

## Success Story

# Subcontractor Makes Picture Perfect Parts

Previously working as an engineer in the F1 industry, it was the unsociable and unpredictable working routines that led Allan Carabine to set up his own machine shop in 2011. Working in the F1 sector taught the new business owner...



### About MK Precision Engineering Ltd

MK Precision Engineering Ltd was established by Allan Carabine in 2011 to undertake Research and Development, Prototype-to-Production and production runs of precision engineered parts. The business has grown consistently since its establishment and has reinvested on a regular basis in its equipment. It employs fully skilled engineers who have between them a vast range of experience. MK has established lasting relationships with its customers in a small number of important sectors. The business is more than just a production unit, it is a valuable development resource to its customers.

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

... two valuable lessons; the first was to start with a 5-axis machining centre and the second was to implement leading CAM software to drive the machine.

For the Milton Keynes Company, this marked the arrival of a Hurco 5-axis VM10U and *hyperMILL*® CAM software from OPEN MIND Technologies as the company's very first acquisitions. Commenting upon this selection that was to base the foundation of the company, Mr Carabine says: "Everyone can do 3-axis work, so when I started; I wanted to start with a 5-axis machine. The next thing I had to get was *hyperMILL*® CAM software. I have worked for F1 teams as well as some of the most prestigious subcontractors in the F1 supply chain, all previous employers in the industry used *hyperMILL*® as it is the only viable package for companies serious about 5-axis machining. I bought *hyperMILL*® on day one of starting the business! OPEN MIND confirmed the post-processors were compatible with the VM10U and from that point, the CNC controller became irrelevant as everything is modelled and programmed in *hyperMILL*®."

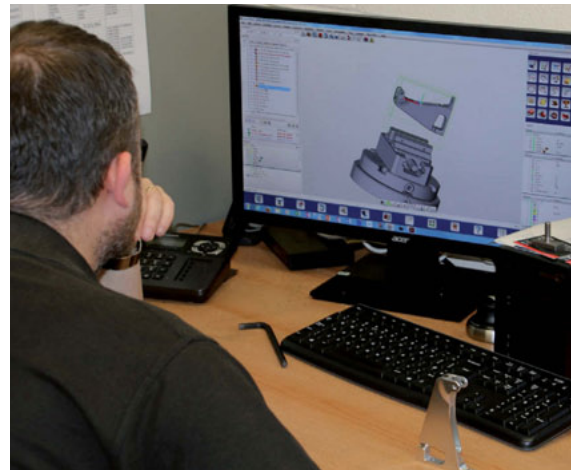
The Buckinghamshire business started by machining steel mount components for a panoramic camera company, this soon evolved into 5-axis F1 work and six years later

the small business has expanded to machining a complete range of rail, cryogenics and motorsport parts. Whilst the four employee business manufactures production runs for the defence industry, the average batch size ranges from 10 to 20 parts, machining materials from aluminium, stainless, plastic and nylon composites. Of course, to take on the additional work, MK Precision required more staff and machine tools. The acquisition trail brought the subsequent arrival of two 3-axis Hurco VM30's, a larger 5-axis VMX30U, a TM8i turning centre and a CMM for ensuring the conformity of F1 components. However, 40% of the company's work remains prototype business and this is where *hyperMILL*® really benefits the company.

As Mr Carabine comments: "The programming time will be anything from 20 to 50% of the overall time spent on each job, something that obviously varies with the complexity of individual jobs. With prototype parts requiring up to four hours of machining, the programming time can be anything from 30 minutes to 3 hours. One of the main benefits of *hyperMILL*® is the modelling and collision checking of the parts. Additionally, the post-processors run error free to give us the utmost confidence that we can load a part onto a machine and whatever program we load to the machine, we can run the pro-

“*hyperMILL*® has reduced tooling consumption by almost 80% and slashed cycle times by over 50%.”

Allan Carabine, Managing Director  
MK Precision



gram without standing nervously next to the machine. This confidence is set in stone with a re-work cycle that creates the tool paths with comprehensive collision detection by re-visiting all toolpaths prior to sending the program to the machine tool.”

The growing workload for the small subcontract business recently noted an additional seat of *hyperMILL*® arriving at MK Precision. The first seat has delivered remarkably short programming times; a necessity for a machine shop manufactur-

ing low quantity, highly complex parts. The second seat is now underpinning this strategy of fast turnaround of complicated 5-axis parts.

