



Photo courtesy Fanuc CNC America

Controls, Software Spur Machine-Tool Productivity

The latest CNCs and CAD/CAM packages can jump-start shop efficiencies

With cost control a top priority during the recession, manufacturers seeking a quick productivity boost can turn to the latest developments in CNC controls and CAD/CAM software for innovative ways to cut parts faster and more efficiently.

The recent economic situation has created the demand to improve productivity, notes Paul Webster, manager, product engineering, Fanuc CNC America Corp. (Hoffman Estates, IL). "This is a key trend in manufacturing overall right now, and it is also the key CNC trend," he notes. "This involves increasing productivity with individual machines, and then integrating the machines into the overall factory system."

"Manufacturers want to increase productivity, but without capital expenses or labor increases," Webster contends. "The solution is automating the machining process to get more out of each machine. Control-system development is the means to the solution. To assist machine operators, maintenance personnel, and supervisors, we are seeing improvements in machine operability, reliability, and connectivity."

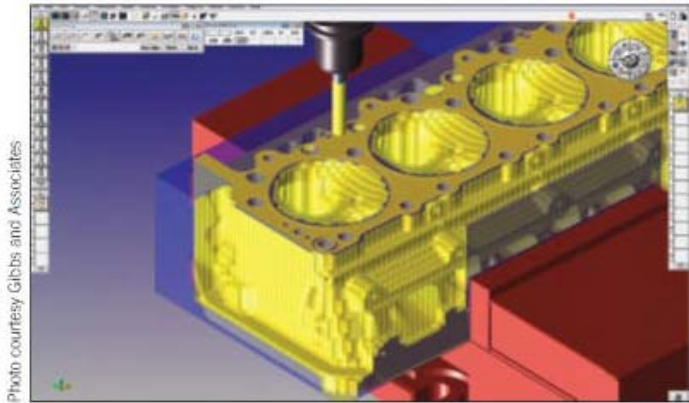


Photo courtesy Gibbs and Associates

Among CNC control innovations, Fanuc CNC America will unveil its new model 30i-B Series CNC and the new 35i-B CNC control for transfer-line machines, plus new five-axis volumetric error compensation and optimized CNC control solutions for specific industries. The company also will show new enhancements for its Oi-D/Oi-DMate control.

The new 30i-B Series CNC is an upgrade from the 30i-A Series, offering newly enhanced features and functions with advancements in operability and maintainability including a USB memory port, advancements in high-speed, five-axis capabilities including Fanuc's High Speed Smooth TCP functionality, volumetric error compensation (rotary), high-speed, multipath PMC, enhanced tilted working plane, and high-speed smoothing functions. The enhanced Oi-D/Oi-D Mate CNC offers new features including nano interpolation, AI contour II control, jerk control, plus tool management and grinding functions.

Adaptive control capabilities are a definitive trend in the industry, according to Todd Drane of Fagor Automation Corp. (Elk Grove Village, IL). "The CNC must have the ability to be massaged through various parameters and online tools to accommodate the customer's application requirements," Drane states. "The Fagor CNC allows this through intelligent parameter sets that allow the CNC to be custom-configured to the application, as well as on-board graphic editors that allow for the creation of custom editors and screens that emulate application-specific operations.

"In reality, customers can now create their own user interface, if desired, that streamlines the information available to the operator for most operations," he adds. "In many cases, an operator only needs a certain amount of information at his fingertips, any additional information is only a distraction, thus a simplified user-interface editor can be created that specifically addresses the application."

At IMTS, Fagor will showcase its wide breadth of products, ranging from CNCs and digital readouts to encoders and servo and spindle motor products. "What most visitors will notice right away is the variety of products we have," Drane points out. "We're known as a CNC and DRO manufacturer; however, many people still do not realize that we are one of the leading linear and rotary encoder manufacturers in the world. We offer precision glass linear encoders for virtually all markets, including our competitors' CNC controls."

Among the products shown will be Fagor's encoder line, which includes a new dual-track rotary encoder specifically engineered for C-axes applications for turning centers, Drane notes. In addition, Fagor will unveil its all-new 8065 CNC which combines advanced CNC technology with a simplified user interface, Drane adds.

Aimed at job shops, the new Siemens Sinumerik 828D CNC will make its American debut at IMTS, where visitors to the Siemens booth will see a combination of new products and product enhancements, according to Ryan Legg, Sinumerik CNC product manager, Siemens Industry Inc. (Elk Grove Village, IL), Motion Control Business—Machine Tools. "This will be a big year at IMTS for Sinumerik, the brand name of Siemens CNC. Sinumerik is celebrating its 50th birthday," Legg adds. "Siemens has come a long way since the first Siemens numerical control in 1960, based on relay technology, and much of that new technology will be on display in the Siemens booth at IMTS 2010."

The Sinumerik 828D control will be shown along with machine tools from three OEMs that have adopted the new control on their machines. The compact Sinumerik 828D maintains robust CNC functionality with functions such as Interactive Animated Elements to make programming and operation more intuitive, Legg adds, plus production-status text messaging to keep operators informed of machining status at anytime, from anywhere." The 828D also was designed to be low-maintenance, using nonvolatile memory, thus eliminating the need for a battery.

