



PowerSHAPE 2014 includes new "design for manufacture" tools

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# Extra "design for manufacture" tools

The 2014 release of PowerSHAPE offers a range of new functionality for the conversion of product designs into tooling designs. Delcam's CAD software now provides an even more powerful set of easy-to-use tools to increase productivity through increased automation and improved workflow.

Full details, including video demonstrations of the new functionality and the option to download an evaluation version, are on <http://lz.powershape.com>

By offering a combination of modelling and reverse engineering functionality, PowerSHAPE provides the most comprehensive range of design techniques available in a single CAD program. Having all the different technologies in the same package reduces the need to transfer data between multiple programs and so streamlines the whole product development

process. At the same time, the combination of quick and easy direct modelling options, together with powerful and flexible surface modelling, makes PowerSHAPE the perfect choice for design for manufacture.

The Solid Doctor in PowerSHAPE has offered quick and easy repair of imported data from other CAD systems for many years. For the 2014 release, these capabilities have been enhanced with the addition of the Smart Feature Manager. PowerSHAPE can already recognise a variety of solid features within imported

"dumb" geometry, such as fillets, slots, bosses etc. The Smart Feature Manager allows users to identify all these features within a solid in a single operation and so makes the analysis of the imported data easier and faster.

The software includes a set of filters so that all the features that fulfil specific criteria can be identified within the model. For example, the Smart Feature Manager can find all the holes having the same, specified diameter, or those having radii between two values. Similarly, if a single feature is selected, all similar features can be identified with a single click.

Once the particular group has been isolated, all the features within it can be suppressed or deleted simultaneously. Creating groups of similar features also makes it easier to manage the feature tree.

One common problem for tooling designers is finding fillets that are too small for successful filling of the mould. The Smart Feature Manager can be used to identify all the fillets having radii less than a particular size so that they can be modified to more suitable values.

Continued on page 2



**P3**  
**Enhanced electrode solution**  
Latest enhancements to integrated solution for electrodes



**P6**  
**The supplier of choice**  
How to combine rapid lead times, high quality and value

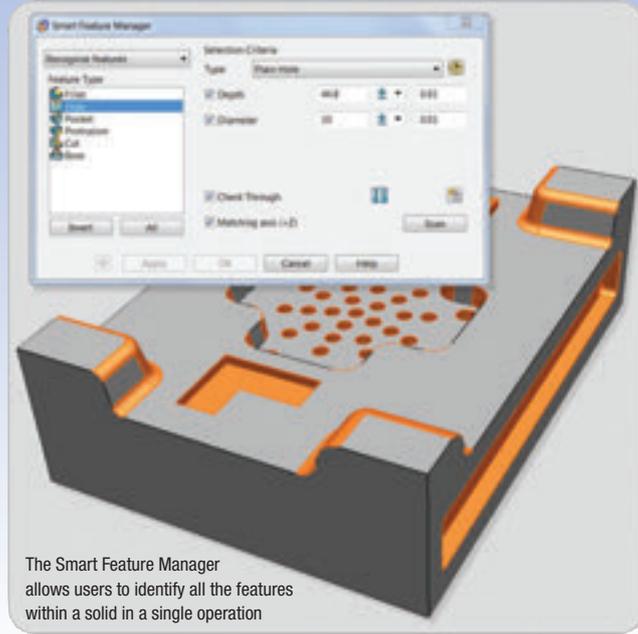


**P8**  
**Combining speed and safety**  
Outstanding speed and reliability from FeatureCAM

## Extra “design for manufacture” tools

Continued from page 1

When creating fillets, two new types of solid fillet have been added to the range of options in PowerSHAPE. Constant-width fillets create a blend based on a nominal radius when the distance between two edges remains fixed. Curvature-continuous fillets create a smooth blend between the selected edges. They have curved cross-sections, with the radius of the curve varying continuously to match the curvature of the underlying faces.



The Smart Feature Manager allows users to identify all the features within a solid in a single operation

Another common requirement for tooling design is adding draft surfaces and split surfaces to the model. These modifications and similar repetitive tasks have been made simpler through the addition of “Apply” buttons to all the surface-creation dialogs that allow multiple operations or operations on multiple surfaces without leaving the form. Clicking the right mouse button has the same effect as pressing “Apply”, which further speeds up repetitive operations.



The core/cavity splitting wizard has been made faster and more effective

The core/cavity separation wizard in PowerSHAPE has been a key option for toolmakers for many years. This functionality has been rewritten to make it even faster and more effective. It divides the solid model into core and cavity pieces that can then be separated dynamically using a simple slider.

Any ambiguous faces can be assigned to the appropriate side, while any regions where slides or lifters might be required can be allocated to a completely new line of draw. If required, individual faces can be split and then attached to the correct part of the tool.

Throughout the process, clear graphical feedback, including undercut shading, highlights any potential moulding issues arising from the design so these can be corrected at an early stage in the mould design process.

Another useful addition is a new “solid extrusion” tool that allows solids to be created from multiple nested curves in a single operation. Any inner curves are extracted automatically from the solids to give hollow shapes. This option is ideal for creating embossed text, such as part numbers or product names, and similar complex-shaped features.

# 13<sup>th</sup> year as CAM software leader

The latest NC Software Market Analysis Report from leading US analysts CIMdata shows that, in 2012, Delcam again had the highest vendor revenues and received the highest end-user payments of all the CAM-centric companies. This means that the company has completed thirteen years as the world’s leading specialist supplier of CAM software and services.

**CIMdata found that Delcam continues to increase its market share.** The company’s share of vendor revenues grew from just over 7% in 2011 to 7.3% in 2012. A further increase in market share to over 7.5% is predicted by CIMdata for Delcam in 2013.

The CIMdata report also confirmed that Delcam has the largest organisation in the CAM industry, employing 671 people, by far the largest

number of staff devoted to CAM software in any company. No other company employs more than 300 people for its CAM activities.

The Delcam staff total includes the largest development team in the industry, with 210 people working on the company’s manufacturing software. The next highest CAM development team comprises 130 people, less than two-thirds of the Delcam total.

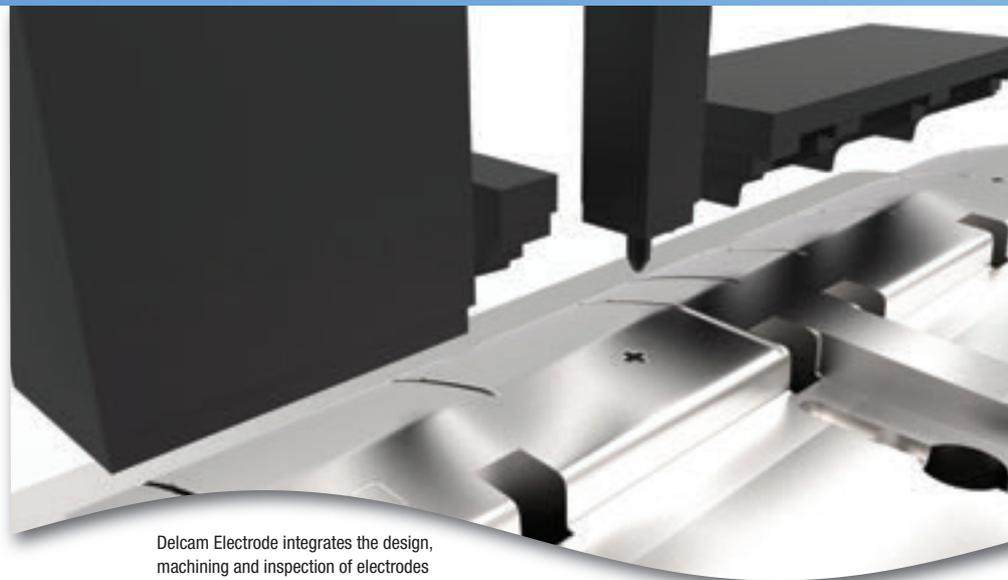
Furthermore, Delcam is adding a total of 30 graduates and undergraduates to the staff at its Birmingham headquarters, a record number of recruits for the company’s annual summer intake. The extra staff are being added across the company in software development, engineering support and marketing.

Some of the 30 new recruits being added to the staff at Delcam’s Birmingham headquarters



A range of enhancements have been added to the Delcam Electrode integrated solution for the design, machining and inspection of electrodes. The new version includes support for burn-vector electrodes, automated machining of electrode frames, batch processing of multiple machining projects and faster generation of electrode drawings.

Full details are available on the website – [www.delcam-electrode.com](http://www.delcam-electrode.com)



Delcam Electrode integrates the design, machining and inspection of electrodes

# Enhanced electrode solution

## Burn-vector or side-sparking electrodes

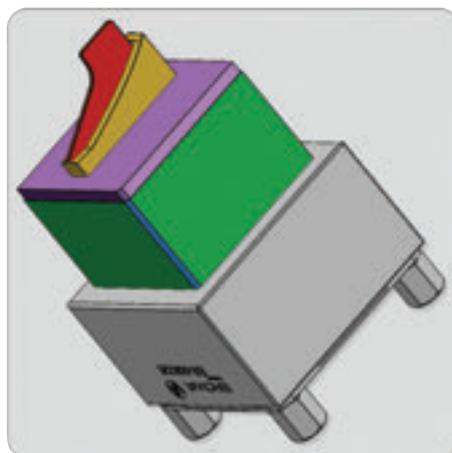
are used to spark undercuts within moulds, including those needed for submarine gates, or to avoid any possibility of a collision when sparking the base of a deep rib or similar feature. They use an arbitrary axis for their operation, rather than being aligned with the principal axes. Delcam Electrode now allows these electrodes to be designed and used with the same quick and easy wizard-based process available for conventional electrodes. The electrode action can be simulated in the software and the final design passed to PowerMILL for machining in the same way as standard electrodes.

