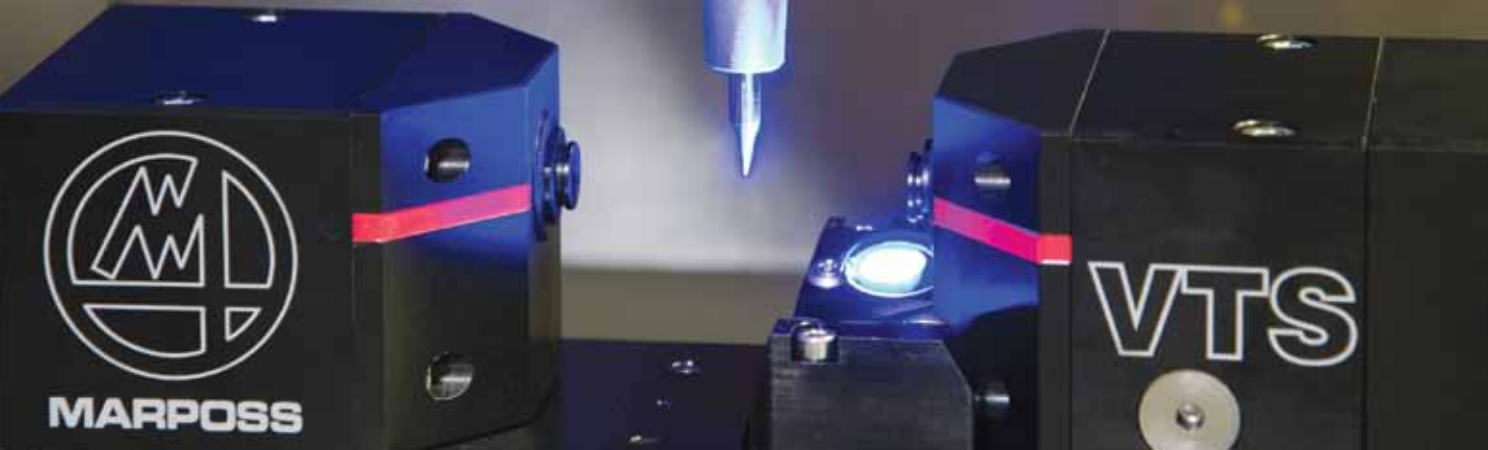


Marposs new generation diamond MIDA VTS visual tool setter addresses the micro and high-precision part processing manufacturing requirements of the aerospace, aeronautical, biomedical, and die mold industries.



Presetting Technology Maxes Out Production

*Good tool management guarantees
process performance*

Jim Lorincz
Senior Editor

There are still some shops, principally smaller ones, that haven't made the decision to adopt the latest advances in tool presetter hardware and tool management software systems. One reason is the aversion of shops to invest in technologies that don't make chips, as if that's the only way to fatten the bottom line. At the heart of the choice is a long discussion of presetting tools offline versus the old fashioned way of touching off tools on machines, while they are sitting idle, to collect and store tool measurement offset data. Tool presetting solutions range from basic dial indicators or shadow graphs and projectors to camera systems and lasers with communications provided by machine readable chips and RFID. Along the way, the evolution of presetter technology has minimized or eliminated operator interpolation and transcription errors, minimized machine downtime, and opened the door to analysis of tool performance data. In keeping with the digital world of Industry 4.0, tool management software is available that provides users the ability to manage and analyze all aspects of their tooling from the toolcrib to the shop floor.

Speroni Tool Presetting Works from Toolcrib Outward

"If you're still touching off on the machine, you're losing one hour per shift in productive machining time—as much as one-to-three hours every day depending on the number of shifts," said Douglas Sumner, product manager-Speroni tool measuring, BIG Kaiser Precision Tooling Inc., (Hoffman Estates, IL). "And that leads to lost production. The Speroni presetter strategy is to work from the toolcrib level outward. Once you start presetting, not only do you get X and Z dimensions, but you can also check runout, minimally less than 0.0005" [0.013 mm]. The result is that you are going to get better tool life with the side benefit of being able to analyze tooling costs and generate reports based on tooling performance."