Siemens will also display its flagship Sinumerik 840D sl and entry-level Sinumerik 802D sl CNCs. Other product enhancements to be exhibited include the new MDynamics milling technology package, Legg notes, for applications with high demands on surface quality, precision, and speed. Siemens also will show its Sinumerik Operate, the newest HMI package from Siemens, that offers an intuitive user interface that can support various machine applications.


User-friendly controls from Heidenhain Corp. (Schaumburg, IL) will be shown along with the Acu-Rite MILLPWR control. All of Heidenhain's controls are conversational and G-code capable, with additional programming features making them suitable for shop-floor programming. The company will showcase its TNC contouring controls for milling, drilling, turning, boring, and machining centers that cover the whole range of applications, ranging from the compact TNC 320 four-axis analog interface control to the high-speed iTNC 530, which features motion-control technology for five-axis machining.

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The iTNC 530 is available with the Heidenhain's KinematicsOpt functionality, which allows users to automatically measure and compensate machine angular axes, and is particularly useful during five-axis machining. The newest TNC 620 contouring control for milling also will be on display; it comes equipped with an integrated digital drive control. The company's MANU-ALplus 620 control for tool-room style lathes also will be displayed, as will the

MILLPWR control, which is suited for small machines and is offered as a complete retrofit system.


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toolpath strategies possible for ultimate performance. "IMTS 2010 will be another fun event, especially for the world of CAM software," notes Bill Gibbs, president, Gibbs and Associates (Moorpark, CA). "Current industry trends are focused on capabilities to reduce user costs and increase their competitiveness. What business doesn't desire lower operating costs? Especially in the current manufacturing economy."

The latest ideas on how to cut parts faster are always a popular topic, says Gibbs, who notes GibbsCAM will be showing new and updated capabilities with plunge roughing, five-axis milling, and HSM. The company will also show the latest version of VoluMill from Celeritive Technologies Inc. (Cave Creek, AZ) for high-volume material roughing of solid models and wireframe geometry, he adds.

"Another way to reduce costs is to keep mistakes off your machines," states Gibbs, adding that GibbsCAM will showcase its second generation of advanced kinematic machine modeling for multitask machining (MTM). "This enables offline setup prove-out, program verification, machine simulation, and collision detection on machines ranging from simple mills and lathes, multiflow, multispindle machines, and advanced Swiss-style machines. It's capable of efficiently programming machines of virtually any configuration. Nothing is more costly than not being able to program your parts or your machines efficiently."

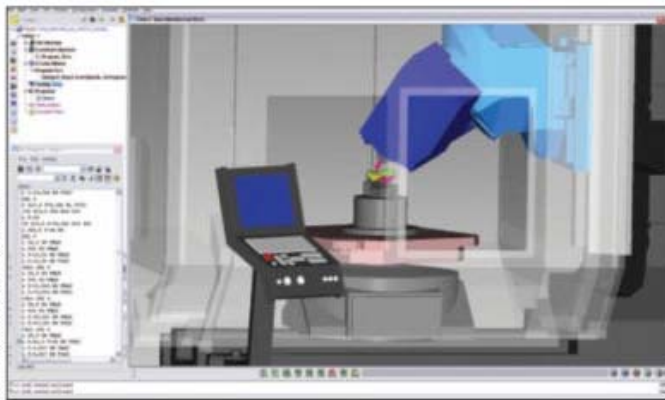


Photo courtesy CGTech Corp.

Programming faster is always popular, Gibbs notes.

"GibbsCAM will preview new CAD feature import capabilities, and new feature-based programming capabilities for milling and drilling. Automatic programming capabilities have been extended through improved user macro capabilities. The only thing faster and easier than programming your parts with GibbsCAM is setting up GibbsCAM to automatically produce programs for your family of parts applications, and to be used by non-NC programmers with human error virtually eliminated."

Most CAD/CAM vendors are trying to take advantage of the latest hardware in terms of 64-bit chip sets, 64-bit operating systems, and multiple-core CPUs, notes Glenn McMinn, president, Delcam North America (Windsor, ON, Canada, and Birmingham, UK). "Last year we rolled out our initial multi-threaded CAM algorithms, and this year we are introducing the 64-bit versions of our product lines and further improving the use of multicore CPUs.

"How to cut parts faster is always a popular topic."

"What advantage does increasing the number of cores in a processor give us as a software developer and does the reality actually live up to the hype? The benefit offered by Delcam PowerMILL is that parallel processing is used in both foreground and background calculations," McMinn asserts. "It allows you to prepare, calculate, or edit toolpaths in the foreground while calculating other toolpaths in the background, with minimal degradation in processing speed. This is what Delcam terms background processing. It works on any hardware, but the benefits are greater on multicore machines."

