

BY TINA CARNELLI

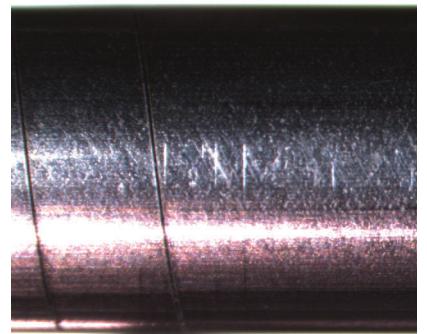
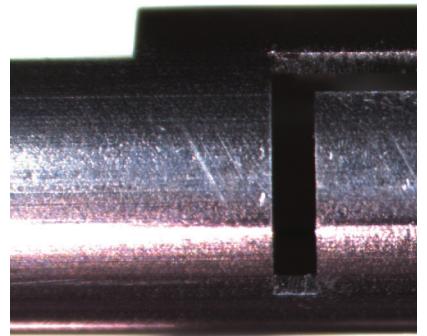
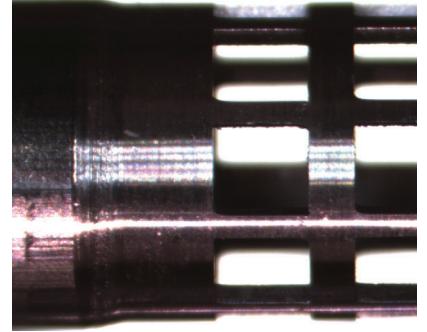
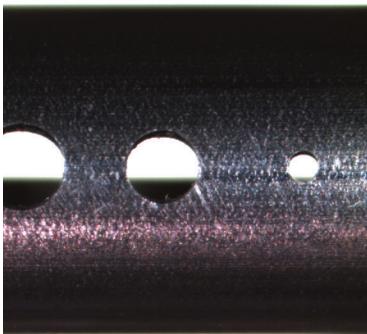
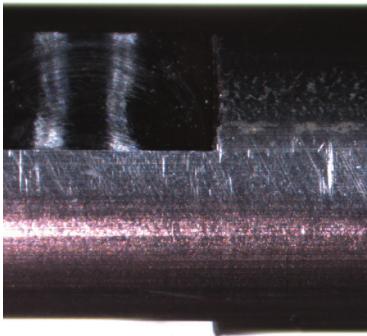
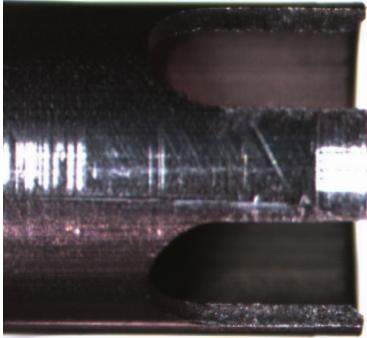
# SWISS- LASER MACHINING FOR SMALL MEDICAL PARTS

Combining a Tsugami 6-axis machining center with a fully integrated laser cutting system helps medical manufacturers stay competitive with shorter run times and fewer changeovers.

The low-rise, nondescript building in Bloomfield, Conn., appears vacant. The front parking lot is empty and the façade is unmarked, with the single exception of a small warning sign on the outer glass door that reads, “Authorized Personnel Only.” Passing motorists might easily assume there’s nothing at all going on inside – and they’d be very wrong.

Inside, Laser Product Manager Dale White of Innovative Machinery Group (IMG) is building a machine that looks to change the way small medical parts are made.

Until now, small tubular medical parts had to be made with two separate machines with two separate setups— a traditional cutting machine and a laser machine. The new Tsugami Laser S206-II with IMG 400LS laser cutting system combines the functions





↑ IMG Laser Program Manager, Dale White, stands next to the Tsugami S206-II with IMG 400LS laser cutting system.

of both into a single machine, allowing manufacturers to perform all operations with one setup.

“I have yet to put anyone in front of this machine who has not been blown away,” White says fervently. “The most common comment I hear while they’re watching the machine run a test cut is ‘Are you kidding me?’”

