


CNC WEST

Volume 36 - Issue 5

THE MAGAZINE FOR WESTERN METAL WORKING MANUFACTURING

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- 
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 - **CHASING THE HORIZON**
 - **NEVER A DULL DAY AT V & T TOOLING**
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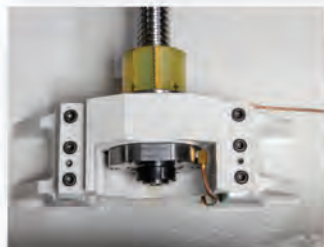
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CNC West

June/July 2018 • Volume XXXVI No 5

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Swaim & Sons uses Doosan Lathes for their Bakersfield Oil Pump Industry Shop
- Pg.22



V & T Tooling Inc. just keeps on growing
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Coming in Aug/Sept 2018

EDM, Waterjet & Grinding Issue: This issue provides readers with profit-making ideas in three major metalworking areas – EDM, Waterjet and Grinding. We'll visit western plants to report on innovative methods and equipment involving wire and sinker EDM, Waterjet and new ideas in grinding. *We will also preview the IMTS show in Chicago*

Editorial: July 21, 2018

Ad Space: July 25, 2018

Ad Material: August 3, 2018

CNC WEST**VOL. XXXVI NO. 5****June/July 2018**

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.

(714) 840-1300 FAX: 657-231-9307
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PRESIDENT/PUBLISHER:

Shawn Arnold

EDITOR: Sean Buur**CIRC. MNGR:** Charlene Strawbridge**PROD. MNGR:** Linda Arnold**PROD. ASST:** Jennifer Hallman**ADVERTISING SALES:**

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Good Summer Vacation Reading Material

When I think of Bakersfield, California I think of three things. I think of country music as this was the city that Merle Haggard and Buck Owens got their start and developed what is known as the Bakersfield sound. I think of agriculture as they are annually one of the top ten cities in agricultural production in the world and have three of the top ten privately held agriculture companies in the United States. Last but not least I think of oil production as Bakersfield is in Kern County and Kern County is the top two producing oil producing counties in the United States. While numerous jobs have been lost in the industry and in the Bakersfield area in recent years our cover story is about a Bakersfield company that makes bottom hole pump parts for oil industry. The story talks about how Doosan lathes have helped them keep their competitive advantage.

Another of Sean Buur's stories this issue about V & T Tooling in Temecula, CA. which specializes in prototypes for the aerospace industry. With the help of AGMA mills this shop this shop is literally busting out the seams as they are trying to get more square footage for their growing business.

Tim Paul marvels how quickly technology is changing and how a shop with a 5th axis machine was unusual ten years ago and now it seems most successful shops are full of them. We also have everyone's favorite column-Hotline along with lots of good reading in our Industry News and New Product Sections. And of-course we are chalk full of ads from companies that want to be seen by western region metalworking manufacturers like yourself.

Hope you have a great summer and if you forget your magazine when you go on summer vacation just remember you can check out this issue and past ones too at www.cnc-west.com

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Established in 1978, Certified Thermoplastics specializes in precision extrusions and assemblies of engineered thermoplastic resins, compounds and alloys for commercial aerospace, defense, medical and industrial applications. Its customers include Boeing Co. and Airbus.

Portland Manufacturer ESCO Acquired in \$1.3B Deal

ESCO Corp., one of Portland's oldest manufacturing companies said it will be acquired for \$1.285 billion by another maker of mining equipment, Scotland-based The Weir Group PLC.

The deal brings together two industry giants in the world of mining and construction tools in a move that ESCO Chairman and CEO Cal Collins said will strengthen the ESCO brand's global reach.

Founded in 1913, ESCO manufactures ground-engaging tools used in mining and construction from its 70 plants and service facilities in 20 countries. It employs close to 365 people in Portland at its headquarters and manufacturing facilities in Northwest Portland. Of those employees, 90 are in manufacturing and related support positions and 275 work from the corporate office.

Once the deal closes – which is scheduled sometime in the third quarter this year – ESCO will continue to maintain its own brand and keep a presence in Portland, two things Collins said were important to the company in reaching the deal.

Eclipse Automation Announces the Opening of a New Facility in Arizona

Eclipse Automation a leading supplier of custom automated manufacturing equipment announced the addition of a new location in the greater Phoenix Area, Arizona U.S.A. to support its rapidly growing international business and its globally based customers.

Eclipse Arizona, located at 2340 W. Broadway

Rd, Mesa, AZ represents the company's third U.S. location, joining Eclipse's existing facilities in Fremont, CA and Charlotte, NC. The new facility will be hiring over fifty automation engineers and technicians over the next few years.

Steve Mai, CEO and president of Eclipse Automation, explains: "Arizona is a strategic location in our growth strategy to further support our customers throughout the southwest market. The state of Arizona has proven to be investing in manufacturing and we feel it is a perfect location for us to continue to meet our goals as a company."

Raytheon in Tucson to Expand

Raytheon Missile Systems unveiled the first phase of a multimillion-dollar expansion effort in Tucson in early May.

The defense contractor debuted 559,000 square feet of new laboratory, missile testing and office space in early May as part of an ongoing \$550 million expansion and modernization project in the Old Pueblo that includes adding 2,000 jobs, reports the Arizona Republic.

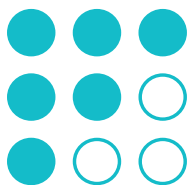
Raytheon's investment will increase capacity and capability of its operations. The renovation project is scheduled to be completed by 2020.

"Our expansion supports the nation's military, the security of America's allies and the U.S., state and local economies," said Dr. Taylor W. Lawrence, Raytheon Missile Systems president, in a statement. "This project validates Southern Arizona's strengths in innovation, technology and quality of life for our growing workforce, and has been made possible by the strong collaboration and support of government and private sector partners."

Raytheon already employs about 12,000 in Arizona.

According to the Republic, the buildings are not complete but will be by the end of the year. Raytheon already has hired most of the employees slated to work there.

Continued on page 88.....



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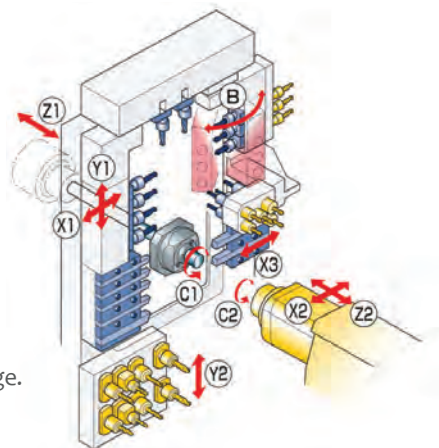
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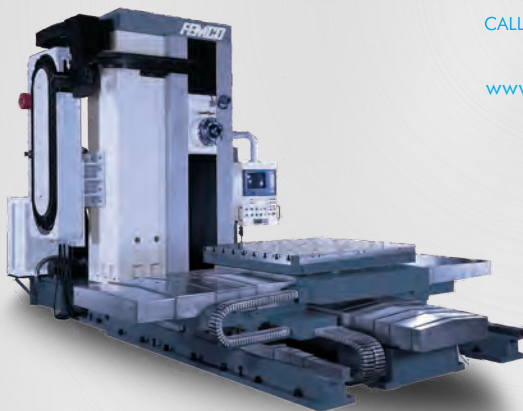
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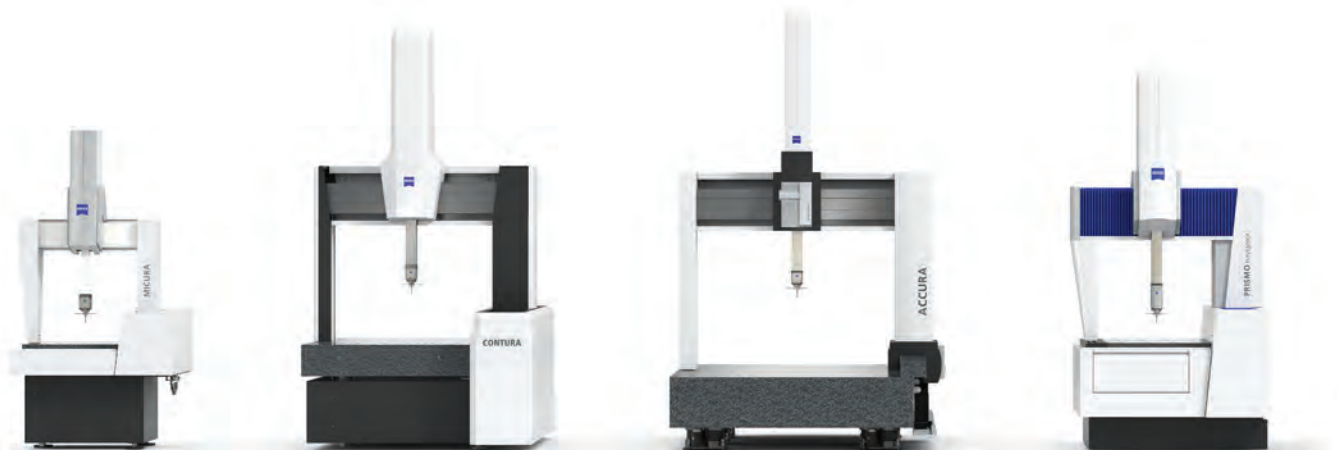
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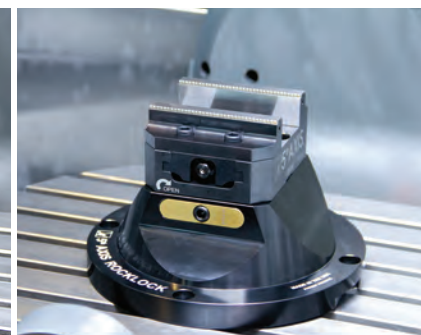
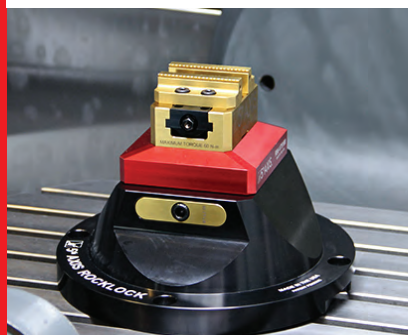
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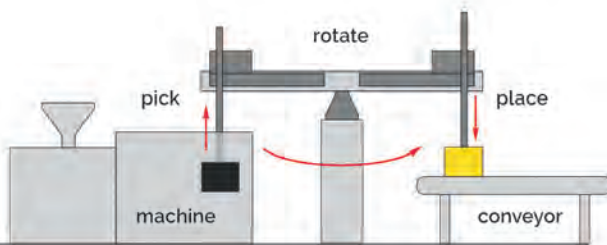
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The New Renishaw Equator™ 500 Enables Accurate Gauging of Larger Parts



Renishaw introduces the new Equator™ 500 – designed to gauge larger parts with all the benefits of the proven Equator 300 gauging system.

Equator gauging systems provide high accuracy dimensional inspection data next to turning and machining centers, at the point of manufacture. The new larger Equator 500 system now enables the gauging of larger parts, with a working volume of 20” in diameter and up to 16” in height.

Both Equator 300 and 500 systems are accurate between 41°F and 122°F at any rate of temperature change and are capable of scanning speeds in excess of 8 inches/second. Every system is compatible with simple-to-use Organizer operator software, EZ-IO software for automation, and IPC (intelligent process control) software for updating tool offsets on CNC machine tools.

The Equator 500 has a gauging volume of 20” diameter in the X/Y plane and 10” in Z when used with the SM25-2 scanning module. This can be expanded to 16” in Z with the SM25-3 scanning module, which allows styli up to 8” in length to reach many more features. The base of the Equator 500 supports workpiece and fixturing with a total weight limit of 221 lbs. The machine is extremely space efficient, with a footprint of just 36.2” by 36.4”. This allows manufacturers of larger parts to easily fit the Equator 500 onto the shop floor alongside their production machines.

Most users of Equator systems need short cycle times to maximize throughput from their manufacturing processes. Both Equator 300 and 500 systems, while maintaining high levels of repeatability, are capable of rapid scans and high-speed touch points on a wide variety of features. Years of customer experience with Equator systems have proven the capability to gauge size, position and geometry on a single device.

This can eliminate the need to stabilize parts to the temperature of the quality room prior to measuring geometry and form of critical features.

Climatic conditions can result in variable daily and seasonal temperature cycles. For example, early in the morning a cold machine shop can increase in temperature due to both external conditions and machinery heating up. The system has been proven to cope with this by re-mastering – meaning that accurate gauging can start as soon as the first part has been produced and continue regardless of how conditions change.

The Equator range is compatible with new IPC software which allows constant monitoring and automatic adjustment of a machining operation, keeping part dimensions close to nominal and well within process control limits. This correction of process drift improves part quality and manufacturing capability and reduces scrap. The proximity of the Equator gauge to the CNC process allows adjustment at the point of manufacture, avoiding time delays or reliance on finished part inspection. An Equator gauging system can be connected to one or multiple CNC machine tool controllers.

IPC software can average results from several parts to determine the true process mean for adjustment of critical cutting tools. For process control purposes, often only one machined feature per cutting tool will require gauging, in contrast with the many features inspected for typical Quality Assurance (QA) applications. The frequency and magnitude of offset updates can be configured on a feature-by-feature basis depending on design tolerances, process variation and tool wear rates. IPC is an integral function of Equator Process Monitor software, using recent historical gauging data to determine process corrections. Connection to a compatible machine tool can be as simple as connecting an Ethernet cable from the Equator controller to a CNC machine.

The new EQ-ATS (Equator Automatic Transfer Systems), for the Equator 300 and Equator 500, allows parts to be loaded on to a fixture plate in front of the gauge, and transferred in and out of the measuring volume under automatic program control. They can be used for either manual loading by operators, cranes or forklifts, or robot loading in an automated cell, protecting the Equator gauge from accidental damage. EQ-ATS is easily integrated, bolting directly on to the base of the Equator gauge.

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Article & Photos by Sean Buur



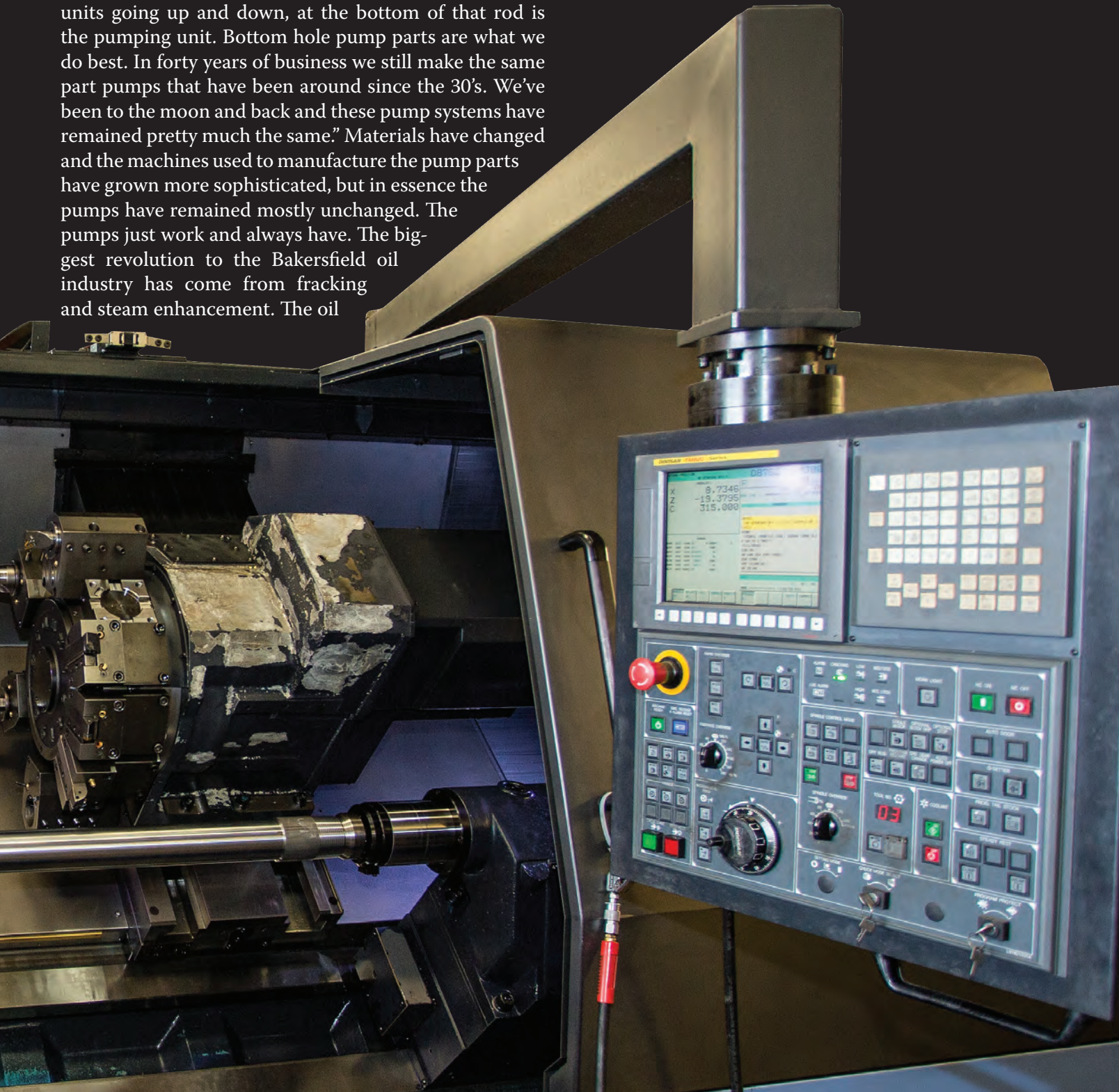
For over a decade Doosan turning centers have been the preferred machine tool at Swaim & Sons Manufacturing. They love the reliability of the Doosans and the Fanuc controls.

