

August • September 2016

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# CNC WEST

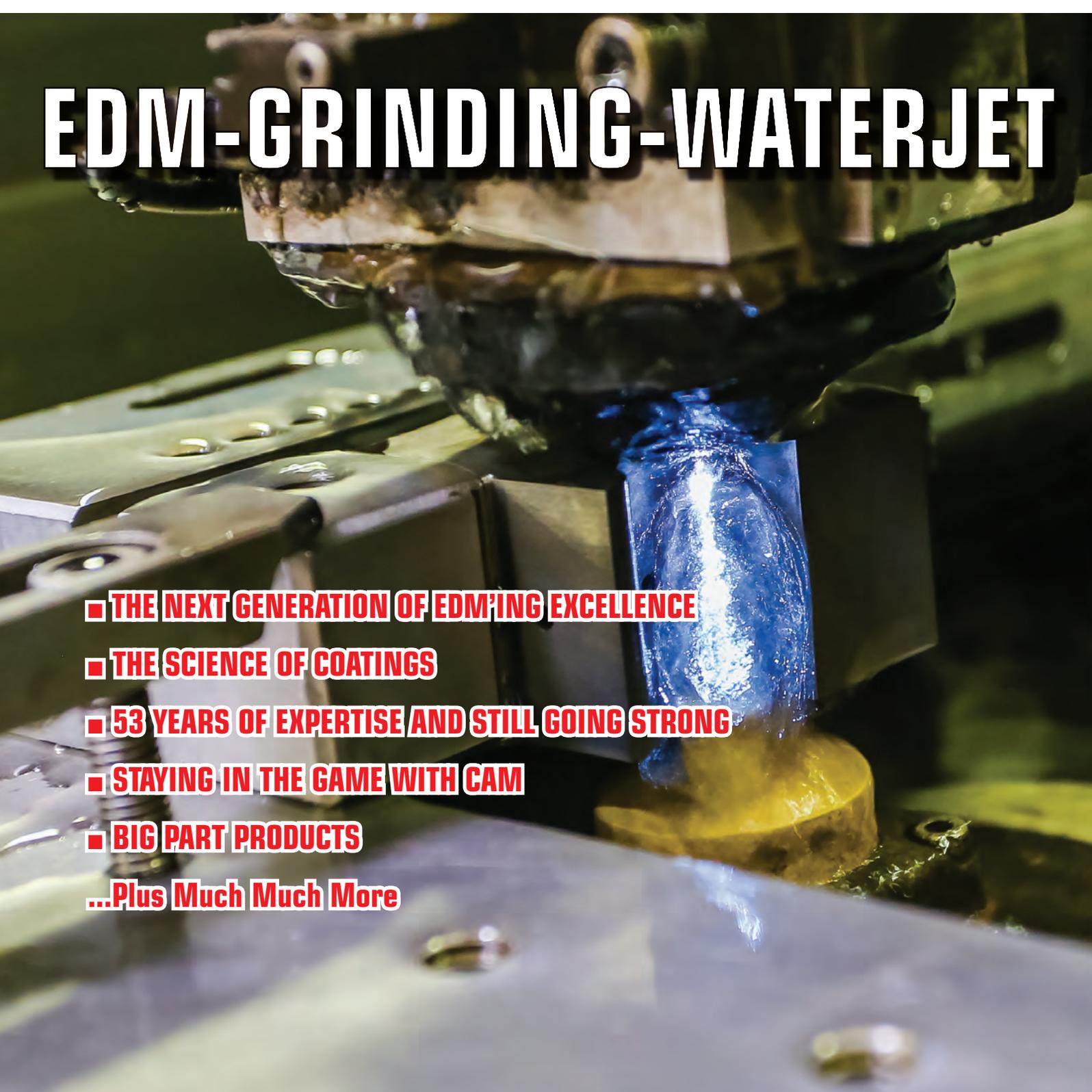
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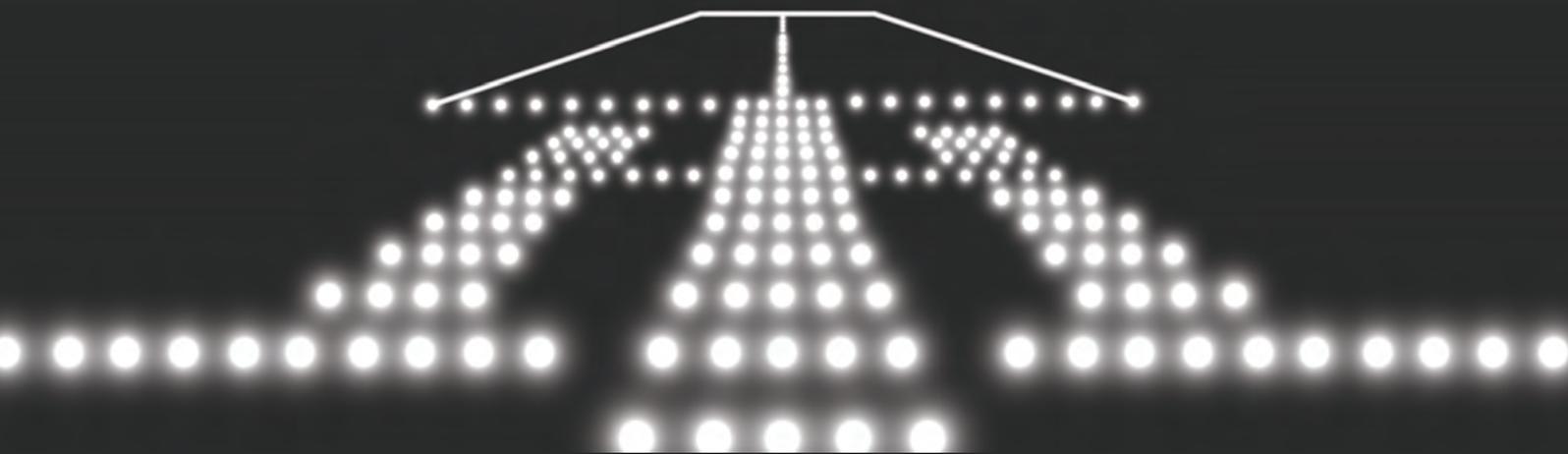


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# CNC West

August/September 2016 • Volume XXXIV No 6

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Franz Klarer honors the past and embraces the future at The EDM Shop  
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Dr. Kamal Upadhyia is a world renowned scientist with a Ph.D. from a renowned UK university in material science and engineering. He is vice president of technology at ACT Inc. and heads up their R & D department.  
- Pg.30



Greg Lange took the plunge and added waterjet to his facility and has not looked back  
- Pg.38

**Coming in Oct/Nov 2016**  
**Cutting Tools & Workholding** — Looking for innovative developments offering better, faster, more accurate cutting tools and material? This is the issue to search. Also look here for workholding, fixtures, sensors and tool management ideas. Also a Fabtech Preview

*Editorial: Sept. 20, 2016*  
*Ad Space: Sept. 26, 2016*  
*Ad Material Oct. 1, 2016*



**VOL. XXXIV NO. 6**  
**August/September 2016**

The oldest regional industrial publication serving the Western States manufacturing managers, owners and engineers from 1 employee to those larger plants of 5,000 or more. Its editorials feature numerical control applications in all size machine shops, tooling, programming, robotics and shop operations, training personnel, financing of new equipment, cutting tools and all related manufacturing requirements. Coverage extends to all of Arizona, California, Oregon, Washington, Nevada, Utah, Idaho, Colorado, New Mexico and Texas.

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# Do Tradeshows Matter??

We put together our biggest issue of the year and it is jam packed with IMTS press releases. Those releases go along with our normal assortment of shop profiles and feature articles. Looking at this issue I wondered to myself if tradeshows really matter any more.

It did not take much time for me to come to an easy answer. YES! As you scan through the many IMTS previews you will see that lots of companies will be debuting new products and technology. A lot of companies wait until shows like IMTS or WESTEC to present something new to the public.

And while IMTS is certainly not a western region show, this is a show that is mostly builders who have their distributors from all over the country working the booth. And while most companies want to sell you something from their booth, there is certainly a lot of education and information being passed along too. A savvy company or sales person will be sure to incorporate all of their latest technology and want to explain it to potential customers. This year's IMTS show in Chicago is packed to the gills with exhibitors. The exhibitors take booth space because they know there will be a large audience of attendees from all over the country (but mostly mid-west) and they can get some one on one time with potential customers and offer hands on information about their company or products.

From the attendee viewpoint they can see and touch and feel new technology. Seeing it on Youtube is one thing but to actually talk to someone or see a demonstration is another.

I hope you enjoy reading this issue with all the IMTS new product reviews and the feature articles and if you can't make the IMTS show I hope reading about it in CNC WEST is the next best thing.

Sincerely

*Shawn Arnold*

Shawn Arnold

Publisher

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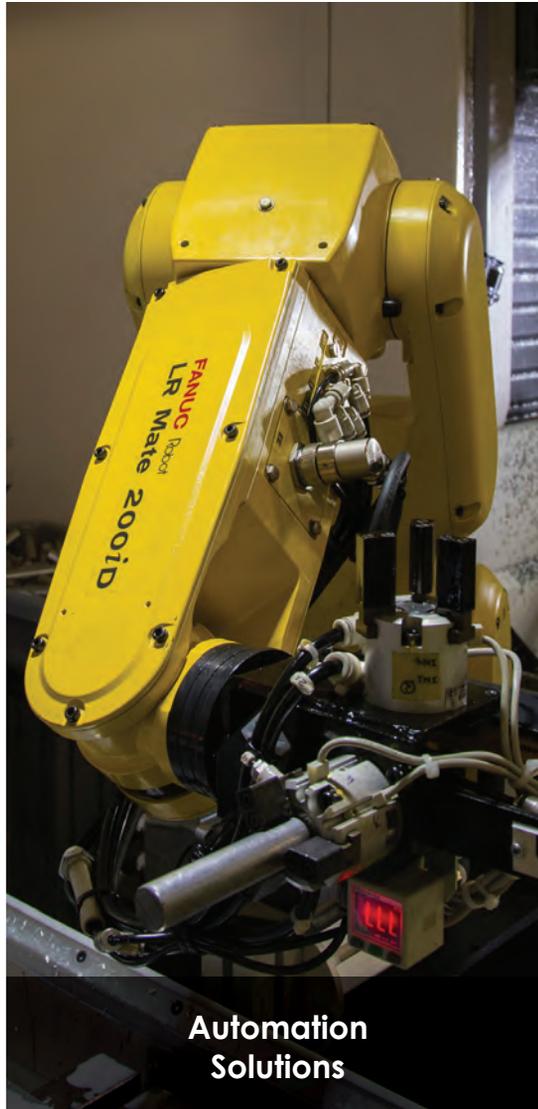


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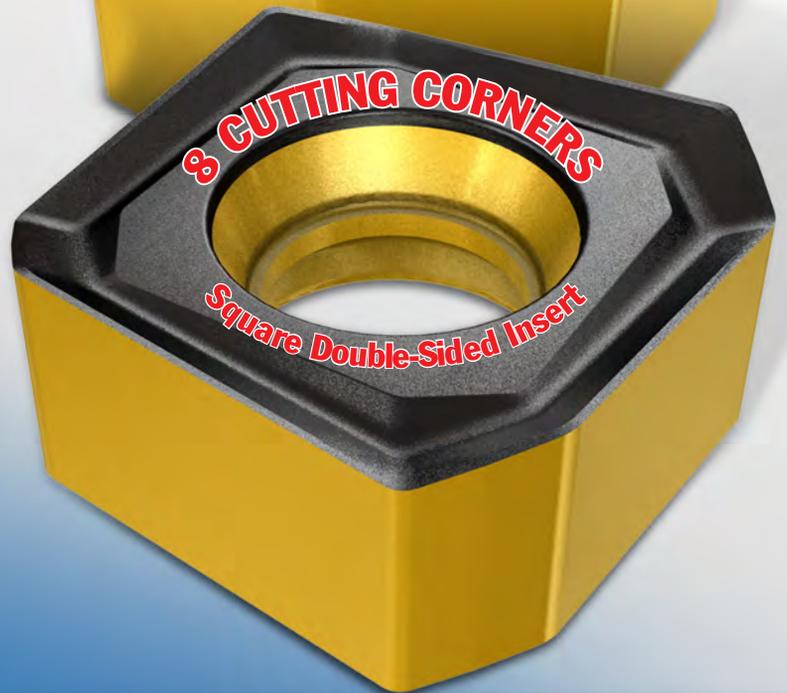
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# EXEC HOTLINE

## Lockheed Martin Prepares to Build Another Batch of Trident Submarine-Launched Ballistic Missiles

U.S. Navy strategic weapons experts are preparing to buy another batch of submarine-launched nuclear ballistic missiles that are capable of destroying city-sized targets virtually anywhere in the world.

Officials of the U.S. Navy Strategic Systems Program Office in Washington announced a \$21.8 million contract in July to the Lockheed Martin Space Systems segment in Sunnyvale, Calif., for long lead items to support the fiscal 2017 Trident II D5 missile production schedule.

The Trident II D5 is one of the most advanced submarine-launched atomic missiles in the world. Each Trident II missile has a range of 4,000 to 7,000 miles. The Trident II D-5 was first deployed in 1990 and is scheduled to remain in service until at least 2027.

Long-lead items involve system components that require the longest time to build, which could delay overall system production if money isn't allocated for production early in the process.

Lockheed Martin won a potential \$1.48 billion Navy contract for new Trident II (D5) missiles, D5 life extension development, and production, and D5 deployed systems support.

Lockheed Martin will do the work in Sunnyvale, Calif., and should be finished by September 2021.

## Boeing Awarded \$127M. Deal For New Air Force One Work

Boeing will begin developing interior, power and electronic specifications for the next-generation "Air Force One" under a \$127.3 million contract awarded by the US Air Force on July 15. The award is intended to reduce the risk of delays and cost overruns before the USAF commits to full-scale development and procurement of up to three 747-8s, the Defense Department says in a contract award bulletin.

Last year, the USAF announced the selection of the 747-8 to replace a fleet of two 747-200-derived VC-25s, which are commonly known as "Air Force One" when the US president is flying onboard. Both 747-200s will be 32 years old when the 747-8 replacement is

scheduled to be declared initially operational in 2023.

## Bellevue, WA. 8th Graders Win International Rocketry Challenge

A team of 8th graders from a public middle school in Washington state has won the International Rocketry Challenge in London.

Five students from Odle Middle School in Bellevue beat out teams from Japan, the United Kingdom and France to win the July competition at the Farnborough International Airshow. The teams designed, built and launched rockets that had to reach an altitude of 850 feet within 44 to 46 seconds. The rocket had to carry two raw eggs.

The team, named "Space Potatoes," represented the U.S. in the international contest after beating out more than 780 teams across the country in this year's Team America Rocketry Challenge. The team was sponsored by Raytheon Co.

## NASA Selects Five Mars Orbiter Concept Studies

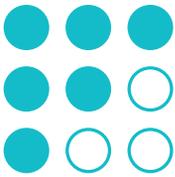
NASA has selected five U.S. aerospace companies (four western region based) to conduct concept studies for a potential future Mars orbiter mission. Such a mission would continue key capabilities including telecommunications and global high-resolution imaging in support of the agency's Journey to Mars.

The companies contracted for these four-month studies are: The Boeing Company in Huntington Beach, California; Lockheed Martin Space Systems in Denver; Northrop Grumman Aerospace Systems in Redondo Beach, California; Orbital ATK in Dulles, Virginia; and Space Systems/Loral in Palo Alto, California.

"We're excited to continue planning for the next decade of Mars exploration," said Geoffrey Yoder, acting associate administrator for NASA's Science Mission Directorate in Washington.

The concept studies will address how a potential new Mars orbiter mission could best provide communications, imaging and operational capabilities. They also will assess the possibilities for supporting additional

Continued on page 122.....



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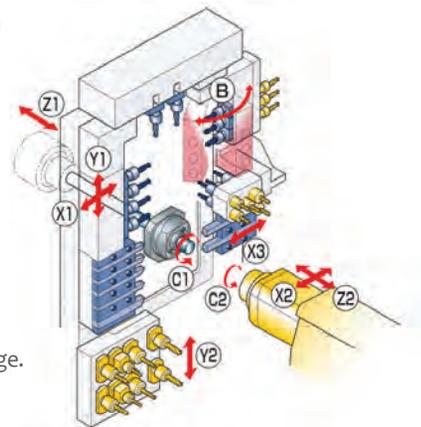
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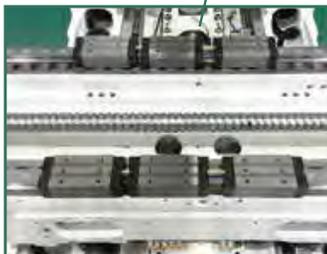
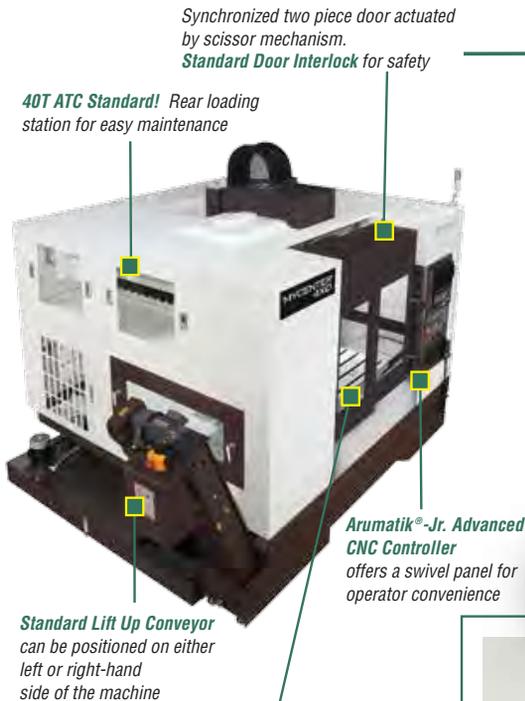
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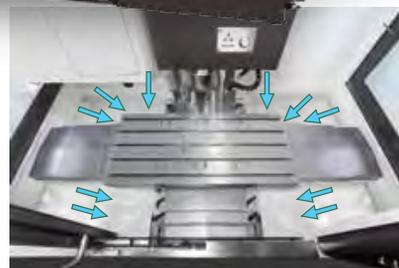
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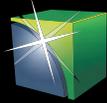


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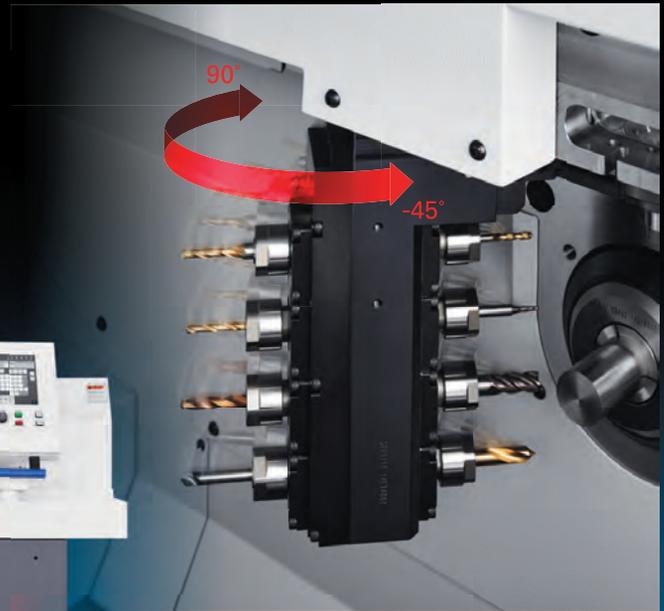
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For 1.5mm x 60° Serration Chucks					STEEL SOFT JAWS		ALUM. ROUND JAWS		
Model	Chuck Size	Groove Width	Screw Size	Hole Space	Hgt Inch	Part Number	Set Price	Part Number	Set Price
Kit B206 HS06	6"	0.472	10MM	0.787	2"	KT-6200F	\$ 30.31	RKT-6200A	\$ 71.87
Kit B208 HS08	8"	0.551	12MM	0.984	4"	KT-8200F	\$ 96.81	RKT-8200A	\$ 108.89
Kit B210 HS10	10"	0.630	12MM	1.181	2"	KT-10200F	\$ 44.31	RKT-10200A	\$ 124.97
Kit B12 HS12	12"	0.709	14MM	1.181	2"	KT-12200F	\$ 63.49	RKT-12200A	\$ 169.18
Kit B212 N212	12"	0.827	16MM	1.181	2"	KT-12208F	\$ 63.49	RKT-12208A	\$ 169.18
					3"	KT-12308F	\$ 95.20	RKT-12308A	\$ 255.14

\*For Pointed Soft Jaws, replace the "F" at the end of the part number with "P" & add \$3.25 per set.

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- Black oxide for long life
- 2 steps (1 step also available)

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Chuck Model	Chuck Dia	Part Number	Price Per Set
B-206, HS06	6"	KT-60HJ2	\$328.76
B-208, HS08	8"	KT-80HJ2	\$388.96
B-210, HS10	10"	KT-100HJ2	\$463.06
B-12, HCH12	12"	KT-120HJ2	\$500.09
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Length	Height	Width	Part Number	Reg. Price	PROMO!
6"	2"	3/4"	VJ-601-10	\$ 143.50	\$ 101.95
6"	2"	1"	VJ-602-10	\$ 159.30	\$ 119.95
6"	2"	1-1/4"	VJ-603-10	\$ 188.50	\$ 146.95

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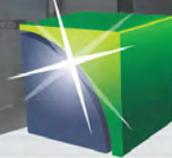
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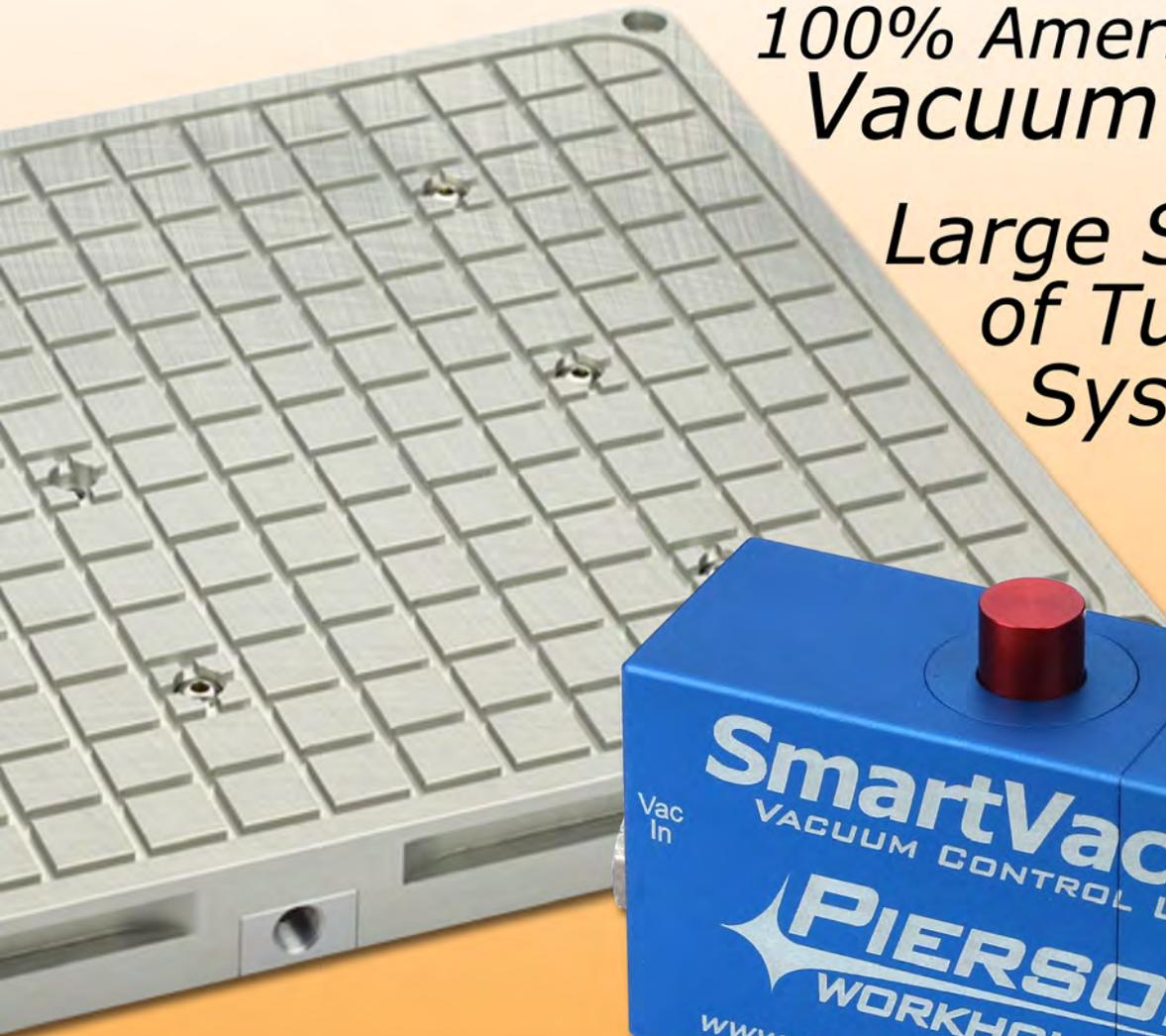


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# EDM

## Makino EDNC21 Sinker EDM: Dual Heads Reduce Process Time for Large Mold Tooling

Makino's EDNC21 sinker EDM with dual heads provide what Makino calls an industry-changing advantage by improving productivity and lowering the tool build time for large molds. The EDNC21 also includes Makino's latest EDM innovations and developments including the Hyper-i control, HyperCut technology, and new HS-Rib high speed Z-Axis.

"As the design complexity of extra-large workpieces, such as automotive bumper and fascia molds, continues to grow, manufacturers must identify new means for processing a wider variety and volume of small intricate features with maximum throughput," explained Brian Pfluger, Makino's EDM product line manager. "The dual-head configuration of the EDNC21 enables shops to process multiple fine details in a workpiece at the same time, significantly reducing total processing time. Due to its rigid and precise construction, the EDNC21 is capable of achieving the same level of accuracy and surface finish as sinker EDM machines one-tenth its size."

The EDNC21 offers a sizable work envelope of 122.0 inches by 70.9 inches by 39.4 inches to accommodate extra-large workpieces, such as automotive bumper and fascia molds. The X-, Y- and Z-axes of the machine provide cumulative travels of 78.7 inches, 59.1 inches and 23.6 inches, respectively. Each of the EDNC21's gantry-style heads are capable of traveling up to 78.7 inches and is independently controlled and programmed using a dedicated Hyper-i control system for each head. The EDNC21 provides a total workpiece payload of 22,047 lbs. and accommodates electrode weights up to 662 lbs. per head.

The design of the EDNC21 includes a programmable rise-and-fall front door for easy operator access during setup and operation. Door height, which controls dielectric fluid level, can be set to match the height of the workpiece providing optimum viewing of the machining operation.

Every Makino EDNC-Series machine also includes these features: High-mass castings to ensure mechanical and thermal stability. A Stationary table for accurate positioning regardless of workpiece size or weight. Space-saving integrated reservoir in the base casting. And dual-anchored, direct-drive ballscrews.

Similar to other EDNC-Series sinker EDM machines, the EDNC21 is designed with Makino's proprietary Hyper technologies, which ensure an ideal mix of speed, finish, and reduced electrode wear.

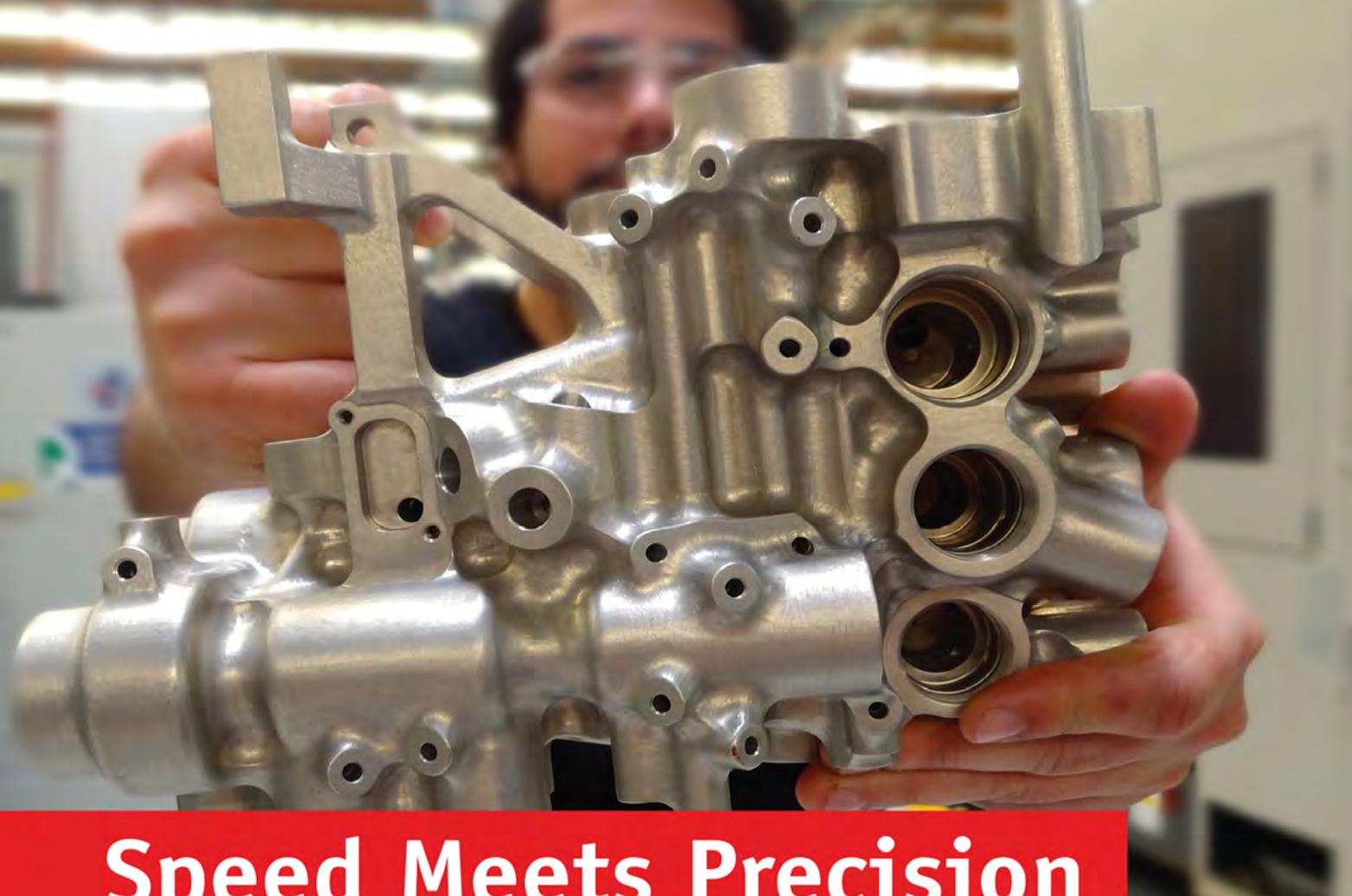
HyperCut technology is a new generator function that Makino reports increases power levels without requiring additional reduction on the electrode, and it improves roughing speeds by up to 30 percent without affecting workpiece accuracy or surface quality. The technology minimizes electrode wear.

