

CNC WEST

THE MAGAZINE FOR WESTERN METAL WORKING MANUFACTURING

Volume 37 - Issue 3

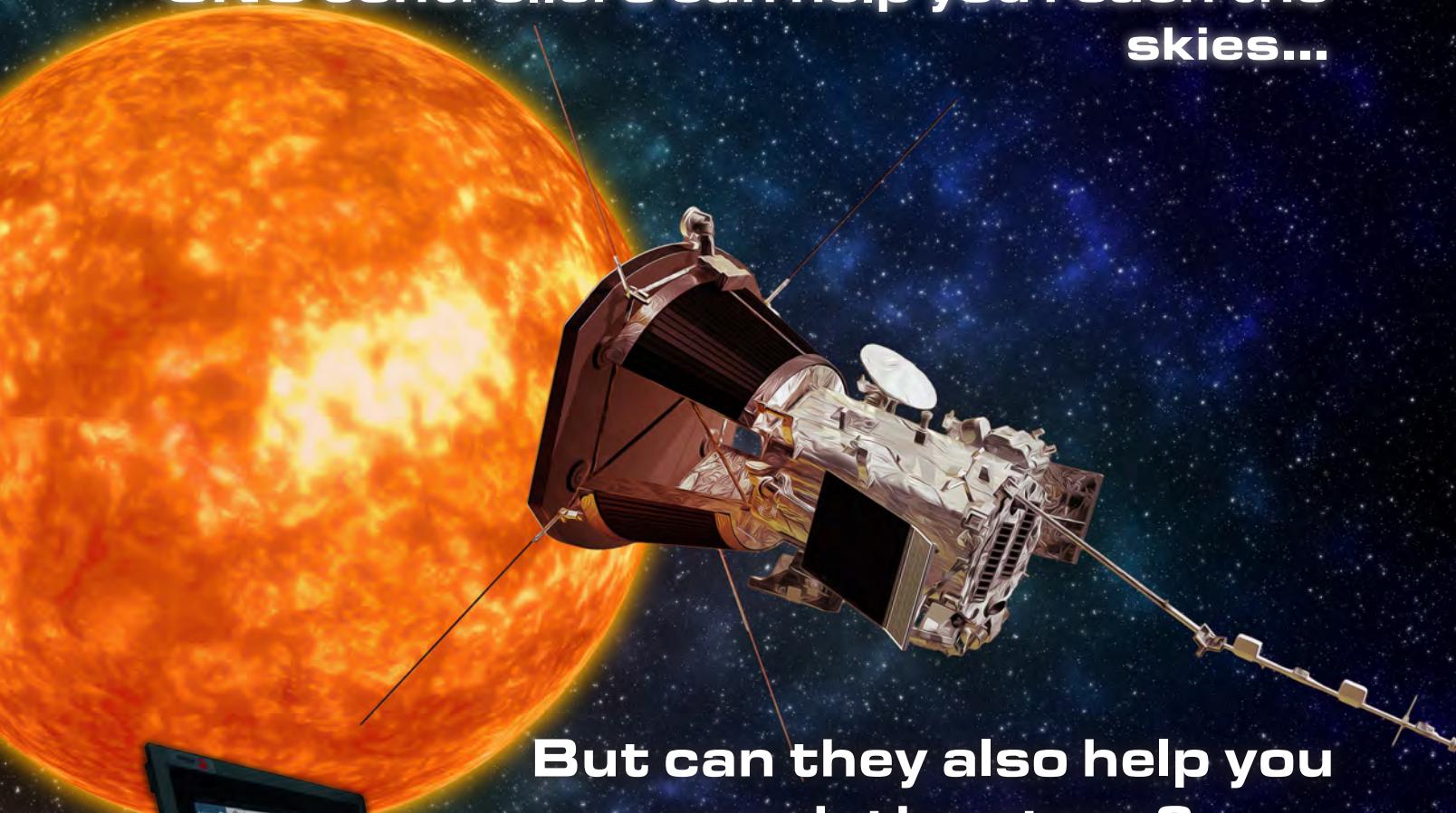
AEROSPACE & DEFENSE

- FAITH IN THE UNKNOWN PAYS OFF AT BOB LEWIS MACHINE
- AT LIBERTY INDUSTRIES PRECISION MACHINING & FAMILY GO HAND IN HAND
- HIGH SPEED MACHINING IS AT THE CORE OF SKM INDUSTRIES
- MOTO PROTO'S HIGH PERFORMANCE IS STANDARD

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up to 360 tool ATC



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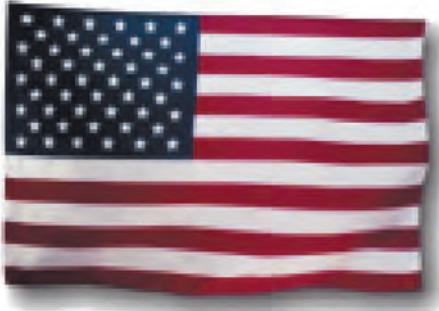
Spindle Speed: 12k-15k

up to 360 tool ATC

Three Sigma Manufacturing Inc., from Kent, Washington is a high tech job shop specializing in a myriad of parts for the aerospace industry. To pilot this demand for 5-axis machining in high mix, low volume part requirements, they needed a machining line that offered flexibility. In 2009 they bought their first Matsuura, the MAM72-63V PC6. Since then they have added a second 63V and a MAM72-100H. When asked why they chose Matsuura, Three Sigma president Ken Frankel (a former Boeing Engineer) stated "The MAM72 series is an optimal solution for our broad spectrum of work. They have a very sound mechanical design, an appropriate tool count, ave the ability to upgrade, and are very reliable."

Contact your local Selway Solutions Representative for more information or set up a demo at one of our showrooms





CNC West

February/March 2019 • Volume XXXVII No 3

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Our cover story explains how Bob Lewis Machine worked with NuTech Machine in Ontario to get a new Chevalier 5 Axis machine. The machine is just as good as advertised.Pg.22



Jodie Brock, Bill Brock, "Big" Bill Carter and Sadie the dog head up Liberty IndustriesPage 32



Sanjeev Kapoor of SKM Industries Inc. has cut his own path, embracing technology, and inventing solutions to meet his needs.Pg.40

Coming in April/May 2019

Software and Controls—Don't miss this issue! It will be an idea-packed focus on developments in computer controls, networking, automating plant management, the latest in CNC software, hardware and machine control technology.

Editorial: March 25, 2019

Ad Space: March 27 2019

Ad Material: April 4, 2019

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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Taking Flight in the West

The western region of the United States has always been a major player in the aerospace sector of manufacturing. According to Site Selection magazine in the July 2017 issue, at that time the number one and number two regions for aerospace related jobs were the Seattle area and the Los Angeles/Long Beach area. Coming in 8th was Phoenix. These three areas made up almost half of the work from the top ten cities for aerospace work. Needless to say, aerospace is big out here and some info in this issue will lead you to believe it will continue.

Our cover story reports on Bob Lewis Machine in El Monte. They specialize in high precision prototype work in the aerospace field. They machine mostly out of titanium and aluminum, but also work with copper and the exotic nickel bases super alloys like Inconel. The majority of parts produced are under the size of a softball, and a standard run might be only a few pieces. Business has been on an upswing the last few which helped them upgrade to a 5-axis machine. Read all about it starting on page 22.

Another story about an aerospace shop is on page 32. Liberty Industries is a family run business that is always looking for better ways and machines to run the shop. With the recent addition of an Okuma 6-pallet machine they have hopes of running lights out on it soon.

Our story on page 44 is about SKM Industries where they learned right away the value of good tooling. Fewer tool changes means less down time and less worker interaction. There is lots more great information in this issue. This is our biggest Feb/March issue in 10 years. The size of our magazine is dictated by how many advertisers we have. This to me is proof that print is not only alive but in our case, thriving. Thanks to all that read CNC WEST and those companies that place ads with us. May 2019 be a great one for you all.

Sincerely
Shawn Arnold



Publisher

Aerospace



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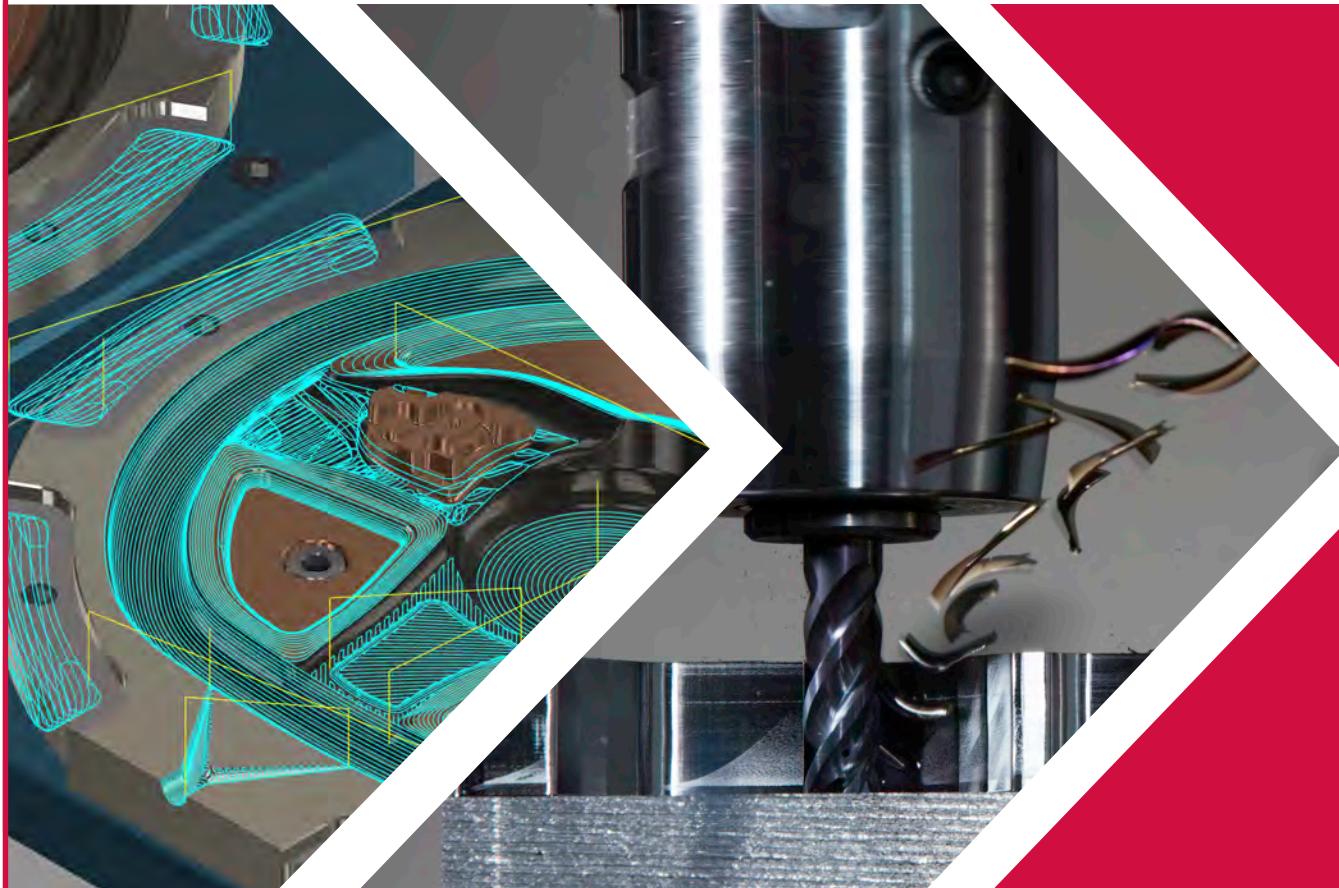
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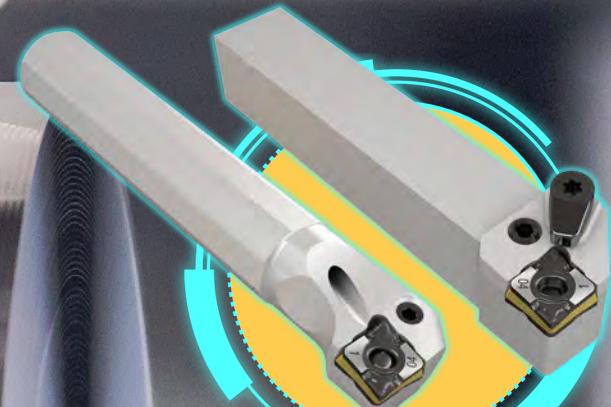


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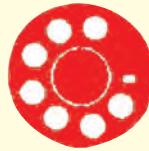


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Boeing Acquires Option on 58-acre Everett Property

Boeing and Snohomish County's Paine Field Airport have signed a deal for the company to potentially lease 58 additional acres for its sprawling Everett jet-manufacturing operations. The option agreement, signed Dec. 11 by county officials and Boeing real estate manager Marc Poulin, says Boeing wants the property for "constructing additional aerospace manufacturing facilities and supporting infrastructure, including a taxilane" to support existing Everett operations.

Kratos to Ride Aboard 7-Year Space Vector Contract

San Diego, CA area Kratos Defense and Security Solutions Inc. said on Dec. 12 that it is a subcontractor to Space Vector Corp. on a rocket project that may last up to seven years.

The U.S. Air Force announced on Nov. 16 that it plans to award as much as \$424 million in contracts to two prime contractors: Space Vector and competitor Orbital ATK (the latter now owned by Northrop Grumman Corp.). It is unclear how the Air Force will split up the work under the indefinite delivery, indefinite quantity contracts.

The program is called Sounding Rocket Program 4. Kratos said it and Space Vector will provide system engineering, vehicle design, manufacturing, integration and launch support services for suborbital rocket vehicles. Work will support prototype weapon systems development and missile defense system target tests.

Kellstrom Defense Acquires Williams Aerospace and Manufacturing

El Segundo, CA based Kellstrom Defense Aerospace (KDA) announced the acquisition of Williams Aerospace and Manufacturing Inc. (WAM) based in San Diego County, California.

WAM's manufacturing capabilities will be combined with the current KDA Engineered Products operating segment and will retain

the Williams Aerospace and Manufacturing brand identity in the market. WAM has been a long-term Lockheed Martin Hologram Product Program licensee for the P-3 and C-130 and a manufacturer of parts for the C-5, F-16 and other U.S. OEM defense platforms.

Over its more than 20-year history, WAM has developed a range of proprietary tooling for the manufacture of complex defense aircraft parts as well as strong capabilities in thermoplastic molding, CNC machining and the integration of aerospace and defense aftermarket components. A combination of WAM manufacturing expertise and KDA product design engineering will be deployed to support increased legacy spare parts solutions for the global military aircraft operator community.

New 36,000 Square Foot Facility for Northrop Grumman in Mesa, AZ.

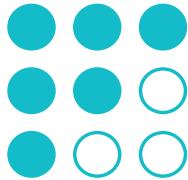
Northrop Grumman Corporation announced that its Innovation Systems sector operations in Mesa completed the expansion of its Bushmaster® medium caliber cannon production facility. The new 36,000 square foot facility nearly doubles the company's current production capacity by collocating warehouse and manufacturing operations into one site.

"The city of Mesa is proud that Northrop Grumman chose to expand in the Falcon District," Mesa Mayor John Giles said. "This new facility will bring more high-tech jobs to Mesa's growing aerospace and defense industry."

The Mesa-based operation produces world-renowned Bushmaster® family of medium caliber cannons.

The Mesa-based operation employs more than 200 full time employees and since the project's groundbreaking in March has begun the hiring of an additional 50 to 60 new engineering, program management and manufacturing technicians as a result of the company's increased production capacity.

Continued on page 104.....



See us in the NWMTS
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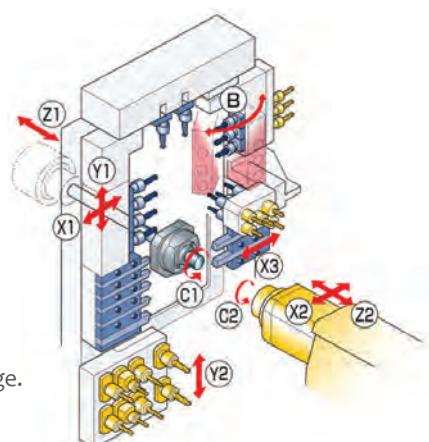
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- Power-driven B-axis capable of working with main/sub-spindle.
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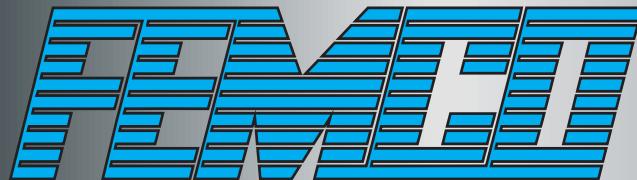
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- Up to 32" diameter
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Model	Chuck Size	Groove Width	Screw Size	Hole Space	Hgt Inch	ALUMINUM	
						Part Number	Set Price
Kit B206 N206 HS-06	6"	0.472	10MM	0.787	2	RKT-6200A	\$ 72.61
						RKT-6300A	\$104.86
						RKT-6400A	\$118.88
Kit B208 N208 HS-08	8"	0.551	12MM	0.984	2	RKT-8200A	\$ 85.36
						RKT-8300A	\$134.30
						RKT-8400A	\$159.83
Kit B210 HS-10	10"	0.630	12MM	1.181	2	RKT-10200A	\$126.28
						RKT-10400A	\$193.60
						RKT-12200A	\$184.71
Kit B12 HS-12	12"	0.709	14MM	1.181	2	RKT-12300A	\$245.72
						RKT-12208A	\$184.71
						RKT-12308A	\$278.56

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- Ideal for machining soft jaws
- Attaches quickly without tools
- Bore jaws in a single operation
- Reduces set-up time
- Allows for through boring of jaws

Chuck Dia	Part #	Price
4"	JBR-04	\$162.00
5"	JBR-05	\$162.00
6"	JBR-06	\$184.25
8"	JBR-08	\$226.48
10"	JBR-10	\$255.67
12"	JBR-12	\$284.23
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Fits Kitagawa, Samchully, Strong, TMX, MMK, Howa, SMW, Seoam, Autoblock and other CNC chucks!

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- Suitable for CNC lathes
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- Jaws are bored at same clamping pressure used to hold part
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Chuck Size	ID	OD	Part Number	PRICE
5,6,8"	3.94	6.7	JBR-TL5-8	\$379.00
6,8,10"	4.92	7.9	JBR-TL6-10	\$439.00
8,10,12"	6.30	9.8	JBR-TL8-12	\$519.00

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Chuck Size	Groove Width	Tongue Width	Screw Size	Hole Space	Hgt Inch	STEEL SOFT JAWS		ALUMINUM ROUND JAWS		
						Part Number	Set Price	Pie Dia	Part Number	
6"	.312	.499	3/8	1.500	2	TG-6200F	\$ 41.64	6"	RTG-6200A	\$ 76.66
						TG-6400F	\$ 71.66	8"	8-RTG-6400A	\$ 158.83
8"	.312	.499	3/8	1.750	2	TG-8200F	\$ 22.15	8"	RTG-8200A	\$ 103.80
						TG-8300F	\$ 64.44	10"	10-RTG-8300A	\$ 240.33
10"	.501	.749	1/2	2.125	2	TG-10200F	\$ 23.83	12"	12-RTG-10200A	\$ 184.94
						TG-10400F	\$ 75.33	15"	15-RTG-10400A	\$ 607.05
12"	.501	.749	1/2	2.500	2.5	TG-12250F	\$ 72.22	15"	15-RTG-12250A	\$ 494.11
						TG-12400F	\$ 102.35	18"	18-RTG-12400A	\$ 851.69
15"	.501	.749	5/8	3.000	2.5	TG-15250F	\$ 87.22	21"	21-RTG-15250A	\$ 908.09
						TG-15400F	\$ 113.74	24"	24-RTG-15400A	\$ 1,550.55

*For Pointed Soft Jaws, replace the "F" with "P" & add \$4.00 (6"-10")/\$7.00 (12" & above) per set.

