predominantly from South Wales, Gloucestershire, Bristol and South Gloucestershire. Whilst we are involved



in supporting some ongoing programmes, like Future Brunels, the majority of our engagement with individual students is on an ad-hoc basis. For example, we work with a local school that, each year, will participate in a STEM workshop for all its Year 8 pupils; so a new cohort each year.

Every engineering business will have something to offer young people, but there are things to consider before establishing an outreach programme. It's important that inputs into science capital aren't repeated, as going over the same topics may actually be off-putting. Outreach work also needs to be carefully tailored to the age group and skill level, so it is accessible, yet stimulating.

Renishaw has split its outreach model into three groups; engage (years 5 and 6), embed (years 7 to 9) and employ (years 10 to 13). King's College Research has also shown that early intervention has lots of benefits, so we have also done story readings for children in years 1 and 2. Each stage of our programme is different, moving from initial introductions to create an interest and a spark, to developing the messages and explaining the role of an engineer in society, to a more future and careers focussed programme.

Think about your company's area of expertise, research the curriculum and establish what else is on offer in your local area, to help identify specific gaps you can plug. A good starting point is to look at what children's science museums or education centres, like We The Curious in Bristol or Techniquest in Cardiff, have on offer. It could be a video stream during an assembly, a careers talk or a workshop you run, that can be the difference between a young person becoming an engineer or not.

### MAKING A LONG-LASTING IMPRESSION

Even if you are engaging with a particular cohort only once, there are ways to make the impact of the session go beyond just attending on the day. Firstly, it is important that the activities are enjoyable and memorable, but

there should also be a take-home message to provide context. This can shift the thought process from "that was fun!" to "that was fun, and I want to be an engineer when I grow up!".

We find it helps to connect the STEM activity to their everyday lives, so they can see how it is applicable by, for example, running Technology Teardown workshops to reveal what is on the inside of common electronics products. Young people use technology all the time and highlighting the detail and design behind it can help them see the wider relevance. Alternatively, running workshops on topical trends and buzzwords, like 3D printing, can help keep young people engaged.

One thing we have seen a lot of success with, is where children or young people can make something to take home with them. For example, designing a key ring in CAD and printing it using 3D printing, or making simple homopolar motors they can take apart and rebuild, means they can show their parents and siblings what they have learnt. This increases the number of people's science capital one session can influence; we cannot underestimate the influence of family on an individual's career choices.

### THE IMPACT OF ENGAGEMENT

Renishaw decided to make an investment in education outreach, not just to inspire potential future recruits, but also to benefit its local area and supply chain, who may not currently be able to invest resources themselves. We have already seen previous work experience and open day participants join Renishaw as apprentices, which is an encouraging sign.

A co-ordinated effort from across the STEM sectors is needed to address the skills crisis. Every little helps, so, if your company is able to, researching what outreach you could offer and reaching out to local schools could provide the spark a child needs to decide that, when they grow up, they want to be an engineer.

[www.renishaw.com/en/education-outreach](http://www.renishaw.com/en/education-outreach)



# CASE STUDY

## SIMULATION AT THE HEART OF AEROSPACE SPECIALIST'S DIGITAL CHAIN

Supported by NCSIMUL software, and French aerospace industry group, GIFAS

The march towards what has now become the ethos of Industry 4.0 began many years ago for a manufacturer focusing on the aerospace sector. And now, a digital thread, with simulation software NCSIMUL at its heart, plays a vital part in their success.

Digitalising, improving production performance, investing in cybersecurity, and accelerating sustainable development are all part of the Lorentz Group's "Industry 4.0" approach.

The Group's story began in 1974 with a single conventional Misal milling machine in the basement of a house in Esbly, Seine-et-Marne, France. The founder, Jean-Claude Lorentz, was joined seven years later by his son Frédéric, the current Chairman of the Lorentz Group. With orders flooding in, the family business had to move to a 500-square-metre factory in the town's business park in 1991.

Today, the Lorentz Group operates with 80 employees from two sites – the second is a few kilometres from the first, in Bornel, Val d'Oise – and has a fleet of several dozen machines, including 23 5-axis machining centres, 16 lathes, of which 13 are multi-axis, and a dozen three-dimensional measuring machines.