Each EDNC-Series machine is equipped with the new Hyper-i control system, which is the same system used on Makino's wire EDM products, signifying a standardization of Makino's EDM machine controls. According to Makino, Hyper-i improves productivity by streamlining and simplifying the machine interface so that operators of all skill levels can achieve the most efficient results. Its 24-inch high-definition monitor provides touch-screen technology similar to that of smartphones and tablets, enabling the use of pinch, swipe and spread movements to select machining conditions for workpiece and electrode material type, and the desired feature shape and surface finish. The user friendliness of the Hyper-i control is further enhanced with the integration of on-board digital manuals, intelligent E-Tech Doctor help functions, and an e-Learning training system.

SuperSpark IV is an advanced adaptive control technology that optimizes the machining discharge power and electrode jump motions during roughing and finishing operations. This technology is especially effective on rib or drafted electrodes; and, when combined with HyperCut settings, Makino reports it can reduce total machining time by up to 50 percent.

All EDNC-Series sinker EDMs can be equipped with Makino's proprietary High-Quality Surface Finish™ (HQSF) technology. The HQSF technology can extend tool life through improved surface integrity, and can also reduce cycle time even when fine surface finishes are not required.

The HS-Rib Z-axis configuration reduces rough machining speeds of small electrodes, such as plastic injection tooling ribs or pin gate details, and provides enhanced jump speeds of up to 20 m/min.



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# THE EDM SHOP

Article and Photos by Sean Buur



Franz Klarer took the helm of The EDM Shop in 2012.

## THE NEXT GENERATION OF EDM'ING EXCELLENCE

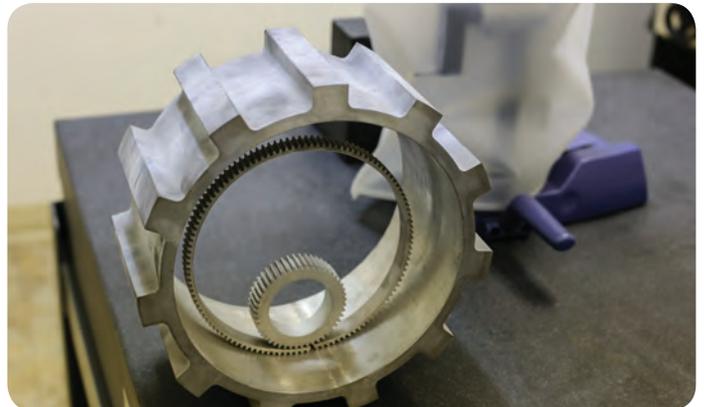
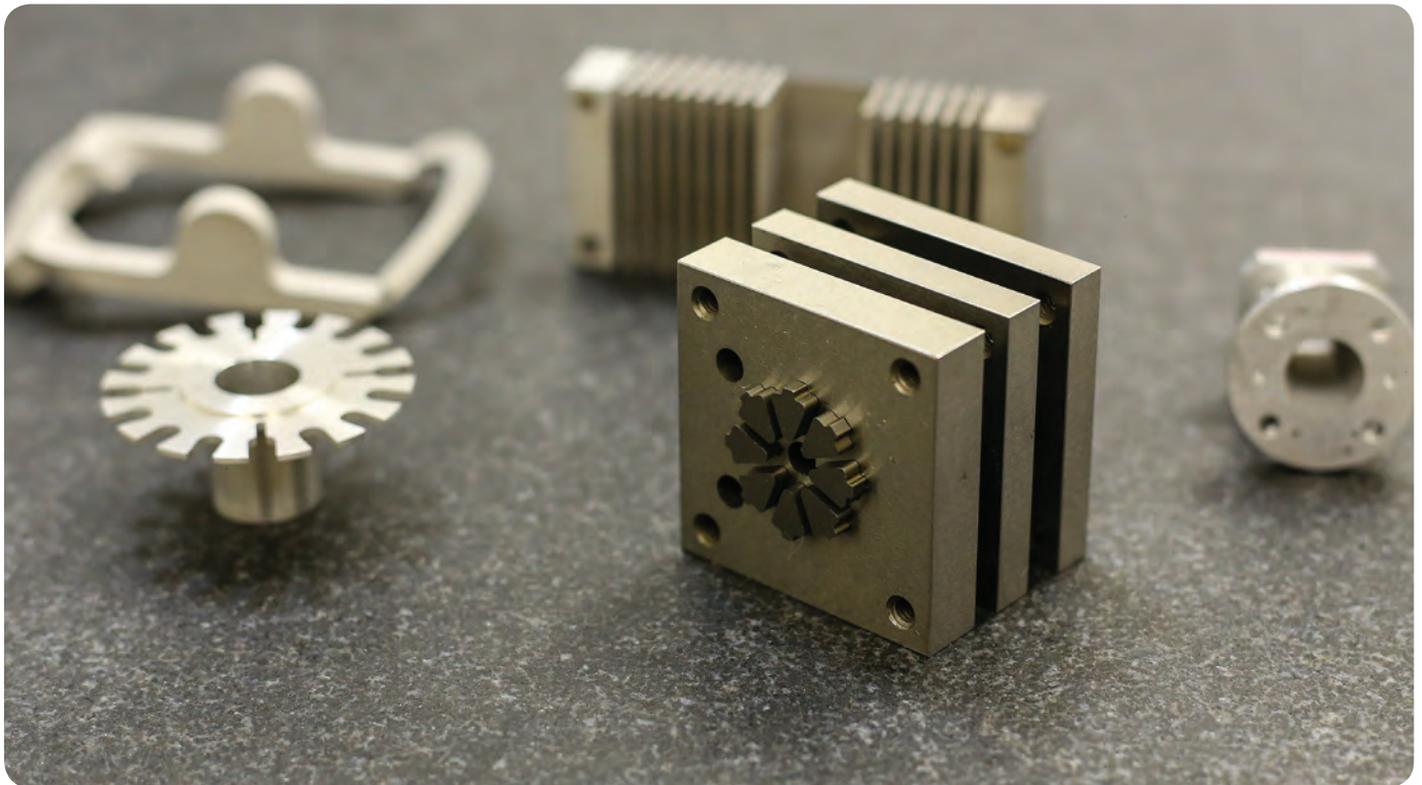
Franz Klarer Sr.'s history with Electric Discharge Machining (EDM) dates back to its inception. Born in Switzerland, he served his apprenticeship with Georg Fischer before coming to America to work as a service technician for Agie. "My dad spent a lot of time trying to explain EDM to guys back in the day," describes Franz Klarer Jr. "It was new back then and people didn't get it. Even today, those in the manufacturing business often misunderstand the EDM process. By discharging electricity in a controlled fashion, we create sparks that melt and vaporize the metal of the piece we are shaping. The wire or electrode never actually touches the material." EDM customarily bridges the gap where traditional machining can't get to. An example would be very sharp corners or boring a perfect square into the middle of a part. When you can't mill it, the EDM Shop can probably still machine it. Many of The EDM Shop's parts come in nearly complete and their job is to finish it off with an operation or two. "I think some shops turn away work because they can't do it all in house and are not familiar with EDM capabilities," add Franz Jr. "If it conducts electricity we can machine it."

Franz Sr. parted ways with Agie to go into business for himself and opened several EDM manufacturing facilities in the area before pulling the trigger on The EDM Shop in 1994. Franz Jr. tells how his mom ran a day care out of the front of Swiss Wire in Costa Mesa, Ca. and how he grew up on the shop floor. "When I was big enough to push a broom I pushed, and when I could reach the tanks I cleaned out the sludge," jokes Franz Jr. "I was running the hole poppers in Jr. High school and progressed up through the wire EDM and into the sinkers when I was in high school. My career literally started in my crib in the front office at Swiss Wire."

While working full time at the EDM Shop, Franz Jr. graduated from Pepperdine with a degree in business. "After graduation I was doing my own thing, starting at the bottom," explains Franz Jr. "My dad came to me and said he was going to retire to Wisconsin and asked if I wanted to take over the business. I'd already worked my way up in his business, so it was an easy decision. It seemed like a great opportunity for me to honor what he had built over the years and still give me the ability to create something uniquely mine." Early 2012 Franz Jr. took the reigns of The EDM Shop and began the process of making it his own.



The EDM process is often misunderstood even by those in the manufacturing business. By discharging electricity in a controlled fashion, it creates sparks that melt and vaporize the metal of the piece they are shaping. The wire or electrode never touches the part.



The versatility of having both sinker and wire EDM machines allows The EDM Shop to manufacture parts varying in size and complexity.

Franz Sr. was a master machinist, but EDM was his specialty. He could do everything from running the machine to taking it all apart and fixing a circuit board. He was also old school and new technology was not his forte. “My dad is the most brilliant machinist I know,” touts Franz Jr. “But he was a little behind the times in how he did things. He programmed by pushing older software to the limit instead of trying more user friendly and intuitive modern versions. All the paperwork was done by hand and stuffed in file cabinets.” Becoming digital and modernizing the company was a top priority for Franz Jr. He paid a person for months to come in and type everything into the computer. He purchased E2 shop management software and has begun the process of AS and ISO certification. “We are AS and ISO compliant, following all the guidelines,” tells Franz Jr. “Getting certified is a big part of my plan moving forward. We are in the market for a new CMM to help us step up the level of service we offer.”

The EDM Shop is a job shop all the way. Typical run lengths range from a single part up to tens of thousands. No one industry makes up more than 15% of the total sales and Franz Jr. is one who never turns away work. “We keep busy as the different industries have their ups and downs,” tells Franz Jr. “If we can do the job, I want to do it. Tool and die, medical, aerospace, automotive, electronics, and injection molding are some of industries we serve.” The EDM Shop has eight Mitsubishi wire EDMs and eight sinker EDMs from a variety of manufactures. They also have two hole-poppers and all the basic support equipment like mills, lathes and grinders.

As a job shop Franz Jr. is continuously upgrading machines to expand capabilities and be able to offer more to their customers. “Every couple of years we either add a new machine or replace an older one,” tells Franz Jr. “One of our latest acquisitions is a Mitsubishi MV2400 ST with 16.5” in Z. It is a wire machine offering a larger cut and bigger work envelope compared to our other machines. We had a customer who needed a deep

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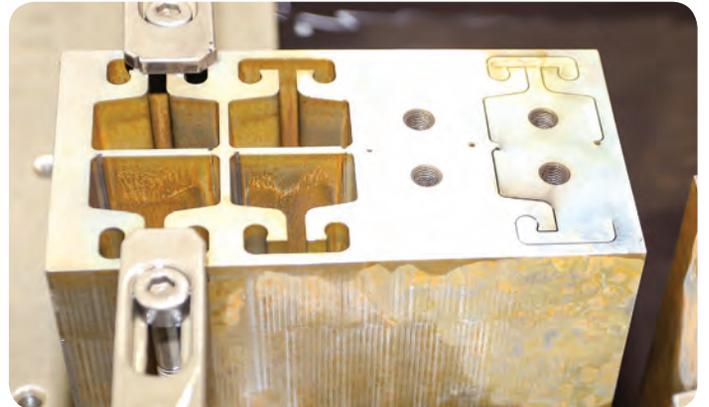
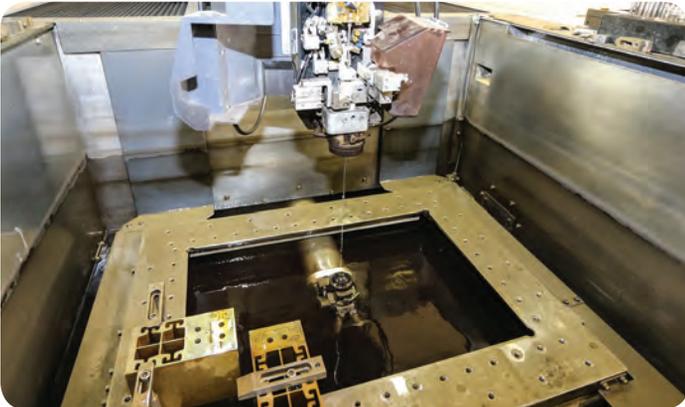
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**The Mitsubishi MV2400 ST has 16.5" of travel in Z and offers a larger cut and a bigger work envelope than their other wire machines. Franz Jr. touts how the rethreading on the machine is fantastic. It can do rethreading at a distance of 12" and will restart right where it left off instead of returning to the start hole.**

cut and it fit the bill perfectly.” The EDM Shop uses Mitsubishi exclusively in their wire EDM department. Mitsubishi has proven to be a reliable brand for The EDM Shop over the years. They have the needed speed, accuracy and repeatability, but the new MV2400 ST has a feature that even impressed Franz Jr. “My guys know the Mitsubishi’s really well, elaborates Franz Jr. “The interface is great and they do the job without many problems, but what stands out to me is the re-threading on the new machine. Re-threading is limited by distance, and the new MV2400 ST will self thread at 12” no problem. The best part is say you are making a cut and the wire breaks. Normally it would have to go back and re-thread via the start hole, but now it will re-thread back into the cut and keep going. Mitsubishi makes a durable product, and they are always making improvements. We stick with them as a brand for those reasons. I have machines from the 90’s that are still going strong.”

Franz Sr. and Jr. share more than a name, they share a passion for EDM machining. One minute with Jr. and his pride for his father and the shop are apparent. Most people hear the name Franz and expect to see an old man, but at thirty-three Franz Jr. is far from that. He is young and eager to put his stamp on the company his dad worked so hard to build. “I’m excited to do what I do,” tells Franz Jr. “I love machining in general, but the accuracy and finishes off the EDMs are what most people are surprised by. It is a niche area of machining and I like that. Every shop has a lathe or mills, but we are a specialty supplier and can do what they can’t. I always like taking a chunk of metal and turning it into something that creates value. You take a block of steel, treat it, cut it, and the next thing you know it is being shot into space, or in a racecar on TV or in someone’s body. Our website says it best. The Klarer name continues to be synonymous with quality and expertise in the industry as Franz Klarer Jr. honors the past and embraces the future.”

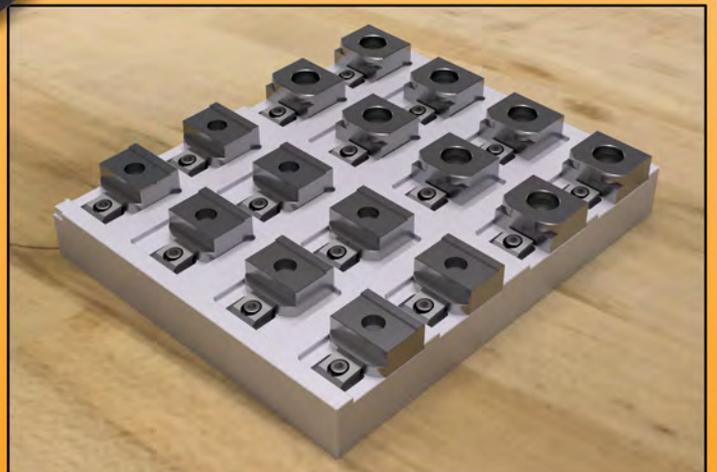
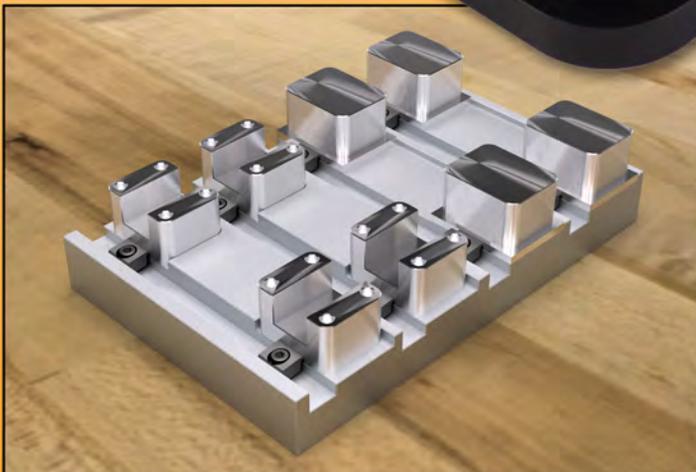
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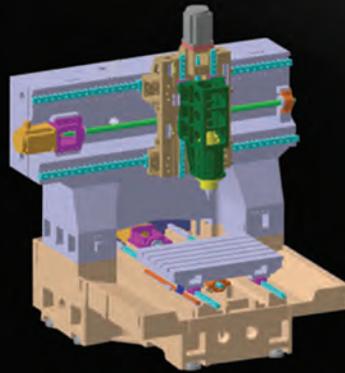
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# ADVANCED COATING TECHNOLOGIES

Article & Photos by Sean Buur



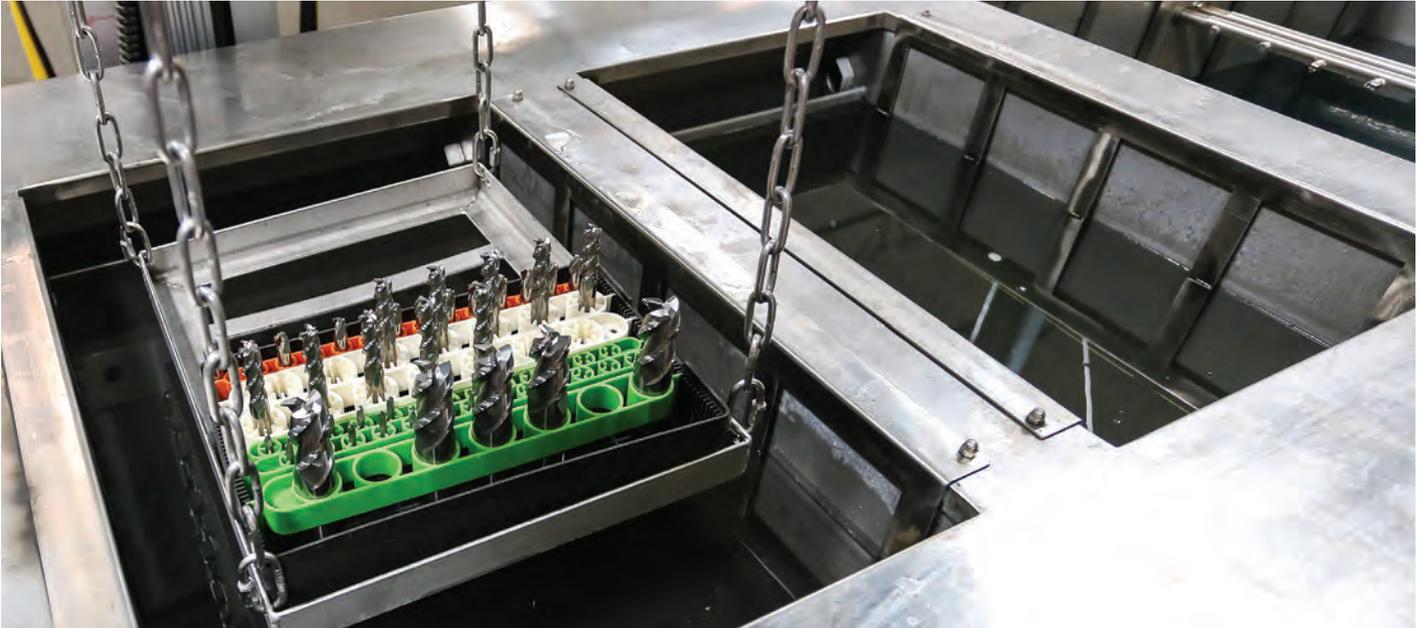
**Dr. Kamal Upadhyha is a world renowned scientist with a Ph.D. from a renowned UK university in material science and engineering. He is vice president of technology at ACT Inc. and heads up their R & D department.**

**B**ased out of Valencia, CA., Advanced Coating Technologies (ACT) began operations in 2006. They quickly made a name for themselves as a leader in the Physical Vapor Deposition (PVD) coating industry. Ironically, their success caused friction between the partners and it was sold. Under new ownership, ACT is in the process of expanding their already extensive coating capabilities. More machines, adding employees, and a new 16,000sq.ft. headquarters are all part of their long-standing commitment to quality and excellence. They manufacture their own brand of trademark® coatings and report that they also provide custom coatings for some of the tooling industry's biggest names. Some customers go to them with tooling and they coat it, while others design their tools with ACT coatings in mind. They offer standard catalog coatings for numerous tooling industries and is a fully customizable coating solution company as well.

ACT has a catalog of more than 30 standard PVD coatings, but what really makes them stand out is their ability to create customized coatings for specialized requirements. "Many of our coatings can be considered industry pioneer coatings" explains sales manager Kristin Cannistraci. "Mold and Dies are just one segment of our business. Some of the biggest mold companies

in the world have us manufacture their proprietary blend coatings. Dr. Kamal Upadhyha, our Vice President, Technology, and head of R & D will meet with them directly to come up with the best coating to meet their need. Having a world renowned scientist on staff is what really sets us apart in a company of this size." PVD coatings have been around since the early 80's with monolayer Titanium Nitride (TiN). Today, coatings are more and more common in applications where two or more surfaces experience wear, abrasion and erosion during sliding on each other or due to rotation. Also in the cutting tools where edges are required to remain hard and retain sharpness PVD coatings have become a necessity. "Nearly every industry can benefit by the use of coatings," continues Kristin. "Racing, medical, aerospace, dental, automotive, injection or compression moldings and standard machining are a few of our larger industries." Dr. Kamal stresses that any time two or more surfaces come in to contact by sliding or rotation there must be a suitable coating with maximum hardness and lowest coefficient of friction in order to minimize or reduce the abrasion, wear, adhesion or surface fatigues mechanism prevailing between the surfaces.

"In short we provide surface modification services for cutting tools, medical, aerospace and automotive industries in or-



**The most important step in PVD coatings is the surface preparation of parts or components to be coated. The cleanliness and smoothness of the surfaces to be coated is the prime importance factor. Smoother and cleaner the surfaces, better the adhesion of coating to substrate and overall higher performance of coating. When ACT gets the tools they are protected by oil. In order for them to add a coating they need to remove all traces of oil, dust, everything for the coating to bond on the atomic scale. ACT's coatings are applied atom by atom so it is imperative that they have removed all the adhering impurities 100%. The clean surface increases surface energy and thus activity at the surface so coating atoms will get adhered to the parts surface and the adhesive strength will be much higher.**

der to achieve “desired properties” for their tools and components,” explains Dr.Kamal. “We modify the surfaces of tool and machine components by depositing a suitable ceramic/composite thin film coating (1-4 microns) atom by atom on it by using very high vacuum environment. PVD coatings are therefore, very pure with high hardness, defect free and generally possess compressive stress. I use word “engineered” because every industry has different needs and requirements. End mills are a different animal than dies, soft metals versus hard ones. Chips get attached to the tools and whatever you are trying to accomplish won’t be as effective without a coating. Each application is unique to the user, and our job is to engineer the coating to meet their specific needs.” ACT knows that there is not a single recipe for every wear, abrasion and corrosion phenomenon, so they engineer the coatings to solve the problem that customers have. Now a days nano technology is the magical word in every technology. Smaller is an advantage because you can mix many different materials if it is small. ACT’s titanium nitrite coating is only 2 microns thick and it consists of 32-35 nano-size layers of ceramic/composite coatings. “Coatings have gone from a single layer into multi layer systems at the nano size and nano grains level,” elaborates Dr.Kamal. “This drastically improves strength and impact resistance. For example a tool with 32.0 layers of coating on it might develop a micro crack predicated on an impact and this will remain confined into initial few layers only. It is just that, a micro crack. We still have layer after layer of coating below it. If that same impact hit a tool with only a single layer of coating the crack becomes structural and you can expect failure of the tool.”

Kristin gives a few examples of how the ACT coatings are helping customers in different fields. “We have a customer who works in super abrasive composites. They have eight end mills going at a time on a single machine. The end mills were lasting only for a short interval of time before they were damaged too much to continue. One of our new coatings Kamal designed specifically for their needs has increased the tool life about five times.” ACT’s goal is to continue to refine the coating so the customer can use their tools for longest time and obtain precise finished dimensions and smooth surfaces of the final finished products. “Tool replacement takes over an hour so we’ve already made huge gains, but we are shooting for more. The new ACT coated end mills cost around 15-25% more than their previous end mills, but labor savings alone makes it worth the money.”

According to ACT they are seeing similar results in the mold industry. “One of our customers invests \$80,000 in a single mold that was lasting only 3-4 months,” describes Kristin. “Our new custom engineered coating for them has driven the usage up to over a year before replacement. The layers of ACT’s coating on their mold is allowing for better release so the parts are not sticking, and the products exhibit superior quality and performance. No more wire brushes and screwdrivers to clean off residue. That alone has added a ton of longevity. Take into account this company has hundreds of molds like this, so we are not talking about saving them just a few dollars.”

Research and development gives ACT unique advantages in the marketplace. Behind all the science is a scientist, and at ACT Dr. Kamal Upadhyia is the driving force. “When I meet with people I have to ask them how long we should continue



our technical presentation,” jokes Kamal. “One hour, half hour? I can keep going and need to be asked to stop most of the time.” Coatings are Kamal’s specialty and his passion. One minute with him and you will question how little you knew about materials science and about coatings. Kamal was born and raised in India by his two very supportive parents. He received his materials engineering degree from IIT, Banaras Hindu University, (BHU), India before earning a Full British research scholarship to the UK to pursue Ph.D. in material science and engineering. He has edited six books, obtained 32 USA patents and pub-

lished over 200 technical scientific peer reviewed papers in various national and international Journals. He was awarded the prestigious “John Chipman Award” for best technical paper for fundamental contributions in the science and technology of materials processing, by AIME. “John Chipman award” is instituted in the honor of renowned Professor John Chipman of Materials Science and engineering department at MIT, USA. Dr Upadhyha has taught as a professor at the University of Illinois, Chicago USA and has lectured worldwide. For his scientific contributions, Dr Upadhyha has been elected Fellow of



**Quality coatings like the ones at ACT will extend tool life, add lubrication, save time, and improves quality in a variety of applications. End mills, molds, knife blades, drill bits and gears can all benefit by having the right coating. There is no single recipe for every application so ACT engineers develop custom coatings to solve specific problems that the different industries have.**

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**ACT PVD coating machines run around the clock with a three shift 24/7 operation. Within the next few months Advanced Coating Technologies are adding 2-3 more PVD coating machines as well as two DLC/Diamond coating machines specifically to service the growing demand for diamond like Carbon and Diamond coatings.**

American Society of Materials (FASM), Fellow of Institute of Materials (U.K.) FIM, C.Eng and has been bestowed with numerous scientific awards including U.N. visiting lectureship award. "I came to the United States in 1981," tells Kamal. "Induction Coupled Plasma (ICP) and a technical paper on plasma sintering of ceramic materials were published on the cover page of the Journal of Materials as well as on Ceramic Bulletin Magazines. That created an earthquake of interest in my work and my plasma research" He spent 6 years at GE Medical System where he obtained 16 USA patents for Thin film coatings on various x-ray tubes and CT scanner components. In 1992 he moved to California and worked with Hughes STX Corporation and Plasma Technology Inc. as VP of Technology. Finally he opened his own plasma coating company for coating aircraft turbine engine and compressor blades. The demand for Kamal's expertise was so high that ACT purchased his company as part of their expansion program.

Within the next few months ACT is adding two dedicated diamond like carbon (DLC) and Tetrahedral Diamond (Ta-C) coating machines to their list of capabilities. Diamond like coatings is a ballooning industry," describes Dr. Kamal. "Automotive and aerospace are leading the way utilizing this next generation of technologically advanced coating. Diamond like carbon coatings are done on 65% of engine components in most automotive applications. You can attribute the recent increase in fuel mileage directly to coatings and reduced frictions and

decrease in energy loss." Coatings are making metal harder, allowing the use of lighter materials, reducing overall weight. The same can be said for the aircraft industry. "Thanks to these new coatings we are able to machine composites materials in new ways. Just compare the composites on a 747 to a new 787 and you will see a noticeable difference. It will not be an exaggeration to say that modern coatings have become "materials in search of solutions." It has brought a revolution in the toolmaking industries world wide." ACT has one machine now that will do the diamond coating, but the time it takes to switch over and back is over 8 hours so they are adding two dedicated DLC and Diamond coating machines to increase productivity and capabilities.