Electrode frames are used to provide the basis for machining and inspection datums. Delcam Electrode now allows these areas to be modelled and then coloured separately from the electrode blank. This makes it easy for them to be identified in PowerMILL for automated manufacture using a specific template. The burn region, extension faces and clearance faces were already able to be displayed and machined with separate colours in this way.

The ability to automate programming within the electrode solution does save considerable time for the user. However, when machining a large number of electrodes, it is inefficient to wait for toolpaths to be calculated on each individual project. To overcome this problem, the option to use batch processing of multiple projects has been introduced within the electrode-machining wizard.

The user now simply allocates one machining template to a series of electrodes if the designs are similar, or applies the appropriate template to each example if they differ significantly in size or style. Processing the toolpaths starts as soon as the first project is loaded. Subsequent projects are displayed in a list, with calculations beginning on the next item in the list automatically.

At any stage, the user can move items up and down the list, depending on the urgency of the various tasks. If the calculations for a particular



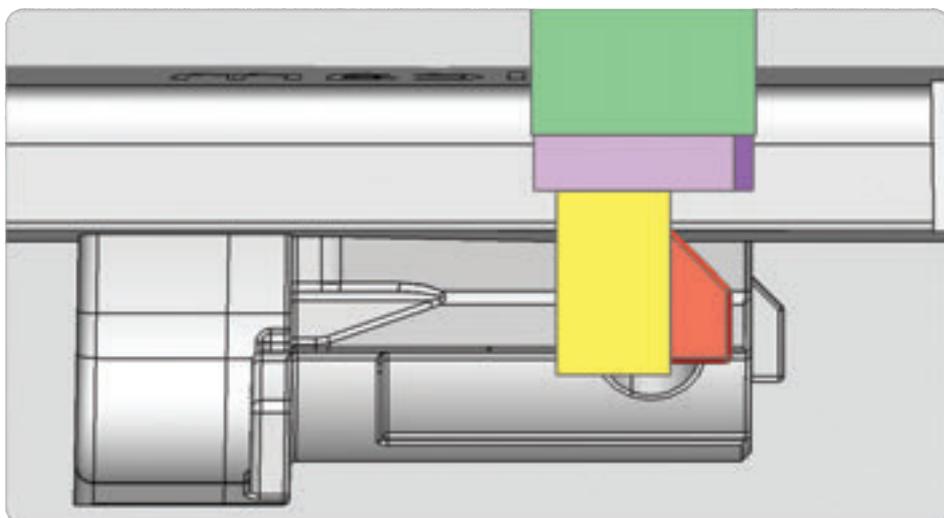
Electrode frames can be coloured for automatic machining in PowerMILL

electrode cannot be completed, for example, if the software detects a collision, the problem is recorded and PowerMILL moves on to the next item automatically. Thus, a long series of calculations can be left to run overnight if necessary. Alternatively, the complete series of projects can be collected into a folder and

moved to a second computer for calculation, while the user carries on with other tasks on their main computer.

The ability to generate customised drawings automatically is another important benefit of the electrode solution. This has been enhanced so that information generated while the user progresses through the electrode-design wizard, such as the project name or the different spark gaps to be applied, is used to fill in details for the drawings immediately. Generation of the drawings when the design is complete becomes much faster as a result.

Delcam Electrode also benefits from a number of options introduced into PowerSHAPE, which provides the CAD element of the overall solution. All of the recent direct modelling enhancements to PowerSHAPE help to speed the creation of the electrode design. Of particular benefit are the "replace-face" command, which ensures extensions are at the same height when merging electrodes to be machined from a single blank, and the "solid-split command", which makes it easier to divide unwanted material away from the electrode to create a simpler shape for machining.

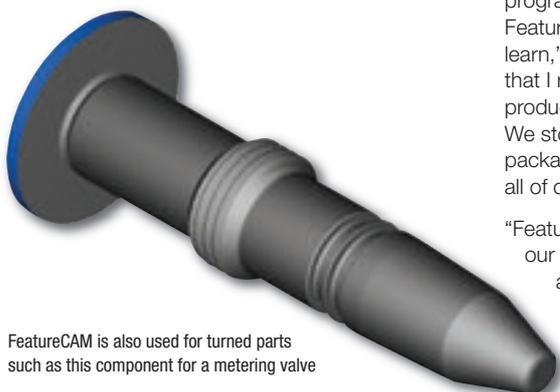


The manufacture and use of burn-vector electrodes is now supported

# Programming times cut from days to minutes

Blue-White Industries has reduced the time required to program custom products substantially by using the feature-recognition capabilities of FeatureCAM to largely automate the programming process. In the past, programming parts for custom products took about two days each because programmers had to define and create toolpaths individually for each feature.

**“When our engineers modify a part design,** FeatureCAM automatically recognises any changes to the geometry and updates the existing toolpaths,” said Darrell Freeman, CNC Coordinator for Blue-White Industries. “This reduces the time required for programming for a new design to an average of fifteen minutes. Even programming packages that are much more expensive cannot do what FeatureCAM can do.”



FeatureCAM is also used for turned parts such as this component for a metering valve

Founded in 1957, Blue-White Industries is a leading manufacturer of metering pumps, flow-meters and water treatment accessories. One of the keys to the company's success is building custom-designed products to fit customers' specific needs on a fast-turnaround basis.

Blue-White Industries produces its pumps in its Huntington Beach, California, manufacturing facility using Mori-Seiki turning centres, and Mori-Seiki, Mazak and Fadal machining centres. The company's experienced engineers use SolidWorks CAD software to modify the existing product designs quickly to meet customers' special requirements.

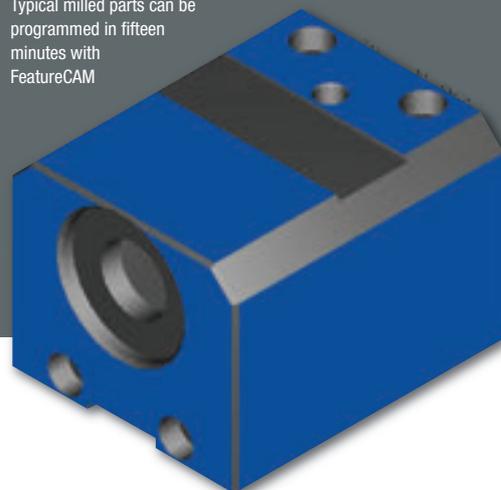
“By the time the custom product is designed, it is typically already very close to the time it needs to be delivered to the customer,” said Mr. Freeman. “The CNC software we used in the past caused major delays because it would not recognise the geometry or features of our SolidWorks models.”

Another problem Mr. Freeman found with the company's previous programming software was limited technical support. “We sometimes needed to have a custom post written to meet our specific requirements,” he remembered. “We found that our previous CNC programming software supplier was unable to deliver new posts on a timely basis.”

Mr. Freeman reviewed more than ten programming packages before selecting FeatureCAM. “FeatureCAM was very easy to learn,” he said. “The program is so intuitive that I received the software on day one and produced our first CNC code on day two. We stopped using our previous software package and began using FeatureCAM for all of our work on the same day.”

“FeatureCAM has substantially streamlined our programming process,” Mr. Freeman added. “When we modify the geometry of a part that has already been programmed, we simply import the new geometry into FeatureCAM and associate it with the existing part program. The software recognises the features and geometry

Typical milled parts can be programmed in fifteen minutes with FeatureCAM

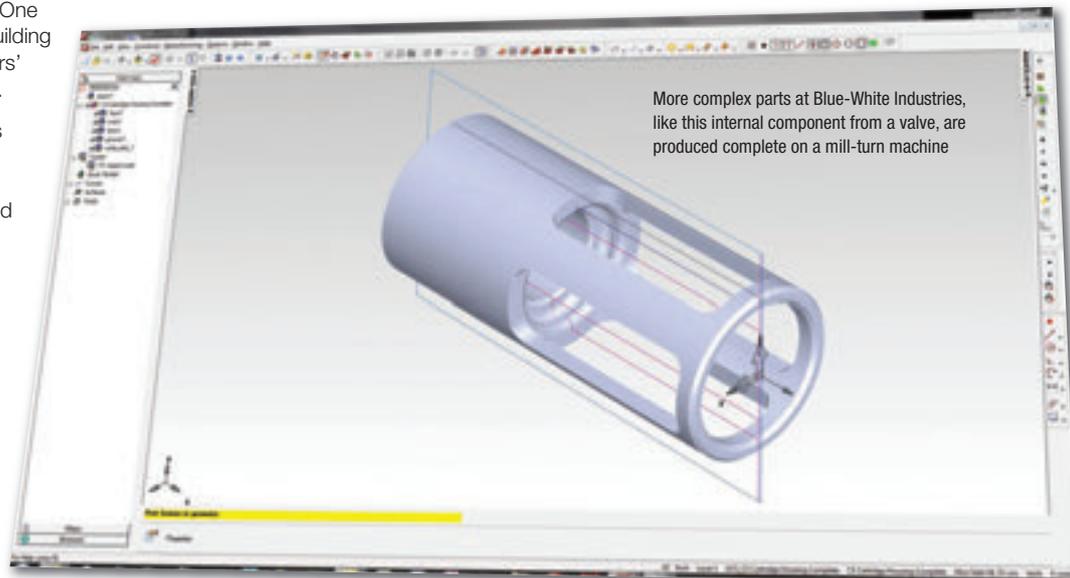


of the new model automatically and associates them with the existing toolpaths. In most cases, there is no need to change the strategies so we simply check the modified toolpaths to make sure they are correct and run the post to generate the new program. The entire process takes only about fifteen minutes.”