The Tsugami S206-II 6-axis machine in front of White is a production powerhouse, even without its laser. It has a Y-axis tool post that allows users to simultaneously machine with the main and back spindle, and its modular tooling layout holds multiple live tools. For added flexibility, it easily converts from sliding headstock to chucker mode. When reconfigured to integrate the cutting laser, however, the machining workhorse becomes a champion thoroughbred.

### Integrating lasers

In addition to the obvious cost savings of purchasing one machine instead of two, manufacturers can increase efficiency with shorter run times and fewer changeovers.

“It’s important that everyone understands that this is not just a Swiss machine with an attached laser,” White explains. “We didn’t just bolt a laser head onto the machine and give it a couple of M codes. This is a fully integrated system that operates on a single software platform.”

All laser-cutting operations are programmed and driven from the machine’s FANUC 32i-B NC control. The nozzle standoff adjustment is also NC controlled, and the laser’s frequency, pulse width, and power are all on-the-fly adjustable and programmed through the machine’s CNC control.

White consulted with industry-leading software and laser engineers throughout the design process, then invited Tsugami customers to see the initial design and asked for their input. Their comments, he says, drove him to find better ways to mount the laser and ensure it didn’t interfere with the machine’s current capabilities.

“They stressed early on that they would see the most value in being able to use all of the standard functions of the Tsugami machine,” White says.

As a result of this feedback, White redesigned the system so it didn’t need an extended guide bushing and he reinstalled the milling motor and face-working block he’d taken out.

“The beauty of this system is that it can be used as a regular Swiss turning machine, when that’s all that’s required, and used for laser cutting when it’s needed,” White said. “Nobody else can do that.”

### Vision behind the machine

The idea to integrate a Swiss machine with a laser developed years ago during a conversation between Lee Morris, CEO and chairman of IMG’s parent company, Morris Group Inc., and longtime friend and consultant Jim Sasanecki. Both men have spent more than 40 years in the machine tool industry and share a passion for solving manufacturing problems.

“The machine tool industry is a traditional industry,” Sasanecki says. “We have a habit of selling our iron because it’s pretty, but the customer doesn’t care about that. They care about ‘how are you going to solve my problem?’ Sometimes they don’t even know they have a problem. We have to speak their language and find out how we can help them. We can use our ingenuity, and that’s exciting.”

Sasanecki and Morris also share a desire to keep manufacturing jobs in the United States. Both are unhappy that America has lost medical manufacturing work to Asia and Europe over the years. This prompted them to examine the industry and look for ways to help its manufacturers.

“We looked at the Tsugami and its flexibility,” Sasanecki says, “and we asked, ‘How can we give customers more flexibility and reduce part piece cost?’”

From that, the idea to integrate a laser with a Tsugami was born.

### The challenges

“Laser cutting is its own science,” Sasanecki explains. “It’s not like turning,

boring, or milling. Lasers can cut small, thin-walled parts exponentially faster than conventional machining methods. If we get to the end of a cut and we have to make a right hand turn with conventional machining we could have a lag error.”

Sasanecki says that’s where the team spent much of their troubleshooting. They had to reconfigure the machine’s response time to keep up with the laser’s speed.

They also had to install glass scales and recalibrate the machine. Additionally, the team had to learn what amperage to use and how fast to move the laser.

“We didn’t buy any off-the-shelf items for this,” White insists, noting that he spent more than 300 hours designing and building the machine’s custom laser head, which is available in 200W to 500W configurations.

White built the gas control box, too, which controls the flow of the machine’s assist gases.

Sasanecki worked with MP Systems General Manager Mike Sayers to develop the machine’s high-pressure coolant system. “We needed a high-pressure pump system that gave us flexibility with pressure and volume,” he says. “Now we have control over the coolant, mist, and the velocity. And we’re allowing the customer to use the machine in any way he wants.”

Designed and built by IMG and distributed exclusively through its sister company, Tsugami/Rem Sales – both are divisions of Morris Group Inc. – the system also includes an automatic bar feeder that allows operators to run the machine unattended.

Although the system was designed

with medical parts in mind, Sasanecki says the technology can benefit other industries that manufacture similar-sized parts.