Friction and corrosion cost industry hundreds of billions of dollars every year. Much of that cost can be avoided with the right coating. "Kamal comes in and dazzles customers with science and I follow up with highlighted points on how that science will benefit them as a user," explains Kristin. "Kamal is a hard act to follow, you can tell how excited he gets by the science and by speaking to people about the possibilities." To compete in the coatings arena you have to provide something different than the rest of crowds. ACT feels that providing an in-house development lab headed up by a world leader in coatings is just the thing needed to succeed.

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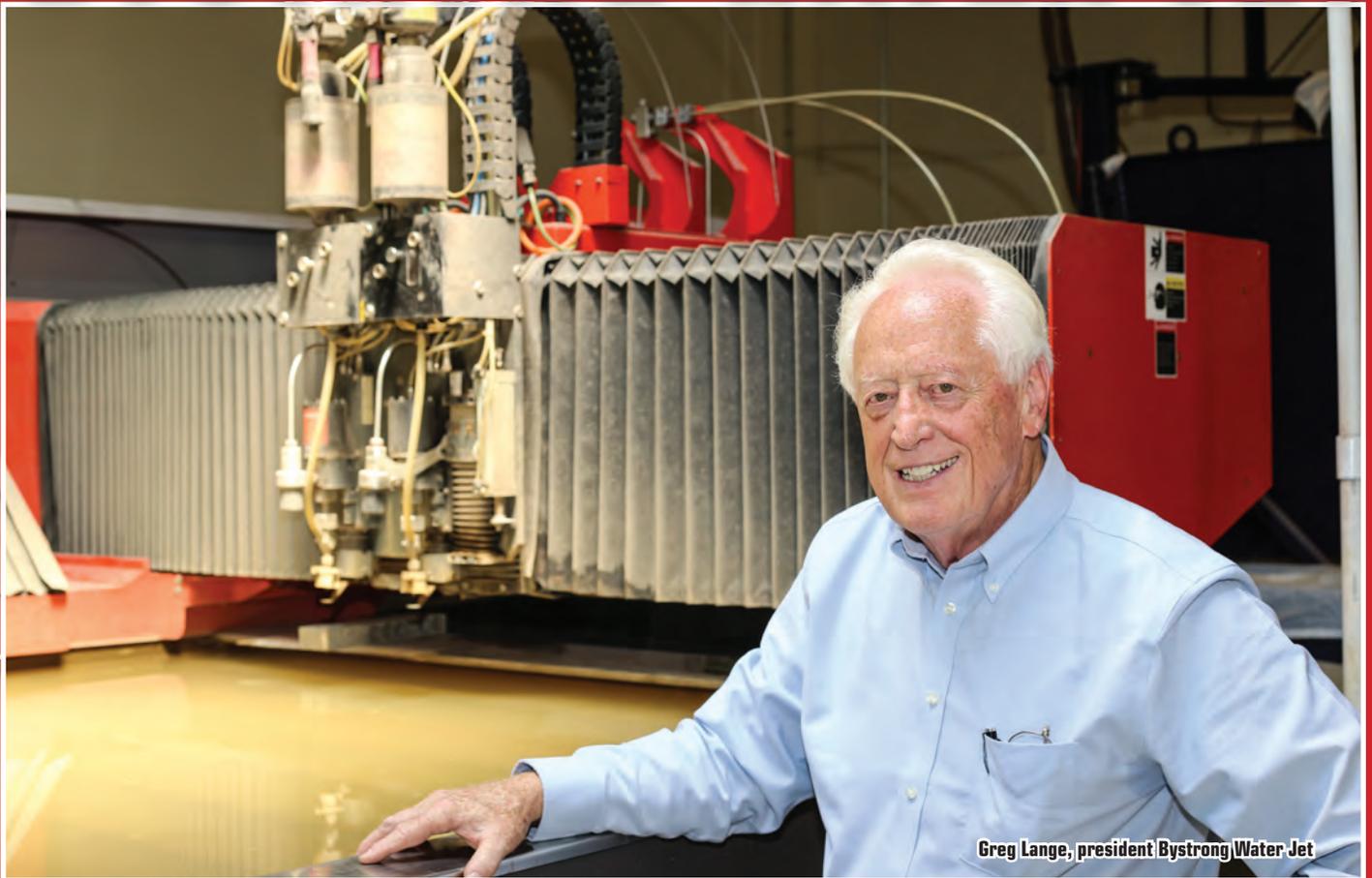
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# BYSTRONG WATER JET

Article & Photos by Sean Buur



Greg Lange, president Bystrong Water Jet

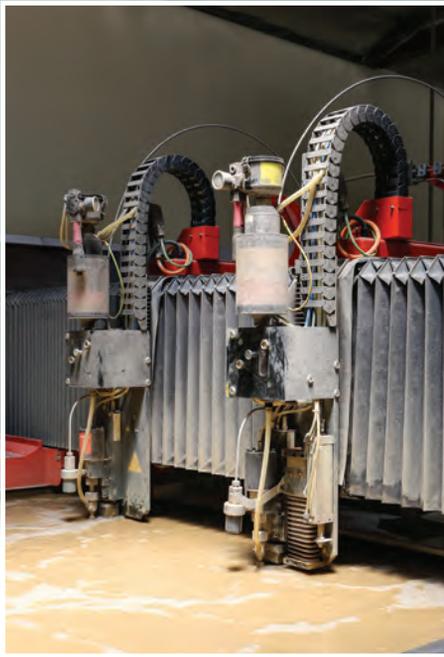
## 53 YEARS OF EXPERTISE AND STILL GOING STRONG

Since his first childhood ERECTOR set Greg Lange has been fascinated with building and manufacturing. Today, at the age of 77 his passion still burns, and there is no place he would rather be than in his machine shop. “I always loved making things,” reflects Bystrong Water Jet’s president Greg Lange. “Over the years I have made some beautiful parts for submarines, planes, spacecraft and even for local theme parks, and I still love it.” In his youth, Greg’s love of manufacturing was only topped by his love of flight. His new hobby was expensive so he needed a job that paid overtime wages. He found it locally at Shur-Lok Fasteners. “It was the early 60’s,” explains Greg. “At the time I was making good money at Shur-Lok, but an acquaintance kept trying to get me to go to work for him. I never did, but one night he took me to dinner and asked how much to make this part. I looked at it, said I can make it for 3 bucks. He said I’ll give you four. That was a lot of money in those days. A good wage per hour was half that.” That was a turning point for Greg, and soon he was in business for himself. It was a simple formula, people would come to him and he would make them parts. “I was good at what I did, but it still seems like a miracle that things worked out the way they did. I’ve always relied on word

of mouth to earn customers and that is no different today with Bystrong Water Jet.” Fifty-three years later Greg Lange is still going strong.

Much of the work Greg does is out of hardened steels and wrecks havoc on his cutters. After researching possible alternatives, he decided the Bystronic ByJet Smart 3015 water jet cutting system was just what he needed. “The Bystronic brand was recommended to me as being a good machine,” explains Greg. “By nature the water jet machining process is a different animal so I started Bystrong Water Jet doing only water jet work to keep it separate from my other company.” The Bystronic ByJet Smart 3015 dual head water jet has been in operation now for just under two years and Greg couldn’t be happier with its performance. “My original idea was to get the water jet to support projects from my other company, but more and more we are getting outside requests from other local shops who heard I had a water jet.”

Greg’s grandson Kyle Stanford programs, runs and maintains the machine. Kyle is currently studying engineering, management, and marketing and works full time as a QC inspector, IT director and runs all the parts at Bystrong Water Jet. “I’ve been with the company a couple of years now,” tells



Top left - The ByJet Smart 3015 water head is a dual head system that doubles the parts output. Minimum separation is 8". Top right - An example of the precision capabilities of the water jet. The tree was cut out of a 3" deep piece of solid oak. Bottom - Kyle Standford runs and maintains the ByJet Smart 3015 water jet. Greg purchased it because it is a very sturdy and rugged machine. It has a concrete base for stability.



Kyle. "I wear a lot of different hats, I can mill, I can turn, but one of my primary duties is being the water jet guy." Kyle has been impressed with the versatility of the ByJet Smart 3015 in just the short time they've had it. "With the water jet we can cut complex precise shapes out of almost anything. Glass and ceramics are no problem, and it can cut to a depth of 4 inches." The Smart 3015 is a dual head unit with an 8" separation between the heads. This means double the output in the same time frame. For thin materials the water jet can cut very fast, but on thicker parts it is slowed down to control the taper. "What I find very fascinating is the precise detail and small cuts it can make at a great depth," elaborates Kyle. "It is at home running thick sheet metal parts and 2D shapes as it is doing stone work or making custom art. The flexibility and the accuracy are staggering."

The last 53 years Greg describes as being a big adventure. He still is amazed how he went from making \$4 parts to the ones his companies make today. "The industry has changed over the years, but in many ways it has stayed the same," comments Greg. "We used to do everything by hand and now computers do it, but at the core we are still just making parts. Technology doesn't bother me, it never has. I come up with the tooling; I tell them how to hold it, how to clamp it and how to attack it. Then it is up to them to implement the process." At 77 Greg has no plans to retire, and you get the feeling that the industry is a better place with him in it. "There is no place I'd rather be than on the shop floor," concludes Greg. "Machining parts has been my life's work and I have loved every day of it."

## Product Preview

# Methods Introduces New Fanuc Wire EDM Series



Methods Machine Tools, Inc., has announced they have introduced the Fanuc RoboCut  $\alpha$ -CiB series including the C400iB, C600iB and the new, larger C800iB wire EDM all of which are built complete in Japan at Fanuc's state-of-the-art robotic manufacturing facility. According to Methods Machine Tools, accuracy is increased in the Fanuc RoboCut  $\alpha$ -CiB Series Wire EDMs via thermal displacement compensation, which compensates for thermal distortion of the casting when room temperature fluctuates greatly. A spokesman said that factory tests show that a 0.0002" positioning accuracy and 0.0001" repeatability are fully ensured, even during long burns.

According to the spokesman, also contributing to increased accuracy is the CiB Series moving tank design feature. Methods reports that unlike a moving column design that can be susceptible to lower guide position inaccuracy due to pitch and yaw of the column, the CiB Series wire EDM column and lower arm are fixed, so the table and work piece move rather than the column, ensuring the highest level of accuracy.

Machine speeds have also increased significantly, with a rapid traverse of 78.74"/min. – over twice the speed of previous machines.

In addition reports the company, "3D Compensation Function" reduces the need for indicating-in workpieces. This standard feature allows the operator to quickly measure the flatness of the workpiece and automatically tilts the wire to make it perpendicular to the surface of the work, greatly reducing set-up time. Another time saving

feature is "Core Stitch" slug retention, which prevents slugs from dropping and eliminates the need for clamps, further increasing efficiency. And Fanuc's advanced automatic wire feed system can thread through the kerf, which allows for full utilization of this feature.

### **All New Fanuc C800iB Large Wire EDM**

Offering a maximum workpiece size of 49.2" x 38.4" x 11.8" and a robust maximum workpiece weight of 5,000 lbs, the all new C800iB wire EDM is ideal for a wide range of work including large molds, stamping dies and challenging applications such as complex aerospace parts. In addition, an automatic dropdown door enables easy access to the work area and trouble-free loading/unloading of parts.

### **Advanced controls and monitoring**

Several other important features come standard with each CiB machine, including the exclusive Fanuc series 31i-WB wire EDM CNC controller with the new iHMI User Interface (Intelligent Human Machine Interface), large program storage capacity and remote PC access from handheld or desktop devices, and the new Cut Linki remote machine monitoring software (ver.2.1) that monitors up to 32 Fanuc wire EDMs, consumables life, and tracks machine efficiency, utilization time and has an easy maintenance service screen.

Similar to other Fanuc EDMs, the new Fanuc RoboCut C400iB, C600iB and C800iB wire EDMs are capable of manufacturing complex components and offer seven-axis simultaneous cutting as an option.

"The FANUC RoboCut  $\alpha$ -CiB Series provides our EDM customers with the latest Fanuc technology that can help them increase their bottom line through the machines' increased accuracy, efficiency and throughput," said Mr. Stephen Bond, national sales manager for Fanuc RoboDrill, RoboCut & EDM products, Methods Machine Tools, Inc.

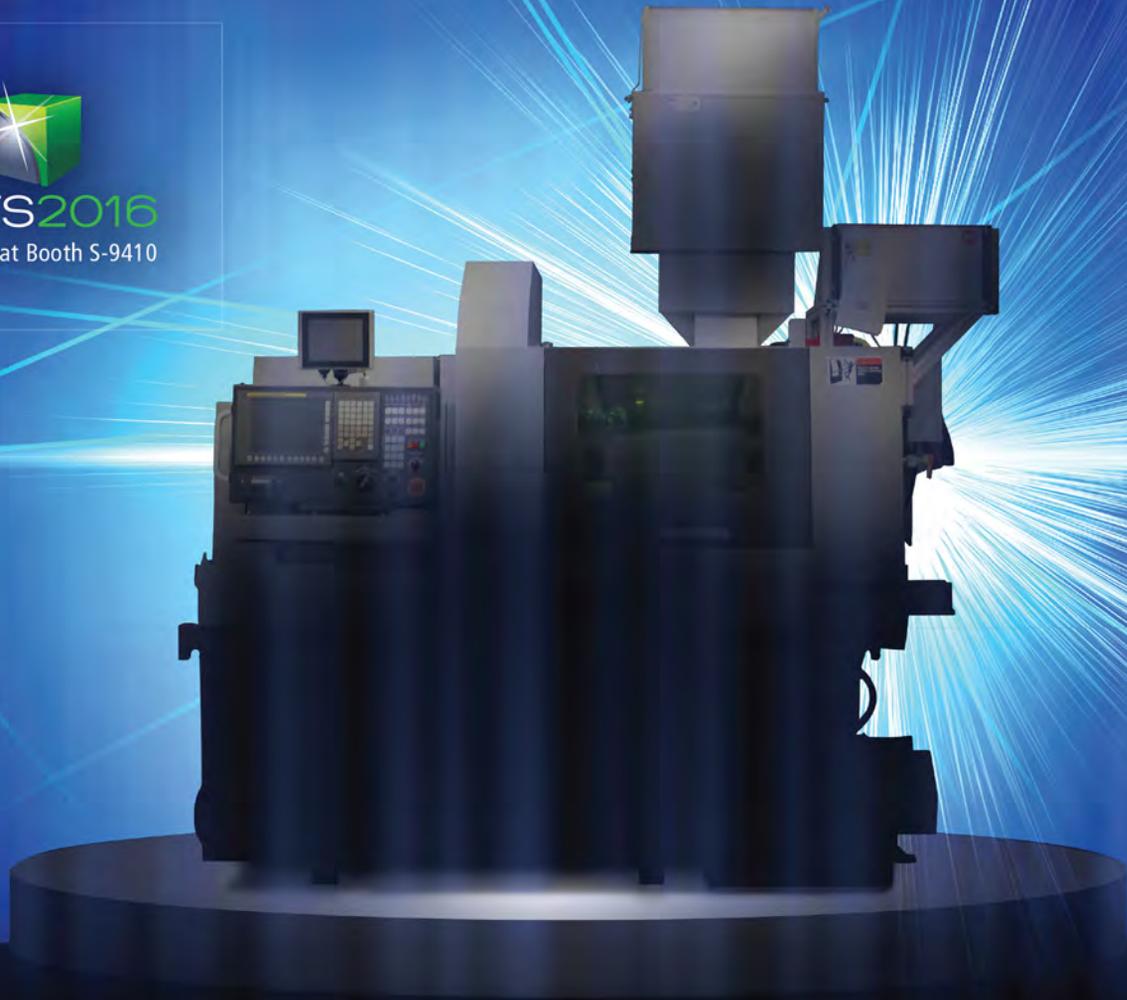
The  $\alpha$ -CiB Series is equipped with the powerful, exclusive, user friendly Fanuc 31iWB control with a 15.1" LCD touch screen. Models include:

- C400iB X, Y, Z travels of 15.75" x 11.81" x 10.04" and U, V travels of  $\square$  2.362".
- C600iB X, Y, Z travels of 23.62" x 15.75" x 12.20" and U, V travels of  $\square$  3.937".
- C800iB X, Y, Z travels of 31.50" x 23.62" x 12.20" and U, V travels of  $\square$  3.937".



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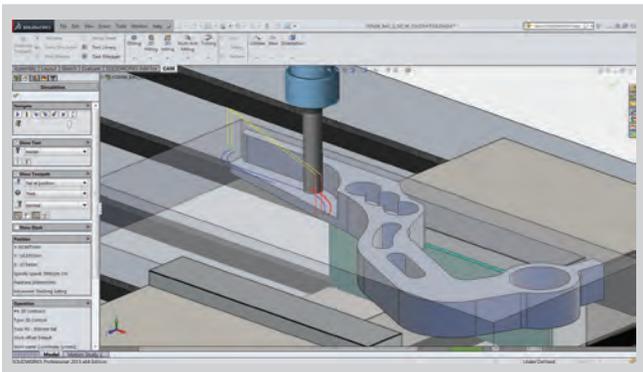


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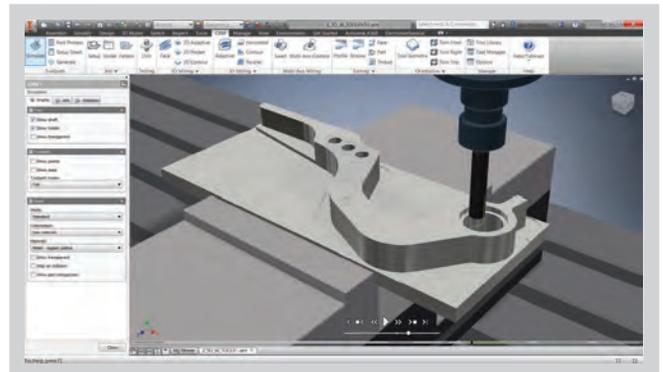


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# “New Abrasive Technology Increases Centerless Grinding Safety and Efficiency”



**Figure 1 Abrasive and bond matrix.**

When it comes to attaining the best roundness, dimensional tolerance and surface finish for bar stock, many feel that centerless grinding is the clear choice among machine operators. The throughfeed grinding process is especially important where parts must be produced very efficiently economically and within tight tolerances.

With these objectives in mind, Saint-Gobain Abrasives R & D engineers have developed Norton Century45 high-performance wheels, designed to improve the cost-competitiveness of centerless grinding operations both large and small. Norton Century45 grinding wheels use ceramic, aluminum oxide and silicon carbide blends to grind bar stock made from a wide variety of materials, including carbon steel, aluminum, cast iron, stainless steel 300/400 series, titanium, nickel alloys (Inconel) and copper.

The company reports that Norton Century45 wheels, with B45 bond, are specifically designed to yield greater efficiency by achieving higher levels of stock removal per pass than conventional wheels. Fewer passes to remove the same amount of material, means reduced cycle times and higher production rates.

## **New Century45 Centerless Grinding Bond**

Organic abrasive products have two major components: abrasives and bond (refer to Figure 1). The abrasive is the cutting tool portion of the wheel while the bond holds the abrasive in the matrix to form the wheel. The space between the abrasive and the bond is referred to as the structure or porosity of the product.

### **Figure 1 Abrasive and Bond Matrix.**

The new Norton Century 45 centerless bond platform features an exclusive chemistry that the company feels greatly improves grain retention in the wheel. This enables

wheels to be constructed with more porosity for a given hardness. This directly translates into a wheel with the grain retention of a hard grade and the performance of a soft grade.

### **Benefit – Longer Wheel Life**

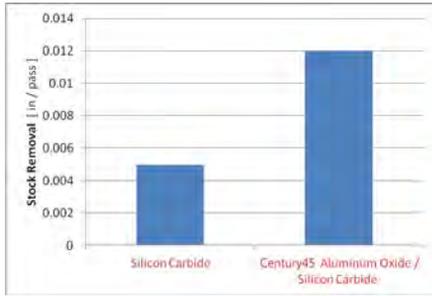
The best quantification of wheel life is the grinding ratio, or G-Ratio. This is a measure of the amount of material removed as compared to the amount of wear of the wheel (refer to Equation 1 below). The amount of material can be measured in mass (grams or pounds) or volume (in<sup>3</sup> or mm<sup>3</sup>) so long as equal units are used. This method removes any variation in production levels during the observed time.

Despite their work rate, Norton Century45 wheels are engineered for durability with maximum G-Ratio and the company says they can last up to twice as long compared to standard wheels.

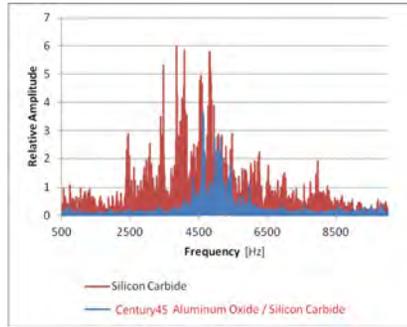
### **Benefit – Quieter Grind**

According to the Bureau of Labor Statistics, approximately 30 million people in the United States are exposed to hazardous noise in their place of work. Noise-related hearing loss is consistently listed as one of the most prevalent occupational non-fatal illnesses in private industry. Every year, thousands of workers suffer from preventable hearing loss due to high workplace noise levels. The increased porosity of the Norton Century45 grinding wheel offers a significant reduction in noise level while grinding hard metals such as Inconel.

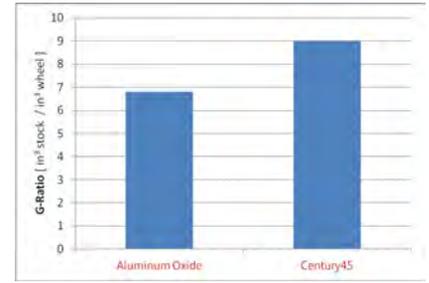
The wheel has been shown to reduce grinding noise by 23.2 dB in some cases. To put this reduction in context, many commercially available foam ear plugs offer noise-reduction in the range of 25 to 28 dB.



**Figure 1: Stock removal of wheels from Case Study**



**Figure 3: Frequency spectrum of wheels from Case Study 1.**



**Figure 2: G-Ratio of wheels from Case Study 2.**

### Application Examples

In a recent application study, a Norton Century 45 wheel was introduced to improve the operation of the customer’s 40-hp Cincinnati Twin Grip centerless grinder, which is used for rounding and polishing Inconel bar stock. The incumbent 24” x 20” x 12” 80-grit silicon carbide resin bond wheel removed 0.005” of the Inconel alloy bar per pass. A Norton Century45 2-wheel set—32CA60-PB45 (10”), 32CA80-PB45 (10”), with a removal rate of 0.012” per pass, was substituted in its place and achieved not only a 140% higher stock removal rate, but also a 100% improvement in wheel life, resulting in a 50% reduction in cycle time, while significantly reducing noise levels during grinding.

#### Case Study

Machine: Cincinnati Twin Grip, 40 HP  
 Wheel size: 24 x 20 x 12  
 Material: Inconel  
 Part OD: 0.5 - 1.75”  
 Part Length: 378 - 384”

#### Results:

Century 45 stock removal from 0.008 - 0.012” per pass  
 Reduced manufacturing process from 4 to 2 passes

### Figure 1: Stock removal of wheels from Case Study

The Norton Century45 wheel demonstrated a total cost reduction of 30% over the incumbent wheel—resulting in what the company said was significant savings.

In addition, in this same case study Norton Century 45 wheel was 23.2 dB quieter than incumbent.

### Figure 3 Frequency Spectrum of Wheels From Case Study 1.

In another example, Norton was tasked to improve the abrasive life, and decrease the overall costs, of a 50-hp Cincinnati #3 centerless grinder used to round and polish the bar stock of a variety of steel alloys, including 1045, 10V45, 4140 and 17-4. For purposes of the test, a Norton Century45

wheel—3NQAC36-S9B45—was selected to replace the incumbent 24” x 8” x 305 46-grit aluminum oxide resin bond wheel.

The Norton Century45 wheel produced a 25% higher stock removal rate over the incumbent wheel (0.005” vs. 0.004” per pass) and a 32% improvement in G-ratio—the volume of material removed per unit volume of wheel wear. The net result was a 100% performance/cost improvement over the incumbent wheel.

#### Case Study 2

Machine: #3 Cincinnati, 50 HP  
 Wheel size: 24 x 8 x 305  
 Material: 1045, 10V45, 4140, 17-4 PH  
 Part OD: 3.5 - 7.5”  
 Part Length: 4 - 6.5”

Results: 32% improvement in G-Ratio over incumbent  
 100% improvement in machine cost performance

### Figure 2 G-Ratio of Wheels From Case Study 2.

As shown in the above case studies, selecting a more productive abrasive wheel can save significant amounts of time, effort, and money in a grinding operation. Fewer wheel changes, less down time and higher efficiency all mean greater capacity to handle additional jobs. Particularly for larger operations with multiple grinders, the productivity—and remunerative dividends can be quite significant.

*This article was provided by Norton Abrasives*

# Grinding

## New Radius Internal Cylindrical Grinding Machines Added to Studer Line



United Grinding has added three new radius internal cylindrical grinding machines to its line of Studer internal cylindrical grinding machines. The S121, S131 and S141 replace Studer's CT700 and CT900 models and extend part production capabilities by offering more advanced technology, a new dressing concept and larger size machine to handle a broader range of workpieces.

With a workhead on a newly arranged simultaneously swiveling B-axis, a Studer spokesman said the S121, S131 and S141 radius grinding machines offer greater thermal stability, mechanical rigidity and interpolation from  $-60^{\circ}$  to  $+90^{\circ}$ . The machines are also equipped with a dressing spindle or a fixed dresser on the B-axis and a measuring probe on the grinding head.

The new machines feature Granitan® machine beds which Studer reports provide higher damping levels, thermal stability and guidance accuracy. The StuderGuide® guideway and drive system with linear motors provide high wear resistance, a long working life and high dynamics. It also includes X and Z-axes in a cross-slide arrangement as well as a cross slide, which in the case of the S121 can take one spindle, two spindles in parallel or two spindles on a hydraulic turret. In the S131 and S141 machines, the

cross slide comes with a four-position turret with direct drive. The spindles on the radius grinding machines are arranged at the rear of the turret.

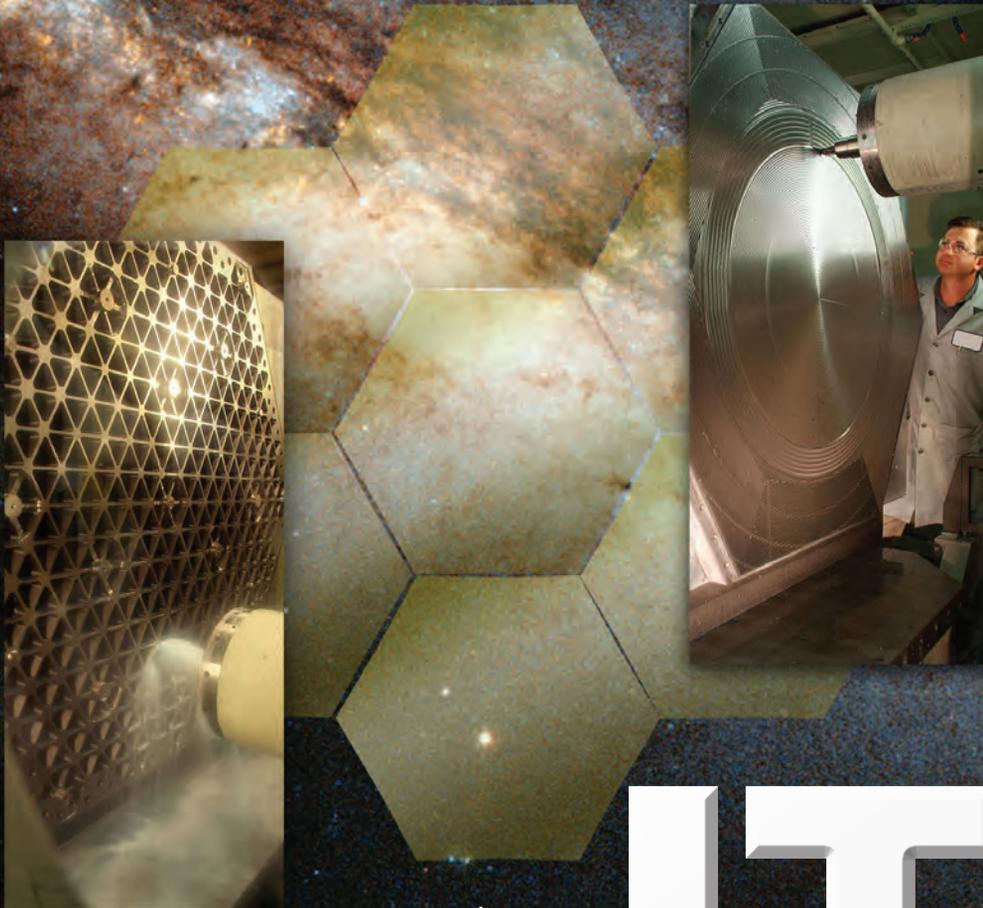
Each of the three radius internal cylindrical grinding machines is powered by StuderSIM software that enables an operator to machine complex parts – often in a single clamping. StuderSIM derives workpieces from a drawing and completely defines and generates all necessary geometric data for the grinding cycles. Furthermore, operators can easily check and visualize the grinding process through simulation on a PC or on the machine.

With swing diameters of 9.84" and 11.8" above the table respectively, the S121 and S131 replace Studer's CT700 and CT900 models. The S141, with a swing diameter of 15.75", further extends capabilities of the product line by enabling machining of larger workpieces. The machines enable external diameters up to 6.3" to be machined with an external grinding wheel 9.8" in diameter. The maximum length of parts including clamping device is 11.8" for all three radius grinding machines, and the maximum workpiece weight including clamping device is 220 lbs.