The founder's demand for quality, passed on to his son, and is now reflected in the company's strong presence and renowned success in aerospace sub-contracting, along with some military work. Aerospace and military contracts account for more than three-quarters of the company's turnover.

While they were still working out of the basement, Jean-Claude Lorentz realized that the future of manufacturing lay with computerisation and automation, and invested in his first numerically controlled machine in 1986, recognising it as a promise of quality and productivity.

"As those were the early days of personal computers, it took audacity at that time for a

craftsman like me to acquire equipment which cost more than my annual income," says Frédéric Lorentz. "But it was the first step on our digital journey...and now, every year, we invest 10 to 15 per cent of turnover in new machines and software."

The digital chain, a central element of the Lorentz Group's operation, extends across all their aerospace work from CAD to dimensional control, via CAM, simulation, machining and production control (MES). This is all connected to the company's ERP and supply chain.

The software includes three modules of the powerful NCSIMUL system, from Hexagon: NCSIMUL Machine, NCSIMUL Tool and NCSIMUL DNC.

The first module simulates the toolpaths based on the digital twins of the range of real machines in the Lorentz Group's workshop. It detects any programming errors and potential collisions from the actual G-Code that drives those CNC machines cutting a wide variety of components.

NCSIMUL Tool orchestrates the preparation of the tools, while the third module provides the link between NCSIMUL Tool and the machine.

But NCSIMUL's role in flexible machining while avoiding collisions does not stop there. "Such investment also has the added benefit of making life easier for the operators, especially since they work on a large number of individual parts," explains the company president. The NCSIMUL Tool module saves them precious time by facilitating tool selection. "When you know the number of hours a tool setter spends looking for tools and the cost per hour, the savings are obvious," he says.

In addition to state-of-the-art equipment and technology, he attaches importance to efficient organisation. To help achieve this, the company has been supported through the



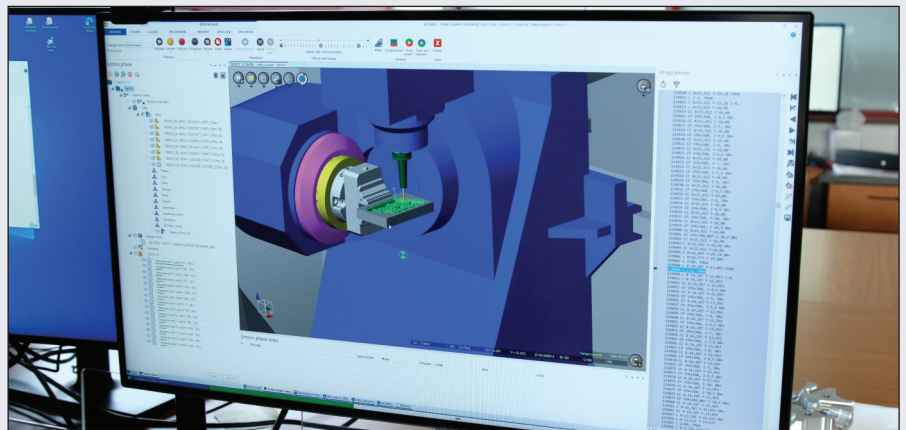
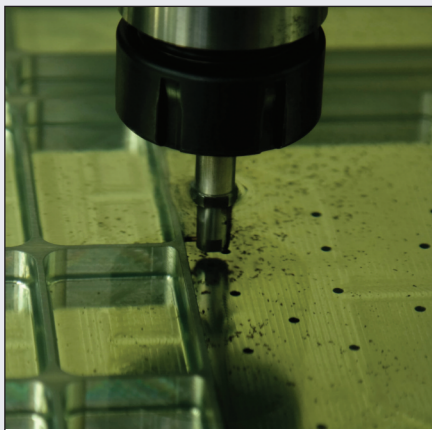
"Industrial Performance" improvement plan run by French aerospace industry group GIFAS, and CETIM (Centre Technique de la Mécanique). That initiative aims to increase delivery performance and strengthen competitiveness across the entire aerospace supply chain, by identifying each supplier's priority's areas for improvement, and assisting them with implementation.