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SOFT CHUCK JAWS

For Kitagawa, Strong, Samchully, MMK & Howa Chucks



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(Must be same part number)

Model	Chuck Size	Groove Width	Screw Size	Hole Space	Hgt Inch	STEEL		ALUMINUM	
						Part Number	Set Price	Part Number	Set Price
Kit B206 HO27M6 HS-06	6"	0.472	10MM	0.787	2	KT-6200F	\$ 34.37	KT-6200AF	\$ 31.59
						KT-6300F	\$ 44.99	KT-6300AF	\$ 41.12
						KT-6400F	\$ 95.71	KT-6400AF	\$ 86.08
Kit B208 ZA6-8 HS-08	8"	0.551	12MM	0.984	2	KT-8200F	\$ 40.70	KT-8200AF	\$ 38.56
						KT-8300F	\$ 46.82	KT-8300AF	\$ 50.90
						KT-8400F	\$ 61.00	KT-8400AF	\$ 62.11
Kit B210 HS-10	10"	0.630	12MM	1.181	2	KT-10200F	\$ 45.84	KT-10200AF	\$ 46.66
						KT-10400F	\$ 76.14	KT-10400AF	\$ 67.46
						KT-12200F	\$ 72.00	KT-12200AF	\$ 74.05
Kit B12 HS-12	12"	0.709	14MM	1.181	2	KT-12208F	\$ 72.00	KT-12208AF	\$ 74.05
						KT-12308F	\$ 107.96	KT-12308AF	\$ 90.10
						KT-12308F	\$ 107.96	KT-12308AF	\$ 90.10

*For Pointed Soft Jaws, replace the "F" with "P" & add \$4.00 (6"-10")/\$7.00 (12" & above) per set.

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For 1.5mm x 60° Serrations Chucks



GRIP-RITE



XTRA BITE

Chuck Model	Chuck Dia	Part Number	Price Per Set	Part Number	Price Per Set
B206, HS06	6"	KT-60HJ2-U	\$245.75	KT-60HJ2-X	\$256.55
B208, HS08	8"	KT-80HJ2-U	\$294.53	KT-80HJ2-X	\$312.71
B210, HS10	10"	KT-100HJ2-U	\$336.60	KT-100HJ2-X	\$370.44
B-12	12"	KT-120HJ2-U	\$391.99	KT-120HJ2-X	\$415.42
B-12, HS12	12"	KT-128HJ2-U	\$390.92	KT-128HJ2-X	\$416.29
B-15	15"	KT-150HJ2-U	\$504.90	KT-150HJ2-X	\$554.85

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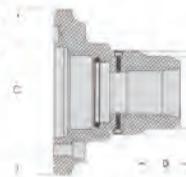
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A2-5	Y	2.187-10	5.00	6.45	1.22	3.14	6,000	ROY-42054	\$1,303.40
A2-6	N	2.63	5.00	7.45	1.05	3.14	6,000	ROY-42055	\$1,372.00
A2-6	N	2.63	6.00	7.45	1.05	3.14	6,000	ROY-42057	\$1,528.80
A2-6	Y	2.187-10	6.00	7.45	1.22	3.14	6,000	ROY-42058	\$1,646.40
A2-8	N	2.63	6.00	9.45	1.05	3.14	4,500	ROY-42059	\$1,685.60

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8"	2.165"	BI-7866-0800	\$ 1,216.00	\$ 1,094.40
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12"	4.055"	BI-7866-1200	\$ 2,282.00	\$ 2,053.80
16"	5.354"	BI-7866-1600	\$ 3,960.00	\$ 3,564.00



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3 MT	5,000	390	3,730	ROY-10853	\$295.45
4 MT	4,500	750	4,990	ROY-10854	\$358.15
5 MT	4,500	750	4,990	ROY-10855	\$402.80

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- "Easy Entry" feature on OD
- Large variety available

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each

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Starting At:
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each

Part # TBC-07-0250-B

TYPE Z

Starting At:
\$60.52
each

Part # TBZ-07-0375-B

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ROUND Collets

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16C & 3J
ROUND Collets

16C & 3J
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Sunnen's Latest Bore Finishing Machine Takes Flight with Aerospace OEMs and Suppliers



New SVL-2115 is a multi-stage automated lapping machine that laps and air gages bores in one setup, freeing operator time and increasing part consistency. Aerospace part manufacturers have found a cost-saving solution for bores with large length-to-diameter ratios and very tight tolerance requirements.

Sunnen's SVL-2115 automated lapping machine brings increased productivity and part consistency to what is traditionally a manual process. Based on the same proven SV-2115 honing system, the SVL-2115 provides single setup processing of hydraulic valves, sleeves, fuel system components and other parts that are prone to distortion when honed. The patented system control is designed for unattended operation and automatically laps and air gage bores throughout the cycle. Gage readings are fed back to the control and the cycle is repeated until the parts are within specifications.

"Automated lapping is more consistent than manual and there are fewer workers today with the skills necessary for precision manual lapping," said Phil Hanna, Sunnen Product Manager. "For very expensive parts an automatic lapping process reduces the possibility of ruined parts due to human error. Since lapping is usually the last process during the machining of a workpiece, if the lapping is not correct all the work to get the part produced up to that point is wasted."

The patented Sunnen lapping tools are available for workpiece diameters from 0.25 to 1.77 in and lengths up to 12 times the bore diameter, not to exceed 7.87 in. Additional diameter ranges are in development. Spindle speed range is 100-2000 rpm during lapping, but it is capable of slow speeds for non-powered steps, such as lapping paste application or slow-rotation bore entry. Stroking speed is 0-350 SPM, with stroke length optimized to achieve a high degree of cylindricity.

"This system is a time-saver and it frees operators to run another machine, or handle other job floor duties," added Hanna. "Operators load the workpiece into the fixture and start the lapping cycle, the cycle ends when the part is in tolerance. With automated lapping, less-skilled operators can achieve consistent, close-tolerance results. The precision control valve market is growing, not only in aerospace, but other industries as well. We have numerous SVL-2115 machines now in operation around the US, proving the need for automated lapping."

Due to the outstanding ergonomics of the machine, repetitive motion injuries often encountered with manual lapping have been virtually eliminated. There is no need to touch a moving part during the lapping process, and a light curtain is standard, so safety is greatly improved.

Easy tooling and probe changeovers accommodate multiple different parts runs during the course of a shift. A stack light allows operators to monitor cycle completions or faults from a distance.

Sunnen reports that they offer the complete automated lapping solution, including machines, tools, fixtures, lapping paste, gage probes, coolant systems and coolants.

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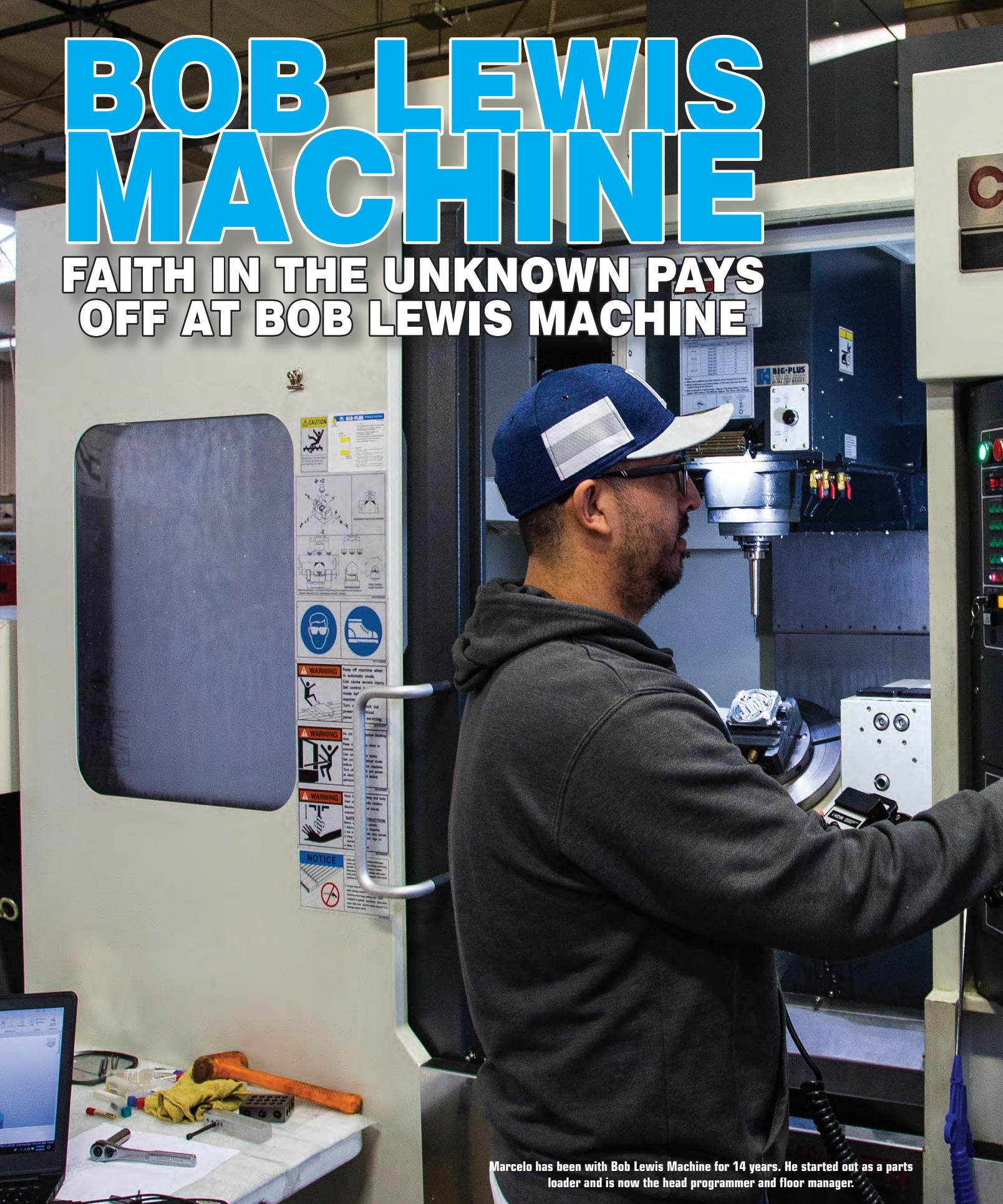
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BOB LEWIS MACHINE

FAITH IN THE UNKNOWN PAYS OFF AT BOB LEWIS MACHINE



Marcelo has been with Bob Lewis Machine for 14 years. He started out as a parts loader and is now the head programmer and floor manager.



Bob Lewis Machine began in 1973 as a one-man operation out of a garage in Torrance, Ca. Bob, AKA "Pops" would churn out thousands of parts from a tiny workspace. Bob Lewis Machine has come a long way since those garage days. With 5 axis milling and multi turret lathes, the AS9100 and ISO9001 certified shop is a trusted supplier to the most respected names in aerospace.

Pops' big break came when Hughes Aircraft contracted with him to start manufacturing a family of parts. He opened an actual shop in Gardena, and then moved to a larger location in the mid 80's. "We moved here in 1986," tells Jeff Lewis, Bob's son and current president at Bob Lewis Machine. "I've been with the company since I was 6 years old. Pops had my sisters and I in a manufacturing assembly line. He would get in an order for 1000 parts and one of us would drill it, the next kid would tap it. My older sister got the most complex jobs, apparently an 8-year-old was more skilled than a 6-year-old. You can image by the time I was done with high school I had enough of machining business and went out to do other things. I quit a few times, got fired a couple times, but it was all I knew growing up. I did everything from being a DJ to a deck hand on fishing boats, but ultimately I came back to work for him and took over the business when Pops retired in 2001."

Bob Lewis Machine (BLM) specializes in high precision prototype work for the aerospace industry. They machine mostly out of titanium and aluminum, but also work with copper and the exotic nickel bases super alloys like Inconel. The majority of parts produced are under the size of a softball, and a standard run might be only a few pieces. Business has been on an upswing the last few years and Jeff has taken the opportunity to invest in new equipment. In the last year Jeff purchased a new Hyundai WAI KF5600 3 axis mill, a Hyundai WAI E160a compact turning center and a Chevalier QP5X-400 5 axis mill. "We replaced a couple older machines with new ones," explains Marcelo, head programmer and floor manager at BLM. "Our milling department has five Fadals, the new Hyundai, the new Chevalier 5 axis, a Nissin 5 axis, and a Kiwa horizontal. Turning has the new Hyundai, an Okuma, a Mori and a Hitachi. We are going more and more towards pallet systems and 5th axis machining. Our horizontal Kiwa has two pallets and there are half a dozen jobs he is setting up on it right now. Even though we are not a production driven shop, the ability to work offline while the machine is still cutting is paramount. It never stops running. We can switch between jobs if we need to because so many are set up on the pallets."

Reducing setups has been a priority ever since they added their first 5 axis Nissin in 2011. Jobs that took six or seven setups are now only taking one. It made a huge difference in how parts were produced. "We came to grips



Bob Lewis Machine has a wide variety of milling and turning centers ranging from 5 axis mills to compact turning centers. Brands like Chevalier, Nissin, Kiwa, Fadal and Hyundai make up the milling department while Mori, Okuma, Hyundai and Hitatchi get the job done in turning.

with the benefits of 5 axis machining a few years ago," tells Marcelo. "Fewer setups reduce the interaction with the operators, minimizing the opportunity to make mistakes. With the tolerances we hold all it takes is a little error loading a part to make a huge impact. A single setup is a great thing. Since all the features are being machined in one pass it has allowed our operators to run multiple machines during the longer cycler times." BLM's newest acquisition is a Chevalier QP5X-400 5 axis mill that they worked with NuTech Machinery in Ontario to purchase. It was bought right off the Chevalier showroom floor in Santa Fe Springs, CA. and been in production for just over a year. "I've noticed over the last few years the Korean and Taiwanese machines have really stepped up their game,"

describes Jeff. "The machines are smarter and everyone is raising the bar. They offer a great bang for your buck. Chevalier is known mostly for their grinding and 3 axis machines. The 5 axis was a new product line for them. It was the first unit sold on the west coast, if not in the USA. It is hard to sell a new machine when there are no others out running in shops for us to see, and admittedly we were skeptical. I sent Marcelo down multiple times to feed it code and check things out."

Jeff freely admits that price was a driving factor in choosing the Chevalier over competitors, but the deciding point was the commitment and faith that Chevalier had in their own product. "The QP5X-400 has a lot of features and capabilities," touts Jeff. "If it lived up to the



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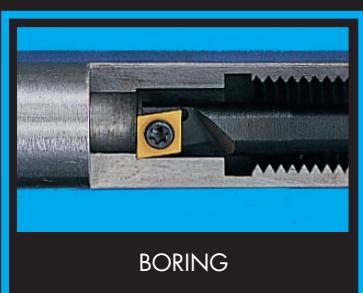
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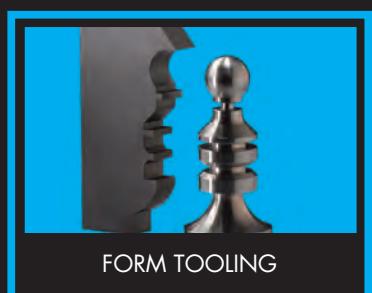
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1. - The C axis on the Chevalier can cut and rotate the spindle at the same time for true 5 axis performance. **2.** - Bob Lewis Machine's programmers use FeatureCam simulation on every machine. **3.** - This part went from 3 setups down to only two, but it has a callout of .001 true position and is very tough to hold.

hype, and if it delivered on the promises, I knew I would be a very happy customer. Chevalier was confident in their machine and they really stepped up by increasing the length of the warranty. It doesn't cost them anything if the machine doesn't have any issues, but it was a great piece of mind for me the consumer. That's when I pulled the trigger. A little over one year in and we've had no issues with it. Beautiful parts come off it on a daily basis and the post sale support has been fantastic."

As a demo model the Chevalier QP5X-400 came fully loaded with a high speed/high torque spindle, a laser measuring system, upgraded Fanuc controls, coolant through the spindle and much more. "We typically don't buy a machine with all of the bells and whistles," explains Marcelo. "Having all these features has been great. Most of the extras are geared towards speed and accuracy while machining harder materials. The spindle runs at 10,000 rpm and has crazy kinds of torque behind it. It has a torque meter that measures the load in real time, and it doesn't even move when I'm getting after it on a titanium part. We noticed right away how good the finish is off the Chevalier. That has a lot to do with the strength of your spindle. A weaker spindle will give you vibrations and a



much worse finish. Especially in harder metals."

The C axis can cut and rotate simultaneously, allowing for flawless round surfaces. "Round parts off the Chevalier are fantastic," jokes Marcelo. "More than once Jeff has had to confirm we ran it on the mill and not a lathe. It is that good." Surprisingly one of the most noted attributes outside of speed and accuracy is the coolant skimmer and recovery system. It filters out all the Waylube and keeps the coolant fresh. The machine has been running non-stop for a year and all BLM has done is top off the coolant. "The coolant system is something we probably wouldn't have ordered if we built the machine from scratch," tells Marcelo. "We don't have it on any of our other machining centers, but really like having it now on the Chevalier." As the head programmer Marcelo loves having the higher end Fanuc control with 525 megs of memory. Their other 5 axis machine only has 128 and they wish it had more. "All our programs on the 5 axis are large and complex," describes Marcelo. "They take up a lot of memory. With only 128 megs we can't load a full program into the control, but with 525 we can. It isn't a huge issue by any means, but again just a nice bonus that comes with a higher end control!"

4.



5.



6.



4 - Jeff Lewis is the second generation owner at Bob Lewis Machine. It is hard to believe that he has over 40 year of machining experience at BLM. 5 - Inconel Material, .014" diameter holes with .050" interrupted counterbores with a true position of .001.

6 - Aluminum Material, .006" +/- .001" thin walls, all around. 7 - Aluminum Material, Precision Valve Body with multiple, precision, cross holes. Precision Bores, +/- .0003. True position held within .001. This was done in 2 setups, using the Chevalier.

"Trust is a big deal," describes Marcelo. "I trust that once I get my first article that the machine is going to do exactly what I want, exactly the same way, with the exact same precision. Part 10 is exactly the same as part 1. The repeatability is amazing, it inspires so much confidence in what we do." "I feel we took a chance on the unknown and it paid off for us," concludes Jeff. "It was a big commitment for us adding a second 5 axis machine. We are very happy with the service and support we've received and still impressed with the quality of parts the Chevalier is capable of producing."

7.





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Jodie Brock, Bill Brock, "Big" Bill Carter and Sadie the dog head up Liberty Industries.