Studer reports the new radius grinding machines are ideal for manufacturing dies, especially in the packaging industry, where tungsten carbide and ceramic are primarily processed, and the production of hydraulic components such as axial pump pistons, guide plates and housings made of hardened steel, cast iron and copper. The machines are also well suited for the production of complex workpieces with several tapers greater than  $20^{\circ}$  to  $90^{\circ}$  in a single clamping. Examples include watch and medical technology with extra-hard materials such as industrial ceramic, sapphire and tungsten carbide, as well as the manufacturer of human implants for shoulders, knees and hips from ceramic and titanium.

The addition of the S121, S131 and S141 radius grinding machines rounds out the platform of Studer internal cylindrical grinding machines. Other machines in the line include the S110 and S120 machines, the S121 to S151 universal internal grinding machines and the S122 production internal grinding machine.

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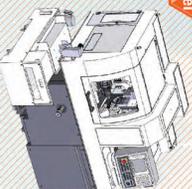
### Industrial parts



### Medical parts



New Model



XD1211H

Index	Characteristic
Machine Max:rpm	15,000rpm
Machining bore	Ø12mm
NC	FANUC 0i-TF
SIZE	1,950 X 1,130 X 1,660
Weight	2,300kg

New Model



XD42N

Index	Characteristic
Machine Max:rpm	Ø45mm
Machining bore	Milan 100 Sub 2/6
NC	FANUC 0i-TF
SIZE	2,580 X 1,690 X 1,750
Weight	4,100kg

XD261-1NH



Index	Characteristic
Machine Max:rpm	10,000rpm
Machining bore	Ø20mm
NC	Hanwaha 321-B
SIZE	2,340 X 1,230 X 1,720
Weight	2,700kg



XD20V



Index	Characteristic
Machine Max:rpm	10,000rpm
Machining bore	Ø20mm
NC	Fanuc 321-B
SIZE	2,160 X 1,160 X 1,690
Weight	2,500kg

XD3811H



Index	Characteristic
Machine Max:rpm	6,500rpm
Machining bore	Ø38mm
NC	FANUC 321-B
SIZE	2,640 X 1,390 X 1,750
Weight	3,600kg

STL38H



Index	Characteristic
Machine Max:rpm	6,500rpm
Machining bore	Ø38mm
NC	Siemens 840D
SIZE	2,800 X 1,840 X 1,790
Weight	4,600kg



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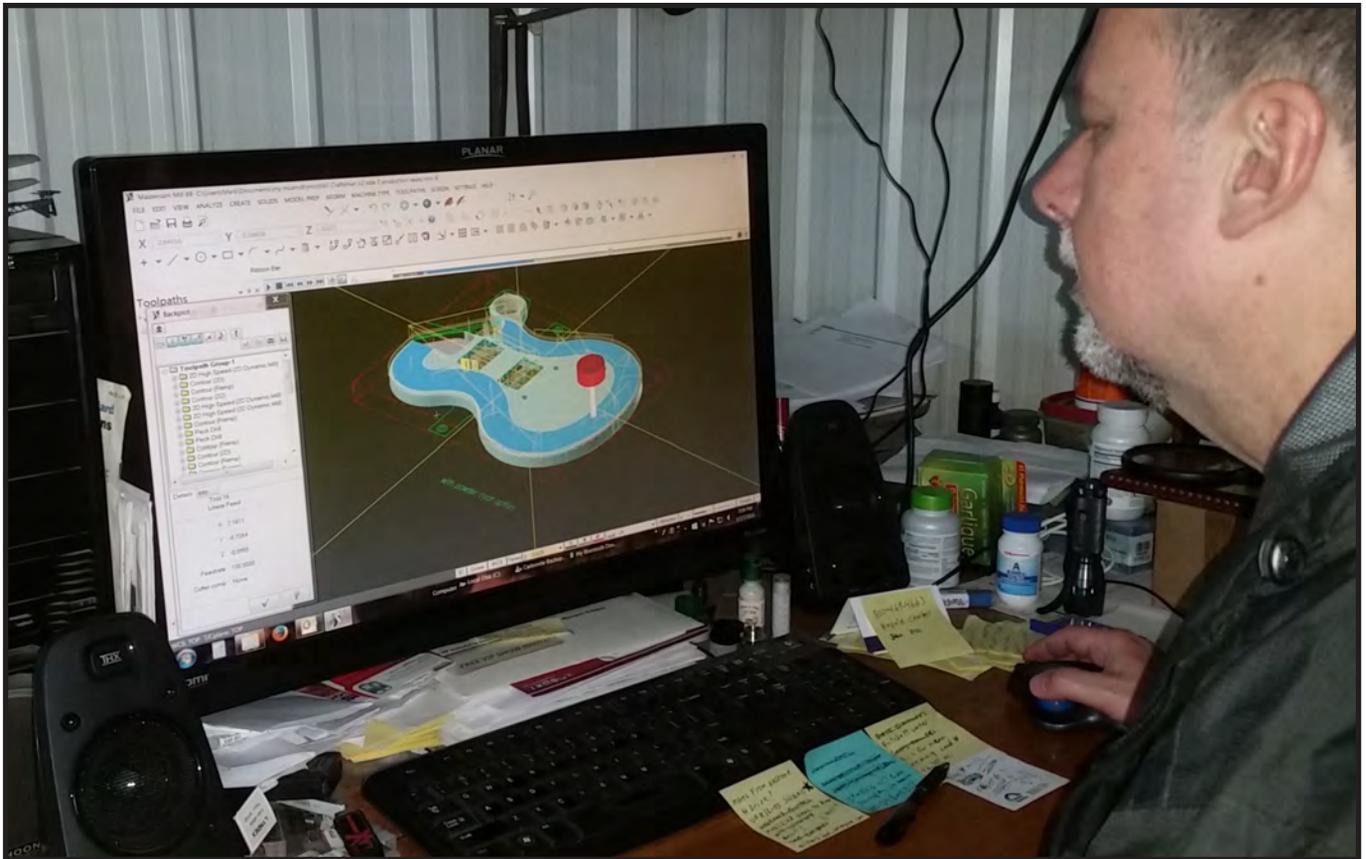
The fully automatic grinding feature consists of rough- and fine-grinding cycles, switching from rough-grinding down-feed increments to fine-grinding down-feed increments at preset points during the cycle. This crossfeed also switches from a rough to fine cross-feed increment, which results in a finer surface finish and finer accuracy.

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# Staying in the Game with CAM

*Technology advances help small East Texas custom mold shop maintain a competitive edge*



*Mark Emory of Emory Custom Tooling relies heavily on its CAD/CAM software (Mastercam®, from CNC Software) to reduce CNC programming time, reduce cutting tool expenditures and generate toolpaths to optimize material removal rates.*

Since 1989, when Mark Emory opened his small tool & die shop in East Texas, the company has produced a succession of molds for products considered to be state-of-the-art entrants into their respective markets: computer mouse wheels, parts for PC computers, plastic ammunition shells, foam fast food packaging, plastic cups, women's cosmetic cases, and aerospace connectors that have made their way into space on the space shuttle and the Mars Rover.

Emory would be the first to admit that East Texas is not exactly a hotbed of industrial activity. Using technology to stay competitive is an essential ingredient for attracting customers with leading edge product developments from this sprawling, sparsely populated territory. This lean, four-person business offers in-house design and development capabilities and meets short lead times by performing all operations, including heat-treating, on-site. To control

costs and minimize lead times, Emory Custom Tooling relies heavily on its CAD/CAM software (Mastercam®, from CNC Software, Inc.) to reduce CNC programming time, reduce cutting tool expenditures, and generate toolpaths to optimize material removal rates.

## **Staying Lean with CAD/CAM**

In 1993, when his shop was on a solid footing, Emory began purchasing a Maintenance license of Mastercam, which entitled him to as-needed support from his nearby Reseller, and an upgrade to the latest version of the product as soon as it was released. Emory said, "I've been upgrading my Maintenance license since 1993. Every year I get more value from it. It has treated us well. We've made a good living for 26 years. I'd do it again in a heartbeat."

A high point of the year for Emory is the day each year when his Mastercam Reseller (MLC CAD) sponsors a rollout

event in his area. This is where Emory gets a heads up on new CAM that will be most helpful to him as tools for reducing lead times and operating costs. Simulation has become an important feature for Emory, who does all of the CNC programming for his two mills. It allows him to visualize the adequacy of material removal and detect any interference that could cause the cutting tool to crash. It makes it possible to run any program posted to his mills with complete confidence so that he can just get on with his work without hovering over the machine. Simulation is also a selling tool. He said, “When customers and visitors come in and see parts spinning around in some sort of simulation, it blows them away. They can tell at a glance that we are really serious about what we are doing.”

Another thing that Emory has found to be very useful is Mastercam’s tight integration with CAD. Jobs typically come in for quoting as PDF files over the Internet. Once the order has been placed, the customer will send some sort of 3D CAD file that can be seamlessly imported into the software. If the assignment is to manufacture an assembly, all of the levels of a model stay on their



***Drew Emory and his partner Myke Wilkerson are using the Emory tool shop as the manufacturing arm of their new venture “660 Guitars”. Dynamic Motion technology is used to rapidly carve out 7.5 guitar bodies from 40 lb. aluminum billets.***



***Over the years, Emory Custom Tooling has produced a succession of molds for products considered to be state-of-the-art entrants into their respective markets.***

own level. “So if you have five pieces in an assembly, you will have five levels you can turn on or off. That saves a lot of time,” he said.

Being able to use Mastercam both as CAD and CAM software has really been helpful for making adjustments to part models, creating workholding solutions for complex parts, and responding quickly to customer emergencies. For example, a customer recently emailed Emory the model of a part that he wanted refurbished when it arrived by ground transport the next day. He imported the model, generated a CNC program file, and manufactured the part that day. He delivered the new part to his customer that evening, long before the damaged part was delivered to his shop.

### ***Dynamic Roughing Productivity***

Emory said the biggest payback he has received to date from his Maintenance license of Mastercam comes from being an early adopter of the software’s Dynamic Motion technology for roughing. This technology continually adjusts tool motions to allow the tool to run at the highest material removal rates without overloading the tool. It allows the machine to operate continuously at the cutting tool, using the vendor’s recommended chipload for the material being cut, not only maximizing material removal but also minimizing tool wear.

Emory said, “We started using Dynamic Motion about four years ago. When it first came out, we tried it on a large piece of D2 steel with a 3/8” cutter at 200 inches a minute and it was eating that stuff up. Today, we use Dynamic Motion technology on about 95% of our roughing. What used to take us a workday is now being done in a couple hours. Overall, we are producing about twice as much work with the same people and equipment, whether we are cutting steel,



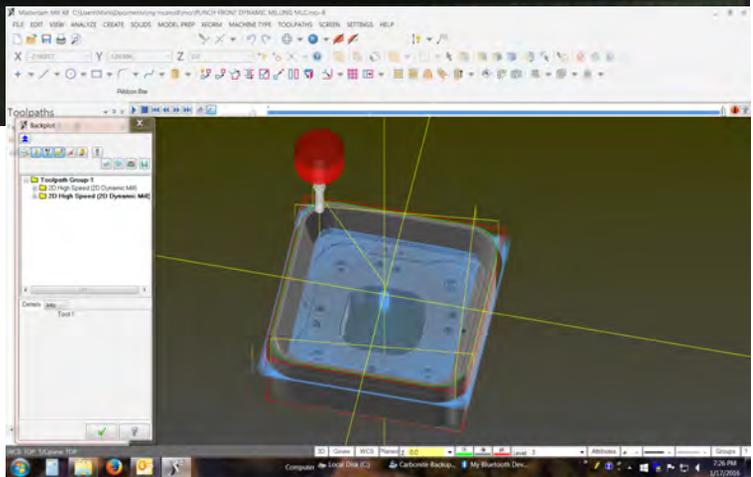
***Rapid Material Removal using Mastercam's Dynamic Motion technology makes it possible to reduce cycles and ultimately lead times for custom tools.***

aluminum, or electrodes thanks to this technology.”

***Drew Emory Rocks***

Mark Emory has built a lean manufacturing operation with automated equipment and a highly skilled four-person staff that is capable of sustaining itself in the economic ups and downs. At the time of this writing, there were about 10 jobs going through the shop, which Emory characterized as being a very comfortable pace. However, his people and equipment can ramp up quickly to handle a lot more in a crunch.

Mark's son, Drew, is taking advantage of the shop's flexible capacity by starting a complementary business. Drew has been with Emory Custom Tooling for eight years. During working hours, he spends much of his time programming the wire EDM with Mastercam and operating it. At night, he sometimes plays in a rock band. Drew and his partner, Myke Wilkerson, have designed an impressive line of electric guitars with bodies carved from solid aluminum billets. Numerous body styles have been designed in SOLIDWORKS and programmed for CNC manufacturing in Mastercam. Dynamic Motion technology is used to rough a 40 lb. aluminum billet down to unique and well-balanced body shape weighing approximately 7.5 lbs. This only takes about 20 minutes



***Material Aware Toolpaths in Mastercam continually adjust the cutting motion based on material conditions ahead of the tool to reduce tool wear while improving cycle times***

per side. After many painstaking manufacturing steps, the finished product is a guitar with good looks, playability, and a sweet, smooth sound, comparable to wood tone guitars that sell for \$6,000 to \$8,000. The MSRP of 660 Guitar Models is about \$3,400. 660 Guitars was formally introduced at the NAMM (National Association of Music Merchants) Show in Anaheim in January of 2016. Numerous musicians have been impressed by the sound, aesthetics, and quality of these instruments. The Emory Custom Tooling shop in Gilmer, Texas, is ready, willing, and able to handle a spike in demand for sculpted bodies and other components for these impressive handcrafted instruments.

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# HONING EXPERTISE GIVES ELITE PERFORMANCE THE “WINNING FINISH”



Article & Photos supplied to CNC West

“Winning finish” has a double meaning for Elite Performance, where the honing expertise of co-owner Nick Ferri has put the winning finish into engines behind 57 national NHRA Pro Stock wins and five championships, including back-to-back titles for 2015 Pro Stock Champion Erica Enders-Stevens. Ferri says honing finish rates a “10” in importance for engine seal-up, which translates into higher vacuum, greater fuel pull and ultimate track performance. After 30 years of developing his honing expertise and secrets in several engine shops on various Sunnen machines, Ferri says he has taken his science to a higher level with greater control, flexibility and repeatability in what he can achieve using a new computer-controlled Sunnen SV-20 machine and multi-stone diamond abrasives.

“With today’s thinner rings and inherently lower ring tension, you need the bore geometry and low-friction sealing surface in the bore that get the most from your rings,” he says. “The computer-controlled hone head and stroker on this machine provide flexibility for fine tuning and repeating surface finishes, overstroke, and crosshatch pattern. It all contributes to our performance on the track.”

Ferri started his career at Madcap Racing Engines in 1986 and later worked at a number of other shops, refining his honing recipes at each stop. He began with a Sunnen CK10 machine, then a CK21. In December 2012, he teamed with Richard Freeman of Elite Motorsports to purchase the equipment of a N. Carolina engine shop, which was moved to Wynnewood, Oklahoma, home of various Freeman enterprises. Freeman and his family have a history in the automotive business including dealerships, drag racing, and race-related equipment. The objective of the new company: establish an Elite-branded engine building operation to support cars sponsored by Elite Motorsports – including the one driven by Erica Enders-Stevens – then build a larger business from there.

“We are all about Pro Stock engines,” Ferri says. “We started with just two, but today we have eight engines we can run in rotation as we campaign three cars full time and one part time. We also produce engines for sale, ranging from Stock Eliminator to Pro Mod and even some engines for other types of motorsports.”

The Pro Stock engines for Elite Motorsports cars start with an OEM block. In the case of Erica Enders-Stevens’ Camaro, it



## 2015 PRO STOCK CHAMPION ERICA ENDERS-STEVENS ON TRACK IN LAS VEGAS.

was a 500-cid GM DRCE 2 block of CGI. “Elite Performance specializes in the high-end engine work that’s most important to final engine performance,” Ferri explains. “We have the machines for our part of the work, but farm out much of the basic machining to a few shops we trust.”

Honing these CGI blocks is a specialty for Ferri. “Everyone thinks it’s all about the heads and cam in these short blocks, but I learned early that ring seal makes or breaks track performance,” he says. “Your other components won’t make up for a lack of good seal. You can see this in the fuel pull on the dyno, and I use this as a key metric. For example, you can have two motors make the same power on the dyno, but one will pull more fuel than the other. On the track, the one pulling more fuel will be the winner. How they pull fuel and run down the track is all about ring seal. We’ve proven we can make the ‘23’ ring work, and though it’s only a slight weight and inertia advantage, it makes a difference in engine acceleration. But when you run a ring of that size and tension at 11,000 rpm, it has to be flat against the piston lands and well sealed, so the condition of the cylinder wall is crucial. We do leakage testing on our engines, but think vacuum is a more important metric.

On a healthy engine, we can pull a 22-inch vacuum with the oil pump alone. Our Pro Stock engines conservatively dyno around 1420 hp and 800+ lb ft torque. We use 0.023” tungsten hard-coated top rings, with a Napier second ring, and 2 mm oil rings.”

The piston’s important, too. It must be well designed and stable in the bore to keep the rings flat, he adds. But cylinder finish and geometry, which create the other half of the seal interface, are bigger factors because they have so many variables, he emphasizes.

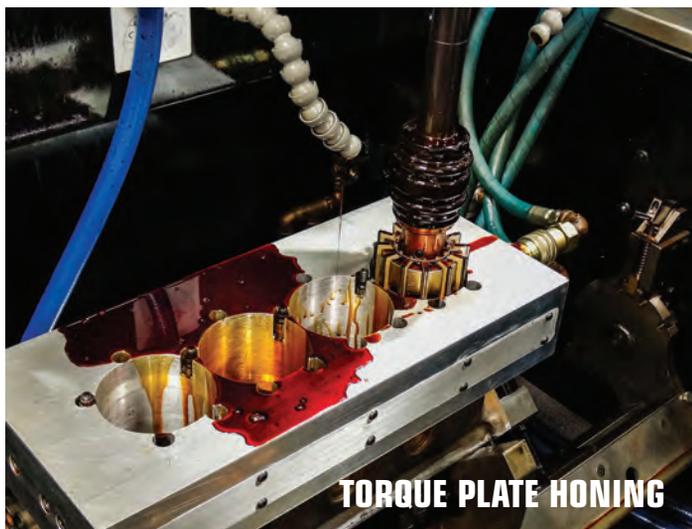
“Our new SV-20 with a true vertical stroke, plus special tooling and abrasives from Sunnen, allows us to produce a rounder, straighter bore,” he says. “Setup of the hone head and stroker is through the control, so it’s precise and repeatable. The servo driven stroker allows precision control of the stroke reversal point, eliminating all the manual adjustments and variability of earlier machines. In a perfect world, we would want at least 3/8” overstroke, but we’re lucky to get ¼” because of our deck height and cylinder lengths. We try to get the tool as close as possible to the top of the main web without contacting it, and it’s much easier to do this with a computer-controlled, vertical stroker.”



**GAGING THE BORE**



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**TORQUE PLATE HONING**



**DIAMOND STONES IN THE 12-STONE HONING HEAD**

Diamond stones in the 12-stone honing head have been a great aid in achieving good bore geometry on the total cylinder length, he adds. "In the past, we would make tapered 'cheater' stones to take out more metal at the bottom of the bore to get the taper out," he explains. "The multi-stone diamond tool produces excellent roundness without special work. This much abrasive contact in the bore also requires a powerful spindle to turn the tool without chatter, which can ruin a finish. This machine handles it easily. Spindle reversal was another new capability on this machine, and we do utilize reversal but are still working to determine how and when to use it for the best effect."

According to Sunnen, spindle reversal in a cylinder bore provides quite a few advantages and duplicates the capabilities of machines used by the OEMs. It can be used anytime in the process, but is especially helpful during the finishing strokes. It requires programmable spindle control and a honing tool/abrasives that can be run in both directions. Spindle reversal helps create a slightly rounder bore and aids in achieving

the desired surface finish. Reversing causes the honing stones to take out any less-than-round shape left after initial passes, while shaping up and dressing the stones themselves. Reversing the spindle, with abrasives or a brush, also aids in removing folded-over metal and cleaning out "honing trash" hiding in the valleys of the surface.

Ferri says on a new block he'll use 150-grit diamond stones to remove stock, then switch to 400-grit and hone to size. "I don't like to hone in one hole for a long time, so may limit it to 20 or 30 strokes and make multiple passes around the block, reversing the spindle direction as we get to final size," he explains. "We'll then plateau with 900-grit diamond and brush at various stages, mostly to remove folded metal and trash from the surface. All these grits can produce a huge variety of finishes, depending on the pressure applied. After plateauing, we'll measure our surface numbers. With lower tension rings, I prefer to have the rings take off most of the surface peaks during the first pull. I believe this optimizes our seal-up."



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Ferri also learned the value of honing with a heated torque plate. “I have seen over 0.001” expansion in the top of a cylinder as the block rises from ambient to 120°F. If we hot hone at 120° and make the bore straight, then it will be looser at the bottom when measured at ambient. On the flip side, I can pull a hot-honed block after 30-40 runs, tear it down, put it in the hone, bring it to temperature, and after just two strokes there won’t be one shadow in the bore. Others who don’t hot hone may have to take out 3-4 tenths to clean out the shadows around the bolt holes. If anything, hot honing from the start of a block’s life has saved me lots of time in salvaging used blocks.”

Ferri does not disclose details, but says he looks at Rk, Rvk and Rpk surface parameters, not Ra or Rz. He has used cross-hatch angles from 30 to near 40, but says the sweet spot is mid-range.

“I’ve been very lucky to work with some well-resourced groups that have allowed me to bring my skills up to the level they are,” says Ferri. “With the support of Freeman Motorsports and drivers like Erica Enders-Stevens on the starting line, we hope our winning cylinder finish will be behind many more winning race finishes and championships.”

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**DMG MORI**

# Machine Simulation

This is the third in a series of articles discussing the CAD/CAM and CNC process work flow.

Machine simulation has become more important as CNC technology progresses and is an absolute “*must have*” for simultaneous 5 axis machining. There are several levels of machine simulation, and at its highest, machine simulation can virtually eliminate the need to prove out programs on a CNC machine.



**By Derek Goodwin**

Imagine sending a program to your CNC machine and pressing cycle start without worrying about crashes, errors, alarms or over travel. Add probing to the mix and you can even inspect parts on the machine, checking dimensions and then applying finishing toolpaths to achieve accurate parts the first time out.

This is the reality in the most technologically advanced of today’s shops, and the productivity benefits are helping them outpace their competition.

## **Kinematic Visualization**

The foundation of machine simulation is kinematic visualization. The ability to see a 3D visual representation of machine movement, while collision checking machine components, fixtures, cutting tools and toolholders. Several CAM systems have machine simulation integrated with their interface or available as an add-in. Check with your CAM reseller for an explanation of features, as capability varies.

## **G-code Verification**

Vericut and NCSimul are leaders in standalone G-code simulation, offering the benefits of kinematic visualization and collision checking and adding an extra layer of security as they are completely independent of the CAM system. G-code verification simulates the machine using **the G-code** that has been output by the CAM system, thus verifying not only toolpaths that were created in CAM, but also catching errors that may have been created during post processing.

This is extremely important in simultaneous 5 axis machining where events, unforeseen in CAM such as cable unwind moves can be detected. They also simulate the machine control and will display the same alarm state as the machine controller would in case of an error in the G-code.

Complete and ICAM are G-code verification systems that also add post processing capability, which is an added benefit in some cases. For example, all Matsuura machining centers ship with a seat of Complete included. This allows for accurate post processing of G-code specifically for your Machine Tool, no matter what CAM system you use.

Contact us if you would like to schedule a review of your CAD/CAM and CNC programming process.

Written by Derek Goodwin, CAD/CAM Applications: Selway Machine Tool  
[dgoodwin@selwaytool.com](mailto:dgoodwin@selwaytool.com)

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# Fab Shop Lifts Big Part Production with Waterjet Cutting



*Petersen's OMAX 160X JetMachining Center provides a big cutting window of 13' x 26'.*

As parts and assembly tolerances continue to tighten, fab shops look for new ways to adapt and change their methods to achieve greater accuracy and improved production flow. Additional set-ups and transfers result in inaccuracies, downtime and loose tolerances. Abrasive waterjet machining solutions can help minimize the amount of additional processing to a single operation – as was the case for Petersen Inc. of Ogden, Utah, a worldwide provider of fabrication, machining, assembly and engineering services.

Large-scale fabrication operations are not immune to global manufacturing trends toward higher precision and greater production efficiency. To keep pace with these demands, Peterson constantly upgrades its capabilities to meet the exacting requirements of customers in the nuclear, aerospace, petrochemical, mining and general industrial segments.

Petersen's offerings have grown dramatically since it was founded 55 years ago to provide basic welding, ma-

chining and fabrication. Today, the company operates more than 100 machines, including abrasive waterjet equipment, multi-axis CNC turning and milling, grinding, EDM and secondary processes, as well as advanced welding and metalforming technologies. The shop's large-part machining capabilities allow it to turn workpieces measuring up to 15' in diameter and mill features within an envelope up to 12' vertically and 66' horizontally.

Petersen has 450 employees at three locations, including the 600,000-sq.-ft. primary manufacturing facility in Ogden and a 72,000-sq.-ft. shop in Pocatello, Idaho. A 900,000-sq.-ft. warehousing and distribution center in Ogden houses the company's logistics and inventory services.

"We have a very clear picture of who we are," said Bart Anderson, manufacturing engineer at Petersen. "We are a job shop. Most projects are low to medium volume, and every job is different in size and quantity. We do many one-off projects where we bid on a single item, large or small, and build

it. Other jobs are low-volume production, with 10 to 100 units in a month. We also produce small parts for customers who have a production line and need a parts supplier.”

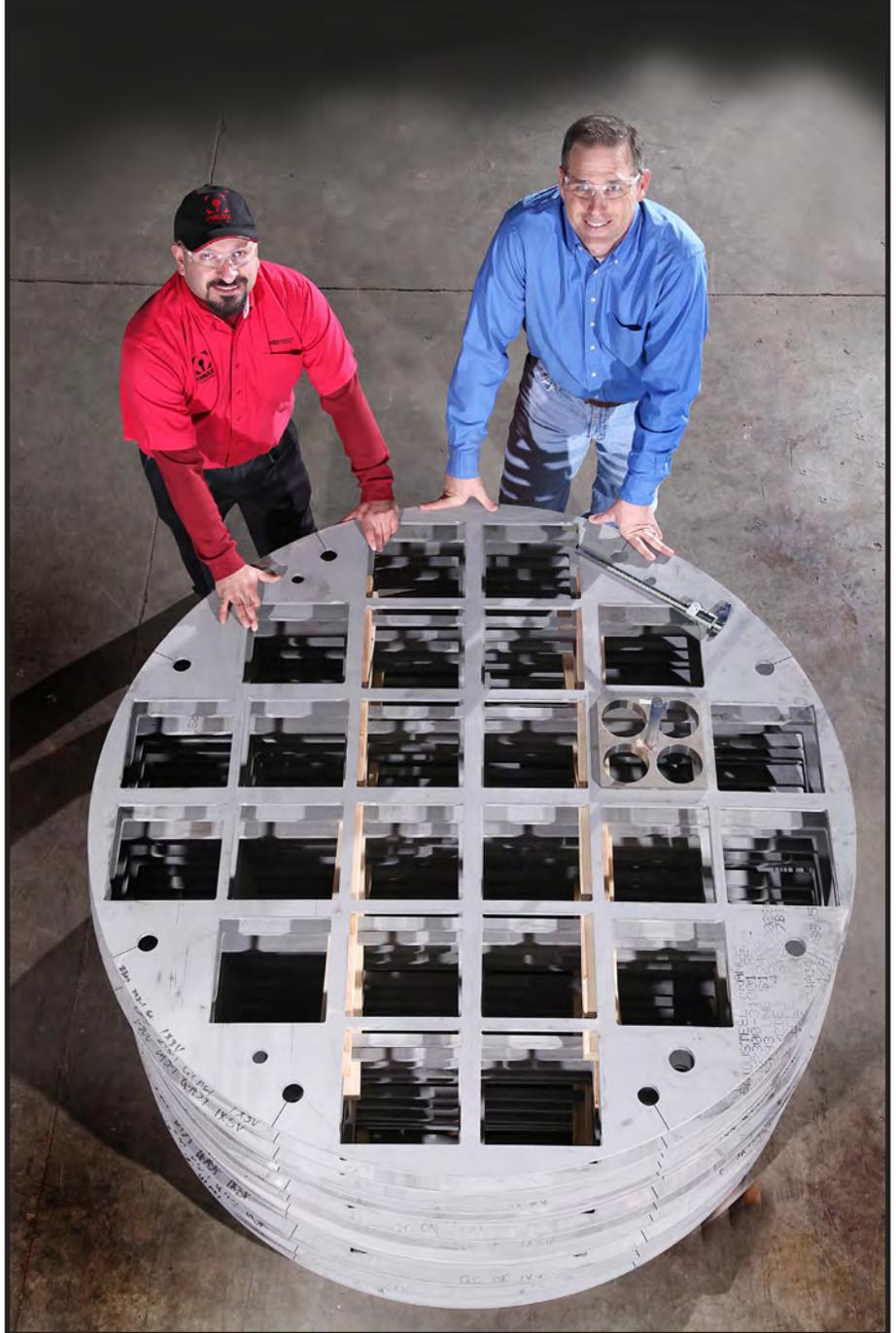
Part sizes vary widely, from several inches long all the way up to mining industry components that measure 60’ to 80’. Individual workpieces typically weigh from a few hundred pounds to over 5,000, and the shop routinely works on weldments and assemblies that weigh 5, 10 or as much as 50 tons. To move such behemoths, the shop has cranes with up to 75-ton capacities that work together to maneuver the parts. But on occasion, when assemblies weigh in at more than 130 tons, the shop has to bring in mobile cranes to transfer them to transport vehicles. But regardless of part size or weight, tolerances continue to tighten.

