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Volume 35 - Issue 2

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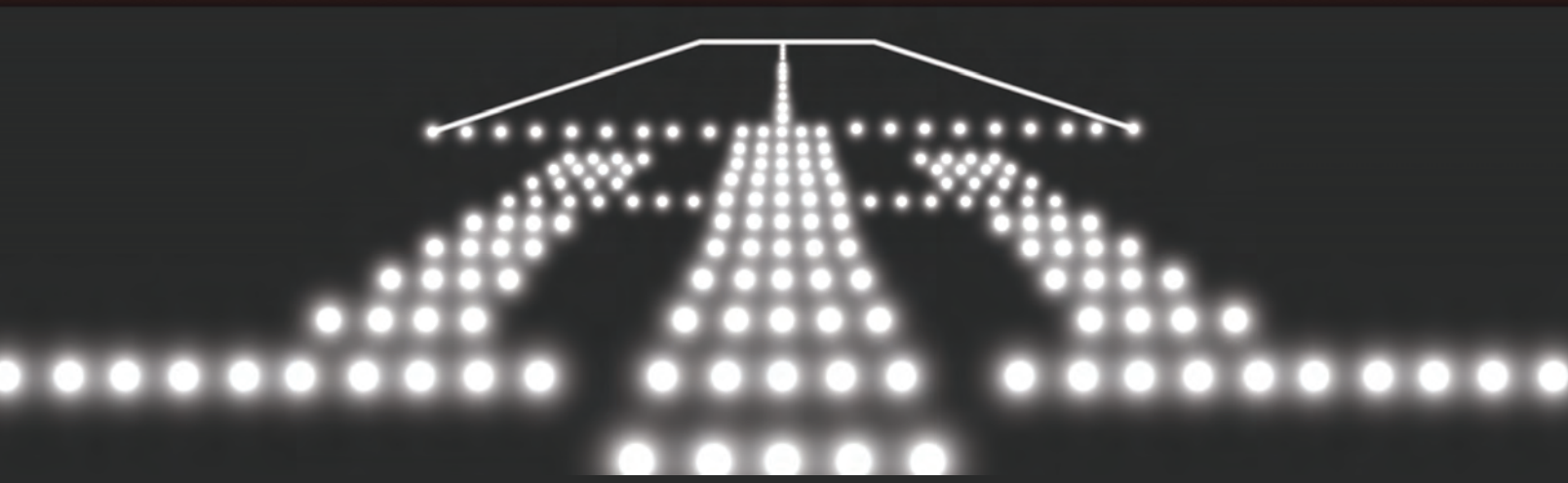

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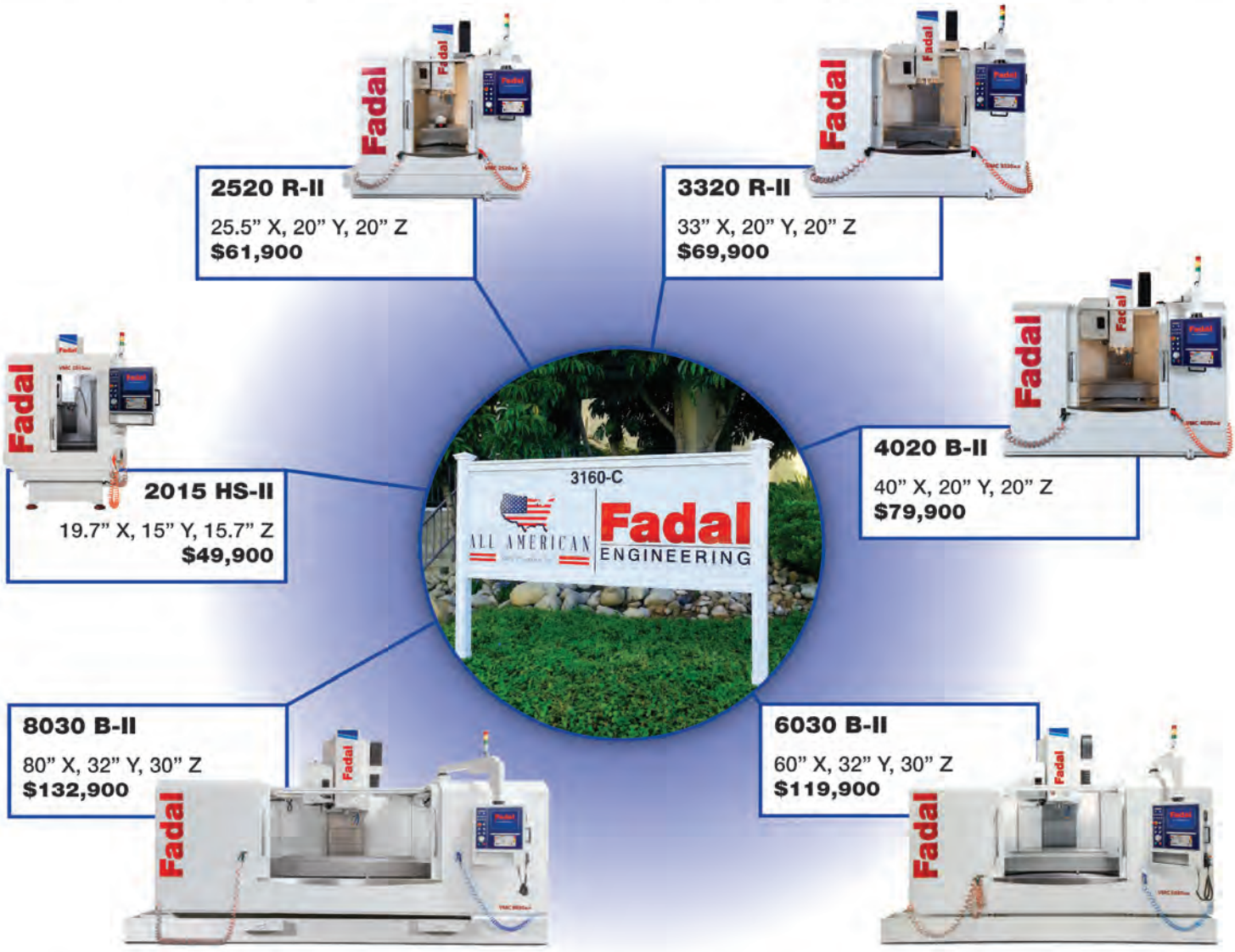

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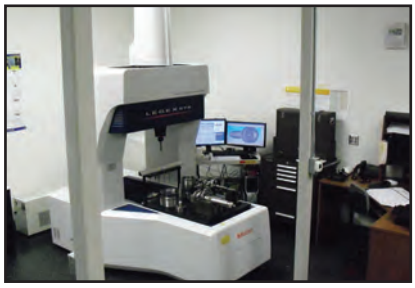
Feature Stories

Departments



Gear Manufacturing Inc of Anaheim adoption of AS9100 Rev. C has had a major impact on the company's approach to manufacturing management.
- Pg 22

Left - Fred Mosey with his first CNC Lathe, a Nakamura TMC-4. Right - Bob Mosey, second generation owner in front of Mori Seiki NH5000 DCG with 24 pallets
- Pg.30

Rakesh Aghi, CEO of Cobra Carbide, Moved his Manufacturing Business back to CA from Israel.
- Pg.38

Coming in February/ March 2017

This issue will look at the aerospace and defense industries. These two industries are vital to the west coast, especially the Pacific Northwest and southern California. We will have articles on shops that specialize in these two industries and the machines and methods that make them successful.

Editorial: Jan 18, 2017
Ad Space: Jan 22, 2017
Ad Material: Feb 1, 2017

CNC WEST

VOL. XXXV NO. 2

December/January 2017

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

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What Just Happened and What is Going to Happen?

We just ended perhaps the craziest election period of all time. The last few months have been unlike anything that most of us have ever seen. In fact you could say there has never been a dull moment in this election. I have a few friends who are jumping with joy with the results and a few that, let's just say are not so happy. My guess you know that same division with some of your friends and colleagues. And I am sure when President elect Trump takes office, dull moments will be few and far in between. I know his talk has been to make manufacturing a priority so fingers are crossed.

I am happy to say that this issue of CNC WEST is not so crazy. And hopefully it is not dull. Our cover story for our last issue of 2016 and first of 2017 is about an Anaheim CA shop that must make ultra-precise dimensional measurements critical to risk mitigation under AS9100 Rev.C. This is not an easy task. Read how they beginning on in page 22.

About 15 years ago CNC WEST asked Bob Mosey to do a story on his shop and he did not want to do it. I saw Bob at a tradeshow recently and we talked about it and he agreed to have us come out and CNC WEST is glad he did. Sean Buur did a great job of finding out about this 40 year- old company that has no intention of slowing down. Another good one by Sean was about Cobra Carbide in Riverside, CA. They used to manufacture tooling in the states, moved all of it to India to save money and now are in the process of happily moving all of their manufacturing back to the states and Riverside.

We also have stories about a college in Colorado, a recap of the recent successful Fabtech show in Las Vegas, a report about Quality machines from Zoller, press releases and much much more. While this issue may not be as exciting as the recent election, it would be fair to say it is anything but dull.

Thanks for reading and wishing you a Fantastic 2017

Sincerely

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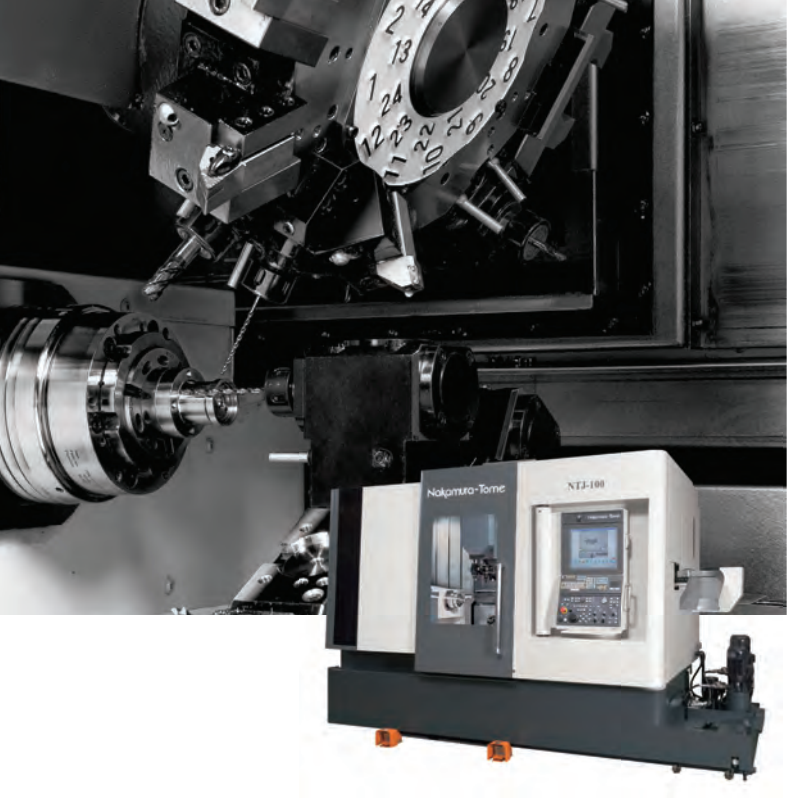

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Navy Awards Northrop Grumman Corp. $10.4 Million Contract

The U.S. Navy awarded Northrop Grumman Corp. a $10.4 million contract modification to produce one additional Fire Scout unmanned helicopter, using 2017 funds. The larger of the two Fire Scout models, the MQ-8C is a Bell model 407 helicopter modified to operate autonomously. One third of the work will be performed in San Diego.

Kratos Gets $17.8 Million Contract for Drones

Kratos Defense & Security Solutions Inc. said on Nov. 16 that it received a $17.8 million contract for target drones.

The deal calls for Sacramento Ca. based Composite Engineering Inc. (CEI), a Kratos subsidiary, to provide an undisclosed international customer with multiple BQM-167i unmanned aerial target drones, plus equipment for two sites where the drones will operate.

In addition to an unspecified number of drones, CEI will provide command-and-control equipment, spares and equipment to initially support 30 flights across the customer's two sites.

German Auto Company Snaps up Manufacturing Facility Near Tesla

A German auto company is establishing a West Coast presence right next door to Tesla's hometown.

SAS Automotive Systems, which makes cockpit modules, has pre-leased Overton Moore Properties' 142,000-square-foot Eureka Landing in Newark Ca. The advanced manufacturing facility is scheduled to be completed by the end of December, and SAS plans on occupying the space in January 2017.

Overton Moore Properties started construction in April on Eureka Landing, a 142,000-square-foot industrial building in Newark.

The company doesn't officially say it's a Tesla supplier, but its arrival is another example of the growing presence of the automotive sector that's been spurred on by the electric carmaker's growth.

Boeing Moves 500 Jobs from Huntington Beach, adds 1,600 to L.A. County

Boeing Co. is moving 500 jobs to its St. Louis operations from Huntington Beach, California as part of a facilities consolidation for its Defense, Space & Security business, which is based in Hazelwood, Missouri.

The company said in November it is "taking steps to operate its Defense, Space & Security business more efficiently through facilities consolidations and work movements," the result of which will add jobs in not only St. Louis, but 1,600 positions in Los Angeles County and 400 in Huntsville, Alabama.

"In order to push ourselves farther and win more business, we need to make the most of our resources and talent," Leanne Caret, president and CEO, Defense, Space & Security, said in a statement. "These steps will help us be a stronger partner for our customers worldwide."

Boeing will cut facilities space by about 4.5 million square feet by the end of 2020, officials said.

The company said it will close its sites in El Paso, Texas, and Newington, Virginia.

Positions in Huntington Beach will move to El Segundo, Long Beach and Seal Beach in Southern California, as well as St. Louis and Huntsville. Officials said "many" positions in Kent, Washington, will move to nearby Tukwila.

"Making better use of our facilities will enhance efficiency and promote greater collaboration," Caret said. "This will help drive our global growth in Boeing's second century."

Steel Company Building 234,000-Square-Foot Facility in Commerce City, Colorado

A steel distribution company has begin construction of a facility in Commerce City that will employ 92 workers.

Intsel Steel's 234,000-square-foot facility is being built on 55 acres near East 86th Avenue and Ulster Street off Highway 2, according to a statement from the company and Commerce City. The company plans to install a BNSF rail spur as well.

Intsel broke ground on the building Oct. 25, and completion is expected by spring 2017.

Continued on page 88....

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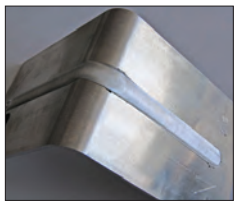

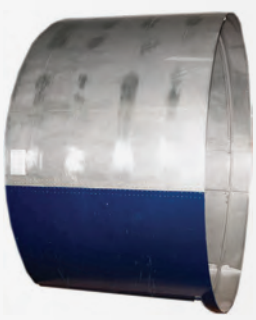

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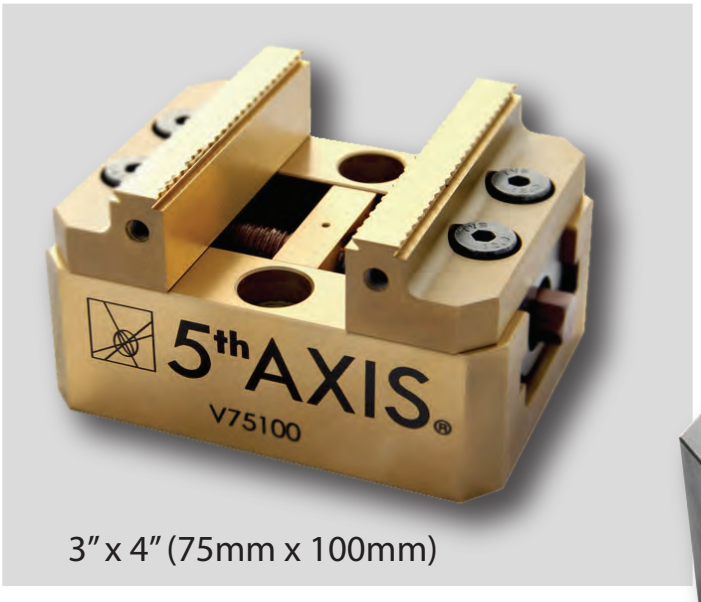

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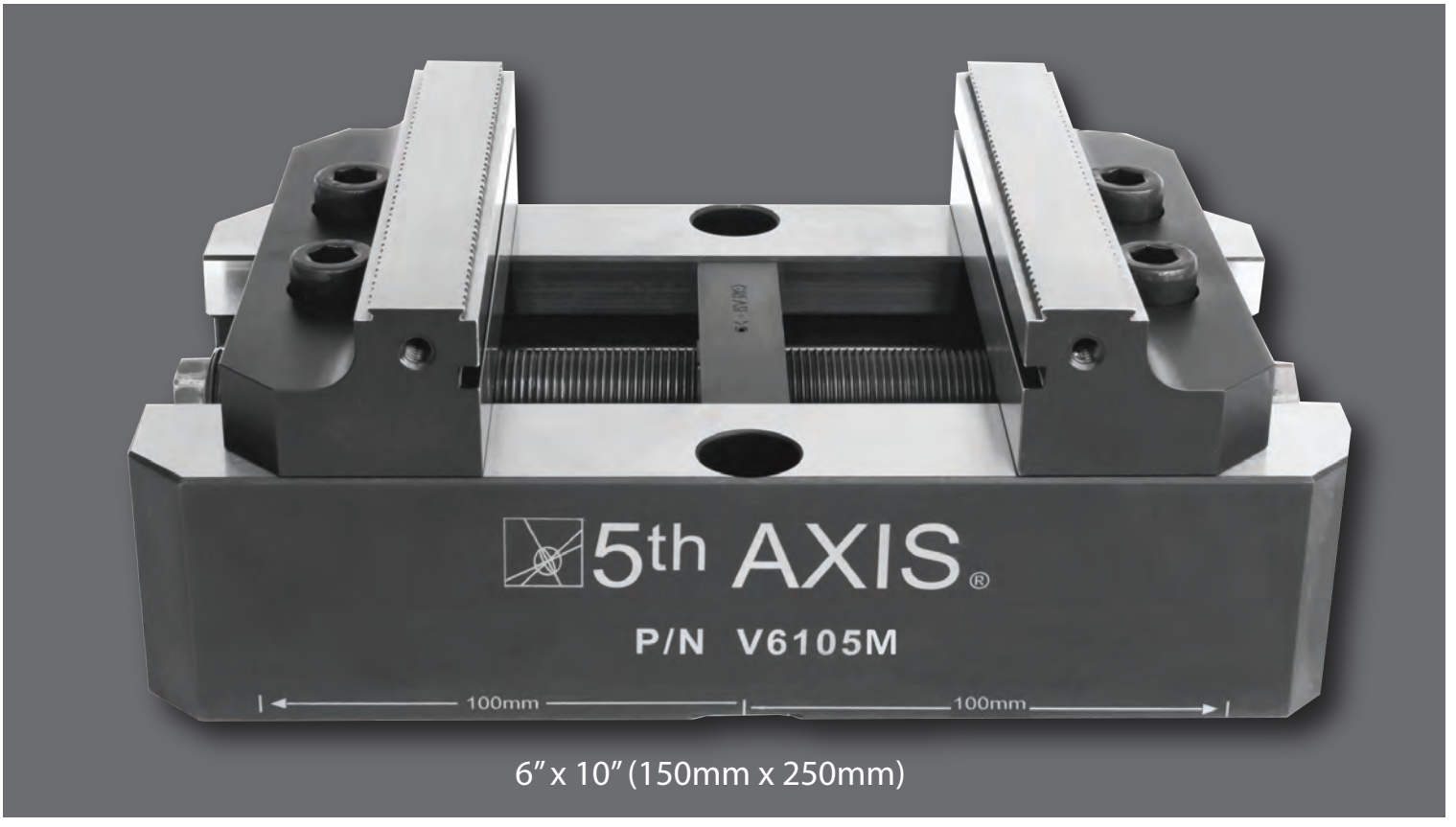
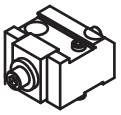
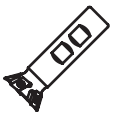


6" x 10" (150mm x 250mm)