“I see too many companies dying out and I want to see manufacturing in this country – I really do,” Sasanecki says passionately. “This integration will allow U.S. manufacturers to quote work more competitively and keep jobs here.”**tmd**

**Innovative Machinery Group (IMG),  
a division of Morris Group Inc.**

[www.morrisgroupinc.com](http://www.morrisgroupinc.com)

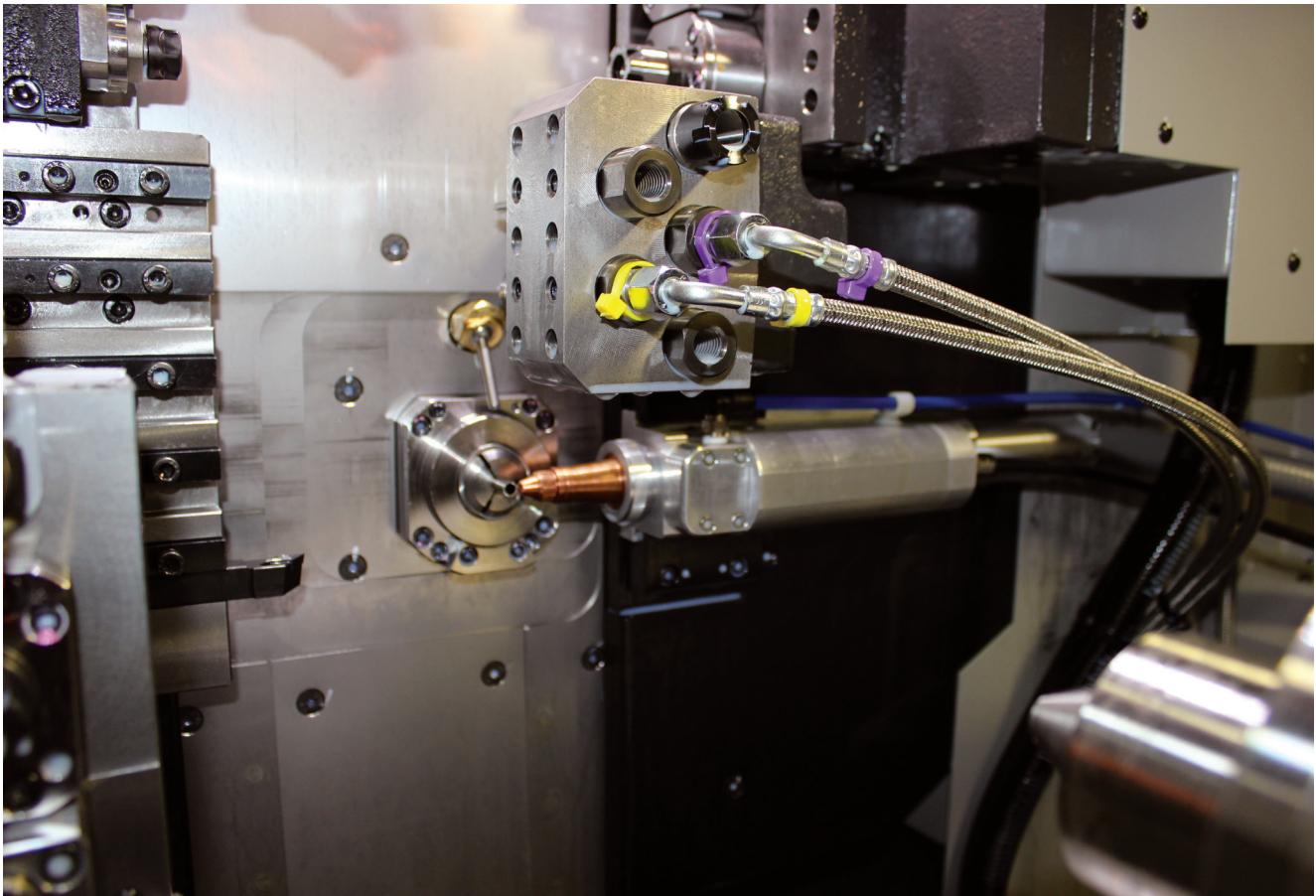
**Rem Sales**

[www.remsales.com](http://www.remsales.com)

**Morris Group Inc.**

[www.morrisgroupinc.com](http://www.morrisgroupinc.com)

**IMTS 2014 booth #S-9410**



The Tsugami S206-II with IMG 400LS laser is a fully integrated system that operates on a single software platform.