“Parts and assemblies that used to have wide open tolerances now have tighter and tighter requirements,” said Anderson. “The accuracy of the individual parts that make up a weldment has a huge effect on the finished assembly. The better accuracy that you start with, the better accuracy you finish with. And the methods we use to achieve that accuracy have had to adapt and change. We are always looking for the best possible ways to process material.”

A key contributor to greater accuracy and improved production flow at Petersen has been abrasive waterjet machining technology. The company uses waterjet cutting as a bridge between traditional plate cutting methods and precision machining operations.

“We use waterjets in all the industries we service to minimize the amount of additional processing,” explained Anderson. “Where parts cut on other equipment often require further processing, such as grinding or machining, to reach final tolerance, waterjet often enables us to achieve that tolerance in a single operation.”

Waterjet machining capability came to Petersen via happenstance. When the company took over the machining operations for a large automotive supplier, it acquired a pre-owned OMAX 55100 JetMachining® Center with a 4’ 7” by 8’ 4” cutting envelope. Prior to that, the shop conducted plate and shape cutting via a CNC burn table with oxyacetylene



**OMAX Application Specialist Octavio Abaonza (left) and Petersen Manufacturing Engineer Bart Anderson stand next to huge power generation parts cut on the shop’s big OMAX waterjet.**

torch and plasma cutting capabilities. As Petersen began using the OMAX machine, it gained an understanding of how much the technology could accomplish and has since added an OMAX 120X JetMachining Center and most recently an OMAX 160X JetMachining Center.

Initially, the OMAX 55100 was used exclusively for smaller parts, but that changed with a job that involved fabricating a storage cask for spent nuclear fuel. The workpiece material was high-strength ASTM A537 carbon steel, and the finished plate was 14’ long, 0.312” thick and weighed 150 lbs.



*With its OMAX waterjet cutting capability, Petersen holds close to normal machining tolerances on fabricated parts as long as 14'.*

Customer requirements called for the plate to be bent 90 degrees after having slots cut in it, but the plasma process created a heat-affected zone along the edge of the cut line, leading to problems. The company considered machining the slots after the bending operation, but this would require additional set-ups and transfers of the large, cumbersome part. Petersen's experience with smaller-scale abrasive waterjet machining suggested that the technology might be a way to cut the material without creating heat-affected areas.

"We did testing with a supplier in Salt Lake City that had a larger waterjet machine, and it was highly successful," said Anderson. "We improved our results drastically, almost an order of magnitude for cutting accuracy. The tolerances we achieved on the cask component ranged between 0.010" and 0.020". With the waterjet, we were holding close to a normal machining tolerance on a fabricated 14' -long part."

Such increased accuracy enabled the shop to eliminate post-cutting operations and permitted it to cut features in the flat pattern that plasma cutting was unable to accurately produce. While cutting time increased slightly, the waterjet eliminated the necessity for an entire other setup in a different part of the shop, as well as material handling time, part staging and storage and the machining operations themselves.

"With the number of parts we had to cut, there was enough justification to buy a machine large enough to handle the cask parts," said Anderson. "So five years ago we purchased the OMAX 120X with a 10' by 26' cutting window."

To multiply the machine's benefits, Petersen ordered it with two cutting heads. Both heads are mounted on the gantry machine's bridge. This allows Petersen to cut two parts simultaneously for some jobs, a feature that the company takes advantage of on 40 percent or more of the work processed with the machine.

All plate cutting for the storage cask job moved from the plasma burn table to the waterjet. Waterjet cutting also has replaced the plasma process on approximately 25 percent of the shop's other projects.

"As our waterjet capabilities increase, we are able to pull a lot of work from plasma cutting and move it to the waterjet," Anderson said. "We cut it to the size that we want and, with little or no further processing, put it right into a weldment."

Petersen keeps its OMAX machines busy. The machines run 80 hours of shifts per week, typically with multiple jobs going across them each day. Other times, a machine may be dedicated to a specific higher production job for a week or two. On average, the company estimates that 15 to 20 jobs

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are cut on the waterjets per week.

Petersen's big OMAX 160X provides a cutting window of 13' x 26'. And like the shop's 120X, the new machine is also equipped with dual cutting heads. But one of the cutting heads on the new OMAX 160X is an OMAX A-Jet head that can cut complex 3D shapes as well as easily cut beveled edges, angled sides and countersinks.

"The principle reason we bought the newest machine was for the A-Jet capability that lets us create weld bevels and edge chamfers," said Anderson. "We cut these features directly on the waterjet table instead of having to move the parts to separate machining or manual grinding operations."

The new machine's larger table size also provides greater productive capacity. For example, it enables the shop to simultaneously cut identical 65"-diameter steel disks from two 0.500"-thick stock plates. Previously, this job was quickly done one at a time on the OMAX 120X machine, so the shop has been able to double its production while maintaining the high accuracy and tight tolerances of the more than three dozen cut-out features on these disks.

Before acquiring the OMAX 120X machine, Petersen did evaluate other brands of waterjet equipment and came to the conclusion that OMAX continued to be the shop's best performance option.

"The capabilities of the OMAX machines are strong, and the results we get are great," said Anderson. "The software is simple to learn yet extremely robust performance wise. It and the well-built machines allow us to hold accuracies in the range of 0.003" to 0.005" over long cut distances. In fact, we currently maintain cutting tolerances well under 0.010" over an entire 26' span, and we are able to repeat that, day in and day out."

Petersen's diversification through a wide range of industries helps cushion the effects of economic volatility. With the recent slowdown in the petroleum and mining industries, the most active area for Petersen currently is the cleanup side of nuclear power. The company works with both the Department of Energy under the Nuclear Regulatory Commission and with utilities themselves.

"Over the last 8 to 10 years, a number of fabrication shops have closed, and it is really sad to watch that capability become extinct throughout the country," said Anderson. "Because of our capabilities, one of which being abrasive waterjet cutting, and our diversification in a number of key industries, we have been able to not just stay in business, but continue to grow as well."



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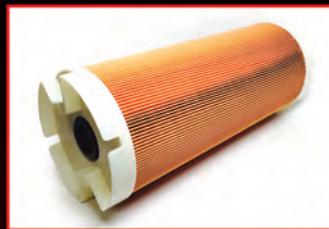
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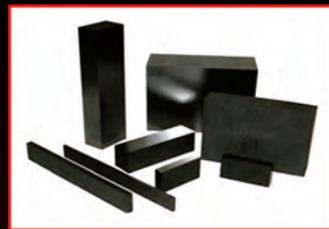
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# IMTS2016

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## Hainbuch America Launches TTT Interactive Displays

—Booth #W-1636

Hainbuch America Corp., a provider to workholding solutions for North America announced the shipment of the first wave of their TTT (Today - Tonight - Tomorrow) Interactive displays to machine tool distributors and OEMs.

These TTT Interactive Displays are fitted with Hainbuch's standard products that are the formation of the Today - Tonight - Tomorrow modular system. To demonstrate the flexibility of the Hainbuch Modular System, the display is equipped with the Spanntop Nova chuck (the original 10-second collet chuck) for turning applications, and the Manok plus chuck for stationary applications. The user can experience the simplicity and speed of going from O.D. clamping to I.D. clamping or to 3-jaw clamping in two minutes or less for each change-over. The adaptations included with the display are clamping heads (collets) for O.D. clamping, the Mando adapt for I.D. clamping and the jaw module for larger diameters.

The TTT Interactive Display will show end users how they can enhance the productivity and flexibility of their new machine.

## Ganesh Machinery To Introduce Auto-Loading CNC Lathe

—Booth #S-8045

Ganesh Machinery, will be introducing the ASL-100 CNC lathe with automatic part loading and unloading capability for processing parts up to Ø2.3" at IMTS. A 6,000 RPM 15-HP spindle with a 6" hydraulic chuck is standard. The machine is equipped with a 12-station tool turret, and a driven-tool turret and Y-axis is available. The dual parts gripper receives a new part from an incoming parts belt and loads it into the lathe spindle after removing the finished part from the chuck. The finished part is placed on an outgoing finished parts belt and a new part is loaded into the gripper unit for continuous automatic operation. The incoming parts belt can be fed by a vibratory bowl feeder or a high-capacity parts storage systems.



Additionally, Ganesh will be showing the Cyclone-32 CS 7-axis Swiss style CNC lathe for bar work up to 1-3/8" diameter with 27-tools including 11-driven tools standard. This dual-opposed sliding headstock machine features 6,000 RPM and 10-horsepower spindles. The Cyclone-52 BY2 9-axis 2" multitasking bar machine with opposed spindles and 36-tools with 18-driven tools including 12-B-axis live tools will also be shown, running an AR-15 automatic rifle bolt. The Ganesh VFM-2818 3-axis milling machine with a 12,000 RPM spindle and 28" x 18" X/Y travels moving at 1417 IPM will also be making parts.

The CNC mill will be powered by the Mitsubishi M830 CNC control with a fast 4,500 block per second processing speed.

There will also be two Ganesh machines in the Mitsubishi booth. A Ganesh ASL-6 slant-bed CNC lathe will have a Mitsubishi robot loading raw parts and unloading finished parts. There will also be a Ganesh VFM-2818 vertical CNC milling machine with a Nikken 5-axis trunnion doing full 5-axis machining with the M8 50 CNC control.

## Refresh Your Memory, Inc to Showcase FactoryWiz™ Monitoring System

—Booth #E-3363

Refresh Your Memory, Inc., will showcase the latest release of FactoryWiz™ Monitoring at IMTS.

FactoryWiz™ Monitoring boosts productivity by collecting live unbiased shop floor data, creating baseline metrics and identifying process improvement opportunities. Vital CNC machinery and other production equipment status and reports are available 24/7 on large display monitors (in common work areas), desktop monitors, mobile devices and smartphones, from any web enabled product anywhere in the world.

FactoryWiz Monitoring includes configurable dashboard displays showing a variety of information in real time providing visual manufacturing material to the shop floor, as well as manufacturing management, maintenance, and quality departments.

Included production reports (usually in PDF format) can be automatically created and set-up to arrive in your inbox. Users have flexibility to create, modify and fine-tune standard reports and performance data that is



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most meaningful to their application using off-the-shelf Crystal Reports™.

FactoryWiz™ Monitoring is MT-Connect compliant but also supports the most direct connect protocols of all CNC monitoring systems in the industry. Included native protocols such as Fanuc Focas, Mitsubishi, Siemens, Mazak, Okuma, Haas, Heidenhain, are standard with FactoryWiz Monitoring. There is no need for additional hardware/middleware for most modern Ethernet equipped machines. In addition to having numerous native direct connections, FactoryWiz™ Monitoring and DNC also supports legacy RS-232 machines using readily available non-proprietary hardware for DNC and monitoring data collection.

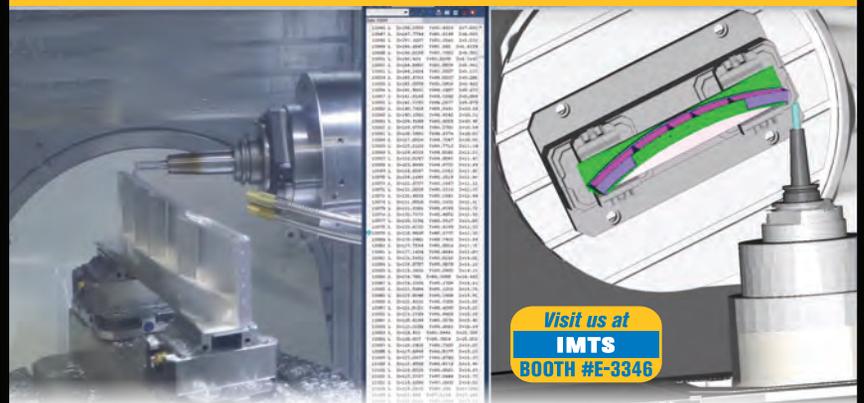
## Zoller to Debut New Tool For Easy and Fast Tool Presetting and Measuring: »pilot 1.0« —Booth #W-2022

The new image processing technology »pilot 1.0« offers all functions for presetting and measuring standard tools quickly and easily. For instance “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 13.3“ panel PC.

The Zoller tool presetter »smile« with »pilot 1.0« is robust, and can be used on the shop floor next to CNC machines, in processing and test centers,

or in measurement rooms. Take advantage of easy operation, real time presentation of the measurement results in the camera field of vision, and of a

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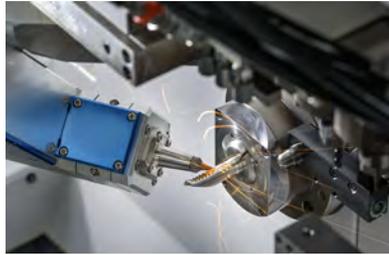
workshop-compatible device version.

All standard measuring functions are available, including longitudinal and cross dimensions, radius, two-angle technology, and concentricity and run-out.

## New Citizen Models on Display

—Booth #S-9419

See the new Miyano BNX-51MSY multi axis turning center and a Cincom L220 equipped with LFV (low frequency vibration) servo systems at booth S-9419. Two L2000 Laser Systems will also be on display performing laser and conventional machining operations on a Cincom L220XII and



a Miyano BNA-42GTU.

This year a major focus in the Marubeni Citizen-Cincom booth will be highly engineered accessories developed by the MCC Tech Center engineering team. In addition, a Fanuc Robot system will be integrated to a Miyano BNA-42S2 and a Mitsubishi system will be interfaced to a Cincom L220X to unload and palletize

completed components. The Cincom L12 will be equipped with a vacuum extraction and automated parts collection system.

## Heidenhain to Showcase Motion Control Influence —Booth #E-5226

From Heidenhain comes an opportunity to view not only its newest motion control products at the upcoming IMTS but also see highlights from two of its many internationally-owned entities: Etel and Acu-Rite brand. Heidenhain North America represents and distributes seven precision measurement component company brands.

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This year's 50x60-foot IMTS-Heidenhain booth will be host to long-awaited Quadra-Chek 3000 digital readout, Heidenhain encoders (including RCN 6000 angle encoder and LC 100 linear scale), and unique TNC control/capabilities. Etel's TMB+ torque motors, as well as the Acu-

Rite MILLPWRG2 CNC control with enhanced features will also be shown.

Descriptions about a few high-lighted products include:

Heidenhain's sleek new Quadra-Chek 3000 evaluation electronics box is designed for measuring 2-D geometrical features quickly and easily, utilizing technology that, up to this point, has only been available on PC systems. The Quadra-Chek 3000 is at home in the lab shop-floor.

– This newest line of ETEL's next generation direct drive torque motors improves upon the exceptional design of the well-known TMB series with even greater material quality, new size additions (62 sizes up from 50), higher force density and more winding op-

tions. These motors can achieve peak torque values up to 44,000 Nm.

The Acu-Rite MILLPWRG2 control is an easy to-operate CNC for vertical knee and bed mills. It is available with an optional AMI (auxiliary machine interface) and spindle control console offering users the ability to use common interfaces as well as control its host machine tool's spindle.

## Hanwha Machinery to Introduce 42 MM Swiss-Type Machine

—Booth #S-9484

Hanwha Machinery announces their newest machine model: the new XD42.

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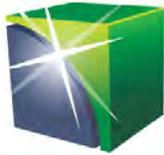
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This new larger capacity Swiss-Type Machine will provide customers looking to produce larger diameter Swiss parts the ability to do so. The new 42 mm (1.653") with a guide bushing offers the industry an additional alternative in producing some parts that were too large for a standard Swiss Machine.

Features of the new XD42 includes: Stability structure of bearings and

toggles on main and sub-spindles, strong chucking force by a large hydraulic cylinder as well as a high-rigid single piece casting bed design. The machine provides cost-effective parts production for heavy milling and cutting. The proven concept of a horizontal gang-type design offers a stable structured base and easy chip removal. Cross and back tools are available with ER20M as an option with a powerful motor (cross drill: 2.2kW,8Nm / back drill: 1kW,3Nm). The off-center drill next to the sub spindle is powered by gears not belts.

The new XD42 offers the option of a bar lifting unit for the automatic loading and replenishing of heavy bar

stock. Equipped with two anti-vibration units that is specially designed for the V-block (Hybrid Static Block) to guide the bar stock efficiently. Other options include specialized tools, chip conveyor with a larger coolant tank that are compatible with XD38II model.

## Fixtureworks Will Showcase Several New Product Lines

### —Booth #W-2377

Fixtureworks will showcase several new product lines. Highlighting the exhibit will be its lineup of Trimax vises, low-profile Trigrip carbide grippers

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and the APS zero-point positioning system.

Trimax production vises enable users to increase machine potential with multiple-part clamping, quick-change components and easy adjustment, the company says.

Trigrip carbide gripper inserts are designed for low-profile clamping with no dovetail workpiece preparation. The triangular grippers feature serrations designed for steel, hardened steel, titanium and aluminum, and are equipped with two rows of teeth at different angles to increase the pull down effect. The inserts are integrated with the Trimax line of vises and can be used for upgrading existing vise jaws.

The APS zero-point positioning system is designed to connect the clamping device or workpiece with the machine tool for faster setup times. The system features receptacles with three air-activated jaws for increased rigidity, clamping force and repeatability of 0.0002”.

Fixtureworks will also display its compact Imao air-assisted clamps, supports and locators designed for remote-control activation and simultaneous control. Products in this line include swing clamps (double acting and spring acting), hook clamps, side clamps, OD (perimeter) clamps and pull clamps. Pneumatic work supports are also available, as well as pneumatic flex locators, consisting of a receptacle and locator pin that is released when air pressure is applied.

Imao one touch fasteners are used for quick changeover and installation without the need for tools. Also on display will be the GP series of rubber gripper pads, and the Fairlane Products full line of fixturing accessories.

## Renishaw RenAM 500M

—Booth #-E-5509

The Renishaw RenAM 500M builds complex metallic components

directly from CAD using metal powder bed fusion technology. The RenAM 500M is first in a family of products based around Renishaw’s optical sys-

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tems and control technology.

Renishaw has core skills in optical engineering, motion control and

manufacturing from over forty years of producing industrial high-technology products. The RenAM 500M builds

on the advantages of the Renishaw AM system platform with over ten years of metal powder bed fusion development and experience and state-of-the-art manufacturing expertise. The machine manufactures parts within the build volume (9.84 x 9.84 x 13.77 inches) and utilizes a high powered ytterbium fiber laser to fuse fine metallic powders together creating functional 3-dimensional parts.

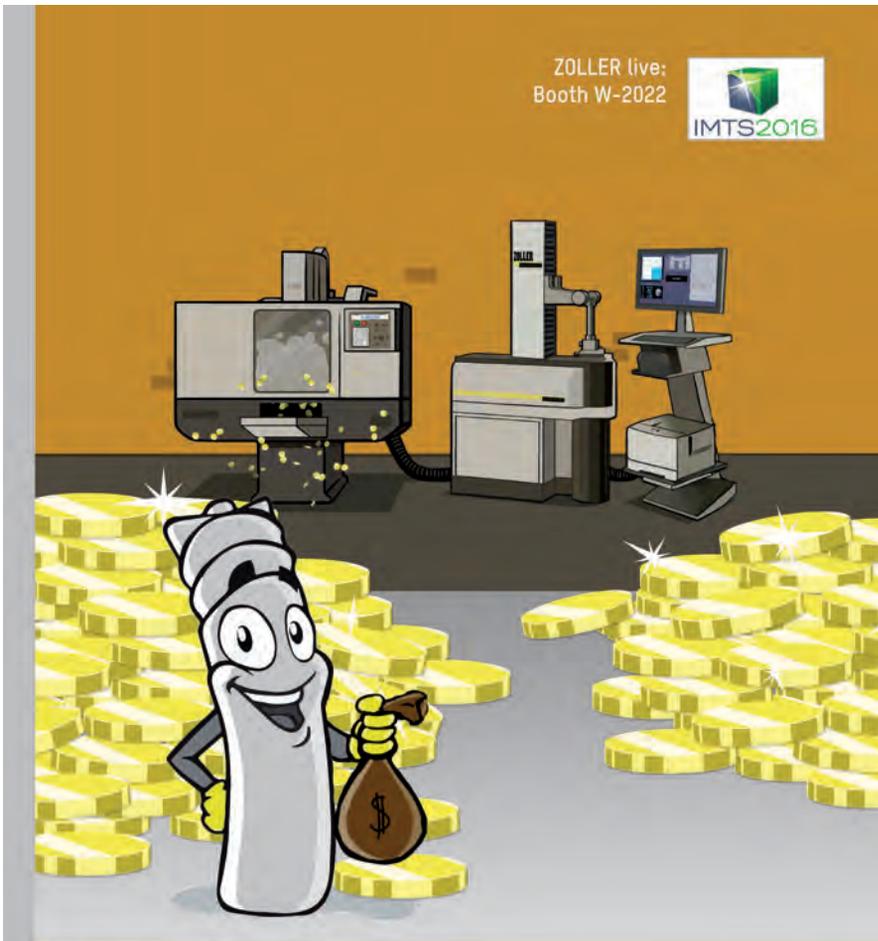
In-line sieving allows powder to be recycled and re-used in a single process under an inert atmosphere. Metallic powder is loaded into the machine hopper at the front of the system and sieved ultrasonically. Any un-melted material is returned to the hopper and passes through the ultrasonic sieve before being processed. Sieved powder is pneumatically transferred in a flow of high purity argon gas into the powder delivery silo.

The RenAM 500M features a patented high capacity twin SafeChange™ filter system enabling builds to run for long periods in a stable and controlled atmosphere. Filters capture process emissions safely and efficiently and the machine's intelligent control system actively senses the filter's condition and redirects the gas circuit to a clean filter before conditions deteriorate.

The large 19 in. durable touch-screen and machine control software allows for ease of navigation. Based on a Windows® operating system with a dedicated user interface.

## Tsugami/Rem Sales to Launch New LaserSwiss CNC Machine —Booth #S-9410

Tsugami/Rem Sales will debut its new SS207-5AX LaserSwiss CNC Machine at IMTS. The SS207-5AX



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LaserSwiss is the third model in the company's LaserSwiss product line.

Tsugami/Rem Sales' LaserSwiss machines combine Swiss style CNC machining with laser cutting on one machine. They allow manufacturers to perform Swiss turning and laser cutting operations with a single setup. All operations are programmed and driven from the machine's Fanuc control, and laser settings are adjustable 'on the fly.'

The SS207-5AX is a 20 mm, 7-Axis CNC Lathe with a fully integrated SPI Fiber Laser cutting system. The machine is available in laser watts ranging from 250 - 400.

"What makes this model unique," Tsugami/Rem Sales vice president Mike Mugno said, "is that it adds B-axis laser cutting capability to the existing range of LaserSwiss machines."

The SS207-5AX LaserSwiss 35 tools, including a B-Axis tool block containing the laser and four other B-Axis tool positions. Additionally, the machine is convertible, which means operators can run the machine as a traditional Swiss lathe with its sliding headstock or with the addition of an optional chucker kit.

"The SS207-5AX without the laser cutting system can already perform a multitude of functions," Mugno said, "but the laser adds even more."

## Makino to Host Lunch & Learn Events

### —Rooms S104A & S104B

In addition to the demonstrations and displays at their booth, Makino plans to host Lunch & Learn events throughout the week. Each session includes presentations from Makino customers discussing real-world manufacturing challenges. Lunch & Learn

events are to be held from noon to 1 p.m. daily in room S104a and S104b in the South Hall. Lunch is provided.

To see the most up-to-date schedule, visit [www.makino.com/imts](http://www.makino.com/imts).

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### Haimer USA Power Mill End Mill Series

—Booth #W-1452

Haimer USA will display its newly

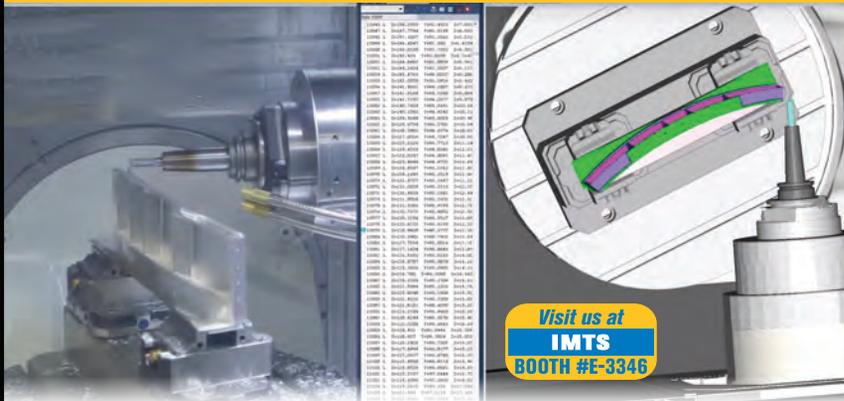
expanded offering of Power Mill end mills. The series is made from K20-K40 grade fine grain carbide developed to be matched with the company's toolholders. The end mill's geometries

utilize flute and helix designs to provide chatter-free, high-end machining.

The series is equipped with integrated Safe-Lock shanks for optional use with the Safe-Lock toolholding technology. Its variable-helix design provides vibration-free machining and a runout accuracy of less than 0.0002". The machines are precision-ground and fine-balanced for consistent and repeatable performance, and maximum metal removal rates. Expanded offerings are available in inch and metric sizes.

The company will also be exhibiting its Duo-Lock modular interface for carbide cutting tool heads and the Safe-Lock tool clamping system. Additionally, the company will display its Power Clamp shrink-fit machines; shrink-fit toolholders and collet chucks; Tool Dynamic balancing machines; 3D sensors; and Cool Flash coolant delivery system.

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### GenSwiss To Feature Louis Belet "Expert" Series Tool Packages

—Booth #W-2356

GenSwiss, a top source for tools, accessories and assistance for Swiss machining, will offer the Louis Belet SA precision carbide "Expert" series tooling packages designed for aluminum, brass, titanium, stainless steels and composite material groups. The packages incorporate newly optimized geometries and coatings for drills, end mills, slotting saws, thread mills, engraving and spotting tools for greater productivity, higher material removal rates, superior surface quality and extended tool life over a wide range of industry applications within the material groups.

Also featured will be UTILIS® Multidec CUT3000 cutoff inserts with

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new geometries with the type GS cut-off insert featuring optimally tuned carbide and coating for high cutting speeds with excellent chip control for carbon steels cutoff work and the Type SPT 06 chipbreaker, available with CUT1600 and CUT3000 series holders is ideal for stainless steel part-off work.

New from PCM are high precision live tools designed for greater tooling speeds for specific Citizen, Tsugami and Star machines.

## OMAX Highlights the Next Generation of Micromachining

### —Booth #N-6228

At IMTS 2016, OMAX Corporation will showcase the next generation of the MicroMAX® abrasive waterjet.

The latest model of the MicroMAX includes accuracy enhancing upgrades and expanded accessory compatibility. “Since its introduction, the MicroMAX has offered industry leading part precision,” says Michael Ruppenthal, vice president of North American sales for OMAX. “Some of the world’s leading high tech companies and institutions have chosen the MicroMAX for work ranging from prototyping to production because of its accuracy and ease of use. We’ve engineered our next generation MicroMAX to deliver more capabilities and benefits to our customers. OMAX is always innovating, and we’ve applied this innovation to the MicroMAX Gen 2, improving the machine’s precision, versatility and convenience.”

OMAX reports the OMAX Tilt-A-Jet cutting head comes standard for even greater precision and virtually zero taper when working with most materials. Contributing to the ultra-high precision capability of the MicroMAX is OMAX’s proprietary linear traction drive system that utilizes optical encoders to provide a positioning accuracy

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of less than five microns. Protective bellows seal off all precision components inside the MicroMAX and the machine's rigid construction minimizes vibration. A catcher tank cooling package is now an option to keep the water at a steady 72°F.

The MicroMAX is now compatible with the OMAX Precision Optical Locator (POL) as an add-on accessory. The POL can locate existing points, edges or holes in a pre-machined part for secondary machining operations or reverse engineering of a part where this is permissible. The rotary axis is another optional accessory compatible with the MicroMAX for full 6-axis machining.

A mobile work station with controller software provides the operator with convenient set-up and monitoring capability. The MicroMAX is compatible with the OMAX Variable Speed Solids Removal System (VS-SRS).

## Hurco Introduces Double Column Bridge-Type Machine

### —Booth #S-8319

Hurco will unveil the BX40i double-column (bridge-type) CNC machine at IMTS. The stability of the double-column design and the overall weight of the machine (20,062 lbs.)

provide exceptional accuracy and outstanding surface finish capabilities. The BX40i meets the needs of any high speed machining application that requires tighter tolerances.

According to Hurco, with the double-column design, there is less tool deflection and less vibration compared to a single column CNC machine and less thermal deformation. Another advantage is the fact that the spindle is closer to the mass of the machine on a double-column machine.

The Hurco BX40i has the integrated Hurco control powered by WinMax® control software and the patented motion system called UltiMotion®. The flexibility of the Hurco control supports multiple programming methods: conversational programming that minimizes idle time that occurs when waiting for the CAD/CAM station; industry standard NC programming; and a Hurco-specific feature called NC/Conversational Merge.

UltiMotion motion control software system determines the optimal trajectory to run the tool and achieves programmed feed rates more consistently, reducing cycle time.

Hurco will also exhibit its new open bed CNC mill, the HTM30i; its new 3D print head adapter that connects to Hurco CNC mills for accelerated prototyping; the new 5-axis CNC machining center VC600i; the 5-axis VMX42SWi CNC machining center; the 3-axis VMX6030i; the trunnion style 5-axis VM10Ui; the high speed 3-axis VMX24HSi CNC machine; the general performance 3-axis VM20i; the TMX10MYSi slant-bed lathe with live tooling and subspindle; and the general purpose TM6i slant-bed lathe.