FeatureCAM also provides the ability to evaluate features in new designs and recommend toolpaths automatically. “Nine times out of ten the toolpaths recommended by the software are correct, plus it is easy to edit the remainder to get exactly what we want,” Mr. Freeman said.

“The technical support provided by FeatureCAM is far superior to our previous supplier,” Mr. Freeman added. “For example, if I need a post that provides a special feature, I can send the details to Delcam in the morning and have my new post back in the afternoon.”

**“When our engineers modify a part design, FeatureCAM automatically recognises any changes to the geometry and updates the existing toolpaths.”**



More complex parts at Blue-White Industries, like this internal component from a valve, are produced complete on a mill-turn machine

# Making good even better

German toolmaker Lahnwerk GmbH has invested in new high-speed mills and five-axis machining centres plus PowerMILL. The outcome has been greatly improved surface quality and reduced processing times.

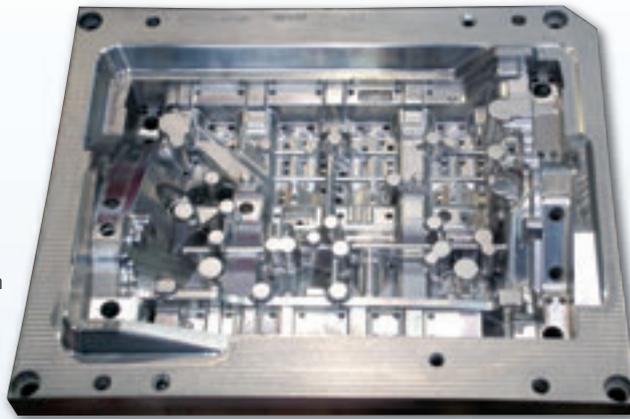
**Lahnwerk, which employs 140 staff in** Hessian Biedenkopf, specialises in the design and production of casting equipment, including patterns, dies and moulds, predominantly for cast metal components for cars and utility vehicles. Since its establishment over 60 years ago, the company has developed into a full-service provider with a continuous process chain from 3D design right through to production, assembly and sampling in-house. The milling area alone encompasses 25 CNC machines, including the latest C40 and C50 five-axis machines from Hermle, plus a three-axis RXP 1200, HSK63F from Röders.

Twenty-three engineers design the casting equipment in 3D, using CATIA, Creo Elements and NX software. Programming takes place both in the office and on CAM workstations located directly adjacent to the machines. "NC programming by our highly-trained machine operators in close proximity to the machines gives us the maximum flexibility," explained Burkhard Dersch, Operations Manager at Lahnwerk.

"The decision to start using a new CAM system was not an easy one for us," conceded Mr. Dersch. "However, the results are extremely impressive and we are therefore delighted that we are programming the new machines with PowerMILL. The parts that our customers produce are becoming increasingly challenging. This has an effect not only on the tool construction but also on the complexity of the moulding surfaces. Today, we mill extremely complex surface forms in a time and to a quality that we would never have dreamed of previously."

The machine-tool suppliers influenced the choice of CAM system, explained Mr. Dersch. "At Röders in Soltau, the high-speed machining demonstrations were programmed with PowerMILL and produced a surface quality that truly impressed us," he remembered. The decision in favour of the Delcam software was reinforced by the move to five-axis machining because a recommendation to use Delcam also came from Hermle.

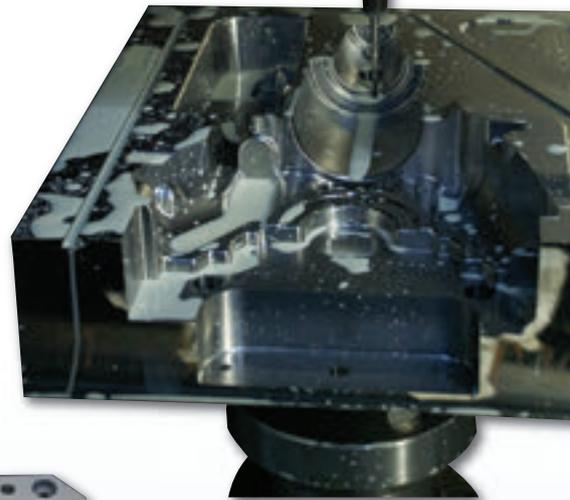
Wolfgang Autschbach, Founder and Managing Director of Aura Frästechnik GmbH, also supported the choice of PowerMILL for high-end



More challenging parts from its customers mean more complex surfaces in the tools

milling. Aura, based in nearby Breidenbach, specialises in the production and sale of high-quality milling tools, drills and clamping devices for the construction of tools and moulds, which are used at Lahnwerk. The company tests its

PowerMILL is used to program the new high-speed and five-axis equipment at Lahnwerk



**Today, we mill extremely complex surface forms in a time and to a quality that we would never have dreamed of previously.**

tools in an in-house milling laboratory, using Röders machines programmed with PowerMILL, testing its tools to the limit of their performance capability before delivering them to the customer.

On top of the benefits of five-axis machining, Daniel Werner, Head of Mechanical Production at Lahnwerk, has been impressed with the ability of PowerMILL to handle very large file sizes. These can grow to the two-digit gigabyte range when working with complex surfaces, yet the Delcam software processes them without difficulty.

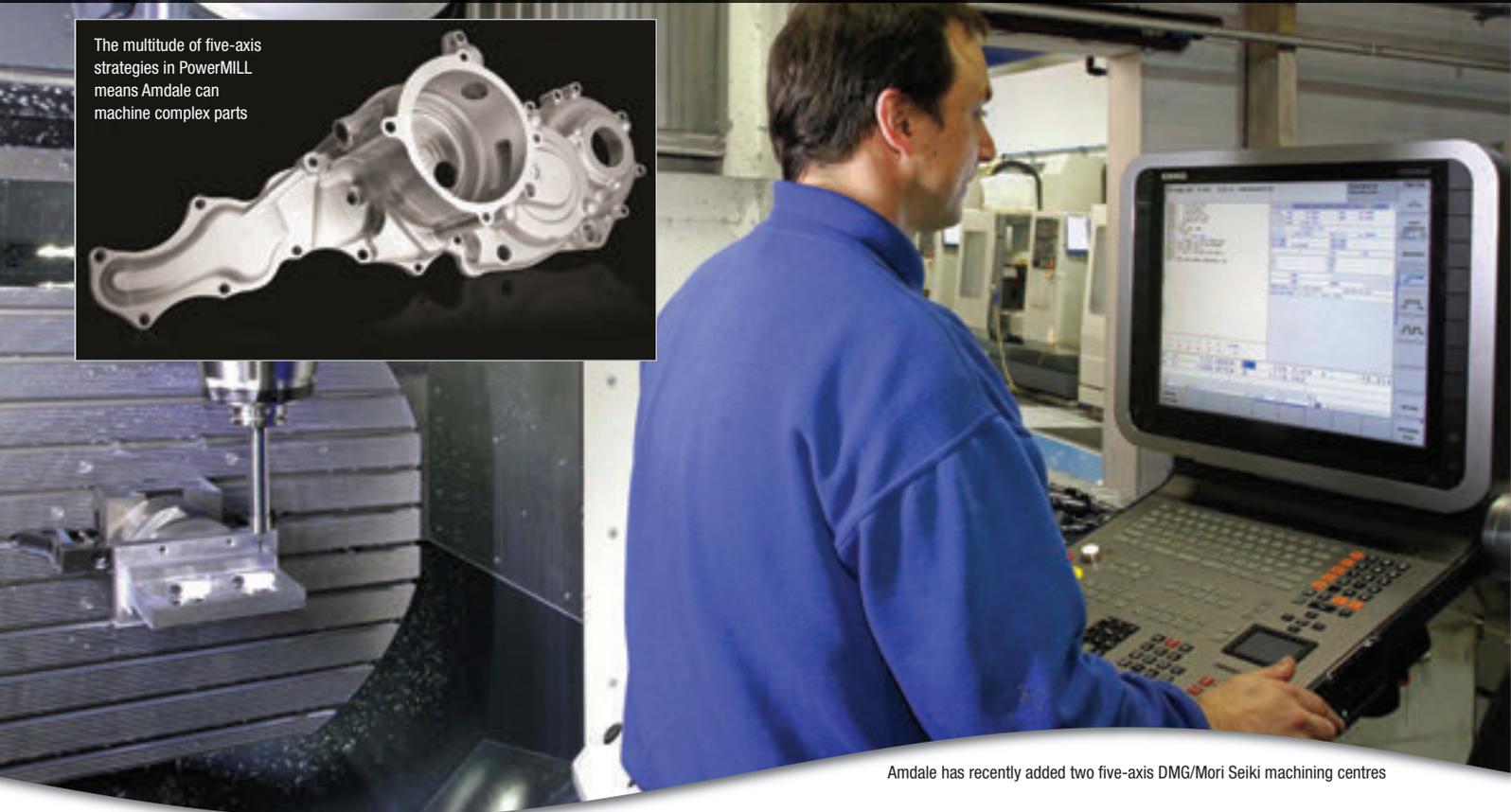
Less spectacular, yet equally vital to the everyday production processes at Lahnwerk, are the drilling operations. PowerMILL supports fully simultaneous five-axis drilling, which Lahnwerk would now never wish to be without. "With just a few clicks, I can recognise the drill holes and can start programming immediately," Daniel Werner explained.