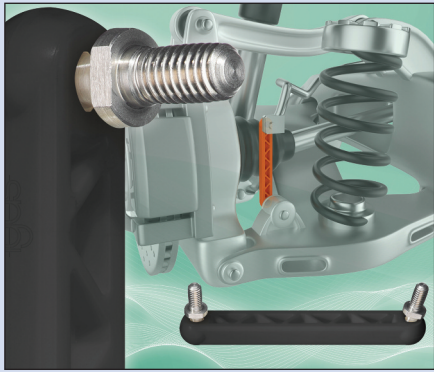
Through their current 'Excellence' project, the Lorentz Group understands that employees need to improve their skills and learn to work in what project mode. "This is all the more important, since part of the responsibility for suppliers has been transferred to the company."

However, they paid attention to digital tools long before 'Excellence' was implemented, through interconnecting production chains, and exchanging information in real time between the workshop and other departments and services such as the design office, methods, and control.

Today, the Lorentz Group's objective, in the short to medium term, is to move towards excellence by concentrating on strategic parts and by extending its services to other industrial sectors beyond its current activity core of aerospace and military.

[www.ncsimul.com](http://www.ncsimul.com)





## A QUIET SOLUTION FOR LABELLING MACHINES

A new elastic double joint from plastics specialist igus is proving to be a perfect – and quiet - solution for the machine building sector.

The igubal GPZM coupling joint, which was officially launched at the end of 2020, is lubrication-free, maintenance-free and 20% more flexible than its conventional alternative.

Dean Aylott, Product Manager at igus UK, said: "This additional flexibility is due to the use of the new igus housing material, which ensures the joint's ball stud remains firmly enclosed and dirt cannot penetrate into the bearing. This new double joint also helps reduce noise levels when in use and is proving particularly successful with labelling machines."

Dean added: "Coupling joints are exposed to a range of loads, permanent vibrations, high tensile forces and compressive strength – so the demands made on them are extremely high. In these igus elastic double joints no external lubricants are necessary, and they can be used at temperatures of up to 300 degrees Celsius."

In the automotive industry alone, the double joint is being used in many applications from sensor connections, actuators, and valve flaps to gear shift mechanisms and turbochargers.

The new igus double joint is extremely flexible, resilient and has been rigorously tested in the state-of-the-art laboratory at igus.

The housing material used in the product ensures that the ball stud is tightly enclosed when the joint moves - sealed against dust and dirt.

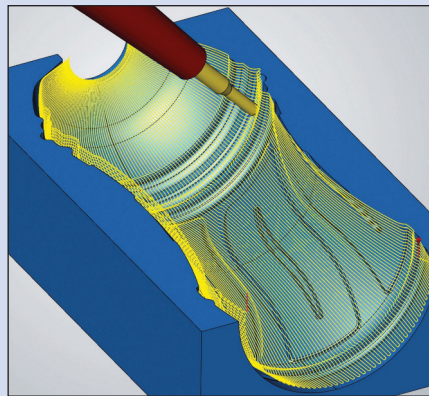
Liquefied dust was injected into the joint during the testing process, resulting in no negative influence on the product. Tests also revealed that these new double joints last 20% longer than a product made of polyamide.

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## INNOVATIVE FUNCTIONS FOR MOULD MAKING AND MILL TURNING

The latest 2021.1 version of the hyperMILL® CAD/CAM suite is now available and it offers a wide range of new functions for even higher quality surface finishes. In mill/turning, OPEN MIND now offers an option for simultaneous turning and HPC machining. In addition, a new function is also available in hyperCAD®-S that allows users to easily align stock and model data, which is particularly useful before reworking additively manufactured stocks.

The latest '5-axis Radial Machining' function now makes programming easier while delivering unparalleled surface finishes. This new strategy allows toolpaths



for bottle, tube or exhaust shapes to be calculated even quicker by using a radial projection method. An indexed tilt per cut allows each step to achieve the best possible surface quality. Also, the standard integrated 'High-precision surface mode' for ultra-precise surfaces in the  $\mu\text{m}$  range and 'Smooth overlap' strategies are available to enhance surface finishes in transition areas.

The new XY Optimisation feature in the '3D Profile Finishing' function improves machining with X or Y-axis infeed strategies, hones the 'Smooth overlap' strategy to perfection. If an area cannot be optimally machined in the X-axis on a steep wall, it is automatically machined in the Y-orientation to maintain a constant infeed. The optimised blending in the overlap area makes changes to the machining direction that are not visible on the workpiece.