## Inspection Plus with SupaTouch™ Software —Booth #E-5509

Renishaw's new enhanced probing software package automatically optimizes on-machine measurement cycles to minimize cycle time and maximize productivity. Inspection Plus with SupaTouch™ enhances the proven benefits of Renishaw's established Inspection Plus software and features an easy-to-use optimization process that automatically determines and selects the highest feedrates a machine tool can achieve while maintaining measurement accuracy.

Inspection Plus with SupaTouch optimization uses intelligent in-cycle decision making to implement either a one or two-touch probing strategy for each measurement routine and eliminates the need for manual optimization of on-machine positioning feedrates, measurement feedrates and strategies. According to Renishaw, compared with traditional software cycles, it provides a significant cycle time reduction (up to 60 percent) on CNC machine tools.

Designed to ensure maximum accuracy, the software detects any measurements taken during machine acceleration or deceleration phases and compensates for errors by taking corrective action and remeasuring. It also introduces a calibration process that improves measurement repeatability in all directions and improves the accuracy of probe positioning during

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multi-axis vector moves. Renishaw reports with this new software, users can significantly improve cycle times and on-machine measurement results.

## “Multi Connect”: Time-Saving Turnkey Device

–Booth #E-3240

Shop Floor Automations (SFA) will announce the release of their latest tool in the Shop Floor Automations Connect line at IMTS 2016. The Multi Connect is a turnkey device, able to continuously monitor the machine’s operating state and other necessary data, while making this information readily available over a network connection using the industry standard MTConnect protocol. The Multi Connect is compatible with a wide range of machine monitoring software packages, including Scytec’s DataXchange, Predator’s Machine Data Collection, and more.



SFA reports what originally required two different devices combined for the desired result, the Multi Connect replaces in one product. This “configure & go” hardware connects to a variety of equipment via built-in digital I/O, which can be overlaid on existing signals for monitoring cycle start, cycle stop, alarm, and status indicators, such as stack lights. These inputs support 10 to 30 VDC signals and may be configured to detect on/off/pulse type signals. The user can then map the data signals to the MTConnect standard data items.

Network access is provided by a wired Ethernet (100Base-TX) connection in addition to built-in WiFi. Additionally, for applications requiring DNC connectivity through serial (RS-232/422/485), single- and dual-port models are available.

Small and compact, it is designed for direct machine mounting (DIN-rail mountable), packaged in compact and rugged metal chassis.

Some features of the Multi Connect include MicroSD for configuration backup and wireless client function for

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flexible integration.

The SFA Connect line of products includes the USB Connect, Floppy Connect, LAN Connect and Ethernet Connect.

## Kitamura Space-Saving, Multi-Tasking HMC —Booth #S-9148

Kitamura Machinery will introduce the elevated high-speed, high-precision capabilities of its ultra-compact Mycenter-HX250iG HMC.

Manufactured in Japan with ultra-high speed rapids of 2,362ipm, the Mycenter-HX250iG offers high ef-

iciency with the ability to drill, mill, bore, tap, thread and turn light to heavy duty materials on a single machine.

The machine has a small footprint, taking up only 6' x 9.7' of floor space. The HX250iG allows for a generous work envelope, one piece, easy grip sliding doors, large windows and door openings along with easy spindle access.

A 2-station APC is automation ready and field expandable up to 10-pallets for unmanned operation potential. The standard full 4th axis rotary table is newly designed with a direct drive motor enabling speeds of 300rpm rapids.

A 40-tool fixed pot (assures tools

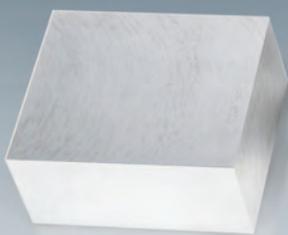


are always returned to the same pot and the next tool to be used is kept in a “stand-by” pot) ATC allows for the addition of up to 102 tools in the field for backup/redundant tools.

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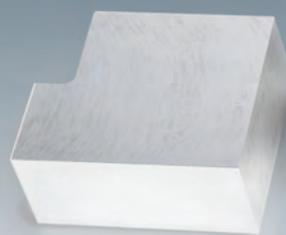
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Standard is a powerful, high torque, 15HP #30 taper, dual contact spindle. A high-speed, 30,000rpm HSK-E40 spindle is an available option.

Ultra-high precision means outstanding positioning accuracy of  $\pm 0.000079''$  /full stroke with 67 million pulse encoder technology.

Kitamura's advanced icon driven Arumatik-Mi control offers user friendly, unique features such as on demand "HELP" guidance, visual work setting, maintenance support functions, and a 19" swivel color LCD. SSS Control delivers high speed processing of 270m/min feed with 1mm/block, 4,500 blocs/sec.

Additional machines exhibited include the new Mycenter-2XD "Sparkchanger" VMC with 180 degree rotating 2-station APC and Kitamura's newest addition to their 5-axis line-up, the Mytrunnion-4G simultaneous vertical machining center.

## Tsugami/Rem Sales New CNC Machines —Booth #S-9410

Tsugami/Rem Sales will debut the new SS207-5AX LaserSwiss, a 20 mm 7-axis Swiss type CNC lathe with B-Axis control. The LaserSwiss combines Swiss style CNC machining with laser cutting on one machine. It allows manufacturers to perform Swiss turning and laser cutting operations with a single setup. The control is a FANUC 31i-B5 CNC.

The Tsugami BW209Z, B0205-III and P034H machines are also new to IMTS this year. The BW209Z is a 20 mm capacity split-slide CNC precision Swiss style lathe. It boasts a 10,000 rpm main spindle speed and a 12,000 rpm back spindle speed. It can house 28 tools and is equipped with a FANUC 31i-B CNC.

"The benefit of a 9-axis machine," Tsugami/Rem sales regional manager Ron Gainer said, "is that it has three cutting tools, all cutting the part simultaneously, and all three tools have independent feed rates."

The new B0205-III represents the next generation of Tsugami Swiss Type CNC Lathes. "It's a heavier, more rigid, enhanced version of the B0205-II," vice president Mike Mugno said.

Improvements to this 20 mm 5-Axis lathe include faster cross tool speeds, longer back spindle strokes on the X2 and Z2 axes, larger ball screw diameters, and expansion of its thermal displacement compensation system.

The P034H is a 3 mm 4-axis Swiss type lathe. Designed for micro machining, it's ideal for mass production of tiny, very precise parts. The main and back spindles operate at 20,000 rpms and the machine has 14 total tool positions. Au-

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tomatic thermal displacement compensation, an adjustable grip chuck, and a specialized bar feeder are standard.

Other Tsugami machines on display include the B038T 38 mm high perfor-

mance gang/turret lathe, B0326-II 32 mm 6-axis Swiss turn, SS327-5AX 32 mm 7-axis CNC lathe and the heavy duty M08SY CNC turning center.



## Visual EstiTrack™ ERP Touch Scheduling Board —Booth #E-3256

Henning Industrial Software will be demonstrating its new Visual EstiTrack™ ERP Touch Scheduling Board application. The new optional add-on to Visual EstiTrack™ is the Touch Scheduling Board, is designed to replace magnetic boards. It provides a visual Kanban-type presentation of operations that is queued up on the workcenters in electronic card format.

Users can move these cards around via the touch screen, and the updates are shared across the network, throughout the organization, without the need to report a single location where a magnetic board would be kept. The features helps customer service departments see their priorities and queuing of work and helps shop floor personnel share data such as status updates and operational notes from one shift to another.

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## Tongtai Multitasking Y-Axis Turning Center — Booth# S-8536

Tongtai's new iTD-2000YBC is an advanced, high precision CNC turning center cast from Meehanite iron. It features a rigid, ergonomic, and super accurate 75° bed design for excellent chip flow. The 75° bed also simplifies the programming of the optional Y-axis as the Y-axis is perpendicular to the X-axis like a vertical machining center. High rapid-traverse rates using 45mm roller type linear ways are also achieved.

X-axis cross travel is 9.05", Z-axis longitudinal travel is 23.6", B-axis sub-spindle travel is 24.8", and optional Y-axis travel is +/-2" from the center line. The main spindle is driven by a 20HP, high torque motor which provides acceleration at 4,500 RPMs. The 5,000 RPM sub-spindle is driven by a 10 HP high torque integral motor spindle. The spindles are synchronized on the fly for part transfer to the sub-spindle. Rapid traverse feed rates for X, Z, and B-axes are 1,181"/min. and 590"/min. on Y. A tool setter and chip conveyor are standard.

A 12-station bi-directional servo BMT-65 (16 station BMT-55 optional) turret provides 0.3 second indexing and coolant through the tool holders. A full C-axis with live tools is standard for milling operations on both the main sub-spindles. The true linear Y-axis provides turret movement perpendicular to the X-axis for complex off-center milling functions and easy programming. The Fanuc Oi-T-F CNC control is standard.

## Koma Precision to Display New Products —Booth # S-9153

For Koma Precision and Tsudakoma, IMTS 2016 heralds the arrival of the tilt ball drive system rotary tables

into the North American market. The ball drive system features advantages like zero backlash, improved cycle times, energy conservation and a life-time adjustment-free transmission system. The TBS tilt tables are perfect for a dual axis use on VMC's.

Also, new from Tsudakoma is the RDS Series direct drive rotary tables that utilizes Tsudakoma's proprietary direct drive motor system enabling the rotary table to achieve high speed and acceleration with no backlash. The new direct drive rotary tables also feature a slim low profile build that makes it very suitable for mass production and high speed indexing operations.

New from Alberti, a pioneer in high precision angle heads, are the high pressure offset angle heads. The new series of offset angle heads feature a combination of high pressure coolant through the main spindle up to 100 bar with increased high speed option. Another big advantage is the possibility of dry running during machining. Also new will be the Hi Smart quick change angle heads, Hi Flex custom made special angle heads and high speed Turboflex spindles.

New and advanced tool presetters from Elbo Controlli featuring a new tool management software package. The new E46L and E46L TW models feature an increased measuring range up to 600mm on the Z Axis, a 22" HD touchscreen display along with optical autofocus and a new electronic control. The E46L and E46L TW are also equipped with Elbo Controlli's proprietary spindle-holder identification system. This technology enables the presetter to automatically identify the spindle holder after each replacement. Five tool presetter models – the Larth, E346, Sethy Six, Hathor Six and E46L - will be on display.

The new m&h product line offering a state-of-the-art measuring solution with probes and tool measuring system software that enables to control quality of the part on the machine.

## GF Machining Solutions to Debut Wide Range of Advanced Technologies —Booth # S-8754

GF Machining Solutions will debut its new AgieCharmilles CUT 2000 X advanced wire EDM, full 5-axis additions within its Mikron MILL S and X product line and advanced automation systems. Additionally, they will showcase its latest in additive manufacturing and System 3R automated laser texturing, along with several other recent advancements in 5-axis milling and both die sinking and wire EDM.

The CUT 2000 X eliminates pitch and positioning errors. With the CUT 2000 X, shops can achieve  $\pm 1.5 \mu\text{m}$  pitch accuracy over 340 mm x 240 mm and the same for M-shape form accuracy.

The new Mikron MILL X 600 U is designed specifically for the production of high accuracy parts with concave and convex part surfaces.

Also shown will be the new Mikron MILL machine within a Fanuc automated multi-machine manufacturing cell. The cell will also house a Mikron HEM 500U milling machine and a high-precision CMM.

Other GF Machining Solutions: The AgieCharmilles AM S 290 tooling machine incorporates additive processes based on the technology of the EOS M 290 metal laser sintering system. The compact 5-axis AgieCharmilles LASER P 400U machine, the new Mikron MILL P 800 U ST (Simultaneous Turning) combining milling and turning. The Mikron HSM 400U milling machine. The Mikron HEM 500U, 5-axis-simultaneous single-setup machining. The Liechti GoMill 350 5 axis mill. The CUT E350 wire EDM, and the CUT 200 dedicated wire EDM.

Other machines include the FORM 20 die sinking EDM and the FORM 200 die sinking EDM.



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## Barton to Show TRI-DENT-2® Diamond Cutting Head —Booth #N-6536

Barton International reports the TRIDENT-2® diamond cutting head offers all the advantages of an integrated diamond design with the versatility of a replaceable orifice cartridge making it the waterjet industry's most advanced cutting head.

Each TRIDENT-2 diamond cartridge is precision machined around a simulated jet stream to ensure perfect orifice to nozzle alignment. Barton reports this ensures absolute alignment of the jet stream through all components of the cutting head resulting in a system that minimizes wear and directs maximum cutting force.

Waterjet operators experience superior accuracy, longer nozzle life and faster cutting with reduced abrasive consumption. The replaceable diamond cartridge can be swapped out when a different orifice size is required expanding the versatility of the cutting head. The TRIDENT-2® diamond orifice cartridge is warranted for 500

hours when used with the short stop filter assembly.

The TRIDENT-2® diamond cut-

ting head is made in the USA and is available exclusively through Barton International.



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# IMTS 2016 Preview

September 12-17, 2016

## CNC Indexing & Feeding Technologies New TJR Rotary Tables —Booth #S-9092

CNC Indexing & Feeding Technologies announces its new partnership with TJR Precision Technology from Taiwan. TJR, or Tan Jia Precision Technology, is a well-established supplier of rotary tables to machine tool OEMs such as Okuma, Doosan, DMG Mori, Mazak, and Tongtai.

“The new partnership allows us to supply the most technically advanced rotary tables in the industry, with special emphasis on direct drive and 5c

collet 4th axis series units,” said Steve Smith, president of CNC Indexing & Feeding Technologies.

The company reports having the largest market share of machine tool accessories in China. Today TJR is a top OEM with offices all around the world. Their rotary tables are built with high quality features such as an anti-wearing worm gear and shaft made of high tensile brass for durability. Further, encircling braking systems use a large clamping range to prevent displacement during heavy-duty cutting.

For tilt rotary tables, TJR offers a 2+1 independent braking system and large diameter radial and axial

preloaded bearings for rigid support during 4th and 5th axis cutting on both single and dual arm rotary tables.

## Yamazen Inc. to Showcase Various Brands of Machine Tools —Booth #S-8640

Yamazen’s 100’ x 100’ booth will display and showcase 14 machine tools from their industry-leading builders.

Brother International Corporation will show their compact machining center Speedio product line; M140 16K/22T/CTSI, R450X1 HT/BBT/



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CTSI, S700X1 27K, S700X1 HT/BBT/CTSI demonstrating the new Flex-S robotic cell by Nachi (made for Brother Speedio S300/S500/S700). Brother will also have their larger workpiece Speedio machines; S1000X1 16K/21T/CTSI, S1000X1 HT and the R650X1 HT/BBT/CTSI. All models feature the powerful and fast Brother CNC C-00 control. With high speed spindles up to 27K, high torque spindles up to 10K.

Also shown will be the Matsuura Machinery USA MX-520 15K/high power/CAT40 5-axis vertical machine center that allows for easy transitioning from 3-axis to 5-axis machining.

See the Mitsubishi Heavy Industries America, Inc. MVR30-Ex double-column, 5-face vertical milling machine with right angle head equipped as standard, and the affordable vertical milling machine, the M-VB25 fixed rail bridge with high speed right angle head.

Takisawa Inc. combined turning and milling centers; TT-500GD parallel twin-spindle, TS-4000YS opposed twin-spindle, TT-2600G twin-spindle with gantry and the TCN2100G single spindle lathe will all be shown.

## Tsugami/Rem Sales to Demo New CNC Lathe —Booth #S-9410

Tsugami/Rem Sales will demonstrate its new B0205-III CNC Lathe with integrated robotics and automated part loading at IMTS.

The machine is one of four next generation opposed gang tool CNC lathes Tsugami introduced in 2016. Other new models include the B0125-III, B0126-III, and the B0206-III. The new models incorporate myriad improvements to the B0125-II, B0126-II, B0205-II and B0206-II models.

To increase the machines' overall

rigidity, Tsugami moved the electrical control cabinet from inside the ma-

chines to an external position behind the machines and installed two addi-



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tional support ribs in the space that held the cabinet. Tsugami also redesigned the machines' castings, increasing the weight of some machines by over 650 pounds.

Other machine enhancements include increasing the main spindle cross tool speeds from 5,000 rpm to 8,000 rpm, lengthening the back spindle slide stroke on the X2 and Z2 axes, increasing the ball screw diameters, expanding the tool area inside the machines, and streamlining chip flow and removal. Tsugami also updated the machines' Abile programming software, which is included with most Tsugami machines.

Tsugami's B0 series of CNC Lathes can be run as traditional Swiss style lathes with a guide bushing or operated with optional chucker kits, which can be quickly installed.

## Okuma's New High Speed Compact CNC Grinder —Booth #S-8500

Okuma's new GA26W CNC grinder is now equipped with the intelligent OSP-P300G CNC control. Okuma's open architecture OSP-P control runs on a Windows®-based platform and fully integrates the machine, motors, drives and encoders, allowing for enhanced machine performance and true customization to suit particular machining needs. The Easy Operation control and touch screen increase efficiency by letting users easily and quickly toggle between machine operations, programming and wheel preparation screens. This machine will



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be shown grinding a steel shaft.

The innovative wheelhead traverse structure gives this CNC grinder a solid, compact footprint while the user-friendly design allows various workpieces to be loaded effortlessly. The extremely rigid foundation paired with Okuma's hydrodynamic wheel spindle allows for heavy-duty grinding.

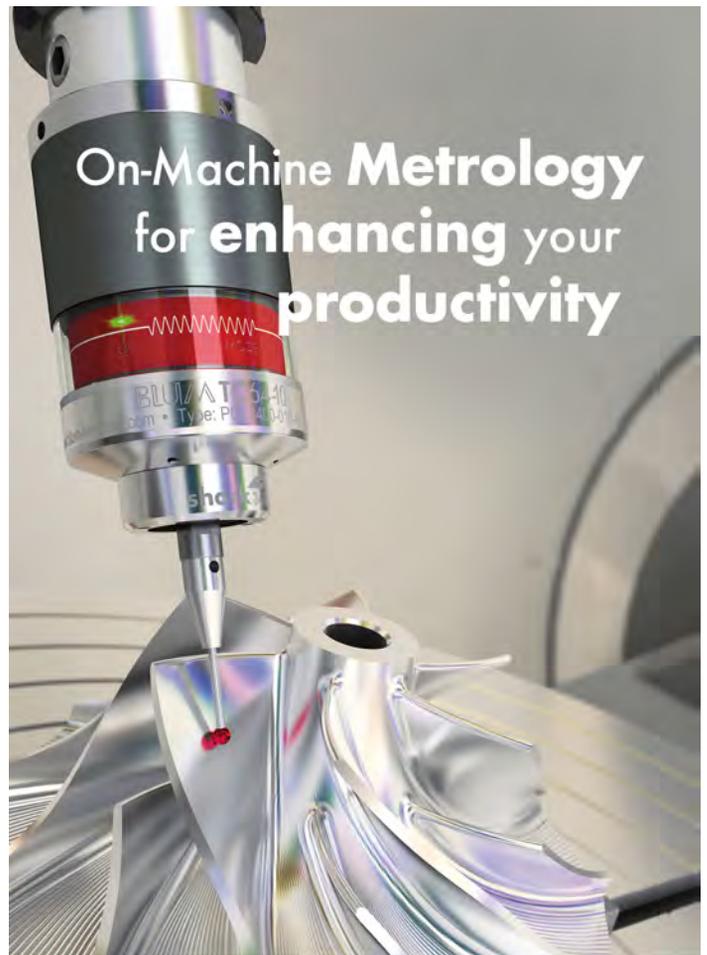
The GA26W is equipped with standard chatter control function that automatically adjusts wheel speed for accurate, stable machining. The powerful 7.5kW (15kW-optional) grinding wheel spindle is ideal for grinding mass produced parts with precision.

## Zoller TMS Tool Management Solutions for Grinding Wheels

—Booth #W-2022

The new Zoller grinding wheel management package enables systematic and efficient management as well as measurement of grinding wheels. This ensures not only precise measurements but also seamless provision of any grinding wheel data required in the manufacturing process. The Zoller »elephant« technology for grinding wheels enables fully automatic measuring of entire FEPA grinding wheel packages at the push of a button by scanning the 3D contour without any data input. This process measures all grinding wheel parameters such as diameter, angle, flange offset and corner radius and clearly displays them in the input dialog of the »pilot 3.0« image processing measuring program.

The structure of a grinding wheel package is reproducibly documented in a parts list. Measurement macros for the individual grinding wheel types according to the FEPA standard are included by default. Availability is visible at any time due to connected storage systems.



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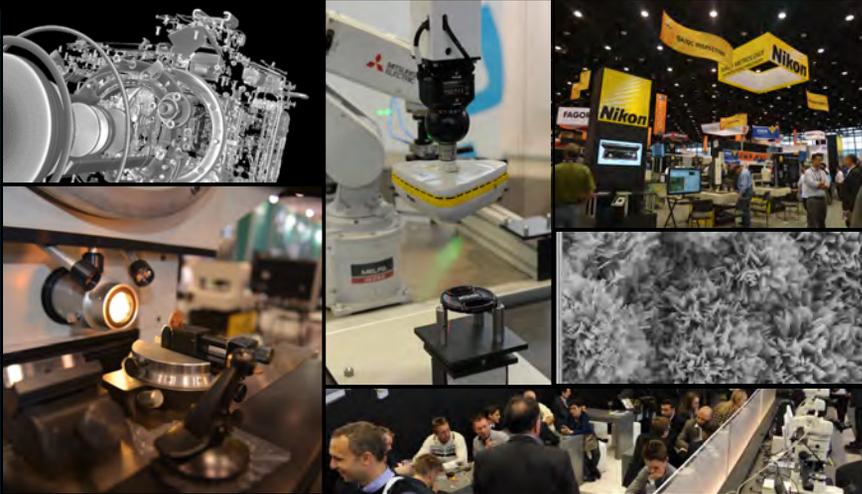
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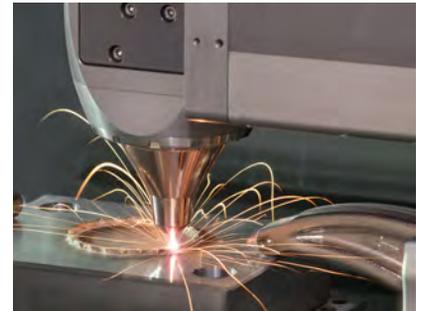
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## New “Hybrid” Additive/ Subtractive Machining System

—Booth #S-8519

Mitsui Seiki USA, Inc., has developed new machining technology that they report successfully combines both an additive and subtractive process on one machine tool platform. Named the Vertex 55X-H, the new “hybrid” technology will be demonstrated by Robb Hudson, technology & business development manager, during IMTS in their booth. He will also be giving a more formal presentation about the new technology during the IMTS Conference on Thursday, September 15 at 10:00 am in room W193-A.



The basic concept of Mitsui Seiki’s new Vertex 55X-H combines a precision-built traditional CNC vertical machining center with a spindle-adapted laser DED (Direct Energy Deposition) / powder feed nozzle. Parts can be 3D printed from nothing or material can be added to existing parts. The nozzle loads into the tool changer like any conventional tool and is changed automatically via the CNC program prompts, a milling/drilling tool replaces it and aspects of the workpiece can be machined conventionally – including internal features. For example, perhaps surface work needs to be machined before the next layer of material is added. Or, the workpiece can be printed to completion and then subsequent machining operations can



# IMTS 2016 Preview

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be accomplished.

Customers can choose either a CAT or HSK spindle that offers 15,000 to 30,000 rpm. Further, Mitsui Seiki has integrated a coolant system for either dry or wet machining best practices. The working range is from 550mm to 750mm in X-axis; 600mm to 800mm in Y-axis; and 400mm to 750mm in Z-axis. Ultimately, most all of the company's machines will be able to be equipped with the new hybrid technology.

## Doosan New Generation Vertical Machining Centers

—Booth #S-9100

Doosan Machine Tools America has evolved its popular and field-proven "DNM" series of vertical machining centers and will demonstrate them at IMTS 2016. According to Ron Kilgore, Doosan's general manager - inside sales, the new series is the third generation of this particular VMC line. "Some of the aspects of the new VMCs to highlight are that we've stepped up the speed with faster spindle acceleration and deceleration rates. We've also upgraded the Doosan Fanuc OiMF control, providing quicker processing



speed. Rigid roller guideways and a new grease-based lubrication system that requires a refill only every 3 - 6 months."

The new DNM series is comprised of three machines, the DNM 4500, 5700, and 6700, stepped up in size and capacity. In general the series offers larger cutting space by 6%, bigger table sizes by 14% and heavier loads by 25% while maintaining the same overall footprint as the previous generation. For the three models, the X-axis travel is 31.5 in., 41.3 in., and 51 in. Y-axis is 17.7 in., 22.4 in., and 26.4 in. Z-axis is 20 in., 20 in., and 24.6 in.

The new DNM series features direct-coupled, thru-coolant type spindles as standard, providing 8,000 rpm and 12,000 rpm. The direct drive spindles also contribute to faster accel/decel rates and tool change times.

One of the key highlights to men-

tion about the control system is the standard "Easy Operation Package" (EOP), developed by Doosan that provides numerous functions designed for expedient operation via pop-up windows and "hot keys".

The DNM series also comes standard with a Renishaw OMI-2T optical probe interface.

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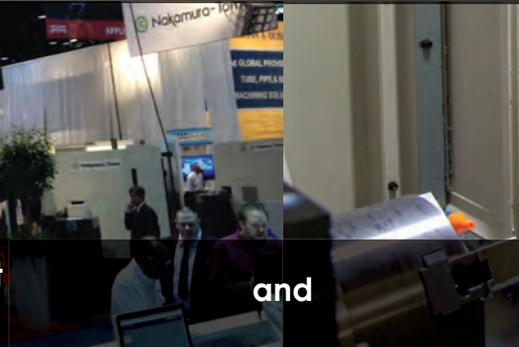
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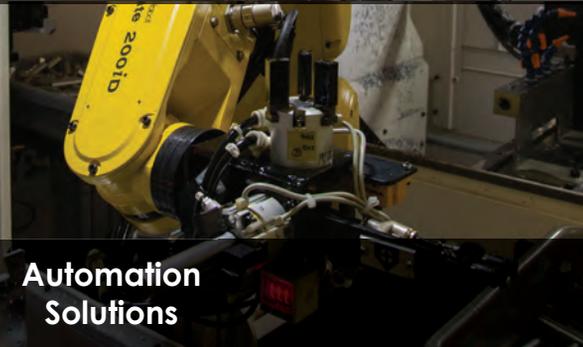
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## Chevalier to Display New Turning Products —Booth # S-8986

The new FBL-230+gantry robotics features a 45-degree slant-bed, rigid box ways structure. Its ribbed Meehanite cast-iron mono-blocking foundation provides strong support and excellent damping absorption, which helps resist deflection and vibration during heavy machining. The series features an 8" chuck, 21.6" maximum swing diameter, up to 12.2" maximum turning diameter and a maximum turning length up to 15.9". For running large quantity production, the servo gantry loader provides automatic loading/unloading of parts without any interruption. The maximum part dimension is up to 6.7" and 11 lbs. weight.

The newly designed, multi-functional FNL-220LSY Series multi-axis lathe incorporates many innovative features. Turning and milling with first and second operations are in one machine. Large Y-axis travel is  $\pm 2.2$ " from the centerline. The series features high-torque live tooling, with full C-axis for the main and sub-spindle.

The bar capacity is 2.0" for main spindle, maximum cutting diameters is 12.6" with a turning length of 20.1". The swing over bed is 24.4"; chuck size is 8" for main spindle and 6" for the sub-spindle. The travel distance on X, Z, Y and C1-C2-axes are 8.7" by 22.0" by 4.3" ( $\pm 2.2$ ) by 360-degrees with a rapid traverse rate of 1,181 ipm. Sixty-degree, compound Y-axis, slant bed design with roller linear ways. German SAUTER, 12-station BMT-45 live turret with maximum 4,000 RPM live tooling speed with all stations live is standard for this series. It has an oversized clamping curved coupling. Hydraulic clamping cylinder with a disk brake. Full C-axis in both spindles

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## New Dimension for Machining Complex Parts Introduced —Booth #S-8894

At their IMTS booth S-8874, Star CNC, a division of Star Micronics Co., Ltd. of Japan, reinforces its long history of leadership in the field of complex machining with the introduction of a new 10-axis Swiss-type automatic lathe.

This latest addition to the Star CNC product line is built for machining of complex, large diameter parts with high efficiency. Rigid machine construction is designed to handle bar stock up to 1-1/2" (1.500) diameter. With B-axis versatility, complex parts can be produced in one operation with the precision and accuracy required by quality critical applications in a variety of industries.

Star's proprietary motion control system further optimizes machining operations and significantly reduces idle machine time.

In addition, Star CNC will introduce two additional machines – SV-20R and SR-32JII with upgraded capabilities.

## Thinbit Dovetail Grooving Insert Line Expanded —Booth# W-2172

Thinbit, manufactured by Kaiser Tool, has expanded its Groove 'N Turn line of dovetail grooving inserts, which

are used to machine O-ring dovetail grooves with 66-degree undercut angles. The insert design uses an insert pair to generate the groove form. Inserts are available in 0.03", 0.05", 0.06", 0.07", 0.08", 0.09", 0.1", 0.125" and 0.15" sizes with major diameters starting at 0.3".

The inserts are available in sub-micron-grain carbide grades for ferrous and nonferrous materials, either uncoated or with TiN, TiCN, TiAlN or diamond-film coatings. The products can be used on conventional, Swiss and CNC machines.

Toolholders are available in square shank sizes ranging from 5/16" to 1 1/4" and round shank sizes ranging from 1/2" through 1", with straight and 90-degree presentations. The inserts fit existing "L" series Thinbit toolholders.