The oil business has its ups and downs and it's no secret that Bakersfield, Ca. knows this better than most. Kern County is a large producer of oil in the USA and for nearly four decades Swaim & Sons Manufacturing has been down hole with them. Oil pumps are what they do well, pun intended.

After ten years working for a local pump company Bill Swaim saw a need for an independently owned sucker rod manufacturer in Bakersfield, Ca. In 1979, at the ripe age of 30 he opened Swaim Machine Shop to service the area's top industry, oil. "Haven't been in business as long as there has been oil in Bakersfield, but this October will be 40 years," jokes Bill Swaim. "When you see pumping units going up and down, at the bottom of that rod is the pumping unit. Bottom hole pump parts are what we do best. In forty years of business we still make the same part pumps that have been around since the 30's. We've been to the moon and back and these pump systems have remained pretty much the same." Materials have changed and the machines used to manufacture the pump parts have grown more sophisticated, but in essence the pumps have remained mostly unchanged. The pumps just work and always have. The biggest revolution to the Bakersfield oil industry has come from fracking and steam enhancement. The oil

in Bakersfield is tar like, so without new ways to harvest it the field would have dried up decades ago. Refineries bring in hundreds of railroad cars of oil from North Dakota to mix with it to make it useable. At the end of the day it still needs to be pumped from the ground.

"Kern County is 3rd in the nation in oil production so we have a lot of local customers, but the reality is that there are very few of us left in the business so we've become more of a global supplier," adds Lance Swaim, salesman and son in the Swaims & Sons. "We have an online ordering system that notifies sales, production and management of a sale." Swaim & Sons sell directly to consum-





Left to right - Lance Swaim - sales, Bill Swaim - president + owner, Mike Aguirre - quality manager. Swaim & Sons just added two Doosan Puma GT3100 machines in April.

ers as well as to manufacturers so customer service is two-fold. Once the order is placed online the warehouse determines if it is in stock or on backorder. If the part is in stock it gets processed and shipped out to the customer. If inventory is low then production schedules another run of parts. Typically the minimum run will be based off utilizing a whole piece of bar stock. "The customer is kept in the loop the entire time," tells Lance. "We have an extensive amount of inventory on hand to best service our customers. Production stays ahead of the demand on the popular items so we just pull the part off the shelf to complete the sale."

Swaim & Sons occupies two buildings totaling 17,000sq.ft. A staff of 13 work a single shift on sixteen

CNC turning and milling centers. "We work primarily in C1215, 8620, 304 stainless, brass, monel, inconel and so forth," details quality manger Mike Aguirre. "We churn out 70,000 parts a year that range in size from small to mid size. Guys work in cells running at least two machines at a time. We have four dedicated setup people and the rest are operators." Mike has been with the company since 2001 and started out part time in the shop as a laborer. He worked his way through the ranks to become the quality manager a few years ago. "I took a good manufacturing person that made the company money and dropped him in an office," jokes Bill. "You can tell he misses working in the shop, but he is doing a great job for us in quality." Mike is responsible for checking all of



Swaim & Sons have a shop full of CNC machining centers, 16 in all. Most of the turning machines are Doosan lathes, but they also have a Mori Seiki lathe with dual spindles and live tooling. The milling department consists of three Haas mills that vary in size.

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Scott Taylor has been with Swaim & Sons for 35+ years. He manages all the inventory of materials and finished parts. Swaim & Sons have over a million dollars of inventory ready for online sales.



Swaim & Sons parts and maintaining their API, Q1 and ISO certifications. As one of the few American Petroleum Institute licensed manufacturers, maintaining the API calibrated gauges is a daunting task. "Most everything we machine has thread," details Mike. "Each of those threads match our set of shop calibrated gauges and then again the set in QC. Without the double verification process the parts don't get put into circulation."

Swaim & Sons has always been tech forward. Back in the day they were a Wasino shop, but over the last decade or so Doosan has become the machine tool of choice. "I try and keep up with new equipment," explains Bill. "Most of our 16 machines were purchased in the last five years. We love the reliability of the Doosans. If the guys didn't crash them now and then they'd be perfect." Swaim & Sons' manufacturing area is filled with Doosan lathes that vary in size and capabilities. "We have a dozen Doosan lathes, one Mori Seiki lathe and three Haas mills," adds Mike. "Most of our lathes have live tooling and/or secondary spindles, but our two newest Doosan machines are simple turning centers. All we needed was a lathe that could run 3" to 5" bar all day, every day, and we got it from Doosan Puma GT3100."

Swaim & Sons recently began their relationship with Ellison Technologies, who is the current Doosan distributor for Bakersfield. "It had been a few years since we added new machines, and the Doosan distributorship has changed hands since then," explains Bill. "We needed parts and the old distributor Protec was kind enough to put us in contact with Ellison. I'd paid off a couple other machines and decided to invest in two more Doosan lathes and called Chad Turner over at Ellison." The two new Doosan Puma GT3100 lathes were installed in April and immediately blended right into the shop's workflow. "We love the Fanuc controls on the Doosans," tells Mike. "Most of our turning centers having the same controls it makes the programs almost universal. With a few edits Swaim & Sons can interchange machines to run parts without much fuss. All the operators can use the controls so they can move freely between all of the Doosan machines. The new Doosan Puma GT3100s are setup as mirror images. Throughout the shop tool #1 is the same in all the machines. "It gives us the flexibility to move parts around depending on our need and vacancy of machines," describes Mike.



Top-2-1/4" bottom lock friction style monel bushing, 1-1/4" monel top cage for ball and seat 7/8" valve rod, 1-1/4" monel top cage for ball and seat 11/16" valve rod, 1-3/4" monel top connector for PAMPA pump. Middle & Bottom - Swaim & Sons are ISO9100, Q1 and API certified. There are not a lot of API certified companies left in the USA manufacturing pumps and pump parts.



THE API COMPOSITE LIST

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The industry goes up and down just like the oil derrick, but with experience comes wisdom. Swaim & Sons has persevered through good and bad with out of the box thinking for day-to-day operations. "We are survivors in a volatile industry," tells Bill. "We always have been and always will be." Creative solutions have come in a variety of forms. Sometimes the answer lies with your accountant explaining how you can write off outdated inventory and other days it is finding untraditional ways to buy materials. "We contracted with a rarely used vendor to bring in bundles of bar stock on consignment," continues Bill. "We have 8 or 10 bundles out there right now that we don't pay for until we break the bundle. It is a huge cost saver and time savor for us. We email them that we used the material and they invoice us for it and ship us another replacement. It is a great system." On their exotic materials they now go directly to the factory for the best pricing and delivery times. The steel market is volatile right now



and price estimates might be good for only a few hours. Bill and his team have been stocking up on materials to help mitigate the price fluctuations as well as aiming their efforts at the higher priced specialty parts.

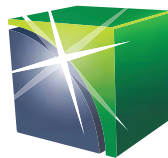
"When I started the business in 1979 there were nearly twenty major manufactures of pumps and pump parts in the USA," concludes Bill. "Now there are five of us. Staying on top of technology has helped us over the years. We were early adopters of computers and CNC machines. I might look like an old man now, but I was young once and I saw the value technology could bring with it."



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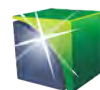


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V & T TOOLING INC.

Article & Photos by Sean Buur



Luke Wilson vice president of V & T Tooling Inc.

NEVER A DULL DAY AT V & T TOOLING

Vaughn Wilson immigrated to the United States from England in the late 80's and found work in the local aerospace industry. "Dad came here with \$250 bucks, my mom and my older brother," tells Luke Wilson, vice president of V & T Tooling Inc. "He managed to start a career and then eventually a company from practically nothing." Vaughn was a tooling guy and apprenticed at a well-respected program in England. When he came to the states he looked for a job and was immediately hired in a lead position, but his youth didn't always sit well with others. "You can imagine that these 50 year old Americans didn't always appreciate having a 25 year old Brit telling them what to do," explains Luke. "It is hard to believe now but people filed false complaints about work visas to try and have him deported. I still run into people who came over on the same plane with him. All of his friends are doing well for themselves. They came to the land of opportunity and flourished. Dad retired pretty early in life and I've been running the company now for a few years."

Luke Wilson has been with V & T Tooling pretty much since the beginning. He remembers being 6 or 7 years old sitting on a 5-gallon bucket and making parts on his dad's old Bridgeports. While other kids played video games he machined parts. All through school he spent his time after school and on weekends in the shop. By the time he could drive and legally work at V & T Tooling he had a decade of experience under his belt. Now as vice president that experience has paid off and his youth is overshadowed by his depth of knowledge. "Every chance I got I was in the shop making parts and learning," explains Luke. "It makes a big difference now that I am running the company. The guys on the floor might be older, but they respect my leadership because I've been in their position and worked all their jobs. I don't just manage I step in and help"

Vaughn built V & T Tooling from the ground up after being dissatisfied by his salary working for others. By day he worked for Convair in San Diego and at night for Lockheed Martin. Temecula was a up an coming new suburb out of the city at the time and they settled down to stay

V & T Tooling has a variety of AGMA milling centers in different sizes. The MC-158 is mid size compared to Luke's smaller AGMA A-6 and monster AGMA BDO 4223 Bridge Type Machining Center





The AGMA BDO 4223 Bridge Type Machining Center is V & T's largest machine. It has 165" of X travel, 82" of Y travel, and 40" of Z travel. They designed a door system for it so they can open it up and run parts twice as long as the machine. They purchased it with the optional 90° head so they can machine multiple sides without disturbing the setup.

away from the traffic. In 1998 he put enough capital together to open V & T Tooling in a small shop with a single Bridgeport mill. The business grew quickly as the titans of aerospace contracted directly with him for their tooling needs. Originally V & T specialized in tooling with a little CNC work on the side, but they've evolved over the years. Ninety-five percent of V & T's clients are aerospace oriented and CNC machining has become an integral part of supporting the tooling contracts and inspection jobs. "Most of what we do is prototypes for aerospace," tells Luke. "One and maybe two parts are 99% of the jobs we take in." V & T Tooling manufactures everything from flight hardware and molds to fixtures that tower between

their rafters. "We are ISO9001 and AS9100 Rev D certified," continues Luke. "We support most of the big boys in aerospace. SpaceX has been a customer for something like 15 years and we just added two more rocket companies to our customer list last year. Customers like that we not only manufacture customized fixtures, but install them and do offsite inspections."

Laser tracker inspection work has become a large part of V & T Tooling's business model. Luke describes the trackers as a mobile CMM with the ability to measure entire buildings. "We use the trackers to set all our bigger fixtures," details Luke. "They measure off a laser beam and are extremely accurate." Luke has seven of them that they



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Laser tracker inspection work is a big part of what V & T Tooling does. It is like a mobile CMM and they have seven of them. A company ten times their size might only have two. You have the ability to check an entire building with it. The tracker follows a laser beam and takes the measurements. V & T use them to set all their bigger fixtures and inspect parts too large for the arm/CMM. The trackers are portable and used onsite as well as in the shop. V & T even rents theirs out when not in use.

use in-house, in the field and rent out to other companies. "A company ten times my size might have only two, but we utilize them so much that we need more," continues Luke. "To be a true tool builder and laser track operator you need to know how to run the CNC machines. We win a lot of jobs because all our guys are great machinists as well as inspectors. We inspect, see the problem, and then fix it. Lots of other companies inspect it, say these parts are bad and that's it. Their service stops there. We fix it, then bring it back and install it. We do it all and the customers love that."

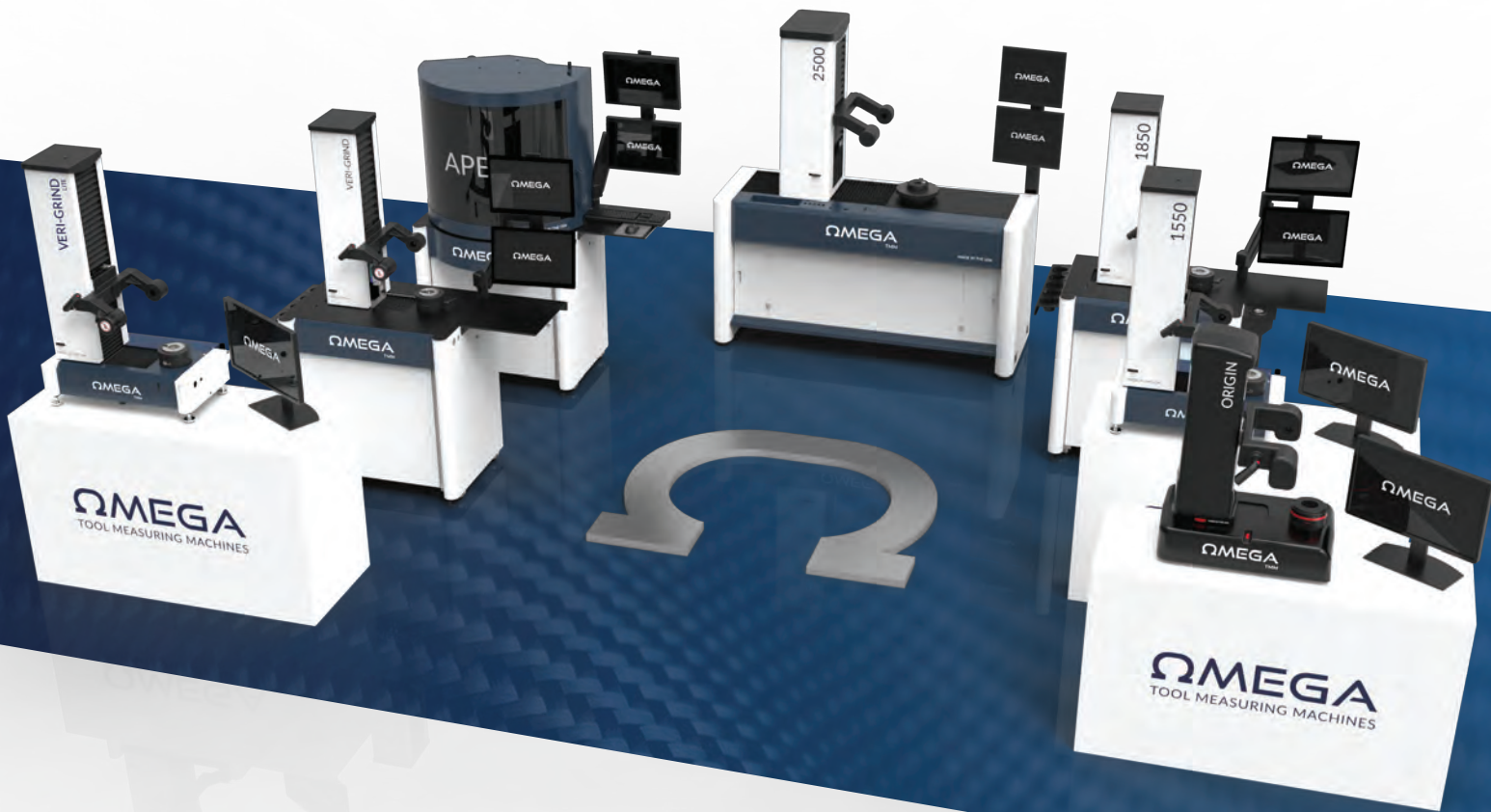
Mission critical tolerances start with quality people, machine tools that get the job done, and in an environ-

ment conducive to precision. V & T Tooling has 10,000 sq.ft. total of manufacturing with 9 CNC milling centers that vary in size and brand. "Our 7500 sq.ft. climate-controlled manufacturing area has a lot going on," details Luke. "We have a variety of brands on the floor, and all but one has been bought new in the last few years. With our continued growth we've been buying up new machines left and right. A climate-controlled ecosystem is crucial in our process. Our customers call out the temperature spec that we need to meet and every degree matters. A small thermal shift on a baseball sized part is one thing, but a few degrees on a 12 foot long part you need to hold .002 on is a lot harder to do with temperature changes."