Parallel processing performs different parts of a complex calculation at the same time, he adds. "Essentially, this takes a single function and processes it on all the cores in the CPU chip to reduce overall calculation time," McMinn explains. "We have further enhanced our multithreading capabilities in our core CAM technology, and this functionality is now being released across all of our CAM product lines this year."

Delcam's 2011 product versions support 64-bit chip sets and 64-bit Windows, according to McMinn, who adds that this technology increases the size of data that customers can process. The 64-bit versions of PowerMILL and PowerSHAPE have already been released, and Delcam will release 64-bit versions of FeatureCAM, ArtCAM, and Delcam for SolidWorks within the next few months. Visitors to Delcam's booth will see these new software releases running on an HP Z workstation that will be given away after IMTS, showing how the packages improve user productivity, he says, with concrete demonstrations of how shops can benefit from the company's approach to multithreading.

Technical trends in CAD/CAM continue to drive toward a familiar goal—making sure shops can get the most out of the equipment they have on the shop floor, notes Ben Mund of CNC Software Inc. (Tolland, CT), developer of Mastercam. "In

the past year or so we've seen this expressed as a push for better finishes and faster cut times," Mund states. "Specific examples of developments to support better finishes include new forms of 'toolpath smoothing' and smart hybrid toolpaths. Smoothing is a technique that refines a toolpath you just created, adjusting the cut on a micro level, within the user's preferences, to ensure a result that eliminates as many tool marks as possible. Hybrid toolpaths switch between two or more distinctly different cut types within a single toolpath, evaluating the geometry and choosing the best strategy for each area as it completes the part," Mund adds. "There are also many examples of advancements in reducing cut and toolpath generation time. These range from additional smart toolpaths that engage the material in the most efficient way possible to techniques that split processing on a multicore computer fast calculation."

"As the software becomes more robust, added complexity is inevitable."

At the Mastercam booth, visitors will get their first look at Mastercam X5, which includes Smart Hybrid Finishing, multi-axis machining, hybrid machining, and new dynamic-milling techniques. "Smart Hybrid Finishing intelligently blends two efficient cutting techniques in a single toolpath," Mund says. "This new toolpath evaluates the model shape and smoothly switches between Constant Z and Constant Scallop machining. The result is a dramatically finer finish with less work."

The new OptiRough toolpath in Mastercam provides faster cut time, all within a single toolpath, he notes. "It is designed to remove large amounts of material quickly. Large, aggressive cuts are followed by fast, smaller up-cuts, which safely deliver a fully roughed part, faster than ever," Mund says. Mastercam's multi-axis suite also features new machining techniques and a new, streamlined, workflow-oriented interface that provides users with only the specific toolpaths needed, depending on what work you are doing.

NC simulation and verification software has been simplified, enhanced, and modernized as both manufacturing and the computer industry have evolved, notes Bill Hasenjaeger, product manager, CGTech Corp. (Irvine, CA), developer of the NC software package Vericut. "As more features are added and the software becomes more robust, added complexity is inevitable," Hasenjaeger says. "Every few years we review and refresh Veri-

cut, focusing on how customers use the software, and how we can make it better fit a modern manufacturing environment."

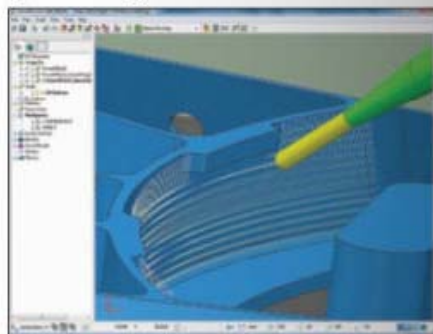
"In the latest release, we designed Vericut's user interface to create a more natural and obvious sequence to the most common user actions," he says. "We created an interface with a top-down flow through a graphical tree layout, with context-sensitive choices that appear as the user moves along the NC program simulation process."

At IMTS, CGTech will exhibit Vericut 7.0, which features significant performance-improving enhancements that reduce the time required for manufacturing engineers to develop, analyze, inspect, and document the CNC programming and machining process, Hasenjaeger says. "Instead of focusing on new features or add-on modules, CGTech developer resources focused on diligent code optimization and customer-driven enhancements," he adds. "We will also be demonstrating Vericut Composite Applications at IMTS, which are machine-independent off-line programming and simulation software solutions for composite tape and fiber placement CNC machines." These packages include two applications, Vericut Composite Programming (VCP) and Vericut Composite Simulation (VCS). In addition, CGTech has also been working on a product for programming and simulating large CNC drilling and fastening assembly machinery, Hasenjaeger notes, which should be available for release around the end of this year and will be previewed at IMTS. **ME**

— Patrick Waurzyniak

Multithreaded CAM

Company will showcase its PowerMILL CAM software's new 2010 release that features the latest background processing and multithreading technologies available in recent hardware. Updated package takes advantage of these two developments to reduce calculation times by up to 25%, although speed improvements will depend on the size and



complexity of the part, and the addition of 64-bit technology removes memory limitations of 32-bit computers, allowing more efficient toolpath generation, especially while