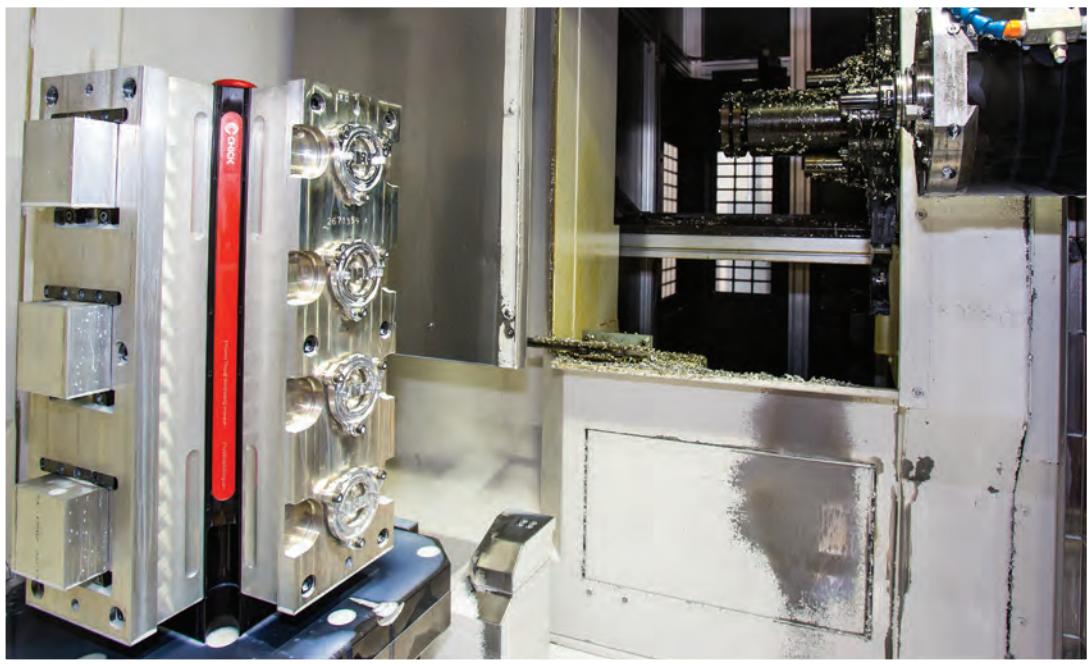
AT LIBERTY INDUSTRIES PRECISION MACHINING AND FAMILY GO HAND IN HAND

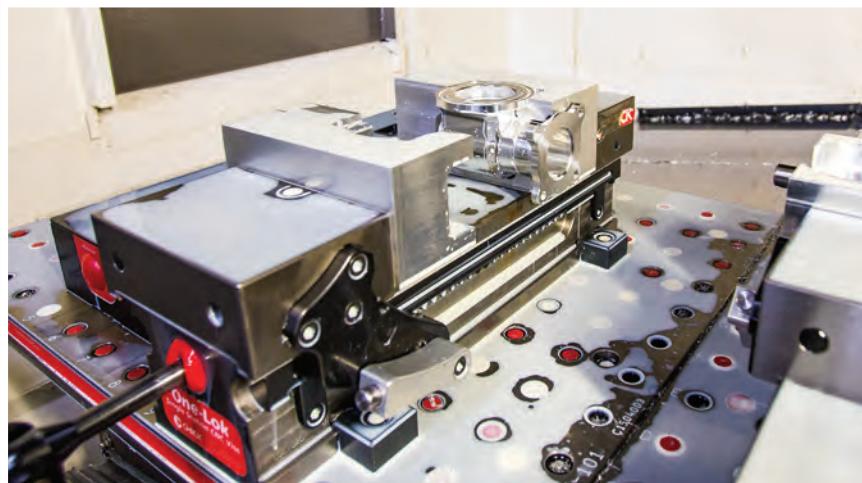
Bill Carter went to school to become a wood-worker, but a friend told him about an apprenticeship at Aerojet General to become a machinist. At 18 years old that sounded good, so he applied. There were over 500 applicants and they only took five people. He was one of those five. "I served my apprenticeship for year and made some friends," tells Bill. "Turns out we were pretty good at machining. We worked on the Mark 46 torpedo program, Apollo missile and other aerospace and defense projects of similar nature. I went into business with my ex partner and his father, incorporating Liberty Industries in 1966."

He and his partners went to the bank and put up \$500 to buy their first machine tool, an engine lathe that they strapped a turret to. They split their time between their actual jobs and getting Liberty up and running. The business grew almost immediately, focusing their efforts on aerospace, but taking any job that came in the door. Bill's family has replaced his partners, and Liberty stands taller than ever with advanced machining centers to support their customers.

For the past nine years there have been two Bills at Liberty Industries, Bill Carter the owner, and Bill Brock the son in law, and general manager. Both answer to Bill, so you need to be more specific. Big Bill, Original Bill, maybe even First Op Bill, will work, but you learn quickly that Old Bill is not going to fly with Bill Carter. With five decades of experience, Big Bill handles all the estimating and is always there to lend a veteran opinion when needed. New Bill tackles the duties of general manager and works his magic in the sales department. Jodie, Big Bill's daughter, and Little Bill's wife is the office manager and been with the company since 1997. "My dad hired me to answer the phones when my mall job wasn't giving me any hours," laughs Jodie. "I was so nervous when the phone rang. I would get up and run to the bathroom. Dad would page me over the intercom to get back to the office. I didn't know what to do if they asked a question I was unsure of." Big Bill laughs at how funny that is now with Jodie running the office. "She is fearless now. This place would stop without her," he touts. "I've done everything to keep her here. Working with your family everyday is such a reward."

Liberty Industries newest machining center is an Okuma MB-4000H. It has six Chick Workholding pallets and 182 tools. They just added the pallet changing system and are gearing up towards lights out manufacturing. The goal is to touch it only twice a day to load and unload parts. The speed and accuracy of the machine have greatly reduced cycle times.





Liberty Industries has a pair of Okuma Genos M560v vertical milling centers. They purchased the first one about four years ago and liked it so much they added a second one a few months later. This part is being held by the Chick One-Loc System on top of the Foundation grid platform . They are utilizing the capabilities of the Okuma to knurl it. They were not able to do this before getting the Okuma but both Bills tout the rigidity of the Okuma as the reason they can do it easily now.

Liberty Industries in El Monte, Ca. focuses most of their efforts on the aerospace industry. Manufacturing tight tolerance, complex parts are where they really shine. From planes to tanks, they expertly service the biggest names in the industry like Boeing, Airbus and Lockheed Martin. With 4 and 5 axis milling and a dozen turning centers they are well equipped for the challenge. "When I first started this business, I wanted nothing but American machines," tells Big Bill. "Liberty Industries was all Hardinge, I just wanted to buy American, and run American parts. Back then Hardinge offered a 1" CNC for say \$40,000. I kept losing job after job and I couldn't figure out why at first. Mori Seiki was selling a 1.25" machine for 25% less. It was either join them or go broke. We started

to buy Japanese machines to stay in business, but now we love what they do and keep adding more. We still buy Haas machines too. They offer a lot of value for the money. It is because of their price point that we were able to make the step up to 5 axis machining without going broke." Co-incidentally the added business from the 5 axis is what allowed Liberty to be able to purchase their first Okuma vertical mill from Gosiger the local Okuma distributor.

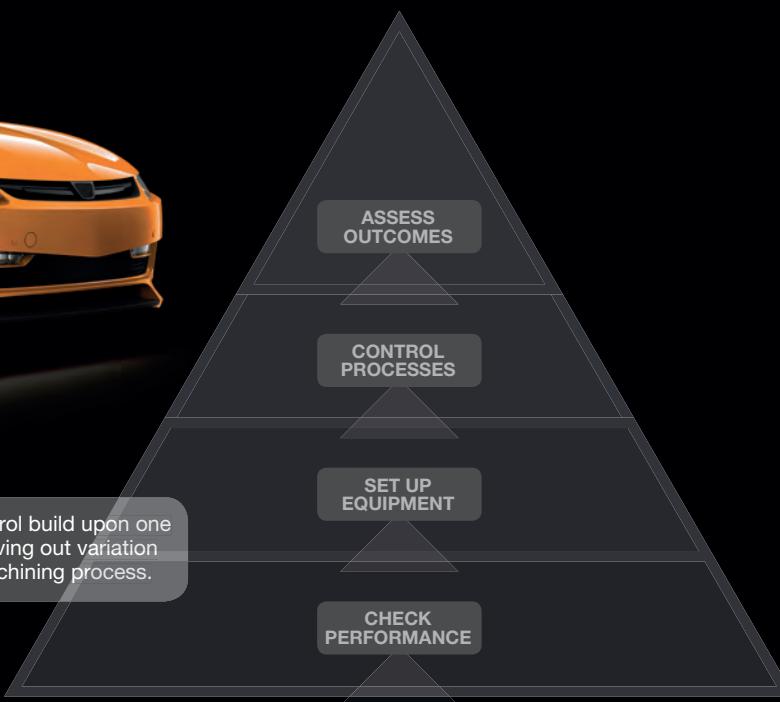
Big Bill has always been one to offer something different than what the other shops might have. It started way back in the 80's when he bought a Mori Seiki ZL25 lathe. "It has 6' between centers. I could turn a full size person in that thing if I wanted to," touts Big Bill. "It has a 2- 5/8th hole through the spindle so we can bar feed the whole

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Liberty Industries is a family owned and run business. Of their 18 employees only four of them don't have another family member as part of the team.

thing. Not everyone had that. I'd buy machines with as many tools as it could hold and a big table so I could setup up multiple jobs. The same thing when it comes to 5 axis machining and having a 6 pallet Okuma horizontal. Not everyone has advanced machining centers, so we have an advantage when it comes to bidding on the job and producing it."

Liberty purchased their first Okuma Genos M560v vertical milling center four years ago. Right away they saw the benefits of more speed and accuracy. So much so that three months later they added a second identical machine. Last year they added an Okuma MB4000H horizontal system and upgraded it this year by adding a six-pallet changer. "We got all three of our Okumas from Gosiger and our favorite salesman Tom Tran," tells Bill Brock. "Seriously, we've been buying machines of varying brands for many years and he is a great guy. Not just a great sales guy, but also a great guy. He worked with us from the get go and is very responsive to our needs. Gosiger and Okuma are phenomenal. We have a job that used to require outside grinding on the diameter, but with our Okuma machines it is now machined in house within the same spec. The MB4000H horizontal came stock with two pallets, but we liked the versatility of the pallets so much that we recently changed it to a six-pallet system. The pallet system is very compact and fits perfectly in the space we had. We have 182 tools available to support the number of pallets and jobs. We have all Chick Workholding pallets giving us the ability to have as many jobs setup on it as we have pallet sides. We are still learning how to

maximize production and are slowly moving jobs over to that machine. The goal is to be running lights out here in a few months. We want to touch it twice a day to unload and load and let it do its thing the rest of the shift. You can even add a 5th axis pallet to the horizontal for even more capabilities, and that is something we are looking into as well."

"When I bought the first Okuma it wasn't for me," explains Big Bill. "It was for my daughter Jodie, Bill, their kids and everyone who works for me. I didn't need it, but the future owners of Liberty Industries did." Liberty Industries employs 18 people and only four of them don't have someone related to them also working here. Father and sons, father and daughters, nephews, uncles, sisters, brothers, wives and husbands, it is all family. Danny started by sweeping floors three decades ago and is the lathe setup guy now. "The employees are what make us great," adds Jodie. "We don't have what we have because of us. It is all because of them that the business is able to succeed." "You can't beat working here with family," concludes Bill Brock. "Jodie grew up here and our kids are growing up here. We have employees who have been here 30 years and their kids work here. It is a great place to work. We take a lot of pride in our parts, in the company and in our families, because here at Liberty Industries it is all the same thing."

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Boeing Sets New Airplane Delivery Records, Expands Order Backlog

**They delivered 806 commercial jets in 2018 with record-setting fourth quarter.
They won nearly 900 net orders valued at \$143.7 billion after finalizing more than 200 orders in December.**

737 MAX family surpassed 5,000 orders; 777 family exceeded 2,000 orders.



Boeing delivered 69 737 airplanes in December and set a new annual record of 806 deliveries in 2018, surpassing its previous record of 763 deliveries in 2017. Even as Boeing delivered more jetliners, the company again grew its significant order book with 893 net orders, including 203 airplane sales in December.

"Boeing raised the bar again in 2018 thanks to our teammates' incredible focus on meeting customer commitments, and continuously improving quality and productivity," said Boeing Commercial Airplanes president & CEO Kevin McAllister. "In a dynamic year, our production discipline and our supplier partners helped us build and deliver more airplanes than ever before to satisfy the strong demand for air travel across the globe."

With a seven-year order backlog, Boeing increased production of the popular 737 in the middle of 2018 to 52 airplanes per month. Nearly half of the year's 580 737 deliveries were from the more fuel-efficient and longer-range MAX family, including the first MAX 9 airplanes.

At the same time, Boeing continued to build the 787 Dreamliner at the highest production rate for a twin-aisle airplane to support high demand for the super-efficient jet. The Dreamliner program finished with 145 deliveries for the year.

Deliveries of various 777, 767 and 747-8 models rounded out the total of 806 airplanes for the year. 767 deliveries include the transfer of 10 767-2C aircraft to Boeing

Defense, Space & Security for the U.S. Air Force KC-46 tanker program.

On the orders front, Boeing achieved sales success across its airplane portfolio with 893 net orders valued at \$143.7 billion according to list prices. While growing the order backlog for nearly every program, the company showed particular strength in the twin-aisle category with 218 widebody orders last year.

The 787 Dreamliner extended its status as the fastest-selling twin-aisle jet in history with 109 orders last year or about 1,400 since the program launched. Highlights include Hawaiian Airlines switching from the Airbus A330 to the 787 and Turkish Airlines becoming a new customer. American Airlines and United Airlines added to the growing list of repeat Dreamliner purchases with 47 and 13 additional jets respectively.

The 777 family continued its steady sales momentum with 51 net orders in 2018, driven by sales of the 777 Freighter to DHL Express, FedEx Express, ANA Cargo, Qatar Airways and other major freight operators. With additional sales in December, the 777 program exceeded 2,000 orders since its launch.

The 737 MAX family also achieved a major sales milestone in December, surpassing 5,000 net orders with 181 new sales during December. For the full year, the 737 program achieved 675 net orders, including sales to 13 new customers.

"We are honored that customers around the world continued to vote for the unmatched capabilities of Boeing's airplane and services portfolio. In addition to the ongoing demand for the 737 MAX, we saw strong sales for every one of our twin-aisle airplanes in a ringing endorsement of their market-leading performance and efficiency," said Ihssane Mounir, senior vice president of Commercial Sales & Marketing for The Boeing Company.

"More broadly, another year of healthy jet orders continues to support our long-term forecast for robust global demand that will see the commercial airplane fleet double in 20 years," said Mounir.

A detailed report of 2018 commercial airplane orders and deliveries is available on Boeing's Orders and Deliveries website.



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Study by Transparency Market Research Reports that the Aerospace Composites Market to Reach US\$24.8 Billion by 2024

The competition in the global aerospace composites market is expected to increase with the entry of new players. Though in 2015, top three players held half of the share. New players are expected to introduce new products with advanced technology that might change the current market structure. Key players are also focusing on different strategies such as merger and acquisitions, collaboration, and innovation that will help them in getting a stronger hold in the market and expand their business in different geographies. Currently, Huntsman International LLC, Toray Industries Inc., Cytec Solvay Group, Hexcel Corporation, and SGL-The Carbon Company these players are analyzed in the report.

According to the report published by Transparency Market Research, the global aerospace composites market is likely to witness high growth in the coming years. The market valuation is expected to reach US\$24.8 billion by 2024. In 2015, the market valued at US\$ 11.5 billion. During the forecast period between 2016 and 2024, the market is projected to rise at steady CAGR of 9.1%.

On the basis of product type, the carbon fiber composites segment held 53% share in 2015. This segment is likely to hold a dominant position over the forecast period. Due to its high fuel efficiency and low

carbon emission, the demand for carbon fiber composites is high in the market. Geographically, North America held a leading position in 2015 and is expected to dominate the market in the forthcoming years. Rising competition among the players and fleet expansion activities in the region has led the growth of this market in North America.

The crucial factor driving the growth in this market includes the rapid growth of innovative technology that has boosted the demand in the aerospace composite market. The growing need for lightweight composites has also provided a substantial push in this market. Moreover, increasing demand for lightweight aircraft that are beneficial in times of war and provides improved payloads are other factors driving the demand in this market.

Adding to the growth factors, rapid growth in air traffic due to the growing number of low-cost carriers mainly in the developing regions has significantly boosted the demand in the aviation industry. This will simultaneously boost the demand in the aerospace composites market. Increasing living standards and reducing government intervention in the aerospace industry in the Middle East countries will further drive the demand in this market.

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11N	1/32-3/8"	2JT	LAM-L40071B	\$132.13	\$92.49
14N	1/32-1/2"	3JT	LAM-L40072B	\$192.22	\$134.55
16N	1/32-5/8"	3JT	LAM-L40073B	\$216.26	\$151.38
18N	1/32-3/4"	4JT	LAM-L40074B	\$324.41	\$227.09
20N	3/16-1"	5JT	LAM-L40075B	\$444.58	\$311.21
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	3.12"	C40-16ER312-K	\$ 82.45	C40-16ER312-KB	\$ 93.08
ER 20	2.50"	C40-20ER250-K	\$ 82.44	C40-20ER250-KB	\$ 93.08
ER 25	4.00"	C40-25ER400-K	\$ 82.44	C40-25ER400-KB	\$ 92.49
ER 32	2.50"	C40-32ER250-K	\$ 82.44	C40-32ER250-KB	\$ 93.08
ER 32	4.00"	C40-32ER400-K	\$ 82.45	C40-32ER400-KB	\$ 92.49
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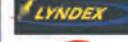
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HAAS BT40	M16-2.0	.590	45°	Yes	B40-4500H	\$ 22.80
HAAS CAT40	5/8-11	.589	45°	No	C40-4501S	\$ 17.72
Fadal CAT40	5/8-11	.740	45°	No	C40-4500S	\$ 15.20
Okuma CAT40	5/8-11	.589	60°	No	C40-6000S	\$ 17.72
Mazak CAT40	5/8-11	.740	45°	Yes	C40-4500H	\$ 15.75
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ER20	40	SIE-SAER-20-40	\$ 40.28
ER25	40	SIE-SAER-25-40	\$ 40.28
ER32	40	SIE-SAER-32-40	\$ 41.56
ER40	28	SIE-SAER-40-28	\$ 41.56

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CAT/BT 40	10	TRAY40-10	\$ 29.50
CAT 50 (not BT)	6	TRAY50-6	\$ 36.00



Dia	Proj	BALANCED TO 15,000 RPM		BALANCED TO 20,000 RPM	
		KINGSTON Part Number	Price Each	SPIN TRU Part Number	Price Each
1/8"	1.75"	C40-01EM175-K	\$ 49.95	C40-01EM175-KB	\$ 69.99
3/16"	1.38"	C40-18EM138-K	\$ 49.95	C40-18EM138-KB	\$ 69.99
1/4"	1.38"	C40-25EM138-K	\$ 49.95	C40-25EM138-KB	\$ 69.99
1.75"		C40-25EM175-K	\$ 53.85	C40-25EM175-KB	\$ 69.99
5/16"	1.38"	C40-31EM138-K	\$ 53.85	C40-31EM138-KB	\$ 69.99
3/8"	1.38"	C40-37EM138-K	\$ 49.95	C40-37EM138-KB	\$ 69.99
	2.50"	C40-37EM250-K	\$ 53.85	C40-37EM250-KB	\$ 69.99
1/2"	1.75"	C40-50EM175-K	\$ 53.85	C40-50EM175-KB	\$ 69.99
	4.00"	C40-50EM400-K	\$ 53.85	C40-50EM400-KB	\$ 69.46
5/8"	1.75"	C40-62EM175-K	\$ 53.85	C40-62EM175-KB	\$ 69.99
	3.00"	C40-62EM300-K	\$ 53.85	C40-62EM400-KB	\$ 73.02
3/4"	1.75"	C40-75EM175-K	\$ 53.85	C40-75EM175-KB	\$ 69.99
	3.00"	C40-75EM300-K	\$ 53.85	C40-75EM300-KB	\$ 69.99
1"	1.75"	C40-10EM175-K	\$ 53.85	C40-10EM175-KB	\$ 69.99
	6.00"	C40-10EM600-K	\$ 60.45	C40-10EM600-KB	\$ 74.47
1-1/4"	2.00"	C40-12EM200-K	\$ 53.85	C40-12EM200-KB	\$ 69.99



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SKM INDUSTRIES

HIGH SPEED MACHINING IS AT THE CORE OF SKM INDUSTRIES



SKM president Sanjeev Kapoor talks tooling options with Jonathan Saada of High Speed Corp

Article & Photos by Sean Buur

SKM Industries Inc. is a Valencia, Ca based job shop focusing on commercial, medical and aerospace parts. Sanjeev Kapoor started the company in 1992 renting spindle time from another shop to run his parts. From day one Sanjeev has cut his own path, embracing technology, and inventing solutions to meet his needs.