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V & T Tooling has YCM, Mori, CNC Matters and AGMA mills and is quite pleased with their current capabilities. "I've been buying a lot of machines lately through Will Atkinson at CNC Matters," tells Luke. "His service is great, and the machines are great. We linked up with Will when he did a retrofit on an older horizontal boring mill for us a few years ago. He mentioned that he also sold new machines and we bought a smaller AGMA machine from him. It worked out pretty well and we bought more. Our largest machine is an AGMA BDO 4223 bridge type machining center we bought a few years ago from Will. It is a beast of a machine with 165" of X, 82" of Y, and 40" of Z." Luke and his team redesigned a custom door system that can open up to run parts twice as long as the machine. With a max table load of 22,000 lbs the BDO-4223 can handle long aerospace structure parts and heavy mold bases. It has a 50 taper spindle with a geared transmission and through the spindle coolant system. They purchased it with the optional 90° head so they can machine multiple sides without disturbing the setup.

Luke looks for a lot of torque and rigidity in every machine he buys. "We are known for killing spindles," laughs Luke. "Not every machine can keep up with us. We run through hardened material such as inconel, titanium, and aircraft steel at the same rate other shops do aluminum. Will recommended the CNCM-6334-VG to us because he knows we get after on every job we run and it is a great size for what we do (63" of X, 34" of Y, and 27.5" of Z)." The CNCM-6334-VG has a max table load of 6000 lbs and weighs almost 40,000lbs. It also has the 50 -taper spindle with a dual speed transmission and through spindle coolant system. "The dual chip augers and rear mounted chip conveyor can take as many chips as we throw at it," continues Luke. "My dad instilled in me the old school mentality of if chips aren't flying we are not making money. More chips equals more money." Even though V & T Tooling is

a prototype shop spindle time is at a premium, and speed is king. "A single part might have over a 100 hours of standard speed machine work in it," explains Luke. "I can do it in way less time. My price is lower and my profit is higher. A lot times I'm bidding on a job against someone who has never run a machine and just sits in an office calculating inches. My experience in the shop sets us apart on a lot of job estimates and my machines have to deliver on my expectations."

The next big step for V & T Tooling will be a larger workspace. Having outgrown their current building Luke is hoping to double the square footage. "We've been entertaining a move for a while, but with the cost associated to move the equipment we haven't done it," details Luke. "All our machines are on 3' deep reinforced pads and it isn't cost effective to move them. An identical building 2 doors down is for sale and we really want it." The building would allow them to move welding, inspection and fabrication to the new locations without much of a hassle. "It will free up a lot of the shop space in this building to add more CNC and it will allow me to take on larger fabrication and weld jobs in those departments. We have the infrastructure in place; we just don't have the physical shop space to take on some of the jobs I have to turn down."

"We manufacture things people have never built before," concludes Luke. "This makes for an exciting work day, but also is limiting when it comes time to finding new hires. A production machinist won't cut it here for very long, you love it here or you hate it. We have 28 great people on staff right now that love it. We run 24 hours a day five days a week. When I interview prospects I tell them how you might be working with Aluminum in the morning, Titanium at lunch and Delrin at the end of the day. It is really all over the place. It is never a dull day at V & T Tooling and that's how we like it."



Left - Luke recently began the process of upgrading his work holding solutions and bought over a dozen of the latest Kurt vises. Right - Jesus Limon VTs General Manger is checking a part via the FaroArm. He is utilizing Verisurf software to check the item to a 3D cad model.



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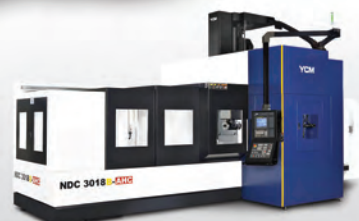
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Vancouver, Washington Aerospace Contract Manufacturer Reduces Cycle Time



OPEN MIND Technologies AG reported that its customer Concept Reality Inc. out of Vancouver, Washington is increasing productivity and improving part accuracy using the hyperMILL® MAXX Machining finishing module for aerospace part manufacture.

The company reports that hyperMILL® CAM software from OPEN MIND enables 5-axis strategies for fast, easy-to-use programming, resulting in reduced cycle times and high-quality surface finishes. The integrated hyperMILL® MAXX Machining finishing module, a performance package of the hyperMILL® CAM software suite, is the CAM programming source enabling the use of conical barrel cutter technology to reduce cycle times significantly. It is ideal for planar, ruled and curved surfaces often found in complex 5-Axis components. hyperMILL® MAXX Machining offers three powerful modules for finishing, roughing and drilling.

“On a recent aerospace project, the hyperMILL® MAXX Machining finishing process allowed us to in-

crease our step down between tool paths by 12x when compared with traditional machining methods using ball nose cutting tools. This saved us 5 hours per part in finishing operations while reducing cusp height,” said Mr. Chris Nunn, president of Concept Reality Inc. “We were able to deliver a higher quality part in less time – a great benefit to our customer.”

The hyperMILL® MAXX Machining finishing module

makes efficient use of machine and tool options in relation to surface quality and speed, by applying an innovative 5-axis tangent plane machining strategy and conical barrel cutters that use the functions of a barrel cutter and a ball mill simultaneously.

A conical barrel cutter features a very large radius – ranging from 250 mm to 1,500 mm. The large radius of the conical barrel cutter makes step-over distances of 6 mm and 8 mm a reality. It does not require switching cutters in order to finish adjacent areas such as rounded interior corners, and hard-to-reach areas can be machined in a highly efficient, secure manner. In addition to superb surface quality, the hyperMILL® MAXX Machining finishing process enables short production times, increased tool life, the use of fewer tools and it offers the highest degree of process reliability.

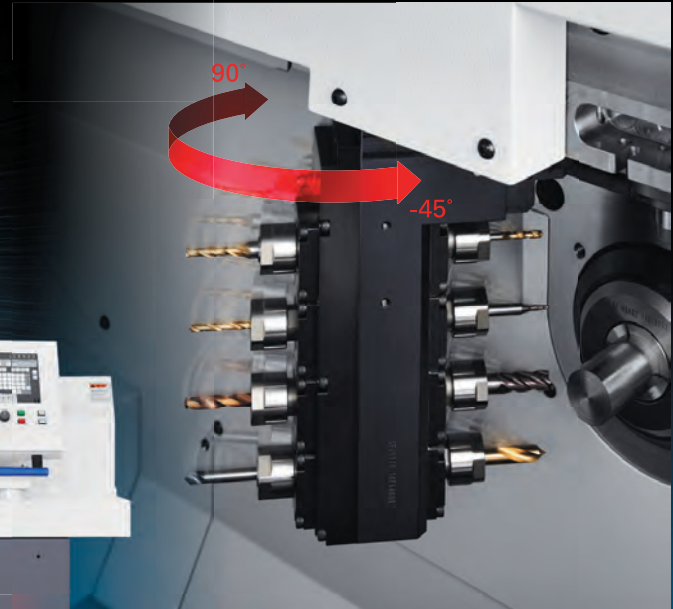
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Machine specifications

Max. machining diameter	1.26"
Max. machining length	GB: 12.6"/1 chuck NGB: 2.95"/1 chuck
Max. main spindle speed	8,000 rpm
Max. back spindle speed	8,000 rpm

- Drilling and milling of angled features and contours without retooling or resetting
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CAD/CAM/CNC Perspective

By: Tim Paul

Manager- Manufacturing and Business Strategy

Tim.Paul@Autodesk.com

Instagram: OneEarTim

Chasing the horizon...

As Autodesk develops Generative Design tools inside Fusion 360, I'm reminded how easy it can be to let technology pass us by. Ten years ago, few people (myself included) would ever have imagined how prevalent five axis CNC Machines would be today. My recent exploration of Autodesk's Generative Design tools got me thinking about what other manufacturing technologies have become commonplace and what new or emerging technologies could be next. For this column I'll keep the topics to software, equipment, and tooling.

Software: When I think of manufacturing software, I mostly think of CAD and CAM software. I started my CNC programming career writing G-Code programs by hand at the CNC Control. Over the years, I incrementally stepped up my capabilities and efficiencies by switching from tool to tool, gaining experience in numerous CAM systems along the way. I've always looked at software as "just another tool" that should make me more productive, which kept me largely unbiased in my evaluations of it. I switched tools many times, with each change driven by the search for the most effective and efficient tool. My willingness to honestly evaluate the challenges

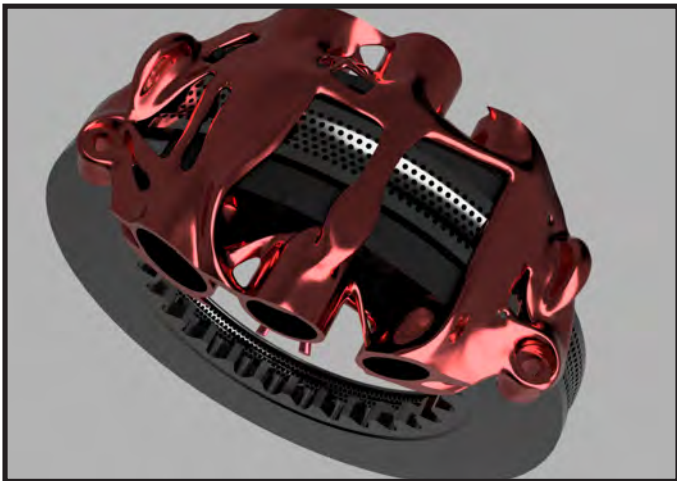
from. It tests and learns from each iteration, finding out what works and what doesn't. Common generative design goals would be light-weighting or part consolidation to improve a design's performance. As the technology stands today, most generative design results take the form of organic shapes requiring additive manufacturing. This additive manufacturing requirement is the root that my pessimism stems from. Additive manufacturing is interesting and exciting, and I have no doubt that it will play a significant role in the future of manufacturing. That being said, additive is far from common or accessible in manufacturing today. When I do get excited about generative design is when I realize it won't be long until we can define machining processes like milling or turning as input parameters to generate machinable results. The promise of using generative design tools to produce optimized designs that fit into a wide variety of manufacturing processes is the reason I will continue to learn about it to understand where it will fit into our industry.



I faced and openly explore what tools were available to overcome them has always been a key part of my productive career in manufacturing.

While exploring the capabilities of Autodesk's Generative Design tools I found myself overwhelmed with pessimistic thoughts that it didn't fit into my machinist world of manufacturing. If you aren't familiar with what Generative Design is, you're not alone. Generative design is essentially a design exploration tool. With Autodesk's generative design technology, designers input design goals along with parameters such as materials and manufacturing methods. The software uses the power of cloud computing to explore all variations of a solution, quickly generating design options to choose

Equipment: It was just 9 years ago that my friend bought his first 5-axis Mazak Variaxis machine. He justified the purchase because he knew that having one of the few 5-axis machines in the region would set him apart from his competition. 5-axis machines were not entirely uncommon, but they were generally found in specialty shops that required them for specific work. At the time, a big bay area shop like Flextronics could have 140 machines, and only one would have 5-axis capabilities - if any. Back then 5-axis machines were synonymous with complex parts like impellers. And then there were all the extras that went along with investing in a 5-axis machine: the new and expensive CAM software to drive it, the expensive process of getting a good post processor dialed in, and the hardest part of all - finding the business to keep it busy. I knew our industry was changing when I saw my first Haas UMC-750 5-axis machine at Westec around 2012, and I could feel that it was going to change quickly. Since then CAM software like HSMWorks and Fusion 360 made driving 5 axis machines easily accessible. There was an industry-wide realization that even using 3+2 machining 5-axis machines could have a significant impact by reducing part setups, improving part accuracy, and increasing process reliability. 5-axis wasn't just for impellers anymore. Now it feels like every third shop has a 5-axis machine.



As I accept that 5-axis machines have become more commonplace than I ever would have imagined 10 years ago; I find myself looking around for what will be the next example of exotic turned commonplace in manufacturing. Cryogenic machining and ultrasonic machining are intriguing, but will they become common in the manufacturing industry? I remember the days when a twin spindle, live tool, Y-axis lathe seemed exotic. Now I hear people ask, “why would I buy a lathe without live tools and a Y-axis?” B-axis mill-turn machines sure seemed much more exotic 5 years ago than they do today. Their cost and complexity might prevent them from becoming truly commonplace, but I would bet they won’t be as uncommon as many people think. Will well-established but less common processes like polygon turning, hobbing, etc. become the norm? I think the real game-changer will be how standalone additive machines and additive/subtractive hybrid equipment evolves. For additive manufacturing to become wide spread, I think it will take a closer marriage between the software and the equipment than I’ve seen in our industry so far. I look forward to seeing how the relationship between manufacturing software and machining equipment evolves in coming years.

Tooling: Solid carbide end mills surpassed HSS in the late 80s and early 90s, but they weren’t the clear winner as the cost vs performance wasn’t cost effective. Early carbide geometry was simply copied from existing HSS/M42 Cobalt tooling. As with many new technologies, early adopters of solid carbide end mills had to be “believers.” Real success for solid carbide end mills came when there was a departure from conventional



thinking with thinner cores and cross sections. By the time I entered the industry in the late 90’s, HSS end mills were still common but the R&D race was on. As cutting tools advanced tool holding, work holding and CAM software had to advance with it. With the creation of constant engagement roughing tool paths, tool manufacturers found more opportunity to further advance cutting tool geometries and coatings, driving metal removal rates (MMR) well beyond what even the most optimistic experts would have imagined.

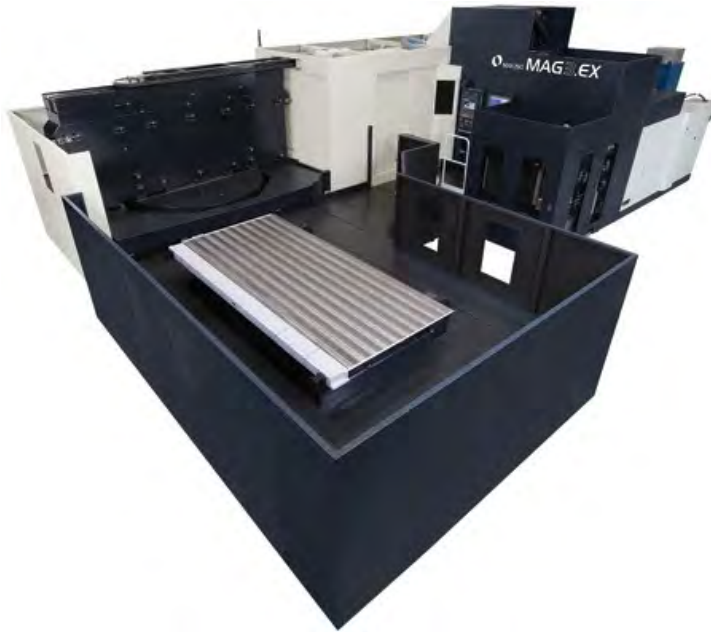
The next big advancement in cutting tool technology is tough to predict for me. I think it’s reasonable to see trends like Sandvik’s prime turning tools, cryogenic machining, ultrasonic machining, and constant engagement style roughing and deduce that the next big advances in tooling will come when machine tool, cutting tool, and software companies work together. These cross-industry partnerships have the potential to create amazing, industry-changing developments. Could we have tool-paths that adapt to feedback received by the machine? The possibilities are only limited to our imagination and desire to move forward.