## Extended Range of Ultrasonic Machining Centers From DMG —Booth # S-8900

DMG Mori extends its ultrasonic machining center portfolio with the Ultrasonic 20 linear 2nd Generation. According to the company, the machine offers high material removal rates, accurate edge machining and reduced process forces in the machining of advanced materials such as glass, ceramics, corundum, composite materials and hard metal. The machine is designed to minimize deflections while increasing workpiece accuracy and process reliability for users in the optical, clock and watch, medical, and high-precision mold construction sectors.

Spindle speeds range to 60,000 rpm and the Celos control is equipped with apps developed specifically for the series. Other features include a digitally-controlled ultrasonic genera-

tor as well as ultrasonic actuators with enhanced performance, the company says. Toolholders with adapted actuator technology are changed into the milling spindle automatically. Each of these holders contains piezo elements, which are activated by a program-controlled inductive system with a frequency of 20 to 50 kHz. Tool rotation is superimposed with an additional tool movement in the longitudinal direction so that a defined amplitude ranging to 10 microns, which can be programmed in the NC-program, is generated on the cutting edge of the tool or on the grinding layer.

Oscillating contact interruption is said to result in improved lubrication and cooling of the cutting edge as well as increased removal of particles from the active zone. This enables longer tool life and surface qualities ranging to a surface finish of less than 0.1 microns for hard-brittle, difficult-to-machine materials.

## Automation in Your CAM and Inspection Software —Booth #E-3222

Delcam, an Autodesk company since 2014 continues to improve their software. Visitors to Delcam's booth will see recent developments in automation for 5Axis machining, intelligent manufacturing systems and inspection.

New CAM software algorithms in PowerMILL have made programming 5-axis mills easier, including digitally verifying the code for safety once programmed. PowerMILL can undertake complete verification of a project for machine-tool issues such as collisions, rather than having to undertake verification of each individual toolpath in turn. Comprehensive verification is

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performed, including ensuring that the machine tool is capable of running the proposed strategy, as well as checking for both machine-tool collisions and tooling collisions, during cutting moves and for all leads and links, including machine-tool movements as tool changes are executed. A detailed list is generated of any problems found.

Automated CAM software such as FeatureCAM, was developed to alleviate many manufacturing challenges by automating the workflow from design to NC code. These include more options for the Vortex high-efficiency roughing strategy, support for bar-fed mills, more efficient turning, increased five-axis functionality and user-interface improvements to make programming even easier and faster.

An improvement to automatic tool selection includes a check of the diameter of the tool shank. If the shank diameter is found to be larger than the diameter of the cutting portion of the tool, FeatureCAM will choose a tool of the appropriate length to avoid collisions of the shank with the part. When used in combination with PowerSHAPE, FeatureCAM now allows machining files to be selected and nested automatically in a single block. Machine design files now appear on a document level, making it easier to check visually which file is loaded. This also makes it quicker to edit the set-up location of the component and to change the machine-design file for the post-processor that is currently loaded.

The latest release of PowerINSPECT makes it easier to complete and accurate inspection of complex assemblies including mold tools. PowerINSPECT can now incorporate probe changes into fully-automated measurement sequences. The new version also includes automatic feature extraction for point-cloud batch inspection, easier navigation of the history tree, better control over RPS alignments and new options for collision checking.

## Chevalier to Display Several New Series —Booth # S-8986

At IMTS Chevalier will introduce several new models and series. Here are just a few of them. The QP5X-400 has a table load of 220 lbs. with a 12.6" trunnion table. The workpiece dimension is 15.7" x 13.7"H. Travel for the X, Y and Z-axes are 20.5", 15.8" and 15". The series offers a 2-axis trunnion table with a heavy-duty, three-piece, cross-roller bearing. The spindle includes a large-diameter, big-plus spindle design. The machine provides fast interpolation, with a high-linear rapid speed of 1,417 / 1,417 / 1,181 ipm. The spindle taper is #40; spindle power is 25HP/Fanuc, with a spindle speed of 12,000 rpm (optional 12K and 15K). Tool capacity is 30+1. The series includes a Fanuc 0iMF control for 4+1 applications, a 10.4" color LCD with a 4-axis simultaneous controller and more.

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The new FVM-3016DCL II series double-column bridge machine table size is 122" x 57" with a table load of 17,600 lbs. The X-Y-Z travel is 122" x 63" x 30.7". The maximum part height under the spindle is 38.6". The distance between columns is 70.9". It has an oversized column and box-type beam construction. The series offers a 6000rpm, two-speed high/low gear box spindle, 35HP motor, with a two-speed gearbox. The Fanuc 0i-MD has a 10.4" TFT LCD display.

The new EM Series is a limited floor space high-speed VMC. The machine's base is supported by full-travel, enabling it to be suitable for high-speed machining. All 3 axes are built with high-speed linear ways. The series ranges from 16" x 20" to 20" x 40". The travel on the X, Y and Z axes are up to 40" x 20.8" x 20".

## New Line of Tsudakoma 4th and 5th Axis Rotary Tables

### —Booth #S-9153

Koma Precision, Inc. introduces a new line of high accuracy, high rigidity, energy saving and zero maintenance rotary tables from Tsudakoma, a leading manufacturer of high-quality, precision rotary tables. The RBS (Rotary Ball System) Series is a 4th axis rotary table series suitable for single axis VMC's and the TBS (Tilt Ball System) is a 5th axis rotary table series suitable for dual axis VMC's.

These rotary tables are built using the new ball drive system featuring advantages like zero backlash, improved cycle times, energy conservation and a lifetime adjustment-free transmission system.



Three new models are available for the RBS Series, with face-plate capacity of RBS-160 being 6.3", RBS-250 with 8.27" and RBS-320 with 10.04". The TBS Series is being introduced with TBS-130 and TBS-160 models. Both the RBS and TBS Series tables are highly rigid and have increased clamp torque delivered by the new improved clamp system design. Various options such as chucks, tailstocks, sup-



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port spindles, and faceplates are available. Pneumatic and hydraulic rotary joints for automatic load and unload of the work piece are also available.

The new Ball Drive System Technology features high speed indexing and zero backlash that result in shorter cycle times. Koma reports this new technology also delivers the industries' highest torque transmission efficiency.

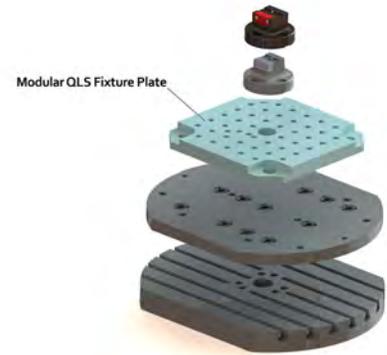
## Jergens New Modular QLS Fixture Plate With Ball-Lock® Quick Change Connection —Booth #W-2154

Jergens Inc. will demonstrate their

new QLS (Quick Locating System) fixture plate designed for use with the company's popular Ball-Lock® quick change system. With the connection to Ball-Lock, the new QLS allows users to add the whole range of the Fixture-Pro® system.

“The ability to use the Fixture-Pro range greatly extends the machining envelope on five axis machines”, says Steve Schmidtke, group manager for Jergens Workholding Solutions Group. “The modular workholding of Fixture-Pro combined with the quick and accurate location of Ball-Lock provides a multiplying effect on productivity”, Schmidtke continues.

The concept has been designed to offer users a system that could be



changed over – even between machines – in just seconds. Ball-Lock sub plates mount directly to the machine table and provide the connection to the new QLS system, which in turn connects to virtually any combination of Fixture-Pro risers, adapters and top tooling.



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## Recently Released GibbsCAM 2016 and 3D Systems' 3D Products —Booth #E-3310

3D Systems, developer of GibbsCAM® software for programming CNC machine tools will be demonstrating the next generation of GibbsCAM 2016, at IMTS. IMTS is an ideal opportunity to check out the level of ease and sophistication that

GibbsCAM® 2016 software brings to production machining. Building on its UKM (Universal Kinematic Machine) technology, GibbsCAM 2016 delivers increased efficiency, accelerated programming speed, and enhanced visualization and accuracy for CNC machine programming.

New features and functions for GibbsCAM 2016 highlighted at IMTS include: Enhanced thread milling, including support for multi-point tools, tapered threads for both single- and multi-point tools, and improved simulation. The latest VoluMill™ technology, providing new toolpath strategies to optimize high speed roughing of large pockets and slots, open face milling strategies that can

Gibbs reports can decrease cutting time by up to 60%, and technology Expert integration for ready access to optimal speeds and feeds.

Also shown will be new oriented turning capabilities, giving users added control in how tools interact with parts. From using a single tool at multiple B orientations to reorienting tool groups for use on a different spindle to full support of flash tooling for multiple-orientation turning tools. Added toolpath strategies for 5-axis milling, enabling users to define toolpath direction using the natural flow of a surface with the new flowline option, toolpaths with extended width and length, improved 5-axis drilling, multi-stepped pocket roughing and

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new gouge checking strategies.

GibbsCAM 2016 together with 3D Systems' full range of end to end software solutions for manufacturing covering scan-design-print-manufacture-inspect can be seen in booth E-3310 and at the 3D Systems booth highlighting 3D Printing technologies at South Building - S-9119.

## New Vise System by 5th Axis

### —Booth # W-1158

5th Axis will be introducing the Deuce™ at IMTS. They report it is the latest innovation in small footprint, low profile workholding. The patent pending vise system created and manufactured by San Diego based 5th Axis® blends the functionality of single station vise with a double station vise, mounted on a common platform. The company reports the Deuce™ substantially decreases setup time and significantly increases productivity.

The hardened steel construction provides maximum rigidity and clamping force. The compact footprint of the Deuce™ makes it a preferred choice for direct mounting to tombstones on horizontal machines. When mounted to vertical machining centers, the design allows for multiple units to be easily ganged together, substantially increasing throughput.

The vise is designed to work with multiple jaw styles. The configuration shown (1) features hardened master jaws with serrated gripper teeth and 45 degree dovetails for clamping of a single larger part.

The fixed center section can be quickly added to transform the single station into a double station vise (2), instantly doubling capacity.

A three-piece soft jaw set is also available (3) which can be used in



place of the master jaws for workpieces that vary in size and shape.

The Deuce™ vise system is available in two sizes: DV56 5" x 6" (shown) and DV510 5" x 10", debuting at IMTS 2016.

## SMTCL to Introduce New i5 CNC Control

### —Booth #S-8245

SMTCL-Americas will display its new i5 CNC Control at the 2016 IMTS.

The i5 CNC Control will not be offered to customers in North America until 2017 but it has been installed on over 2000 machines in China. In addition to bringing world-class performance and reliability the i5 is easy to use and brings a new level of information to organizations. The control will be available on most of SMTCLs 300 models and can be used on 2,3,4 and 5-Axis machines. The i5 control was named after the characteristics it brings to customers: Intelligent, Internet, Integrate, Industry, and Information.

The control is intelligent by making programming easier and more conversational. The i5 Control features 3D color graphics for simulations as well as feature programming. It also has full tool management and remote diagnostic capabilities. The i5 control opens up the full power of the Internet to users by offering remote diagnostics and remote machine management for "lights out" operation. Email and text messages from the machine can also communicate key information to manufacturers. Apps are also available for both Android and IOS devices.

The i5 Control integrates with production systems and can seamlessly

provide data to measure productivity and performance.

SMTCL's i5 Control is also made for industry, as it is built on a reliable platform of industrial processors and electronics. Based on the proven i-Port technology, the control is UL certified and performs accurately and reliably in manufacturing environments.

The information provided by the i5 Control is valuable to management by directly providing key information to finance, production, and sales. The machine can directly provide information to production scheduling systems and full ERP systems.

"The i5 Control will revolutionize manufacturing by its ease-of-use and its highly rated performance," said Jerry McCarty, chief operating officer of SMTCL. "In addition, it will provide accurate information directly into manufacturing production systems which otherwise had to be entered manually by machine operators".

## Mastercam 2017 to Debut —Booth #E-3340

This year's IMTS will feature the latest in the line of powerful Mastercam software with Mastercam 2017. This release introduces a more efficient workflow, improved usability and Dynamic Motion improvements.

Mastercam 2017 features a new ribbon interface and makes it easier to find the functions you need to complete your tasks. "Many of our more powerful tools were underused because customers did not know where to find them," says CNC Software president, Meghan West. "We spent a lot of time with users determining the best way to simplify this, and the response has been overwhelmingly positive." The ribbon tabs group similar functions and displays them in order from simple to more complex. Each tab relates



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to a type of activity, from creating wireframe geometry to generating toolpaths. Editing functions are on the same tab as creation functions.

Mastercam reports that their Dynamic Motion technology can slash machine time by as much as 75%. And, Dynamic Motion will help you get the most out of any machine in your shop—new or old. Mastercam also reports that Dynamic Motion technology extends tool life, reduces cycle time, saves wear and tear on machines, and cuts hard materials more easily.

New to 2017, micro lifts now use a line-of-sight approach to move the tool where it needs to go through unobstructed areas. This results in reposition moves during micro lifting

that are more efficient, less complex, and travel a shorter distance.

Mastercam 2017 introduces Maximum Stock Engagement for select 3D HST Finishing toolpaths, allowing you to select a previously made stock model and set the maximum depth so that you can limit how deeply the cutter engages uncut material. HST Raster allows you to limit raster passes relative to a cutoff distance, and then fills in the limited area with perpendicular raster motion to create a clean result.

Mastercam Mill-Turn now supports multiple sessions, multiple Machine Groups, and multi-station tool locators for turrets as well as half index positions.

## Where Human Ingenuity Meets Automation —Booth #S-8700

Makino will demonstrate their latest machining and automation solutions. Makino plans to unveil a variety of all-new machine technologies. The new versions of the a51nx and a61nx horizontal machining centers provide expanded machining capacity through several new features, including vision broken tool detection, enhanced levels of inertia active control and Geometric Intelligence technologies. Makino will also introduce the a71nx, a high-speed 50 taper, 500mm horizontal machining center with a standard direct-drive NC rotary table.



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Other machines include the L2 vertical machining center which provides high-volume, small-part production capability using a minimal footprint, while the processing speeds of the new DA300 5-axis vertical machining center reduce manufacturing time and the pallet pool system helps shrink setups.

The Makino EDAF3 sinker EDM machine with Hyper-i control shows faster servo speeds in multi-axis machining and features an on-board Alicona measuring system. The U6 H.E.A.T. wire EDM will demonstrate its on-board CAM software and easy part setup using offline part loading and a manual shuttle system. The EDBV8 EDM hole drill will showcase fast hole-drilling for blade and vane

machining.

Finally, the aerospace theater is streaming video of the T-series 5-axis horizontal machining centers built for titanium aerospace machining.

Makino's booth is designed to demonstrate a variety of automation systems such as: a Makino Machining Complex (MMC2) pallet-handling system with an a61nx-5E 5-axis horizontal machining center showcases high-mix, low-volume production with improved machine utilization.

The a51nx-5xu 5-axis horizontal machining center, designed with a unique work-holding magazine and large-tool magazine, can perform continuous 5-axis machining unattended for extended hours in both

high-mix, low-volume and low-mix, high-volume production environments.

A custom, automated system includes the newly updated a51nx horizontal machine with 60-tool magazine and EROWA robot multi-ERM system.

The J3 horizontal machining center with stacked axes design enables it to be easily integrated into high-volume automation concepts. Two machines are in this cell.

A die/mold automation cell featuring an EDNC6 sinker EDM and V33i-5XB 5-axis vertical machining center with an EROWA ERC will demonstrate low-volume, high-mix production of mold components.

The a40 high-performance horizontal machining center with overhead

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gantry system performs high-volume, parallel processing of small, nonferrous, die-cast parts.

## Methods Manufacturing in The Future —Booth #S-9119

Methods Machine Tools, Inc., will demonstrate a wide range from additive manufacturing (3D printing), to automation cells, robots and advanced CNC machining centers. Methods will have over 40 solutions under power.

Methods3D, a newly formed subsidiary of Methods Machine Tools, will be exhibiting six 3D Systems production machines representing four technologies (SLA, SLS, MJP, DMP),

including the new ProX DMP 320 3D metal printer. 3D System's experts will also be on hand to answer any questions.

Automation solutions will be emphasized in the Methods booth, where new multitasking, CNC machining, deburring and inspection cells, integrated with robots, will be demonstrated.

A full range of advanced CNC machining centers, multitasking/turning centers, EDM's and digital optical comparators will be demonstrated. CNC Machines and EDMs making a North American debut at IMTS include:

Nakamura-Tome NTRX-300 heavy-duty multi-tasking turning center with full twin spindles, built-in automation and advanced software.



Methods has developed the NTRX-300L, with 20" longer Z-Axis for larger part applications. A new Nakamura "Smart X" Operating System will be demonstrated.

Yasda YBM 9150 CNC jig borer, this 3-axis machining center features an ample work envelope with a 61"x37"x18" (X-Y-Z) axis travel.

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horizontal machining center with a column traverse structure, flexible mounting capability and machining access for long workpieces.

Fanuc D21 MiA, D21 MiB and D21 LiB Series RoboDrills. These tapping/drilling machining centers are the latest generation with new servo motor-driven ATC's that reduce tool to tool speed and an increased Z-Axis stroke.

Fanuc CiB series wire EDMs including the new larger CiB800 model, offering increased accuracy, speed and throughput via innovative design efficiencies.

Feeler HV-1100V high performance

vertical machining center with dedicated trunnion, 4+1 axis configuration , 350mm rotary table and a reinforced cross-ribbed column structure.

Feeler U-800 5-axis machining center 5 axis gantry style machine designed with a rigid structure and a HSK-63 12,000 rpm DDS spindle.

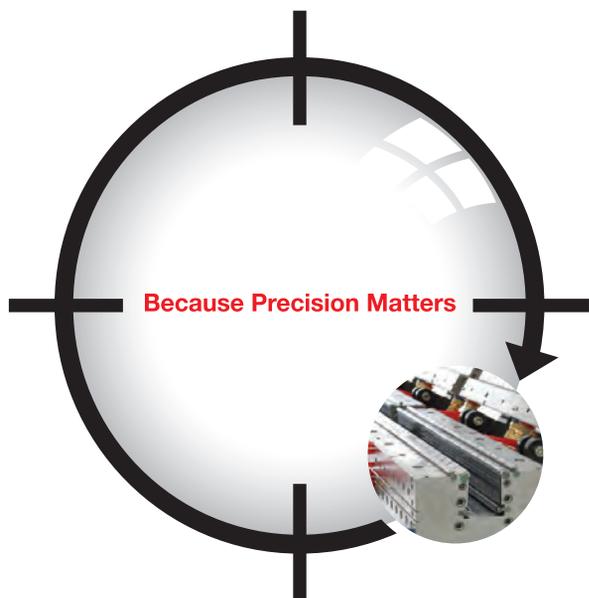
Feeler SV-350 vertical machining center built as an overlapped 3- axis traveling column 3+2 vertical machining center with a dedicated trunnion and 250mm rotary table.

VisionGauge 700 Series extended travel digital optical comparators with a large work envelope and tilt and rotary axes in a trunnion configuration.

## SMTCL EVC160100s for Large Vertical Turning —Booth #S-8148

SMTCL-Americas will display its new vertical turning center, the EVC160100s at IMTS. The EVC160100s is designed for manufacturers that do large vertical turning. It is a large, reliable, and rugged vertical turning center that has been designed to be effective in machining a variety of materials including cast iron, aluminum, steel, and composites.

“We have developed the EVC160100s configuration based on the needs of manufacturers in the aerospace, rail, and energy industries,” says



  
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Jerry McCarty, chief operating officer. "Manufacturers love the capacity of this machine and its metal cutting ability and accuracy." SMTCL includes a tool changer, Heidenhain scales, and a chip conveyor as standard components.

The EVC160100s has a 55" chuck and swing of 63". The machine has Z-Axis travel of 39" and a 60HP motor.

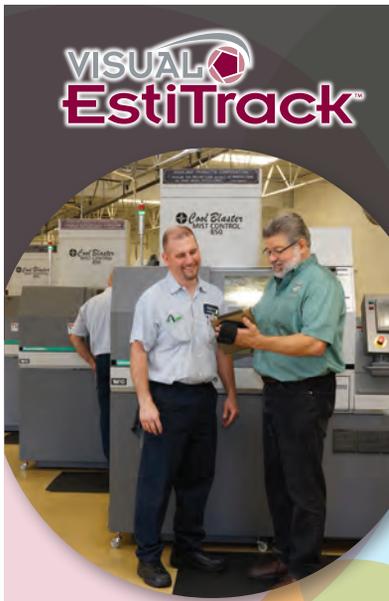
The EVC160100s has a weight of 55,000 lbs. resulting in rigidity and excellent part finish. The machine is controlled by the Fanuc Oi-TF control with a 10" screen and USB, PC/MIA, and Ethernet interfaces.

## CGTech to Demonstrate New VERICUT Version —Booth #E-3346

VERICUT version 8 will be featured in CGTech's booth. VERICUT CNC machine simulation, verification and optimization software simulates all types of CNC machining, including drilling and trimming of composite parts, water jet, riveting, robots, mill/turn and parallel kinematics. The software operates independently, but can also be integrated with leading CAM systems.

VERICUT Machine simulation detects collisions and near-misses between all machine tool components such as axis slides, heads, turrets, rotary tables, spindles, tool changers, fixtures, workpieces, cutting tools, and other user-defined objects. Users can also set up 'near-miss zones' around components to check for close calls and detect over-travel errors.

The new Ribbon Bar allows you to quickly select the VERICUT function you want to use. As you move from tab to tab, the Ribbon bar updates to show the options available for that tab.



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Booth # E-3256

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The Ribbon Bar is highly customizable, but to ease the transition for existing users, a “VERICUT Classic” setting organizes all of the menus and options where users previously found them. Users can also create and save their own layouts as needed.

Many leading cutting tool manufacturers now make 3D solid model data available and VERICUT can read in this model data for use in the simulation process. Many of the 3D models are available via the Machining Cloud App, and version 8 has been enhanced to take advantage of more Machining Cloud metadata. This simplifies the configuration of tools for use in

VERICUT. VERICUT also interfaces with many leading tool management systems for access to databases storing cutting tool information. Pre-setting suppliers including Zoller and Speroni can also interface to the software.

The VERICUT logger now displays messages and reports from many sources. In addition, errors, warnings, and other messages from the VERICUT session, it also displays information from AUTO-DIFF and X-Caliper.

The Force module, is a physics-based optimization method that determines the maximum reliable feed rate for a given cutting condition based on four factors: force on the cutter, spindle

power, maximum chip thickness, and maximum allowable feed rate. In version 8 there are new features to account for entry/exit speeds, “clean-up” feedrates, and tooling information has been rearranged to be more intuitive.

A new “Toolpath Trace” feature creates a wireframe of the motion path that can then be measured.

## Showing Off Waterjet Capabilities and More —Booth #N-6181

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is capable of cutting not only virtually any metal, such as stainless steel, copper, brass or aluminum plate but also plastics and composites, within the strictest of tolerances up to +/- 0.005”.

A Dix spokesman reports that more traditional processes in metal cutting can be impacted by heat, mechanical and chemical stress, all of which can adversely affect and potentially compromise the material. Waterjet cutting eliminates the negative effects of such aggressive techniques and instead retains the original properties of the material, thereby also eliminating the need for secondary processing.



Additional benefits of waterjet cutting include the efficient cutting of complex shapes, an excellent edge quality and a finish cut all in one, saving on finishing costs.

“Our state-of-the-art waterjet cutting equipment allows us to provide unmatched precision and the tightest tolerances,” said company spokesperson Jon-David Nutter, “The waterjet process reduces machine time and eliminates secondary processing costs, ultimately passing on those savings to the customer.”

For projects requiring intricate, custom cutting to tight tolerances, Dix Metals is an industry leader in providing abrasive waterjet cutting to a large range of industries, including the fields of automotive, aerospace, military, and medical.

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## Industry 4.0 the Emphasis for Fagor Automation —Booth #E-5237

Industry 4.0, referred to the 4th revolution of cyber physical systems, will be showcased at the Fagor Automation booth. Aspects of Industry 4.0 including robotic control coupled with smart data analysis based upon new Smart Factory Automation.

Also shown will be the new Fagor 8060 FL CNC and the Multi-Axes Box (MAB) that brings a compact easy to integrate CNC solution for small to mid-size machine tool applications. Standard features include a complete library of canned cycles for milling and turning. It offers compact flash expansion capability plus two USB ports with one on the keyboard. The Process Informer feature allows the ability to automatically text or notify the user of CNC conditions.

Another advanced feature is the Fagor “Process Informer” application, that allows automatic notification to your phone or email of program stoppage or error during lights-out operations. A free offline simulator is offered that assists in quotations and offline program creation.

The Multi-Axes Box (MAB) is a new philosophy on the management of the servo and spindle drives. Offered with both regenerative and non-regenerative drives, the MAB can contain up to 4 axes servo drives or 3 axes servo drives plus a spindle. It has the ability to handle up to 20 -HP spindle motor systems and 23 NM servo motors.

A new advanced wireless HBA handheld pendant will be shown offering ease for those with large machines to perform a broad range of functions. Equipped with a LCD screen, capability will include jog, MDI, home reference and more.

Also on display will be the new line-up of Micro motors. The new FKM 12 series motor is offered with

a .54 NM stall torque rating, 4500 rpm capability and can be equipped with an absolute encoder.

The 8065 series CNC designed specifically for the highest performance applications, is equipped with proprietary advanced features to execute high speed machining applications.

Also on display will be the 8055 series CNC, which utilizes a simple to program icon key based conversational programming system and a built-in ISO G-code programming system within the same control. It ranges from 2-7 axes.

The GA, LA & SA absolute linear encoder lines for all applications requiring high accuracy absolute positioning capability will be on display along with the 40i true vision DRO and high resolution rotary encoder series.

## Hurco to Demonstrate 3D Print Head Adapter for CNC Machines

—Booth #S-8319

Owners of Hurco vertical machining centers will have the ability to transform their WinMax part programs to a 3D printed rapid prototype directly on their CNC machine using an optional spindle-powered wireless accessory Hurco will unveil at IMTS. The 3D Print Head which extrudes plastic PLA filament will be exhibited at the Hurco booth and at the Additive Conference.

“The new Hurco 3D Print Head takes commercial desktop 3D printing technology to the next level allowing users to take full advantage of the size of the machining center. The portable accessory is powered and controlled by spindle rotation, so there are no wires to install, and it can easily be moved to other Hurco machining centers within a shop,” said Greg Volovic, president of Hurco Companies, Inc.

“We’ve designed this product to make it easy for people who have no solid modeling experience. Hurco’s WinMax programming environment is the most versatile on the market today with our powerful conversational programming that is known for its user-friendly and intuitive user interface and the control’s support of standard M&G code programming. With this release, we’ve added support for additive manufacturing to the control,” said Volovic.

“The Hurco control’s WinMax software gives users powerful graphics tools to develop even the most complex 3D shapes quickly and efficiently with conversational programming. Once you program the part, simply select the WinMax 3D Print button to start the build process on the Hurco CNC machine. Alternately, you can send the model to a commercial 3D printer,” said Fred Gross, engineering manager at Hurco.

## Haimer USA to Feature New Modular Interface Duo-Lock

—Booth #W-1452

Haimer USA will have many products and technologies on display including its new modular interface Duo-Lock for carbide cutting tool heads.

Haimer USA introduces their new modular interface Duo-Lock for carbide cutting tool heads. To combat the steadily increasing cost of carbide, modular cutting systems with carbide heads have continued to gain traction in the marketplace. Haimer has recognized the value of such modular systems and perfected the technology, creating a very stiff, precise interface. The concept of Duo-Lock™ provides maximum stability and stiffness.

Haimer will also be exhibiting their



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Safe -Lock tool clamping system and power mill end mills. The Haimer Safe -Lock Clamping System provides reliable pullout protection that withstands even the toughest materials. The power mill end mill series is made from K20-K40 grade fine grain carbide developed to be matched with Haimer's premium tool holders.

Other technologies and products in Haimer's exhibit are the Power Clamp Shrink Fit Machines, Haimer Shrink Fit tool holders and collet chucks, Tool Dynamic Balancing Machines, Haimer 3D Sensors, and Haimer Cool Flash coolant delivery system.

## You Ji 5-Axis Vertical Mill/ Turn Multitasking Machine —Booth #S-8536

The new You Ji VMT-800 is a versatile mill/turn multitasking machine well suited for both oil and gas and aerospace manufacturing applications. This machine allows a manufacturer to perform vertical turning operations as well as five-face milling operations in one setup. This machine will increase productivity by largely decreasing machining time and avoid inaccuracies from multiple hands-on movement of the workpiece from one machine to another.

The heavy duty moving column

design allows for robust turning as well as heavy milling. The rugged 20HP 50-taper B-axis head allows for vertical/horizontal milling for true one-setup machining. The B-axis indexes 0-90 degrees in 5-degree increments. The 32-tool (60/90 optional) changer provides flexibility. Maximum swing diameter of the workpiece is 43.3" and maximum turning height is 35.43". The You Ji VMT-800 has a C-axis table for easy five-sided machining.

The VMT-800s axis travels are +/- 22" in X, 43.3" in Y, and 47.2" in Z. A 35HP spindle motor drives the standard 32" hydraulic chuck. Fanuc CNC controls are standard.



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# Industry News

## Steve Thiry Named President of Fives Cincinnati

Steve Thiry has been named president of Fives Cincinnati and its Global Services division. Mr. Thiry brings over thirty years of international and domestic manufacturing experience, and most recently served as CEO of Fives Landis Ltd, in the UK.



## Announcing the Passing of John Martinez, Director of Sales and Procurement for TCI Precision Metals

TCI Precision Metals is sad to announce the passing of John Martinez who died peacefully, following a short illness, on May 24, 2016. John was dedicated to his family, work and the manufacturing industry as a whole.