OPEN MIND's hyperMILL® 2021.1 now provides a new, extremely convenient and intuitive option for subsequently editing toolpaths. The 'Edit toolpath' Interactive mode gives the user great flexibility to select and remove existing toolpaths at selected points and curves or entire toolpath sequences between two G0 movements.

[www.openmind-tech.com](http://www.openmind-tech.com)

## NEW CATALOGUES REFLECT GROWTH IN XYZ MACHINE TOOLS

Not one but two new catalogues are now available from XYZ Machine Tools, one covering milling/machining centres, the other featuring its turning machine range. The move to split the catalogues was driven by the growth in number of machines now available from XYZ Machine Tools, along with a recognition that while some customers have requirements for milling and turning capability, many simply want one or the other. The move to two catalogues also allows for much larger images, with each machine benefitting from one, if not two pages to highlight the specifications and key features.

"With the addition of several new machines and ranges to the XYZ Machine Tools' portfolio, splitting the catalogue into two separate documents made perfect sense," says Nigel Atherton, Managing Director, XYZ Machine Tools. "Customers are also being more specific and selective in their machine tool buying, so it was time to focus on the two sectors of the range as we

have done."

The catalogue complements the detailed online machine specifications available at [www.xyzmachinetools.com](http://www.xyzmachinetools.com) and the support provided by the nationwide team of area sales managers, along with a network of technical centres and showrooms available for machine demonstrations and training. All of which means customers can access the information they need about any of the machines in the XYZ Machine Tools range to make an informed purchasing decision whenever they need it.

[nigel.atherton@xyzmachinetools.com](mailto:nigel.atherton@xyzmachinetools.com)  
[www.xyzmachinetools.com](http://www.xyzmachinetools.com)



## ITC TAKES MILLING PERFORMANCE TO THE XTREME



To deliver the ultimate milling performance for the aerospace, energy and power generation and general subcontract sectors, Industrial Tooling Corporation (ITC) has now introduced the Widia Hanita VariMill XTREME. The new addition to the solid end milling brand that is devoted to delivering high-performance tools is a significant advancement upon its predecessors from the iconic VariMill Series.

The VariMill XTREME has been engineered to excel in a variety of aggressive machining conditions through its innovative product design that uses key features from the already-successful VariMill I, enhancing chip evacuation and corner stability to exceed performance expectations on a wide range of materials. VariMill XTREME customers will benefit from a reduction in the number of passes it takes to finish components credit to its higher productivity levels as well as a versatility that sees this new range offer the ability to machine a broad range of materials in challenging conditions. This will certainly reduce tool inventory requirements.

Perfect for machining a broad range of materials such as steel, stainless steel, cast iron and superalloys, the VariMill XTREME exceeds performance and tool life expectations in a variety of operations that includes ramping, slotting, plunging, drilling, helical interpolation and dynamic milling. This makes the Widia VariMill XTREME the perfect all-rounder for your business.

The impressive 4-flute solid carbide end mill is offered with a choice of geometries that include a square-end, sharp edges, chamfers and corner radii designs. This choice permits end users to exceed all previous machining expectations, especially when working with aggressive cutting parameters. This is a credit to a design that incorporates a multitude of geometry advancements. The advancements include a 4-asymmetrical divided flute and variable helix angle that work in tandem to reduce vibration and harmonic impact, subsequently improving surface finishes and tool life. This is complemented by a twisted end-face that improves edge and corner stability. The twisted end-face significantly enhances ramping and helical machining capabilities beyond that of competitor product lines.

To maximise stability in the most extreme conditions, the VariMill XTREME has a parabolic core that reduces deflection and the risk of tool breakage. Furthermore, this new addition to the ITC solid carbide range has a non-linear gash profile that excels with chip evacuation and provides higher ramping and Z-axis machining capabilities.

**Email:** [sales@itc-ltd.co.uk](mailto:sales@itc-ltd.co.uk)  
**Web:** [www.itc-ltd.co.uk](http://www.itc-ltd.co.uk)



## NEW THREADMILLS FROM GUHRING

When it comes to holemaking and threading, Guhring is an industry leader with a product range that stretches beyond convention. This product range has now been expanded with the arrival of the MTMH3-Z. An expansion of the Drifter series of thread mills, the new MTMH3-Z Drifter helical drilling thread mill demonstrates impressive performance levels when processing materials up to 66HRC.