I started this article as a personal reflection of how far the machining industry has pushed technology and



to use those reflections to identify where it might be headed. Much of this technology is still on the elusive horizon, and we have a lot of parts to make before we get there. A couple recent observations kept coming up as I considered where the industry is headed. The first comes from a few machine shop owner friends whose businesses are dying a slow death due to their struggle to identify and utilize technology that will help them be more productive, competitive, and profitable. My second observation comes from the “Made in China 2025” (MiC2025) initiative to reboot China’s manufacturing with a focus on quality over volume. With the help of heavy government involvement, China is set to be the largest user of robotics and lights out manufacturing practices in the industry. These two observations drive me to ponder what the future of American manufacturing will look like as our private industry continues to compete with one of the richest governments in the world. During my career, I’ve seen independent American companies lead the industry in pragmatic implementation of new manufacturing technology while consistently growing their businesses, paving the way for a reversal of the off-shoring trend. I believe that with thoughtful adoption of appropriate emerging technologies, American manufacturing can and will continue to grow.

Makino 5-Axis HMC for Complex Aluminum Structural Parts



Makino offers the next-generation MAG3.EX 5-axis horizontal machining center (HMC), a machine platform updated with expanded capabilities for the processing of complex aluminum structural parts for the aerospace industry. "With its speed, power and motion control enhancements, the new MAG3.EX provides aerospace manufacturers with the productivity necessary to exceed customer demands for costs, quality and lead times,"

said a company spokesperson.

"The original MAG3.EX has been a staple in the aerospace industry for more than a decade. However, to continuously innovate and position manufacturers for the future, we pushed to increase both cutting and control capabilities," said Dave Ward, product marketing manager, Makino. "When updating the machine, we focused on three main design objectives: higher productivity, enhanced features and reliability and interchangeability. The new design delivers on all three with enhanced results, establishing a new standard for aluminum structural aircraft component production."

The MAG3.EX is fully equipped to take on aluminum structural parts up to 13' in length, including wing ribs, bulk heads and beam-type components. Its X-, Y- and Z-axis travels of 157.5", 59.1", 39.4", respectively, accommodate part sizes up to 157.5" by 59.1" by 29.5", respectively. The machine's A- and C-axes are located within the spindle housing and provide $\pm 110^\circ$ tilting and 360° rotation.

Many key components, including the spindle, coolant system and automatic tool changer, have been updated with enhanced technologies to achieve next-generation productivity.

By increasing the spindle power from 120 kW to 130 kW in the updated model, maximum power can be achieved at 26,000 RPM rather than 33,000 RPM with the previous spindle. Cutting feedrates and acceleration rates have also been improved with cutting feedrates increasing from 25.4 m/minute to 50 m/minute and acceleration rates reaching 1G. Together, these enhanced features improve processing speeds for all aluminum structural type components.

In addition to added power and feedrates, rapid traverse rates have been improved across all axes: 25 revolutions per minute on the A/C 2,440 IPM on the X-axis and 2,283 IPM on the Y- and Z-axis. These faster axial movements, combined with an improved automatic tool changer and automatic pallet changer, reduce non-cutting times in operation for the highest degree of machine utilization. Makino reports that in some test parts, cycle times have been reduced by up to 23% compared to the previous model.

The MAG3.EX is built with a large-capacity automatic tool changer, capable of holding up to 120 tools and reducing the time it takes to change tools by 30%, and an automatic pallet changer, eliminating the need to stop machining for work set-up. Furthermore, the platform features a horizontally oriented work-setting station that lets operators quickly and easily set workpieces on the pallet, similar to how they would a vertical machining center (VMC).

Three key features of the next-generation MAG3.EX include Makino's new Pro6 control, MPmax real-time process monitoring and Collision Safe Guard technologies. A dedicated monitor screen for MPmax is located next to the Pro6 control. Here, the operator can watch uptime rates, view images captured by the monitoring camera and monitor the condition of the spindle in real time. Moreover, operators can access the recorded data and check details afterward.

Makino's proprietary Collision Safe Guard technology is a function that runs real-time interference checks to avoid spindle crashes. By combining on-board machine geometry models with workpiece, fixture and tooling data input by the user, Collision Safe Guard can predict and stop the machine prior to collision, protecting investments in the machine, fixture, tooling and workpiece. This state-of-the-art sensing technology protects the spindle from damage caused by overload.

The updated MAG3.EX can be used with existing pallets, work-setting stations and even pallet changers, making it fully compatible with Makino's MMC2 systems. This design enables manufacturers to expand existing MAG3.EX cells or replace older machines from their MMC2 with no changes to the foundation.

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Fadal CAT40	5/8-11	.740	45°	No	C40-4500S	\$ 14.48
Okuma CAT40	5/8-11	.589	60°	No	C40-6000S	\$ 16.88
Mazak CAT40	5/8-11	.740	45°	Yes	C40-4500H	\$ 15.00
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1/2	1	1/2	3	YG-EMUGMF68909	\$ 45.87
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Methods Machine Tools Celebrates 60th Anniversary



This year, Methods Machine Tools, Inc. a leading supplier of leading-edge precision machine tools, automation and additive manufacturing solutions, is celebrating its 60th anniversary. Founded in November of 1958, with 3 employees and a few refurbished machines, Methods has grown into one of the largest, most innovative, high precision machine tool suppliers in North America. Methods today has roughly 350 employees, 8 sales and technology centers and over 35,000 machines installed throughout North America, ranging from EDM machines to sophisticated 5-Axis CNC Machining Centers to state-of-the-art robotics, automation and 3D printing solutions.

The company's founder Mr. Clement McIver Sr. established principles that have continued to serve Methods well. "Anyone can sell a machine. But not everyone provides the extra effort that makes a difference on a company's bottom line." – Clem McIver Sr., 1917 - 1995.

"Staying true to our founder's vision, we have built an excellent reputation in the machine tool industry by closely partnering with machine builders and customers, as well as providing strong application expertise," says Mr. Scott McIver, Methods chairman and 3rd generation owner. "We offer a total service solution from design and applications to engineering, installation, training and unmatched support, to help manufacturers be more profitable, productive and competitive."

Methods' product line strategy offers advanced, optimal technology for each machining discipline or class. Machine tool partners include Nakamura-Tome, Yasda, Fanuc, KIWA-Japan and most recently, Niigata Machine. EDM partners include Fanuc wire EDM's and new partner Ocean Technologies Co., Ltd. In addition, Methods 3D, Inc. provides what they feel are the industry's most advanced 3D printing solutions through 3D Systems and MarkForged. For measurement and inspection solutions, Methods offers digital optical comparators from VISIONx INC.

Demonstrating a strong commitment to quality and reliability, many of Methods' machine manufacturer partnerships have been long term, such as being the exclusive U.S. importer of premier Nakamura-Tome multitasking turning centers for 35 years, and 25 years with Fanuc

as importer of one of the world's most popular tapping/ drilling Fanuc RoboDrill machining centers and Fanuc wire EDM machines for all of North America. The close, collaborative relationships with Nakamura-Tome and Fanuc have provided Methods' customers leading machine technology solutions for decades. In addition, Methods' reports that their close attention to applications and dedicated service ensures productive, profitable, customer centric solutions and support.

"We are excited to celebrate our 60th anniversary milestone," said Mr. Jerry Rex, president & CEO of Methods. "Our dedicated, experienced team, together with our powerful partnerships, have provided us a strong foundation for serving our customers. We are proud of our heritage and are looking forward to further expand our leading technology solutions in machine tools and automation, including the most proficient ways to apply and support them."

Strategically located across the U.S., Methods Sales and Technology Centers complement an extensive, national network of distributors and dealers, offering the latest technology and automation solutions, machines, training, spare parts and engineering support demanded by manufacturers. In addition, the company has state-of-the-art Automation Centers in three locations as well as 3D printing labs throughout the U.S.

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Prima Power Announces the Launch of the Laser Next 2141 3D Fiber Laser Machine



Prima Power announces the launch of its new Laser Next 2141 3D fiber laser machine. The product is designed and developed to satisfy the needs of stamped-metal-parts manufacturers in diversified industrial sectors, such as job shops, press shops, aerospace, agricultural, and automotive. The Laser Next 2141 will provide them flexibility in terms of processes, part sizes, and configurations, combined with state-of-the-art performance, quality, and accuracy.

Prima Power is the Machinery Division of Prima Industrie. The Group experience in 3D laser working machines is unique in the sector and dates back 1978, when the first 5-axis laser robot was developed. Today its 3D laser product range is one of the widest on the market and represents more than 25% of total revenues.

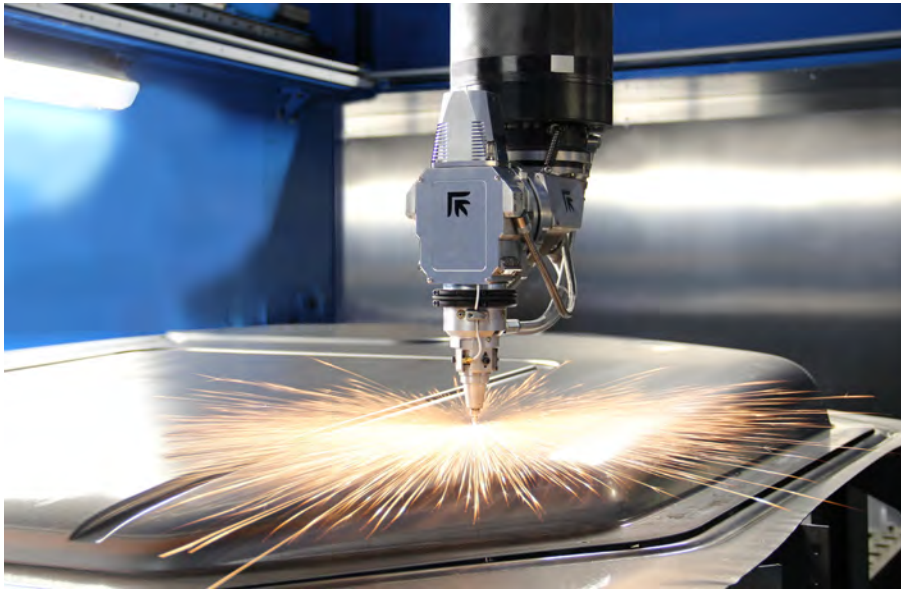
Laser Next 2141 is the new product in Prima Power's 3D fiber laser machine range and the latest evolution of the Laser Next family. All the winning features of the Laser Next 1530 and 2130 systems, highly specialized for the processing of components

for the automotive industry, are made available in this new product, which is designed to be as universal and multipurpose as possible.

The company reports that the working volume of this machine is the largest on the market (4140 x 2100 x 1020 mm) with a very compact footprint, and it is suitable to virtually all 3D stamped and flat sheet metal part sizes. Its technological features allow it to process both three-dimensional and two-dimensional parts, and to easily switch from cutting to welding applications.

The company reports that Laser Next 2141 is the perfect balance of speed, accuracy, and reliability. The linear motors on the main axes, the direct drive on the focusing head, and advanced control systems, provide the highest dynamics in its market segment, with single axis speed of 120 m/min and trajectory speed of 208 m/min. This is combined with maximum accuracy (Pa and Ps= 0.03 mm) in a very large working envelope.

The Laser Next 2141 is available in different configurations to better suit any production. The standard version with fixed tables exploits the entire working envelope to process large parts and features great accessibility from all sides. With the split cabin configuration, the working volume is separated by a removable wall and a sliding roof into two halves, where the parts are alternatively processed or loaded/unloaded in total safety. In this way, machine productivity is increased and, when needed for larger parts, the wall can be removed to restore the entire working envelope. For the fastest part handling operations without machine stops (cover time operation), the turn-table configuration is available. This is the ideal solution for large-series production of medium to large-size parts. The shuttle tables version allows the fast and automatic movement of parts and fixtures outside the working area from the



sides or the front of the machine. This is the solution for allowing large and heavy parts to be handled outside the working area and in case of complex set-up. Combined with the split cabin, the shuttle tables configuration also allows cover time operations.

With its versatility and performance, Laser Next 2141 opens up new horizons for 3D parts processing. The Laser Next family, launched on the market in 2014, is very popular in large-series production of automotive components in terms of throughput and reliability. These unique features are also made available for small to medium-batch sizes for a wide range of applications in addition to hot stamped parts.

Laser Next 2141 is equipped with either a 3 or 4 kW Prima Power fiber laser, featuring high reliability, quality pumping diodes, better protection against back-reflections, a patented highly-reactive electronic shutter, and a high integration into the system.

As all Prima Power products, Laser Next 2141 is Industry 4.0 Inside and features innovative solutions for digital manufacturing and cloud-based communication. This productive and flexible machine interacts with the factory and with the whole enterprise, and customers have the power to remotely monitor, control, and predict the production process for the highest efficiency.

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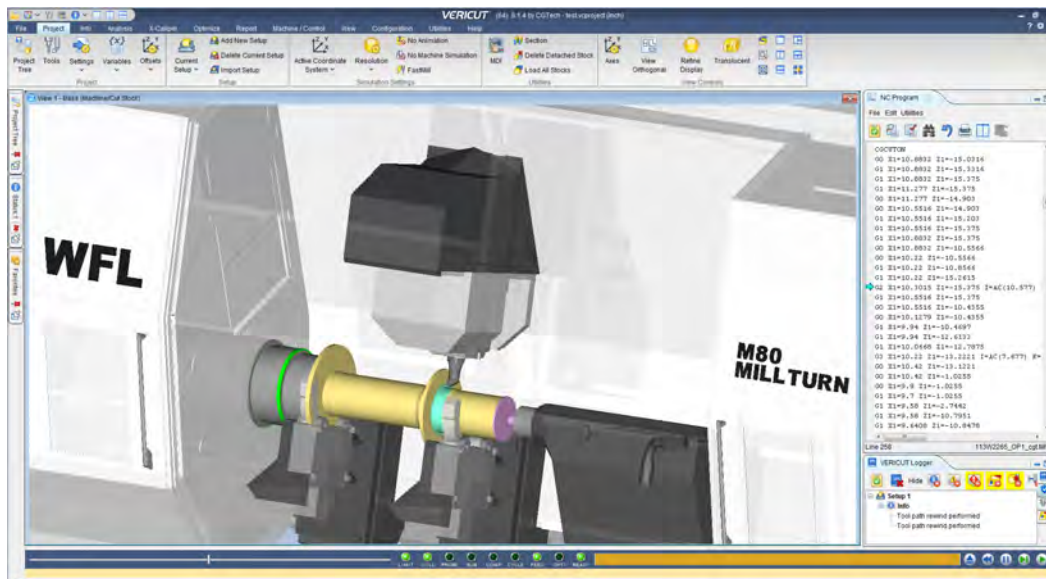
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OMIC R&D Expands Members with Addition of CGTech and Summit



contract manufacturing and fabrication services.

Matt Carter, chair of the OMIC R&D Board of Governors said, "We welcome CGTech and Summit to the OMIC R&D partnership and know that they will broaden our expertise in metals manufacturing. Both of these organizations have high quality reputations, and we know they will add great value to the innovation environment that we are

creating with this impressive group of organizations. The Board looks forward to the value that we know CGTech and Summit will bring to this collaborative environment."