“This is an extremely sad time for the industry and all of us who have had the distinct honor of knowing John. He has been a part of this company for 38 years and will be greatly missed by his co-workers, customers and all who have crossed his path over the years,”

said John Belzer, CEO of TCI Precision Metals.

Joining TCI Precision Metals in September of 1978, John had worked in customer service, purchasing, sales and sales management over the years, most recently serving as director of sales and procurement. A manufacturing industry advocate, John served as president of the LA Chapter of the NTMA for two years, January 2011 – December 2012.

“At TCI Precision Metals we share a strong sense of family, which John Martinez helped foster. The fact of the matter is; I’ve never known the company without his presence since he joined before I was born. I have

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# Industry News

learned a lot about business, sales and life from John and miss him dearly,” said Ben Belzer, president of TCI Precision Metals.”

John is survived by his wife, Blanca, and children, John-Michael, Joseph and Michelle.

## Takumi USA Opens Indianapolis Showroom to Launch New Brand

Takumi unveiled its new technology center and showroom to distributor partners to kick off the introduction of Takumi USA to the North American market. Joe Braun, vice president of marketing and product management

for the Takumi brand said, “Takumi machining centers have been prevalent in Europe and Asia for 30 years. However, the brand hadn’t been introduced to the North American market. To be successful, we knew we needed to open a local service and support center here in Indianapolis in addition to a showroom.”

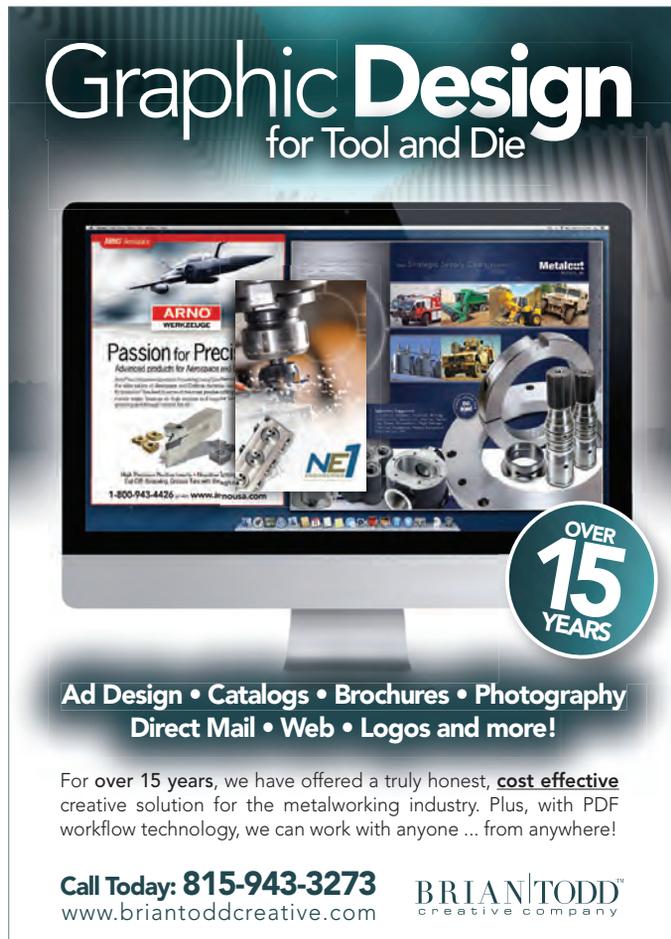
The Takumi CNC machines are equipped with Fanuc controls with three machine categories: the double column H-Series machines are high-speed, high performance machines designed for the mold market and aerospace industry; the VC-Series includes high-precision CNC machining centers with fast rapids; and the V-Series are heavy-duty box way CNC machines.

The official launch of Takumi USA will be at IMTS.

## 5TH Axis Workholding Signs On Tom Paine Group as Mfg Rep

5th Axis Workholding, of San Diego, California, recently announced its choice of the Tom Paine Group for manufacturer representation.

Founded and inspired by self-described “passionate machinists and engineers,” 5th Axis specializes in fine-tuned work-holding solutions. All of the company’s 5-axis vise and dovetail fixtures are produced for machinists by machinists who use the products every day. They also designed a line of low-profile mounting fixtures



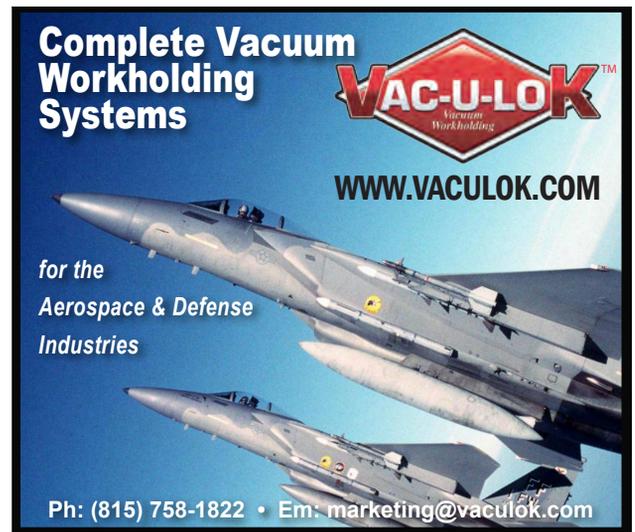
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# Industry News

and clamps that self-center and install with two bolts.

“5th Axis Workholding is a perfect match for us,” said Tom Paine, founder and president of the group. “These guys are truly passionate about what they do, and it shows in the elegant design and elite level of performance they bring to their products. There’s no one better at representing that entrepreneurial devotion and quest for the best than the Tom Paine Group, and we’re delighted to be able to offer their products to our customers.”

The Tom Paine Group represents 5th Axis in Arkansas, Oklahoma, Louisiana and Texas.

## Mitutoyo America Corporation Announces Grand Opening of LA M3 Solution Center

Mitutoyo America Corporation announces the grand opening of the newly renovated M3 Solution Center in City of Industry, CA. This nearly 35,500-square-foot facility is conveniently located for customers to schedule appointments for product demonstrations, assistance with application challenges and metrology solutions, as well as product and educational training seminars. The M3 Solution Center is located at 16925 East Gale Avenue, City of Industry, CA 91745.

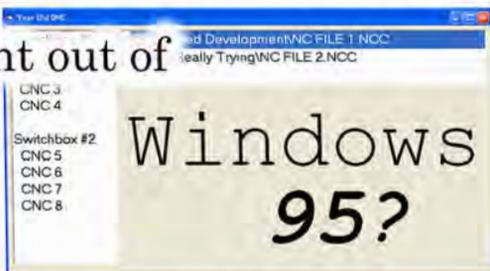
“Our goal is to provide relevant and timely metrology solutions to our cus-

tomers, in a region that is home to aerospace, defense, medical and general machining industries. In updating our M3 Solution Center, we’re providing our customers with industry-leading technology and training all under one roof,” says Jeff Thompson, Western regional sales manager.

## New Ganesh Toolroom Machinery Division

Ganesh Machinery announced that Ganesh CNC Production Machine Tools and Ganesh Toolroom Machinery will be operated as two distinctly separate divisions of the company. This change in emphasis will allow each machine group to focus on the

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# Industry News

unique needs of the customer relevant to their product line. The experienced technical specialists in each group will ensure that the correct solution is offered in every machine application.



Ganesh Machinery began business in 1985 as an importer of first-class manual lathes and milling machines from Taiwan. Ganesh Machinery has grown into a company with a broad offering of high-technology CNC lathes up to 11-axes, and 3 to 5 axis Milling machines from 24"x 16" to 100" by

39". CNC Swiss machines in up to 8-axes in 20mm, 32mm, and 42mm are offered, as well as "Big-Bore" lathes with bores up to 15" and bed lengths up to 300".

The Ganesh Toolroom Machinery Division offers engine lathes from 13" by 40" up to a 44" swing by 315" bed length. Hardinge-style 5C collet toolroom lathes and speed lathes are also offered. Geared-head CNC toolroom lathes using Fanuc controls start at 18" x 40" and go up to a 24" swing by 60" bed length. Ganesh adds specialized workholding and DRO installation in-house.

Manual knee-mills are offered in 5-sizes from a table size of 9" by 42" to 12" by 54". Fagor or Acu-Rite CNC controls can be added at Ganesh to

convert the machines to 2 and 3-axis CNC knee-mills. CNC 3-axis bed-mills are offered in 26" by 16" to 60" by 24" with spindles using 40-taper quick-change tooling.

## Scholarship Announced for Training Center Students

The Los Angeles Chapter of the National Tooling & Machining Association recently inaugurated a scholarship award program to benefit students at the NTMA Training Center.

The scholarship commences this year with several graduating students to be awarded \$500. Assessment from the head training instructors from the

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# Industry News

five education modules will determine the award winner.

“We have always supported the Training Center in a number of ways throughout the years,” notes board president Ben Belzer. “But, this is the first time we have set up a structure to award a new professional for their overall excellence.”

Applicants will be evaluated on skill levels important for success in the manufacturing industries. A minimum grade point average of 3.5, initiative, leadership, problem solving, and several other criteria will be part of the formal performance review. A written essay will also be required.

Members of the board of directors of the LA/NTMA form the scholarship committee and will review applica-

tions each year. Interested students are encouraged to apply for the scholarship at the campus director’s office at either the Santa Fe Springs or Ontario locations.

The Los Angeles Chapter of the National Tooling and Machining Association welcomes manufacturing companies of all sizes as members to enjoy networking, technology updates, legislative support, mastermind sessions, and money saving member benefits.

## Behringer Saws Appoints Ken Bartelli As Western Regional Sales Manager

Behringer Saws, Inc., a manufac-

turer of high-quality bandsaw, circular and plate sawing solutions, has announced the appointment of Mr. Ken Bartelli to the position of western regional sales manager. Mr. Bartelli will be responsible for the sale of Behringer bandsaws, circular cold saws and material handling equipment in 11 western U.S. states including California, Oregon, Washington, Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona and New Mexico.

“Ken comes to Behringer with over 30 years of machine tool experience,” stated Mr. Richard Klipp, president of Behringer Saws, Inc. “We are excited to add a regional manager of Ken’s caliber, and with the experience he brings to the table we are confident his understanding of metalworking

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# Industry News

and machining will be of extraordinary value to our customers.”

Previously he spent 24 years at Amada America, Inc. where he held a range of positions from sales engineer and sales management to executive vice president. Prior to joining Behringer, Bartelli spent 10 years in a variety of sales management roles for companies, including Jorgenson Machine Tool.

## Shop Floor Automations Hires Digital Marketing Coordinator

Shop Floor Automations recently announced the hiring of Amanda Rosenblatt as their digital marketing coordina-

tor. Amanda holds a skill set with more than 10 years in the making with writing, marketing and social media, and will seek to



increase recognition of SFA’s services within the manufacturing industry.

Amanda has garnered awards and distinction with her skills, and looks forward to using those abilities to create a crisp new view of SFA’s services and products.

## John Arroues Named National Sales Manager for Southwestern Industries

John Arroues has been appointed as national sales manager for Southwestern Industries (SWI), the manufacturer of TRAK Machine Tools and ProtoTRAK CNC Technology. Mr. Arroues rejoins the SWI team after 20 years as owner of Trio Tool and Die, a

Los Angeles-area aerospace shop. As national sales manager, Mr. Arroues is responsible for overseeing SWI’s entire field sales operation, including direct sales representatives and distributors in all 50 states and Canada.



Mr. Arroues first became acquainted with SWI and TRAK Machines in 1992 when he bought his first ProtoTRAK as the manager of Trio Tool and Die. Impressed by the technology, he came to SWI to work as a sales representative and eventually the western regional manager, until he left in 1996 to buy the shop he had once managed. During his 20 years as Trio’s owner, Mr. Arroues cultivated it into a highly successful shop with a wide range of manufacturer’s machines, including 14 TRAK machines.

As both a recent customer and former sales representative and manager for TRAK machines, Mr. Arroues brings invaluable insight to his new role. Along with his extensive experience, Mr. Arroues holds an MBA from the University of Tennessee’s prestigious Aerospace and Defense program.

“John’s ability to apply his still-fresh customer’s perspective to his new role as national sales manager will be key in systematically assessing the quality with which we serve our customers,” said Steve Pinto, president and owner of SWI. “He is fortunate to be able to build upon the excellent work done by his predecessor, John Palmquist, in building good structure and sound management of the sales and service functions. As we work through the process of transitioning and strengthening our emphasis on TRAK Machine Tools, I am confident

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that Mr. Arroues will be able to determine and execute what we need to do to take our sales and service organizations to the next level.”

Mr. Arroues’s predecessor John Palmquist, who held the position from 2011 until the end of 2015, continues to work with SWI as business develop-

ment manager for education.

## CNC Solutions Celebrate New Facility with Grand Opening/Open House

CNC Solutions a distributor of some of the industry’s nicest machines tools



in Northern California recently held a combo Grand Opening and Open House at their new facility in Milpitas. The reported a very nice turn out of customers and potential customers all there to see machines under power and the new larger facility.

Attendees saw nine machines under power from builders like: Toyota, Samsung, Hurco, Tornos and Ganes. Attendees not only left the Open House with increased knowledge about the machines CNC Solutions sells but went away full too as there was a lunch provided along with door prizes.

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## Kracoe Szykula & Townsend Celebrate 25TH Anniversary

Kracoe Szykula & Townsend, Inc., a leading industrial advertising and public relations firm celebrated its 25th anniversary on July 15, 2016.

The firm, started in 1991 by Roland Kracoe, Ed Szykula and Andrew Townsend, began with the positioning statement, “Things can change, if you just change your approach” bringing a fresh approach to business-to-business and in particular industrial marketing communications. That position still holds true today. The firm started with

## Industry News

zero clients and today boasts over 25.

Kracoe retired in 2015 and the firm is currently being managed by Szykula and Townsend.

The company works with many clients that are leaders in their respective industries. Its current client list includes Walter, a cutting tool manufacturer, BLM Group USA, a tube processing equipment manufacturer, Creform, a materials handling systems provider and Fixtureworks, a national industrial distributor and manufacturer to name a few. The firm also works with service providers such as The 3-Dimensional Services Group, a prototype and low-volume production manufacturer. The agency continues to experience steady growth.

In a related matter, although the official corporate name will not change, the company has re-branded itself as KST. According to Ed Szykula, account director "We just felt it was a good time to simplify our name. Our name has served us well, particularly when we first opened our doors and our names had recognition, value and cache with the industries that we serve. It will still continue to be the official corporate name, but it can be a tongue twister, and we felt it was time to give everyone answering the phones a break."

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# ...Hotline Continued From Page 8

scientific instruments and functionalities, in addition to optical communications. The orbiter concept under study would take advantage of U.S. industry's technology capacities by using solar electric propulsion to provide flexible launch, mission and orbit capabilities.

NASA's Jet Propulsion Laboratory in Pasadena, California, is managing the concept studies under the direction of the agency's Mars Exploration Program.

NASA is on an ambitious Journey to Mars that includes sending humans to the Red Planet in the 2030s. The agency's robotic spacecraft are leading the way, with two active rovers, three active orbiters, the planned launch of the InSight lander in 2018, and development of the Mars 2020 rover.

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## Rocket Maker Blasts Off to El Segundo

Sacramento-area rocket engine maker Aerojet Rocketdyne Holdings Inc., moved its headquarters to El Segundo this summer, The Sacramento Bee reports. Only a handful of employees will be making the move and the operating plant will continue to build and engineer rockets in its Rancho Cordova, CA. location.

---

## High-Performance Engine Parts Manufacturer Relocates to Boise, Idaho

The Blower Shop, a high-performance engine parts manufacturer for the automotive and marine markets, has announced that it is relocating its operations to Boise, Idaho from Simi Valley, California. In operation for more than three decades, The Blower Shop is recognized as a world leader in roots-style supercharging technology and manufactures superchargers as well as drive components for the professional racing industry along with street and marine enthusiasts.

Ron Hayes, CEO of the Blower Shop, explains, "We selected the Boise area for our relocation because of the huge opportunity to expand the business within a growing region. Financially, it made sense to leave our leased space in Southern California and purchase a building centrally located in southeast Boise. We are a growing company trying to stay on the leading edge in our marketplace, and also expanding our product line within the automotive performance

industry."

The Blower Shop has entered into an agreement to purchase a 13,000 square foot building in southeast Boise near the Boise Airport. It will house a full machine shop with both CNC and manual machines, and is expected to be online by August 2016.

The Blower Shop plans to hire up to 20 full-time benefited employees within the first few years of operation, and will be working closely with the College of Western Idaho to support its training needs. The Blower Shop will manufacture, warehouse, sell and distribute its products all from the new location in Boise.

---

## Vector Space Acquires Garvey Spacecraft

A startup developing a small launch vehicle says it's on schedule for a first launch in 2018 after completing the acquisition of another small launch company.

Vector Space Systems announced July 20 it had completed the acquisition of Garvey Spacecraft Corp., a California company that has been working for more than a decade on small launch vehicle concepts. That company's founder and chief executive, John Garvey, will join Vector Space Systems as its chief technology officer.

Vector Space Systems had previously announced hiring Garvey, but in a July 20 interview, chief executive Jim Cantrell said this acquisition gives Vector Space Systems access to the intellectual property, assets and contracts of Garvey Spacecraft Corp. "It gives us a more complete acquisition," he said.

Garvey Spacecraft Corp. has been working for several years on the Nanosat Launch Vehicle, a two-stage vehicle designed to launch payloads weighing a few dozen kilograms into low Earth orbit. That design will serve as the basis for Vector Space System's Vector 1 vehicle.

Vector Space Systems, which has about 20 employees currently at offices in Tucson, Arizona, and Huntington Beach, California, raised a \$1 million seed round in April. Cantrell said the company is currently working on a Series A round of about \$10 million this year, to be followed in 2017 by a Series B round of approximately \$25 million. That funding, he said, will be sufficient to get the company through the start of commercial launch operations.

Continued on page 124.....

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# ...Hotline Continued From Page 122

## **M&M Plastics Inc. Acquired**

A New York-based plastics supplier has acquired M&M Plastics Inc., a plastics fabrication shop in Miramar, CA. that services businesses nationwide. Curbell Plastics Inc. announced the acquisition Wednesday, July 20.

"The acquisition is integral to our focus on customization for our customer needs," said Gerry Helbig, president of Curbell. "Increased inventory levels in Southern California will further strengthen our support of key growth markets and product lines." M&M Plastics will operate as a Curbell division, the New York company said in a statement.

The addition of the San Diego shop adds a full-service West Coast fabrication shop to the services offered by Curbell, which include custom fabrication and next-day delivery nationwide, according to the company.

## **Lockheed Sunnyvale Gets Missile Contract**

Lockheed Martin Space Systems Co., Sunnyvale, California, is being awarded a contract for long lead material and the labor, planning and scheduling necessary to support the fiscal 2017 Trident II D5 missile production schedule. Work will be performed at Sunnyvale, California, with an expected completion date of Sept. 30, 2021.

## **General Atomics Gets Air Force Contract**

General Atomics - Aeronautical Systems Inc., Poway, California, has been awarded a delivery order to previously awarded contract action for Block 25 and Block 30 ground control station production. Work will be performed at Poway, California, and is expected to be complete by May 31, 2018.

## **Mesa Aerospace Firm Expanding with Helicopter Maintenance Facility**

Mesa-based Able Aerospace -in its first expansion since being acquired by Textron this past spring - has opened the Able Maintenance Center for rotary aircraft maintenance.

The AMC is purported to be the world's most comprehensive helicopter maintenance center. Able serves both domestic and international customers in the new facility.

The new center is focused on Bell helicopters, another Textron division, but is planning expansion to Airbus AS350 and AS355 aircraft. Able's facility, according to the company, is upgraded to meet upcoming helicopter flight safety electronic technology.

The company is dedicating 10 percent of its 500-person workforce to the new rotary wing center.

## **Raytheon Awarded \$291M Navy Missile Contract**

The defense contractor and industrial corporation responsible for manufacturing military weapons, will build the AIM-9X Sidewinder missile at its facility in Tucson.

According to the company, the weapon will be an advanced infrared-tracking, short-range, air-to-air and surface-to-air combat missile.

The U.S. government has developed similar contracts with Raytheon every year for the past 16 years, said Stephen Andersen, AIM-9X business development lead.

## **Strong Sales Lift Callaway Golf's Q2 Earnings**

Callaway Golf Co., the Carlsbad, Ca. maker of balls, clubs and golf accessories - reported a 140 percent improvement in second quarter earnings and got a surprise gift from a competitor.

Callaway reported greater sales in woods, irons, putters and balls. Sales increased in every region, including the United States, Europe and Japan and the rest of Asia.

The July 27 announcement was followed by a surprise on Aug. 3, when Bloomberg reported that competitor Nike planned to exit the golf equipment business.

Nike is a comparative giant, with revenue of \$32.4 billion in the recently concluded fiscal year. The Oregon company plans to continue making golf apparel.

In the research and development space, Callaway said it teamed up with aerodynamics specialists at Boeing to launch new driver technology.

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# CUSTOM SPOTLIGHT

## An Eye For Opportunity

A brief story of Scott Henry and IR Defense

Article: Zack Selway  
Photos: IRD & Selway Machine Tool Co

I recently had the privilege of sitting down with Scott Henry of IR Defense and I was excited to find that he lived up to the description that my cousin, Andy, provided. Andy described a character like we see in the movies of a rugged mercenary type. The picture I had in my head was of a larger than life arms dealer who has seen his fair share of action in the world. Scott did not disappoint.

He stood around 6'3" with tanned skin that looked like he could have just come from a desert mission or jungle safari. A tough looking vertical scar on his forehead (that I'm sure has a good story behind it) strengthened his calm confident demeanor. We sat down with the Sales Manager for Selway Machine Tool's Sacramento/N. Nevada territory Keith Granno, over a beer at the local brewery in Auburn, CA. to learn about the roots of IR Defense.

In the late eighties a presidentially appointed commission was tasked with recommending the closures of 98 major military bases, and hundreds of smaller installations and facilities. Although this was estimated to save the Department of Defense \$57 billion over 20 years, it would also eliminate 70,000 military & civilian jobs. To most the base closures were seen as a misfortune, but to Scott Henry it was an opportunity. He began scouring the military auctions that sprouted up during the closures, buying aircraft instrumentation for resale. It was during this time that he discovered night vision components for gun scopes. "I was so intrigued by the technology that I immediately bought the parts by the truckloads" Scott said matter of factually. He would then machine or outsource the remaining components, turning them into finished products for resale to hunting, law enforcement, and military customers.

In 1995 with the military bases closed and the surplus auction parts no longer available, Scott had to figure out how to make night vision products on his own. Already equipped with a 3 Bridgeports, a few lathes, and years of market knowledge, Scott and his team went to work making the parts one op at a time. As their designs became more advanced, and job orders began to pile up, Scott soon realized that in order to take his business to the next level, he would have to invest in CNC technology.

After a trip to IMTS, and visiting some manufacturer's facilities, Scott purchased his first CNC machining center, a used Haas VF-1. The only problem was that neither Scott nor his team knew how to run the machine. Not seeing this as an obstacle, but a chance to grow, Scott began to teach himself how to program the machine. Armed with the Haas manual and general machining knowledge, he took a piece of particleboard, attached it to the machining table with toe clamps, & began cutting his name, over & over again.

In 1 week, Scott was able to learn G-Code - "it's just geometry" he said modestly. With the very first job he landed, Scott was able to pay off the machine. Confident with his CNC capabilities, Scott purchased more CNC equipment and founded NAIT (North American Integrated Technology) making his own night vision products as well as silencers and gun parts for customers. After a few years, Scott cashed out on NAIT to live the life of a traveling freelance weapon & accessory designer/machinist. After 9/11 Scott settled down again working for a large company in the SF Bay Area, meanwhile he began to build a shop of his own in the small Northern California city of Grass Valley.

# An Eye For Opportunity...continued

A few years later Scott left the Bay Area. Feeling the itch to make his own branded product, he moved near his shop in the Sierra Nevada foothills, and got to work. Recalling all the insight gained from testing equipment with professional hunters, the military, government, & law enforcement agencies, Scott focused his attention on making the most innovative gun scopes and monoculars. At the time, night vision was considered the only option for military & government agencies. Always looking for opportunity, Scott discovered that advancements in digital camera & thermal imaging technologies could be used to manufacture a thermal scope worthy to stand up against the well-established night vision options. Thus, IR Defense was born.

Since the inception of IRD's first scope many other companies have entered the thermal optics arena. Innovative features like a joystick toggle dubbed a thumb-stick, and pure digital displays instead of hard to see buttons, and analog screens, helped to separate IRD from the herd. "Utilizing core technologies has enabled us to focus on manufacturing the final product" Scott said, "kind of like Dell computers". IRD is proud that they design, machine, build, and assemble each thermal system at their facility in Auburn, CA. The company mantra is to deliver the highest-level thermal systems at an affordable price. Keeping the whole process in-house has allowed them to keep cost down while producing quality precision devices.

After finishing at the brewery, we headed over to the IRD facility. The first building holds a clean looking assembly and QC room. A recently acquired second building now houses the manufacturing floor, fully stocked with Haas CNC machines he purchased from Haas Factory Outlet Sacramento, a Division of Selway Machine Tool. The American Made machining centers give IRD a little more clout with it's clientele of government, military, & gun enthusiasts. Scott was excited to show off his UMC-750. The 5-axis technology insures that they will be pushing the limits of thermal optics systems even further, even if Scott still prefers to do his programming at the machine. IRD produces roughly 100 units a month at the Auburn facility, with only a handful of product variations, focusing on making a few products really well. At the end of the tour, I was finally handed a thermal scope to test. It was awesome! I felt like the Predator, not the 1987 Arnold Schwarzenegger version, more like the 2010 Adrien Brody version. The resolution on the digital view screen was highly detailed even in the afternoon light.

From his young entrepreneur and swashbuckling weapons maker days to the president of a well-polished, high tech thermal weapon sight company, Scott has seen it all. With an eye for opportunity and the focus to innovate, Scott has made IRD a household name among the gun and weapon sights industry. Always ready to support with manufacturing technology, we will keep our sights on IRD & Scott Henry.



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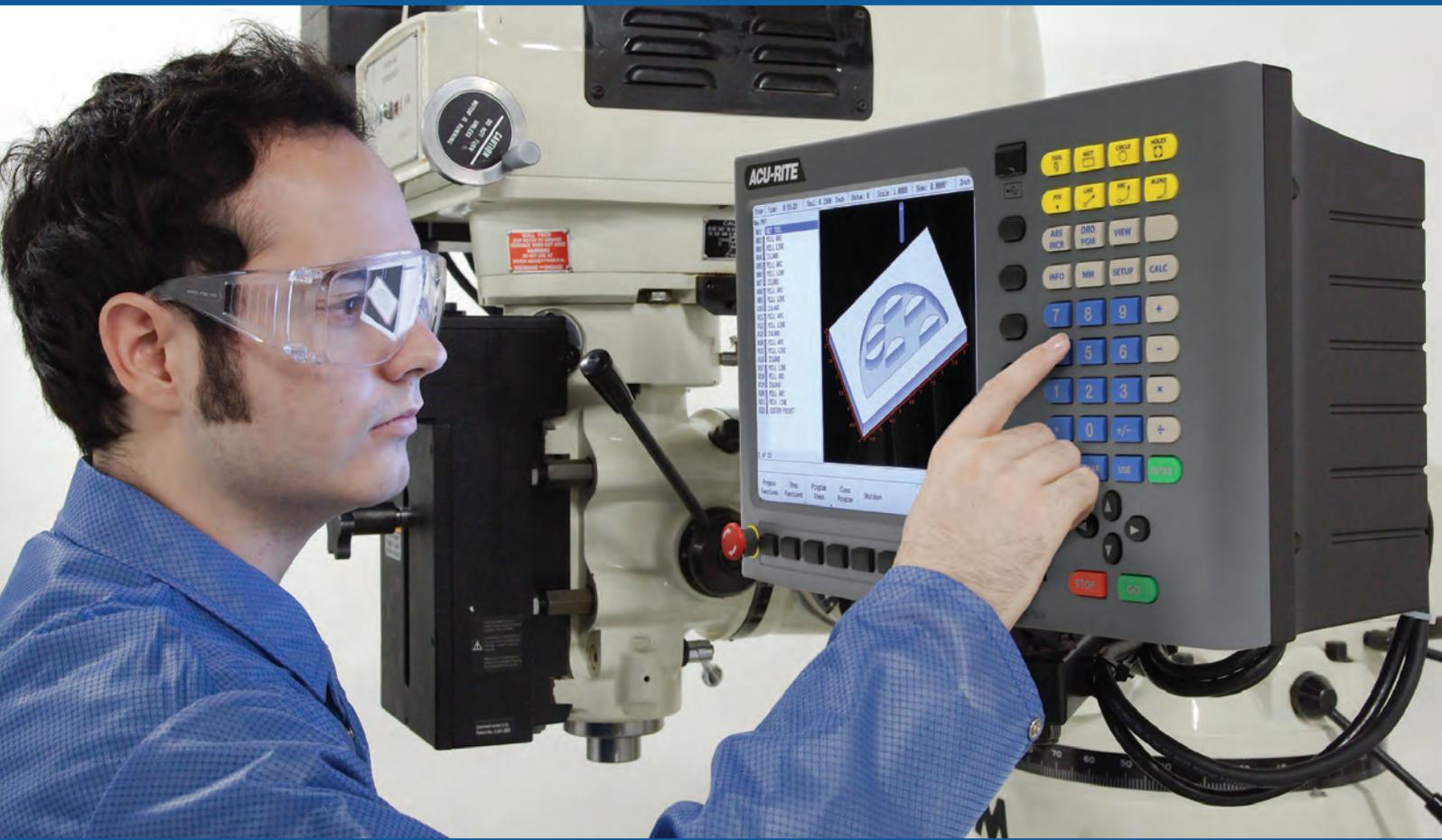
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