Combining core drilling and threading in a single operation, the MTMH3-Z Drifter helical drilling thread mill delivers excellent machining results and process reliability when wet or dry cutting all material types. With two oil grooves on the shaft to provide optimum cooling with cutting fluid or air; the range also has a left-hand cutting geometry that stabilises performance during climb milling. This is complemented by the fine-grain high-performance carbide composition that gives the MTMH3-Z Drifter stability and performance that is unrivalled.

The special fine-grained carbide is characterised by its high hardness and is optimally suited for hard machining. Supplementing this is Guhring's special temperature resistant TiSiN coating that prolongs tool life and performance whilst making wet, as well as dry machining possible. Furthermore, the MTMH3-Z Drifter incorporates a special face geometry with hollow grinding and this generates process-safe core hole drilling and thread milling possible in almost all material types.

With a shank diameter from 3 to 12mm and a neck relief from 5 to 40mm, the new thread milling series is suitable for creating threads from M2 to M16 on a material range that includes all steels and stainless, duplex, cast and graphite iron, aluminium and Ti alloys. Suitable for drilling and threading holes up to 2.5XD in a single operation, the MTMH3-Z Drifter can drastically reduce set-ups, cycle times, tool inventory and costs for end-users.

To simplify the process further, Guhring has also developed its CNC Guhro Thread Mill software that is free to download for Guhring customers.

This innovative software enables users to specify the thread data by selecting from all current thread standards and then inputting the material to be machined. At this stage, the software provides the optimal parameters.

**Web:** [www.guhring.co.uk](http://www.guhring.co.uk)

## VARGUS INTRODUCES NEW TURNING TOOLS

Telford based Vargus UK has now introduced its new ST-Cut line of cutting tools for small part machining. Developed specifically for the turning of small components on Swiss-type sliding head-turning machines, the ST-Cut line presents a solution for virtually every small part turning application.

The ST-Cut series from Vargus features a unique insert replacement system that provides fast and easy changeovers of inserts from both sides of the tool. This is particularly suitable for manufacturers running sliding head turning centres where space is often limited inside the working envelope. Also, the innovative clamping system demonstrates high repeatability and excellent rigidity for manufacturers aiming to part-off components with a maximum part-off diameter of 17mm.

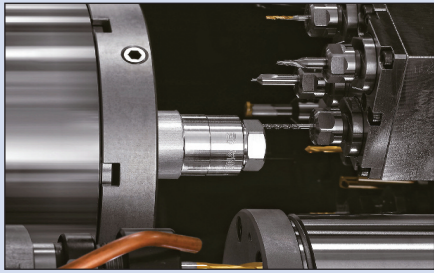
The ST-Cut Series encompasses everything from parting-off, groove-turn, square grooving, round grooving, threading, front and back-turning as well as face grooving. From the parting off-line, the ST-Cuts series incorporates both left and right-hand inserts with a cutting width from 0.5 to 2mm with a range of cutting depths, geometries and insert grades. Similarly, the square grooving/turn and round grooving line offers left and right-hand variants with insert widths from 0.5 to 3mm with the round groove inserts offering a choice of radii from 0.2, 0.5, 0.75, 1, 1.25 and 1.5mm. From a threading perspective, the left and right-hand inserts are supplied with a 55° and 60° profile option with a maximum insert width of up to 3.2mm.

The inserts are available in two grades, this includes the AlTiN PVD coated VPG grade for achieving medium to high cutting speeds on alloy steel, stainless and titanium alloys. Alongside this, the uncoated VS020 sub-micro grade is recommended for medium to low cutting speeds. The VS020 is uncoated to ensure a sharper cutting edge that is crucial for very small components where accuracy is paramount.

To cater for the diverse demands of small part turning companies, Vargus has introduced the ST-Cut Series with a choice of tool holders that include square shank tool holders, step square shank tool holders and square shanks with 90° tools. The square shank tools are available in both left and right-hand variants with an adjusting screw, key and torque limiting adapter.

**tooling.uk@vargustooling.co.uk**  
**www.vargusuk.co.uk**





## NEW MILL-TURN CENTRE PREPARED FOR AUTOMATION

Building on the strengths of previous generations of Miyano fixed-head mill-turn centres, the BNA-42SY is Citizen Machinery's latest addition to the range. The CNC lathe is the first BNA model to have a 12-station turret giving  $\pm 35$  mm of Y-axis movement, all tool positions now being live, and a new design that lends itself to easy automation.