OMIC R&D is the fifteenth such research center established with Boeing leadership worldwide, and the first Boeing has sponsored in the United States. Its mission is to bring together manufacturing companies and higher education in an innovation environment where "outside-in" applied research with faculty and university students solves real problems for advanced manufacturers while training the next generation of engineers and technologists.

"We appreciate being invited to participate with OMIC," said Bryan Jacobs, CGTech's representative for the Pacific Northwest. "VERICUT is a proven tool for reducing manufacturing costs while improving quality for our existing users. Working with OMIC will help more Oregon manufacturers achieve the benefits of using VERICUT to improve manufacturing efficiency."

Lew Barnes, president of Summit said, "OMIC fills a critical need in our region for economic development and innovation in advanced metals manufacturing. We are excited to be a part of the OMIC Team

The Oregon Manufacturing Innovation Center Research and Development (OMIC R&D) continues to grow its company membership with the addition in May of California-based CGTech, and the Oregon-based manufacturer, Summit. With a total now of fifteen manufacturing industry partners and three Oregon public universities, the Scappoose, Oregon based R&D facility continues to build a world-class operation to develop advanced metals manufacturing technologies.

CGTech, whose main headquarters are in Irvine, California, was founded in 1988 and specializes in numerical control (NC/CNC) simulation, verification, optimization, and analysis software technology for manufacturing. Since that time, its main software product, VERICUT®, has become the industry standard. With offices worldwide, VERICUT software is used by companies of all sizes, universities/trade schools, and government agencies.

Summit, which was founded 25 years ago in Hillsboro, Oregon produces high-quality steel-based products for commercial and industrial use such as modular workstations, server racks, and fuel transfer tanks. Its capabilities include fabrication, laser cutting, press brake and band sawing. They also provide

and appreciate that manufacturing facilities of all sizes will benefit from the state-of-the-art technology, training and business opportunities OMIC brings.”

CGTech and Summit join sixteen other OMIC R&D industry and university members in the Scappoose facility: ATI; Blount International; The Boeing Company; Daimler Trucks North America; Hangsterfer's Laboratories, Inc.; Kennametal; Mitsubishi Materials Corporation; OSG USA, Inc; Silver Eagle Manufacturing; Vigor; Walter Tools; and WFL Millturn Technologies and Oregon Institute of Technology (Oregon Tech); Oregon State University (OSU); and Portland State University (PSU).

The OMIC R&D model focuses research on helping indigenous industries increase competitiveness while creating a real partnership with and integration into the local economy. As research activities expand with high-cost, high-value machinery added on to the production floor, OMIC R&D is expected to eventually increase state and regional commercial productivity in manufacturing and stimulate economic growth and development.

OMIC R&D will coordinate its applied research projects with hands-on “earn and learn” apprenticeship programs at OMIC Training Center, led by Port-

land Community College, and located in a nearby facility that PCC is building. The PCC OMIC Training Center, scheduled to open in fall 2020, will emphasize craftsmanship, professionalism, and placing graduates into high-wage, high-demand jobs; with students completing an associate degree or certificate leading to an advanced degree. While Training Center construction is underway, PCC will have a temporary delivery site at Scappoose High School beginning in 2018.

OMIC has the strong support of trade unions, including the International Association of Machinists and Aerospace Workers and the Society of Professional Engineering Employees in Aerospace, which recognize the importance of training and apprenticeship programs in growing high-skill, high-wage manufacturing jobs in Oregon via innovation and industry growth. Metals manufacturing is a cornerstone industry for the Greater Portland area, with current employment estimated at nearly 28,000 and approximately 600 small, medium and large metals manufacturing companies. OMIC presents a significant opportunity for the retention and expansion of these firms and the workforce in the region.

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DataXchange E-Learning Now Available

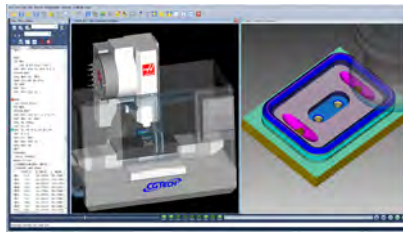
Scytec has launched a new E-Learning website for their machine monitoring system DataXchange. Knowing how to get the most benefits from the machine utilization tracking software is now easier than ever, with the educational courses available for all shop personnel.

E-Learning is a series of online courses that DataXchange users can take at their own pace, at any time. Topics covered include: configuring reporting options, shift options, software installation, initial configuration, modifying existing machine data, system administration, and understanding the machine data collection sources. The learning modules are a combination of text and videos with a quiz at the end of each class.

A subscription of DataXchange E-Learning is valid for 12 months. During that time, the user has unlimited access to the site and the ability to revisit courses they have finished, if a refresher is needed.

New courses will be added frequently, so the 12-month investment will continue to provide added value with more opportunities to learn. Access to the site is controlled with a single customer login that can be shared with any employees of the shop floor that can benefit from the classes.

In order to obtain the goals of lean manufacturing, overall equipment efficiency and increased machine capacity, the user needs to know the best ways to utilize DataXchange to make better shop floor decisions. With E-Learning, the user should be able to achieve the benefits of increased utilization and decreased downtime with proper use of the software.



CGTech Proctors Skills USA/NIMS Contest Submissions with Vericut

CGTech technical support engineers will be on hand at the National Leadership and Skills Conference (NLSC) in Louisville, KY, June 26-28. Each year, CGTech staff proctor multiple SkillsUSA/NIMS events related to CNC machining. In addition to grading events, CGTech will demonstrate its latest version of VERICUT CNC simulation software.

The weeklong event is expected to draw more than 16,000 participants including students, teachers, and business partners. The event is designed to help prepare students for the workforce.

Participants will be graded by CGTech in two categories: CNC Milling and CNC Lathe machine operations. Each category will be evaluated to measure the contestant's level of understanding and preparation of CNC programming. The contest assesses real world scenarios such as writing CNC programs, interpreting prints, and measuring/gaging parts. Participants will also demonstrate theoretical knowledge of CNC machine configuration, setup, and operations.

"This is a great opportunity for students to see where their skill level is compared to their peers," said Steve Arteman, CGTech technical support engineer. "VERICUT software will

be used to evaluate the accuracy of the participant's NC programs created, while ensuring their programs run without violating safety standards or damaging machines. After each student's NC program has been simulated, the virtual workpiece will be compared to the original design model to check for accuracy"

Ganesh Gen Mill I Gen Turn New Website

Gen Mill I Gen Turn by Ganesh launched its newly revamped and extensively upgraded website that focuses on the "ENDLESS POSSIBILITIES" theme showing Gen Mill I Gen Turn. The new website focuses on a clean design and making information more accessible and easy to navigate.

This new site will allow Ganesh customers and partners to have a very informative experience as Ganesh continues to grow and increase their market presence and it also offers updated information on company shows, client testimonials, applications, training, service, parts and even provides useful machining calculators that machinists appreciate. Local Gen Mill I Gen Turn dealer contact information is provided under the contact heading "Dealer Locator".

The Gen Mill series shows each individual machine with applicable specifications, including the mill-tap, 5-axis, and the full line of Ganesh C-frame vertical machining centers up to 100" by 39" travels. The Gen Turn series shows the 20mm, 32mm, and 42mm Swiss machines up to 8-axis. There are numerous multi-axis mill/turn centers up to 3" bar capacity with sub spindles shown with highly detailed machine specifications. Manual

Industry News

and CNC toolroom lathes/mills are shown with detailed specifications.

The new website is at www.ganesh-machinery.com.

Rex-Cut Abrasives : 90 Years In Manufacturing

Rex-Cut Abrasives is celebrating its 90th year in business. Rex-Cut's specialty abrasive material was invented in 1928 and over the following 9 decades the Massachusetts based company engineered, refined, and customized cotton-fiber abrasive products for metalworking industries.

Up until the early 1970's, Rex-Cut manufactured and sold only bulk rolls of fabric for conversion to large abrasive companies. At this time Robert H. Hurst began purchasing equipment and converting the Rex-Cut abrasive material in-house. Rex-Cut's first finish products were Type 27 Grinding wheels. Abrasive discs designed to sharpen gardening tools and lawn mower blades were second. Type 1 wheels followed and Mounted Points began being manufactured several years later. In 1978, Rex-Cut built a 60,000 square ft. facility where it still operates today.

In 2008, Rex-Cut was sold to the employees as a 100% ESOP company. The company began doing business as Rex-Cut Abrasives in 2011.

Rex-Cut is the oldest and primary manufacturer of cotton-fiber abrasive grinding and finishing products in the world. Over the years the small line has expanded to serve metalworking industries globally. Rex-Cut's first international account was set up in the late 1970's, and now the company ships to 54 countries.

Rex-Cut currently manufactures

products for innovative applications such as jet engine turbine blade profil-

ing, automotive brake blending, and 3D printing finish work.

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RobbJack Partners up with Industrial Applications Group

RobbJack announced their partnership with Industrial Applications Group, who serves as a knowledgeable technical representative for Colorado and Utah, as well as New Mexico and Wyoming.

Jeff Barnes began his cutting tool career as a CNC Programmer in 1981, and has since flourished into a successful technical representative, who has extensive knowledge of the cutting tool industry. Jeff is well versed in exotic metals and composites, and he is no stranger to the cutting tool industry. Jeff programmed for approximately 15 years at Aerospace and Military

defense contractors, and has been in technical sales ever since.

U.S. Bank Hires Relationship Manager, West Region

U.S. Bank has hired Adam Clarke as relationship manager for the west region. Clarke has over 10 years of experience delivering creative, sustainable financial objectives in providing financial solutions that help manufacturers meet their manufacturing/operational needs and financial objectives.

Clarke will be based in Sacramento, CA, and is available to help with manufacturing financing needs

in California, Nevada, Utah and Wyoming.

RÖHM Adds National Sales Manager

RÖHM Products of America has added Steven Onik to its sales team as national sales manager. Onik is responsible for supporting the company's chucks, centers, vises, tool clamping and automation systems as well as customized solutions for turning, milling, drilling and grinding.

Onik comes to RÖHM with extensive sales and marketing experience in the cutting tool industry. Most recently, he held the position

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of director of sales and marketing for Fraisa USA, Inc. His career also includes sales management and sales engineering positions with other cutting tool providers. He graduated with a Bachelor of Science in business management from Aurora University in Illinois.

MicroCare Corp. Appoints Western Regional Manager

MicroCare Corp., a New Britain, CT-based manufacturer of environmentally progressive fluids and tools used for critical cleaning, has appointed Don Phifer as west coast regional manager for the Precision Cleaning Products. Phifer comes to MicroCare with 28 years of experience in electronics and electrical distribution.

While in distribution, Phifer worked at a wide variety of different duties: inside sales, outside sales and business development. He developed a specialty service orchestrating a "vendor managed" inventory program, which helped clients reduce their inventory carrying costs. He previously worked alongside OEMs, contract manufacturers and product development firms. His industry-specific experience includes medical, aerospace, defence, automotive and commercial electronics.

"Having Don join the team is a great honor for MicroCare, and we are lucky to get him," said Dan Sinclair, national sales manager, MicroCare.

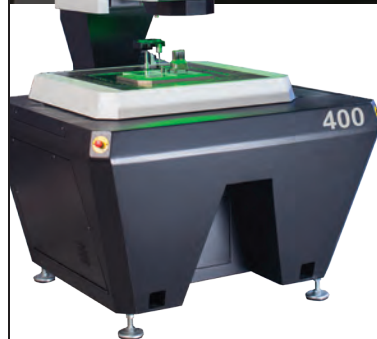
COE Press Equipment Appoints Regional Sales Manager

COE Press Equipment has announced the appointment of Guy Spencer as regional sales manager

serving the Southwest United States and Mexico. In this position, Spencer will be responsible for sales development and for supervising Coe Press distributors in his territory, keeping them apprised of new equipment and

service offerings, working with them on pricing and visiting customer sites.

"Guy has excellent experience in developing sales channels that create new opportunity," said CEO Hunter



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Coe. “We are happy to have him join the sales team and believe he will be an excellent asset.”

Spencer has nearly 20 years experience in sales and business development positions, most recently serving as the West region strategic channel partner for major accounts at Pharos Systems International.

ASF Metrology to Acquire CMM Business from Nikon Metrology

Nikon Metrology announced that ASF Metrology intends to acquire Nikon Metrology’s coordinate measuring machines (CMM) business. Nikon Metrology’s CMM activities, with offices in Belgium, France, Germany, the UK and the USA, represent about 25% of the total Nikon Metrology worldwide consolidated turnover.

Upon closing the transaction, all CMM production, development, sales and service activities, including the CAMIO software, will be transferred to ASF Metrology, under the ownership and management of Angelo Muscarella, who has a long and proven track record in metrology and especially the CMM business. Nikon Metrology will continue to serve a number of selected accounts as part of a strategic marketing partnership where both companies will promote each other’s products and services. All employees mainly dedicated to the CMM business, a crucial asset to the know how of the company, are intended to transfer to ASF Metrology.

Hajime Kosawa, CEO of Nikon Metrology based in Leuven, Belgium, said: “This business transfer is in line with the 2017 Nikon Corporation strategic review for industrial metrology to focus on non-contact inspection, based on optical and X-ray technology and will allow both compa-

nies to focus on a more efficient growth strategy for each of their businesses.”

Angelo Muscarella, CEO and owner of ASF Metrology, said: “Due to our long-term experience in the CMM market and the close cooperation with Nikon Metrology, I believe that ASF Metrology’s competitive position in the industry and its focus on CMM will enable us to expand the existing solid customer base. We will focus on growth in all regions by expanding our market coverage worldwide, leveraging on the former LK brand name of the CMM business and its track record.”

Both companies will work together to ensure a smooth transition with suppliers, customers and resellers.

Precision Drive Systems Promotes Calvin Stiles to National Sales Manager

Precision Drive Systems (PDS), a global provider of high-speed precision spindle motors, support and spindle repair has announced the promotion of Calvin Stiles to national sales manager. Stiles’ previous title was market development manager. In his new capacity, he will oversee the company’s North American marketing program, marketing analyses, strategic planning and coordination of sales efforts.

“With more than 20 years of experience in the CNC industry, Calvin Stiles is an ideal choice to address Precision Drive Systems’ ability to repair any spindle make or model,” said Bob Barone, vice president of Precision Drive Systems. “Calvin possesses



a tremendous breadth of knowledge regarding machining, processing and application projects.”

ANCA Inc. Officially Opens Plant Expansion

ANCA celebrated the opening of its new plant expansion May 23-24, 2018, in Wixom, MI. A formal ribbon cutting took place Wednesday, May 23.

The expansion will allow ANCA to better serve its customers and user base in North America and South America with a larger demonstration floor, classrooms for training, machine assembly and process development and an enlarged reception area.

“Our plan with this facility improvement is to assure that ANCA will offer the leading customer experience for the tool production industry,” said Russell Riddiford, ANCA Inc. president. The modern facility with the addition will cover about 42,000 sq. ft.

Renishaw Launches Guide to Additive Manufacturing

Renishaw, an additive manufacturing (AM) systems and software manufacturer and user, has launched a dedicated AM page on its website. The company will use this new information hub to educate and inform customers, and the wider engineering community, on the possibilities of additive manufacturing and its business impact. The objective is to increase the use of AM technology in mainstream manufacturing.

The page can be accessed for free on the Renishaw website <http://www.renishaw.com/amguide>.

Content includes videos, feature articles, industry news, opinion pieces and detailed case studies of successful AM applications. It also contains a col-

Industry News

lection of technical articles written by Renishaw's industry experts, including popular AM LinkedIn blogger, Marc Saunders and Lucy Grainger, an expert in metal powders for AM.

Featured on the new page is the beginner's guide to AM, which explains how users can optimize their use of metal AM to take advantage of the design freedom, performance and efficiency of this manufacturing technique. It also explains how understanding the particular AM process characteristics are essential to waste and cost reduction.

"Investing in AM requires time, resources and equipment," explained Robin Weston, marketing manager at Renishaw's Additive Manufacturing Products Division. "To understand the benefits and develop a reliable and capable process, companies must rigorously assess their operations.

"We want to educate the industry on why to consider AM, when to consider it and what applications are suitable," continued Weston. "Alongside our knowledge of AM, Renishaw has expertise in precision measurement, machining and finishing. This positions us as the perfect partner for an integrated industrial additive manufacturing solution."

