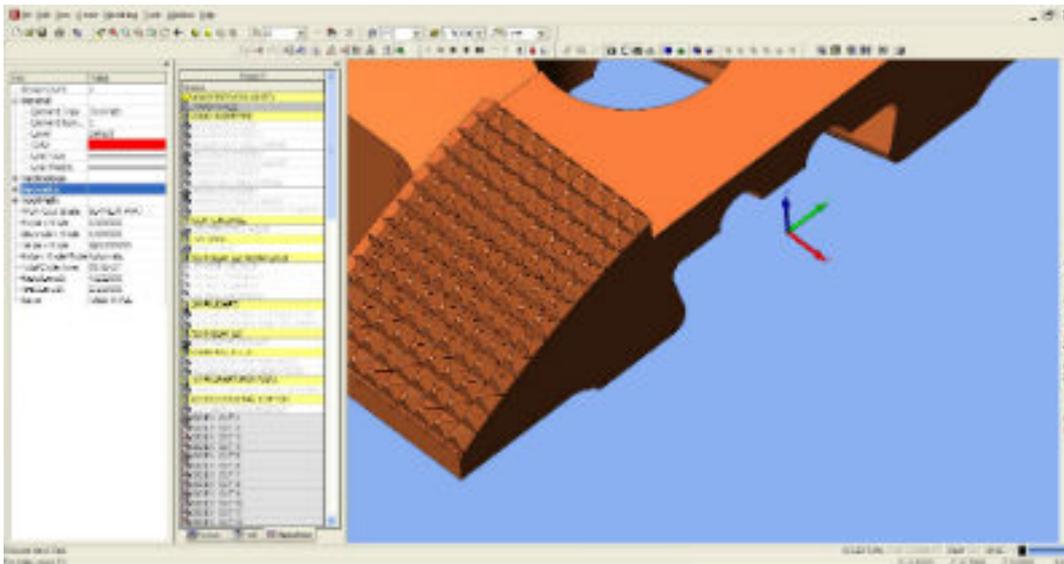


## Staying On Top

Stacey Wiebe, DP Technology

*Precision Machine Shop Single Source, Inc. stays competitive with the right machine and CAM software combo*

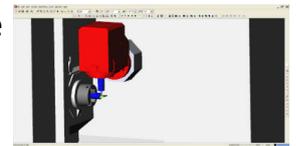


There is magic in machining.

After all, job shops turn daydream concepts into those you can actually touch, and with nary an “Abracadabra” to boot.

But Single Source, Inc.—no mom-and-pop job shop by any stretch of the imagination—is a place where parts go to be born.

Single Source is about precision, which means that the place is the



machinist’s equivalent of a coveted clothing designer’s workshop: Nothing here can be grabbed off the proverbial rack.

“We work very closely with customers to develop products that work for them,” says Programmer Nathan Ellinger of the North Liberty, Ind.-based company.

Founded in 2001 by Tom Moore and Greg Singleton, who boast 60 years of combined experience in the machining industry, Single Source is a precision shop that manufactures implants and instrumentation for the medical industry.

“We like to lead with quality and quality is everything,” Singleton says. “We see that the industry is changing and, considering the competition and economy, we have to find ways to set ourselves apart from the competition.”

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No easy feat, that.

“Quality always has to be No. 1, but everyone also wants their parts made faster and less expensively,” says Moore, adding that Single Source takes pride in delivering quality parts and delivering those parts on time. “In our business, it’s imperative that you continue to take care of customer needs as time goes on. What we create is real value—and if our pricing’s not right, we won’t even get a shot at the job.”

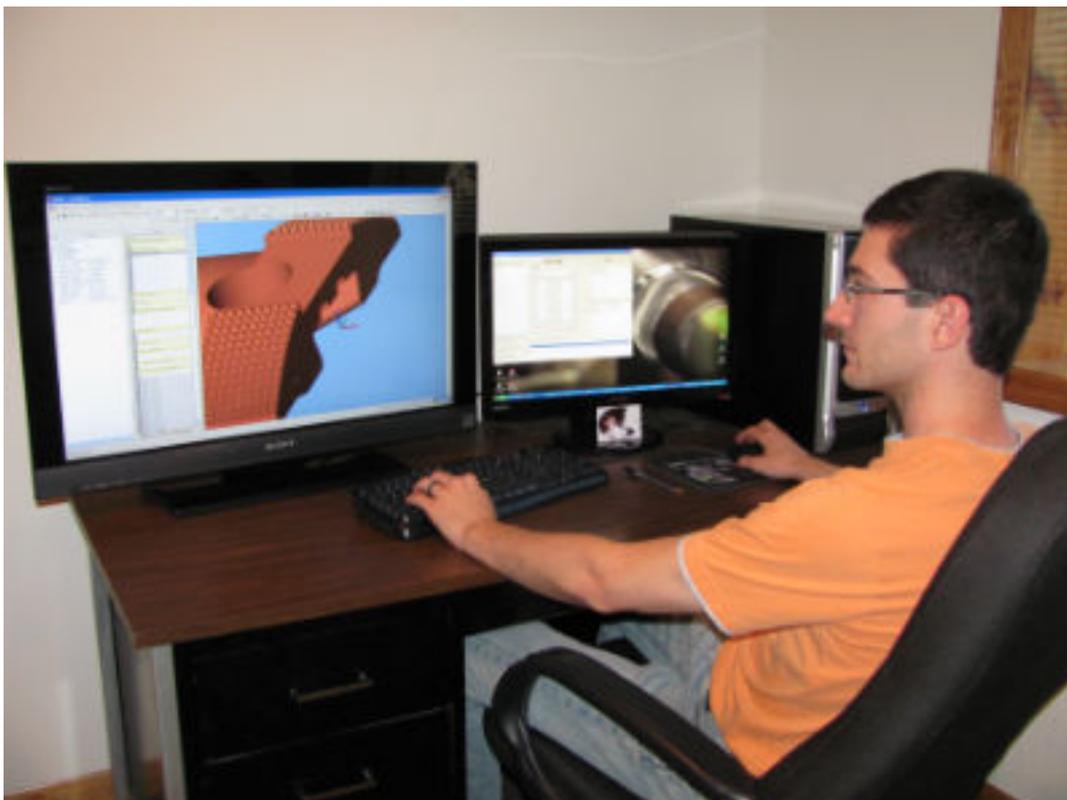
As customer needs grow increasingly complex, diversifying and improving on how you do business is similarly imperative.