Compared with current BNA models, machining efficiency has been upgraded by more powerful spindle motors, which are rated at 7.5/5.5 kW (15min/cont) for the 6,000 rpm main spindle and 5.5/3.7 kW for the 5,000 rpm sub spindle. Acceleration and deceleration are quicker on both spindles, improving productivity further by minimising idle times.

The machine's rigid bed, the weight of which has been greatly increased to 1,823 kg, brings thermal control advantages and more capacity to house a larger coolant tank. The base casting has been prepared with space at the right hand side for robotic load / unload equipment. If a user intends to take advantage of automation, the machine can be supplied with a swarf conveyor that exits to the rear as an option.

The automation may be employed solely for unloading components that have been mill-turned from bar stock up to 42 mm diameter, either directly from a spindle or via a parts catcher and conveyor. Alternatively, or in addition, it may load and unload billets or near net shape workpieces like castings or forgings up to 135 mm in diameter. A workpiece stocker is positioned at the right hand side of the machine to accommodate the finished components.

Mounting points have been included to provide an option to add an overhead gantry if only chucking is to be carried out, in which case a raw material stocker can be positioned to the left of the machine in place of the bar magazine. For complete flexibility in layout, top shutter and auto door options are offered.

At 285 mm, the turret's Z-axis travel has been increased by more than 20 percent, expanding the machining range of this compact, space-saving lathe. The turret and spindles are mounted on hand-scraped box slideways for improved rigidity and damping characteristics, leading to high metal removal rates, prolonging tool life and maintaining high accuracy.

[www.citizenmachinery.co.uk](http://www.citizenmachinery.co.uk)

## E4Q ENERGY CHAIN REDUCES ASSEMBLY TIME

For safe cable guidance in unsupported and long travels, igus has developed the E4Q energy chain. The bionically inspired design saves weight, while crossbars with locking tabs reduces the assembly time of the e-chain by 40 per cent. To facilitate assembly further, igus has launched a new interior separation system for the E4Q. Universal separators are placed on the chain crossbars, shelves can be inserted from the left or right, along either the inner or outer radius. A mechanism in the separators automatically locks the chain when closing.

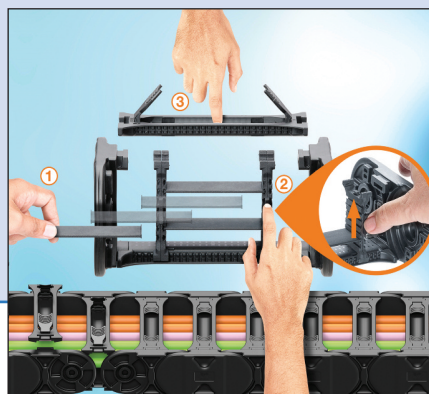
The separator and shelving system in the E4Q energy chain needed to be simple and easy to assemble. The result is an integrated energy supply system for unsupported and long travels that uses less material and is 10 per cent lighter than the previous E4.1 series energy chain, achieved through an organic bionically inspired design. In addition, it is more robust and tougher than its predecessor.

Uniquely, the chain can be opened and closed without tools with the help of a special crossbar feature, saving the assembly time by 40 per cent, a popular feature among users as well as the jury of the German Design Award 2021, where the E4Q won a prize for its pioneering design.

To populate the E4Q with cables even faster, igus has now developed a new flexible interior separation system in co-operation with its customers. The system consists of universal separators and lockable shelves, which keep cables separated on different layers. The cable-protecting separators have fixtures for inserting the shelves. To assemble the interior separation system, the separators are placed on the crossbars, then the shelves can be pushed into the required level from both sides.

An integrated slider allows the shelves to be locked in place so that they remain securely fitted even when the cable system accelerates quickly. "Even if the fitter has forgotten to secure the shelf, it's not a problem", explains Justin Leonard, e-chain director at igus. "When the crossbar is inserted, the lock is automatically activated. A foolproof and safe concept for all occasions." To modify the interior separation of the energy chain, the user simply opens the crossbar along the inner or outer radius, depending on the accessibility, then unlocks the shelf via the lateral slider and pulls it out. igus offers the new interior separation system for the four E4Q sizes in different widths.