Vises



Dovetail Fixtures



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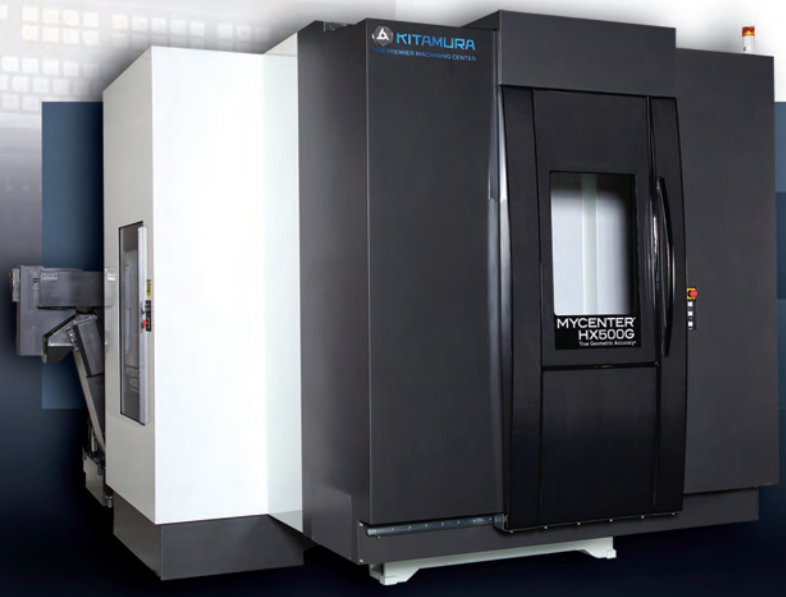

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					4"	KT-6400F	$ 86.81	RKT-6400A	$ 108.89
Kit B208 HS08	8"	0.551	12MM	0.984	2"	KT-8200F	$ 39.68	RKT-8200A	$ 84.48
					4"	KT-8400F	$ 67.48	RKT-8400A	$ 150.00
Kit B210 HS10, N210	10"	0.630	12MM	1.181	2"	KT-10200F	$ 44.31	RKT-10200A	$ 124.97
					4"	KT-10400F	$ 72.75	RKT-10400A	$ 201.19
Kit B12 HS12	12"	0.709	14MM	1.181	2"	KT-12200F	$ 63.49	RKT-12200A	$ 169.18
					3"	KT-12300F	$ 95.20	RKT-12300A	$ 255.35
Kit B212 N212	12"	0.827	16MM	1.181	2"	KT-12208F	$ 63.49	RKT-12208A	$ 169.18
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1/2	1	1/2	3	YG-EMUGMF68909	$ 45.87
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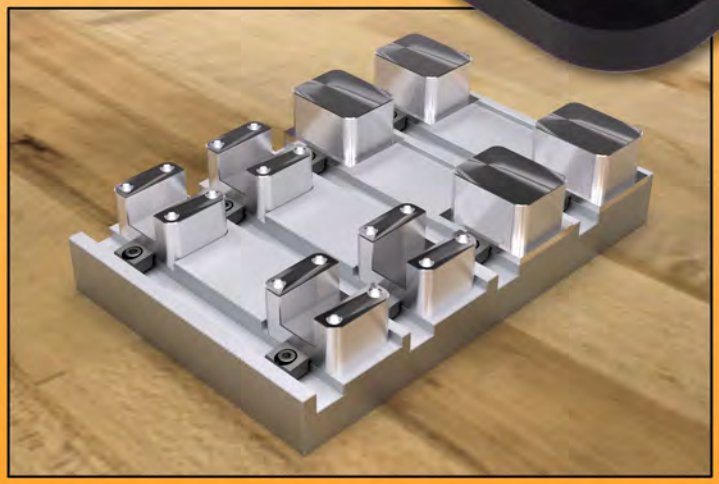

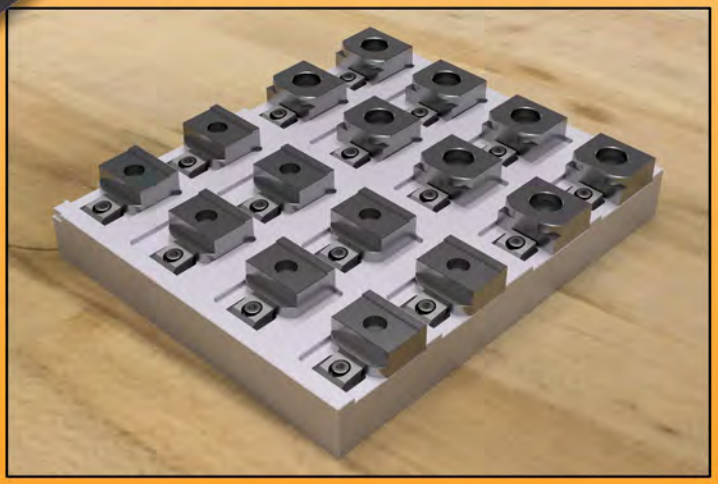

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Fabtech 2016 Las Vegas was A Knockout

FABTECH 2016, North America's largest collaboration of technology, equipment and knowledge in the metal forming, fabricating, welding and finishing industries, welcomed 1,500 exhibiting companies and a total of 31,110 attendees from over 120 countries in mid November to the Las Vegas Convention Center.

FABTECH's expansive exhibit space spanned more than 575,000 net square feet, giving attendees ample opportunity to see manufacturing's latest innovations, interact one-on-one with key vendors and learn about new industry trends. Throughout the three-day event, attendees also had access to more than 100 education sessions and expert-led panel discussions. A variety of special programming was featured as well, including a powerful opening keynote from boxing legend and entrepreneur Sugar Ray Leonard and an appearance from cast members of the hit reality TV show "Counting Cars."

"We are so grateful to our exhibitors, attendees, special guests and the City of Las Vegas for helping make FABTECH 2016 such a resounding success," said Mark Hoper, vice president of expositions & media, FMA. "The enthusiasm and commitment displayed by everyone at the show to improve our industries were contagious. By participating in FABTECH 2016, attendees now have stronger, more diverse business networks and increased knowledge on manufacturing's top trends and best practices."

Hundreds of live product demonstrations showcasing manufacturing's most cutting-edge equipment and technologies took place daily on the exhibit floor. These demonstrations allowed FABTECH exhibitors to present their current product offerings to targeted buyers and generate quality sales leads.

"FABTECH for us is all about networking," said Angus Catterson, president, KAAST Machine Tools Inc. "Year after year, this event is a great venue to strengthen our relationships with current customers and help us meet potential new ones as well – all while promoting our new product lines and letting more people know about who we are as a company."

Special event and panel discussion topics varied and covered important matters relevant to all of today's manufacturers. They included additive manufacturing/3D printing, how to attract more women to manufacturing careers, improved product development strategies and how the 2016 presidential election results could impact manufacturing around the world.

For more information about FABTECH 2016 or FABTECH 2017, taking place in Chicago on Nov. 6-9, 2017, please visit fabtechexpo.com.

For future updates, follow FABTECH on Facebook, Twitter and LinkedIn.

Methods 3D Expands Presence Via New U.S. Additive Manufacturing Labs

"Figure 4" Automated 3D Production Cell

Methods 3D, Inc., a newly formed subsidiary of Methods Machine Tools, Inc. continues to broaden its presence in 3D printing through the completion of seven additive manufacturing laboratories strategically located across the U.S.

In addition, at IMTS 2016 Methods 3D introduced exciting new advancements in 3D technology via an integrated production cell, made compelling presentations and showcased the very latest in 3D printing systems. Methods 3D has also added personnel to support its new infrastructure, and Mr. James Hanson was appointed as Chief Operating Officer (COO).

At IMTS, the packed Methods 3D booth featured an innovative new concept demonstrating how 3D technology can be deployed in an automated production cell environment. 3D System's modular 'Figure 4" cell was operating lights-out with Fanuc robotic arms, mass-producing multiple parts.

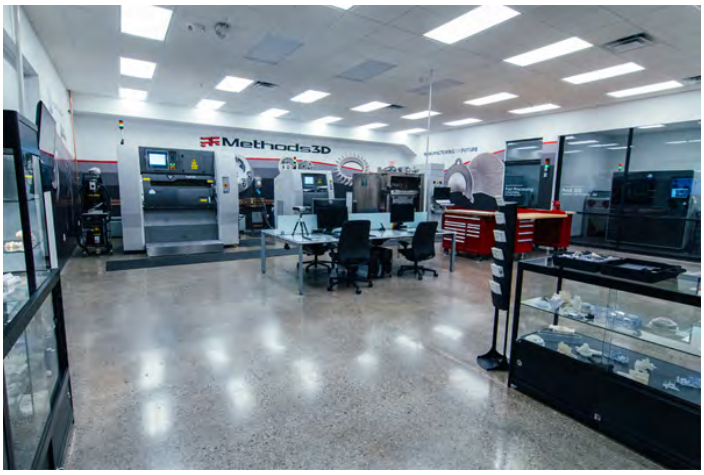
Discrete modules in the system enable automation to pass 3D printed parts from design to printing to washing, curing and final finishing, all without human involvement. At the IMTS Additive Manufacturing Conference, Methods 3D general manager Ben Fisk presented "The Integration of Additive Manufacturing with Traditional Machining" to a throng of almost 500 attendees, while 3D Systems CEO Vyomesh Joshi highlighted Methods 3D at their IMTS presentation as a key strategic partner for the implementation of Additive Manufacturing solutions into production.

Methods 3D advanced new additive manufacturing labs are outfitted with 18 printers including Direct Metal Printing (DMP), Select Laser Sintering (SLS), Stereolithography (SLA) and Multi-Jet models running 14 different materials. A full complement of post-processing equipment such as EDM, CNC machining, automation and inspection is also onsite and each location is fully staffed by a dedicated team of sales, application engineers and service technicians. The additive manufacturing labs are in each of Methods Machine Tools' technology centers including Sudbury, MA (Boston) headquarters; Detroit, MI; Charlotte, NC; Chicago, IL; Phoenix, AZ; San Francisco, CA; and Los Angeles, CA.

"Our new additive labs are ideal for manufacturing professionals to consult our experts and explore ways to design and produce their components using the latest 3D technology integrated with conventional machining, automation and more," Hanson stated. "Engineers have been bringing their application challenges to us and we have been working with them to implement this technology into their manufacturing operations"

Before his recent appointment as Methods 3D COO, Mr. Hanson was director, corporate development of Methods Machine Tools, Inc. from 2007 through 2015. Relishing his new role at Methods 3D he added, "By partnering with 3D Systems, whose core competencies complement Methods' suite of metalworking machining and automation solutions, we will provide our customers the most advanced 3D printing available, in addition to the highest level of service, support and solutions that Methods Machine Tools is known for. We are at the front end of this innovative technology that is poised to grow exponentially." Hanson considers the latest developments from 3D Systems and in particular, Figure 4, "a game changer".

In October 2015, Methods Machine Tools announced it entered into a partner agreement with 3D Systems, a provider of the most advanced and comprehensive 3D digital design and fabrication solutions available today, including 3D printers, print materials and cloud-sourced custom parts.



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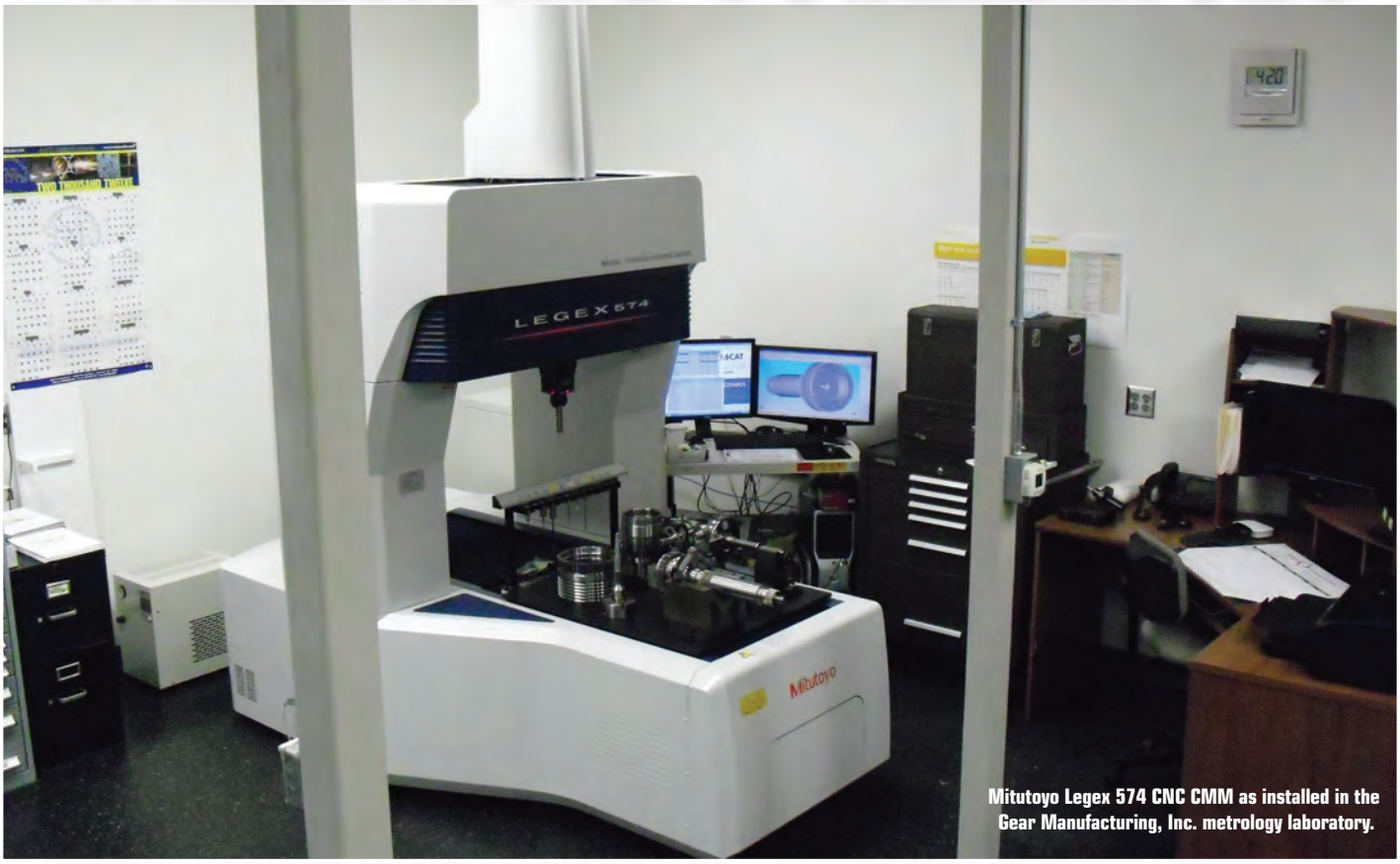


Mitutoyo Legex 574 CNC CMM as installed in the Gear Manufacturing, Inc. metrology laboratory.

ULTRA-PRECISE DIMENSIONAL MEASUREMENTS CRITICAL TO RISK MITIGATION UNDER AS9100 REV. C.

Gear Manufacturing, Inc. (GMI), Anaheim, CA, was founded in 1989 with a mission to manufacture high-quality custom gears and gear-related components and assemblies. Housed in 27,500-square-foot facilities, the company is equipped with the latest CNC machining centers supported by extensive engineering capabilities and leading-edge software. The company makes almost every type of precision gear configuration imaginable, which it produces in materials ranging from tool steel and titanium to cast iron, copper, all types of alloys and engineered plastics – virtually any material that can be used to cut a gear.

Approximately two-thirds of GMI's output is dedicated to the aerospace and defense industries and includes customers such as Northrop Grumman, Lockheed Martin and Boeing, as well as the Bell Helicopter and Sikorsky Aircraft. It will come as no surprise that GMI products comply with standards promulgated by the American Gear Manufacturer's Association (AGMA), Deutsches Institute Fur Normung (DIN), National Aerospace Society (NAS), the Society of Automotive Engineers (SAE), and the American Society of Mechanical Engineers (ASME). In addition, GMI's processes comply with AS9100 – the aerospace version of the ISO9000 quality management system – recognized internationally by both the SAE and the European Association of Aerospace Industries. Specifically, GMI complies with Rev. C of AS9100 released in January 2009, and which adds an emphasis on risk mitigation.

Not unexpectedly, GMI's adoption of AS9100 Rev. C has had a major impact on the company's approach to manufacturing management.

RISK MANAGEMENT AND MITIGATION

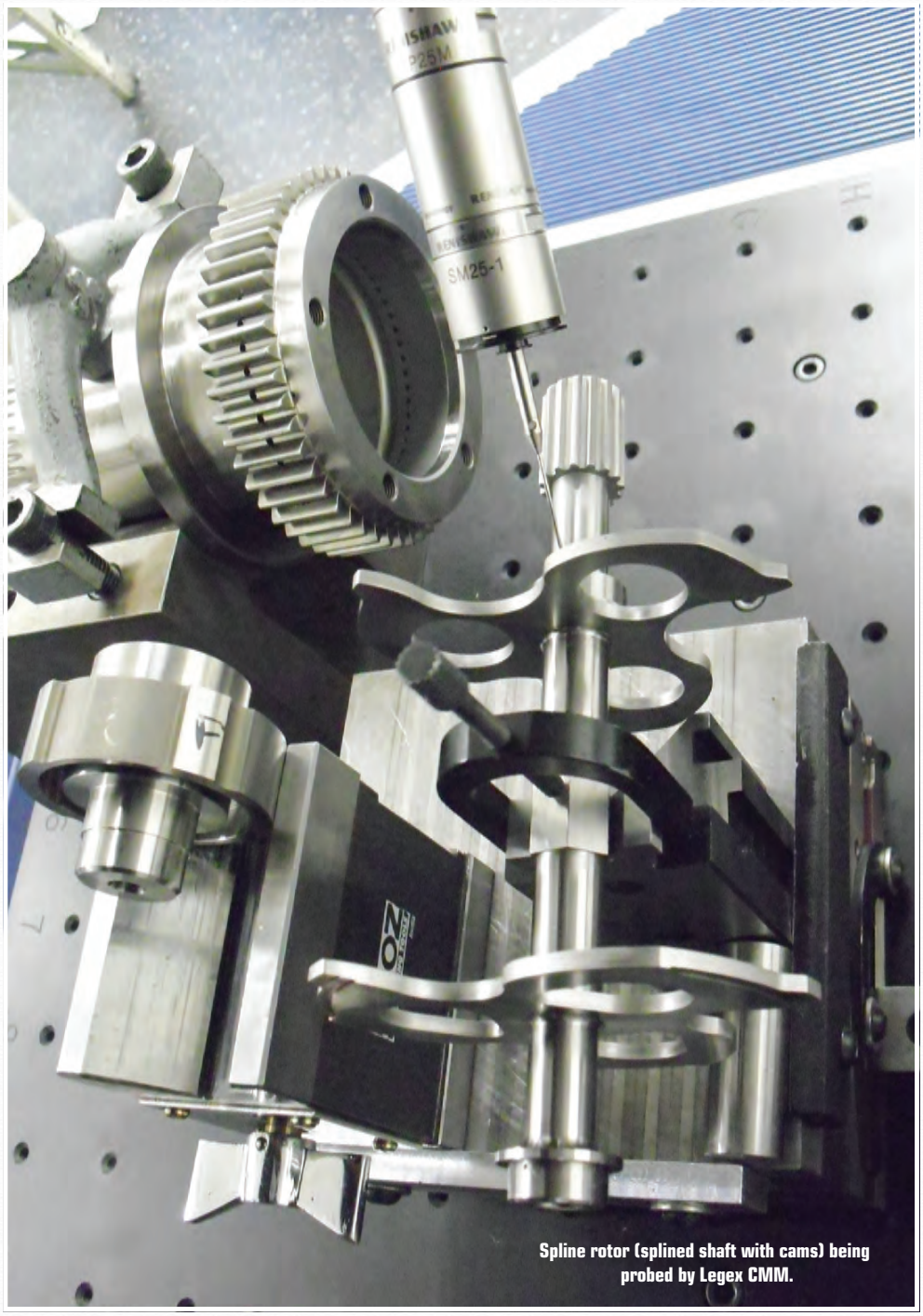
Risk management and mitigation is the identification, assessment and prioritization of risks. As defined by AS9100 Rev. C, risk is *the effect of uncertainty, whether positive or negative on achievement of objectives.* Risks causing uncertainty can derive from project failures (at any phase in design, development, production or sustaining life-cycles), legal liabilities, financial markets and credit risk, as well as accidents and natural causes. Strategies to mitigate risk typically include reducing the probability of the risk, reducing the negative effect should the risk occur, transferring the risk to another party, avoiding the risk, or even accepting some or all of the potential or actual consequences of a particular risk.

The notion of risk is subtle. Gary Smith, president, Gear Manufacturing, Inc., commented, "Risk mitigation includes things like having a catastrophe plan in place to account for events including having a key staffer walk out the door to get hit by a truck. Risk can be inherent in PO quality clauses containing some gray areas that may not be fully understood; it might also reside in tight tolerances or other specifications that could be difficult to validate."