Tsugami/Rem Sales, LLC Announces Partnership with MachineMetrics Industrial IoT Platform

MachineMetrics and Tsugami/Rem Sales, LLC announced their partnership to bring predictive manufacturing analytics and remote machine monitoring to customers. The MachineMetrics Industrial IoT manufacturing analytics platform, paired with Tsugami/Rem Sales' Swiss-type machines will benefit end-user customers through improved production visibility, predictive analyt-

ics, and service.

"Tsugami/Rem Sales is thrilled to partner with MachineMetrics, bringing cutting edge, disruptive technology directly into our end-users' businesses," explained Michael Mugno, vice president, Tsugami/Rem Sales. "The

addition of MachineMetrics to our Swiss-turn machine platform packages allows users to collect data on machine health, production status, down-time, and so much more that they may never have known existed."

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Kaiser Tool Co. Breaks Ground on Facility Expansion

Kaiser Tool/Thinbit recently broke ground on what will amount to an additional 8,000 square feet of manufacturing space for its facility in Fort Wayne, Indiana. This expansion will allow for a more efficient workflow, additional machines and additional employees, the company says.

The recent groundbreaking ceremony was attended by Kaiser Tool Co. president Lenore Perry, vice president Doug Perry, chief operating officer Ken King and all company employees.

The company says that the expansion marks a new chapter in its 54-year history. Kaiser Tool Co. started in 1964 in the garage of William and Hazel Kaiser. In 1980, the company

expanded. In 1994, the company built a new energy-efficient manufacturing facility. When this land was purchased, the building was designed with future expansion in mind. This latest expansion is said to reflect the company's efforts in sustainability and efficient energy usage

Omega Tool Measuring Machines Created

Omega Tool Measuring Machines Inc (Omega TMM), a world leader in tool presetting and tool measurement was created after the sale of the Parlec tooling business. Michael Nuccitelli purchased Parlec Inc. in 1990 and developed the company into a global leader of US manufactured tool holding, tapping, boring and presetting

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equipment. The company located in Fairport, NY has been building world class, USA made presetters since the early 1980's

In 2016 president and CEO Michael Nuccitelli reorganized Parlec Inc. into two separate business units. One business unit would be dedicated to tooling, boring and tapping, while the second business unit focused solely on tool measurement and presetting. In April of 2017 a deal was completed that sold the Parlec tooling business, along with the name Parlec to Technik's Industries. Mr. Nuccitelli would retain the presetter business unit and re-name the company Omega Tool Measuring Machines Inc.

In late 2017 Michael Nuccitelli promoted then executive VP Mark Higgins to the role of president. Mr. Higgins has taken over the day to day operations of Omega TMM while Mr. Nuccitelli remains on as CEO providing strategic direction for the organization. Omega TMM retained all the employees involved with Parlec presetter business unit. Omega TMM designs and builds their presetters and develops the software at the companies' global headquarters in Fairport, NY.

In addition, the company has a wholly owned foreign enterprise in Nanjing, China to serve the growing

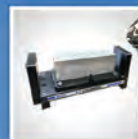
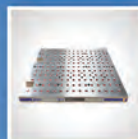
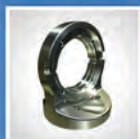
Chinese machining industry. Omega incorporates a global network of distributors to provide worldwide sales

and service to customers. Visit them at IMTS September 10-15th in the west hall level 3 at booth 431900.

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Industry News

Autodesk Inc. Announces the Promotion of Tim Paul to Manager of Manufacturing and Business Strategy.

"Tim's perspective as a long-time machinist, business owner and custom-

er of numerous CAM systems makes him the perfect person to lead our Manufacturing strategy," said Al Whatmough - CAM



product manager

Tim joined Autodesk After 16 years in the manufacturing industry as a machinist, business owner and shop manager. Tim started at Autodesk in 2015 as an application engineer for the HSM CAM products and served as a customer success manager for Fusion 360 CAM for the past year.

"When I became an Autodesk HSMWorks customer while managing a machine shop for L3 Communications, it was clear that Autodesk was serious about improving the industry and I wanted to be a part of it." Tim stated. "For nearly 20 years I've passionately pursued better, more efficient manufacturing solutions. In this new position, I'm excited to be working with our many talented teams to offer the ultimate tool box of software solutions to help our industry be more

productive and profitable."

"After carefully considering numerous internal and external candidates it was clear that Tim's manufacturing experience made him the right person to drive our manufacturing strategy into the future," states Bob Yancey – director MFG Business Development.

Tsugami and Rem Sales, LLC. Celebrate 40th Anniversary of Partnership in 2018

Tsugami/Rem Sales, the exclusive North American importer of Precision Tsugami machine tools, announced that 2018 marks the 40th anniversary of the Tsugami and Rem Sales partnership.

In 1978, Tsugami and Rem Sales



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Industry News

began a partnership to offer top of the line technology and engineering solutions. Since the start of the Tsugami/Rem Sales partnership, Rem Sales has been the exclusive source for Precision Tsugami CNC machine tools across North America.

"Precision Tsugami CNC lathes, Swiss-type CNC lathes and CNC milling machines are known around the world for their machining and positioning accuracy, exacting construction techniques, flexible designs, high speed, and reliability. We are proud to offer only the best machines to the manufacturing industry," said Brad Morris, CEO and president, Morris Group, Inc.

Throughout the years, Tsugami/Rem Sales and Morris Group, Inc. work in parallel to offer transformative solutions to the machine tools market including a patented whirling unit for thread cutting and the Tsugami LaserSwiss machine line. Most recently, the LaserSwiss has been equip with two laser heads, one for cutting and another for welding.

"We at Rem Sales are incredibly honored to have such a longstanding partnership with Precision Tsugami. The Tsugami/Rem Sales relationship is based on innovation and collaboration. Together, it is our mission to create advancements that benefit the manufacturing industry," said Michael Mugno, vice president, Tsugami/Rem Sales, LLC.

BLM GROUP Hires New Regional Sales Managers

BLM GROUP has appointed three new regional sales managers to support the company's high-precision laser tube and flat sheet cutting and tube bending business. Although there are three managers in three regions they all cover western states.

Misgana Mulat will serve as regional sales manager covering Arizona, California, Idaho, Nevada, Utah and Washington. Mulat has over 15 combined years of experience in the manufacturing and technology arena focused on engineering innovative solutions and designing efficient process validation methods. He is currently completing his Master of Science degree in Industrial and Systems Engineering from the University of Southern California.

Brian Borchardt is the new regional sales manager covering Minnesota, Montana, North Dakota, South Dakota and Wyoming. Borchardt has spent the last 20 years in capital equipment sales throughout the Midwest.

As regional sales manager for the Southern U.S., Manny Ortiz will cover Arkansas, Louisiana, New Mexico and Texas. Ortiz has over 11 years of experience spanning sales, engineering, customer service and technical support in the fabrication industry.

New Products

New Roughness Sensor Increases Measuring Efficiency —Zeiss

Zeiss reports the new Zeiss Rotos roughness sensor enables the use of coordinate measuring machines to completely inspect surface waviness and roughness – even on complex workpieces, and all in a single measurement run without any reclamping. This cutting-edge innovation simplifies and speeds up the measurement of all surface parameters from the drawing in a single measurement cycle.

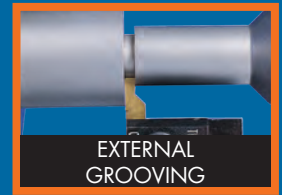
The Zeiss Rotos sensor makes it possible to check the size, form and location tolerances together with the roughness parameters on a single machine. Instead of requiring separate stylus instruments to capture more significant form deviations, these can now be performed on Zeiss Prismo and Zeiss CenterMax CMMs. The sensor can easily be exchanged in as needed using an interface on the CMM probe. Depending on the measuring machine and the particular stylus, you can capture Ra roughness values of up to 0.03 μm with this new sensor.

The innovative design of the new Zeiss Rotos enables the inspection of nearly all workpiece characteristics. Thanks to the three rotatable, multiple stylus arms, it is also possible to measure deep boreholes and difficult-to-reach surfaces. Even overhead measurements are not a problem for the Zeiss Rotos. The new features also include skidless styli intended for measuring roughness and waviness on sealing faces. Programming the surface parameters is quick and easy because the Zeiss Rotos is completely integrated in Calypso, the Zeiss measuring software.

According to Zeiss, companies benefit from no longer having to invest in separate systems for at-line roughness measurements. With the Zeiss Rotos sensor, the operator also avoids having to reclamp parts and transport them between roughness measurement systems and CMMs. Surface roughness can be analyzed and visualized in a customized, professional display together with size, form and location in ZEISS PiWeb reporting.



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New Products

New Line of Hydraulic Chuck Extensions —Kennametal

Kennametal's reports their new line of hydraulic chuck (HC) extensions has been designed to enable drilling holes in deep cavities and complex pockets as well as reaching past clamps and fixtures.

Key features include run out to within 0.00012" at 2.5×D, improving tool life and hole quality; reduced vibration, even at 25,000 rpm, being balanced to ISO G2.5; and a hydraulic clamping mechanism within the chuck body. Internal channels facilitate through-the-tool coolant setup, without the need for hoses or adapters. A slim design enables clamping of, for example a 1/2" drill in a 3/4" shank. A

variety of reducer sleeves, available in both inch and metric sizes, provides cost-effective flexibility. Drill and reamer shanks down to 0.125" can be accommodated. The extensions are suitable for rotating and stationary applications alike.

The extensions do not require heat-shrink machines, thereby easing use. Tool lengths are adjustable up to 0.393" axially. A specially-ground chamfer on the end of the shank eases insertion into the hydraulic chuck. Prepared wrench flats promote safe and convenient handling without the need for a torque wrench. A one-piece design minimizes concerns over contamination and downtime due to maintenance. The clamping mechanism eliminates operator-to-operator tightening varia-

tions, according to the company.

A simple design enables users to set any h6 tool shank inside the HC extension and turn the clamping screw on the end of the unit until seated. This causes a hydraulic piston within the unit to move forward, compressing the locating sleeve and gripping the tool.

New Machine Combines Vertical Turning and Finish Grinding —Ewag

Ewag has developed the VLC 100 GT, which combines vertical turning and finish grinding. It is said to reduce cycle times for chucked components as large as 100 mm in diameter.

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New Products

The machine uses the company's pick-up concept, where the main spindle is used to load and unload workpieces from the integrated conveyor belt or shuttle. Users can equip the machining area with a variety of turning and grinding modules.

The first step is to pre- or complete-machine component surfaces that can be hard turned. Then, without changing the setup, the machine finish grinds areas that require high-precision geometries. This process has two advantages: the turning process is faster than grinding flat surfaces and using the grinding tools for only finish grinding operations reduces wear and tear, the company says. Because the workpiece is machined in a single

setup Ewag reports that the process is more efficient than when carried out on two machines.

The machine can be used as a conventional vertical grinding center, equipped with two grinding spindles for external and internal grinding, or for combination machining, with an additional block toolholder for hard turning operations. It can be equipped with corundum or CBN grinding technology, and users can dress vitrified-bonded CBN grinding wheels using a rotating diamond roll. A structure-borne sound system serves as GAP-control between the dressing roll and grinding wheel. An adaptive process control system promotes shorter cycle times.

New Whisperline Turning Boring Bars—Iscar

Deep boring applications are often accompanied by strong unwanted vibrations. Iscar's new Whisperline offers a new solution for overcoming chatter and vibrations. The boring bars feature a unique integral absorber which Iscar reports suppresses cutting tool vibrations. The absorber mechanism provides optimal surface finish and a soundless turning application.

The boring bars are available up to 10 x D length bars. This new tool line is supplemented with a variety of exchangeable heads for turning, threading and grooving.

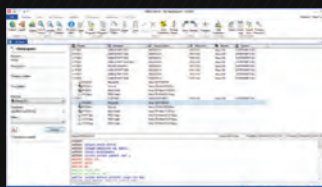
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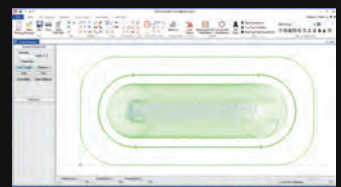
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New Products

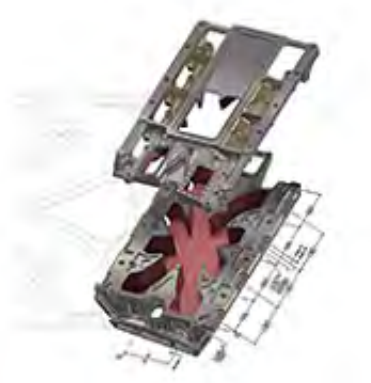
Mastercam's "CAD for CAM" Design Tools Provide Flexibility and Ease of Use

Mastercam is known for precision NC programming, but it also delivers a suite of shop-tested design tools aimed at getting parts on and off the machine as quickly as possible. Powerful modeling tools include not only 3D surfacing and solids, but hole-filling, direct editing without a solids history, geometry repair, and much more.

Mastercam Design streamlines and simplifies modeling and editing geometry. It also supports advanced geometry creation, including solid

modeling, hybrid machining, NURBS curves and surfaces, 2D and 3D associative dimensioning, surface extension, blending, trimming, splitting, variable filleting, solid modeling, and hybrid modeling to complete your jobs quicker and more efficiently.

A few new enhancements to Mastercam 2018 Design are: Angle Sweep-To improve the creation of more complex wireframe functions and when creating or editing primitives, there are now on-screen sweep and rotate controls. These controls can snap to the Auto-Cursor positions of existing entities, including tangencies. Additionally, the controls recognize horizontal and vertical snap positions based on the gnomon orientation.



Solid Sweep has more options and controls, and now supports 3D Along curves in addition to 2D. New alignment options have been added to control the alignment between your profile and the Along chains. Profile



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New Products

geometry now easily runs along sharp corners, giving you greater flexibility and precision when modeling. If any sharp corners are encountered, Mastercam miters them.

Hole Axis is now easier to use with a large number of holes, especially holes with matching diameters that are selected as a group. New Direction options allow you to change the direction of the holes easily, and new Orientation options determine the direction of the top of the holes.

Other Mastercam 2018 Design Improvements include: a new gnomon-based rotation control is now available, allowing you to visually rotate the seam to see how geometry will respond, as well as snap to AutoCur-

sor positions. Also, users can easily translate from inches to millimeters, or from millimeters to inches, when using Scale. And Align Note is now available as a drafting function, allowing you to move existing notes and labels in a way that is more organized and easier to read.

New Multifunctional Chamfer Cutter Series-Tungaloy

Tungaloy has added a multifunctional chamfer cutter series to its TungQuad family. It enables the completion of multiple chamfering operations with one cutter.

The series uses compact inserts in positive, single-sided, square shapes with a cutting-edge length of 0.200". This enables the same cutter to front-chamfer holes as small as 0.240" in diameter and back-chamfer holes as small as 0.510" in diameter. The series' cutters can chamfer along the edges as well.

The series uses Tungaloy's existing SDMT05 and SDHT05 TungQuad inserts, in grades AH725, AH140, and TH10. Three types of cutter bodies are stocked in 12-, 14-, and 22-mm shank diameters. Special cutters are available, though the series is currently obtainable in metric shanks only.

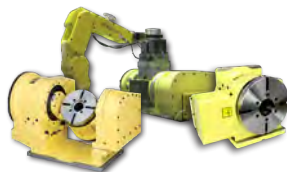
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New Products

Reusable Quick Change DoveLock™ Jaws —Kurt

Kurt DoveLock master jaws are designed to be installed in replacement of standard cap screw jaws and create a quick-change capability. Once the DoveLock master jaws are installed into the vise they perform as a receiver for the replaceable jaws and are installed or removed by loosening 3 quick clamps in the top of each master jaw.

“Change-over of jaws can be completed in under 1 minute and really saves a lot of time where frequent setups are required,” reports Steve Kane, global sales and marketing manager for Kurt Industrial Products. Most machinists get accustomed to



the system really fast and complete the changeover in 10-15 seconds.”