“The customers in the medical field are really coming up with some parts that are very challenging to make,” says Ellinger, who has been with the company for four years.

In response to the increasingly complex demands of customers, the company, which had heretofore not ventured into the mill-turn realm, acquired a Mori Seiki NT-1000 multi-tasking machine.

“With a lot of the simpler work going overseas, you have to be able to serve the customers in the region who want to keep the complex parts here,” Singleton says.

Though the 15 or so machinists on the Single Source shop floor are equipped with basic programming knowledge, it was Ellinger who was given the task of mastering ESPRIT®, the computer-aided-manufacturing (CAM) software made by DP Technology and purchased in May specifically to drive the powerful new Mori Seiki machine tool.



Moore notes that

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the company's relationship with Ellison Technologies led to the purchase of the new machine tool and its acquisition of ESPRIT.

"What's cool is that all four companies think the same way," Moore says.

Both software and machine were chosen at an opportune time: The diverse precision parts the company is being asked to make are growing increasingly challenging from both the programming and manufacturing points of view.

For prototype parts, companies usually order fewer than 12 parts at a time. "Some of the parts are very complicated, and they are new and still being developed—so we do a handful at a time to give the customer an opportunity to make sure they are getting what they want," Ellinger says. Plenty of research and development goes into precision concepts that ultimately make it down the line.

From a manufacturing standpoint, complex parts are, in a phrase, "hard to get to," which means that it's difficult to isolate surfaces to be machined on actual tools.

For example, prior to the implementation of the NT machine, the completion of one fixture-intense part produced at the company required seven separate machine setups—lathe to mill, mill to lathe, and so on—before it was finally out the door.

"When you manufacture a part on a three or four-axis machine, you can only get to it from so many different directions and we're getting parts with features that we just can't get to without extensive fixturing," Ellinger says. "That's why we wanted a multi-tasking machine."

That's also why they wanted ESPRIT.

"With the new multi-tasking machine, that seven-setup job is now a one-setup job," Ellinger says. "That's one example of how the machine has made manufacturing easier, and ESPRIT played a huge part in that."

From a programming standpoint, parts with complicated features—for instance, a cylinder with wave-like contouring as opposed to a simple square—considerably up the complexity ante.

ESPRIT's feature-recognition capability, which is the ability to automatically recognize features specific to any part, has been a significant time-saver at Single Source, especially when it comes to creating toolpaths for parts with complex shapes.

Whereas other types of CAM software require programmers to define features specific to any part, ESPRIT reads the solid model and automatically recognizes and isolates features, "which is incredible to see," Ellinger says.

"When you're programming parts with complicated features, you have to create work planes so the machine knows from which angle to machine the part," he says, "but ESPRIT creates those planes automatically from the features. In other software,

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I would have to manually create a plane, then define on which plane I want to create my toolpath, and finally create the toolpath.”

Considering that it takes roughly four to five mouse clicks to manually create a plane, a simple part with few planes requires a minimum of clicks.

But when you consider, for example, a part that features a series of serrated teeth, it's easy to see how the click count can quickly multiply. Such a part can include 30 planes for the teeth alone, which means we're talking 150 mouse clicks (and that's just for starters).

“Literally, with ESPRIT, it's two to three mouse clicks instead of hundreds of mouse clicks,” says Ellinger, adding that it's not uncommon to produce parts with as many as 50 planes. “Just in programming in general, the ease with which ESPRIT creates planes alone can save 30 to 45 minutes on a part that would take six hours to program.”

Another part manufactured at the company formerly required seven to eight programming operations. With the addition of the Mori Seiki multi-tasker and ESPRIT, the number of operations has been whittled down to one.

While time can be saved by doing your homework—like researching cutting tools, for instance—Single Source finds that hours can be saved in prototype work by eliminating programming (like all those mouse clicks) and setup time. “Typically, when people come in for a new part, they order a couple of them. That's when cutting programming and setup time is key.”

Another advantage that Single Source has found in ESPRIT is greater control over cutting tools.

“Basically, ESPRIT can control your tool in any way you can think of.”

One of the ways you might think of is that ESPRIT allows the user to perform roughing and finishing operations in any order, which means that users can negotiate various depths of cut and multiple passes as they see fit.

“You can perform a finish path on the floor without touching the walls, and then a finish path on the walls with a depth of cut from the top,” Ellinger says. “With other software, I needed at least two toolpaths to get that job done. It's incredibly flexible in that you can control your rough passes and finish passes separately, but within the same toolpath.”

In addition to the ease of toolpath creation and general flexibility built into the software, the simulation capabilities of ESPRIT are another asset—especially when it comes to protecting a major machine-tool investment.

“I've used several different types of CAD and CAM software and the simulation in ESPRIT is incredible, especially with the multi-tasking machine,” Ellinger says. “I feel confident that, when I'm done programming, even though I may not have done

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everything perfectly, I won't have a crash at the machine."

For more information, visit [www.dpotechnology.com](http://www.dpotechnology.com) [1].

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