Burkhard Dersch, Operations Manager at Lahnwerk, is delighted with the results from PowerMILL

# The supplier of choice

The multitude of five-axis strategies in PowerMILL means Amdale can machine complex parts



Amdale has recently added two five-axis DMG/Mori Seiki machining centres

Using Delcam's CAD, CAM and inspection software helps precision engineering company, Amdale, to combine rapid lead times, high quality and competitive value with engineering excellence in order to be its customers' supplier of choice.

**Amdale, a family-owned business formed** in Portsmouth in 1988 to provide an EDM wire-erosion facility with round-the-clock manufacturing and engineering support, is currently progressing through a five-year expansion and diversification plan. The company increased its five-axis machining capacity with the addition of two new DMG/Mori Seiki machining centres earlier this year, following a factory extension to 7,700 sq ft last year.

Amdale is heavily involved in manufacturing development parts for 1.6 litre turbocharged V6 engines, which will take over from the current 2.4 litre V8 engines at the start of the 2014 F1 season. The company is also working on mechanical kinetic energy recovery systems (KERS) and on the development of a high-performance electric car.

Medical is currently the second-biggest sector serviced, with spinal implants and surgical instruments for hip and knee replacement being two typical jobs. The manufacture of tooling to produce aluminium foil containers for ready-

meals is another area of specialisation, while contracts are also undertaken for the oil and gas industry. A wide range of materials are machined, from aluminium through phosphor-bronze to titanium and nickel alloys.

Amdale purchased its first Delcam software around fifteen years ago and now operates two seats of PowerSHAPE, two of PowerMILL and one of PowerINSPECT to support its range of five-axis machines.

"After evaluating numerous CAD/CAM packages we opted for Delcam because of the quality of the finish produced on our sample components," remembered Nathan Cheung. "We were also impressed with the pre/after-sales care, the fact the product is tested in a real-life environment in Delcam's own machine shop and the reinvestment into development that ensures the software is at the leading edge of the CAD/CAM sector."

The software has proved to be a good decision. "The first benefit is that we have no data translation problems between receiving customer data and progressing through programming, machining and inspection," reported Mr. Cheung. "Once the data is imported, we can quickly prepare parts for manufacturing, and develop tooling and workholding designs in PowerSHAPE."

"The time in which highly detailed parts can be programmed through PowerMILL is also important, plus the multitude of five-axis strategies available means you never get a part of the job you just cannot physically machine," he added.

"Similarly, the PowerINSPECT interface enables parts to be programmed for inspection fairly rapidly and simply."

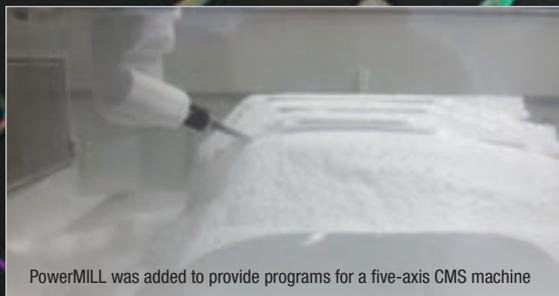
Speed of programming and machining is essential to meet the rapid turnaround times demanded by F1 customers during the race season. High accuracy is also important, both to maximise power and to give reliability in the engines.

The recent investments at Amdale underline its commitment to the latest precision engineering technology. It was an early adopter of five-axis simultaneous and positional machining, having installed its first model back in 2002. The company continues to thrive on challenging projects that have built it a reputation within the industry for its expertise in completing demanding and complex machining projects.



Amdale prides itself on the high precision given with its Delcam software

# Climbing the walls



PowerMILL was added to provide programs for a five-axis CMS machine

Walltopia is a world-leading manufacturer of climbing walls

The production of climbing walls may be one of the most unusual applications for PowerMILL. However, the reason for the choice of software by manufacturer Walltopia was one of the most common; a desire to maximise the productivity of a new five-axis machine tool.

Walltopia was founded in Bulgaria by two climbers in 1996 as a manufacturer of artificial climbing walls and climbing holds. Today, the company has completed projects in 42 countries on six continents. In addition to its head office in Bulgaria, Walltopia has offices in the USA, Canada, Austria, UK, Germany, the Netherlands and Russia. Among its customers are gyms, schools, shopping centres, kindergartens, amusement and water parks, recreation and entertainment facilities, hotels, trade centres, and military, police and fire-brigade departments.

Walltopia is an official partner of the Climbing Wall Association, Climbing Wall Manufacturers Association, International Federation of Sports Climbing, World Waterpark Association and International Association of Amusement Parks and Attractions.

Innovation has always been, and continues to be, the driving force at Walltopia. The company employs more than 300 professionals in departments covering design, engineering, sales, marketing, accounting, logistics and installation, to support its customers during every stage of the project. It offers not only the largest and most complete range of climbing wall surfaces available in the world today but it also delivers complete solutions for customers' facilities and business: from project design to wall assembly, route setting and staff training.

All manufacturing is done at Walltopia's brand-new 8,000 sq m. production facility, the largest climbing factory in the world. On the site, the company has built some of the world's largest climbing gyms with climbing surfaces over 2,700 sq m.

Walltopia purchased PowerMILL at the end of May 2012, in order to generate programs for its CMS ARES five-axis milling centre that had been purchased to machine larger parts and patterns.

After a very short installation period, the full capabilities of the machine could be used. This enabled the manufacture of a new Walltopia product, the Space Boulder, which was launched at the prestigious international Outdoor Show exhibition in July in Friedrichshafen, Germany.

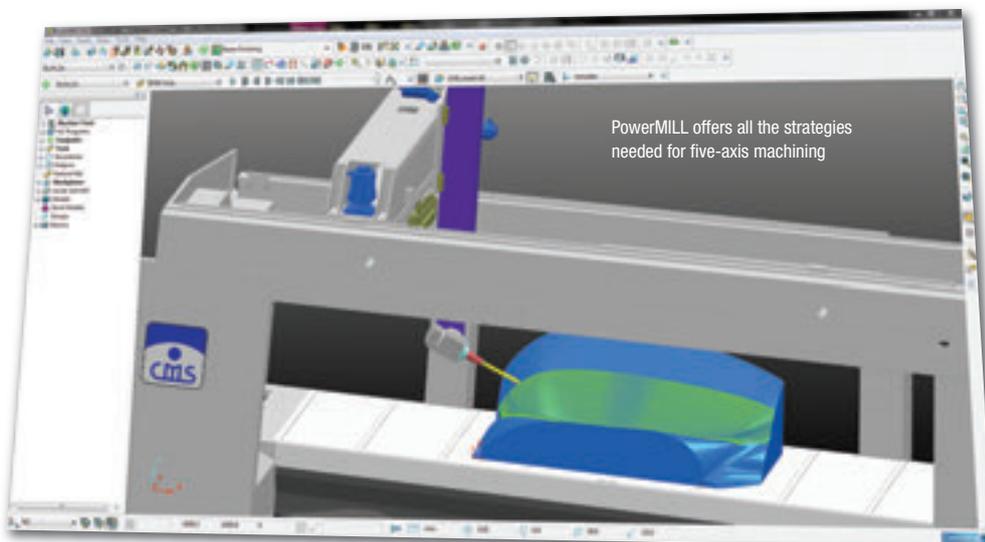
Ivaylo Penchev, Co-owner and General Manager of Walltopia, explained the reasons for choosing the Delcam software solution and the benefits from its implementation: "Being a global leader in the innovation and manufacture of climbing walls, Walltopia likes to work with the most innovative and competitive companies. In the CAM world, that means Delcam. We chose PowerMILL because it provides a friendly interface, and safe and highly efficient programs. It gives us all the possible strategies we need for five-axis machining."

As well as allowing Walltopia to use all of the capabilities of its five-axis CMS machine, the

software makes it possible to automate the production process and shorten the programming time by using templates and macro programming to generate toolpaths. In particular, specialised strategies for disk cutting have boosted productivity by replacing the previous manual approach.

The local Delcam representative, DiTra Ltd., covered all of Walltopia's requirements and proved once again that it is a constantly innovative company. "We found DiTra to be a significant, energetic, helpful and ambitious business partner," commented Mr. Penchev. "We are keen on working with the staff there in the future."

Both Walltopia and DiTra were given awards by the President of Bulgaria at the 8th National Innovation Forum, recognising them as being among the most innovative companies in Bulgaria for 2012.



PowerMILL offers all the strategies needed for five-axis machining

# Combining speed and

Achieving the right balance between speed and safety is essential for everyone associated with motor racing, and not just on the track. Hogan's Racing Manifolds is able to achieve an outstanding level of speed and reliability when machining its parts thanks to its FeatureCAM software. To see how, go to [www.delcam.tv/hogan](http://www.delcam.tv/hogan)

**Hogan's Racing Manifolds is a family firm** with a thirty-eight year history of successful manifold manufacture. It operates out of a state-of-the-art facility in Santa Maria, California, designing and manufacturing custom intake manifolds for a variety of applications in the automotive industry, including drag racing and street cars.

Tyler Hogan, President of Hogan's Racing Manifolds, is passionate about his industry, claiming that "there is nothing like the rush of launching a dragster and going that quick." However, he is conscious of the need for

precision and reliability in producing components to ensure safety in his racing manifolds.

As everything is custom-built to order, speed and simplicity of design and machining are of optimum importance to Hogan's Racing Manifolds. In this fast-paced environment, the company is always working to a tight



With FeatureCAM, Tyler Hogan feels safe getting into his dragster

deadline, which is why FeatureCAM's speed of programming is so important. Mr. Hogan explained that, when he first used FeatureCAM, he could design, program and make a part within "a couple of days". "That's not an exaggeration, that's really how it was," he remembered.