[www.igus.co.uk](http://www.igus.co.uk)



## ETG HAS THE 3D SOLUTION FOR INVESTMENT CAST COMPANIES

Wellesbourne based Engineering Technology Group (ETG) has now introduced the latest addition to its remarkable range of additive manufacturing technology with the arrival of the ProJet® MJP 2500 IC from 3D Systems. Developed for investment casting professionals, the ProJet® MJP 2500 IC from the originator of 3D printing can produce RealWax™ patterns in a fraction of the time and cost compared to traditional pattern production.

Drawing on 3D Systems' deep expertise and unique workflow approach including software, hardware, materials and services, this digital foundry solution from ETG is designed to transform a centuries-old manufacturing process. This significantly reduces time and provides cost savings whilst creating new possibilities for the types of parts that can be cast. Typical production time for a 3D printed wax pattern is a few hours or less; no time or money is wasted on an injection moulding process for traditional pattern tools. Cost reductions for initial patterns can be significant when the cost of traditional injection mould tooling is taken into account. For example, in a cost comparison analysis conducted by Mueller Additive Manufacturing Solutions, a pattern tool for a mechanical cam can cost over £5000 while the 3D printed equivalent pattern cost less than £20 - with the only lead time being the short time to print the pattern.

An ideal solution for the production of metal cast components, the ProJet MJP 2500 IC is well suited to span production needs from the iterative initial design phase to bridge manufacturing and low volume production. Working in a digital workflow provides complete design freedom, enabling wax patterns to benefit from topology optimisation, light-weighting and part consolidation. Design files are prepared for 3D printing and managed with 3D Sprint™ software. The patterns are produced in VisiJet® M2 ICast, 100% wax material that delivers the same melt and burn-out characteristics of standard casting waxes and fits seamlessly into existing foundry protocols.

3D Systems' MultiJet Printing (MJP) technology enables smooth surface finishes, sharp edges and fine details with high fidelity and repeatability to hold tight tolerances. Design iterations and design optimisation for complex parts can now be done quickly and economically.

[www.engtechgroup.com](http://www.engtechgroup.com)

## HAINBUCH LAUNCHES SMALL ‘QUICK CHANGE’ INTERFACE

The Centrotex quick change-over interface from Hainbuch has set new standards since its market introduction and now, the proven system is available in a new version for smaller machine spindles. Recognised as the smallest available system on the market for setting up clamping devices in a matter of seconds, the quick change Centrotex S has a diameter of just 224mm.

The new Centrotex S is the perfect solution for eliminating non-productive downtime, set-up time and job changeover times that are often increased when access to a compact work envelope can be restrictive on operator movement and access. With its fast change-over system and compact design, the new Centrotex S eliminates excessive set-up times and it is the



## FANUC LAUNCHES ASSISTED REALITY SERVICE IN EUROPE

FANUC has launched its new digital service FAR (FANUC Assisted Reality) in the UK, which provides quicker response times for maintenance issues on FANUC products.

FAR is an app that uses augmented reality to facilitate remote support for FANUC customers. It allows service engineers to identify problems via real-time video and overlaid digital content, which ensures the correct spare parts and tools can be determined during the initial call. It also helps to improve the planning of service visits, owing to optimised error analysis.

Despite already boasting an unrivalled 28-hour average response time from initial call to machine repair, the introduction of FAR is anticipated to bring this down to less than 24-hours. It forms part of FANUC's commitment to providing 'lifetime maintenance', whereby customers can continue to receive support for as long as they are using the product.

Tom Bouchier, Managing Director at FANUC UK, comments: "We're thrilled to be launching FAR in the UK, particularly at a time when social distancing measures and travel restrictions are putting extra strain on manufacturers. While all of our machines are built to minimise downtime, there will always

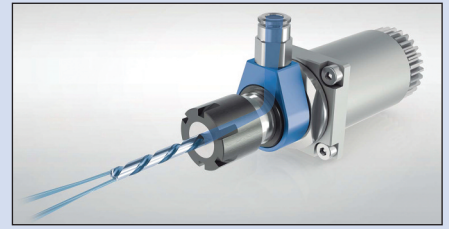
be the occasional issue, which is where this level of rapid support becomes invaluable.