DoveLock features reusable, machinable jaws which are precision manufactured from 6061 aluminum or 4140 pre-hard steel. They are designed

for repeatable use after the part profile has been machined into the jaws. DoveLock jaws also can be flipped 180° to accommodate a second part profile for an additional setup.

DoveLock master jaws come equipped with a unique workstop located on the side of the jaw providing quick and repeatable location of up to ± 0.001 ", without measuring. The workstop also ensures high repeatability even after the jaws have been stored which saves the cost of having to machine new jaws for every production order. DoveLock master jaws fit all Kurt industry standard 3.5", 4", 6" and 8" vises.



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New Products



New CNC Interface for Bending-Bystronic

Bystronic's CNC interface ByVision Bending has a full 22" HD touchscreen and press brake users are able to quickly maneuver through screen selections for easy set-up and operation. Bystronic reports that the operator is seamlessly guided through the programming and manufacturing process. Bending sequences can be modified on-the-fly by the operator even if the program was developed off-line. The ByVision Bending user interface operates within the Windows platform for a high level of speed and network compatibility. Program data transmissions are transferred between the ByVision Bending interface and the CNC utilizing high speed network communications.

For complete process integration, the BySoft 7 programming module provides off-line programming software offers users advanced synchronization of press brake, laser and waterjet processes. Bybend, an integrated BySoft software module, provides off-line programming capabilities including, automatic bend deductions, bend reliefs, bending sequences and back gauge placements for press brake users. With a 3-D simulation feature, visualization of the bending sequences as well as automatic collision detection is performed before the part is sent to the operator for processing, reducing set-up time and the need for test bending.

Hydraulic Chuck Extensions-Kennametal

Kennametal's line of hydraulic chuck (HC) extensions has been designed to enable drilling holes in deep cavities and complex pockets as well as reaching past clamps and fixtures. Key features include runout to within 0.00012" at 2.5×D, improving tool life and hole quality; reduced vibration, even at 25,000 rpm, being balanced to ISO G2.5; and a hydraulic clamping mechanism within the chuck body. Internal channels facilitate through-the-tool coolant setup, without the need for hoses or adapters. A slim design enables clamping of, for example, or a ½" drill in a ¾" shank. A variety of reducer sleeves, available in both inch and metric sizes, provides cost-effective flexibility. Drill and reamer shanks down to 0.125" can be accommodated. The extensions are suitable for rotating and stationary applications alike.

The extensions do not require heat-shrink machines, thereby easing use. Tool lengths are adjustable up to 0.393" axially. A specially-ground chamfer on the end of the shank eases insertion into the hydraulic chuck. Prepared wrench flats promote safe and convenient handling without the need for a torque wrench. A one-piece design minimizes concerns over contamination and downtime due to maintenance. The clamping mechanism eliminates operator-to-operator tightening variations, according to the company

Flexible Goes Adaptive in New FMS Systems—Fastems LLC

Fastems LLC is launching a new generation of flexible manufacturing systems engineered to fulfil manufacturers' growing needs to handle shorter



product lifecycles, higher product mixes and lower volumes.

Included in the product family are FMS One, a fully configurable machine tool pallet automation system, and RoboFMS One, which combines the benefits of an industrial robot and a flexible manufacturing system. Both systems are built from standard modules that offer fast delivery and easy operation. MLS Multi Level Systems and RoboFMS are systems that can be customized for special needs.

The FMS systems feature increased modularity that enables fast deployment and adaptability. Standard modules reduce equipment delivery and implementation lead times and enable custom fitting of automation solutions to specific end user needs. Easy integration with a larger number of four-axis and five-axis machine tools adds to the hundreds of machine brands already capable of integration with Fastems FMS.

Greater adaptability also includes expanded access to a wide range of load handlers such as cranes and robots that can handle workpieces from 0.1 kg to 2,500 kg in any shape or size. Smaller shop-floor footprints and more spacious pallet storage maximize space utilization. A key design driver is improved ergonomics, including lower system reaches that free operators from working in difficult positions.

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New Products



New HCR-5000S for 5-Axis, High-Speed Aluminum Machining—Mazak

Mazak's new HCR-5000S 5-axis, single-table (S) horizontal machining center offers a range of high-speed spindle options, from a standard 12,000-rpm spindle up to 30,000-rpm one, and each feature an integral spindle/motor and ballscrew core cooling that minimize vibrations. A 40-tool Auto Tool Changer, which is expandable to a 160-tool capacity with a chip-to-chip tool change time of only 2.8 seconds.

Linear roller guides allow the HCR-5000S to achieve 60-m/min rapid traverse rates, 1G acceleration/deceleration rates in the X and Y axes and 0.8G in its Z axis.

The HCR-5000S has a single-table design that incorporates a high-rigidity bed, solid base X-axis construction and roller gear cam systems for the A and C axes. The machine's tilt/rotary table provides rapid traverse rates of 50 rpm in its C axis and 30 rpm in the A axis. The table positions in 0.0001-degree increments and accommodates parts weighing as much as 500 kg and measuring up to 700 mm in diameter and 644 mm high.

Mazak's Mazatrol SmoothX CNC provides operators with complete control of the HCR-5000S. The SmoothX enables 3-D part program visualiza-

tions via its touch screen.

New Industrial Cutting Tool with Ultra-Durable Coating Materials—Kyocera

Kyocera Corporation announced that it has developed a new ultra-durable coating technology and base material for indexable industrial cutting tool inserts to improve steel machining. The new CA025P CVD Coated Carbide grade was made available to the U.S. market in the middle of May 2018.

Steel is often used in numerous industries including automotive and industrial machining. There is a growing demand for long-lasting inserts with excellent resistance against wear, fracturing and chipping capable of stable machining performance over a wide range of cutting conditions. Kyocera's new industrial cutting tool series features multilayer CVD coatings with a layer using a thick film of aluminum oxide (Al₂O₃) for excellent heat resistance. Utilizing cemented carbide as a base material ensures excellent fracture resistance, long-term performance, and longer tool life.

High-Volume Gundrilling of Scroll Compressor Drive Shafts

—Kays Engineering

The DeHoff 518 Cell is a gundrilling machine for high-volume production of scroll compressor drive shafts. The shaft requires a different diameter hole to be drilled in each end for lubrication of the scroll bearing.

The DeHoff 518 Cell is comprised of 9 gundrilling spindles used to drill the opposing holes. The larger diameter, shorter hole is produced

first using 3 gundrilling spindles on a single machine base. The smaller diameter, deeper hole is produced next using 6 gundrilling spindles (two separate machine bases with 3 spindles each). More spindles are dedicated to the deeper hole because of its longer cycle time, which results in a balanced throughput for each gundrilling operation.

The 518 Cell has a 0.5-inch gundrilling capacity and an 18-inch slide travel. The machine features a cast iron drill head base with hardened and ground steel box ways, plus hand-scraped and fitted saddle, gibs, and straps (versus linear guide ways and milled surfaces).

DeHoff gundrilling machines are built-to-order by Kays Engineering in their Marshall, Missouri, USA facility.

New Online Utility: The Boring Insert Selector—Allied Machine & Engineering

Allied Machine & Engineering announces their newest online tool: the Boring Insert Selector. The company reports this resource saves valuable time by simplifying the boring insert selection process and ensures machinists are provided the correct boring insert for each job's unique details. Rather than hunting through multiple catalog pages in order to narrow the field of possibilities, this online tool guides the user to the correct boring insert for the job in just six easy steps.

Allied's Boring Insert Selector allows end users to select job-specific criteria from drop-down menus. Criteria include roughing/finishing, shape, substrate, form, nose radius, and material to be machined. If users are unsure which nose radius to select for their finish boring application, this tool provides tips on formulating that as



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1.26"	32-3	GTN-3	25-6	BI-6895-923	\$ 217.80	\$196.02
32mm	32-4	GTN-4	1" shank	BI-6895-924	\$ 220.55	\$198.50
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New Vertex 100 5-Axis Vertical Machining Center

—Mitsui Seiki

Mitsui Seiki’s new Vertex 100 5-axis vertical machining center is engineered to fulfill manufacturers’ demands for a compact, high-speed machine capable of high-precision milling of larger parts such as blisks for aircraft engines. The Vertex 100 can machine workpieces 1,250 mm in diameter and 850 mm tall while occupying only 3 m x 4.2 m of shop floor space. X-Y-Z axis strokes are 1000 mm, 900 mm, and 750 mm respectively. Maximum swing diameter is 1480 mm.

From CAT 40 to HSK-A100 taper sizes the Vertex 100 is supplied with multiple spindle options (15,000 rpm, 25,000 rpm and 30,000 rpm). A large 60-tool standard automatic tool changer handles maximum tool lengths of



300 mm and maximum tool diameters of 125 mm (CAT40/HSK A 63) or 160 mm (CAT 50/ HSK A 100), offering maximum flexibility.

Does your part require multiple operations that involve both milling & turning? Tired of changing out tools mid process on complex parts? Running out of floorspace? Then it might be time to get your shop a

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The machine's tilt/rotary table, designed and built by Mitsui Seiki and supported by the rigid and robust

cast iron base, provides high precision and rotation speed up to 100 rpm. The table's C-axis motors are direct drive while the A-axis has tandem direct drive motors. The machine is capable of workpieces up to 49.25" diameter.

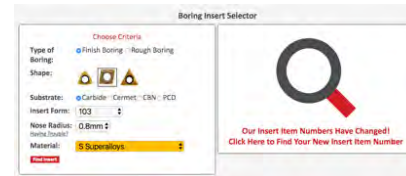
The X- and Z-axes of the Vertex 100 are driven by single ball screws, with dual ball screws on the Y-axis. The linear axes are capable of fast, 1-G acceleration and deceleration. The machine's Fanuc control features a state-of-the-art 14.75" LCD HMI.

The Vertex 100 has numerous features that assure accuracy and consistency. The machine features a proprietary cast iron bed and a solid "box-in-box" design. The innovative machine geometry results in positioning accuracy in the X, Y, and Z-axes of 0.000040", ± 6 arc seconds in A-axis, and ± 4 arc seconds in the C-axis.

New TurnCheck™ Family of Shaft Measuring Systems

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announced the newest precision optical instruments for measuring shafts and other cylindrical parts – QVI TurnCheck™.

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New Products

The illumination system found in TurnCheck systems produces highly collimated light with a constant wavelength, eliminating the wrap-around effect on turned parts. The receiving optics are fully telecentric with each element designed to eliminate distortion. The result is a crisp, uniformly magnified image across the entire field of view, with no edge effects or exclusion zones.

TurnCheck systems are designed to deliver accurate measurements in shop floor conditions where vibration and temperature variation are common. Careful consideration was taken in

selecting materials to allow the design of TurnCheck systems to mitigate the effects of thermal variation found in shop floor environments.

TurnCheck system software is intuitive and intelligent. There is no need to adjust lighting, focus, or image tools – the system optimizes these features automatically. Simple controls, easy loading and unloading, and intelligent tools let the operator focus on what they want to measure, rather than how they should be measuring it, allowing for fast setup time without the need for extensive operator training.

Designed and manufactured in the United States, TurnCheck systems are offered in three different model ranges

to accommodate a range of parts, up to 1200 mm in length.

New and Improved DRO for Machinists —Heidenhain

Heidenhain Introduces the new ND 5023 digital readout (DRO) for use with manually operated machine tools. This new DRO replaces HEIDENHAIN's entry-level ND 522/523 models and consolidates it to one three-axis product. The new DRO comes equipped with a new TFT color display that significantly improves

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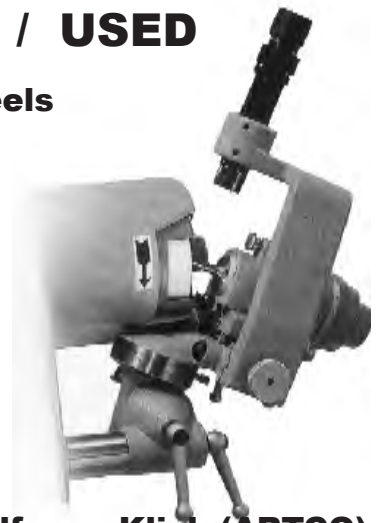
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the readability of the information displayed over older models, plus features other design changes and enhanced functions.

To make installing the readout easier for users or an inexperienced machinist, a new installation guide has been implemented to assist in per-

forming the basic configuration. When switching on the unit for the first time, the user can select this support feature and will then be guided through step-by-step.

A straightforward user management has been introduced in order to make it easier for multiple users to operate the product. Up to nine operators can save their personal settings with a user number and call them again.

Many new features are being introduced including the new dynamic zoom feature which offers a noticeable improvement in position value readability. Once activated, the display value for the axis currently being moved is magnified. For small num-

bers (i.e., numbers close to zero), the character height can be increased from 17 mm (standard height) to 25 mm. The operator immediately sees which axis is currently moving and can also easily read the numerical value from a greater distance. When the axis stops moving, the display returns to its standard size.

The new ND 5023 DRO uses a membrane keyboard. As before, encoders with a TTL interface (differential and single-ended) can be connected via a 9-pin D-sub connector.

The data interface on the ND 5023 was changed to USB Type C which has the advantage of allowing the digital



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New Series Grades for Cutting Steel

—Sumitomo Electric Carbide

Sumitomo Electric Carbide, Inc., offers AC8000P series grades for steel turning. They feature advanced Absotech Platinum CVD coating for a longer tool life.

The AC8000P series consists of this patented CVD coating, a surface layer and a smooth surface treatment from the crystal orientation process. Three

grades are available to meet a complete range of application requirements. The AC8015P grade offers enhanced wear resistance during high-speed, high-efficiency steel cutting.

The AC8025P grade is reliable during general-purpose steel cutting. Its special surface treatment results in improved tool surface smoothness, as well as adhesion and chipping resistance. The AC8035P grade provides enhanced stability during interrupted steel cutting.

Mini Tools Vertical Inserts/Toolholders

—Carmex Tools

The carbide shank toolholders from Carmex Precision Tools Ltd. offer vibration resistance and longer reach. The vertical inserts are constructed of BLU-Sub-micron grade carbide with advanced PVD triple layer coating for high heat resistance, smoother cutting operation and better finish. The toolholders feature through coolant, and inserts can be quickly indexed.

Capable of threading, grooving, boring, profiling and chamfering, these units are suitable for long threads or long-reach applications, as well as small diameter, course pitch threads.

Jim White, National Sales Manager for Carmex USA, said, "The increased



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New Products

Swiss-style machining for complex part production has resulted in the introduction of a wide range of tools for grooving and other applications.

Due to our more than 28 years of experience in thread milling applications, Carmex engineering has developed a superior and more versatile tool for multiple applications. The insert is positioned in a recessed pocket in the toolholder that provides additional support, while the carbide construction minimizes vibration even in long-reach applications”.

Diamond Standard CBN and Tipped Inserts

—THINBIT

THINBIT, manufactured by Kaiser Tool Company, has announced inserts tipped with cubic boron nitride (CBN) and polycrystalline diamond (PCD). PCD and CBN inserts are available for grooving, turning, face grooving, threading, boring, parting, form tools and custom geometries.

CBN tipped inserts are designed to provide an increased production rate, improved surface finish and dimensional control when used on high-temperature alloys such as incol-nel, nickel base alloys and materials with a hardness of Rockwell C-35 or harder.

PCD tipped inserts are designed

to provide an increased production rate, improved surface finish and dimensional control when used on nonferrous and abrasive metal such as aluminum, brass and copper. Inserts fit all “L” series toolholders and can be used in conventional, Swiss and CNC machines. Toolholders are available in square shank sizes 5/16” - 1-1/4” and round shank sizes 1/2” - 1” with straight and 90° presentations.

Coolant-Through Designs on Straight and Angle Head Tooling —Heimatec

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Heimatec now offers a coolant-through feature on all the company's current line items. Heimatec reports that coolant-through technology is often the answer for faster, cleaner cutting on larger and deeper parts, where the chips and excess heat build-up are significant challenges.

Heimatec offers high-pressure coolant-through designs up to 1,000 PSI on straight and 2,000 PSI on angle head tools.