A mechanical engineer by trade, Sanjeev Kapoor began his manufacturing career in a manual shop working for others. It was the 80's and the owners took him to the Westec trade show where he was exposed to CNC for the first time. "Right away I saw the added value in CNC," tells Sanjeev. "I convinced the owners to buy a Bridgeport with a CNC control. That was 1986. I liked computers, and had a little programming experience from school, I knew I could program it, but they took a little convincing. Within a couple years we had half dozen CNC machines and were running Gibbs Cam." That shop did a lot of production work to take advantage of the still relatively new CNC technology. Sanjeev was programmer and production manager. "I began to look at ways to reduce the cost and maximize production," explains Sanjeev. "I learned right away the value of good tooling. Fewer tool changes means less down time and less worker interaction. Decades later I still apply the same principles, focusing on tooling and fixtures that can reduce cycle time at the same time reduce interruptions."

When Sanjeev went out on his own and started SKM Industries Inc. he spent the first year in business renting spindle time in a shop in Camarillo, Ca. "I helped them out with their prototype work, and they let me rent open time on their machines," touts Sanjeev. "It worked out well for about a year until I could purchase my own CNC machines. I started with a Fadal mill and a Mazak lathe. I've been adding machines ever since." SKM moved to their current 11,000 sq.ft. manufacturing facility in 2008 where they house 15 Haas and Mazak CNC machining centers. "As a job shop we have to be ready for anything," explains Sanjeev. "We have 4 axis milling and advanced turning centers. We work in all materials ranging from aluminum, steel, plastics, copper and brass to more exotic alloys like Kovar. One of our largest customers is an OEM and we make hundreds of different part numbers for them. We run anywhere from 5 pieces to 50,000. We prefer the production runs, but are always ready to help out a customer who needs a smaller quantity. We use the latest version of Gibbs Cam and it is all set up to maximize high speed machining. Our high speed machining practices allow us to be competitive on pricing even with smaller run quantities."

Technology is a big part of manufacturing at SKM, and high speed machining on all materials is at the forefront. Peel milling with 5, 6, and 7 flute end mills is com-



This 4140 part has a hardness of 40 Rockwell. Previous tooling only yielded a maximum of 8 parts per corner of the insert. The new YG1 inserts are delivering 24 parts per corner of the insert and cost less than half. SKM has switched over and uses YG1 inserts whenever possible, regardless of materials.

mon practice regardless of material. "We are using a 5 flute end mill for high speed machining on aluminum," describes Sanjeev. "Most people use a 2 or a 3 flute conventional tool." More flutes offer them the ability to machine at a much higher speed. "High speed machining is taking a smaller cut, but going much faster," continues Sanjeev. "You have less wear on the tooling, less wear on the machine, no chip trapping issues, and less load on the part. We cut at 600" a minute, only taking 30, 40, or 50 thou axial cut at a time. The load on everything is very light and we get way better life out of everything involved. We have fewer tool changes and they never break. It is a very stable process allowing you to predict life expectancy regardless of the job. If a tool lasted for so many cutting hours on this part, it will last that many cut hours on any part because the process is the same. We monitor loads on all the tools so before the tool breaks we change it out.

That is pretty standard practice in shops running large diameter tooling, but it is rare that you see it on small tooling like we use. A larger tool has the ability to break and do a lot of damage, but for us we use it to get the absolute most life out of the tool and replace it before it breaks and shuts down the machine."

At 600" a minute, tooling is a key element when it comes to producing a quality part. Sanjeev relies on Jonathan Saada of High Speed Corp to help him get the most out of his tooling investments. "Jonathan has so much experience, he is a wealth of information," describes Sanjeev. "I've known him for many, many years and I always make the time to talk to him when he comes by. That is not the case with most sales people. He introduced us to YG1 tooling about a year ago and I'm so glad he did. We've seen an increase in tool life and a decrease in tool pricing across the board."



Sanjeev touts the reason he has Haas and Mazaks is because he can hold one tenth all day long when needed. He has always had the policy that if you need a pistol, he'd rather have a rocket launcher.





SKM made the switch to all YG1 high speed end mills. They were using 7 flute end mills for high speed machining of steel until Jonathan from High Speed Corp brought in a 6 flute. He said try it at the same feeds and speeds and let him know what you think. They got 25% better tool life out of it without changing anything else.

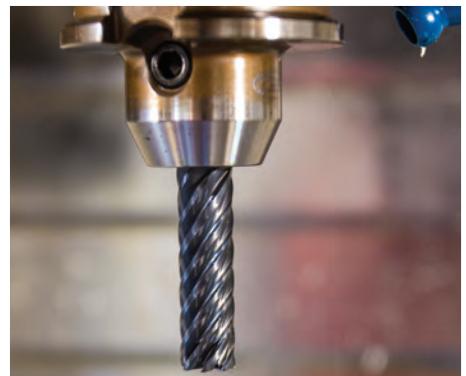
"YG1 is a completely new tooling line for us," tells Jonathan Saada of High Speed Corp. "Sanjeev is one of the few people who are always eager to try new things. He has a different way of looking at tooling than most of my customers. He doesn't just look at the price of the tool; he looks at the throughput from the tool." Sanjeev explains that people often confuse the price of the tool with the price of the tool per part. He can look at his self made Job Shop Manager MRP system's hard cost matrix and see exactly what the cost was to make any given part factoring in labor, tooling, outside processing, materials, and so forth. "YG1 are one of the biggest end mill manufacturers in the world," continues Jonathan. "Getting tools out in the real world was important and I knew SKM was a perfect fit. I know that SKM produces only the highest quality parts and I knew that Sanjeev would give me honest,

and informed feedback on each YG1 product he tested. His data collection processes are fantastic, so we would know right away how effective the YG1 tooling compared against his current and past tooling choices. I brought him YG1 Dream Dills, YG1 4, and 6 flute end mills, and YG1 turning inserts. He was able to beat the competition in every category." Sanjeev developed and coded the JOB Shop Manager MRP system himself, which is designed to manage and integrate data for every work order and also deploy it on iPads at every work station so that any revision changes, prints, travelers, run times etc. are live everywhere at all times.

With over three decades of experience, Sanjeev is not one to just believe the hype that comes from a tooling salesman. But he is a person always looking for any gain in performance. For him the first real test came on a part



All of SKM's high speed 4 axis milling is done on Haas Super Speed CNC machining centers. The machines run at 600" a minute thanks in part to GibbsCam and High Speed Corp tooling.



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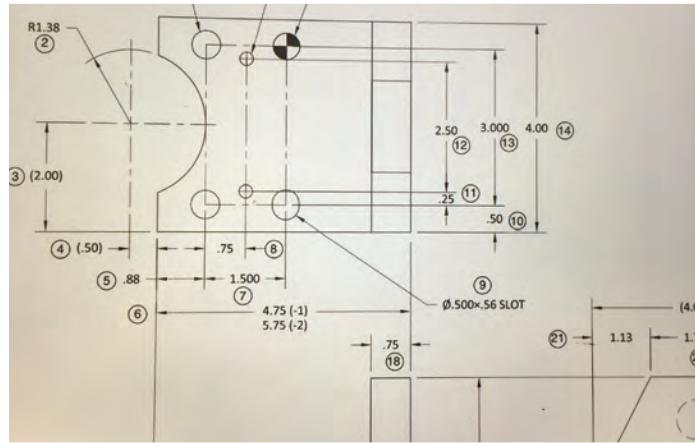
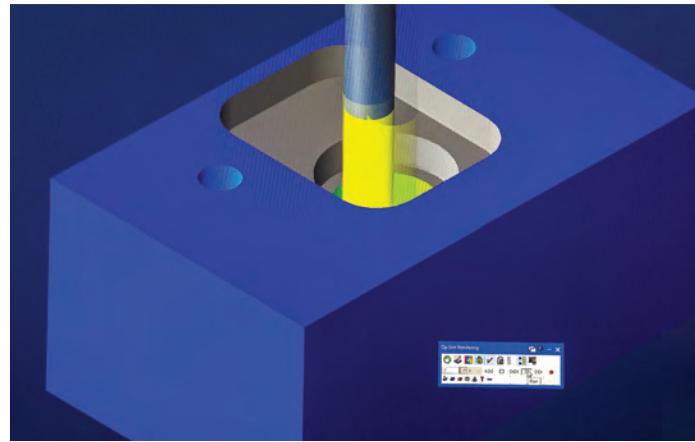
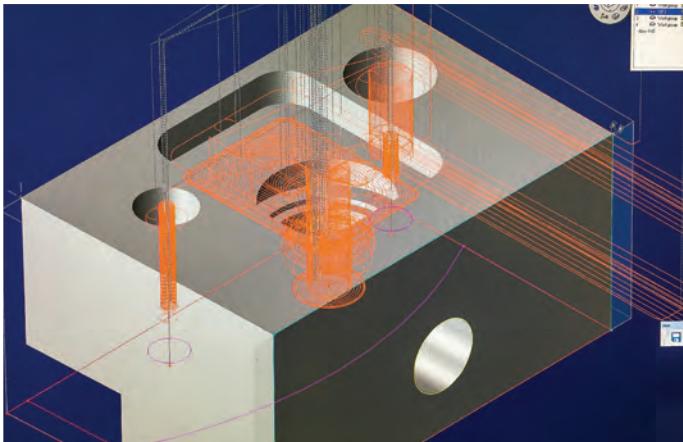


GREAT TOOLS, PERFORMANCE, AND PRICING

“The real magic behind us getting the most out of YG’s tools was Hi-Speed’s input . . . which tools to run and how to most effectively run them.”

– Sanjeev Kapoor, President
SKM Industries, Valencia, CA

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Top Left - High speed machining tool paths in GibbsCam on Steel with 6 flute endmill. Top Right – Simulation of the tool paths for verification before machining.

Bottom Left – Live shop travelers on iPads deployed at each workstation through Job Shop Manager MRP system paving the way for paperless shop floor.

Bottom Right – Live Zoomed in Print on an iPad at a machine eliminating the need for distribution of paperwork in case of any revision or other changes

that he has years of past data to compare to. "I was running a job in 4140 at 40 Rockwell," describes Sanjeev. "The max we were getting was eight pieces per corner of the insert. These were not cheap inserts, but a respected tooling brand that cost \$16 or \$17 each. The YG1 insert on the same job lasts for 24 parts per corner and costs only \$6. So we got a huge gain in tool life, and pay less for it. It was amazing; we didn't believe it at first. We run 1200 of that part a month and the results speak for themselves. I switched over to YG1 on every turning insert available on every job. Same thing for end mills. We were using 7 flute end mills for high speed machining in steel and Jonathan brought in a 6 flute. He said try it at the same feeds and speeds and let me know what you think. We got 25% better tool life without changing anything else. They too have a much lower price point. It has been a really, really good change for us. We switched all the end mills too. YG1 are adding more and more tools to their catalog and if I need that tool I don't hesitate to order it from Jonathan."

One of the things that really sets SKM apart is that Sanjeev has trained every operator. They don't hire people who have been a machinist in other shops. "We like to train in-house," tells Sanjeev. "We want a clean slate, and have found that starting from zero is the best way to teach

good habits instead of inheriting bad ones." An example of those good habits is that the operator checks critical dimensions on every single part. Not every five, or every ten parts, but every single part. "The best complement I've ever got from a customer was when he told me how he could calibrate his mic off my parts. We've virtually eliminated the problem of not being able to find skilled workers. I hire young people, I believe in the youth. I hire college students and work with them on their schedules. My latest hire had no manufacturing experience. He applied with a background in bookkeeping. There was something about his resume that struck me and I called him in for an interview. He always wanted to be an engineer, but it didn't work out that way. In high school he tried to buy a table top CNC mill for fun. I explained that he isn't going to get to utilize the experience he already has, and he didn't care. He just wanted to get his foot in the door. He starts next week. Youth is the future of manufacturing, and it is key part of our success. They are young, eager and hungry for knowledge. I like that."



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WCMX 1.81.52	\$7.75 ea
WCMX 21.52	\$7.75 ea
WCMX 2.522	\$7.75 ea

Dia	Shank	LOC	Part Number	Price EA	Uses Insert
0.500	0.625	1.340	UD-0500-2D-063	\$124.32	WCMT 1.211
0.625	0.625	2.815	UD-0625-4D-063	\$178.57	WCMX 1.81.52
0.750	0.750	1.748	UD-0750-2D-075	\$137.88	WCMX 21.52
0.750	0.750	3.698	UD-0750-4D-075	\$197.78	WCMX 21.52
1.000	1.000	2.345	UD-1000-2D-100	\$151.44	WCMX 2.522
1.000	1.000	4.635	UD-1000-4D-100	\$218.12	WCMX 2.522
1.125	1.000	4.760	UD-1125-4D-100	\$218.12	WCMX 2.522

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Description	I.C.	Thick.	Radius	Part Number	Price Ea
CCGT Inserts					
CCGT 21.50.5 AK H01	1/4	3/32	0.008	KOY-1024	\$7.87
CCGT 21.51 AK H01	1/4	3/32	0.016	KOY-1026	\$7.87
CCGT 32.50.5 AK H01	3/8	5/32	0.008	KOY-1028	\$9.22
CCGT 32.51 AK H01	3/8	5/32	0.016	KOY-1030	\$9.22
CCGT 32.52 AK H01	3/8	5/32	0.031	KOY-1032	\$9.22
DCGT Inserts					
DCGT 21.50.5 AK H01	1/4	3/32	0.008	KOY-1199	\$7.87
DCGT 21.51 AK H01	1/4	3/32	0.016	KOY-1201	\$7.87
DCGT 32.50.5 AK H01	3/8	5/32	0.008	KOY-1203	\$9.22
DCGT 32.51 AK H01	3/8	5/32	0.016	KOY-1205	\$9.22
DCGT 32.52 AK H01	3/8	5/32	0.031	KOY-1207	\$9.22

Description	I.C.	Thick.	Radius	Part Number	Price Ea
TCGT Inserts					
TCGT 21.51 AK H01	1/4	3/32	0.016	KOY-1458	\$8.02
TCGT 21.52 AK H01	1/4	3/32	0.031	KOY-1460	\$8.02
TCGT 32.50.5 AK H01	3/8	5/32	0.008	KOY-1462	\$10.14
TCGT 32.51 AK H01	3/8	5/32	0.016	KOY-1464	\$10.14
TCGT 32.52 AK H01	3/8	5/32	0.031	KOY-1466	\$10.14
VCGT Inserts					
VCGT 220.5 AK H01	1/4	1/8	0.008	KOY-1632	\$9.67
VCGT 221 AK H01	1/4	1/8	0.016	KOY-1634	\$9.67
VCGT 222 AK H01	1/4	1/8	0.031	KOY-1636	\$9.67
VCGT 330.5 AK H01	3/8	3/16	0.008	KOY-1638	\$11.04
VCGT 331 AK H01	3/8	3/16	0.016	KOY-1640	\$11.04

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- TiAlN Coated-for general purpose use on all materials
- Center cutting
- 30° helix, right hand



Dia	LOC	Shank Dia	OAL	4 Flute TiAlN Coated	Price Each
1/8"	1/2	1/8	1-1/2	MO-EM001067-4	\$ 7.91
3/16	5/8	3/16	2	MO-EM001107-4	\$ 10.68
1/4	3/4	1/4	2-1/2	MO-EM001137-4	\$ 15.35
5/16	13/16	5/16	2-1/2	MO-EM001153-4	\$ 21.84
3/8	1	3/8	2-1/2	MO-EM001177-4	\$ 25.39
1/2	1	1/2	3	MO-EM001207-4	\$ 40.75
5/8	1-1/4	5/8	3-1/2	MO-EM001226-4	\$ 74.00
3/4	1-1/2	3/4	4	MO-EM001244-4	\$ 109.50



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Shank	Arbor Hole	Part Number	Price Ea
.500	.250	SIE-SA-250	\$ 41.52
1/2"	.375	SIE-SA-375	\$ 43.51
.500	.500	SIE-SA-500	\$ 46.29
.750	.625	SIE-SA-625	\$ 50.50
3/4"	1.000	SIE-SA-1000	\$ 58.70
	1.250	SIE-SA-1250	\$ 59.28

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1/8	3/8	1/8	1-1/2	YG-EMUGMF68901	\$ 13.12
1/4	3/4	1/4	2-1/2	YG-EMUGMF68905	\$ 22.41
3/8	7/8	3/8	2-1/2	YG-EMUGMF68907	\$ 36.92
1/2	1	1/2	3	YG-EMUGMF68909	\$ 56.72
5/8	1-1/4	5/8	3-1/2	YG-EMUGMF68911	\$ 114.53
3/4	3/4	3/4	3	YG-EMUGMF68048	\$ 145.70
1	1-1/2	1	4	YG-EMUGMF68913	\$ 264.96



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6444	Extra Duty Hand Pad	Brown	20	3M-16553-0	\$ 31.43
6448	Light Duty Hand Pad	Dark Gray	20	3M-16555-4	\$ 28.55
7440	Heavy Duty Hand Pad	Tan	20	3M-04050-9	\$ 36.02
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P100	3M-19791-8	\$28.12	3M-19822-9	\$48.28
P120	3M-19790-1	\$28.12	3M-19821-2	\$48.28
P150	3M-19789-5	\$28.12	3M-19820-5	\$48.28
P180	3M-19788-8	\$28.12	3M-19819-9	\$48.28
P220	3M-19787-1	\$28.12	3M-19818-2	\$48.28
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9 (mm)	1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm	BO-69699	\$ 28.98	\$ 23.77
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	9	SC	Fine	3M-05790-3	\$ 53.58
	8	AO	Medium	3M-13617-2	\$ 75.01
6" x 1" x 1"	8	SC	Fine	3M-09549-3	\$ 75.01
	9	SC	Fine	3M-05132-1	\$ 75.01

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MOTO PROTO'S HIGH PERFORMANCE IS STANDARD

Article & Photos Courtesy of Story provided by CNC Software

He has navigated steep slopes, a few bumps, and occasional tough terrain, but Jason Miyamoto made his way through starting his own high-performance automotive parts manufacturing company in 2015 and, to this day, he's never looked back.

For eight years, Miyamoto worked as an engineer for what is known as the largest manufacturer of aftermarket off-road parts for Jeeps and light trucks. He designed and machined parts for products like locking differentials, shock absorbers, axle housings, and lift kits for off-road 4-wheel vehicles. Once promoted to director of engineering, Miyamoto became less involved in hands-on manufacturing and more involved in management. Managing people was taking him away from what he was passionate about – designing and machining specialty parts. He knew he needed to make changes.

Around the same time, Miyamoto observed that, although there was plenty of machining going on around him, a good amount of prototype work was being turned away. In fact, there were few, if any, local companies that really wanted to service that portion of the job. In June of 2015, with almost two decades of experience and an extensive network throughout the automotive industry,

Miyamoto bought some machines, one seat of Mastercam® CAD/CAM software from CNC Software, quit his job and, based on what he saw as a pressing market need, he started Moto Engineering and Prototype (Moto Proto).