In manufacturing process terms, one aspect of mitigating risk is to be certain that correct revisions of engineering documents, instructions and specifications are used. And when tooling and other equipment (including CNC machines) are employed, it is essential to demonstrate the integrity of the equipment as related to the suitability and fitness-to-purpose of the items produced.

Manufacturing a product as complex as an aircraft or space vehicle requires close attention at every step of the process for every part produced – no matter how small.

For GMI, an important area of risk management and abatement is to be sure that the parts it manufactures meet specified dimensional tolerances.



Spline rotor (splined shaft with cams) being probed by Legex CMM.

GAGE R&R AND THE 10:1 RULE

GMI routinely manufactures to tolerances as low as one-tenth (.0001 inch). Validating these tolerances can be problematic, especially given the limitations, in terms of gage repeatability and reproducibility (GR&R), of both metrology instruments and of the operator. GR&R is the amount of measurement variation introduced by a system comprising the measuring instrument together with the individual using the instrument. *Repeatability* refers to variation introduced by the *instrument*; *reproducibility* refers to variation introduced by the instrument operator. Gage R&R references the combined effect of the two.

Magnifying GMI's measurement challenge is the fact that its aerospace customers frequently specify that measuring techniques must meet the GR&R 10:1 rule. The 10:1 rule holds that total GR&R should not exceed 1/10 that of the tolerance required. For example, if the tolerance is .002, then the total of GR&R should be .0002 or better. In other words, the combination of measurement uncertainties introduced by both instrument and human error cannot total more than 10% of the tolerance being measured. Tough, but necessary in aerospace.

GMI found that achieving these levels of repeatability and reproducibility was challenging for even skilled operators using the most accurate handheld measuring instruments. According to Smith, "About 20% of the parts GMI was making were extremely difficult to validate at the tolerances required. Our measurement process involved using high-accuracy super micrometers and going directly from reference gage block to workpieces – then going back-and-forth from blocks to workpieces. This process burned up a lot of time and motion. Measurements were becoming time-consuming. A way had to be found to avoid overwhelming our capacity for taking these measurements."

Second view of spline rotor measurement set-up; in the background alternative probes can be seen mounted in a rack for automated selection and loading by the Legex CMM.

Since its founding, GMI had been using Mitutoyo metrology equipment. As a result of this longstanding relationship, GMI decided to consult with Mitutoyo America to see if they could suggest a solution.

ULTRA-HIGH PRECISION CNC CMM MEASUREMENT

Smith elaborated, "We supplied Mitutoyo with some sample parts and asked for a recommendation. We were looking at tolerances that could go down to as little as 50 millionths on length with measurements that had to comply with the gage R&R 10:1 rule. Within weeks, Mitutoyo came back with an approach based on use of a Mitutoyo Legex 574 CNC Coordinate Measuring Machine (CMM)."

The Legex 574 CMM combines state-of-the-art design, electronics, computing, sensors and materials to offer substantially enhanced performance while at the same time providing a relative price advantage. A total accuracy of 18 millionths (.000018, MPEE = [0.35+L/1000] µm), a large measuring range

(X: 510mm, Y: 710mm, Z: 455mm) high traverse speed (200mm/sec.) and robust worktable loading capacity (200kgf) make the Legex 574 CNC CMM both productive and practical in diverse applications.

"Furthermore," Smith said, "Accuracy of the Legex ranges from 2 to 22 millions at its longest point of travel. The Legex is a lab-grade machine that provides us with part-checking capabilities that can go beyond those of our customers. It has gear geometry checking capabilities and we can use it to calibrate our own gage artifacts. Procuring the Legex was a no-brainer – even had it cost twice what it actually did."

CMM OPERATING SYSTEM

The Legex 574 CMM uses Mitutoyo's MCOSMOS (Mitutoyo Controlled Open System for Modular Operation Support) operating system. By combining intuitive icon-based programming with the ability to import native CAD models,

MCOSMOS enables even novice users to easily import part and fixture models and virtually place them in the volume of their specific CMM. MCOSMOS graphically defines the CMM, racks, probes and even styli.

Selected graphically, all measurement points are clearly displayed on a 3D graphic view that can be rotated, zoomed or panned to any convenient viewpoint. Animation enables offline running of a workpiece before ever placing it on the CMM, thus providing machine volume verification and collision avoidance. Then, MCOSMOS enables users to choose various software modules to analyze measurement results, to document and present results, and to archive the data in practical structures. Furthermore, MCOSMOS integrates with networked systems for in-line process control applications, as well as to enable true enterprise-wide functionality.

By incorporating high-level software, CMMs can measure virtually any type of geometry. For example, MCOSMOS includes standard and optional modules, enabling CMMs to:

- Support a variety of probes including contact, constant contact scanning, laser scanning, optical, etc.
- Enable a rotary table to act as a fourth axis
- Create and process prismatic features imported from a CAD model for comparison to nominal values (including animated path generation and collision avoidance)
- Collect data in real-time and network for SPC
- Evaluate airfoils and turbine blades
- Measure all types of spur (straight or helical), simple and complex segmented gear, bevel (straight or spiral), hypoid and worm gear profiles and subsequently compare results to international and user-defined standards

The gear measurement capabilities mentioned last in the preceding list is enabled via use of GEARPAK, the MCOSMOS software suite enabling GMI to measure all the types of gear tooth geometries as described. It is used for rapid generation of measurement programs and creates evaluations and reports. The parameters to be included in a report are determined by the user, with numeric or graphic representations, or a combination of the two.

EXAMPLE APPLICATIONS

Smith continued, "Photos 2 and 3 show an example of a part that we could not even have attempted to machine without an advanced, ultra-precise CMM. The part is a spline rotor, which is key to the operation of a critical-function material feed system. The customer provided us with only a solid model (STEP file) and nominal dimensions. No conventional manufacturing drawings were provided. Driven from the STEP files, our CAD-CAM systems drove the part through CNC operations to completion. Then the Legex running MCOSMOS interpreted the STEP file to automatically determine the best way to measure the part. The resolution of measurements that we can obtain gives me peace of mind knowing that in terms of dimensional metrology, we are meeting the challenges of AS9100 Rev. C."

Metallic Glass Gears Make for Graceful Robots

Throw a baseball, and you might say it's all in the wrist. For robots, it's all in the gears.

Gears are essential for precision robotics. They allow limbs to turn smoothly and stop on command; low-quality gears cause limbs to jerk or shake. If you're designing a robot to scoop samples or grip a ledge, the kind of gears you'll need won't come from a hardware store.

At NASA's Jet Propulsion Laboratory in Pasadena, California, technologist Douglas Hofmann and his collaborators are building a better gear. Hofmann is the lead author of two recent papers on gears made from bulk metallic glass (BMG), a specially crafted alloy with properties that make it ideal for robotics.

"Although BMGs have been explored for a long time, understanding how to design and implement them into structural hardware has proven elusive," said Hofmann. "Our team of researchers and engineers at JPL, in collaboration with groups at Caltech and UC San Diego, have finally put BMGs through the necessary testing to demonstrate their potential benefits for NASA spacecraft. These materials may be able to offer us solutions for mobility in harsh environments, like on Jupiter's moon Europa."

Recipe for the perfect gear

How can this mystery material be both a metal and a glass? The secret is in its atomic structure. Metals have an organized, crystalline arrangement. But if you heat them up into a liquid, they melt and the atoms become randomized. Cool them rapidly enough --about 1,832 degrees Fahrenheit (1,000 degrees Celsius) per second -- and you can trap their non-crystalline, "liquid" form in place.

This produces a random arrangement of atoms with an amorphous, or non-crystalline microstructure. That structure gives these materials their common names: "amorphous metals," or metallic glass.

By virtue of being cooled so rapidly, the material is technically a glass. It can flow easily and be blow-molded when heated, just like windowpane glass. When this glassy material is produced in parts greater than about .04 inches (1 millimeter), it's called "bulk" metallic glass, or BMG.

Metallic glasses were originally developed at Caltech in Pasadena, California, in 1960. Since then, they've been used to manufacture everything from cellphones to golf clubs.

What makes these gears perfect for space?

BMGs have low melting temperatures. That allows parts to be cast using injection-molding technology, similar to what's used in the plastics industry, but with much higher strength and wear-resistance. BMGs also don't get brittle in extreme cold, a factor which can lead to a gear's teeth fracturing. This last quality makes the material particularly useful for the kinds of robotics done at JPL.

Hofmann said that gears made from BMGs can "run cold and dry": initial testing has demonstrated strong torque and smooth turning without lubricant, even at -328 degrees Fahrenheit (-200 degrees Celsius). For robots sent to frozen landscapes, that can be a power-saving advantage. NASA's Mars Curiosity rover, for example, expends energy heating up grease lubricant every time it needs to move.

"Being able to operate gears at the low temperature of icy moons, like Europa, is a potential game changer for scientists," said R. Peter Dillon, a technologist and program manager in JPL's Materials Development and Manufacturing Technology Group. "Power no longer needs to be siphoned away from the science instruments for heating gearbox lubricant, which preserves precious battery power."

Gears that turn smoothly while cutting costs

The second paper led by Hofmann looked at how BMGs could lower the cost of manufacturing strain wave gears. This type of gear, which includes a metal ring that flexes as the gear spins, is tricky to mass produce.

Not only can BMGs allow these gears to perform at low temperatures, but they can also be manufactured at a fraction of the cost of their steel versions without sacrificing performance. This is potentially game changing for reducing the cost of robots that use strain wave gears, since they are often their most expensive part.

"Mass producing strain wave gears using BMGs may have a major impact on the consumer robotics market," Hofmann said. "This is especially true for humanoid robots, where gears in the joints can be very expensive but are required to prevent shaking arms. The performance at low temperatures for JPL spacecraft and rovers seems to be a happy added benefit."

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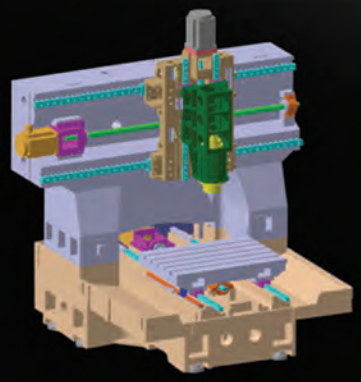

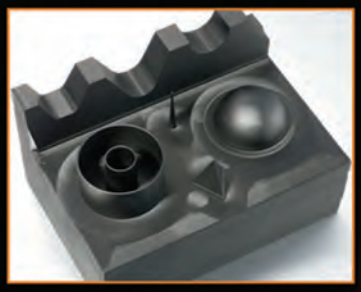

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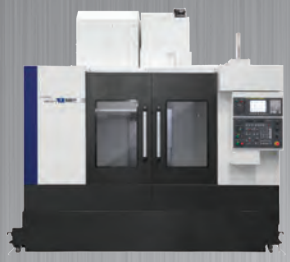

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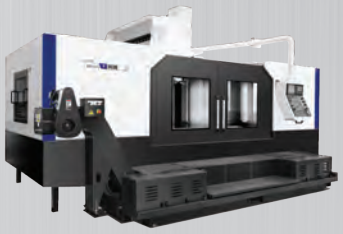

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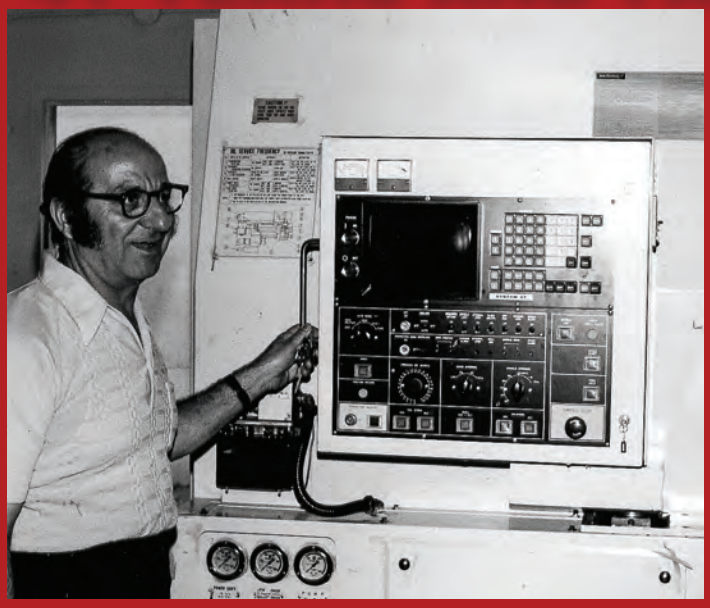
MOSEYS PRODUCTION MACHINISTS

41 YEARS AND FACING THE FUTURE

Article by Sean Buur Photos by Sean Buur & Moseys



Left - Fred Mosey with his first CNC Lathe, a Nakamura TMC-4. Right - Bob Mosey, second generation owner in front of their Mori Seiki NH5000 DCG with 24 pallets.

Moseys Production Machinists is a family owned and run business that dates back 41 years. Second generation owner Bob Mosey is capitalizing on their successful four decades of manufacturing and setting in motion plans for the next 40 years and beyond.

Fred & Nedra Mosey started Moseys with a single Mori Seiki engine lathe in 1975. "Much to my mom's dismay, dad leveraged their home to buy that first machine," tells Bob Mosey. "He worked evenings after work with the goal of not making one of anything anymore." Fred was a tool and die maker and the prospect of production runs appealed to him. So much so that even the company's name reflects his desire, Moseys Production Machinists. "We are a production machine shop and have been since the beginning," describes Bob. "We work mostly in medical, medical laboratory, medical device, hydraulics, laser, natural gas, aerospace, and oil/gas. The first 4 or 5 customers we ever had were oil related, but the embargo in the 80s nearly killed us." Diversification kept them going. In those days they machined everything they could get their hands on, including fiberglass just to stay alive. It was a lesson learned and one of the reasons they now have a more diverse customer base. Their focus is working with and creating relationships with OEMs in all industries.

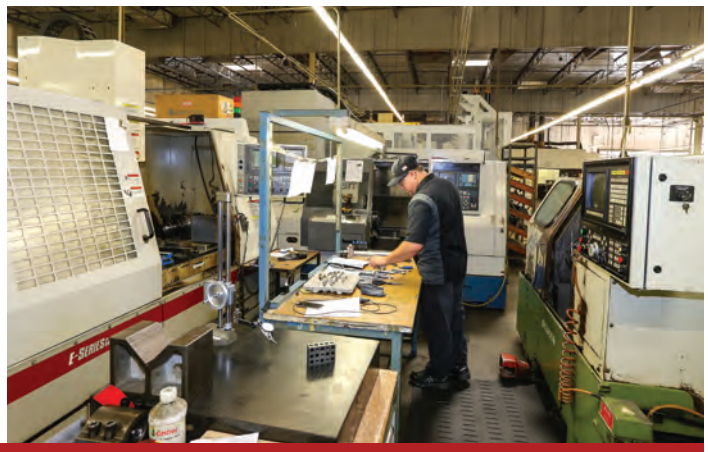
Fred was able to quit his day job and work full time for himself. He picked up a used Bridgeport mill from his former employer and away they went. Mom was the first employee, but 15-year-old son David started working after school right away. It took Bob six months on and off before he joined the company full time. "I went from high school to the Air Force, then right to the workforce," details Bob. "My sister Sheila got involved doing the books when it became necessary that accounting was a full time job. Together mom, dad, brother, sister and I grew the business from a little 2400 sq.ft. industrial unit in Fullerton, CA." As neighboring units became available Moseys would punch through a wall and expand the company. It was a disconnected way to the run the shop and Bob knew it was time for a move. "In 1994, a broker found us a larger building for less money than we were paying in rent," tells Bob. "I only needed to come up with the down payment." Bob followed in his father's footsteps and leveraged all he had to buy their first building. "We cashed in everything to buy our first 11,500 sq.ft. building. We felt like we would never outgrow it, but 8 years later we were elbow to elbow again and in search of larger accommodations. In 2002 we moved to our present 32,000 sq.ft. manufacturing facility in Anaheim and have room to grow. We have nice wide aisles and with the right combination of machines could double our manufacturing without the need to expand our footprint." Their growth goal is just that, to double revenue in next five years.

NTMA has been a large part of Bob's life. He is a big proponent of the organization and has been since attending his first meeting. Bob's dad and sister joined NTMA in 1992 for their insurance program. Almost ironically they didn't end up using it and were just going to let the membership expire. "My dad was not a joiner, not into networking, didn't want to go to meetings, he saw no real value in the membership," explains Bob. "One day we got a flyer faxed to us to tour the local C-17 plant. My brother and I asked if we could go and dad let us. We had

JoAnn, Bob's wife is the outreach coordinator and works with local schools to foster new machining talent. One of their strategic objectives is to give back to the industry by getting more young people involved in manufacturing. Manufacturing Day this year saw two schools tour their facility, twice as many as last year. They worked with the local LA NTMA chapter who also set up similar programs at other NTMA member companies. Participation was up for nearly everyone this year. JoAnn contacted NTMA members who were willing to do tours and put them in touch with their local school districts. "It is a long term process but tomorrow's leaders need to come from somewhere," tells Bob.

never been outside these four walls so this was a new experience." The tour was fantastic, but it was the lunch after that that opened Bob's eyes. Bob found himself sitting next to John and Bert Belzer of TCI Precision Metals. He knew them because Moseys bought blanks from their company. "I was so impressed that I was eating lunch with these two guys," describes Bob. "John was the NTMA Los Angeles chapter president and there he was eating lunch with me. He was just a regular guy like I am. He invited me to come check out their monthly meeting with a round table discussion. I walked into the meeting and didn't know anyone. Once the roundtable started people began throwing out problems and the collective group helped solve them. They even solved an issue I was having. I was hooked after that." Bob went to all the meetings, met new people, learned new things and his involvement escalated quickly. He joined the board of directors and went through all the chair positions in the LA chapter before doing the exact same thing at the national level. He spent six years going through the chairs at National and in his chairman year, he visited 20+ different chapters of NTMA. "In one year I toured 80 different shops around the country," explains Bob. "People with huge operations were willing to share information, it was enlightening. I saw things I strived to be, and things I never want to do. That first NTMA meeting changed me, and changed this company for the better. I never went to college, NTMA was my schooling and I hope I can pass some of my knowledge on to the future leaders of this industry."

2013 was a crossroads personally and professionally for Bob. It marked a point in time where honoring the past needed to be replaced by looking towards the future. "My brother changed careers before dad died," tells Bob. "Then after dad passed in 2000 my sister Sheila and I ran the company." Sheila battled health issues and passed away in 2010. Like so many family run businesses Bob was tasked with taking care of his aging mom and Moseys. "After my mom passed in 2013, I looked at the company with a new set of eyes," he explains. "It wasn't dad's business any more, it wasn't about keeping things going to take care of mom, it was about JoAnn and I. What did we want to



Fred & Nedra Mosey started Moseys with a single Mori Seiki engine lathe in 1975. Even in the 70's Moseys ran in cells because it made sense to have all the manual machines needed to make a part grouped together. They still use cells of two CNC lathes and one mill because 80% of the parts they manufacture require those three ops.

The first CNC machine Fred bought was a Nakamura lathe. His son inherited Fred's love of Japanese machines and Moseys is full of them. Bob appreciates their precision and their long service life. "We buy the right machine to meet a specific need," tells Bob. "They don't all have to be the same brand but we only run Japanese machines in this shop. We have modernized with DMG Mori, Okuma, Matsuura, Kira." Part of the lean culture of the shop is to maximize everything from floor space to spindles. "We have 21 spindles running right now spread between a little over 18 machines. We have two Mori Seiki LPP (Linear Pallet Pool), one with two DMG Mori Seiki NH5000 DCG and 24 pallets and one with two Mori Seiki NH5000 and 32 pallets. We also have a DMG Mori NTX 2000 mill-turn. This machine is fantastic. It has two lathes and 5-axis mill in a single unit with a robot arm. We run those machines lights out. People ask how many shifts I have and I say three, but only one with people."

do with this asset?" They were faced with a situation that many companies similar to theirs are faced with every day. What did we want the company to be?

Options included closing Moseys down, build it up and sell it, auction it off, retire now or retire later. Bob and JoAnn took their time and decided what they really wanted was to keep Moseys going. "Moseys is in a trust for our children," continues Bob. "But that's not it. We want it to keep growing into whatever it is meant to be, and keep supporting the families of our 30 employees. We want Moseys to go on being successful long after we're gone." To do that Bob needed to change the core culture of the company with everyone on the same page. It was evident how difficult decisions like these are just listening to Bob detail his journey. "You ask around and it is something most of us in this industry haven't thought about, let alone have a definitive plan. Maybe retirement is 5 or 10 years off, but grooming leaders today will pay dividends in the future. Everyone in the company knows the plan, and is doing their part to help us succeed. We set about putting things in place for us to be able to sustain and go through a succession. Our primary focus has been geared towards that for the last three years."