#### Shop floor benefits with *hyperMILL*®

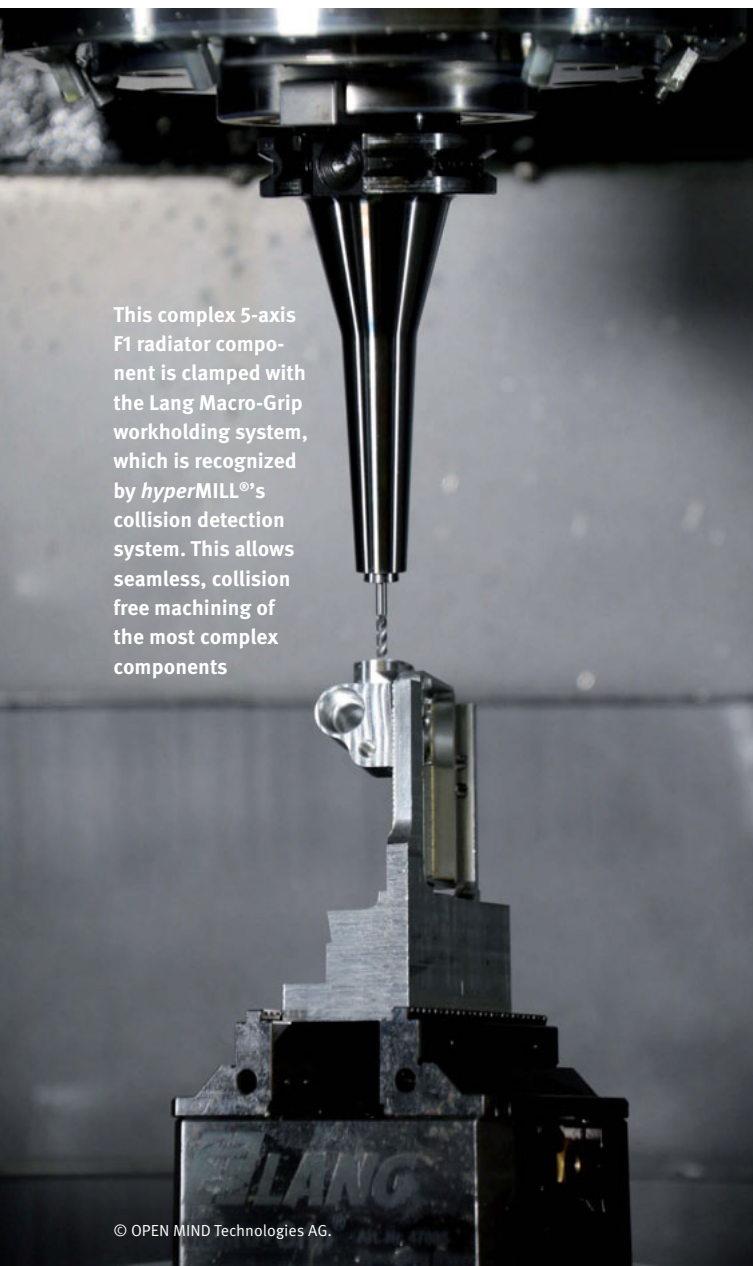
From a cost perspective, *hyperMILL*® has reduced tooling consumption by almost 80% and slashed cycle times by over 50%. These savings are credit to continually evolving strategies that are being developed by OPEN MIND Technologies. Some of the new strategies that are now being applied were unfamiliar to the company when it bought its first seat some 6 years ago. The staggering statistics are partially credit to innovative trochoidal milling strategies, something that is also generating a noticeable reduction on spindle load at MK Precision.

Another strategy that is prolonging tool life and improving consistency and process reliability for unmanned machining is the 5-axis optimised rest material machining strategy. The new cycle generates high speed cutting toolpaths for rest material machining based on the preceding roughing operation. It offers the ability to use shorter tools with improved stability for machining excess material from cavities and hard to reach areas. “This feature has given us more confidence when machining parts with cavities. Previously, we would order extra tools in preparation for tool breakages in cavities, but the 5-axis optimised rest material strategy has given us confidence in the process, the cutting tool and the ability to run unmanned machining where necessary.”

With customers that frequently require engraved components for traceability, MK Precision is making great use of the 5-axis contour milling strategy. As Mr Carabine continues: “There are certainly projects that we would never have won without the 5-axis contour milling strategy. It enables us to engrave parts on irregular and round parts. Easy to program, the strategy keeps the cutting tools perpendicular to the component face to generate simple and precise part marking. This has been a huge benefit when we have needed to engrave batches of parts with individual part numbers. Even when doing this, *hyperMILL*® has a sequential feature that automatically changes the part number on each component.”

#### *hyperMILL*® – not just a powerful 5-axis CAM package

MK Precision has a number of components that are turned parts that often require second operation machining on one of the company’s 5-axis Hurco machines. Referring to this, Mr Carabine says: “*hyperMILL*® accommodates all our turning requirements and the multi-axis shape-offset module has the ability to trim tool-paths automatically to in-process stock, thereby saving manual tool edit procedures. This utility covers stock model



This complex 5-axis F1 radiator component is clamped with the Lang Macro-Grip workholding system, which is recognized by *hyperMILL*®’s collision detection system. This allows seamless, collision free machining of the most complex components



generation where we can easily transfer the stock model to our 3 or 5-axis machines. This feature streamlines the transfer of parts from one machine to another whilst saving considerable programming times. It also reduces the machining times as it intuitively recognises what stock has already been removed.”

In addition to the powerful *hyperMILL*<sup>®</sup> CAM package, MK Precision is making good use of *hyperCAD-S*. Commenting on this, Mr Carabine concludes: “Whilst *hyperMILL*<sup>®</sup> enables us to model and program parts extremely quickly, some customers, particularly in the rail industry only supply physical 2D drawings and not common electronic formats such as STEP, IGES, DXF and STL files. Using *hyperCAD-S*, we can quickly generate component models from 2D drawings and these are rapidly expedited to create CAM programs. Additionally, we can accept customers’ electronic files, drop them into *hyperCAD-S*, manipulate and edit the files where necessary and then generate part programs. Overall, *hyperMILL*<sup>®</sup> has delivered huge savings in programming times, shop floor production, tool life and it has also streamlined our processes to improve lead-times. I don’t know how our business would survive without *hyperMILL*<sup>®</sup>!” ■

**An Aluminium F1 Pivot bracket  
programmed with *hyperMILL*<sup>®</sup>  
and machined on a Hurco 5-axis  
machining centre**

---

## About OPEN MIND Technologies AG

OPEN MIND is one of the world’s most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND designs optimized CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2.5D, 3D as well as 5-axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the *hyperMILL*<sup>®</sup> CAM system. *hyperMILL*<sup>®</sup> provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CAM/CAD manufacturer in the world, helping it become one of the top five in the CAM/CAD industry according to the NC Market Analysis Report 2017 compiled by CIMdata. The CAM/CAD solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America, and is a Mensch und Maschine company.



We push machining to the limit

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