In the next few years, business expanded and he hired two machine operators to work in the 2,000 square foot El Cajon, CA, shop. Today, the company has a few customers in the aerospace industry, but mostly, Moto Proto serves high-performance automotive and motorsports customers. "We do everything from parts for vehicles that race in the desert, to suspension components, to parts for race car teams," he said. Mostly, though, automotive "one-offs" is Moto Proto's specialty.

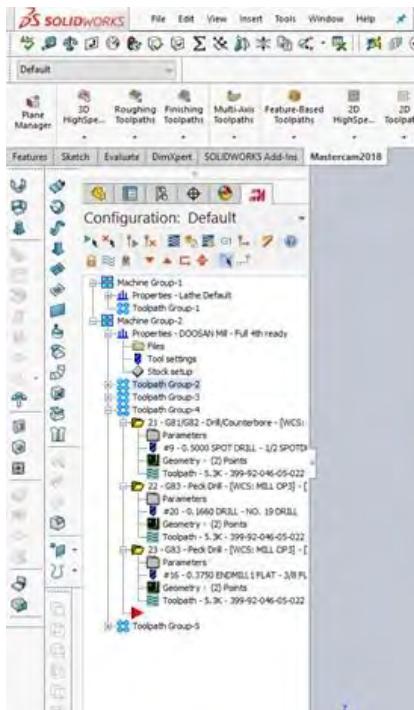
"We service people that need design work. We service people that need machining prototype work. And sometimes we service people who need both. It's our niche in the San Diego area," Miyamoto said.

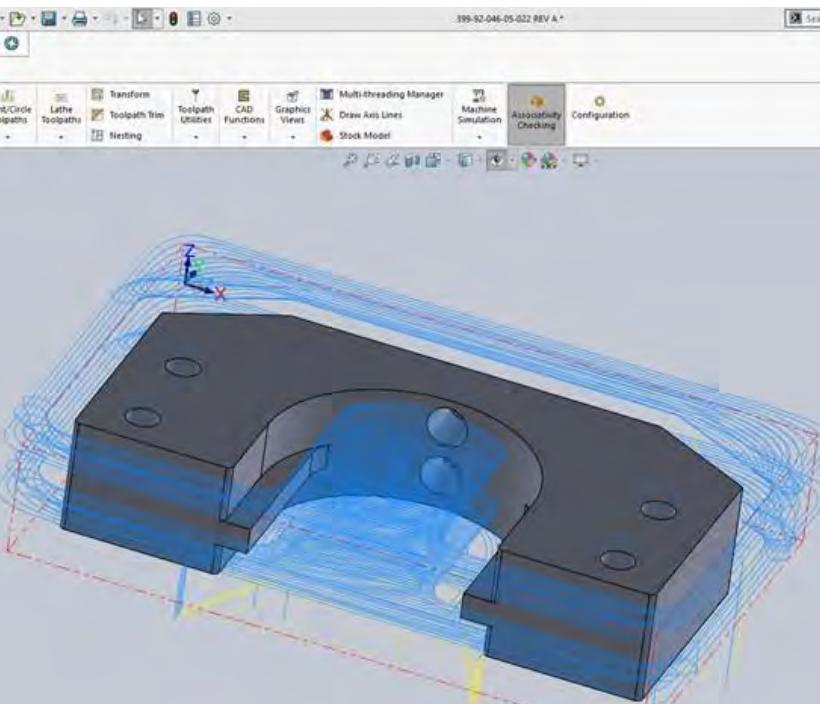
Being a design engineer, and having spent so much time at the machines, enables Miyamoto to add some very important value to what Moto Proto offers. "We can optimize the design of a prototype part to help minimize the cost of producing it come manufacturing time. Knowing what's going to work and what's not, we can look at the part and say, 'Hey, if we just change a few things, this would be so much easier to manufacture on the shop floor.' Miyamoto said his customers appreciate that kind of input.

Moto Proto produces prototypes from drawings, solid models, or actual parts. According to Miyamoto, 25 percent of their work is reverse engineering. "When we get an order from a customer who has a CAD drawing, or a solid model, I'll program it, then use the software's Backplot feature to create a new model in the software." His



Moto Proto serves high-performance automotive and motorsports customers. "We do everything from parts for vehicles that race in the desert, to suspension components, to parts for race car teams."





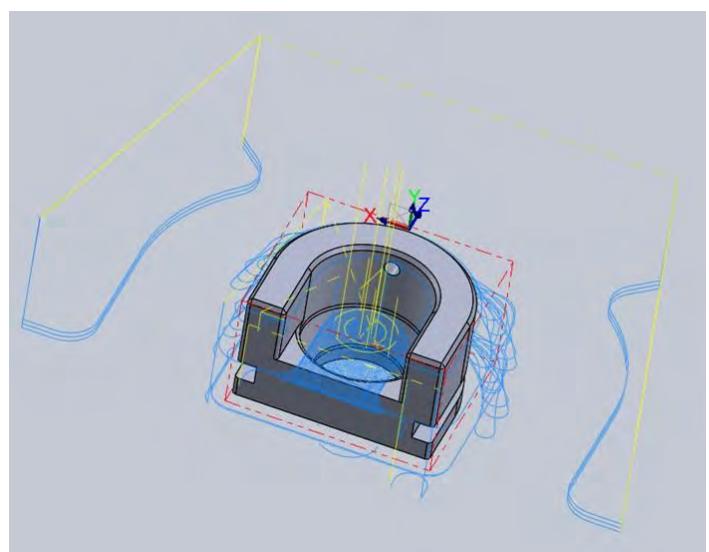
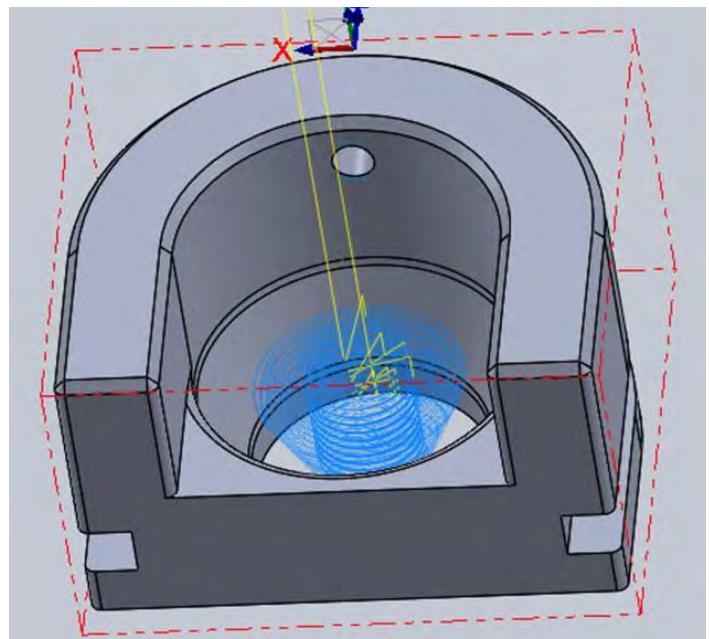
Mastercam for SOLIDWORKS® software allows Miyamoto to not only design his own and import customers' CAD drawings, but to reverse engineer existing parts using a 9-foot FaroArm for more accurate measurements when callipers or traditional measuring techniques are not enough.

"Mastercam is very intuitive and it does exactly what you ask it to do. You can set how high it pulls-up out of the material, so you don't waste too much time, rapiding up further than you need." Here Miyamoto programs the toolpaths for the base and guide bushing of a shock bushing install tool for a jeep product line.

Mastercam for SOLIDWORKS® software allows Miyamoto to not only design his own and import customers' CAD drawings, but to reverse engineer existing parts using a 9-foot FaroArm for more accurate measurements when callipers or traditional measuring techniques are not enough. He measures the part in 3D, designs it in SOLIDWORKS, and then imports the 3D model into Mastercam. The process is seamless and ideal for tough to measure parts such as the front bumper of a car.

Miyamoto does all the programming for the machines, which takes up typically about half his day. "With prototypes, every part is brand new, and every part is pretty intricate. What we produce is fairly small in size – a half-inch to 7-inches. Tolerances are tight, he said, but nothing tighter than a few 0.0001". "We do a lot of traditional surfacing parts with tapered walls, with flat bottoms. But we can do anything you can get to with a 3-axis or 4-axis mill."

However, when producing prototypes, Miyamoto is making one new part with its unique intricate geometry. He said, "I've got to do it fast, and it's got to be right. Mastercam is very intuitive and it does exactly what you ask it to do. You can set how high it pulls-up out of the material, so you don't waste too much time, rapiding up further than you need." The software's high-speed Dynamic toolpaths shave valuable time off of the actual machining time



by detecting (via proprietary algorithms programmed into the software) changes in the material and adjusting tool length and stepovers to accommodate them. By remaining constantly engaged with the material, the tool rarely leaves the material, ploughing through as fast as programmed.

"The time-saving results from using the software for high speed machining mill work is amazing," Miyamoto said. "Just put in 'percent of a tool width' that you want to take a cut at, and let it go! It used to be that you'd have to stand at the machine and just watch it, to make sure it didn't crash. Not now." They use the Verify feature to make sure things are running okay, and, once he makes sure his Z's are set correctly, Miyamoto walks away and starts another project.

Miyamoto is not fazed by parts that need to be machined to exact tolerances or exact measurements. "Intricate parts that have very intricate cuts or holes in the



"The time-saving results from using the software for high speed machining mill work is amazing," Miyamoto said. "Just put in 'percent of a tool width' that you want to take a cut at, and let it go!"

middle of the part are no problem, even with the high speed toolpaths. We don't have to worry about the air cuts or the tool coming up and down," he said.

Miyamoto also noted that being able to program the machines to do exactly what he wants saves tool life because he can avoid collisions and tool breakage. "In SOLIDWORKS, I can draw quick fixtures, locate my bolt heads, and tell it to avoid this area. Then I flip back over to the Mastercam side, tell it exactly what I've drawn. This is "a zone of error", so it enters the part inside a pocket so I don't have to come in from the outside. Really, as long as you fill out everything correctly, it does exactly what you want."

By being able to set-up collision parameters, he said, he can put in zones to avoid. "Let's say you have a clamp in your way. It's great to have the flexibility to say, 'Okay this is a zone and I've got a clamp here. And there's a bolt head, so I need to raise it up higher.'"

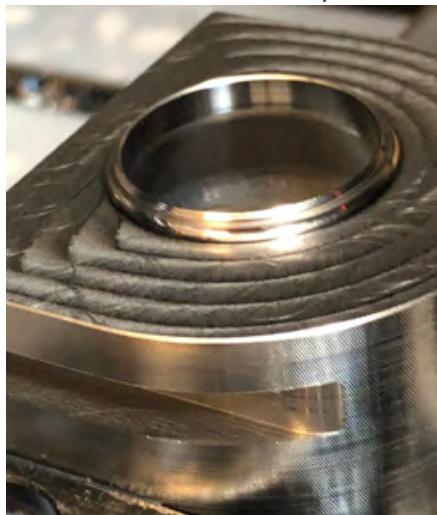
Miyamoto used the example of an automotive air cleaner assembly job he completed recently to describe the flawless, worry-free operation of his machines once he has programmed the software with the right instructions.

"The piece was 24 x 18 inches and required me to work right on the table. We laid it out in SOLIDWORKS so it lined up over the T-slot holes. Then we made custom T-slot nuts to offset the bolts to the outside of the T-slot so we could come around and machine within those bolts," he said.

"Not only was I able to tell Mastercam the exact location of the bolts, but I programmed my 'avoid here' instructions so the machine would not hit the bolts. I simply drew my boundaries and said, 'Okay, machine here because I can put a 1-inch end mill inside something and say 15% step-over'. The best part is I can trust it'll all happen just the way I programmed it, and simply walk away."

For another customer, a leading high-end shock absorber manufacturer in Southern California, Moto Proto is ideally equipped to make prototype parts and tooling for their assembly lines. "There are a lot of small little parts that go inside a shock absorber. They're shaped like a piston – round – and they have tapered walls in all directions. Before, I would have needed a tapered end mill for jobs like that. Now, I just grab a sixteenth ball end mill and taper the walls."

They also use the software to make a lot of their own



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"Intricate parts that have very intricate cuts or holes in the middle of the part are no problem, even with the high speed toolpaths. We don't have to worry about the air cuts or the tool coming up and down."

fixtures, saving the company even more. "We can't spend thousands of dollars making a fixture to make a \$100 part. So we make what we call "quick and dirty fixtures" by telling Mastercam where the things are to avoid."

A totally automated system shaves considerable time off the machining process and allows Miyamoto to focus on programming and delegate the set up and machining processes to his machinists. "Jobs just move along because we can spit-out the tool lists and spit-out set-up sheets. My machine operator will come in and I'll just hand everything to him. He leaves my desk and I go on to program the next part." Before using the software's Tool Library, Miyamoto said he would have to write down what tools were going to be needed. Now, the machine operator gets an image with the tool or the tool nose radius and details of exactly when it's going to be used.

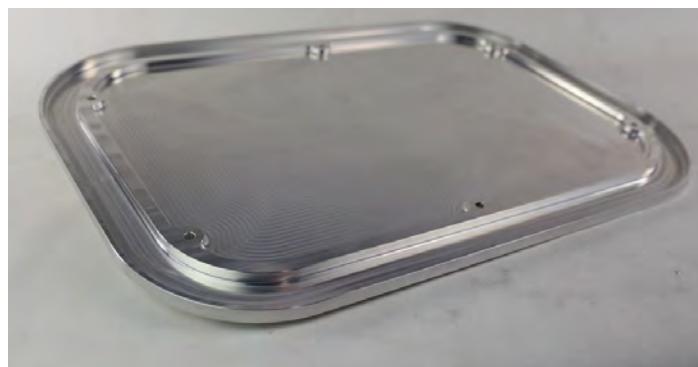
Set-up time has been dramatically reduced. The machinists typically run about three jobs per day on each of the three machines – one vertical mill, a 2-axis lathe, and a multiaxis lathe with live tooling, subspindle, and Y-axis. Miyamoto says it's about 10 parts. "That's an hour of set-up, 30 minutes of runtime, and you're on to the next part. Sometimes, the programming can be just as long as the runtime. Or, it can take an hour to program a part and 15 minutes to run it."

"That cuts down on my need to be out there babysitting the machines. It's more time I can spend programming. Plus, I use the Tool Library for the mill work, leaving 15 tools in the mill all the time. Obviously, it saves time just to know that, 'OK, tool number 7 is a quarter 20 tap and tool number 8 is the tap drill for it, and that never changes.'"

Miyamoto said now that he has the right equipment in place, he takes on jobs that, years ago, he would have passed on. Knowing how easy it is to use the software for surfacing radii on top of parts or machining tapered walls, Miyamoto can quote jobs without having to buy expensive tools to get it done. "When I can easily quote a job and move on, everybody benefits."

Today, Moto Proto is working on prototype suspension components for Agile Off-Road, a company that offers custom van suspension tuning and long travel 4x4 conversions. They are also making prototype parts for a variety of Jeep accessories including winches.

"Off-road automotive aftermarket parts is a very highly specialized industry," Jason said. "But ... it's a growing one!"



To machine an automotive air cleaner assembly, Miyamoto laid it out in SOLIDWORKS so it lined up over the T-slot holes. "Then we made custom T-slot nuts to offset the bolts to the outside of the T-slot so we could come around and machine within those bolts. Not only was I able to tell Mastercam the exact location of the bolts, but I programmed my 'avoid here' instructions so the machine would not hit the bolts."



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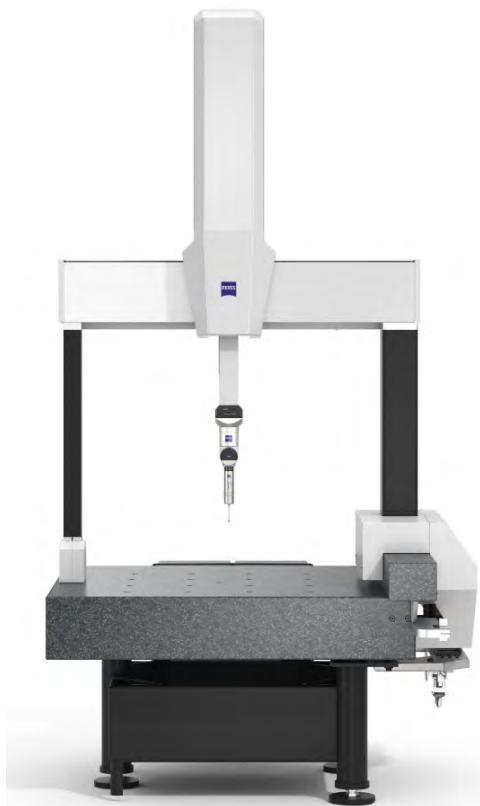
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CAD/CAM/CNC Perspective

By: Tim Paul

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The perfect 3D Surfacing toolpath...

The last issue launched a series exploring the details of 3D machining toolpaths. In that issue, I covered some of the fundamentals that changed my 3D machining game, including tessellated surfaces, boundary conditions, and the effects of smoothing on point distribution. In this issue we will continue the 3D toolpath discussion.

So, what is the perfect 3D toolpath? The most generalized answer is something like, “the most efficient toolpath that produces a surface that matches your design intent.” In other words, there isn’t a perfect 3D toolpath. If there was a single perfect toolpath, we would only have one 3D surfacing toolpath instead of the many that are available. The real answer is that you need to decide which toolpath best matches your priorities. In this article we will explore different priorities to consider and how different toolpaths satisfy different priorities.

Know your priorities:

Defining your priorities is an important first step before starting to work through different toolpaths for different geometry types. This reminds me of the funny sign I grew up seeing in my local engine machine shop, “You can have it done right, cheap, or quick. Pick two.” It’s a good reminder that everything we do in life and in the shop is a compromise of many different things.

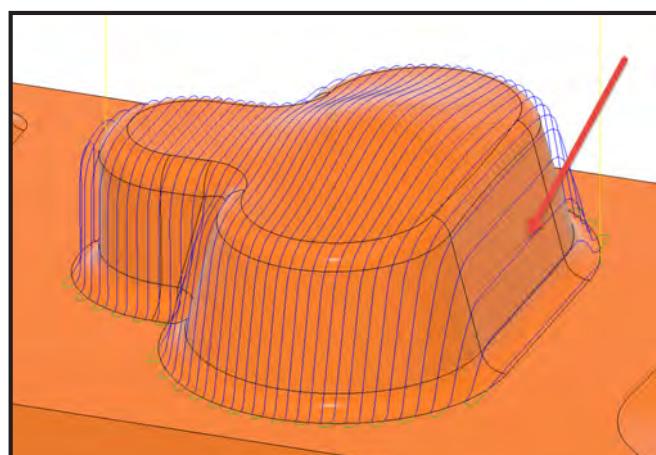
I generalize my priorities into three categories: time, measurable surface finish, and surface appearance.

Time: Time is easy to define and measure, but there are many tasks that consume time in a machine shop. I usually focus on measuring and minimizing CAM programming time, machining time, and setup/edit/change time. Which toolpaths you choose for different surface geometry will have a significant impact on the time required for each task. Some toolpaths are very efficient to apply on the CAM side but may take significantly longer machine time to achieve the desired surface. Other toolpaths may take more upfront work on the CAM side and be more efficient in the machine but take extra setup/edit/change time to get the desired surface result.