Using FeatureCAM has also allowed his business to machine parts he was not able to tackle before thanks to the toolpath simulation capabilities. "FeatureCAM is really quick at programming and then you can test the results

**In this fast-paced environment, the company is always working to a tight deadline, which is why FeatureCAM's speed of programming is so important.**



Hogan's Racing Manifolds produces manifolds for drag racing and street cars

just as quickly on the computer to see what works and what doesn't work," he explained. "This means we don't have to waste time, effort and materials testing on the machine."

# Impossible becomes easy

Micron Manufacturing has found that PartMaker has given the company the competitive advantage that it needs. "We are now able to machine parts easily that are almost impossible to do by hand," claimed Manufacturing Engineer, Pete Vellenga.



With PartMaker, Micron Manufacturing can take on more complex parts

**Based in Grand Rapids, Michigan, Micron Manufacturing** is a family-run business which has been handed down through generations, working on an ethos of holding long-standing

relationships and going beyond simply satisfying its customers. Micron prides itself on being able to produce parts of all sizes and complexities, and puts all its efforts into giving customers

what they want, when they want it, how they want it. Its lean manufacturing practices were recognised with the presentation of a Shingo Silver Medallion Award in 2008.

"The goal at Micron Manufacturing is to get away from the easy stuff that everyone can do and move toward the higher end, getting us to the next level to make us a great company," Mr. Vellenga explained. With help from PartMaker, the team at Micron Manufacturing have got machining complex parts "down almost to a science."

The range of equipment at Micron Manufacturing includes the largest Citizen machine available, the Citizen L-32. This machine has five stick tools, turning tools, four live tools and four back-working tools. "Writing the code to produce these parts is almost impossible by hand, but with PartMaker, it's easy," claimed Mr. Vellenga. "You can simulate the part in PartMaker and see what's going to happen before you've even put it in the machine. That saves us a lot of time."

Micron Manufacturing also appreciates the training and support that it has been given. "After our week's training with PartMaker, we were able to get back and start programming straight away," said Mr. Vellenga. "On occasions when we have needed support, I've not ever waited more than 24 hours for a response from anyone at PartMaker. We're never left out there on our own; we've always had help."

# safety

Mr. Hogan praises Delcam for its support team, recommending them as "top notch". "When I have a problem, I can send them the programs that I have created, they will tell me where I went wrong, correct it and then send me back the corrected file. They don't get annoyed at me, which other support people have done."

"The main reason I recommend FeatureCAM is because I feel safe getting into the car. I can focus completely on the task in hand. I don't have things going on in the back of my head "Is this right?": "Is that right?" I just think "Go!"".

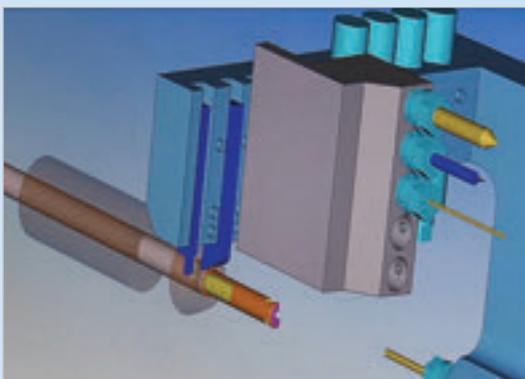


Speed and simplicity of machining are of optimum importance to Hogan's Racing Manifolds

In a highly competitive industry, it is essential that Micron remains ahead of its competition. "We have to get ahead of our competitors and stay ahead of them," Mr. Vellenga explained. "PartMaker gives us the competitive advantage that we need."

"Our customers are very happy; they always come back. Adding PartMaker software has made it possible for our customers to be able to send us more of their complex parts that they couldn't send us before. Whether it is a standard part or a complex piece, we don't shy away from a challenge. Our goal here is to go after the more difficult work and PartMaker is the thing that makes that possible for us."

PartMaker allows Micron Manufacturing to simulate parts on the computer before moving to the machine



The flexibility of Delcam's software has played an important role in the rapid growth of Base Patterns. Since the company's formation in 2010, Base Patterns has established a successful business supplying models, patterns, fixtures and tooling to various advanced engineering sectors, including aerospace, automotive and motorsport.

# Flexibility brings success



PowerSHAPE was used to model a key component for Base Group's exhibition stand at the 2012 Composites Engineering show

**Base Patterns is a part of Base Group,** which was founded by John Miller and consists of several manufacturing companies providing chemicals and materials for advanced composite applications. Over the past three years, Base Group has successfully implemented an ambitious development programme to provide high-performance model and tooling boards, pre-impregnated fabrics, surface coatings and custom-formulated resin systems, supported by a design and manufacturing facility utilising the latest high-speed milling technology.

Base Group is the only company worldwide that controls the entire manufacturing cycle from polymer to 3D machined prototype, model, pattern, jigs and subassemblies. This has delivered exceptional results in the domestic market with growth in excess of 35% in 2012.

During the same period, Base Group has also expanded its overseas activities, resulting in a 20% contribution from international markets. This is an exciting time in the evolution of Base Group. With its sights firmly set on the future, it is developing several innovative technologies that will enhance the customer experience and shape the future of composites.



As a key strategic international partner, Delcam is able to support Base Group's business needs through a variety of software. Comprehensive technical support further supports the long-term vision for the Group.

Tony Wilcox, Project Manager at Base Patterns, recognised the benefits of using the software range developed by Delcam stating, "this is the heart of the operation and delivers a seamless transition from initial CAD through to final inspection."

"By utilising PowerSHAPE and PowerMILL, we are able to meet the design needs of our clients and convert them into a three-dimensional form," he claimed. "We can provide our clients with faster response times and shortened lead times and, in doing so, exceed our customers' expectations."

# Project management for footwear manufacture



Delcam CRISPIN has launched project management and collaboration software for the footwear industry called ShoeCloud. ShoeCloud enables more efficient management of design and manufacturing data throughout the development of new shoe designs, either within a single company or along a supply chain. It also makes decision making more productive by giving the right information to the right people at the right time.

**ShoeCloud can be integrated within the** CRISPIN range of software for 3D footwear design and manufacture. Alternatively, for staff not directly involved in design and manufacturing, such as management or marketing departments, ShoeCloud data can be accessed through standard Web browsers and e-mail. This versatility allows ShoeCloud to speed and streamline communications at all levels, and so leads to quicker introduction of new designs.

ShoeCloud is expected to be of most benefit to organisations that undertake design in North America or Europe and manufacturing in Asia. By enabling easier and faster exchange of data between the two regions, detailed project management will be possible with a significant reduction in the time and cost of international travel.

ShoeCloud can store all project data in any format but works best with the CRISPIN.Shoe format. This format contains the information required for every aspect of design and manufacturing, from the generation of the initial design through to mass production, so there is no need to manage multiple file types. It makes data management and project planning much simpler, as well as giving greater confidence that the designer's original intent is captured in the finished footwear. For staff who do not use any CRISPIN software, designs of complete shoes, or of components such as patterns and soles, can be viewed as .jpg images or 3D pdf files.

Each change to the overall design, or to a single element, is stored within ShoeCloud to give a complete revision history showing who has generated the data and when. Revision authority can be allocated as required, with staff not authorised to make changes themselves able to record comments. Designs are locked automatically when they are removed from the vault to prevent conflicts if more than one person tries to change the design simultaneously.

Once any project has been started within ShoeCloud, tasks can be assigned to one or more team members, who receive an e-mail notification with information on what they need to do and the deadline for their part of the project. The whole team can see a full record of the project to date, together with the tasks that are scheduled for them and for the other team members. Managers can track the progress of each project and the level of activity that is scheduled for each team member.

This comprehensive access to project data ensures that every person involved in the project group has all the information they need in order to set their individual priorities and to participate in collective decision-making. It also enables each person involved in a project to track exactly who is expected to do any specific task, together with both when it is due to be completed and when it is actually finished.

All workflow is recorded as the project progresses. Thus, as ShoeCloud is used, a knowledge base is created with the full history of all projects undertaken to date. For any project, details can be tracked of all communications, with a full record kept of all instructions given and information supplied, together with a history of who approved what and when.

All design changes are recorded as the project progresses

This database can be searched to provide background information when starting a new project related to, or similar to, any previous contracts, for example designs already produced for a particular customer. As well as helping in project planning and team management, this in-depth recording also allows ShoeCloud to be used to maintain quality standards.

As a result of all the continuous communication, the number of formal meetings between footwear design and manufacturing teams can be reduced. Actions from the meetings that are held can be logged within ShoeCloud and the people responsible e-mailed with details to ensure that they are aware of the decisions made, the work that needs to be done and the scheduled completion dates.

Most importantly, ShoeCloud allows the work that needs to be progressed most urgently to be highlighted for immediate action. Everyone involved in the project knows exactly what tasks they are supposed to be doing and in which order of priority, so there is less chance of them being sidetracked into less important work.



# Making more complex parts

Switching from manual programming to programming with PartMaker has allowed Clippard Minimatics to produce more complex parts than ever before, even though the company has been making its miniature fluid-power devices for more than fifty years. For the full story, go to [www.delcam.tv/clippard](http://www.delcam.tv/clippard)

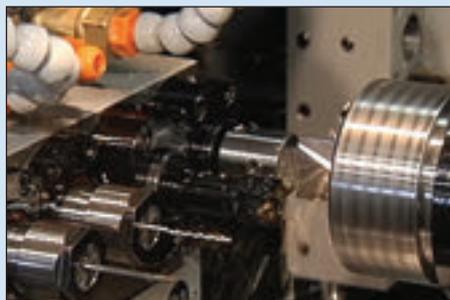
**William Leonard Clippard, Jr. founded** Clippard Instrument Laboratory in Cincinnati, Ohio, in 1941, with an initial product line consisting of electrical test equipment, magnetic windings and radio-frequency coils. The first miniature fluid-power devices designed and built by Clippard were for use in the manufacture of this equipment. In the early 1950s, Clippard introduced Minimatic® components as a new product line. The need for miniature pneumatics was widespread and, since no similar products had been available previously, the Minimatic® line was successful enough to become Clippard's primary product line, and to lead eventually to the change in company name.