Company president Preben Hansen commented, "Production drilling should almost always be done with internal coolant tools and this development means we will be able to satisfy more customer needs in that area."

A full range of styles and pressures is available. Heimatec literature is offered, fully detailing all products available, both with and without this coolant-through feature.

Chevalier Machinery USA, a long-time innovator in the CNC machine tool industry, has launched a product that they report enables users to avoid downtime and a loss of productivity.

"Our clients are able to connect to MT-LINKi on Chevalier's machines via our patented iMachine Communications System™ at any time for performance data, which includes anticipating potential issues and preventing stoppages," says Johnson Lan, vice president of Chevalier Machinery.

Efficiency is no longer about a machine's uptime but how the entire machine line works as a whole. Chevalier's iMachine Communications System™ reporting enables remote machine monitoring, alarm history,



CNC Machines are Now Equipped with iMachine Communications System™
—Chevalier



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maintenance, data analysis and overall equipment effectiveness (OEE).

The ability of remote monitoring and service functionality of the machinery from anywhere eliminates

having direct physical contact during inspection, ensuring downtime is kept to a minimum. Addressing the critical issue of costly downtime and waste dramatically impacting an end-user's bottom line, Chevalier has embedded iMachine Communications System™ software to identify and report lags in productivity on a 24/7 basis. Instantaneous communication from a machine allows the operator to make fast modifications, resulting in a highly efficient and profitable machine.

iMachine Communications System™ software is user friendly and specifically designed for an end-user's analytic needs. Smartphone applications will be available to provide access to the monitoring status of the machine

regardless of the end-user's location. This level of monitoring fosters a greater understanding of production assessment.

MU-V Series VMCs for Machining Complex Parts —Okuma

Okuma's MU-V Series vertical machining centers (VMCs) are designed for 5-axis, multi-sided machining and suited for the aerospace and die/mold industries. They provide high speed, process intensive machining combined with turning and 5-axis multitasking machining in a compact footprint. The series includes the MU-4000V, 5000V, 6300V and 8000V.

These VMCs have enhanced machine mass and can handle complex

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and difficult-to-machine materials. The dual-driven, B-axis trunnion is fully supported, therefore eliminating overhang. Ball screw cooling is standard, and a highly rigid, left-right, mobile trunnion table, supports high precision and impressive cutting power. This workhorse is available with a broad scope of spindles ranging from 12K to 25K RPM, providing a configuration for nearly any 5-axis job.

Maximum productivity is achieved with a wide array of automation options. The unique machine design places the pallet changes at the back of the machines, allowing easy connection to a Palletace flexible manu-

facturing system, pallet pool, large capacity automatic tool changer (ATC) and robots.

ATCs can be configured to meet growing demands with 32 to 64-tool chain magazine systems and 64-plus matrix tool cabinets.

The series can be equipped with Okuma's Super-NURBS function, enabling high feedrates and smooth finishes. Built using Okuma's Thermo-Friendly Concept, Okuma reports these 5-axis machining centers perform consistently from the first part to the last, regardless of warm up time or ambient temperatures. Standard 5-Axis Auto Tuning System technology automati-

cally measures and compensates for up to 11 geometric errors to provide quick set-up and precision machining.


DMU 90 P duoBLOCK for Heavy-Duty Machining-DMG MORI

DMG MORI has introduced the DMU 90 P duoBLOCK, featuring a high-performance motor spindle and 60 SK50 tools in its standard version.

According to the company, 5-axis machining is also the trademark of the fourth generation of the successful duoBLOCK series. Features include the stable design of the universal machines, long-term accuracy and high precision with up to 4 μ m positioning accuracy even in the standard version.

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It is designed as a package machine with a high-performance motor spindle, space for 60 SK50 tools and IKZ coolant unit and provides an economical entry into heavy-duty machining.

According to the company, applications in tool and moldmaking as well as in general mechanical engineering call for investment in reliable, high performance production equipment. The DMU 90 P duoBLOCK is geared especially towards the universal machining typical for tool and mold making and mechanical engineering. With an X-axis travel of 35.4" and workpiece weight of 3,970 lbs., it outperforms the smaller DMU 80 P duoBLOCK.

The equipment package of the DMU 90 P duoBLOCK includes a

vertical chain magazine with space for 60 SK50 tools and a 69.7 HP motor spindle.

With 12,000 RPM and a torque of 317 ft.-lbs., it is designed to handle even demanding machining tasks. A spindle growth sensor, machine protection control and a 600-liter IKZ coolant unit with 40 bar and 23 l/min round off the basic machine.

Numerous options mean the basic machine can be adapted individually to meet higher requirements. A motor spindle achieves 15,000 RPM and a torque of 297 ft.-lbs. The tool magazine can be expanded to 90 SK50 pockets, with HSK A100, BT50 and CAT50 toolholders also available as an alternative plus a 980-l, 80-bar IKZ

coolant unit. Workpiece measurement in the work area using a Blum laser system and a 3-D quickset can also be implemented.

The standard version of the DMU 90 P duoBLOCK is equipped with Celos and a Siemens 840D solutionline. The HEIDENHAIN TNC 640 3D control is also available as an alternative.

Cut MX Grooving and Parting Tool —Walter Tools

The new Walter Cut MX grooving and parting tool is designed to improve accuracy, stability and process reliability. These indexable inserts feature four cutting edges per insert. Inserts

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are offered in three different geometry types (GD8, CF5 and RF5), and Tiger tec Silver PVD coating. The company reports the self-aligning, tangential clamping of the MX system and the dowel pin location in its insert seat result in greater repeatability.

"It is impossible to fit the inserts incorrectly in the Walter system, which makes handling reliable," said a company spokesperson. In addition to the high-precision toolholder system with precision cooling, the inserts' Tiger tec Silver PVD is engineered to maximize tool life.

Walter Cut MX geometries offer enhanced chip control, particularly the CF5 sintered geometry. The inserts

have four precision ground cutting edges. Cutting depths of up to 6 mm and cutting widths from 0.8 to 3.25 mm are available in the standard range.

Shark-Cut Multi-Function Cutting Tool —Arno

ARNO Werkzeuge USA's SHARK-Cut multi-purpose cutting tool platform is designed for a wide range of turning applications. The company reports SHARK-Cut allows machines shops to use just one tool for four different machining operations, including

facing, drilling, boring and turning.

The SHARK-Cut product range features inserts that are peripheral ground and precision pressed in grades and geometries suited to machining a wide variety of materials. This includes aluminum/non-ferrous, steel and high temperature alloys. Multiple coolant ports provide enhanced cutting edge emersion and chip evacuation.

New Compact VMC —Doosan

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nounced the addition of the DNM 4000 to its line of vertical machining centers (VMCs). This compact VMC was designed for lean cell applications where space is tight, but productivity and cutting performance are essential.

The DNM 4000 is suitable for machining small parts in tough-to-machine materials for a range of industries including medical, aerospace, automotive, job shops, firearms and die & mold. Featuring a 12,000 RPM, 25 HP 40 taper spindle with 86 ft-lbs of torque and a standard BIG-PLUS dual-contact interface, the DNM 4000 is designed to deliver shorter cycle times, improve part surface finishes and have longer tool life.

This VMC has a compact footprint of 65" W x 112" L x 108" H and travels of 20.5" X, 15.7" Y and 18.9" Z. "The two-door design incorporates the largest opening width in its class, allowing for easy operator access," said a company spokesperson. The coolant system is located in the rear of the machine so the DNM can be placed mere inches from the neighboring machines.

The DNM 4000 features a 20-tool capacity magazine with a 1.3 second tool-to-tool time, standard spindle cooler, Doosan Smart Thermal Monitoring software, grease lubrication system and 230 PSI through spindle coolant. The Fanuc i control with Easy Operation Package (EOP) software developed by Doosan provides numerous functions designed for convenient operation and reduced

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...Hotline Continued From Page 8

Space X to Build Huge Rocket at Port of LA

The future SpaceX deep-space rocket capable of flying missions to Mars will be built at the Port of Los Angeles, Mayor Eric Garcetti announced.

The BFR — which stands for Big Falcon Rocket — will be the largest rocket ever built, capable of carrying 150 tons and powered by 31 Raptor engines.

The Los Angeles Board of Harbor Commissioners will consider leasing an 18-acre site on Terminal Island to SpaceX to build the 4,400-ton rockets, which will be so massive they must be moved by water.

Both SpaceX and the port confirmed early negotiations in April, but wouldn't provide further details. But descriptions in planning documents led many to believe the plant will produce the BFR.

According to plans reviewed by the harbor commission in March, SpaceX would build a 105-foot-tall, 203,450-square-foot building on the vacant site, which today is used mostly for film shoots. It would accommodate up to 750 workers daily, according to plans.

The facility would be used "to design, develop, and manufacture prototypes and first-generation models of specialized commercial transportation vessels," according to a project description.

Boeing Gets Big Order from Southwest Airlines

Southwest Airlines said in late April that it quietly pulled the trigger on options to buy 40 additional 737 Max 8 jets, becoming the largest airline customer for the popular Boeing airplane.

The Dallas-based budget airline disclosed the 40-jet order, worth \$4.68 billion at list prices, and other airplane deals in an update on its aircraft fleet modernization plans contained in its latest quarterly earnings report.

Southwest said it will take 10 more 737 Max 8 single aisle jets each year between 2019 and 2022.

Southwest also said five prior 737 Max 8 orders, originally slated for delivery in 2019, have now been accelerated and shifted into the fourth quarter of 2018.

Lastly, three older, pre-owned Boeing 737-700 Next Generation jets, previously scheduled for delivery to Southwest in 2018, have now been replaced with three new 737 Max 8 aircraft, to be delivered in 2019.

Sacramento Based Aerojet Rocketdyne Signs Decade Long Order

Rocket company United Launch Alliance will stick with an Aerojet Rocketdyne engine for the upper stage of ULA's new Vulcan rocket.

ULA announced in early May that the Aerojet Rocketdyne RL10 engine, which has powered the company's rocket upper stages for years, will remain the upper-stage engine of choice after Vulcan starts flying in 2020.

ULA reach a long-term agreement with Sacramento, California-based Aerojet Rocketdyne to supply RL10s "for the next decade" and develop a new variation of the RL-10 for ULA to use as well, the company said.

ULA considered other upper-stage engine options and as recently as last month was publicly holding open the possibility it could switch suppliers.

The new version of the upper-stage engine, dubbed the RL10C-X, will increase the use of additive manufacturing — an advanced form of 3-D printing using metals — and introduce other advanced technologies to improve the engine's quality, reliability, affordability and performance, ULA said.

Boeing, Uzbekistan Airways Finalize Order for 787-8 Dreamliner

Boeing and Uzbekistan Airways, the flag carrier of the Republic of Uzbekistan, announced in late April the finalization of an order for one 787-8 Dreamliner, valued at \$239 million at current list prices.

Uzbekistan Airways currently operates two Dreamliners on international routes, including Europe, Southeast Asia, Japan and USA. With today's order, the carrier will add five more Dreamliners as part of its plan to modernize and expand its fleet.

Boeing Business Jets Grows Order Book with New Sales

Boeing Business Jets have won four new orders in 2018 as elite customers continue to favor Boeing's portfolio of ultra-large-cabin, long-range airplanes, the company announced recently at the European Business Aviation Conference & Exhibition (EBACE).

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The new orders this year follow an impressive 2017 in which customers purchased 16 Boeing Business Jets.

Two of the new orders this year are for the BBJ MAX airplane, adding to a backlog of 19 airplanes and making the BBJ MAX one of the selling business jetliners in history.

GA-ASI Kicks Up Desert Dust with First MQ-25 Engine Test

General Atomics Aeronautical Systems Inc. — one of three companies going after a multibillion-dollar U.S. Navy contract to produce a carrier-based refueling aircraft — said it successfully tested the jet engine that will be at the heart of its entry.

The project is significant because the Navy is asking for something new — an unmanned aircraft that will take off from, and land on, an aircraft carrier deck.

Poway, CA-based GA-ASI said earlier in the year that it chose the PW815 model engine from Pratt & Whitney. GA-ASI completed an engine test successfully on April 5, on a test stand using the inlet and exhaust structures it will use on the aircraft. The company publicly disclosed details on May 31, including a video of the test which appeared to be in California's high desert.

Teams from Boeing Co. and Lockheed Martin Corp. are also competing for the MQ-25 contract. Northrop Grumman left the competition. The Navy is expected to award the MQ-25 contract in the coming months.

Wheel Pros Acquires Amcor Industries

Wheel Pros, a portfolio company of Santa Monica, CA-based private equity firm Clearlake Capital, announced June 4 the acquisition Amcor Industries Inc. of Vernon, CA. Deal terms were undisclosed.

Denver-based Wheel Pros is a marketer and distributor of aftermarket automotive wheels, performance and accessories.

Amcor designs, manufactures, and sells branded lug nuts and other automotive accessories. The company also does business as Gorilla Automotive Products

Teledyne Technologies Wins Contract

A subsidiary of Teledyne Technologies Inc. has won the second phase of a \$47 million contract from the European Space Agency to provide sensors used aboard a spacecraft.

Teledyne e2V already completed the first phase of the contract by building components, and now will make the visible light image sensors used aboard the Planetary Transits and Oscillations of stars, or PLATO, mission spacecraft.

The sensors can detect minute changes in the apparent brightness of stars, orbited by planets.

"Our reliable and high-performance technology remains at the very forefront of space imaging and the team are very proud to be providing (the space agency) with a technology which enables this exciting PLATO mission to search for new planets," said Giuseppe Borghi, vice president of business development at Teledyne e2v

Teledyne Technologies, in Thousand Oaks, CA, acquired Teledyne e2v, a manufacturer of image sensors, radio frequency subsystems and semiconductors in a deal last year.

Las Vegas Company Receives Tax Abatements to Grow Company

Inside the Pictographics print shop, a set of realistic miniature figures are displayed on a table. They only stand a few inches tall, but the 3D-printed portraits are extraordinarily detailed, from the print on their clothes to the shading on their hands.

Craig Miller plans to make Pictographics the world's premier 3D print company.

Known for digitally dying textiles, the Las Vegas company is planning to expand into the manufacturing industry. It currently has four machines and plans to own 15 to 30 within the next two years.

The Governor's Office of Economic Development approved about \$1.1 million in tax abatements for Pictographics on Thursday. The company plans to make a capital investment of \$17.7 million.

Miller said the printers allow the company to produce different molds, jigs and fixtures for a variety of manufacturing industries.

"There isn't a single manufacturing industry that will not need our services," he said.



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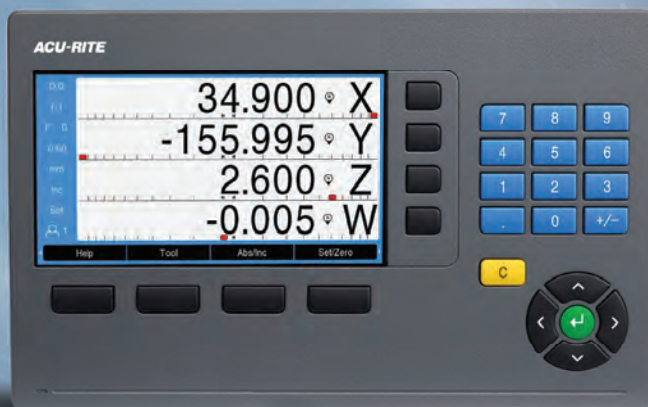
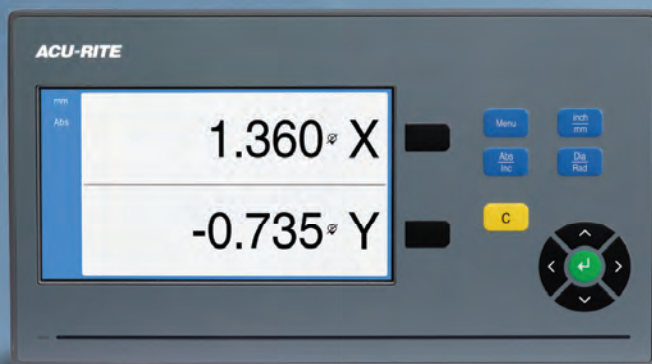
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