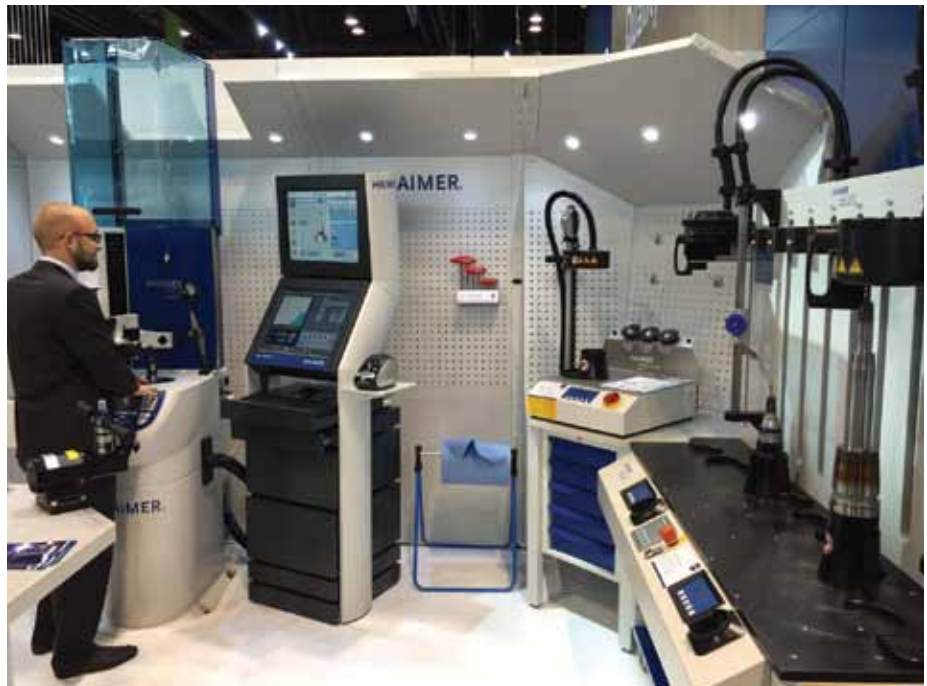
Speroni's products include the Magis benchtop tool pre-setting and measuring system that features a single screen user interface and the modular Speroni Futura high-precision tool presetting system. The Magis line is available with manual motion, gravity feed, tool clamping and CNC spindle to do runout checks. "The one camera system with easy controls can measure height and diameter, cut path measurement of the tool by rotating the tool and locking in the greatest height and greatest diameter, as well as check runouts. Magis is our best seller with 400, 500, and 600-mm lengths and 14" [356-mm] diameters. With the Magis we guarantee 0.0003" [0.008 mm] 16" [406 mm] out of the spindle," said Sumner.

"Speroni Futura is a high-precision modular tool presetting system designed to achieve repeatable precision of 1 μ m or better. The Futura is available with all manual motion without clamping. Clamping, high-precision spindle, CNC operation, and RFID can be added. With the Speroni Futura, and a high-accuracy spindle, we'll guarantee 0.0001" [0.003 mm] maximum runout 16" out of the spindle," said Sumner.

The Speroni Futura AutoShrink is an integrated presetting and shrink-fit system that was developed for the auto industry.

The newest system was introduced as a hands-off, fully automatic and operator independent and completely safe solution in terms of functionality.

At IMTS, BIG Kaiser showcased in a cell the fully automated Speroni Futura AutoShrink CNC tool presetter shrinking and unshrinking tooling with the aid of a FANUC LR Mate 200iD robot, plus a FANUC M-710iC robot with a Unilock Twin Pin Gripper loading and unloading workpieces from a FANUC RoboDrill a-D14SiA. The common interface is BIG Kaiser's Unilock automation workholding for pallets and tables.



At IMTS, Haimer exhibited its compact TD Preset and Tool Management System which includes optimized tool storage and work surfaces for heat shrink, dynamic balancing, and inspection of milling cutters. Haimer's Sebastian Kögl is balancing and inspecting a milling toolholder (left). Induction heat shrink machine is seen at right.

"We've added a tool presetter that will be tended by a smaller robot," said John Zaya, product manager-workholding. "Previously, if you wanted to use the heat-shrink machine, the operator would have to manually handle the cutting tool a few times during the process. We're taking the operator completely out of the loop and having the robot load the toolholder into the tool presetter, loading a setting bushing and also the tool into the setting jig. It won't be much faster but it allows the customer to have multiple tools that are going to be loaded and unloaded in the presetter much faster and possibly for overnight applications rather than shutting down once a tool has reached its excessive wear point," said Zaya.

Data Management Meets Stringent Process Requirements

Solutions from Zoller Inc. (Ann Arbor, MI) are capable of meeting the most stringent requirements for process reliability and traceability. Zoller's product range includes hardware for tool presetting, measuring, and inspection and automation and software. Zoller systems satisfy requirements for 100% inspection, gapless documentation, and traceability. These are recognized as the foundation for Industry 4.0 consolidation of all tool data in a centralized database with process-reliable data exchange between machines. Using the automation solution roboSet, there is even the opportunity to fully automate quality assurance.

For easy and fast tool presetting and measuring the new image processing technology "pilot 3.0" software offers all functions for presetting any kind of tools quickly and easily. Examples of functions include "automatic cutter shape and measuring range detection," navigation system "compass," "projector function and cutting edge inspection," "cris360" to determine the effective cutting area of tools, and a clear representation of the tool cutting edge on a panel PC.