Before acquiring PartMaker, Clippard Minimatics programmed all its parts by hand. "Our main goal when purchasing PartMaker was to be able to create parts on all our various machines," remembered Scott Fible, a CNC programmer at Clippard Minimatics. "We have a Star SB-16 type D, three different types of Citizen machines, Ganesh machines and Haas mills. All of them are now programmed with PartMaker."

After the investment, Mr. Fible spent one week being trained on the PartMaker software. "Even though I had no previous CNC experience, by the end of that week I was programming parts," he claimed. More training followed so that

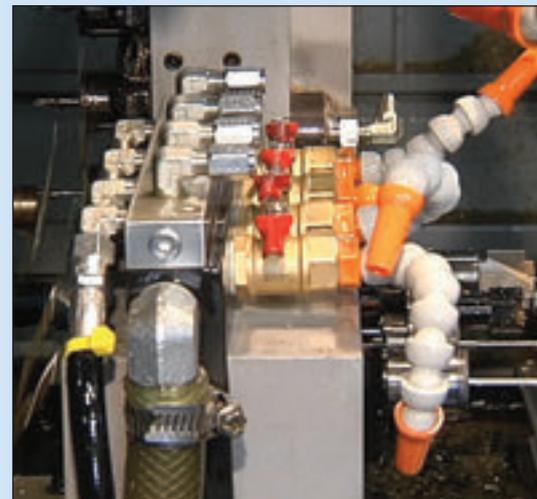
the company now has five different people programming for its five different types of machine.

"We've created some more complex parts that we never would have tried before. Now that we have PartMaker, we have the ability to do the programming, run a simulation on the computer and be able to tell whether it would be a good fit for the machine or not."



With PartMaker, Clippard Minimatics can program all its machines

"We're going to buy a new machine to run a new family of parts, aiming to run lights-out so we can operate non-stop. Before, it would always take us a lot of time to make up our minds before deciding to purchase a new machine. Now, we know that we have PartMaker so we can basically buy anything



PartMaker has made everything easier for Clippard Minimatics, especially programming multi-spindle machines

we want and be confident that we will be able to program it. If they can build a machine, I believe PartMaker can build a post-processor for it."

As well as praising the software, Mr. Fible spoke highly about the support provided, saying "the updates are terrific, and the service and technical support are phenomenal".

As a company operating in a competitive market, it is crucial for Clippard Minimatics to be working to their full capability. Mr. Fible explained, "We need results and we need results now. PartMaker has made everything so much easier; the transition from manual programming was unbelievable."

## Manufacturing Technology Centre

Delcam has become a member of the flagship Manufacturing Technology Centre in Coventry. The MTC is a key part of the UK Government's drive to make the UK the home of advanced manufacturing technologies.

**As a member, Delcam will be able to** become a partner in development projects with industrial members of the centre such as Rolls-Royce, Airbus and GKN Aerospace, and with many suppliers of complementary equipment, including machine-tool manufacturers DMG-Mori Seiki and Agie Charmilles, cutting-tool suppliers Sandvik Coromant and SGS, and metrology specialists Hexagon and Renishaw. Other MTC partners include The National Physical Laboratory and The Welding Institute, plus three forward-

thinking universities from the region: Birmingham, Nottingham and Loughborough.

One programme at the MTC where Delcam has already been heavily involved is the RECLAIM project, which has the potential to save UK industry millions of pounds by re-manufacturing high-value components that would otherwise have gone for scrap.

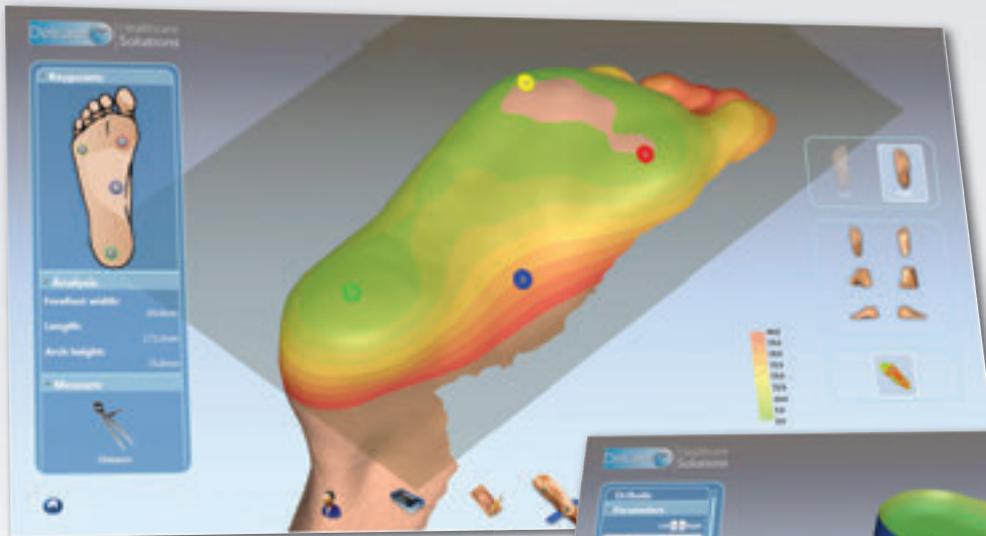
The process developed by the project uses laser cladding, automated inspection and high-speed machining in a single, fully integrated



Delcam has worked with MTC members on the RECLAIM project to re-manufacture high-value components

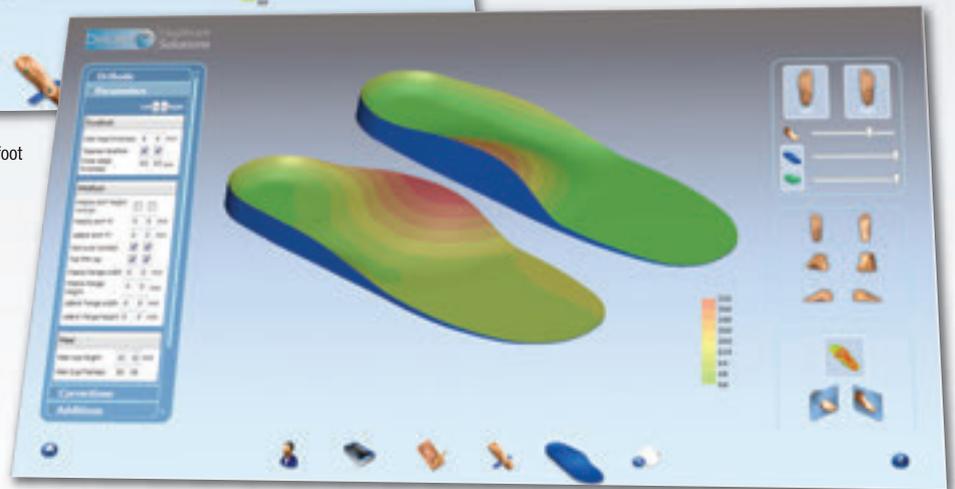
re-manufacturing cell. This combination of technology enables manufacturers to repair and recycle worn, high-value components, such as turbine blades, to a consistently high quality. It is expected to make a major contribution to the reuse of worn components in the aerospace, defence and power industries in particular.

The system can also be used to manufacture totally new complex metal parts, upgrade obsolete parts and reconfigure standard parts for low-volume applications.



OrthoMODEL makes it easy to locate and measure the key points on the foot

Delcam has introduced an enhanced version of its OrthoMODEL design software for EVA custom orthotic insoles, with options for the design of corrective orthotics for the first time.



A contour map can be displayed showing the height profile of the orthotic

# OrthoMODEL software enhanced

The new release, OrthoMODEL 2013 R2, offers “real-time design” of both accommodative orthotics, ideal for patients with diabetes and for those requiring comfort insoles, and corrective orthotics, to address problems with the patient’s foot orientation and gait cycle.

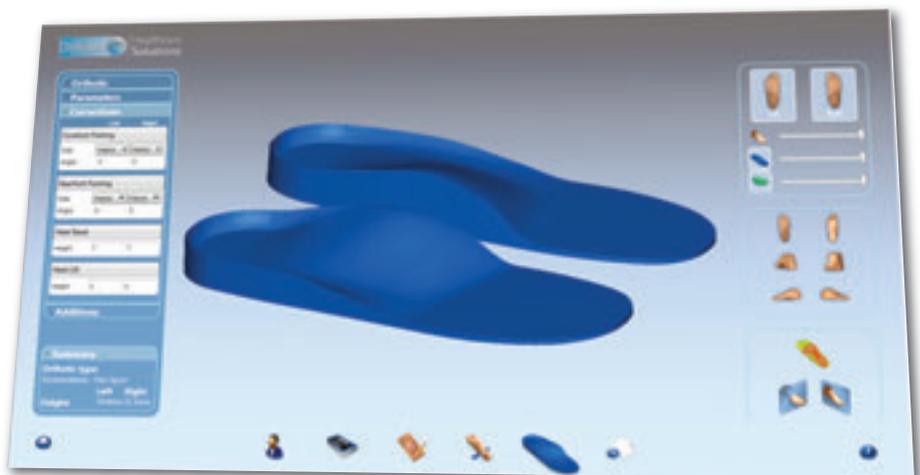
The software has a direct interface to Delcam’s iQube range of scanners, all of which are able to scan the patient’s foot, foam boxes or casts. It can also import scan data from most other systems.

