

SPARTAN AEROSPACE
MANCHESTER, CONNECTICUT U.S.A.

INDUSTRY CASE STUDY



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Superalloys and Flying RoboDrills

Manchester Job Shop Cuts Cycle Times in Half Using VoluMill

Spartan Aerospace mills some of the toughest stuff around. Inconel 718, Waspalloy, Rene 41—these are just a few of the high-temp superalloys that keep machinists awake at night. Sometime in early 2011, Engineering Manager Lionel Andújar grew tired of watching their legacy CAM system send expensive endmills plowing into corners like the proverbial bull in a china shop. He called VMH International, the same company that provided Spartan with their Siemens NX-8.5 PLM system.



A few weeks later, the Manchester, Conn. aerospace manufacturer watched as cycle times dropped and tool life soared. VMH set them up with VoluMill™, a patented high-performance roughing engine from Celeritive Technologies, Cave Creek, Ariz. “We have a titanium aircraft component that took over two hours to machine previously,” Andújar said. “We flipped it to VoluMill and the cycle time went to 38 minutes.”

Because the VoluMill roughing engine bolts on to most CAM packages, including Spartan’s NX-8.5 system, the implementation was

fairly simple. “Our internal IT staff did the install. It was basically just a matter of clicking next, next, next. After that, the programmers picked it up in about three minutes flat.” That’s according to Steve Daniels, engineer at Spartan Aerospace. “The online help, together with their website, was enough to get us going. Enter a few parameters such as tool diameter and material and VoluMill figures out the rest. It wasn’t tough to learn at all.”

From 27 Minutes to 6 Minutes - Fast and Predictable Cycle Time Reduction

Ease of use is great, but fast and predictable metal removal is what really matters at this job shop. The heavy lifters in Spartan’s milling department are a pair of YAMA SEIKI BMV1200 vertical machining centers. Daniels pointed to a bracket made of Hastelloy. Prior to VoluMill, cycle times were long and tool life unpredictable at best. “We have to rough out four pockets on that part, leaving a cross-shaped island measuring around 1” x 2” in the middle. We used to run at a feedrate of 16 ipm and went through endmills like crazy. Cycle time (not counting stops to change out broken tools) was around 27 minutes. Now we run 40 ipm with fewer passes and get the part out in 6 minutes.”

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Reducing the number of passes is key to better tool life, especially on tough materials. Where Spartan once ran 3/4" of flute engagement on a titanium job, they now go four times that. The result is up to three hours of roughing on a single endmill. "I think that's phenomenal," Daniels said. "VoluMill really shines wherever large amounts of material need to be removed quickly."

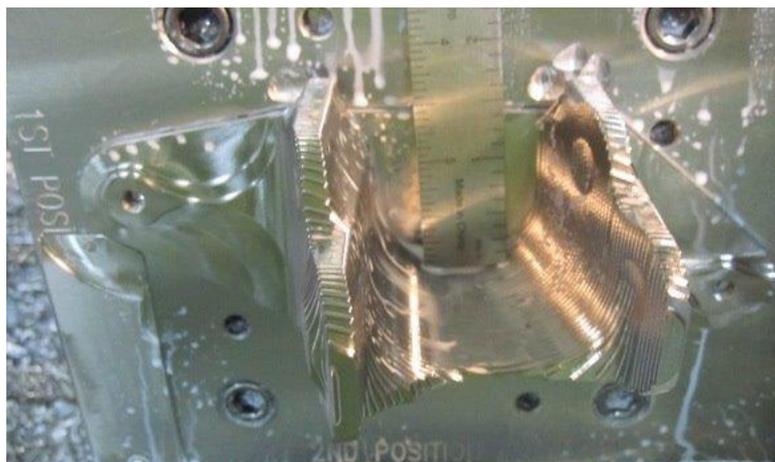
This Isn't Spartan's First CAM System Rodeo

They used a competing system for several years prior to the implementation of VoluMill and NX-8.5. They've since delegated that old software to their laser machine programming. Daniels said that, aside from the obvious process improvements seen with VoluMill, it also cranks out clean code far more quickly than their legacy system. "Aside from the time we save out in the shop, our programming time has dropped by around 40%. There's no tweaking at all. I'm responsible for the post-processors, so I keep a close eye on things. I can tell you the programs come out ready to go, whether you're milling aluminium or Inconel."

Rush Order, No Lead Time? - No Problem

Daniels cited another success story. When one of their aircraft OEM customers called with a rush order for some stainless steel door latches, Spartan pulled out all the stops to get them parts quickly. They knew from previous runs that the optimal barstock for the job had a long leadtime, so they ordered oversize material instead. And since their heavy-duty machines had a backlog, they ran the parts on their Fanuc RoboDrill, a 30-taper machine designed for fast, light cutting.

Using a 1/2" diameter endmill running at 6000 rpm and 132 ipm feedrate, Spartan roughed and finished the 1-1/4" round barstock down to the size of a pen cap in just 23 minutes. Prior to VoluMill, Daniels said, the same job took hours. "That machine was really flying. Some of the guys in the shop were actually getting a little nervous at how fast we were cutting." Better yet, the toolpaths were so efficient that Spartan saw their cutters lasting 3x longer than on previous runs, and on a lighter machine.

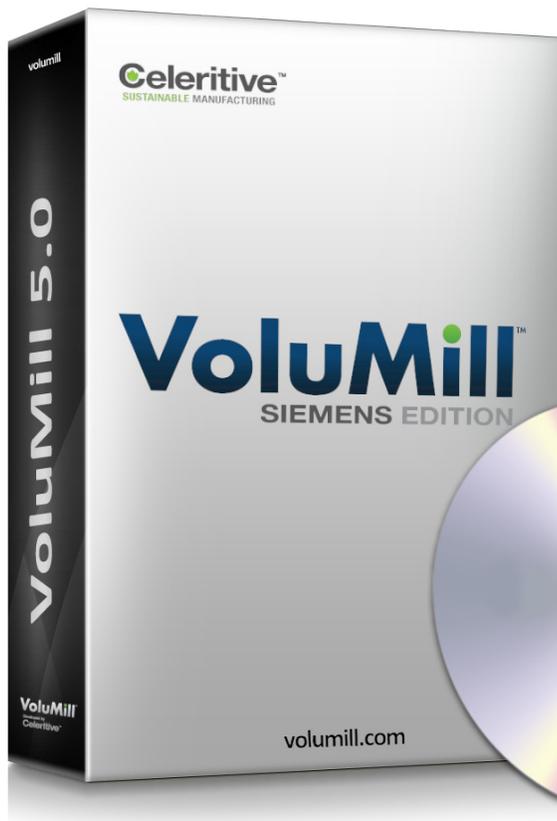


Their customer was thrilled. "We were under such pressure to deliver these parts that we bypassed the normal engineering process," Andújar added. "Steve just programmed it, took the job down to the floor and ran it himself. We actually delivered the order early. Because of VoluMill, we were able to help our customer out of a jam, and come out okay on the job besides."



Spartan's Been Using VoluMill For Over Two Years Now

In that time, Andújar said they've seen machining times drop by an average of 50%, and in some cases far more. Tool life has improved substantially, and programming is basically plug and play. Better yet, their improved milling capabilities have pulled at least one customer out of the drink, opening the door to additional work. So if you're tired of broken cutters and long cycle times, give Celeritive a call. Maybe they can make your machines fly, just like Spartan's.



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