Changing the culture started with strategic goals, leader-

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ship development, and lean manufacturing. Bob learned about lean in the 90's and fully bought into it. He read the books, followed the guidelines and even incorporated the 4 arrows of process improvement into their logo. The problem was when Bob learned about lean he failed to instill it as a culture in the company. Management knew about it, but it never became a way of life on the shop floor. "Dad had taught us a lot about production processes and we were already running in cells back in the 70's," explains Bob. "It made sense then to have machines close to each other." They would move an engine lathe, a turret lathe, a drill press and a Bridgeport next to each other depending on what the processes required on each part. Moseys was constantly moving equipment until they got to CNC. "Somehow we went from having the machines together for production, to having milling and turning departments. We got away from departments when we moved to this building. You see in the shop we have cells of two lathes and a mill because a large portion of the parts we manufacture require those 3 ops."

To make the company more sustainable everyone had to be engaged. Everyone from Bob to Fernando, their custodian, were part of the process improvement. They brought in CMTC to do a company wide 26-week lean training program. It was a big commitment, but every Friday they shut down and went through lean training together. "It was an evolution and is still evolving," touts Bob. "By changing the culture and getting everyone on board they all know that they have part in the success of the company. We never had a good set of metrics to measure how we are doing, but now we are mining our data and making it available to all our people." Moseys has had an ERP system since 1989, but up until recently they didn't extract the data for anything other than replicating what they were doing manually. "We have bright young minds that are doing an incredible job generating reports and spread sheets," continues Bob. "More importantly the reports are actually useful." The people on the floor are eating up the information. They don't see it as a person with a stopwatch and clipboard measuring what they do, but as a way to maximize performance. Moseys' sales goal metric sits on the shop floor for everyone to see. When they meet that goal they get Panera Bread for breakfast. "It is making a world of difference in how this company is run and how we are performing," tells Bob. "The employee engagement, not the Panera."

Moseys is two years into their five year plan of doubling revenue. They need the growth to support the continued development of their leadership team and for sustainability through a succession. "We have great leaders now," details Bob. "The problem is I want to pay them more, and we will eventually need a president. To make that a reality our revenue needs to increase. We've made great strides so far at accomplishing that goal, but we still have a ways to go." Bob's son Nick has joined the company doing the bookkeeping, and his other son Patrick is also dabbling in the industry. It brings Bob solace knowing that if they want to be part of the business they can, but if they don't that's fine too. Moseys was built on relationships. Forty-one years garnishing relationships with customers, with employees, with family. "We've always had great quality, always had good delivery and we have the best group of customers," concludes Bob. "We have customers that have been with us since day one and they need to know we will be here for decades to come. Moseys is here to stay and with our strategy in place Moseys will outlive us all."

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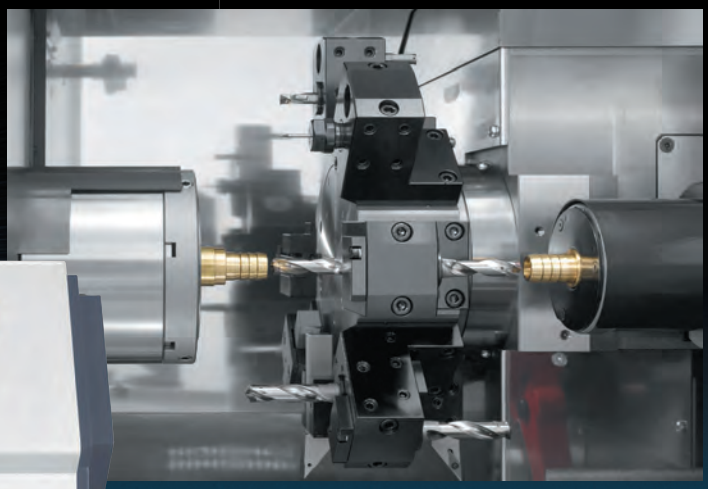

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COBRA CARBIDE

AMERICAN QUALITY WITH A BITE

Article by *Sean Buur*
Photos by *Sean Buur & Cobra Carbide*

Quality comes in all shapes and sizes, but most manufacturers think about it in terms of meeting the spec. Companies spend huge amounts of money on machines that do the job in the most efficient way. The right tool for the right job is an industry wide mantra, but what about the right tool being the right tool? Without quality tooling the spec could be out of reach. No one wants to get snake bit by inferior tooling and that's why Cobra Carbide offers American made quality with the perfect amount of bite.

Rakesh Aghi CEO of Cobra Carbide grew up outside New Delhi, India and came to America as a student. He earned his bachelors and later received his MBA at the University of La Verne. "Emphasis since childhood is on your studies," explains Rakesh. "If you want to achieve anything in life, the first step is doing well in school. There are a lot people in India and it is very competitive. You have to work hard to be better than the next guy and that purpose is ingrained in our DNA." While at University, Rakesh interned at a company that imported tooling from around the globe. After graduation his choices were to go back to India and run the family Diesel Engine manufacturing business or stay in the land of opportunity and build his American dream. "Manufacturing and distributing diesel engines in India was a good business," details Rakesh. "At the time my family had 250 employees, but with that came a lot of unwanted stress. I'm an entrepreneur at heart and wanted to build something all my own."

Rakesh began selling the tools he learned about from his internship. There was a shortage of tooling at the time and all the tooling catalogs were looking for representation. "I started buying tools from Germany, Korea, Spain and India," tells Rakesh. "For the next five years I sold tooling and could barely keep up with the demand." In the mid 90's he started selling carbide tooling. The demand was so high that in 1997 he opened up a warehouse in Singapore just to service his Southeast Asia customers. "The tooling industry started with carbon steel, then high speed and cobalt," explains Rakesh. "Carbide was the new emergence there, and gaining popularity. Even in Southeast Asia made in America is the universal brand for quality, and they wanted what I was selling." Rakesh was purchasing more than 25,000 tools a month from a Chicago based manufacturer, 95% of their capacity. "In

Rakesh Aghi, CEO of Cobra Carbide.

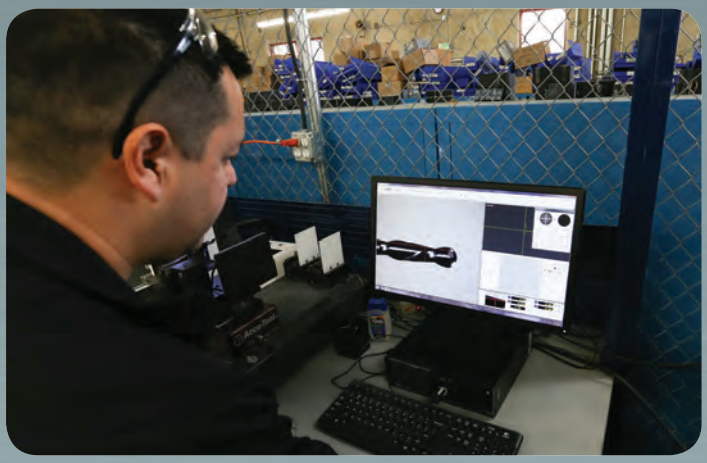
1998 the owners approached me to buy them out," tells Rakesh. "I was buying almost everything they could make, so after some negotiations I bought the company and relocated all the manufacturing to Riverside, Ca."

With Rakesh now being a manufacturer and not just a distributor he needed a name. Marketing companies came up with everything under the sun, but it wasn't until he heard Cobra Carbide that it just clicked. "We needed a brand and Cobra Carbide just rolled off the tongue," touts Rakesh. "Cobra Carbide had a good alliteration sound to it and the Cobra paid tribute to my Indian roots. It just worked and we've been Cobra Carbide ever since. Around the world it is a recognized name in tooling." Business was on the rise and growing for Cobra Carbide until 9-11. "Everything came to an abrupt stop," describes Rakesh. "The world changed that day and so did this company. In September of 2001 I had eighty-five people working for me, and by July 2002 that was down to only six." Tooling companies began to dump prices to stay afloat, and Cobra Carbide was no different. They had inventory to service their dwindling customer base, but the machines sat idle. "We retained market share in Asia but that was about it," continues Rakesh. "We needed to bring the cost of manufacturing down and desperately needed a new avenue to survive."

Rakesh flew to the retirement city of Bangalore in southern India. There are more than 50 engineering colleges in the area and a growing tech sector. "Bangalore was the perfect city to manufacture from," tells Rakesh. "I bought land, erected a building and shipped the machines from Riverside to India. With lower operating costs we began importing tools back into the US and exporting them to other neighboring countries." India has 200 languages, and 300 dialects, but each region has something in common. They all speak English. "India was ruled by the British for Two Hundred years so everyone speaks the queens English," tells Rakesh. "Before the English, India was a

Cobra Carbide stocks more than 25,000 part numbers from their catalog. Endmills, drills, burrs, inserts, and reamers are all ready for shipment.

Design, engineering, manufacturing and quality control are all based out of Cobra Carbide's Riverside, California office.

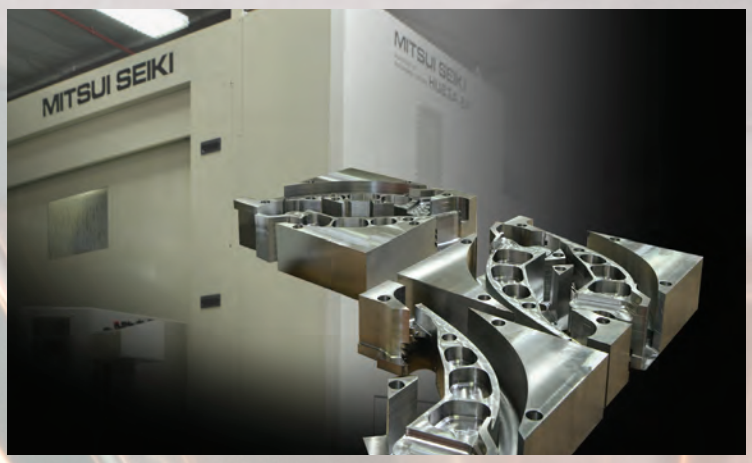


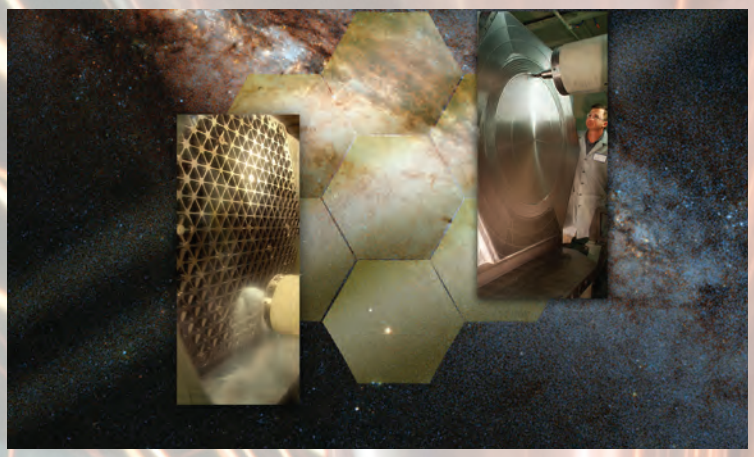
lot of states, Britain united them as a country, built infrastructure, and gave us a common language. English is the international language of business so it makes it easier for westerners to do business with India. That being said India is not that easy of a place to conduct business." Managing the manufacturing from a far was getting tiresome and in 2006 Rakesh packed up his family and moved to India.

From 2006 to 2010 Rakesh maintained distribution in Riverside and ran the company from Bangalore. "My wife and kids are from there," explains Rakesh. "I'd lived my entire adult life in America. It was hard for all of us, but a real life changing experience for my family." Relocation from a gated community in Orange County to an apartment in Bangalore would be an eye opening experience for anyone, but Rakesh hopes his kids see the value later on in life. "They were not happy about the move," explains Rakesh. "That experience opened them up to the world, one they never would have seen from living in Orange County. I am not happy that the economy forced my hand, but we turned a negative into a positive and rebuilt the company from 9000 miles away from home."

Outsourcing was never the plan, but only a temporary solution needed at the time. By 2010 business was growing again and Cobra Carbide was back running full speed in Riverside. The Bangalore facility remained open and continued to supply their fair share of tooling, but cost were going up in India. "As India's economy started to open up and the Bangalore area boomed, we experienced high turnover of employees," details Rakesh. "Salary auctions with other companies were happening at a high rate. One month your supervisor would need to double his wages and two months later he had another offer doubling it again." Quality was going down because of employee turnover, freight was going up, logistics were difficult, and it became harder to manage operations from America. Once again Rakesh bought another tooling manufacturer from Boston, MA., and moved it to the Cobra Carbide facility in Riverside, Ca. "My interest in having two manufacturing operations was waning," describes Rakesh. "U.S. business is up and it has become a nightmare dealing with having a business in India. So I sold my operation in Bangalore to another tooling company and invested 2 million dollars in new machines for the Riverside, CA facility." Once the sale is finalized in the next few months all Cobra Carbide tooling will be 100% made in the USA again.

Cobra Carbide runs 24 hours a day six days a week and is adding four more machines to their already capable fleet. "We have Rollomatic Swiss grinding machines and German made Walters," details manufacturing supervisor Ruben, "They are the Rolls Royce of our industry and we will have four more online next year. We stock 25,000 different catalog product numbers so advanced manufacturing practices go a long way. We run the night shift totally lights out." An extensive inventory of standard tooling is just one aspect of Cobra Carbide. They like to think they shine when it comes to "specials." "Specials are customized tooling manufactured to meet a customer's specific requirement," explains Rakesh. "Most companies utilize standard endmills, drills and inserts, but we have the ability to custom make anything they need in a very quick timeframe. Spe-





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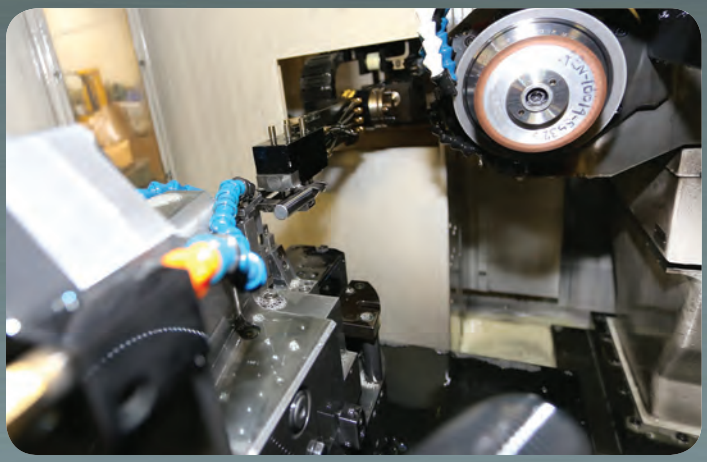

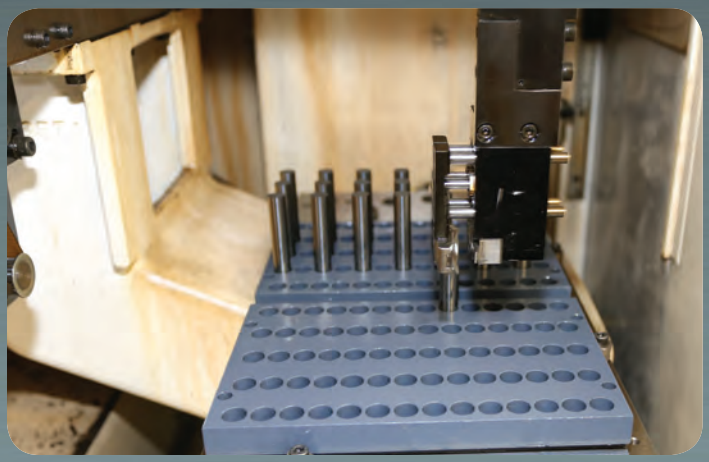

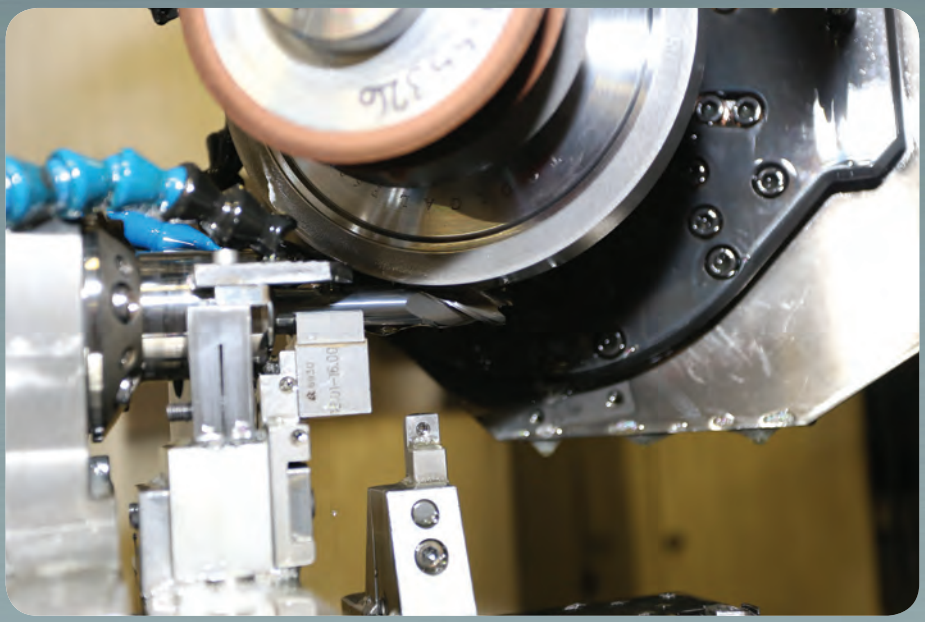

Cobra Carbide runs 24/6 with the night shift all lights out. They utilize top of the line machines from Rollomatic and Walter. Four new machines are due to come on line around the new year, doubling production capabilities. Cobra Carbide has invested 2 million dollars in the new machines to better service a growing demand for specialized tooling and to maintain the levels of inventory their customers have come to rely on.

cialized tooling companies are mainly situated in the Midwest and east. We are one of only a few based on the West Coast. Aerospace companies have no time to wait on quality tooling. Being local they don't have to." The idea is to have local tool manufacturing to support local companies. With design, engineering, manufacturing and coating all local it allows Cobra Carbide to make quality tooling, in a fast manner, to service an industry that needed it yesterday.

Forty percent of Cobra Carbide's business is exporting tooling to other countries. Countries like Mexico, Brazil, Argentina and Peru love made in America tooling. Mexico alone has 70 Cobra Carbide distributors. "We have 600 distributors in the US," tells strategic accounts manager David Goodman. "Our US market share continues to grow but we are exporting a large portion of our production to countries that don't have quality tooling readily available locally to them. Made in America has value everywhere, our distributors want it, and our customers want it."

Rakesh's immediate plan for Cobra Carbide is to grow sales though increased manufacturing capabilities, upgraded software and offering a quick turnaround on specialized tooling. "We have a huge amount of inventory of standard tooling," clarifies Rakesh. "But you can't effectively manufacture specialized tooling from India. The local aerospace companies need it sooner rather than later. With our west coast manufacturing we can get it to them sooner." Ten minutes with Rakesh and you can see the pride he has in his company and their products. "I have employees that have been with me since the very beginning," concludes Rakesh. "We love what we do and I'm proud of the fact that we brought our manufacturing back to America. This is my home and the tooling industry has been a fun journey. People say to me Rakesh you never look stressed. That's because there are bigger challenges in life. Business shouldn't be one of them."

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Scott Leitch
Product Specialist
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"WESTEC IS A GEM

We were delighted with both the quantity and quality of the leads. SME knows how to rock a trade show!"