With repeatability better than  $\leq 0.002\text{mm}$  on the interface without having to re-align, the latest addition to the Centrotex family of 'quick change' systems can also meet the most rigorous of industry requirements. The machine adaptor is mounted on the spindle and the clamping device is equipped with a counterpart adaptor that can be exchanged for another clamping device in less than a minute. This exciting new system makes long set-up times a thing of the past, providing end-users with a fast, efficient and user-friendly interface that significantly reduces non-cutting times.

The smallest Centrotex S incorporates the proven technology of the established Centrotex platform whilst demonstrating superior levels of convenience. The Centrotex S is actuated via just one radial locking screw and ergonomic operation has been significantly improved, thanks to the fewer rotations required to tighten and clamp the system. In addition, the Monteq changing fixture contributes to a faster clamping device set-up. The new Centrotex S is perfect for clamping parts typically up to 52mm diameter and is suitable for A2-5, A2-6, AP140 and AP170 spindle nose systems.

The compact design makes the new Centrotex S the ideal solution for small turning centres and machining centres where operator access can be a considerable challenge in a compact work area.

[www.hainbuch.com](http://www.hainbuch.com)



## FLOYD TURNS UP THE PRESSURE

Floyd Automatic Tooling has now added the new Precitronics TOHP Series of driven tooling with integrated high-pressure coolant feed to its portfolio. The exciting new TOHP system offers high-pressure through coolant delivery up to 135 bar for driven tools and applications on sliding head turning centres. The new system can drastically reduce cycle times, eliminate swarf issues, improve productivity and enhance surface finishes.

The new Precitronics TOHP extensive range of driven tooling is available for all makes of sliding head and fixed head machines fitted with a high-pressure coolant pump. Connecting the variety of live tooling configurations to the machine tool and the external high-pressure coolant pump is facilitated by a selection of high-quality ultra-compact quick-change connectors from the HEB range of locking and connecting plugs, flexible and rigid fluid distribution tubes, distribution blocks, connectors, adaptors etc., also available from Floyd Automatic to provide high-pressure coolant delivery to all your driven tooling stations.

In the work envelope, the Precitronics system is available for all spindle types with configurations such as ER, ER-A internal collets, CAPTO, KM, HSK, DIN, Weldon, MMT and ABS KOMET all covered. The flexibility of the Precitronics TOHP also extends to the drive connection that can connect to all types of tool connection. From a flexibility perspective, the Precitronics TOHP is offered with an astounding range of options to suit all machining applications. This includes an axial system, an axial offset, axial speeders, radial double output, radial 90-degree system, radial 90-degree speeder, fixed angle, radial adjustable, axial multiple spindles, radial multiple outputs, polygon maker, thread whirling, gear hobbing and radial Y-axis – all of which can be configured to your turning centre.

Capable of reducing cycle times by up to 30% by delivering high-pressure coolant directly to the cutting edge with through tool delivery, many of the systems also incorporate an additional coolant nozzle that simultaneously delivers cutting fluid to the shank of the tool as well as the cutting edge, significantly improving cooling and swarf evacuation. Furthermore, the various systems can provide cutting tool speeds from 8,000 to 16,000rpm for high-speed cutting, which is perfect for small cutting tools typically applied in the sliding head lathe environment.

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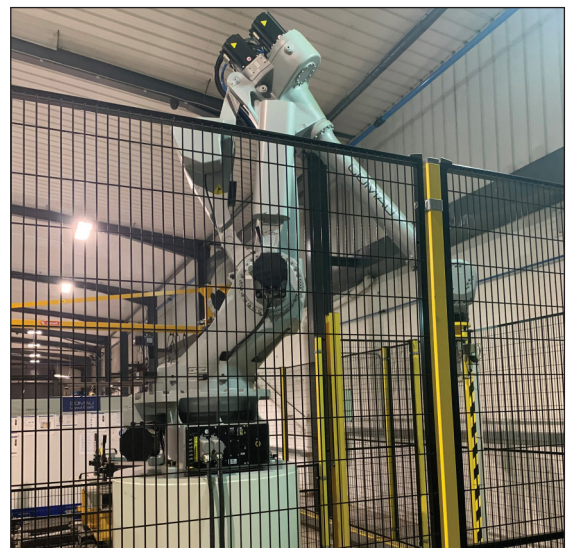
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