Measurable surface finish: The measurable surface finish is typically driven by engineering requirements from the customer or based on the application of the part. When the measurable surface finish requirement is out of my control, I compromise programming time and machining time to achieve the required surface finish as quickly as possible for the entire job. I may prioritize a quick to apply toolpath for a job of one part – even if it’s less efficient in the machine – to minimize the total time to delivery. On the other hand, for a large job where I’m trying to minimize cycle time to have the shortest total job time, I may prioritize a toolpath that is more efficient in the machine but takes some extra time to apply in the CAM and may require some additional adjustments.

Surface appearance: Surface appearance is generally a matter of visual opinion. A combination of details such as how a part captures light, how visible the toolpaths are, and how the toolpaths flow with the part geometry all affect people’s opinions of the visual quality of a part. This is the category I find myself and many other programmers spending an unjustifiable amount of time on. I used to

spend unreasonable amounts of time making aerospace parts look like beautiful works of art suitable for the pickiest consumers only to find out that they were getting bead blasted and painted in thick baby food colored paint. I enjoy making pretty parts as much (or more) than anyone, but a business owner and programmer’s job is to run a profitable business. Your goal should be to produce parts that meet the requirements as efficiently as possible. Old Man Frank’s saying, “the only perfect part is the



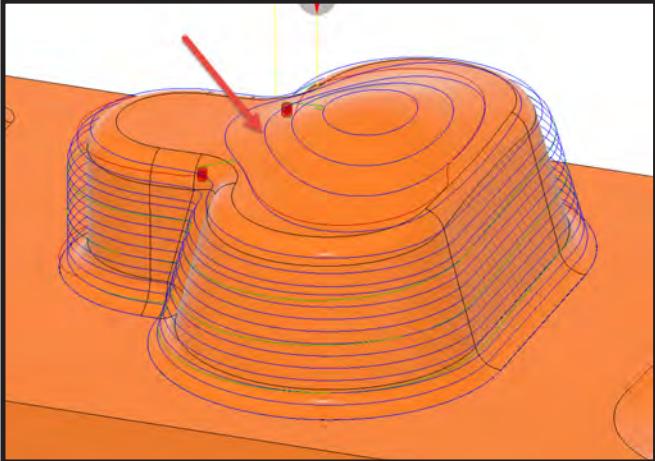
Projection: Parallel

part that meets the print,” is the perfect reminder of what we should all be focused on: efficiently producing parts that meet the requirements. Applying the appropriate combination of toolpaths is an important part of running a profitable shop.

Know your geometry:

Knowing your geometry and how toolpaths move along the geometry is one of the most important steps in machining quality 3D surfaces. Steep and shallow surface geometry are two examples of surfaces that require different toolpath strategies to produce similar surface finish results.

I generalize surfaces into three main categories: steep,



Z slice: 3D Contour

shallow, and transitional.

Steep: I consider steep surfaces to be 45 degrees or steeper, plus or minus 10 degrees

Shallow: I think of shallow surfaces as shallower than 30 degrees, but as steep as 45 degrees depending on how the toolpath moves over the surface

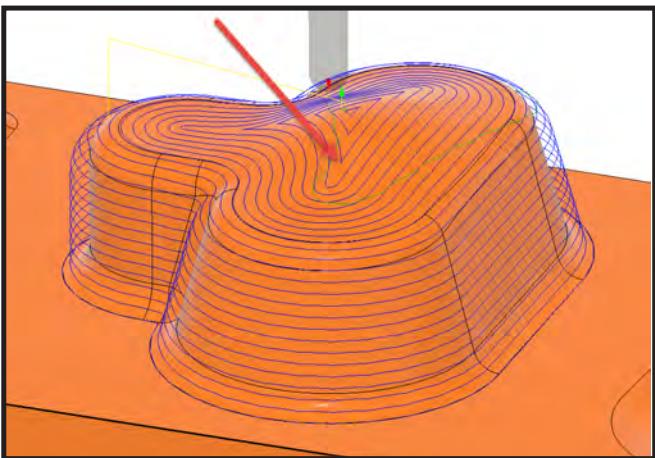
Transitional: Transition surfaces are simply the surfaces that transition between steep and shallow surfaces.

Know your toolpaths:

Knowing your available toolpaths and how they are produced will help you choose which toolpath – or toolpaths – best satisfy your priorities for each surface. 3D Contour and 3D Parallel are two examples of toolpaths that will produce significantly different surface finishes on the same surface slope.

I generalize toolpath types into three categories: projection, Z slice, and surface stepover.

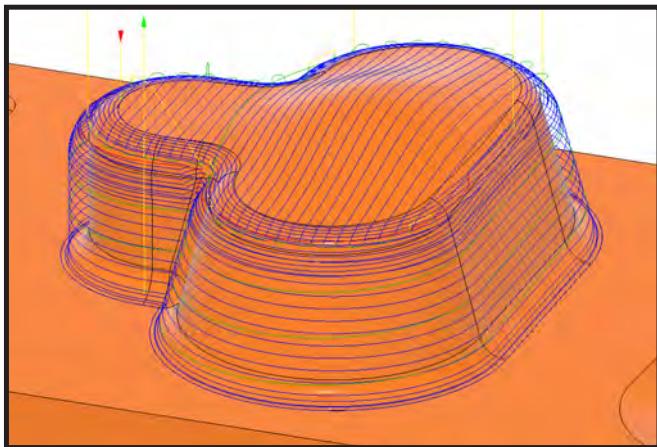
Projection: Projection toolpaths essentially take the surface to be machined, flatten it, apply a stepover toolpath on the flattened surface, and then project those toolpath lines onto the surface to be machined. The 3D Parallel toolpath is a common example of this type of toolpath. This toolpath works great on shallow surfaces and often does fine when driving straight up steeper surfaces. Projection toolpaths aren't ideal when they side step up steeper surfaces where the controlling stepover could produce a significant step up, leaving large cusps and a poor surface finish.



Surface stepover: Scallop

Z slice: Z slice toolpaths apply toolpaths at distinct depths based on the step-down distance specified in the toolpath parameters, just like the name indicates. The 3D Contour toolpath is a common example of a Z slice toolpath and produces efficient and consistent finishes on steeper surfaces. Where Z slice toolpaths aren't ideal is on shallow surfaces when the controlling stepdown produces a significant stepover.

Surface stepover: Surface stepover strategies produce toolpaths that are evenly spaced from one another along the 3D surface to be machined, no matter the surface slope. 3D Scallop is a common surface stepover toolpath and is typically easy to apply to a variety of surfaces while producing consistent and predictable machined surfaces. I most commonly use surface stepover toolpaths when programming time is my highest priority, or when machining segments of transitional geometry. While it may sound like surface stepover toolpaths are the ideal solution, they are often less efficient on steep surfaces than Z slice toolpaths. Surface stepover toolpath may also produce inefficient machine movement, including sharp direction changes as it follows the surface or boundary. Finally, sometimes the aesthetics of the toolpath don't accentuate the part geometry and result in a less visually appealing surface finish.



Combination: Parallel, 3D Contour, Scallop

Bringing it all together:

With all the possible options, 3D surface machining may seem like a daunting task. I've always found that breaking each detail of this complex trade down into digestible components has helped me pull them all together to improve the productivity of my time in the shop and the quality of my parts. Learning containment techniques to apply multiple toolpath types to a single part with multiple surface types such that each toolpath is applied in an optimal way is critical to producing great results on all but the simplest parts. A classic example is using slope to contain a 3D Contour toolpath to only machine surfaces from 35 to 90 degrees while containing a 3D Parallel toolpath to only machine surfaces from 0 to 40 degrees. This keeps each toolpath contained to geometry it can machine effectively while covering the entire part.

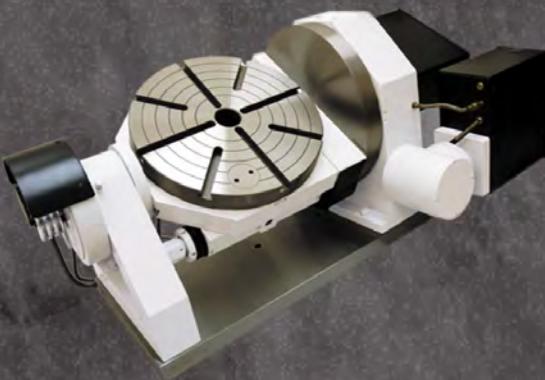
With a good understanding of your priorities, the part geometry, and which toolpaths are best suited for different geometry, it's not hard to efficiently produce quality surfaces that meet the part requirements. I hope this article helps you better assess your priorities, understand how part geometry affects different toolpaths and helps you choose what toolpaths are best suited for different geometry.



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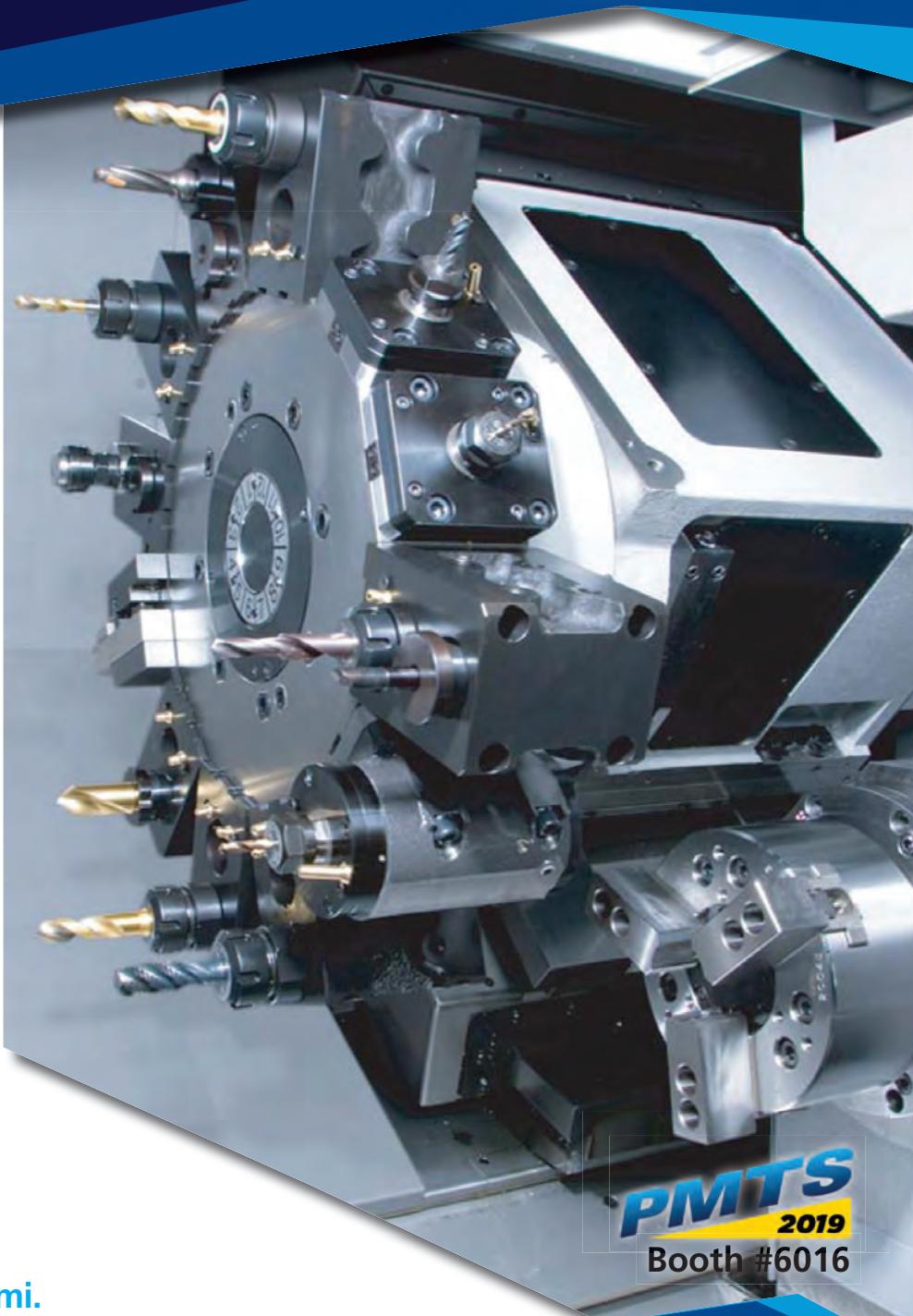
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HEIDENHAIN Opens New Office on West Coast To Provide Specialized Motion Systems with ETEL

As the Silicon Valley in California and the West Coast continue to be the hub of the semiconductor manufacturing in the U.S., HEIDENHAIN has expanded its motion systems support by establishing an ETEL facility in Fremont, CA. This new 2018 office will provide product, service and support of its ETEL motion systems designed specifically for that industry and others.

The Fremont office is an expansion of HEIDENHAIN's San Jose, CA, office and provides warehouse space to keep multiple ETEL motion systems on site. On display currently is an ETEL VULCANO stacked platform motion system, the METIS planar platform, and a demo bench showing ETEL single-axis solutions all operating using ETEL's AccurET controls.

A cleanroom has been built at this ETEL facility to simulate the expected working environment of its operation, and multiple service engineers are on hand to provide real-time support. A conference room space has also been established as a meeting area for visitors.

"The opening of this facility in 2018 has allowed HEIDENHAIN to meet the needs of the high-tech and fast-paced nature of Silicon Valley that often demands immediate response and is yet another example of HEIDENHAIN's Customer First

initiative," said Daniel Wiseman, HEIDENHAIN Motion System sales engineer. "And actually, area customers of all kinds can now walk-in and see motion systems in person. Plus, we can now provide on-site trouble-shooting more easily when required."

CAD/CAM software in the world. As we sit back and look at what has driven the success of our product through the years, we realized it's one thing: our users. If it weren't for our global community, we'd be nowhere."

Industry professionals, students and educators in the Mastercam community are encouraged to join Masters of CAM and share their experiences. Templates will guide story submissions on Masters of CAM. The first template available is "What Makes You a Master of CAM?" The Masters of CAM platform will grow with additional templates open to all users. It will also include templates for submissions from participants in contests hosted or sponsored by CNC Software.

Mastercam Launches Website for User-Generated Content

CNC Software Inc., developers of Mastercam, has launched Masters of CAM, a new website dedicated to its CAD/CAM users as a community.



Masters of CAM is a content-driven platform for Mastercam users to post stories of their skills and accomplishments. It is designed to develop as a hub for anyone with an interest in manufacturing.

In addition to user-generated content, Masters of CAM includes Featured Stories produced by the company. These videos present people and organizations that have had inspiring experiences as Mastercam users. In the future, compelling stories submitted through Masters of CAM will be considered for development into additional featured stories content.

"2018 was a monumental year for Mastercam," says marketing manager Graham Hargreaves. "We've celebrated 35 years in business and our 250,000th installation, further solidifying Mastercam as the most widely used

TRAK Machine Tools Announces New Distributor for the Western Region

TRAK Machine Tools has taken on CNC PROS LLC as their new distributor for the Phoenix, Tucson, and Las Vegas regions as a full line distributor for ProtoTRAK CNC's. In 2005 CNC PROS first started out as an independent service provider on a wide variety of CNC machines for the state of Arizona. Ray Beauregard Jr. and Cornel Loghin founded the company on a strong service-oriented



background, equipped with expertise in a wide variety of CNC machinery.

Most recently due to the rapid growth and expansion of their business, CNC PROS sold their original building and purchased a new showroom in Phoenix, AZ that has increased

Industry News

their showroom space by 3 times. This new location is in heart of the valley and will serve their customers and vendors well into the future. They have also grown their organization to 8 members, including 3 full time service technicians, a full time applications engineer, and are currently looking to add to their service and engineering department.

CNC PROS strives to be a turnkey provider, consulting with customers on engineering solutions supported locally by CNC PROS applications specialists. With the help of ProtoTRAK, CNC PROS is able to provide an intuitive, flexible, and cost efficient CNC control for a wide variety of prototype/low volume production for both milling and turning applications.

Valley Financial Services Opens for All of Your Financial Needs

Valley Financial Services finances all types of manual and CNC machinery, fabrication equipment, welding equipment, forklifts and wood working equipment. Whether your next machine is a manual mill, manual lathe, a machining center, a press brake or a five-axis milling center, call them for a one-stop solution for fulfilling the funding needs that will facilitate your business growth.

Acquiring a pre-approval before negotiating for machinery puts you in a stronger position by showing equipment providers that they are dealing with both a serious and a qualified buyer.

Harvinder Singh, CEO of VFS, has been one of the machine tool industry's trusted equipment funding resource since 1985 when VFS was instrumental in the growth of Ganesh Machinery. VFS provided the funding for hundreds of machine purchases that allowed many machine shops to expand their

business.

When purchasing machinery for your business, you are eligible to receive the Section 179 tax deduc-

tion. This can benefit your business by saving you a considerable amount of money on your business tax return. See the Valley Financial Services tax

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incentive page at www.vfsfunding.com for an informative sample calculation that is sure to open your eyes to the full extent of the benefits of the Section 179 tax incentive.

Niigata Machine Hires Hobbs as VP of Sales and Marketing

Niigata Machine Techno USA Inc. has appointed Gregory Hobbs as its vice president of sales and marketing. Mr. Hobbs' responsibilities will include planning and overseeing Niigata machine sales, marketing and product development programs to promote sales growth and customer satisfaction.

"Mr. Hobbs' long-term experience

and vast knowledge of the field made him a natural choice for Niigata," says Hans Retra, president and CEO. "We look forward to his contributions as the Niigata brand continues to grow in the U.S. marketplace."

Mr. Hobbs began his career in the manufacturing industry as a tool and die maker for Advanced Machine & Engineering (AME) Co. He later served as the National Service Director for AME and Hennig Inc. Prior to joining Niigata, Mr. Hobbs returned to AME to serve as plant manager, where he managed all manufacturing, assembly and equipment maintenance. He is a member of several ASME B5 committees

TDM Systems Appoints New Managing Director

TDM Systems has appointed Dietmar Bohn as its new managing director.

Bohn replaces Peter Schneck, who is retiring after five years as the head of the tool data specialist company.

Bohn joins TDM Systems from SAP SE where he spent 14 years in various positions of leadership at the Walldorf, Germany-based software company.

Most recently he was vice president of Industry Solution Management.

Bohn began his professional career in 1990 as a systems developer of machinery control systems at Heidelberg Druckmaschinen AG, rising to become director of Global Processes.

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Bohn said, "My goal is to take an active approach in shaping digital transformation and manufacturing in the future. TDM Systems was, and is, a pioneer in digitalization. The company brings together in-depth manufacturing and software expertise. I would like to think that those are my strengths as well."

KENT USA Celebrates 40th Year

In 1979, Kent Industrial USA Inc started with a line of precision surface grinders focused on delivering quality, value, and service to the metal working industry from small job shops to large manufacturing enterprises.

Today, the company offers conventional and CNC models of knee mills, bed mills, tool room lathes, oil country lathes, bandsaws, sinker and wire-cut EDM, in addition to surface grinders, cylindrical grinders, centerless grinders, and tool & cutter grinders - with more than 20,000 machines sold globally. Company CEO, Bill Young, attributes their steady success to partnering with the best people and companies in the industry, and having a "We succeed when our customers succeed" mentality.

The challenge in the future is global and technologically intensive. Applications and their solutions are more and more complex each day. Kent CNC, a division of Kent USA, focuses on the CNC market with products and solutions geared toward more complex machining works with 5-axis machining centers, large double column gantry machining centers, turning centers with mill-turn capabilities, dual spindles and dual turrets, CNC grinders, and industrial robot automations for machine tending applications.

Located in Tustin, California, Kent USA has been steadily growing its roster of industry experienced and

customer-centric sales and support engineers. On average, senior staffs have over 20 years of hands-on industry experience, to help customers achieve

"effective - sustainable - growth" which is the company's guiding purpose for its employee and customers.