Ellen Kominar
Marketing Manager
Total Grinding Solutions

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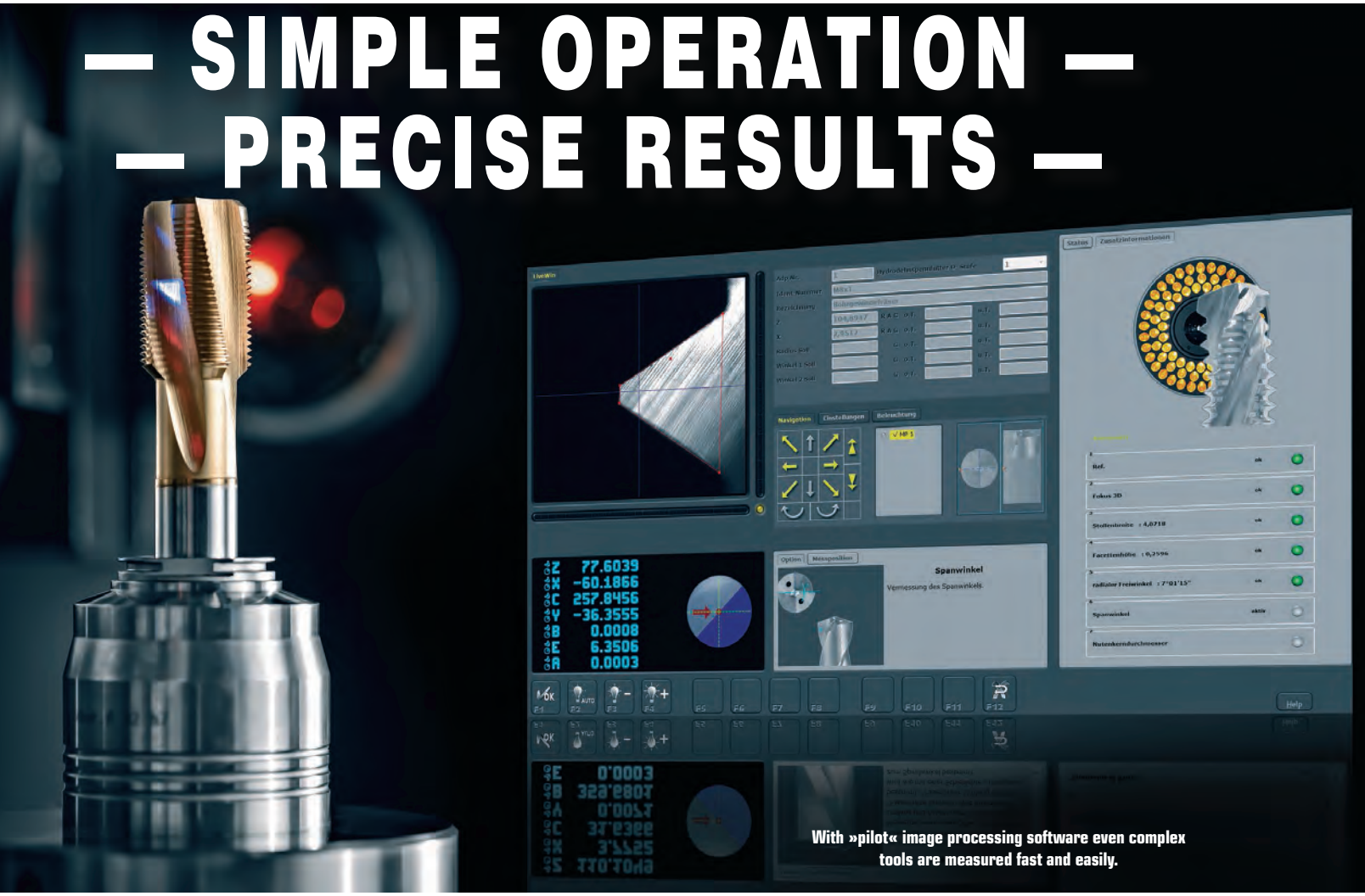
— SIMPLE OPERATION —
— PRECISE RESULTS —



With »pilot« image processing software even complex tools are measured fast and easily.

Measuring equipment must be precise; that much is clear. But it also needs to be easy to operate and economical to use.

Only precisely-measured tools produce precise components. That's why every company that wants to manufacture parts with the highest quality needs precise tool presetting and measuring. Zoller offers a broad spectrum of solutions for both precise and economical presetting, measuring, and inspecting of all types of cutting tools. What makes our presetting, measuring, and inspecting machines stand out in comparison to all other products is their ease of operation, integration into existing manufacturing processes, and construction appropriate for the shop floor.

PRECISION ENSURES QUALITY — AND NEEDS TO BE CERTIFIED

Only optimally inspected and tested tools guarantee high component quality. Accordingly, the most important requirement of a tool measuring device is maximum precision, to achieve the accuracy demanded in manufacturing precise components. But precision also needs to be certified — in other words, it requires 100% repeatability with proven, traceable measured values.

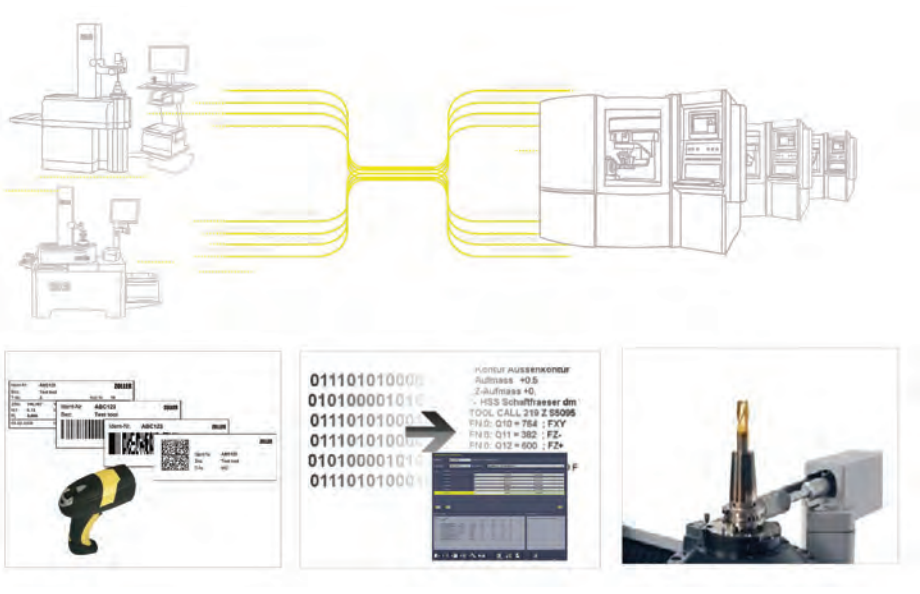
In practice this means: no matter how many times the measuring process is repeated the user will always get the same precise measuring results. To facilitate this, Zoller uses a combination of high-end brand name products, such as Heidenhain measuring systems, Festo pneumatics, Uhing linear drives, software that is simple to operate, and maximum automation.

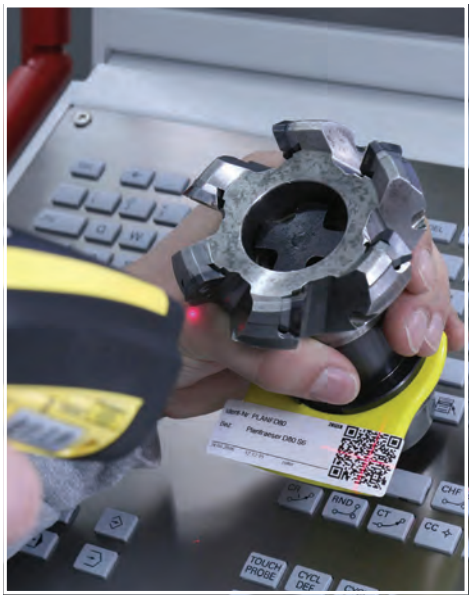
MEASURING RESULTS CAN'T VARY FROM PERSON TO PERSON

Measuring results may not vary from person to person, and must be available for seamless documentation. Therefore, Zoller has developed systems with as many automatic processes as possible, a clear operating structure, and the capability to connect with other systems through interfaces. This helps to avoid operating errors, downtime, and machine crashes.

Users like David Molone, tool engineer at the Cummins Inc. plant, confirms that this strategy works. He says, "A big advantage the Zoller »redomatic« presetting and shrinking machine brings to us is the elimination of operator error from judging and entering offsets manually. And we eliminate tool setting on the machine tools. Compared to the previous manual setting of our boring bars and milling cutters, such as for a chamfer width for example, the Zoller saves hours a day and is very consistent."

Zoller has developed systems with as many automatic processes as possible, a clear operating structure, and the capability to connect with other systems through interfaces. This helps to avoid operating errors, downtime, and machine crashes.





Left - Zoller data transfer options. Right - Each tool is integrated into the system via a QR scanner and code.

But Zoller presetting and measuring machines not only measure precisely and reliably — they can also be operated right on the shop floor, not just by highly specialized experts. Thomas Ware, product manager of Gear Tools at Star SU, confirms this. He measures and inspects tools using the Zoller »hobCheck« measuring machine. "We also like the way Zoller uses graphics and other visuals that make using the machine easy and quick. Operators expect ease-of-use in equipment — more now than ever," he said.

PRECISION UNDER TENSION

Tool clamping also plays a key role in obtaining precise measuring results. Insert tool, push a button, finished. That's how easy it is to use the »ace« (all-clamping-element) high-precision spindle developed in-house by Zoller to clamp tools with power-activated convenience on almost all Zoller devices. Always enjoy the same µm precision and absolute security. No matter what tool holder system you use, whether steep or hollow shank tapers, Capto, VDI or KM, and cylindrical shafts with various diameters — all attachment holders can be replaced in less than 10 seconds with µm precision.

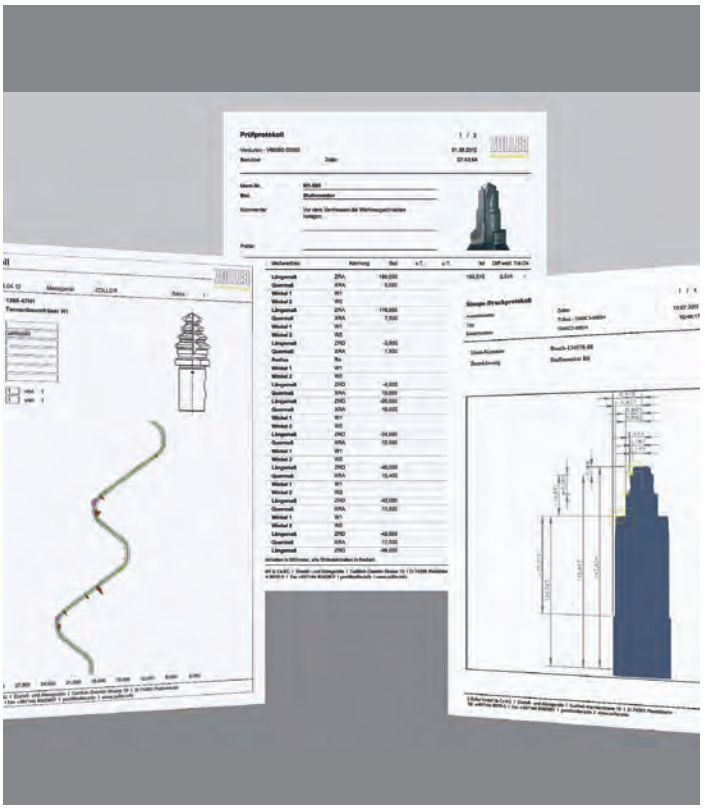
»PILOT« SECURELY GUIDES USERS THROUGH ALL MEASURING PROCESSES

Of course, there are a wide variety of precision tools available due to the many different materials which need to be processed and the many processing procedures required. There are large and small tools, robust and delicate tools, and even multi-functional tools. And measuring requirements are just as diverse.

The »pilot« software, installed on every Zoller solution, offers intuitive operations and securely guides the user through all measuring tasks. No matter how complex the measuring task or the tool geometries are, the user is guided through the task until precise measuring results are achieved, which are then transmitted to the machine. For precise measuring results only guarantee a precise component if the data is delivered correctly to the machine.

PLAY IT SAFE — ALL THE WAY TO THE MACHINE

There are already many secure options for transferring data from the presetter to the machine. RFID chips, specialized label formats, data matrix codes, or post-processors — depending on the individual requirements of the company. The human factor, the element of uncertainty, is excluded in every case and data is transmitted without errors. Since transposed digits are no longer a problem, the machine crashes they cause are also eliminated.



Zoller Test reports sample collage.

The »pilot« software, installed on every Zoller solution, offers intuitive operations and securely guides the user through all measuring tasks.

CLIMATE CHAMBERS ARE OVER, WELCOME TO THE MANUFACTURING HALL

Good suitability for the shop floor is a key aspect in economic efficiency, requiring less walking and saving time accordingly. All Zoller devices are extremely robust, partially due to their use of an alloy specially developed for measuring machines. This allows the user to complete precise measurements directly on the shop floor, beside the CNC machine.

One fact is clear: presetting and measuring machines today can provide precise measurements. But the only way to make them economical is if they can deliver these precise results directly in manufacturing, independent of the user involved, and with good repeatability.

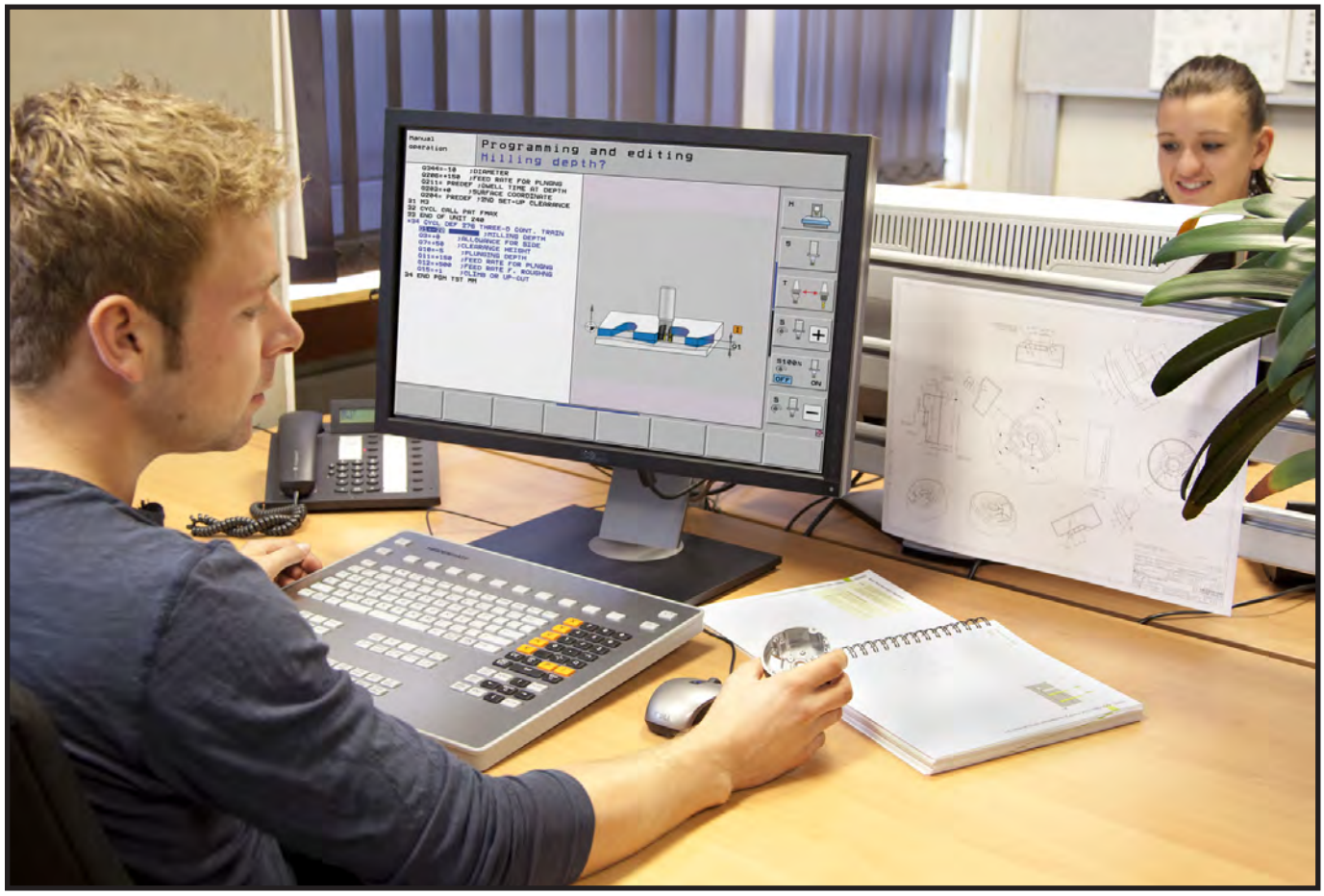
PRECISION, EVEN IN THE ENTRY-LEVEL CLASS

All basic principles described in this article apply even to the entry-level Zoller presetting and measuring machine series. Even our smallest »smile« device makes no compromises when it comes to quality components, and is designed to provide secure data transmission to the machine. And the Zoller myTouch »pilot 2 mT« operating technology makes it easy (even for beginners) to preset and measure tools.

In addition, integration into existing manufacturing processes is a unique benefit in this price category — and plays a key role. Presetting and measuring equipment and software must integrate optimally into the system environment and make all interfaces available.

Zoller inspection and measuring machine titan cutting edge inspection

CNC Controls at Focal Point of Denver, CO. College Advanced Manufacturing Center



There are three HEIDENHAIN's TNC Control Programming Stations at CCD's Advanced Manufacturing Center.

Community College of Denver (CCD) is one of the few colleges in the United States with a state-of-the-art Advanced Manufacturing Center (AMC). This newly upgraded center received its highest accolade in July 2015 when U.S. Vice President Joe Biden visited the facility. At AMC's heart are two GF Mikron machines (HPM 450 U) equipped with HEIDENHAIN's iTNC530 controls. The new training classes are now available for CCD's manufacturing students who will also benefit from TNC programming stations that were received through the HEIDENHAIN support program for schools.

History

In 2011, as an important continuing education facility in Colorado, the administrators at the Community College of Denver sought to make an even more positive impact on Denver's manufacturing base and beyond.

To do so, Tony Rubino was hired as director of the AMC. It was clear to him that the focus for the new center needed to be on the highest technology in subtractive manufacturing to guarantee both the success of the advanced manufacturing program and the intention to elevate local manufacturing. When first asked about the best technology and with what to equip the new center, Rubino shared: "Due to my experience in the aerospace and medical industry, the first thing that came to my mind was the use of GF Mikron Machines and HEIDENHAIN controls".

Rubino further explained that in order to make an impact on local manufacturing, a focus at the AMC had to be on automation. Thus, his chosen machines were purchased and specified with palletized systems and the Dynamic Efficien-

cy controls packages from HEIDENHAIN. Rubino added that precision, of course, is mandatory for current machining requirements but that efficiency is required by companies to compete in the business.

One of TNC control functions for automation that Rubino specifically finds impressive is Adaptive Feed Control (AFC) and the fact that operators can monitor the spindle load and lock out the tool by using this function. The benefit of the Extended Tool Management for automation with the possibility to define replacement tools was also recognized by the directors of the AMC at the time the machines were specified.

From years of experience with CNC controls, Rubino is further pleased with the user friendliness of TNCs: "We are especially pleased with the graphics in the test mode and the comprehensive structure of Program Management that will both help with successfully teaching CNC programming to students."

A manufacturing center at CCD has existed since 1978 with tools and machinery on a level respective to the time, but had not been updated in many years. With the support of Rubino, school President Everette J. Freeman, the Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant, CCD now offers one of the few advanced manufacturing centers of this kind. "We are hoping to impact local businesses and attract students from not only Denver, but also the whole region. We realize the importance of manufacturing and the special program we have here".

CCD AMC Student/Teacher

CCD's Rubino and VP Biden at AMC.

Significant Events at AMC

In 2015, two important events served to showcase CCD's advanced manufacturing center. The first was a visit from U.S. Vice President Joe Biden which naturally gave the AMC a high-profile standing within the community. "Joe Biden's office reached out to us wanting an update on the TAACCCT grant, so we in turn invited him to the facility, and I was lucky enough to give him a one-on-one tour of our high-tech manufacturing facility", explains Rubino. "Many students were present during the visit and it was well received by the community."

After all, the program grant was facilitated through the Vice President's manufacturing initiative. During the event, the program directors discussed trends such as "Reshoring" with Joe Biden and the visit brought awareness to local businesses. Reshoring is a trend among US companies to bring their manufacturing facilities back from overseas and many say is only cost-effective through the use of high-quality manufacturing and automation.

The second event was an open house at the AMC which took place in October 2015. HEIDENHAIN staff attended, and demonstrated the TNC programming station and controls with all its capabilities to students and local businesses. In total, approximately 350 attended the open house with visitors including staff from the governor's office, the Chamber of Commerce and local manufacturing agencies. "Without HEIDENHAIN, the open house wouldn't have been such a success", Mr. Rubino assured HEIDENHAIN after the event. "The high attendance also reflected the need for an Advanced Manufacturing Center among the college's stakeholders".

