

## Member Spotlight - Machining from an engineer's perspective



### Machining from an engineer's perspective

By Penny DiCarlo, Journalism Manager

Third Wave Systems helps companies do three things: machine faster, machine smarter, and machine for less. President Kerry Marusich says there's one reason they can do that: "We're putting more engineering into machining."

Third Wave is a machining modeling and simulation software company. "What makes us really special is our ability to develop the core technologies around machine modeling," Marusich said. "We can capture very accurately what is physically going on in a machining process. It's about developing predictive models that will give engineers more information than the old ways of trial and error, handbooks, etc."



TWS develops two software products, AdvantEdge FEM and AdvantEdge Production Module. The company also offers a full complement of testing, modeling, and simulation services. AdvantEdge FEM is a CAE software solution for metal cutting optimization, which allows users to analyze machining processes for identifying best-case design and manufacturing parameters. The software is most useful for customers looking to improve part quality, increase material removal rates,

and extend tool life.

AdvantEdge Production Module, TWS' NC program optimization software, is described by Marusich as a "CAD/CAM hub," taking toolpath files and optimizing them based on machining physics, cutting tool geometries, machine dynamics, and workpiece material properties.

"The value proposition is that it's all about getting parts out to market faster and utilizing spindles as effectively as possible," Marusich said. "Machine time reductions of 20 to 50 percent are pretty common for our aerospace alloy customers, and on the order of 15 to 30 percent for companies running higher-volume types of operations like automotive."

TWS' customers come primarily from automotive, aerospace, and cutting tool markets, and the company is beginning to expand into the medical and optic device markets, as well. To maximize its outreach to its customer base at IMTS, TWS will staff two booths — one in the Tooling & Workholding Systems Pavilion (W-2123) for cutting tool companies, and the other in the Controls & CAD-CAM Pavilion (E-3929) geared toward automotive and aerospace companies looking for toolpath optimization. In both locations, customer success stories will be showcased, all of which share a machining goal: getting things done faster.

"When you're talking about creating indexable tooling, the turnaround just to get a prototype die set could take weeks," Marusich said. "[By reducing the need for trial-and-error testing iterations,] We help cut down that time significantly. We've heard from customers that they're reducing the time from design to getting it to market by a factor of three."

But TWS is about a lot more than doing things faster. They've also been recognized for their commitment to R&D and innovation, and in December 2009 the company was selected to take part in the National Institute of Standards and Technology's \$71 million Technology Innovation Program (TIP).

"We apply for a lot of government R&D funding for a lot of really risky early-stage technology development," Marusich said. For their involvement in the NIST TIP, for example, TWS is developing predictive models for nano scale manufacturing.

"We're going to go after markets where traditionally you're using grinding, lapping, and polishing to get a super fine, nano scale finish. We're going to replace those operations with a conventional high-precision machining approach," Marusich said. "It will eliminate all those other approaches that are slow and environmentally nasty." This innovative approach to manufacturing has garnered attention at NIST, as well as the Department of Defense.

TWS is also involved in several other DoD research projects, including initiatives funded by NAVAIR and the Air Force for the Joint Strike Fighter program.

Additionally, TWS is developing high-powered computing capabilities in order to run analyses that were previously impossible to do.

"You can't just do [computationally-intensive] stuff on a laptop," Marusich said. "We're developing a cloud computing environment to run simulations that, right now, are actually impossible to run. We'll be able to run them in a matter of days.

"This will enable us to drive into markets that really demand precision — mold and die, semiconductors, optics, medical devices, and others that you don't think about as real mainstream machining markets. But they're going to become very important."

Not surprisingly, TWS has even more in the pipeline. They're also introducing "simulation as a service," which will allow customers to run simulations on TWS' computers without having to invest in the hardware themselves. And with more big companies farming out their machining, TWS has been sending out its engineers to those companies' suppliers to work with them on product and process optimization.

So how does Marusich sum up TWS? "We're engineers. We're passionate about airplanes, cars, materials, computers, and manufacturing. And we're trying to keep jobs in the U.S.! Those are good jobs and we need to keep those in our country."

If more companies can follow TWS' example and push the industrial envelope, those jobs are most certain to be around. The future of U.S. manufacturing would be as bright as ever, indeed.

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