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JTEKT Toyoda Americas Partners With YG-1 Tool Company For Charlotte, NC Technical Center

JTEKT Toyoda Americas announces the opening of its Charlotte, North Carolina based Technical Center in collaboration with YG-1 Tool Company, a supplier of high-quality cutting tools for over 20 years.

Conveniently located 20 minutes from uptown Charlotte, the showroom features a variety of machines from Toyoda's product lineup while serving as an extension of Toyoda's efforts of delivering more accessible training and support to better serve customers' needs.

Visitors can catch a look at the

tech center's four machines: FH500J horizontal machining center, Stealth 1165 vertical machining center, GL4-i cylindrical grinding machine and recent additions to the Toyoda lineup, Takisawa Taiwan's LA250YS turning center. The new showroom will enable local customers to see these machines first-hand and experience the power, quality and speed indicative of a Toyoda product.

Pros will assume sales and service for Grob's line of five-axis universal machining centers and automation systems in Arizona.

Ray Beauregard Jr., founding partner of CNC Pros, says the company was impressed with Grob's approach to five-axis machining as well as with its HMC platform, retractable spindle and single-sided trunnion.

"CNC Pros has built a solid reputation for fast and dependable customer support," says William Vejnovic, vice president of sales at Grob Systems. "Even with our factory service and parts right here in Ohio, our customers find it reassuring that the local Grob distributor has the know how to support them before and after the installation."

CNC Pros to Provide Sales and Service for Grob in Arizona

Grob Systems has partnered with CNC Pros of Phoenix, Arizona. CNC



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Orange County Choppers Creates Hydromat's 40th Anniversary Bike on American Chopper Show

In 2019 Hydromat Inc. is celebrating its 40th Anniversary (1979 -2019). As part of this celebration, the company engaged Orange County Choppers (OCC) to build a custom one-of-a-kind motorcycle to commemorate this milestone. The bobber-style bike is themed

in the classic Hydromat logo style. The OCC head designer, Jason Pohl then utilized the red color theme of the new Hydromat Eclipse 12-100 machine to tie the past to the present.

Orange County Choppers has been the center of the hit reality TV series American Chopper which debuted in September 2002 on the Discovery Channel. Now after a 5-year hiatus, the show has returned to the network with all new episodes. Paul Teutul Sr. and Paul Teutul Jr. are reunited in the current version of the show as the world-class motorcycle builders return to reclaim their place atop the world of customized bike building.

OCC bikes are customized and built around a theme or for a broad spectrum of motorcycle enthusiasts around the world. The design and build of the 40th

Anniversary Hydromat bike was the feature of the first episode of American Chopper's 2019 season and aired on the Discovery Channel February 12th.

Royal Products Promotions

Royal Products has made two changes in its leadership management structure, promoting Tom Sheridan to president and Chris Jakubowsky to executive vice president.

Mr. Sheridan has been with Royal for 28 years. He has previously worked within the company as an applications engineer, design engineer, director of sales and marketing, and vice president of marketing. Mr. Jakubowsky has been with the company for 22 years



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and has worked as industrial engineer, director of production, director of operations and vice president of operations. Both employees have been heavily

involved in all aspects of day-to-day operations for years, the company says.

Former President and current CEO Allan Curran says, "Together they will

run the company, while I scale back a bit and start taking some time off. Of course, this business is in my bones and I don't think I will ever fully retire, so I will continue to remain involved with Royal on the strategic planning side of the business."



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Fives Giddings & Lewis to Celebrate 160 Years

2019 is a big year for Fives Giddings & Lewis as it celebrates its 160th anniversary, with a special celebration happening this summer. What started back in 1859 as a lumber equipment job shop has grown and evolved with the demands of the markets, touching several industries along the way. Fives Giddings & Lewis still stands today in the same location as in 1859, at the corner of Doty and Rees Street.

In 1902 they began producing machine tools, starting with engine lathes and boring mills. During WWI and WWII a large portion of the business was in government work as our nation's defense department and military took first priority. In 1955 the first commercially available CNC was created in partnership with MIT. Current innovations include the integrated contouring head and new vertical turning center and milling product lines. The company has been part of the Fives Group since 2013.

ProShop USA, Inc., Established In USA

Vancouver, B.C.-based Adion Systems has established ProShop USA, Inc. in Bellingham, Washington as a U.S. subsidiary to facilitate sales and support of its ProShop manufacturing enterprise software to its growing U.S. customer base. ProShop software is a comprehensive web-based, paperless shop management system engineered

Industry News

to benefit small- to medium-sized manufacturing companies.

ProShop software provides an integrated, comprehensive set of modules for managing a shop's ERP (enterprise resource planning) operations as well as MES (manufacturing execution system) and QMS (quality management system) functions.

Paul Van Metre, Adion Systems co-founder and vice president of sales, and president of ProShop USA, said, "ProShop software represents a Digital Manufacturing Ecosystem or ERP 4.0. It enables smaller shops to easily manage their business with a big data, manufacturing-analytics approach, including shop floor monitoring of part quality inspection, work instructions and tool management."

In addition to typical ERP segments dealing with estimating, quoting and purchasing, ProShop includes MES and QMS control, monitoring and collection capabilities. The MES function tracks machine usage, cutting tool management, work instructions, part inspection data and more. QMS functions include all the modules needed to manage a company's ISO 9000, AS9100, API and ISO 13485 certifications. Data regarding standards, procedures, equipment, users, training, audit reports, non-conformance reports, corrective actions and more are included.

Mazak to Invest \$8.5 Million in Kentucky Manufacturing Operations

Mazak Corporation has announced it will invest \$8.5 million in new manufacturing technology for its Florence, Kentucky, Mazak iSmart Factory operations. The investment encompasses the installation of a new state-of-the-art manufacturing cell with fully automated storage and retrieval system, six of Mazak's most advanced machine

tools and several Mazak SMOOTH Technologies.

With an expected completion date

of late 2019, the new cell will entail two HCN 6800 and three HCN 8800 machining centers and an INTEGREX

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e-1250V multi-tasking machine and one MAZATEC Smart Manufacturing System (SMS).

The new cell in Kentucky will incorporate Mazak's SmartBox for process monitoring and optimization. Mazak will also use this new cell setup to demonstrate the company's SMOOTH Technology digital manufacturing solutions.

A new fully automated MAZATEC Smart Manufacturing System (SMS) for both machine pallet and raw material stocking will supply the six new machine tools for continuous production. The new manufacturing cell, with four load/unload stations, will combine the three different models of machines, three different size work pallets and one new raw material/stocker system all in one cell.

Community College of Denver Becomes First ATP of HEIDENHAIN Controls in North America

Heidenhain announced that Community College of Denver's (CCD) Advanced Manufacturing Center (AMC) as the first HEIDENHAIN authorized training partner (ATP) focusing on its CNC controls in North America. Here, both students and industry stakeholders alike can now access and train on the latest in state-of-the-art manufacturing equipment.

To become a Heidenhain ATP, CCD staff completed several rounds of advanced training on the 5-Axis HEIDENHAIN TNC machine controls and successfully passed an extensive exam.



HEIDENHAIN announces that Community College of Denver (CCD) is their first Authorized Training Partner for HEIDENHAIN TNC controls in North America. Pictured here (from left to right) are: HEIDENHAIN's Julian Renz, CCD's Eric Miller, HEIDENHAIN's Joe Pizzoferrato and CCD's Matthew Sweeney

"We are thrilled to be able to contribute to domestic manufacturing with these advanced capabilities," said Matthew Sweeney, AMC Director. "It's exciting to see what can now be done



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just by knowing what buttons to push on these conversational and effective HEIDENHAIN controls. And we are just scratching the surface of what these HEIDENHAIN controllers can do. Even the most experienced machinist can benefit from these advanced capabilities."

Heidenhain's TNC business development manager Gisbert Ledvon explained that "HEIDENHAIN has been in a relationship with CCD and their Advanced Manufacturing Center in Colorado since 2015, including participating in multiple joint workshops held at CCD for 5-axis machining covering theoretical and practical parts." There are multiple HEIDENHAIN TNC controls in operation at the AMC, and student classes are currently being offered there from basic to advanced control programming and training.

Platinum Tooling Now Represents Henninger

Platinum Tooling, the importer of live tools, angle heads, marking tools, Swiss tools and multiple spindle tools manufactured by various global suppliers, is now importing Henninger Speed Increasers for North America. The announcement was made by company president, Preben Hansen.

Henninger is a manufacturer of specialized equipment and precision machine tool accessories. Spindle speeder types including mechanical, air and electric motor driven styles are all available.

These speed increasers help maximize productivity by achieving a higher spindle rpm that is required for certain applications in today's marketplace. Small diameter tools require rpms that are sometimes not possible to reach with existing machine tools. In addition, they allow for less wear and tear on the machine's spindle when it is not required to run at its maximum rpm.

Mechanical speeders are available with up to a 1:8 gear ratio and a maximum speed of 50,000 rpm. Air speeders can run continuously at up to 80,000 rpm and high frequency motor

spindles can maintain up to 80,000 rpm with high torque and have variable speed options.

Many of the speeders have automatic tool change capabilities and are

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Zoller Joins OMIC R&D as 22nd Member

The Oregon Manufacturing Innovation Center Research and Development (OMIC R&D) welcomes Zoller as its newest member. Founded in Germany in 1945, Zoller is a market leader in tool presetting and measuring, inspection and measuring, tool management software, and storage solutions and automation.

Craig Campbell, executive director of OMIC R&D said, “Zoller brings tremendous weight to OMIC R&D’s high-end inspection and measuring capabilities, bolstering the strength of our unique partnership model. Their voice is critical to our efforts to help manufacturers increase their ability to quickly and effectively evaluate the quality of their products. The Board of Governors and our staff are also excited about having a Zoller Titan at our facility. It boasts the most advanced capability of any Titan in the world, and we are eager to see it in action.

OMIC R&D is the fifteenth innovation research collaborative established with Boeing leadership worldwide, and the first Boeing has sponsored in the United States. Its mission is to bring together manufacturing companies and higher education in an innovative environment to solve the advanced manufacturing challenges facing industry.

Faculty and university students undertake “outside-in” applied research to solve real production problems while training the next generation of engineers and technologists to meet the high demand for skilled workers in advanced metals manufacturing.

Michael Gallier, regional sales manager for the Pacific Northwest at Zoller Inc. said, “Zoller will be bringing some of its best capabilities to OMIC R&D as it seeks to solve industry’s challenges. We look forward to working together with such a strong, diverse group of industry and academic partners.”

Industry News

Cadence Aerospace Appoints Director, Business Development

Cadence Aerospace, a provider of complex aerospace components and assemblies to commercial and defense customers, has appointed Darren Waltier as director, business development, Cadence Aerospace-Aerostructures. With Centers of Excellence based in the U.S. and Mexico, Cadence Aerospace serves manufacturers of aircraft, aerostructures, aeroequipment and other defense platforms.

"Darren is a transformational leader with more than 25 years of experience in the aerospace and aviation industry, and I am pleased and excited to welcome him to the Cadence Aerospace team," said Tom Hutton, CEO, Cadence Aerospace. "

Most recently, Waltier served as vice president, sales and marketing for the Commercial Airline division of International Water-Guard, where he was responsible for all marketing and sales activities while positioning and presenting new products and technologies to the 737/MAX commercial airline market and operators. During his tenure at International Water-Guard, he also founded Pacific Aero Partners, LLC, an aviation and aerospace consultancy providing advisory services to the airline industry and the Boeing/OEM sectors of the aerospace industry.

From 1999 to 2016, Waltier served as director of sales and contracts, among other roles, for Aviation Partners Boeing

Marposs Acquires Automation Assembly and Test Company

Marposs has announced the acquisition of Elettrosystem s.r.l. based in Scurzolengo (AT) Italy, specializing in automation, assembly and industrial testing. This acquisition is part of Marposs' strategy to expand its solution offerings by integrating products and capabilities that complement its traditional portfolio.

Founded in 1980, Elettrosystem offers custom engineered solutions for a variety of needs such as plastic vial assembly and test machines for the medical industry or cylinder head assembly lines for automotive ap-

plications. These automated solutions can perform a variety of operations inclusive of material handling, vision inspection, measurement, functional testing and assembly

Creative CNC Appointed NCG CAM Reseller in U.S. and Canada

Creative CNC LLC has been appointed an NCG CAM Reseller for Canada and the U.S. Originally launched 20 years ago, this CAM software has a long-standing reputation in many countries for its advanced 3D milling capabilities.



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This software offers a number of advanced 3D machining routines, rest roughing and 3+2 capabilities for all toolpaths; a 5-axis simultaneous add-on module is also available. NCG CAM provides fast, efficient roughing strategies, comprehensive drilling routines and gouge protection all in a very user-friendly interface.

According to Janet Murphy, president, "We're excited to offer our customers this excellent software. The stand-alone CAM software can be used with any CAD software, is extremely easy to use and optimizes tool paths, increasing efficiency, reducing wear on machines and prolonging tool life. In addition, NCG CAM is an outstanding software for mold makers."

Open Mind Announces Turbomachinery Seminar on March 28.

Open Mind Technologies AG, has announced that together with SoftInWay Inc., it will be holding a "Turbomachinery Made Easy" Seminar on Thursday, March 28, 2019 from 10:00 a.m. to 4:00 p.m. at DMG Mori – 5740 Warland Drive, Cypress, CA. With greater demands on turbomachinery to be designed and manufactured to superior tolerances and meet increasingly tight deadlines, the necessity for a seamless workflow from design to manufacture has become a vital requirement throughout a variety of industries.

OPEN MIND and SoftInWay, both leaders in turbomachinery design and

manufacturing applications, will offer an integrated end-to-end solution from concept to finished product at the seminar. OPEN MIND's hyperMILL® CAM software and SoftInWay's AxSTREAM® CAE software provides companies worldwide with the resources to achieve an integrated and effective workflow from preliminary design to optimized cutting strategies for efficient manufacturing.

During the Seminar, OPEN MIND will present the programming of a centrifugal impeller and axial turbine blade, and SoftInWay will show the designing of these parts. The Seminar will also include a tour of the DMG Mori showroom. Manufacturing professionals are welcome and encouraged to attend.

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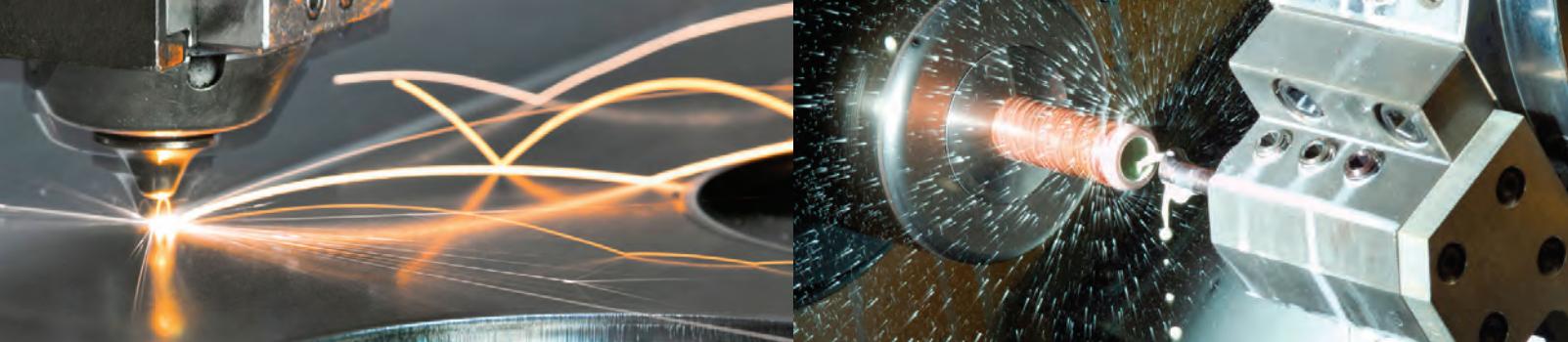
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Bystronic Announces Appointment Of West Coast Regional Manager

Bystronic, a global manufacturer of applications-oriented systems and solutions for laser cutting, bend-

ing and automation, has appointed Richard Chesnut as west coast regional manager, encompassing the states of Alaska, Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, and Washington. Richard brings over 22 years of diverse manufacturing, customer service, and direct sales and operations management experience to Bystronic.

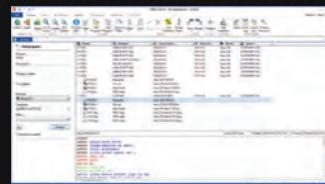
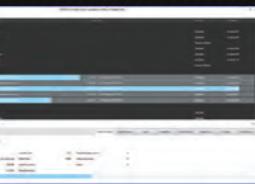
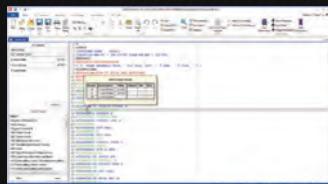
Richard's expertise with CNC machinery, automation, engineering, production, sales and service management will serve to further strengthen Bystronic's presence as a leader in the local market. Richard is a proud 12-year U.S. Navy veteran having worked on-board nuclear-powered submarines.

Mazak Distributor Magnum Precision Opens New Facility

Mazak distributor Magnum Precision Machines, serving Arizona, New Mexico, Southern Nevada, West Texas and parts of Northern Mexico, will host a special grand opening to celebrate its new, Arizona headquarters located in Phoenix. Scheduled for March 26-27, 2019, the event will feature advanced live machine demonstrations and facility tours from 11:00 a.m. to 4:00 p.m.

Magnum Precision's new 10,000-sq.-ft. facility enables it to offer increased levels of customer support, including a dedicated training center. The company will deliver an expanded

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Machine	Job Number	Operator	Run Time	Part WIP	Part %	Action
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HMC-518	543-6460	Wallace	00:07	03:40	0%	Stop
VMC-3Axis	Ingen	Patrick	00:00	00:00	0%	Start
VMC-48	1404	Roark Jr	03:21	03:50	100%	Stop
	507-5420	Stan	06:24	06:20	100%	Start
	509-0159	Dwight	00:08	02:45	100%	Start
VRX-S	Ingen	Esther	00:00	00:00	0%	Start

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roster of technical training options, service, applications and technical support, equipment rentals and machine sales at its new location.

Magnum Precision's staff includes sales, applications and service personnel. The new facility offers ample space for training seminars, including hands-on sessions targeting machine operators and other customer personnel. The dedicated training center accommodates classes of more than 10 students for locally based sessions, enabling customers to opt for training without the need for long commutes. Magnum Precision offers bilingual education with translation support for Spanish-speaking customers.

The grand-opening event also will feature ancillary equipment from the brands and product lines the company represents. For more information and additional details about the grand-opening event, visit www.magnumprecisionmachines.com.

Takisawa Taiwan Host Successful Open House in California Showroom

Taiwan Takisawa makers of turning centers and slant bed lathes recently held an open house at their spacious office and showroom in Chino Hills, California. The open house was well



attended with attendees looking at the latest technology and machines from Takisawa Taiwan.

Among the machines displayed were the MX-800 and the FX-800 twin turret, twin spindle turning centers. The FX-800 is a multi-purpose machine

made for process integration and high productivity. The company reports it is the perfect machine for short cycle times and high volumes. Its heavy-duty twin turrets and highly rigid twin spindles enhance machining accuracy.

The MX-800 is equipped with twin turrets and twin spindles and is a multi-

tasking fully intelligent turn/mill CNC lathe made for complex machining.

On hand to lend a hand were California distributors Tornquist Machinery who cover southern California and Performance Machine Tools who cover northern California.

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Mastercam Partners with Harvey Performance Company

CNC Software, Inc., developers of Mastercam is partnering with Harvey

Performance Company. Through its leading cutting tool brands Harvey Tool and Helical Solutions, Harvey Performance Company provides world class products, services, and solutions.