Now in CCD's Fall 2016 semester, three classes are being offered at the AMC: Introduction to 5-axis milling, as well as a machine operator class and a programming class which has the-easy-to-learn Klartext programming on its agenda. What is unique here is that current students as well as working professionals have access to the TNCs in a school environment, where they can obtain either two-year degrees or six-month certificates. HEIDENHAIN will support the instructors with training manuals and will also introduce HIT (HEIDENHAIN Interactive Training) as an innovative learning method.

CCD's Rubino and HEIDENHAIN TNC Control at AMC

The AMC has already run demonstrations for other local colleges on the GF Mikron machines, for example to show aerospace students how turbine blades used to propel rockets are manufactured.

Going forward, in order to promote advanced manufacturing among students on a broader scale, Rubino points to teaching "new manufacturing and technology" according to the European model. And in regard to teaching the newest technology, Rubino and his colleagues plan to rely on new generation TNC controls for their students to succeed in their manufacturing careers.

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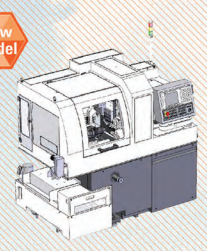
New Model



XD12III-H

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

New Model

XD42N

Index		Characteristic
Machine	Max.rpm	Ø45mm
	Machining bore	Mian 100 Sub 276
NC		FANUC 0i-TF
SIZE		2,580 X 1,690 X 1,750
Weight		4,100kg

XD26II-NH

Index		Characteristic
Machine	Max.rpm	10,000rpm
	Machining bore	Ø20mm
NC		Hanwha 32i-B
SIZE		2,340x1,230x1,720
Weight		2,700kg

XD20V

Index		Characteristic
Machine	Max.rpm	10,000rpm
	Machining bore	Ø20mm
NC		Fanuc 32i-B
SIZE		2,160x1,160x1,690
Weight		2,500kg

XD38II-H

Index		Characteristic
Machine	Max.rpm	6,500rpm
	Machining bore	Ø38mm
NC		FANUC 32i-B
SIZE		2,640x1,390x1,750
Weight		3,600kg

STL38H

Index		Characteristic
Machine	Max.rpm	6,500rpm
	Machining bore	Ø38mm
NC		Siemens 840D
SIZE		2,800x1,840x1,790
Weight		4,600kg

Hanwha Machinery America

Address : 9750 S Oakwood Park Dr. Franklin, WI 53132
Tel : 414-421-2300

CAD/CAM Perspective

By: Tim Paul
CAM Application Engineer with Autodesk Inc.
Tim.Paul@Autodesk.com
Instagram: OneEarTim

Life doesn't have to be comfortable to be awesome:

I've followed a lot of opportunities throughout my career that pushed me well past what was comfortable. Often the more awesome the opportunity the more uncomfortable the journey.

I recently started hosting a "Nor-Cal Machinist Geek Meetup" group. My goal was to start a group of likeminded Machinists to help build our machinist community, share knowledge and be awesome.

At our first Meetup, the group discussed the lack of skilled and experienced people in our trade. We also talked about the lack of willingness to learn something new like modern CAD/CAM software. I asked the group, "what are we doing to fix this?" and received mixed answers. I talked about Autodesk's commitment to supplying Students, Teachers and Academic Institutions with professional tools and resources for free and the impact I've seen it have locally and around the country. I talked about the great work I've seen from Titan Gilroy and his team. Titan is working on a Titan's of CNC Academy that offers projects and training for free to everyone online. What's even more impressive to me is what Titan's employee, Stuart Mcconnachie is doing. Stuart is volunteering his time to mentor Rocklin High School students from Dan Frank's Engineering Support Technologies program.

At our 2nd Meetup we were joined by two smart and enthusiastic Rocklin High School students from Dan's program. Jacob Sanchez (Sr.) and Nic Sherrill (Jr.) brought great energy to our group and are a good reminder of why I love the manufacturing industry. The students were able to explain to the class how nice Dan's program is but more importantly how priceless Stuart's mentorship has been. Nic and Jacob were eager to show off their Fusion 360 projects and pics from the Fusion app on their Phones of parts they made for their Car's.

As part of our group conversation people were sharing their experiences, different companies they worked for and why they moved from job to job. It became clear to me that a lot of machinists have done what I have done to further my career. I have made a number of moves inside of the manufacturing industry and almost every time it was in pursuit of more knowledge and challenges.

My good friend Andy had just given his two weeks' notice at a well-known Government contractor job. Many people would happily die or retire from the job Andy was leaving. I asked Andy, "Why did you just give Notice?". Andy went on to tell a similar story that many of us had already told. He wanted to learn more and be challenged in his trade. He also explained to me personally how nervous he was about leaving the job. I told Andy the same thing I often tell myself, "Life doesn't have to be comfortable to be awesome.".

Towards the end of our meetup someone asked Nic and Jacob what they were planning on doing after High School. They both gave thoughtful answers. Both involved some level of college and both clearly wanting to be in the business of making things. I can assume most of the people in the room were as disappointed as I was to not hear them say, “I want to be a machinist.’. I have no doubt that Jacob and Nic will be hugely successful at whatever career they find, as long as they find one they are passionate about and challenge themselves to not get too comfortable.

If the machining industry continues to lose young people like Jacob and Nic, we will continue to see the industry we love starve of good, experienced people that are willing to learn new things. There are many great programs around the country that have good curriculum, but how many are showing the path into our industry?

If we want our industry to survive and thrive, there needs to be more people from inside the industry like Stuart Mcconnachie that reach out to young people and steward the next generation of machinists into the industry we love.

Industry News

Index Announces Western Regional Sales Manager

Index Corp. named Gino Viviani regional sales manager covering the western US, including California, Arizona, Utah, Nevada, Colorado and New Mexico. Gino joins Index from his previous position at Alcoa Fastening Systems in southern California where he managed the aerospace facilities capital acquisition.

Gino will be leading a sales force in the western US as well as developing sales strategies specific to the region. "Gino has demonstrated his ability in the productive application of technology and will introduce manufacturers in the Western region to Index and Traub solutions. We are looking forward to leveraging his skills, experience, and regional knowledge." –Mark Saalmuller, Index North America sales manager

Moseys Production Machinists Announces Rebrand and New Website Launch

Moseys Production Machinists, has announced the launch of its new brand and website. Long known as "MPM" for Moseys Production Machinists, the new brand and logo places greater emphasis on the name "Moseys," the family's name who founded the company in 1975.

The new Moseys website is www.moseys.com. Built on the latest responsive technology, the website is designed to provide a more user-friendly and functional experience. The site is highly compatible on all devices, including mobile, creating easier and quicker access for customers.

"We are very proud and excited to announce the launch of the new Moseys brand and website," said Bob Mosey, the company's president. "The new brand and updated look will allow us to better represent the high quality, precision work that we do around the world, and also expand our presence across multiple industries. As a third-generation business, we have experienced growth and success with a few common denominators: fully understanding the needs of customers and building strong, long-term relationships. Even though our look has changed, our commitment to partnering with customers remains the same."

Moseys' success during its 41-year history can be attributed to its commitment to innovation. By focusing on its innovative operational approach, the company has developed a set of master production processes for customers that are lean, efficient, and consistently repeatable. Moseys refers to this as "Production Process Innovation," a concept highlighted on the website. The manufacturing process is facilitated by a team of precision craftsman.

Mazak Optonics Promotes Bohlen to President

Mazak Optonics Corporation has announced that effective immediately Al Bohlen has been promoted to president of their North American operations.

Bohlen has been vice president and general manager since 2013. The appointment reflects Bohlen's record of leadership and results achieved throughout his tenure at Mazak. He has been a key driver in elevating sales performance and increasing the market share of the company since his arrival in 2011.

Tomohisa Yamazaki, president and CEO of Yamazaki Mazak, made the appointment of Bohlen to president to better position Mazak Optonics for future growth and to continue the momentum of the last few years. The launch of Mazak's new Direct Diode Laser technology and laser machine manufacturing operations at their Florence, Kentucky campus makes it an important time for Mazak.

Bohlen's depth of technical experience should help strengthen Mazak's position in this evolving market.

OMAX Employee Earns Prestigious Grade of ASME Fellow

Darren L. Stang, principal systems engineer at OMAX Corporation, was recently elevated to the distinctive grade of Fellow from the American Society of Mechanical Engineers (ASME) in recognition of his outstanding engineering achievements.

Thomas G. Loughlin, executive director of ASME, and Dr. Sam Y. Zamrik, past president of ASME, presented Stang with the award at the 50th annual PVP Conference honors and awards banquet on July 20th, 2016 in Vancouver, Canada. Stang joins an

Far left: Sam Y. Zamrik, PhD, ASME PVP 2016 Conference Advisor Middle: Thomas G. Loughlin, CAE, Executive Director of ASME Right: Darren L. Stang, Principal Systems Engineer at OMAX Corporation

Industry News

elite group of 3,439 Fellows out of over 100,000 ASME members.

Stang has over 30 years of experience in designing, manufacturing and high-pressure equipment. Stang is an expert in high-pressure technology, and serves as the subject matter expert for OMAX Corporation in the areas of fatigue, fracture mechanics, damage tolerance and fatigue mitigation.

Stang merits his fellowship through his leadership, dedication and promotion of high-pressure technology in the Pressure Vessel and Piping (PVP) Division of ASME, and through his work in the ASME Section VIII, Division 3 codes and standards committee. Stang has served as chairman of the High Pressure Technology Committee and currently serves on the PVP Division Executive Committee. Stang is also a past recipient of the prestigious S.S. Chen PVP Outstanding Service Award, and Jim Farr PVP Outstanding Conference Session Award.

Big Kaiser Receives NTMA Distinguished Service Award

The National Tooling & Machining Association recognized Chris Kaiser, president/CEO of BIG KAISER, with the 2016 NTMA Distinguished Service Award at the recent Fall Conference in Charlotte, N.C. The annual award recognizes an associate member or partner for their exceptional support of the Association, and leadership in the manufacturing industry.

"Chris has demonstrated a tireless commitment to manufacturing advocacy," said David Tilstone, president of NTMA. "He supports workforce development through the company's apprenticeship and internship programs, STEM initiatives like National Robotics League, and the Northern Illinois G-CAMP manufacturing partnership. He is a strong supporter of many regional and national NTMA events, as well as international Technology Tours for our members."

Industry News

From left: Mark Hatch, Product Director, Emuge Corp.; Bob Hellinger, President, Emuge Corp; Stas Mylek, Senior Product Marketing Specialist, Mastercam & Jesse Trinque, Applications Engineer, Mastercam.

Emuge And Mastercam Establish Partnership

Emuge Corp. announced it has established a partnership with CNC Software, Inc., developers of the manufacturing industry's well known Mastercam® CAD/CAM software.

Both companies will share technical data and best practices on machining applications and programs, participate in joint seminars and training events at each other's technology centers, and collaborate to develop and promote advanced, high productivity machining solutions for North American manufacturing professionals.

"We are very pleased to partner with Mastercam and see the relationship as an excellent way to further enhance our metal cutting solutions for customers throughout the U.S. and Canada. Mastercam has an outstanding reputation across the industry for providing leading CAD/CAM solutions for the latest machining technology, which aligns well with our customer base and approach," said Bob Hellinger, president of Emuge Corp.

"We are excited to establish a partnership with Emuge who, like CNC Software, has consistently provided innovative, industry-leading solutions for manufacturers. We are looking forward to working together, leveraging our extensive resources and expertise to offer the very latest technology for our customers," said Meghan West, president of CNC Software, Inc.

Emuge and Mastercam are planning upcoming training and seminar events for 2017. Customers will be notified and information on events will also be posted on their respective websites.

Industry News

Heidenhain Introduces Lighthouse Global Energy As a New Distributor in Texas

With close proximity to the largest wind farms and oil fields in Texas, Lighthouse Global Energy partnered with Heidenhain Corporation earlier this year to become an official distributor of Heidenhain equipment components. Specializing in the offering of the Leine & Linde brand of rugged encoders, Lighthouse Global Energy has quickly become an important go-to source for the area.

With an in-house engineering department, as well as a full line of manufacturing and machining capabilities, Lighthouse Global Energy in Abilene, TX specializes in repair and manufacturing solution for wind energy and oil & gas components. The heavy, severe duty Leine & Linde encoders used in these applications are well suited for drive and measurement applications. They are well known as high quality, heavy duty encoders of both the incremental and absolute types, and are noted for their product robustness designed to cope with the harshest of environments, such as those with high vibration, dirt and cold temperatures.

"We are thrilled to partner with Lighthouse Global Energy in order to quickly meet the needs of important energy customers in the U.S.," explained Tom Wyatt, Heidenhain's product management and marketing manager in North America.

Boeing to Acquire Liquid Robotics

Boeing has entered into an agreement to acquire Liquid Robotics, a market leader in autonomous maritime systems and developer of the Wave Glider ocean surface robot, to grow its seabed-to-space autonomous capabilities.

"With Liquid Robotics' innovative technology and Boeing's leading intelligence, surveillance, and reconnaissance solutions, we are helping our customers address maritime challenges in ways that make existing platforms smarter, missions safer and operations more efficient," said Leanne Caret, president and CEO of Boeing Defense, Space & Security.

In September 2014, Boeing and

Industry News

Liquid Robotics entered into a teaming agreement resulting in extensive integration on the Sensor Hosting Autonomous Remote Craft (SHARC®), a version of the Wave Glider. The SHARC, integrated with Boeing's advanced sensors, connects intelligence, surveillance and reconnaissance capabilities ranging from satellites to manned and unmanned aircraft to subsurface crafts.

Liquid Robotics has designed and manufactured the Wave Glider, the first wave and solar-powered autonomous ocean robot, since its founding in 2007. With more than 1 million nautical miles traveled, the Wave Glider's capabilities address the challenges facing defense, commercial and science customers by making ocean data collection and communications easier, safer and immediate.

Liquid Robotics has approximately 100 employees in California and Hawaii. The company will become a subsidiary of Boeing operating under its current business model

Makino Q1 2017 Online Seminar Schedule Announced

Makino announced its latest lineup of online seminars for first-quarter 2017. The upcoming presentations are set to provide attendees with the latest technologies and insights to improve productivity in the coming year with topics focused on new 5-axis machining solutions, customer support tools and advancements in CNC capabilities. All Makino seminars are presented free of charge with account registration.

Makino's online seminar series has broadcast more than 150 presentations with thousands of attendees over the last 10 years. Each online seminar typically consists of a 20- to 30-minute presentation with a live Q&A session with the speaker. The Makino online seminar schedule is updated regularly throughout the year with updates posted to www.makino.com/webinars upon announcement.

First Quarter 2017 Online Seminar Schedule

January 19 – Building a New Benchmark for 5-Axis Productivity

Industry News

What do you get when you mix the best design characteristics from both 5-axis vertical and horizontal machine platforms? A powerhouse of 5-axis productivity—the DA300. This uniquely designed vertical machining center provides the ideal blend of speed, precision, technology, flexibility and expandability for complex part applications. .

February 16 – MyMakino Customer Portal: A Valuable Tool to Enhance Your Makino Experience

Makino has developed MyMakino, a web portal that provides a personalized, secure interface between you and Makino. This tool equips you with information that can help your manufacturing operation and relationship with your supplier. MyMakino has specific machine service history and responses to frequently asked questions and other technical advice. Users can view and download manuals, watch instructional videos and much more.

March 23 – Breaking Through the CNC Barrier

Sometimes the only barrier between an idea and finished product is the CNC interface. Learn about the critical features and qualities of a CNC that can either help or hinder your productivity, profitability and even safety. Break through the CNC barrier, and get your shop moving from parts to profits faster.

Sandvik Coromant becomes DMG MORI Premium Partner

Sandvik Coromant has signed an agreement to become a Premium Partner of leading machine tool manufacturer DMG MORI. The deal, which makes Sandvik Coromant the only tooling manufacturer to be named as a DMG MORI Premium Partner, will further strengthen the relationship between the companies on a global scale.

As a DMG MORI Premium Partner, Sandvik Coromant will work with the machine tool builder on a wide-range of initiatives, including R&D and engineering, open house events, trade show appearances, technical seminars, website collaboration, and the DMG MORI Journal. Specifically, the agreement will give users of DMG MORI machines access to the turning, parting and grooving, threading, milling, drilling, boring, and reaming tools from Sandvik Coromant.

Sandvik Coromant will equip DMG MORI machines with a wide range of products, services, and know-how. For example, a customized start-up tool kit and service will be supplied with each NLX series

Industry News

universal lathe and NT turn-mill center in selected markets. On the CLX/CMX (previously Ecoline) entry-level machines and DMC V vertical machining centers, users will receive a defined tool kit and global service provision.

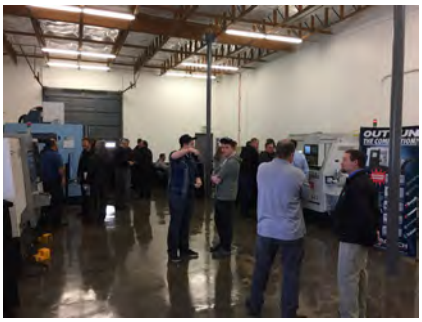
Vice President–elect Mike Pence recently met with members of the National Association of Manufacturers' (NAM) Executive Committee, a group of the country's most influential manufacturing leaders, at the NAM's

Caption: Vice President-elect Mike Pence speaks to the National Association of Manufacturers' (NAM) Executive Committee. From left: Chairman and CEO of Tenneco/Chairman of the NAM Board of Directors Gregg Sherrill, Pence, NAM President and CEO Jay Timmons. Photo by David Bohrer/ NAM

headquarters in Washington, D.C. They had a wide-ranging and robust conversation about the policies needed to create jobs and support working families by growing manufacturing in the United States. They discussed the need to work together to deliver tax reform, make necessary investments in our infrastructure, address regulatory burdens, rethink how regulations are developed, rein in health care costs and unleash our energy resources.

The vice president–elect asked the NAM to help their administration prioritize which regulations should be reviewed for possible repeal that will best help support and grow manufacturing jobs in America. Manufacturers also communicated to the vice president–elect their appreciation of President-elect Donald Trump's willingness and commitment to engage constructively with manufacturing leaders and support manufacturing to create jobs as well as a better business climate in the United States.

Industry News



Selway Machine Tool Company Now in Utah

Selway Machine Tool Co., a premier manufacturing solutions house opened up their modern Utah showroom to the public. Customers drove from as far as 3 hours away for live machine demonstrations on Matsuura's MX-330, the Eurotech Rapido B436Y2, and Hwacheon's Cutex 240B SMC. Autodesk CAD/CAM software was showcased with factory rep demonstrations and training classes.

"It was a fantastic event" stated Andrew Hogue, Utah territory sales manager when asked about the open house. "We had over 100 attendees over the course of 2 days. Customers had a great time interacting with our application engineers & factory reps from Eurotech, Matsuura, and Autodesk. One attendee stayed at the event all day watching demos, eating lunch, & participating in the free afternoon HSMWorks software class. It's great to be able to provide a place where the Utah manufacturing community can network, learn some tricks, or just hang out and talk shop."

Below is a list of the featured products presented at the event:

Matsuura MX-330: Compact, ergonomic, 5-axis, high speed machining center comes with a 15K BT40 Maxia Spindle, 60 tool changer & a 250mm rotary table. This machine was cutting a single blade aluminum part programmed in Autodesk HSMWorks software & showcased CAMPlete's live machine simulation during the cut.

Eurotech Rapido B436Y2: 10 Axis turn/mill machining center with (2) 12 station live turrets, (2) 7000rpm C-axis Spindles, 1.97" of Y-Axis Stroke, 1.5" Bar Capacity, capable of having 3 tools in the cut simultaneously. The Rapido was cutting a muzzle brake in under 3 minutes.

Hwacheon Cutex 240B SMC: 8-10" chucker intergrated turning center, 12

Industry News

station single turret, 5,000-6,000 rpm main spindle, 5,000 rpm sub spindle, 1.81”-2.5” max bar size.

Autodesk HSMWorks Software: 2.5 axis – 5 axis professional milling and turning applications CAD/CAM software.

Of the company’s recent move eastward, President Bill Selway said, “We were offered the opportunity to represent most of the CNC machining center lines we carry for the Utah territory and jumped right in. It’s progress. Selway started in Northern California, spread to Washington, Oregon, southern California and Nevada; with it’s diversified manufacturing market, Utah was the logical next step for us.”