The Zoller tool presetter "smile" with "pilot 3.0" is robust enough to be used on the shop floor next to CNC machines, as well as in processing and test centers, or in quality assurance measurement rooms. All standard measuring functions are available, including longitudinal and cross dimensions, radius, two-angle technology, and concentricity and run-out. Zoller's identification code offers an efficient solution for tool identification and data transfer, especially for small to medium-sized companies. The procedure of this data transfer version doesn't require any network connection. The tools are measured by the Zoller presetting and measuring devices and the measured tool data are encoded in a QR code, which is printed on a label. Once the QR code is scanned with the reader, the data are automatically transferred to the control of the CNC machine, eliminating the possibility of error resulting from manual data entry via typing.

In Zoller's vision of the smart manufacturing future of Industry 4.0, shops and plants will not only need top-notch physical tools for their machines, but also their digital twins for work preparation. To answer that need, Zoller offers not only solutions for 100% inspection and documentation of physical tools, but also solutions for generating digital twins according to ISO 13399 (DIN 4000) with its new software

"digitalTwin" module, a valuable capability for tool manufacturers as well as grinding and sharpening companies.

Marposs Unveils the Diamond Visual Tool Setter (VTS)

At IMTS, Marposs Corp. (Auburn Hills, MI) introduced its new generation MIDA VTS visual tool setter to address the needs of micro manufacturing, including micro and high-precision part processing and mold production to meet the demand for accuracy in the aerospace, aeronautical, biomedical, and die mold industries. Due to the requirement for more elevated levels of precision, tools employed in such processes are made smaller and smaller, reaching diameters of 0.05 mm or less. As a consequence, these micro tools are redefining the rules of on-machine tool measurement, making traditional technologies inappropriate and less accurate.

The new compact VTS is much smaller than the original device, reducing the machine table area required. The VTS unit's main strengths remain its repeatability 0.2 μm , which is not affected by the limited dimensions, and the wide variety of relevant parameters, including length and diameter measurement, tool run-out, cutter radius, tool center, single cutter integrity, and thermal drift of machine axis.

"The basic principle of the VTS system is the measurement of tool dimensions through the processing of images taken by a CCD camera. Such technology allows checking tools as small as 0.004" [0.100-mm] diameter, reaching exceptional repeatability values of 0.2 μm , thanks to a system resolution of 0.1 μm ," said Sharad Mundra, MIDA probing product manager. "VTS is able to elaborate the variety of parameters listed above with the tool rotating at full spindle speed. The fact that the user does not have to slow the spindle down to check the tool implies reducing pre-setting time and increasing of measure accuracy. On the other hand, VTS can be also used to manually analyze tool surfaces, thanks to a continuous frontal light: the operator can see on a PC monitor the illuminated tool surface and evaluate cutter integrity."

The VTS unit is designed to be installed inside the machine working area. It incorporates a double protection system to provide high resistance to harsh machine environments. "By so doing, the measurement process is far more accurate as it takes place during the actual tool working conditions. Pneumatic shutters cover and protect the optical lens when VTS is not working. Furthermore, an air flow from the optical window forms an air barrier that rejects chips and

coolant drops, keeping the shutter side clean and protecting the optical lens when the shutter is open,” said Mundra.

With the Diamond high-precision products, tool pre-setting and verification, workpiece setup, and part inspection are realized by high-performance tool setters and spindle probes. Furthermore, the Diamond high-precision products can equip machines of different typologies and dimensions, thanks to the variety of implemented technologies: wired, optical, radio and visual/camera.

Haimer Finds Balance in Dynamic Tool Setting

At IMTS, Haimer USA (Villa Park, IL) exhibited its complete Tool Management System, which organizes all the tools needed for shrink fitting and balancing tools for the most challenging machining requirements and includes ample space for presetter, balancer and shrink fit machines. Haimer TD Presets Tool Dynamic presetting and balancing recognizes the challenge machine shops have faced in the last decade to increase cutting volumes in order to increase profitability in a highly competitive global market.

Tool Dynamic presetting and balancing machines are typically found in the toolcrib where a well-equipped toolcrib would have a shrink machine, a presetting machine, a balancing machine, and other inspection tools. TD Presets are

particularly economically attractive for customers who would like a balancing machine and a presetting machine and have limited floor space or have utmost need for precision/accuracy afforded by the patented high-precision spindle adapter in the TD Preset.

With machine shop operators needing to increase speeds, feeds, and depths of cut, the importance of balanced tools and toolholders has become more and more apparent. This is made especially clear through the increasing numbers of high-speed spindles that are being used and the trend toward larger taper machines for heavy-duty milling. Imbalanced tool holders cause chatter, bad surface finish, shorter tool life and increased spindle wear. This imbalance forces operators to slow down production, until acceptable tolerances have been attained, which in turn reduces machining profitability.

Haimer Tool Dynamic balancing machines are designed to provide highly precise measurements to ensure that tools are balanced to provide longer cutting tool life, especially running at high cutting speeds, and reduced machine spindle wear. To better organize all the tools needed for the setting, balancing, and inspection of tools, Haimer has designed and offers specially designed Tool Management Systems which were exhibited at IMTS with all the tools and work surfaces needed for TD Presets. ➡