



Customer Spotlight

Soaring to New Heights

Martin Aerospace

Aerospace Supplier Cuts Multi-Tasking Cycle Time by Integrating a New CAM System

Martin Aerospace serves as a vital link in the supply chain of some of world's best known aerospace companies. The company has thousands of different components and assemblies in its portfolio of live parts, which are critical to the safety and integrity of the finished product into which they will be incorporated. Most of the company's products are built to high tolerances, and many are machined from difficult materials such as Inconel and titanium. They range from small components whose dimensions are just a few millimeters, to large components and assemblies weighing upwards of 50 kilos.

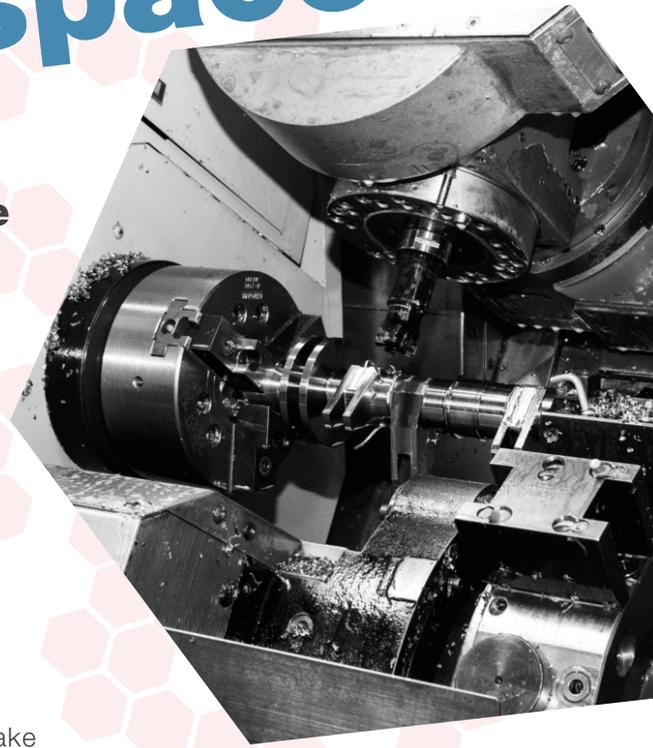
Competitive pressures have been forcing aerospace components manufacturers, such as Martin Aerospace in Lanark, Scotland, to reduce costs and cut lead times, while at the same time produce parts at a higher level of complexity than ever before.

The company's programmers started to experience difficulties with their previous computer-aided manufacturing

(CAM) software when trying to take full advantage of the capabilities of more advanced machine tools, such as integrated Millturn centers, which they had purchased in an effort to reduce cycle times when producing complex parts. In particular, Martin Aerospace produces many components on Swiss style sliding head machines, such as the Goodway SW20 and Nomura

NN-25YB and NN-20UB.

In the past, the company's programmers used a different CAM system for programming milling machines that did not handle turning. Programmers generally created programs for turning machines by



manually entering them into the machine control. The machine controls were typically limited to very basic capabilities and programmers had difficulty becoming proficient in all of the different controls used on the company's machines.



Martin Aerospace programmers now use ESPRIT to program every machine in the plant.

Martin Aerospace programmers first worked with the Millturn version of ESPRIT CAM software that was provided with one of their MultiTasking machines. They found that ESPRIT better supported the advanced capabilities of their machine tools by providing them with the ability to easily move operations between spindles in order to optimize cycle times. Therefore, Martin Aerospace decided to switch to ESPRIT CAM software for all of their programming needs.

They made the decision to buy the full version of the software from Scotcam, an engineering software solutions provider. Pat Loughrin of Scotcam quickly trained Martin Aerospace's programmers and they began using ESPRIT to generate all of their company's programs.

They also found that ESPRIT CAM software's simulation capabilities enabled them to closely examine programs in

regards to cycle time and other improvements. This has allowed Martin Aerospace to reduce cycle times between 20% and 30% on most parts, substantially improving the firm's competitive position.

More recently the company invested in integrated turning and milling centers such as the Mori Seiki NTX 1000 that consists of a multi-axis, 2-spindle machining center with full 5-axis milling, as well as a lower turret.

These machines provided Martin Aerospace with the capacity to perform what previously took three or four operations in a single operation, thereby reducing setup and cycle time, allowing them to produce more complicated parts at higher levels of productivity. ESPRIT CAM software was incorporated in the Mori Seiki MAPPS IV control to enable the programming of 3D shapes and complex, added-value workpieces.

“The very lifelike simulation often helps us visualize a way to improve the machining process.”

-- Tom Morrison, Industrial Engineer for Martin Aerospace, Scotland, UK

Implementing ESPRIT CAM

Martin Aerospace's new programming processes typically begin with importing solid model geometry provided by the customer into ESPRIT.

ESPRIT's automatic feature recognition capabilities are then used in most cases to define the features in the part. The next step is applying machining operations to each feature.

“ESPRIT's KnowledgeBase is used to store optimized machining cycles for the most common operations performed by the company,” said David Hughes, Industrial Engineer for Martin Aerospace. “If the programmer identifies a better way to machine the feature, he updates the KnowledgeBase with the new process. Standardizing on these optimized processes reduces cycle time.”

Martin Aerospace programmers also use ESPRIT's built-in machining strategies such as ProfitMilling and ProfitTurning, which combines trochoidal tool motion and a traditional offset of the toolpath to optimize engagement angle, chip load, lateral cutter force and machine acceleration in order to further reduce cycle time.



The company has migrated to multitasking machines such as the Mori Seiki NTX 1000.

After the programmers create the operations, they use ESPRIT to assign them to different spindles and turrets of multitasking machines, optimize their sequences, and synchronize their cycles.

Next, programmers simulate the resulting machine cycles, viewing the machine, turrets, spindles, tools and workpieces in real-time operation.

“The very lifelike simulation often helps us visualize a way to improve the machining process,” said Tom Morrison, Industrial Engineer for Martin Aerospace. “I may decide to change the order or move the sync points of several operations. Then I run the simulation again to see if I was able to reduce the cycle time. ESPRIT’s comparison function also makes it easy to check the part produced by the program against the customer’s specs.”

less time which translated into higher revenues and improved customer service.” said William Martin, Managing Director of Martin Aerospace.

“ESPRIT has helped us reduce cycle times on the average part by over 30%, giving our programmers the tools they need to optimize our machining cycles to a higher level than was possible in the past”

-- William Martin, Managing Director of Martin Aerospace, Scotland, UK



Pat Loughrin Scotcam Application Engineer and Tom Morrison Industrial Engineer for Martin Aerospace.

“The software’s ability to program every CNC machine in our shop has reduced our training expenses and increased programming productivity. The end result is that we are able to get more jobs done in

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