To solidify a position in Utah as a thought leader for manufacturing solutions Selway acquired a 3500sq ft showroom just outside of downtown Salt Lake City. This facility will be used as an office for sales/service personnel, as well as a showroom for live machine demos, & training classes.

The Selway Machine Tool Co. Utah showroom is located at 2562 West Custer Road, Salt Lake City, Utah 84104

Heidenhain Launches Touch Probe Rapid Repair Service Program

Heidenhain Corp. Commercial Services has announced the new Touch Probe Rapid Repair service program. This new program is intended to provide timely and accurate support to the Touch Probe Stocking Program launched earlier in 2016.

The Touch Probe Rapid Repair program is now providing all Heidenhain touch-probe customers in North America with quicker turnaround for select touch-probe assemblies.

California Based Inland Empires Manufacturers’ Council is Seeking Applications for Summit Innovation Awards.

Inland Empire area Manufacturers are encouraged to enter in five categories. A new award, for college student teams, has been added and offers up to $2,000 in scholarships per project team.

Awards will be made at the Manu-

Industry News

facturing Summit, the largest event of its kind in Southern California, to be held at the Ontario Convention Center on February 3, 2017. To apply, simply download the application from the MCIE website, at http://mfgcouncilie.com/innovation-awards.

Bourn & Koch Purchases DTI

Bourn & Koch a subsidiary of Alleghany Capital Corp., has acquired Diamond Technology Innovations (DTI; Olympia, Washington), a manufacturer of waterjet orifices, nozzles and related products.

"The acquisition of DTI enhances Bourn & Koch's existing business in machine tool consumables and spare parts, and provides an entrance into the waterjet market," says Terry Derrico, Bourn & Koch president. "Waterjet is one of the faster-growing segments within the machine tool industry," he adds.

Ted Jernigan, president of DTI, will continue in his role, and the company's day-to-day operations will not be impacted by the transaction, according to Bourn & Koch.

DTI offers a variety of waterjet orifice materials including low-cost, short-life ruby and sapphire; mid-grade, low-cost/high-performance TetraCore; and premium-grade DTI-Core Diamond

Okuma America Gains ISO Certification

Okuma America Corp. has been awarded the ISO 9001:2015 certification by PRG (Preferred Registrar Group) Inc. According to Okuma, it is the first and currently the only CNC machine tool builder to earn this ISO certification.

This standard is based on a number of quality management principles including a strong customer focus, the motivation and implication of top management, the process approach, and continual improvement. Using ISO 9001:2015 helps ensure that customers receive consistently good-quality products and services.

By implementing ISO standards, Okuma says it reduces operating costs by minimizing waste and errors through improved systems and processes.

New Products

VarioBore Precision Boring Head System —Allied Machine & Engineering

The Wohlhaupter VarioBore precision boring head system, available from Allied Machine & Engineering, is said to improve productivity through ease and accuracy of adjustment and to virtually eliminate scrap because of its exact adjustments. With a range of 0.016" to 5.985" the boring head provides an accuracy of 0.0001" on diameter, and speeds ranging to 30,000 rpm.

The boring head can be used alone or with a docking port and universal digital readout (DRO) module. A single universal DRO module can be used to set any number of tools that have docking ports. The module provides accuracy of 0.0001" on the diameter with setting accuracy of ±1 micron. The battery enables as many as 5,000 settings and is switched off after 30 sec.

Many New Features for DataXchange —Shop Floor Automations

Shop Floor Automations, an authorized reseller of Scytec's DataXchange, announced changes that the shop floor software is undergoing.

New features include an MTConnect Data Viewer, making the software more compatible with MTConnect.

Scytec support staff will now remotely restart DataXchange services.

The Real-Time Viewer has been updated, adding the ability to copy RTV screens to groups or users, as well as new reports and charts like Operation Time, plus the OEE Equipment Summary and Grid. Scytec has also added a UI option to change whether the service runs over http or https.

Many existing features have been updated or improved. A line has been added in the Target Utilization per period chart that represents the average for each of the machines.

This software update includes a number of bug fixes, as well. Labels on the Metric Definitions page have been fixed to properly reflect the calculations being used. Also, sorting by equipment filter has been improved.

Enjoy easier removal of machines from the RTV, plus your saved utilization charts should now return data. Managing user report group memberships should be smoother, and the Auto Login should work in iOS.

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For exhibiting information contact
Joyce Lortz at800-827-8009 x4424 or jlortz@facilitiesexpo.com

New Products

Computed Topography Scanners —Zeiss

Zeiss offers two computed tomography (CT) scanners: the Zeis Metrotom 800, with an extended performance spectrum, and the Zeiss Metrotom 1500. For the Metrotom 800, users can choose between models with a tube voltage of 225 or 130 kV. The significant increase in power from 39 to 500 watts on the 225-kV version offers several advantages. The machine can scan metal components along with mixed materials, such as hybrid workpieces, without any difficulty, the company says.

With the 225-kV Metrotom 1500, operators can receive information about the entire component. Unlike its predecessor, this model is designed to scan larger components with a new measuring Z axis. The maximum height of the components has been raised from 300 mm to 700 mm. The workpiece can now be raised and lowered by 400 mm instead of 150 mm. In addition, multiple scans can be merged into one volume model. Workpieces such as steering columns and other larger castings can now be tested non-invasively. This is an important requirement for shortening the time needed for initial sampling and accelerating process optimization during production ramp-ups.

The corresponding visualization and evaluation software provides 3D visualizations and section views based on the voxel data generated by the Metrotom OS. In addition to visualizations, the program also provides information on the shape, size and position of characteristics.

The machines feature a complete enclosure to protect the operator from X rays, but the interior can be viewed by standing in front of the CT scanner or at a different workstation. Every machine is equipped with a camera and monitor. The image from the camera can be displayed on the reconstruction computer to set up the measurement. When preparing the measurement

New Products

at the workstation, the operator can ensure that there will not be a collision between the component and the detector or tube.

Version 4 of SmartProfile Released —Kotem

Kotem, a Quality Vision International (QVI) company, has released version 4 of SmartProfile, its 3D geometric dimensioning and tolerancing (GD&T) analysis software. It is designed to provide fast, accurate analysis of measurements compared to a part's CAD model and can be used to confirm GD&T compliance for shape, form, profile, orientation and location on any rigid part. According to the developer, the software complies with current GD&T standards (ASME Y14.5-1994, ASME Y14.5-2009 and ISO 1101) including multi-tier position and profile tolerances.

The new SmartProfile edition numerous new features including the ability to construct new features and relationships from a complete library of geometries; a control frame editor supporting multi-tier tolerances, complex compound datums and standard specific symbols; and the user's choice of graphical or text-based reports, or output to statistical analysis software. New productivity tools include multi-thread architecture for high performance with very large point clouds; predefined filters for failed items and tolerance types as well as custom filters; a Scripting Wizard for automating common routines; and the ability to import or replace popular native CAD formats including IGES, STEP, STL and VDA files.

An optional Shop Floor Manufacturing Assistant enables the user to import work groups from CAM, set up alignments to match machining processes, visualize tolerance status under functional GD&T datums and machining datums, and clearly see corrective actions needed to comply with GD&T.

New Products

New Big Portfolio of Software —Autodesk

Autodesk now offers a portfolio of software for additive and subtractive manufacturing, bringing together products previously offered from Autodesk, Delcam, Netfabb, Pan Computing and Magestic Systems, including HSMWorks, Inventor HSM, Fusion 360, FeatureCAM, PowerMill, PartMaker (now included in FeatureCAM), PowerShape, PowerInspect and Netfabb. Taken together, these products comprise CAM, additive manufacturing, composites, robotics fabrication, factory layout, inspection and modeling.

One part of the portfolio is Autodesk 2017 CAM products, which combine CAM software from Delcam with Autodesk's 3D design and manufacturing offerings. These products include FeatureCAM for automating CNC programming; PartMaker for precision part manufacturing on Swiss-type lathes; PowerMill for programming complex molds, dies and other components; PowerShape for preparing complex models for manufacture; and PowerInspect for part inspection.

The portfolio also includes Autodesk HSMWorks, a fully integrated CAM solution for SolidWorks; Autodesk Inventor HSM, which helps CNC programmers, designers and engineers rapidly produce machined parts designed in virtually any CAD system; Autodesk Netfabb, with software to reduce costs, increase efficiency and improve part performance in additive manufacturing; and Fusion 360, the centerpiece of Autodesk's cloud-based platform, which combines CAD, CAM and CAE in a single package.

This integrated portfolio is intended to provide a modular and scalable platform for manufacturers of all sizes.

Mastercam 2017 Released —CNC Software

CNC Software Inc. offers Mastercam 2017, introducing dozens of significant improvements intended to make it easier to create CNC programs for complex parts, improve safe material removal and extend support for a

New Products

broader range of equipment.

The software incorporates a robust CAD package that includes special tools for preparing CAD models for efficient CNC programming and for designing tools and fixtures used during subsequent manufacturing processes. CAD-for-CAM tools can reportedly eliminate hours of time required to prepare models for efficient CNC programming. For example, Solid Impression helps quickly make custom fixtures while Solid Disassemble takes an assembly and lays each body out for easier machining.

Enhancements to make 2D machining more efficient include improvements to Mastercam's Dynamic Motion tool paths.

To ease programming for complex parts on four- and five-axis machines, the Advanced Rotary 4-Axis module automatically constructs the appropriate tool path based on a short sequence of predefined steps. Similarly, Stock Aware Multiaxis Drilling simplifies and automates the creation of multi-axis hole drilling operations. For programming mill-turn machines, Mastercam 2017 introduces Multi-Station Tool Locators for turrets and half-index positions. Tool locator positions are now set in the turret setup, which has been redesigned; as a result, CNC Software reports that turrets that could only support 12 tools before can now show 50.

Mastercam's CAM programming tools have been reorganized and relocated to be easier to find and to improve workflow.

New 5-Axis VMC —Matsuura Machinery

Matsuura Machinery's MX-330 five-axis VMC features a high-accuracy, 15,000-rpm spindle with 48 foot-pounds of torque. Optional 15,000-rpm spindles with 88 foot-pounds of torque and 20,000-rpm spindles with 80 foot-pounds of torque are available. The machining center is designed for medical, aerospace and other high-precision components. The company reports that the MX-330 offers an easy transition from three-axis to five-sided or five-axis production.

The VMC features a table loading

New Products

capacity of 177 lbs and a maximum work envelope of 330 × 320 mm. A ram-type structure offers a compact and durable machining platform, while available tool magazines include a standard 30-tool drum or optional 60- and 90-tool chains. The MX-330 also features a 10-pallet changer and comes standard with a Fanuc 31iMB with Panel-I control.

New Tool Magazine on VC-500A/5X —Mazak

Made in Kentucky, the VC-500A/5X vertical machining center has a trunnion-style rotary/tilt table that allows for the accurate, cost-effective

processing of small complex parts via full 5-axis machining. The machine also features the Mazatrol SmoothX CNC.

The VC-500A/5X comes standard equipped with a high-performance CAT-40, 12,000-rpm spindle. Optional speeds of 15,000 rpm and 20,000 rpm are available.

Mazak reports with 60-tool capacity, the new tool magazine on the VC-500A/5X helps reduce set up time, allows for redundant tooling and provides more unmanned uninterrupted operations. In tandem with the magazine, the machine's automatic tool changer provides fast tool exchanges.

Axis travels for the VC-500A/5X measure 19.88" in X, 19.88" in Y and 20.07" in Z, allowing it to accommodate a part sizes up to 19.68" in diameter and 12" high. Rapid traverse speeds for these three linear axes are 1,181 ipm.

New Products

To minimize thermal displacement, Mazak incorporates an oil chiller that cools the VC-500A/5X's head and table. The machine's trunnion-style rotary/tilt table is constructed with durable high-speed roller gear cam drive technology. The table tilts +110 degrees / - 110 degrees in the B axis and rotates 360 degrees in the C axis and can accommodate workpiece weights up to 440 lbs.

Mazak's Mazatrol SmoothX CNC on the VC-500A/5X generates programs for highly complex parts production. It has several advanced functions that allow it to ensure the shortest possible machining cycle times, especially in fine increment programs for simultaneous 5-axis operations and free-form die-mold machining.

A large 19" display presents all of the critical machine data within a single page view, while the tilt control panel allows for optimum positioning based on operator height. An intuitive multi-touch screen, enables fast and smooth programming operations.

Mitutoyo Releases Latest Generation of Linear Scale

Mitutoyo announced the ABSOLUTE AT1100, the latest generation of assembly-type linear scales that incorporate Mitutoyo's electromagnetic induction technology, which provides resistance against contaminants such as cutting fluids, oil and water.

The innovative shape and location of the detector track in the aluminum frame provides a highly effective defense against the contamination of the scale and sensor, even in harsh environments. The sensor-to-scale air gap is approximately 0.4 mm, about 4x as wide as that of conventional optical or electromagnetic induction systems, thereby providing additional protection against dust or oil contamination.

ABS AT1100 linear scales are available up to an effective range of 3,040 mm and are compatible with fanuc Corporation's serial interface and Mitsubishi Electric Corporation's high-speed serial interface.

ABS AT1100 series scales are a special order item.

New Products

Non Contact Vision Probe —Renishaw

RVP, Renishaw's vision measurement probe, is designed for use with the Revo five-axis measurement system on coordinate measuring machines (CMMs). The probe is said to increase the multi-sensor capability of Revo by adding non-contact inspection to the existing touch-trigger, high-speed tactile scanning and surface finish measurement capability of the system.

Thin sheet metal parts or components with large numbers of holes as small as 0.5 mm and parts which are not suited to tactile measurement can be fully inspected with the system. The probe is designed to improve throughput and CMM capability by utilizing the five-axis motion and variable positioning provided by the Revo head.

The system consists of a probe and a range of modules that are automatically interchangeable with other probe options available for Revo. Data from multiple sensors is automatically referenced to a common datum. According to the company, this flexibility means that the optimum tool can be selected to inspect a wide range of features on one CMM platform.

When using the system, part illumination is provided by integrated programmable LED lighting inside each module. Background feature enhancement is also available using backlighting combined with custom part fixturing. The system is managed by an I++ DME compliant interface and user functionality is provided by Renishaw's Modus metrology software. New Modus vision software capability includes RVP configuration, image processing with application-specific options and automatic image storage for review and further analysis.

New Full Line of High-Pressure Vises for Milling, Grinding and Workholding —Dapra

Dapra Corporation now offers a full line of Arnold high-pressure vises that provide controllable power and dependable clamping for a wide variety of workholding applications.

The Arnold family of vises, manufactured by Fresmak, includes durable solutions that are suitable for milling, grinding, drilling, toolroom and pro-

New Products

duction work. These vises are manufactured to precision tolerances and accurate standards.

Arnold's all-purpose Classic Hydravise provides up to 18,000 lbs. of clamping pressure, with jaw widths ranging from 3.5" to 8". Hydraulic and mechanical spindles are available, as are narrow base configurations for applications requiring close mounting.

Dapra also offers Arnold vises that are designed for horizontal and vertical machining centers; twin workpiece clamping; and 5-axis machining (featuring tall jaws). Self-centering vises with small footprints are available without high-pressure clamping.

BMT Tooling Now In Stock —Heimatec

Heimatec has announced immediate availability of base mount tooling (BMT) standard products from inventory at its Chicago-area headquarters.

In addition to standard X- and Zaxis tools, styles such as adjustable tools, speed increasers and internal coolant tools with capabilities to 140 bar (2,000 PSI) are now available in an assortment of standard BMT tooling types, including BMT 45, 55, 65 and 75.

All Heimatec BMT tooling is supplied with the company's U-Tec flexible machining system, which provides high power transmission via polygonal drive. Integrated collet nut, with easy change out, can convert the output to arbor (for face mills), Weldon or ER collet extensions. The U-Tec system further allows the cutting tool to be in closer proximity to the bearing, which results in higher rigidity. "The cutting tools last longer and yield an improved finish, as a result of this Heimatec design feature," said a company spokesperson.

New Products

New PCM 4X High Speed Spindles for Citizen Swiss Machines —GenSwiss

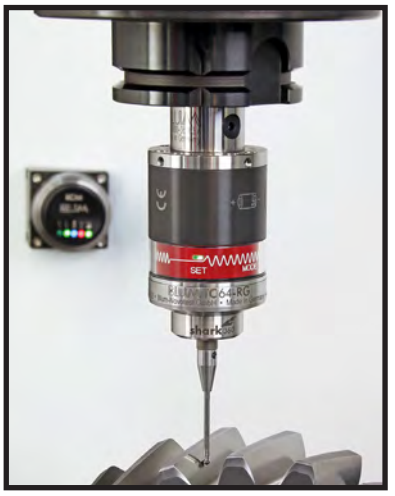
GenSwiss, a leading source for tools, accessories and assistance for Swiss machining, now offers the new PCM Swiss made 4X high speed spindles for select Citizen Swiss machines, allowing users more productive performance from their existing micro drills, end mills and high speed thread milling tooling. The spindles feature a new planetary style gear system with a low- profile configuration. The 4X Models GSC510 and GSC110 are a direct fit for many Citizen A, L, M and the new L32 series machines providing easy installation and operation.

In addition, the unique housing design seals out cutting oil for reliable long life. From application to application whatever the user programs allows use of higher rotational output speeds to minimize burrs, provide improved surface finishes and eliminate secondary operations. Rego-Fix ER8 collet is standard for the full range of micro tool holding.

New TC64-RG Roughness Gauge —Blum-Novotest, Inc.

Blum-Novotest, Inc. introduced its surface roughness gauge at IMTS, a new product in the field of machine-integrated quality monitoring.

Initially released only to test markets, the TC64-RG immediately



won appraise and various innovation awards. Recently, Blum brought their new roughness gauge to the North American market and has now made it available for sale along with complete

New Products

software packages developed for most major controls.

In the past, a reliable method of surface finish analysis could only be performed post machining, which meant the part had to be removed for analysis. Then, if during inspection, rework was deemed necessary, the part would either be hand finished or returned to the machine for machining, in which case resetting the part in its original orientation could be difficult. If not reset correctly, new defects would be introduced into the surface finish.

The TC64-RG was developed to solve this issue prior to a part's removal from its originally clamped position on the CNC machining center. Manufacturers can now check part surface finish before removing the. With a special stylus and the gauge's integrated Digilog-technology, a technology that allows analogue scanning of the part, the gauge can accurately determine a part's surface "roughness" with the part in its original orientation, thereby eliminating the necessity to remove the part for surface finish inspection and possibly resetting for improvement. New software developed for Fanuc, Heidenhain, and Siemens controls now offers easier integration with controls for various applications. Surface data such as Ra, Rz, and Rmax values are sampled at over 1,000 hz per second and recorded directly with the control.

This provides a means of integrated process control for manufacturers that must hold a specified grade of surface finish.

New Digital Dashboard —OMAX

OMAX Corporation recently launched its new Digital Customer Dashboard. This customer-centric digital initiative allows the company to further strengthen its service and support as well as streamline the overall parts-purchasing experience for customers.

OMAX meticulously developed

New Products

its Customer Dashboard, which features the company's new Marketplace e-commerce interface, to provide customers a personalized, all-encompassing and convenient digital support experience. The dashboard caters to the hectic schedules of OMAX customers that can range from Fortune 500 companies to start-ups to job shops.

"OMAX support options extend to fit our customers' schedules," said Stephen Bruner, vice-president of marketing at OMAX. "We continue to develop easy to use tools that help operators and owners get the most out of their waterjet cutting systems."

At the portal, an intuitive dashboard greets customers who can then access part order status, service cases, manuals, e-learning materials and account management tools. OMAX's E-learning resource provides convenience and flexibility for customers to obtain valuable employee training on a schedule and at a pace that works specifically for them.

After setting up their own personalized OMAX accounts, customers can also download/activate software. Plus, there is a new channel to engage, one-one-one with OMAX customer service if questions and/or concerns arise.

At the OMAX Marketplace, customers can order from over 1,000 high-quality genuine parts for OMAX and MAXIEM model abrasive waterjet machines any time day or night. The Marketplace is easy to use and also provides a quick and convenient way to re-order consumables.

New Innovative, Compact Kiwa Horizontal Machining Center —Methods

Methods Machine Tools has announced the addition of the Kiwa-

New Products

Japan Triple H40 horizontal machining center with a column traverse structure.

One of the most unique design features of the Triple H40 is its ability to support flexible mounting of various fixtures and rotary tables based on the application. The stationary table design enables long workpieces to be clamped firmly to the table, eliminating the back and forth action of moving parts with special guarding and allowing machining access to either ends of long workpieces.