New trimming tools allow the removal of any unwanted scan data before aligning the scan. Faster alignment tools enable quicker design times, whilst giving information such as arch height, scan length and other key measurements.

Following scan alignment, the orthotic design is created automatically by simply selecting from a number of types. The range of types is configured by the user according to the way in which they prescribe. Each type has a “recipe” of parameters that is combined with the required trim profile and the scan to create a truly custom insole. A wide range of additions, including pads, bars and depressions, can be applied to relieve pain or ulcerations.

Further to the already extensive range of parameters that can be adjusted, including arch fill, forefoot tapers, flanges, heel cups etc., the user can now also apply corrective features.

“The software has a direct interface to Delcam’s iQube range of scanners, all of which are able to scan the patient’s foot, foam boxes or casts. It can also import scan data from most other systems.”



The heel of the orthotic can be raised to compensate for differing leg lengths

Intrinsic forefoot and rearfoot posts can be added to adjust foot alignment, and heel raise or lift can be applied in the event of leg-length discrepancies. These new options enable OrthoModel to be used for corrective, as well as accommodative, applications.

Even with these added options, the new version of OrthoMODEL remains exceptionally easy for the practitioner to use. Rapid generation of designs that can be instantly visualised and modified in 3D ensures that the practitioner and customer are totally satisfied with the product before it is sent for manufacture and so minimises any possibility of returns.

# Technology Forum at Georgia Institute



Geza Kogler from the Georgia Institute of Technology gave Forum delegates a tour of the Institute's extensive facilities

Delcam recently held the 2013 Orthotics Technology Forum in the USA, at the Georgia Institute of Technology. The event showcased new and upcoming technologies and processes designed to assist practitioners in the prescription, design and manufacture of custom orthotic insoles and orthopaedic shoes.

patient services, efficiencies and profitability.

The guest speakers, who were experts in the field of orthotics and orthopaedic technologies, demonstrated hardware devices to help measure biomechanical features, pressure and anatomical form, and CAD/CAM

tools for plasterless manufacture, as well as new ideas for increasing productivity and reducing manufacturing costs.

Subjects that were covered at the event included reverse engineering, unique designs for mass production, lean manufacturing applications, the use of ultrasound to assess plantar tissue behaviour, the integration of digital technology within a clinic or lab infrastructure, the evolution of orthotic design due to the

unique possibilities of CAD, and the future of orthotic manufacturing.

Sponsors Freedom Machine Tool, Surefit, Nora, Acor, Mile High Orthotics Lab, Walking Mobility Clinics, Kiwi and e-CUSTOM also invested considerable time and effort into making the event such a success.

"This is the third year of the Forum and it has grown from strength to strength," said Chris Lawrie, Business Development Manager for Delcam Healthcare Solutions. "It was an incredible event; Geza Kogler and the Georgia Institute of Technology were fantastic hosts and our speakers created a very informative Forum."

Due to the continued success of the Forum, Delcam plans to host two separate events in 2014, one in Europe and another in the USA. Anyone interested in attending can register their interest at [www.orthotics-technology-forum.com](http://www.orthotics-technology-forum.com)

Over 100 delegates from around the world, including Sweden, the Netherlands, France, the UK, Canada, South America, Japan, China and, of course, many states within the United States, attended this educational event, which was certified by BOC International, (The College of Podorthotics of Canada) and BAPO. The Forum presented delegates with a number of technologies from a wide variety of organisations, all committed to improving their

# Orthotics Sales Partner in the Netherlands

Delcam Healthcare Division has appointed Podomark as its new Sales Partner in the Netherlands for the sale and support of Delcam's hardware and software for the design and manufacture of custom orthotic insoles. Podomark is a respected organisation in the Netherlands with great experience in CAD/CAM as well as in providing clinical products and consultancy to podiatrists, podotherapists and orthopaedic shoe makers.



The first orthotic machined by Podomark's first customer in the Netherlands

**Delcam and Podomark first met at the** Orthotics Technology Forum held in Bath during 2011 and very quickly found an opportunity to cooperate commercially. Based in IJsselstein near Utrecht, Podomark is headed up by Constant Kivits, who has surrounded himself with a team of specialists in the commercial footwear business. In the team, there is over 50 years of experience in both podotherapie and CAD/CAM, making Podomark the perfect partner for Delcam's range, including the iQube scanner, OrthoMODEL CAD software, OrthoMILL CAM software and OrderManager workflow management system.

In addition, Podomark is the Dutch dealer for pressure mats with RSscan International which

offer highly accurate, dynamic pressure-measurement systems complementing the Delcam solution.

Podomark has already created and distributed marketing collateral within the Dutch market with great feedback. As a result of this work, a new partnership has already been created with Podomasters, indicating that there is a good level of interest within this market.

"The market is just right for the Delcam solution and we are very excited about the partnership," said Constant Kivits. "The world's best CAD/CAM solution for custom orthotic insoles is now available in Dutch."

# Sales partner news

## Delcam for SolidWorks in Mexico



NC Tech is one of the largest SolidWorks resellers in Mexico

Delcam Mexico has appointed NC Tech to supply and support the Delcam for SolidWorks integrated CAM system in Mexico.

**Based in Querétaro, one of Mexico's main centres for the automotive and aerospace industries, NC Tech is a leading SolidWorks reseller in the country with close to 100,000 installed seats. It has more than 300 industrial customers in Mexico and also supports more than 350 educational sites.**

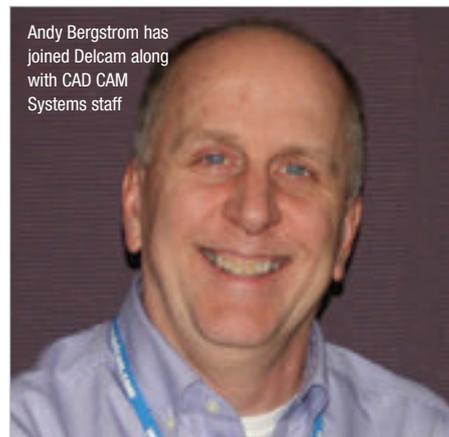
NC Tech aims to achieve the highest levels of customer satisfaction through high-quality training and excellent support. It has appointed three specialist engineers to support the Delcam software, having a total of almost thirty years' experience in CNC and CAM programming.

## Illinois office

Delcam has established a direct office in Illinois following its acquisition of its Rockford-based reseller, CAD CAM Systems.

**Delcam Illinois is the company's sixth direct office in North America; the others are in Salt Lake City, Philadelphia and Pasadena, California, in the USA, and in Windsor and Toronto in Canada.** CAD CAM Systems President, Andy Bergstrom, and the company's staff will become direct employees of Delcam North America to ensure continuity of service to the hundreds of users of Delcam software in the region.

CAD CAM Systems was founded in 1986 by Andy Bergstrom and his partner, Jim Epperson. The company became a Delcam Sales Partner in 1994, with both partners believing the Delcam software to be the best in its class. Its history of almost twenty years makes it the most experienced Delcam reseller in the USA. During



Andy Bergstrom has joined Delcam along with CAD CAM Systems staff

that time, CAD CAM Systems has supported hundreds of customers in Illinois and Iowa, ranging from multi-national organisations to companies of all sizes in the mould, die, pattern and prototyping industries.

## Liverpool office

Delcam UK has opened an office in Liverpool to support increased sales in the North-West of England, especially to the region's aerospace industry.

**The expansion follows significant growth in UK sales during last year.** A large number of new customers for the company's CAD/CAM programs, together with greater investment in additional seats by existing customers, saw an increase of almost 40% in software sales from 2011 to 2012.

The new office is located in the same building as Delcam's robot integration partner, CNC Robotics. "Demand for machining with robots is increasing, with a growing number of companies



A meeting of the COMET project on machining with robots was held recently in Delcam's new Liverpool office

looking to use robots either alongside or instead of conventional machine tools," said Mr. Creron. "Sharing premises with CNC Robotics will make it easier to present joint demonstrations to potential customers and to train users on the application of the robot and the software."

## Vietnam appointments

Delcam is targeting increased sales to the footwear industry in Vietnam with two new appointments.

**Applications Engineer, Nguyen Van Van, and Sales Engineer, Than Phung, have joined the Delcam Vietnam representative office in Ho Chi Minh City.** Initially, they will support sales of the Delcam CRISPIN range of software in Vietnam but later their responsibilities will extend to Cambodia and Laos.

Nguyen Van Van has seventeen years' experience as a CAD/CAM engineer. Twelve years of that time has been spent in the footwear industry, with part spent working for Delcam's reseller USMC. Than Phung has spent four years in the footwear industry in Vietnam and Cambodia.



Nguyen Van Van (left) and Than Phung have joined the Delcam Vietnam representative office

# ArtCAM update

New versions have been released of the complete range of the ArtCAM artistic CAD/CAM software.

## ArtCAM Express

ArtCAM Express offers 2D drawing, over 600 free pieces of relief clipart, and 2D and standard 3D machining functions, and so provides an ideal introduction to computer-based manufacturing. A range of modules are available to add extra functionality.

ArtCAM Express now offers extra tools for creating and editing vectors



The main focus in the new release is on vector creation and editing. New snapping options make vector creation much quicker. They include the ability to snap to anything in the design, including any point on a vector, intersections between vectors, guidelines and key points within a model, such as the origin, centre and corners.

Vectors can be joined when they are mirrored using any of the many mirroring options. This allows faster creation of vertical and horizontal vector patterns. Vectors can now be offset interactively by dragging the offset to the required position as well as by a specified amount.

