

Manufacturing[®] ENGINEERING

www.sme.org/manufacturingengineering

**Manufacturing
for the Amputee**



**Laser
Technologies**

**Lasers Advance
in the Third
Dimension**

**Lasers Seal the
Deal in Medical**

Controller Halves Machine Cycle Time

A new line of machine tools to be sold by GBI Cincinnati Inc. (Cincinnati) will employ a high-speed, multiprocessor controller from Miceli Technologies Inc. (MTI; Essex, Ontario, Canada) capable of simultaneous eight-axis, 50,000-blocks/sec processing speed. This processing capacity allows the new line of machines to achieve constant machining velocity, and thus allows the machine builder to guarantee a 50% reduction

chased from a varied supply chain. Machines will be built by Saginaw Machining Systems (SMS; Saginaw, MI), and will be offered under the GBI brand.

Also partnered with GBI Cincinnati and MTI is Velocitech CNC (Florence, KY), which licensed the marketing and distribution rights to the technology developed by MTI. Kevin V.G. Bevan, president of GBI, Tom Johnson, and Rich Ormrod are joint owners and partners in Velocitech.

Conventional controllers, according to Ormrod, have a look-ahead processing capacity of 600–3000 blocks/sec. High-end controllers may provide 5000 blocks/sec. The great expansion of processing capacity, to 50,000 blocks/sec for eight simultaneously controlled axes, has a significant effect upon machine tool performance.

Because the controller can handle the very high volume of data that describes, in detail, the cutting tool path, the cutting head can maintain a nearly constant speed over the workpiece. This constant velocity along the cutting path eliminates the acc/dec experienced by the cutting head as a conventional controller moves it through a complex contour. Maintaining constant velocity over the workpiece, i.e. sustaining a cutting speed over the workpiece that is very near to the programmed speed, enables a guaranteed reduction in cycle time of 50%, according to

Carlo Miceli, president of MTI. This guarantee applies to milling parts with complex contours, not to turning.

Miceli describes the MTI controller as having 80 smart data buffers, as compared to the four buffers found in conventional controls. The unit has 256 MB to 2 GB of RAM, and from 80 to 200 GB of hard drive memory. Able to run any CAD/CAM brand that can run in a Windows XP environment, the controller can handle mid-program restart without difficulty. In fact, such restarts can be handled in four different ways—by line number, block number, percentage of program run, or by



Line of machine tools offered by GBI Cincinnati Inc., designated the *Revolution* line, will include units aimed at the aerospace, medical, and general-machining/die-mold areas.

of cycle time when milling complex prismatic parts. Also, the MTI controller will be offered as a retrofit to machine tool brands now in use in North America, with GBI Cincinnati serving as the exclusive source for the controller through its distributors.

Designated *Revolution*, the new line of machine tools will include three units designed specifically for aerospace, medical, and general machining/die-mold applications. The base castings for the machines will be supplied by the Feeler Division of Fair Friend Enterprises (Taiwan), while drives, ballscrews, and other components will be pur-

having the operator position the cutter over the workpiece and start.

Miceli says that his company began developing its CNC approximately six years ago, but the technology on which it's based has been under study by various groups since 1968. He refers to the MTI controller as a Constant Velocity Controller or CVC. It has dedicated processors wherever necessary to manage data (Miceli will not specify the exact number or type of processors used in the design.) The front end employs a Windows XP Pro environment, and the controller can accept 253 tools/tool table, and an unlimited number of tool tables. Miceli emphasizes that the 50,000 blocks/sec processing speed is the minimum achieved when interpolating eight axes; in a three or four-axis system, the controller is faster. It comes with a hand-held pendant that can manage six axes. Content-specific help for the operator is available at the control. Miceli describes the controller as network-ready, and says it can perform offsets on the fly for blending in real time on all three axes, and negative or positive quadrature.

A conventional look-ahead system relies on feedback as the machine operates; the MTI controller calculates look-ahead before the machine starts and adjusts cutter movement as the machine runs. Its data-processing capacity enables the controller to monitor operations and update tool-paths in real time. Calculations in the controller, according to Miceli, are cut off at 15 decimal places, and the system monitors encoder counts at four million counts/sec. He describes the controller as highly scalable. Power can be added to the base version of the controller at a relatively low cost. So while there's a price differential between the top end and base version,



Named *Revolution*, this new line of machine tools comes equipped with the Constant Velocity Controller (CVC) from Miceli Technologies Inc.

that difference is not as great as is seen when looking at conventional controls of varying capability.

As of March, there have been approximately 70 retrofits of the MTI control to existing machine tools. A controls kit has been developed by Velocitech CNC for Fadal machine tools that permits retrofit of the new controller in two to three days, and the GBI/Velocitech/MTI team intends to develop kits for other machine tool brands. The control can be fixed to a machine, or mounted to a mobile stand near the machine tool. Now in development, a full-blown dual-display workstation designed by MTI will permit engineering changes, cutter path changes, and other adjustments on the fly, at the machine.

To ensure that the new machine-tool line is focused on market needs, a committee of representatives from five key GBI distributors will be established to suggest features and specifications for *Revolution* machines.

Bevan states that current plans, which are subject to revision, call for

the 40-taper general-purpose/die-mold *Revolution* machining center, the model CV4020, to be offered with a 12,000 rpm, 25-hp (18.7-kW) spindle (18,000, 20,000, and 24,000-rpm units are optional). It will have a 24-tool magazine and a double-arm toolchanger rated at 1.9-sec chip to chip (1.0 sec optional). GBI will use linear guides on the X and Y axes and a box way on Z. The CV4020 will be exhibited at EASTEC 2008.

The machine designed for the medical market, the CV3020apc, will have a 15,000-rpm spindle (30,000 rpm optional) rated at 25 hp, a 24-tool magazine and 1.9-sec chip-to-chip double-arm toolchanger, linear guides on X, Y and Z, and a built-in pallet shuttle. Designed for aerospace work, the *Revolution* CV6030 VMC will come with a 15,000 rpm (20,000 rpm optional), 37-hp (27.6-kW) spindle and the same 24-tool magazine and toolchanger as the CV4020 and CV3020. It will have linear guides on X, Y, and Z, and will offer 1400 ipm (35.6 m/min) rapids.

Join The **REVOLUTION!**

**Our Revolution™
Series Machine
Tools are the
Most Efficient in
the Industry –
GUARANTEED!***

**Come see the Revolution
at Eastec and IMTS!**
Eastec Booth #1357
IMTS Booth #A8735



What if...

- American manufacturers could again compete globally!
- Your company was viewed as a technology leader!
- You were to double your profits guaranteed!*

Contact us today to join the Revolution!

* in predetermined applications

Revolution Machine Tool Models Specifically
Designed for the following industry applications

- **General Purpose / Die Mold**
- **Aerospace**
- **Medical**

GBI
CINCINNATI

6899 Steger Drive
Cincinnati, Ohio 45237
(513) 841-8684
www.gbincincinnati.com