The Kiwa Triple H40 has a very compact machining area of 43.3" x 23.6" x 31.5. The work table stays stationary and the X/Y/Z Axis ball-screws and roller guides are behind the X/Y Axis way covers.

The Z-Axis moves back and forth on the column, which Methods reports assures higher rigidity of the spindle than quill type spindles. In addition, the long-nosed spindle has six bearings for increased stability. Pallet size is 32.3" x 17.7" with a maximum work height of 31.1" and a maximum workload of 2,200 lbs. Exceptionally efficient chip evacuation is possible as a result of the minimized machining area due to the moving column structure and a large opening in the bed.

The Triple H40 also features a new armless Automatic Tool Changer (ATC), mounted on the top of the machine to save space, which allows the spindle to directly change tools with the magazine. This is available in a 20 or 40 tool system.

"The Triple H40 is perfect for larger fixturing and supports good access for automation," said Mr. Bernie Otto, Kiwa product manager for Methods Machine Tools, Inc. "The machine is also ideal for parts that are long and need work done on the ends."

New Optical Comparator Fixturing —R&R Fixtures

R&R Fixtures now offers a full range of optical comparator fixturing for all your inspection needs, allowing you full capacity to position, stabilize and inspect your part with complete access and viewing circumference around the part.

Choose from three options, fixturing plate with components, rotational

New Products

angle vise or vertical fixture (shown) all attach to the optical comparator rails via dovetails/ jam nuts and can be used in conjunction with all other R&R Fixturing components. Built for flexibility, ease of use, and most of all unobstructed viewing of your parts on your optical comparator

New 2017 Software —Verisurf®

Verisurf Software, Inc. announced Verisurf 2017, the latest release of its measurement software for advanced surface analysis, quality inspection, assembly guidance and reverse engineering. The new release includes many enhancements and added capabilities. The Verisurf User Interface (UI) has been entirely reorganized with updated icons and enhanced "tool tips" to streamlines workflows, make applications easier to learn, and maintain compliance with the latest Windows standards. Programmers can now create custom apps using any common programming language with the rollout of "Verisurf SDK." "Power Surface" catapults existing Verisurf CAD modeling power to new heights with the ability to fills holes or fit CAD surfaces through point clouds and meshes with fine tuning control and fidelity previously nonexistent. This release also has a spectrum of new tools for managing, displaying, editing, and enhancing scan and mesh data.

There are many added-features and enhancements in the new Verisurf 2017 release. The following is a brief description of the highlights:

A completely reorganized user interface features all new icons, expanded, pop-up "tool tips", and improved dialogs consistent with current Windows standards.

20mm Hybrid Swiss CNC Lathe —Ganesh

The Ganesh CNC Swiss lathe se-

New Products

ries, such as the twin-spindle SL-20Y2 8-axis 20mm Swiss lathe, addresses the need of getting work up to Ø 3/4" done efficiently in only one operation with all of the axial and radial milling features accurately timed and deburred. Getting the work completed without building fixtures for follow-on operations, and tying up multiple machines and operators, is true "Done-in-One" machining efficiency.

Ganesh multi-tasking CNC Swiss lathes start with the 8-axis SL-20Y2 20mm machine. Ganesh Machinery also offers 32mm and 42mm Swiss CNC lathes. The SL-20Y2 can be operated with, or without, a guide bushing so you can make the most profitable choice of operating modes that provide the best production solution for each job. The 10,000 RPM main spindle is powered by a 5-horsepower spindle motor, the sub-spindle turns at 8,000 RPM and is also 5-horsepower. There are 30-toolholders supplied with the basic machine of which 8-tools are driven using ER-16 collet spindles.

The main spindle can bring 17-tools to work the part and the sub-spindle can utilize 13-tools in the basic machine configuration. Many tooling options are available to address the specific tooling needs of each workpiece. All of the Taiwanese built Ganesh machines feature a high-performance C-axis on both the main and subspindle for accurately timed axial and radial milling feature placement.

A parts catcher and parts conveyor is provided on all Ganesh multitasking machines. A cut-off confirmation sweep-arm switch is provided to ensure that the part was separated from the

New Products

barstock successfully. Cutting oil flow confirmation monitoring is provided to ensure that the cutting oil is properly lubricating the cutting tools.

40-Ton Electric Press Brake —LVD Strippit

LVD Strippit has expanded its Dyna-Press Series of compact, high-speed electric press brakes with the addition of the Dyna-Press 40/15 Plus, a 40-ton model that offers a working length of 60" and features a precision 4-axis back gauge and LVD's exclusive TOUCH-B touchscreen CNC control.

The Dyna-Press 40/15 Plus is designed to efficiently bend parts at high bending speeds of 59" per minute producing more parts per hour at a lower cost per part. The coupling of the ram and servomotors is realized through two heavy-duty ball screws to distribute force and tonnage evenly across the working length. The electric ram offers smooth transition from approach to working speed and minimizes power consumption through the use of an optimal power to inertia motor ratio.

The Dyna-Press is designed to provide enhanced production capabilities with consistent repeatability and accuracy, as well as the flexibility to handle a broader range of parts through a precision 4-axis back gauge.

The Touch-B 15" touchscreen control is designed to make set-up fast and efficient. With minimal input, the operator can create 2-D and simulate in 3-D on the 15" touchscreen. The Touch-B control also offers network connection with Cadman-B programming software for added flexibility.

The Dyna-Press 40/15 Plus front support table gives the operator the option to work in a seated or standing position.

Compact Linear Pallet System —Doosan Machine Tools

Doosan Machine Tools America offers a range of automation devices to enable customers to extend machining time during staffed shifts and for lights out operations. Doosan's LPSII linear pallet system, for example, can be used with its high- performance HP 5100II

New Products

horizontal machining center (HMC).

"We classify this system as 'compact' with a 12-pallet capacity serving one machine," said Jim Im, Doosan's engineering manager–Machining Centers. "We offer more extensive systems— some with up to 72 pallets. We designed the LPSII compact system with floor space concerns in mind. Many of our customers want to boost productivity but cannot add real estate. Customers are generally surprised at how simple it is to integrate with one of our newer HMCs out in the field. Installation only takes about five days. It adds a remarkable level of continuous production, particularly for those customers who are new to the concept. Training for the system is less than two days."

Workpiece sizes up to 31.4 x 35.4" can be accommodated on each pallet and with weights up to 1,102.5 lbs.

Slimmed-Down Milling Chuck —Big Kaiser

Big Kaiser has launched the HMCJ, a super-slim milling chuck with peripheral coolant supply, designed to support heavy-duty and finish end milling tasks with power and precision using Ø1/2" or Ø12mm cutters.

The newest, slimmer member of the Hi-Power Milling Chuck (HMC) family features a clamping bore with fine slots surrounded by hundreds of needle bearings, which ensures concentric, precise and smooth clamping when the nut is tightened.

The slim yet rigid design of this new chuck brings the nut diameter down to an impressive 1.260". This was achieved while maintaining an uncompromising and substantial cross section of .394" to prevent

New Products

chatter and deliver cutting security. The max jet-through coolant pressure is 70 bar.

Despite being designed for heavy cutting, the HMCJ milling chuck is able to maintain a runout accuracy of ten microns at 4xD, giving it additional flexibility for use on finishing applications. For additional rigidity and accuracy, the CAT and BT interfaces are BIG-PLUS® as standard, however, a BIG-PLUS® spindle is not necessary to achieve the excellent performance of this chuck. A Ø32mm straight shank design is also available.

It is also possible to use smaller diameter milling tools through the use of PJC reduction collets. The Ø.500" HMCJ can then accept Ø3/8" and Ø1/4" shanks, and the Ø12mm HMCJ can accept Ø10mm, Ø8mm and Ø6mm shanks.

3D Scanning Technology Even for Tiny Spaces —Werth

The ultra compact Werth ScopeCheck® S Probe coordinate measuring machine has advanced scanning capability. The measurement range is 400 mm in the X axis, 200 mm in the Y axis, and 200 mm in the Z axis. The measuring machine has a granite base and does not require any compressed air supply. Precision mechanical guides and a temperature compensation system guarantee reliable measurement results.

The new WinWerth 8.40 3D measurement software provides efficient and simple operation of the devices. Particularly significant are the new user-friendly functions for semi-automatic and automatic generation of scanning paths and for modifying programs. The ergonomic, interactive graphic user interface makes it possible to capture dimensions simply by clicking on the graphic. With password

Growing tool manufacturing company in Riverside, CA has several positions available.

Outside Sales Rep.

Looking for an Outside Sales Representative who will be responsible for developing ongoing and profitable relationships with our current customers. Must be motivated to physically visit potential and current customers in order to reach target sales goal.

Inside Sales Rep.

Seeking an experienced Inside Sales Rep. who is a high achiever and a self-starter. Must be able to up -sell and close sales, as well as generate leads. Must have great communications skills and provide excellent customer service.

CNC Operator/Programmer

Previous CNC experience is required for this position and candidates must have previous experience in a machine shop environment. Must have experience with CNC machining, calipers and micrometers

Marketing Coordinator

The ideal Marketing Coordinator will need to know how to conduct market research, present creative and innovative ideas, coordinate online marketing, update website with promotions and flyers, organize promotional mailings, and work with the sales team to promote our brand.

Telemarketer

Solicit and explain our product and services to potential customers. Obtain customer information and enter in data accordingly. Send emails and other corresponds to customers to follow-up. Conduct online and directory searches for obtaining new customers.

Sales and Marketing Manager

Candidate will oversee the sales and marketing team. Ideal person will plan, develop, implement, and evaluate activities needed to reach our sales goal.

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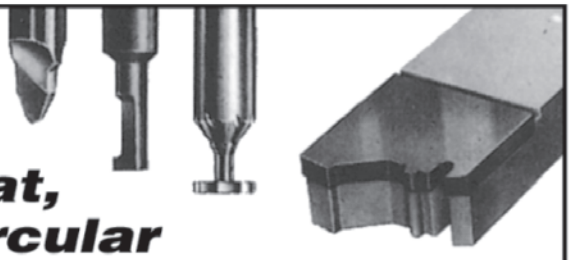

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protection, users have access only to those portions of the software that their level of qualification allows.

The modular design principle means that the measuring machine can be expanded to meet future requirements at any time. It is even possible to retrofit an image processing sensor and other optical sensors.

CoroPlus™ Brings Connectivity to Manufacturing Plants —Sandvik Coromant

Cutting tool and tooling systems specialist Sandvik Coromant has unveiled its CoroPlus™ suite of Industrial Internet of Things (IIOT) solutions aimed at helping manufacturers prepare for Industry 4.0. The concept is designed specifically to improve the control of productivity and costs through a combination of connected machining and access to manufacturing data and expert knowledge.

CoroPlus is the umbrella name for a new platform of connected tools and software; essentially comprising technologies that can send and/or receive data. The concept makes it possible to reduce data waste and improve manufacturing processes, from pre- to post-machining, through the use of connected technology and machining knowledge from Sandvik Coromant.

Sandvik reports the principal benefit for production managers is that CoroPlus makes it possible to optimize manufacturing through better understanding and insight into what's happening in the workshops and machining environment, on either a micro or macro level.

From a CAM programmer's perspective, connection with accurate tool and application data means that recommendations can be adapted to specific tasks. There are also advantages for operators as machining processes can be monitored remotely. Furthermore, specific sensor-equipped tools can be controlled to ensure that breakages are avoided and performance is secured with data intelligence collected live throughout the machining process.

The offer currently comprises dashboard solutions, software solutions in CoroPlus Tool Guide and Adveon™ Tool Library, as well as Silent Tools™+ and CoroBore®+ cutting tools, and Promos 3+ machine monitoring IoTsystem.

New Products

Vertical Lathe Precisely Machines Large, Heavy Parts —Okuma

Okuma's V920EX single-saddle vertical lathe features a powerful turning spindle and a larger work envelope, making it ideal for cutting a variety of large, heavy parts. The machine's work envelope provides a maximum turning diameter of 36.22" plus 33.86" of swing over the saddle, enabling it to accommodate large, odd-shaped workpieces. Highly rigid construction and powerful ballscrews generate slideway movement to both axes for precise machining. The lathe has a maximum swing of 39.37", and an rpm range of 20 to 1,250.

The V12 turret is said to enable maximum machining productivity when paired with effective chip discharge. Optional side or rear chip conveyors can be placed to match discharge direction based on shopfloor requirements. Maintenance tasks are simplified with easy access to the air filter, hydraulic unit and coolant tank on the back of the machine.

Okuma's Thermo-Friendly Concept is standard and automatically compensates ambient temperature changes to maintain tight tolerances. Okuma reports that cycle times, lead times and energy costs are significantly improved with their open architecture OSP-P300L control and Eco suite feature.

...Hotline Continued From 8

"The property in Commerce City allows us to consolidate our Denver and Commerce City operations and grow the business," said Rod Fisher, an Intsel manager. "We provide steel for projects all over the world and access to the BNSF railway will further allow us to support the global market."

Raytheon Looking to Add up to 2,000 jobs in Tucson

Raytheon is planning a major expansion in Tucson that could bring the defense contract as many as 2,000 jobs.

The expansion, reported by the Arizona Daily Star, could be a major boon to the southern Arizona region.

Singapore to Buy Military Heli-Copters from Boeing

Singapore has agreed to buy new CH-47F heavy-lift helicopters from Boeing as it seeks to replace its aging fleet of military helicopters.

The country's defense ministry also plans to buy H225M medium-lift helicopters from Airbus, Reuters reports. The country did not provide specifics on how many helicopters it would be purchasing.

Washington State a Top Contender to Build New Supersonic Jets

A Boston company is eyeing Spokane as a location to manufacture a supersonic jet now in the early stages of development. It's a move that could create hundreds of high-paying jobs.

Spike Aerospace is designing an 18-passenger supersonic jet that could fly from New York to Los Angeles in just over three hours. The privately held company is one of three U.S. startups looking to revive supersonic technology with a focus on business travelers.

At an October aerospace conference in Lynnwood, Washington, Spike's chief executive officer said the company is considering several locations in Washington, including Spokane, Moses Lake and Everett. The company has considered several other states, but CEO Vik Kachoria has called Washington "one of the top contenders."

The state Department of Commerce approved a grant to speed up development of land currently owned by Spokane International Airport. Local officials said an out-of-state aerospace company has expressed "great interest" in building a factory on the site, but they declined to name the company, citing a nondisclosure agreement.

Startup Car Company to Build a Plant in Casa Grande, AZ

A California startup company will build a $700 million plant in Casa Grande to manufacture luxury electric vehicles.

The plan by Lucid Motors announced in late November eventually will involve hiring 2,000 workers for what would be the state's only car manufacturing operation. The first hires will take place next year, with training of local workers for the jobs through the community and technical colleges in Pinal and Maricopa counties.

Plans are to have the first vehicles ready for sale by 2018 with the goal of producing 8,000 to 10,000 built the first year. The goal is full-scale production of more than 50,000 a year by 2022.

At this point, though, the vehicle is little more than an "alpha prototype" for what Peter Rawlinson, the company's chief technology officer, said will get 400 miles on a single charge. He said it is now ready for beta testing; it will take until late 2018 for actual production to occur.

Raytheon to Add Jobs in Tucson, AZ

Tucson-based Raytheon Missile Systems plans to expand its Southern Arizona operations and add nearly 2,000 high-paying jobs over five years, potentially adding billions of dollars to the local economy.

Raytheon announced the expansion plan in late November, after reaching tentative agreements with officials from the city, county and state on potentially tens of millions of dollars in tax breaks and related incentives.

In return, Tucson will get the kind of higher-paying, technology-based manufacturing jobs that have become the gold standard for economic development.

Raytheon said it plans to hire workers at all skill levels, with an emphasis on engineering and other higher-wage, technical positions. Missile Systems president Taylor Lawrence said the company's expansion plans are driven by

Continued to 90.....

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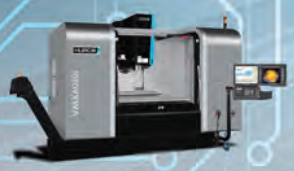

- VM5i
- VM10i
- VM10HSi
- VM20i
- VM30i
- VMX24i
- VMX30i
- VMX42i
- VMX50i
- VMX50i-50T
- VMX6030i
- VMX6030i-50T
- VMX64i
- VMX64i-50T
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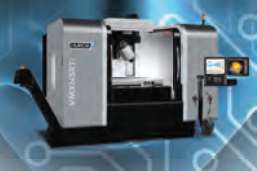
- VMX84i-50T
- VMX24HSi
- VMX30HSi
- VMX42HSi
- VMX60HSi

5-AXIS



- VM10Ui
- VM10UHSi
- VMX30Ui
- VMX30UHSi
- VMX42Ui
- VMX42UHSi
- VMX60Ui
- VTXUi
- VMX42SRTi
- VMX42HSRTi
- VMX60SRTi
- VMX42SWi
- VMX60SWi
- VMX84SWi
- VC600i
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- TM10i
- TM12i
- TM18i
- TM18Li
- TM18LBBi
- TMM8i
- TMM10i
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- TMX8i
- TMX10i
- TMX8MYi
- TMX10MYi
- TMX8MYSi
- TMX10MYSi

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- DCX22i-50T
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...Hotline Continued From 88

renewed growth in its 20 "franchise" missile programs due to U.S. and allied demand for its products. The company also is in contention for some major new programs, such as development of next-generation hypersonic missiles.

Raytheon's existing product line includes the Tomahawk cruise missile, the AMRAAM and Sidewinder air-to-air missiles, and the Standard Missile series of ship-defense and ballistic-missile interceptors.

Raytheon Co in Tucson Awarded Contract for Missiles

Raytheon Co., Missile Systems, Tucson, Arizona, has been awarded a contract for Griffin A Block /III missiles. Work will be performed at Tucson, Arizona, and is expected to be complete by Dec. 1, 2017.

AZ Company Wins Black Hawk Support Contract

Robertson Fuel Systems LLC, Tempe, Arizona, was awarded a contract for the procurement of 541 crashworthy external fuel systems bussed aircraft A-kits in support of UH-60 Black Hawk helicopter requirements.

Edwards Air Force Base Launching Program to Promote STEM

The Air Force Research Laboratory Rocket Propulsion Division at Edwards Air Force Base, Calif., is launching a new program to promote science, technology, engineering and mathematics classes and announces the first six projects started in local high schools this year in that effort.

The AFRL Rocket Lab is calling its new program ENSPIRE, which stands Engineering & Science Producing Inspirational Rewarding Education. The program seeks to inspire innovation in students to become more involved in STEM efforts by seeking unique and innovative STEM projects that develop the next generation of STEM activities in schools to take the program to a new level in the Antelope Valley, organizers say.

Six high school STEM projects have been started under the ENSPIRE program since its inception this year. Tehachapi High School, Rosamond High School, Boron Junior-Senior High School, Hesperia High School, Antelope Valley High School and The Palmdale Aerospace Academy have all started projects, which were announced by Kriss Vander Hyd.

Work Begins on New Building in Utah for Lockheed Martin

Construction has begun on an office building at Falcon Hill National Aerospace Research Park, near Hill Air Force Base, that will house a major expansion by Lockheed Martin.

Lockheed announced in October it was expanding its Utah operations by locating its program-management offices for the Air Force's Ground Based Strategic Deterrent (GBSD). That is one of the modern integrated weapon systems the Air Force is considering to replace the Minuteman III intercontinental ballistic system.

Real-estate developer Woodbury Corp. is leasing Lockheed Martin 25,000 square feet of office and lab space in the 75,000-square-foot building. The company hopes to move into the facility next August said Lockheed Martin vice president and GBSD program manager John Karas.

Orbital Adds Another 500 Jobs in Chandler, AZ

Arizona's continuing gain in manufacturing jobs gets a boost. In a competition with Utah, Arizona prevailed with another locate, this time a 500-job expansion for Orbital ATK's launch division. The nearly 50KSF facility goes into an Allred Company spec building in the Chandler Price Corridor.

Raytheon Awarded Contract And Most of Work Will be Done in the West

Raytheon Co., Goleta, California, is being awarded a contract for repair support of 10 weapon replaceable assemblies for the AN/ALR-67(V)3 for F/A-18 A/B/C/D/E/F aircraft. The contractor is also responsible for managing technical and configuration changes, and obsolescence. This is a four-year base period contract with a one one-year option period. Work will be performed in Goleta, California (44.9 percent); Jacksonville, Florida (13.3 percent); Port Mugu, California (8.7 percent); Lansdale, Pennsylvania (8.6 percent); Forest, Mississippi (7 percent); Tucson, Arizona (7 percent); Chatsworth, California (5.2 percent); San Diego, California (3.5 percent); and Hudson, New Hampshire (1.8 percent). Work is expected to be completed by December 2020

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