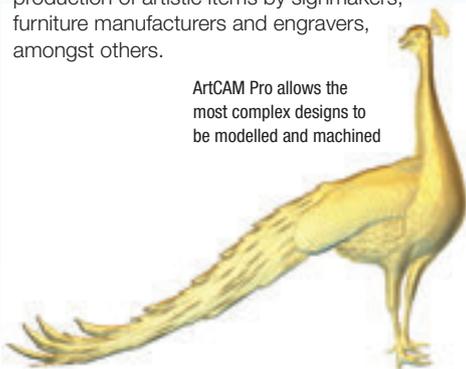
The Vector Doctor has been enhanced so imported vectors can be cleaned up more quickly. Duplicate vectors and vectors longer, shorter, larger or smaller than specified sizes can be identified immediately. In addition, "quick select" functions help to spot unobvious open vectors that could cause machining issues.

The optional modules for advanced 2D machining and nesting have been enhanced to allow bridges to be placed, moved along and resized on vectors. Moreover, with the nesting module, these bridges can also be applied to vectors before nesting.

## ArtCAM Insignia

ArtCAM Insignia includes 3D modelling and machining tools to make it suitable for volume production of artistic items by signmakers, furniture manufacturers and engravers, amongst others.

ArtCAM Pro allows the most complex designs to be modelled and machined



As well as the enhancements to the vector tools in ArtCAM Express, ArtCAM Insignia has the ability to distort vector artwork in real time, allowing the user to see changes instantly.

Designers can also create moulds by removing material from their design whilst retaining the base shape of their model. A new machining option gives the ability to add linear or curved fluting to designs.

## ArtCAM Pro

ArtCAM Pro is aimed at skilled artisans wishing to create complex 3D designs.

The main additional enhancement is interactive distortion modelling. This allows users to distort either vectors or reliefs by bending or stretching the design and to see the results in real time.

On the machining side, the most important new option is fluted-weave machining. This allows fluting toolpaths, including Celtic weaves, to be created from vectors.

Also new is the ability to specify colours for areas within different height bands, making it easier to sculpt reliefs to a required depth.

## ArtCAM JewelSmith

ArtCAM JewelSmith is a special version of ArtCAM Pro with extra tools for the design and manufacture of rings, brooches, cufflinks and other jewellery.

JewelSmith also includes a new gem library, where any STL, OBJ, 3DS or 3DM file of a custom gem can be placed and used subsequently to create bespoke jewellery designs.

These designs can then be rendered in the new rendering engine, KeyShot, which is bundled with ArtCAM JewelSmith. It creates extremely realistic and lifelike design images. A more advanced rendering package, KeyShot CAD Pro, is available as an upgrade which offers additional features including unlimited rendering resolution, render queues and turntable animation.



A new rendering engine in ArtCAM JewelSmith gives extremely realistic images



Delcam for SolidWorks 2014 includes improved support for four-axis rotary machining

# 2014 CAM for SolidWorks

The 2014 version of Delcam for SolidWorks includes toolpath editing, support for four-axis rotary machining and more strategies for two-axis finishing. Also included in this release are new options for turning from the latest version of FeatureCAM (see page 16).

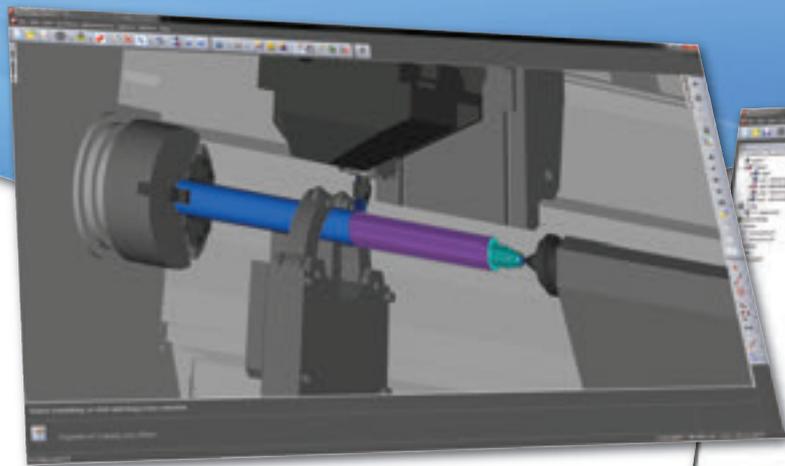
**Toolpath editing has been added for all strategies.** This allows segments within any toolpath to be deleted or to be divided into smaller segments. Segments can also be connected to create complete toolpaths.

Improved support for machines with four-axis rotary tables allows two- or three-axis operations to be wrapped around the rotary axis. The same option also supports wrapped features for turn-mill operation. The wrapped feature can be taken directly from the SolidWorks model using the feature-from-feature concept at the heart of Delcam for SolidWorks.

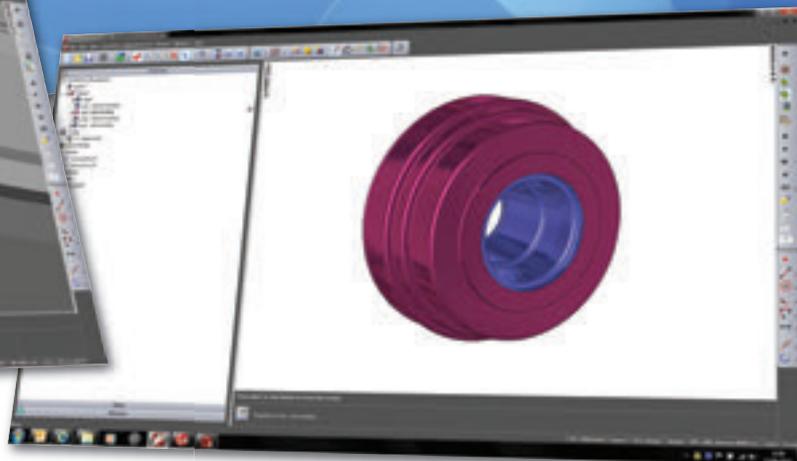
A number of extra strategies and options have been added for two-axis finishing. These include dedicated strategies for finishing the bottoms of pockets and continuous spiral machining either from outside to inside or inside to outside.

More efficient machining has been made possible with the ability to clip both roughing and finishing passes to stock models. This reduces air moves that might otherwise be generated when machining arbitrary shapes, such as castings or forgings.

For more news, go to  
[www.delcam.com](http://www.delcam.com)  
[www.delcam.tv](http://www.delcam.tv)



FeatureCAM 2014 can program and simulate the movements of the steady-rest and the tailstock



Fillets can be added to turned parts automatically

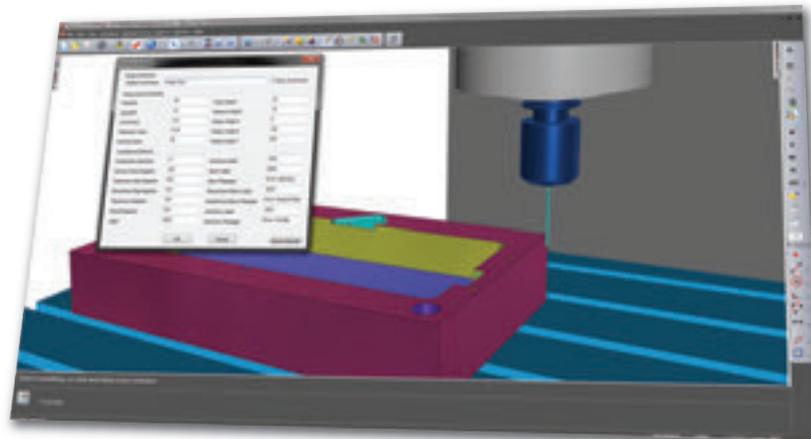
# New turning options in FeatureCAM

The 2014 version of FeatureCAM includes a number of new options for turning, four-axis rotary machining and turn-mill operations. Other enhancements in this release include more strategies for two-axis finishing and easier programming of probing sequences.

**The first improvement to turning in the 2014** release gives the ability to add fillets to any sharp corners, for example for automatic deburring, without having to edit the geometry. The user simply has to specify the radius to be applied and all the sharp corners will be filleted automatically. Similar functionality for automated chamfering of corners has been available in FeatureCAM for several years.

Turning simulation has been made more realistic with the ability to program and simulate the movements of the steady-rest, which can be used to position large parts during turning, and the tailstock, which can be used to hold long parts on centre during machining. Collision detection against both these types of accessory is undertaken automatically during both cutting and transfer operations.

Programming of both turn-mill and four-axis equipment has been made much easier with the ability to change the index axis part-way through programming. Previously, all aspects of the part, including features, geometry and curves, would have to be moved if a change in the index axis was required. Now, this can be achieved simply



The incorporation of probing routines into FeatureCAM programs has been simplified

by creating a new user-coordinate system and using that as the new index axis.

An improvement to the FeatureCAM interface will make it easier to use a curve to define start points and plunge points for both turning and milling. Users can now pick these curves by clicking on them, instead of having to type the name of the curve.

The ability to incorporate probing routines into machining programs was added in FeatureCAM 2013 to make it easier to undertake unsupervised production operations by allowing automated checks to be carried out before, during and after machining. Programming of these operations has been made easier and

quicker with the new ability to incorporate decision making with built-in options in the software, instead of having to hand-write toolpath edit commands. For example, it is now easier to include a re-machining command if the probing results show that more material needs to be removed from the part.

Finally, a number of extra strategies and options have been added for two-axis machining. These include the ability to use larger stepovers with automatic machining of any upstands that may be left, continuous spiral machining either from outside to inside or inside to outside, support for stock models created from roughing toolpaths, and automatic avoidance of clamps.