"CNC Software is proud to partner

with Harvey Performance. Working with an industry leading tooling company like Harvey Performance allows us to continue to advance manufacturing technology on both the tooling and CAM side of development," says Stas Mylek, partner program manager, CNC Software, Inc.

Due to this partnership, toolpaths within Mastercam will now be able to integrate Harvey Performance Company's breadth of tool options. For example, a new "Deburring" toolpath was released in Mastercam 2019 which will allow Mastercam programmers to leverage the strong line-up of Harvey Tool deburring tools. Harvey Tool, a brand known for its specialty profile and miniature tooling, and Helical Solutions, known for its line-up of material specific high performance end mills, offer many other areas for the teams to collaborate on improving end user experiences with Mastercam.

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Eriez Appoints Vice President and General Manager

Tim Gland has been promoted to the newly created position of vice president and general manager of Eriez USA, according to an announcement from Eriez president and CEO Tim Shuttleworth. Gland has been with Eriez since 2014, serving most recently as director of Erie operations.

In his new role, Gland will continue to serve as a member of the company's corporate executive team while expanding his leadership role as he oversees all Eriez USA operations. Shuttleworth said, "In his time at Eriez, Tim has been instrumental in improving production, quality and processes throughout the company, especially in terms of our growing Xtreme metal detection and Quick Ship programs."

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New and Used CNC Machinery**

New Products

Accurate Retention Force Measurement of Machine Tool Spindles

—Big Kaiser

Big Kaiser has developed Dyna Force, a device for measuring the retention force of machine tool spindles.

Insufficient retention force of the spindle clamping mechanism could lead to reduced rigidity and vibrations, loss of machining quality, poor surface finish and shortened tool life. By ensuring that the retention force is at the correct level, cutting performance remains consistent, providing high-quality machining results.

"The Dyna Force makes regular measurement of the retention force easy and accurate, preemptively miti-



gating the risk of machine damage or poor machining quality resulting from a low force on the spindle," said Jack Burley, vice president of sales and

engineering.

The lightweight and compact Dyna Force includes a digital display, cable and robust storage case. Dyna Force is available for 30, 40 and 50 cones, with one common digital display for all taper sizes. It is also fully compatible with BIG-PLUS spindles.

Precision Twin Spindle CNC Internal Grinding Machine

—Okamoto

Okamoto's IGM-15NCIII/2 Precision Twin Spindle CNC internal grinder offers optimum grinding versatility, productivity and precision through advanced machine design

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New Products



and construction. The elimination of multiple chucking not only simplifies set-up and boosts productivity, but also

optimizes workpieces dimensional accuracies. A workpiece that requires an ID, OD and face grind normally necessitates the use of two separate grinders. Since no two machines are exactly identical, and the workpiece has to be re-chucked, the relative accuracies of the ID, OD and face are lost. This is not the case with the IGM-15NCIII/2 because the workpiece stays fixtured on one machine.

The IGM-15NCIII/2 has an internal diameter to be ground capacity of 0.24" ~ 4". The maximum grinding stroke is 3.2" and maximum swing over table is 24". This I.D. grinder is compact with a small footprint. and weighs 5,300

lbs. The IGM-15NC2 is equipped with a Fanuc 0i-Td 2-axis simultaneous control with conversational programming. The simple "teach input" format reduces programming time making it ideal for operators that are new to CNC I.D. grinding

The IGM-15NCIII/2 features heavily ribbed Meehanite cast iron construction. The table rides on high precision linear guide ways and is driven by an AC Servo motor that enables minimum feed increments as fine as 0.00001". Maximum longitudinal table travel is 20". Feed rate ranges from 0.001" to 400"/minute.

The grinders high performance

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New Products

wheelhead is equipped with two rigid, high frequency inverter controlled spindles with 10,000 and 30,000 rpm spindles speeds standard. Any combination of 10,000 / 20,000 / 30,000 / 40,000 and 60,000 are available as optional. A 2-point diamond dresser dresses grinding wheel ODs and faces. The X-Axis (crossfeed) is a closed loop feedback system with linear scale. This in combination with an AC servo motor drive and a high precision internally cooled crossfeed ball screw enables peak accuracies with minimum infeed increments as fine as 0.00001" (dia.). The maximum

crossfeed (X-Axis) is 12". Workhead speed is infinitely variable from 100 ~ 850 rpm and is programmable through the CNC. Workhead swivel ranges from -5o to +15o. The work spindle is powered by a 2 HP motor.

Standard accessories include a Fanuc 0i-Td CNC with color LCD screen, 2-point swing type dresser with diamond tools, spindle oil lubrication and temperature regulator systems, wheel spindle speed, load meters and more. A long list of available optional accessories is available.



New Circular Cold Saw —Behringer Saws

Behringer Saws, Inc. has introduced its Behringer Eisele PSU-450M automatic miter circular cold saw. With its optimized sawing parameters, the

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New Products

newly designed clamping system with self-adjusting clamping units and PLC controls, the PSU 450M is suited for single piece cuts and mass production.

The flexible and universal automatic miter cold saw has a variety of features, including full miter cutting capability, a servo-driven axis for precise material length positioning, integrated gripper feeding unit, PLC controls, upstroking saw design and more. It lends itself to solids, tubes or any type of unique shapes.

The PSU has cutting capabilities up to 8.6" x 2.6". The automatic miter cold saw can be configured to support user application, with miter cutting or straight cuts at 90°.

High Productivity Cutting Band Saw Blades

—L.S. Starrett Co.

The L.S. Starrett Co. offers Primalloy Bi-Metal band saw blades for heavy-duty cutting applications including materials such as tool, high-speed, stainless and hardened steels, and nickel and titanium alloys.

Primalloy Bi-Metal band saw blades offer a cost-effective, highly productive sawing solution. The cutting performance, as well as heat and wear resistance of Primalloy's M-51 high-speed steel, is increased through alloying with cobalt and vanadium. The Primalloy product line also features a proprietary Extended Life Treatment (EXT) applied to the alloy steel back material.



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—Methods Machine Tools

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New Products

gies and now offers Ocean Technologies EDM drill machines, including the River 300.

Ocean Technologies' EDM drills models range from simple-to-use manual machines to fully programmable 5-axis machines capable of machining complex aerospace parts. Ocean Technologies EDM drills have patented technologies for breakthrough detection, and a proprietary HP1+ Power Supply for reduced wear and shorter burn times while reducing energy consumption.

The compact, entry-level River 300 features high-efficiency linear guideways and a 100L DI/Filter comes standard. The X-axis travel measures 11.8", Y-axis at 7.9", Z-axis at 11.8" and W-axis at 13.8". Table dimensions are 13.8" x 9.9". Maximum workpiece

height is 11.8" with maximum workpiece weight capacity at 330 lbs.

E-Learning software is featured on the River 300, as well as on all Ocean CNC models, allowing new operators to easily run the machine or seasoned operators to review particular processes on the fly.

Universal 5-Axis Milling Machine for Complex Workpieces

—SNK

SNK America offers its CMV-100 Universal 5-axis milling machine. The CMV Series of machines are specifically designed for the production of complex workpieces, such as aircraft components, dies & molds or any intricate

piece requiring continuous 5-axis, inclined surface machining. The CMV can be used to machine a variety of materials, including aluminum alloy, steel and titanium.

A column-feed design eliminates table overhang and increases accessibility to large workpieces. The machine has two rotary axes of spindle head tilt (A-axis) and table rotation (C-axis), in addition to the three linear axes of table longitudinal travel (X-axis), column traverse travel (Y-axis) and spindle-head vertical travel (Z-axis). All 5 axes are simultaneously CNC controlled.

The wide-tilting angle of the A-axis (from + 30° to -120°) allows expanded undercut capabilities. The 40/30 HP built-in spindle motor allows high speed, high power cutting of larger workpieces while offering a variety

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New Products

of spindle speeds for specific material cutting requirements. High speed linear guides with rigid construction maximize vibration damping at the tool tip for optimum tool life. An optimized high volume coolant system allows enhanced chip evacuation for efficient machining of titanium and other difficult to machine materials.

Tom Klukow, vice president of sales for SNK America, said "Whether it is for aero structure, jet engine, die/mold or general job shop production of large parts that require high speed, light duty or hard milling and heavy metal applications, the CMV models from SNK have a viable solution for large envelope part production."



Compact ALX 2500 Turning Machine

—DMG MORI

With the ALX 2500, DMG MORI has added a new turning machine to its portfolio that adheres strictly to customer requirements with regard to performance, precision and process re-

liability. The sturdy construction with its slideways on the X-axis and linear motion guides on the Z-axis ensures good damping properties and a high level of positioning accuracy. The ALX 2500 is available in 11.8 inches, 19.7 inches, 39.4 inches, and 78.7 inches turning length.

The ALX 2500 with its tailstock and twelve powered tools in the BMT turret can also handle more complex components. Rapid traverses of up to 98 ft/min and the high-performance turnMASTER spindle with a speed of 3,500 rpm and a torque of 587 ft lbs guarantee the necessary power and dynamics. Its accuracy is at 0.4 μ . DMG MORI offers the turnMASTER spindle with a warranty of 36 months without any hourly limit.

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New Products

The ALX 2500 gains in process reliability thanks to its optimum chip flow and simple chip disposal, which is at the front of the machine. Maintenance parts can also be reached quickly and simply from there. The user-friendly, ergonomic design of the ALX 2500 is continued for the controls, as well, where DMG MORI relies on the proven 12.1" COMPACTline with MAPPS Pro for 11.8 and 19.7 inches turning length and 15" SLIMline with MAPPS IV for the longer versions.

DMG MORI offers the ALX 2500 with the optional installation of a gantry loader, which enables virtually unmanned and therefore extremely cost-effective production. Modular

expansions for the automation solution, such as a measuring unit or deburring unit among others, are also available for even higher process integration.

Waterjet Nozzle Enables Longer Cuts —Kennametal

Kennametal reports the APX series of Roctec waterjet nozzles provide 20 percent longer operating life than the Roctec 500 series of tungsten carbide nozzles. The APX nozzles are designed for use in precision cutting applications where long, uninterrupted cuts or close tolerances must be maintained for

long periods to maintain part integrity or minimize expensive scrap due to premature nozzle failure.

The company says that the APX series was developed in response to demands for the ability to make longer cuts with more flexibility using higher-pressure pumps and more efficient processes on the latest waterjet machines. According to Kennametal, APX nozzles enable shops to take on more challenging, complex jobs, or run at faster production speeds or longer production periods.

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New Products

Imperial and Metric High-Quality Metrology Fixtures Announced

—Renishaw

Renishaw, a precision engineering and manufacturing technologies company, is introducing a $\frac{1}{4}$ 20 imperial thread size to its existing metrology fixtures product range.

Fixturing components are currently available in M4, M6 and M8 thread sizes. The Renishaw $\frac{1}{4}$ 20 fixturing range will be available for purchase early in 2019. Its addition means a complete fixturing solution can now be created for any part regardless of its size, shape or material.

A range of modular and custom

fixturing and software is available for use with co-ordinate measuring machines (CMMs), Renishaw Equator™ gauges and vision systems. Using high quality metrology fixtures can improve throughput, reproducibility and accuracy of inspection processes with quick repeatable fixturing set-ups.

dimensions.

The two-flute design, because of its wide spacing, is ideal for long-reach applications in softer-to-mill materials like plastics. These two-flute tools have a reach dimension ranging to $12 \times D$. The three-flute design, because of its combination of flute space, strong core and balance, is said to be ideal for long-reach roughing applications.

The reach dimension on the three-flute tools ranges to $25 \times D$. The four-flute end mill is designed with a heavier core for maximum rigidity, which makes it an ideal tool for long-reach finishing applications, according to the company. The reach dimension on the four-flute design ranges to $12 \times D$.

Micro End Mill Tools Offer Longer Reach

—Kyocera SGS

Kyocera SGS Precision Tools has expanded the micro end mill line of tools to include 594 items. These line items include tools with two, three and four flutes, and will include long-reach

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New Products



Single-Setup Machining of Large Parts with G420 Turn-Mill Center —Index

Index has announced the launch of its new G420 turn-mill center. The machine features identical 3,500 rpm twin spindles with 315-mm (400 mm optional) chucks and a 5-axis milling

spindle that provides up to 12,000 rpm with an HSK-T63 interface or 18,000 rpm with a Capto C6 interface.

The G420's main and counter spindles each accommodate bar stock of up to Ø102 mm and can chuck parts up to Ø315 mm (Ø400 mm optional). The large work area provides space for parts up to a maximum length of 1,600 mm and incorporates an ergonomic design to optimize operator accessibility. Additionally, an optional workpiece handling system can be incorporated for loading, unloading and transferring parts of up to 20 kg and Ø120 mm.

A powerful milling spindle offers 26 kW, 150 Nm and 12,000 rpm with an HSK-t63 interface or 27.5 kW, 100

Nm and 18,000 for the Capto C6 option. Optimized Y/B quill kinematics allow for simultaneous 5-axis milling operations.

Designed as a modular system, the G420 can accommodate up to three tool carriers in its workspace, each equipped with a Y axis. Turret steady rests are available to ensure maximum stability.

Ergonomics and flexibility were major considerations when designing the G420. All relevant components are easily accessible to operating and maintenance personnel. A chip conveyor can be mounted to either side of the machine.

An advertisement for Valley Financial Services featuring a scenic mountain landscape background. The logo consists of three blue mountains above the word "Valley" and "FINANCIAL SERVICES".

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An advertisement for Pacific Swiss & Manufacturing, Inc. featuring a blue header with the company name and "Multi-Axis CNC Swiss Turning" and "CNC Swiss Micro Machining". Below the header are two images: one showing various small metal parts and another showing a collection of precision tools. The text "CNC Swiss Miniature Machining" is in the top right of the first image.

Pacific Swiss & Manufacturing, Inc.

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CNC Swiss Micro Machining

CNC Swiss Turning

CNC Swiss Micro Machining

Shown above: Micro machined parts with table salt

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New Products



Newest DRO Announced —HEIDENHAIN

Heidenhain's newest digital readout (DRO) is now available to the market. Called the ND 7013 model, this new DRO replaces the ever-popular ND 780 and offers an improved user interface and user-friendly touch screen,

among other improvements.

This new ND 7013 DRO offers an improved status bar on the right side of the main screen that provides helpful options for selecting the respective operating status. A quick access menu allows the user to view or select multiple options such as displaying length and angle values, presets and tools, a stopwatch or calculator, feed rates, an edge finder (in milling mode), as well as an "Auxiliary Functions" key.

An I/O function is available on this new DRO providing additional useful enhancements for supporting machine functions.

The changeover from the conventional Heidenhain keyboard to the touchscreen facilitates operation and

makes custom settings possible. This also provides increased protection from the ingress of dirt and liquids.

The custom settings are done by configuring keys that are used to switch or control actuators in the machine. Furthermore, with a keystroke, a machinist can call documents (operating instructions, machine manual, tables, etc.) and display them on the screen. If spindle control is activated on the ND 7013 I/O, the user can also define keys for presetting the spindle speed. These custom-defined keys are then included in an OEM bar that can be dragged into the screen, if required.



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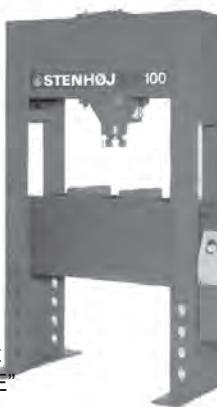
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New Products

Self-Centering Vises

—Jergen's, Inc.

Jergen's vises for multi-axis machining, part of its Fixture Pro line of modular five-axis workholding, come in sizes ranging from 75 to 130 mm with a number of mounting options. The self-centering vises feature a low-profile design to provide greater access to the part being machined.

A pull-down jaw design actively reduces jaw lift caused by flex and raising up during the clamping process. The vises feature centering/re-centering adjustment and quick-change jaws that require no tools. These jaws are reversible and available as step jaws with serrated inserts, aluminum

soft jaws, steel soft jaws and hardened step jaws.

Versatile mounting options are compatible with several Jergen's platforms including Fixture Pro, Drop & Lock, Quick-Loc, Lang Quick Point and 5th Axis RockLock. Maximum clamping force is 3,600 lbs with 50 foot-pounds of torque. In combination with the full line of Quick Loc pallet systems, the vises are said to offer versatility and quick change-over on vertical, horizontal and multi-axis machining centers.

Insert Grade Enhances Turning Performance

—Tungaloy

Tungaloy's T9225 insert grade complements the T9200 CVD grade series for steel turning. The insert grade features a wear resistant coating, hard ceramics for the outermost layer and the company's PremiumTec for post surface treatment. These features are said to make the insert grade effective for a range of applications and ensures a long tool life and stable performance.

Included in this grade are the -TSF, -TM and -TH chipbreakers for steel turning in standard ISO inserts and ISO-EcoTurn inserts. A total of 349 inserts are introduced in this grade.

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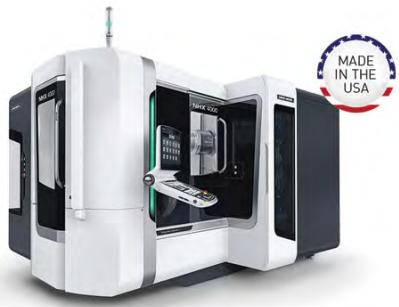
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Horizontal Machining of Complex Workpieces

—DMG MORI

DMG MORI offers the NHX 4000 3rd generation horizontal machining center (HMC) for horizontal machining of complex workpieces. Built in

Davis, CA, it is equipped to provide flexible and economic production due to its range of automation options.

The NHX series features sturdy construction for stable and high-quality machining. The X- and Z-axis guides are arranged to maximize rigidity of the bed, column and spindle. DMG MORI has increased the stability of the NHX 4000 3rd Generation even further, primarily with dynamics in mind. Acceleration rates of 1.2 g in all axes and 60 m/min rapid traverses contribute to high overall performance.

The speedMASTER motor spindle provides high chip removal rates. It offers a speed of 20,000 RPM, a power rating of 37 kW and a maximum torque

of 163 ft-lbs.

Hydraulic fixtures means it is easy to automate. It is equipped with a pallet changer when it leaves the factory, which moves the workpieces weighing anything up to 882 lbs. to the work area after setting up parallel to machining. It offers intelligent automation solutions. These range from a pallet handling system with up to 21 stations for a stand-alone machine and 99 pallets in a linear pallet pool for several machines and on to include direct workpiece handling using a robotic system. The product range is designed for both experienced users and those entering automated production for the first time.

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a large magazine. The cooling system includes a coolant tank with a filter unit and spindle cooling. Direct path measuring systems from Magnehelic, laser measuring probes and a sensor package that includes machine protection control round off the available options. The Fanuc NC control and CELOS operator interface provide an integral digital process.

Expanded CNC Series for Mold, Aerospace

—Hurco

Hurco has added two models to the BXi CNC machine series: the BX50i

(XYZ travels 37.4" x 53.2" x 23.6") and BX60i (XYZ travels 52.1" x 63" x 27.6"). The rigidity and thermal stability of the double-column design and the overall weight of the machines provide enhanced accuracy and increased surface finish capabilities.

The BXi Series utilizes a double-column design - minimizing machine distortion and thermal deformation. The ladder design of the BX50i bridge provides maximum support to the head casting; the spindle center line is closer to the supporting structure, allowing increased rigidity.

Additionally, the bridge structure is isolated from part weight and operates in a stable and predictable manner.

"The BX50i differs from other

bridge-type CNC machines due to the integrated Hurco control powered by WinMax control software and the patented motion system called UltiMotion", said a company spokesperson. The control helps machinists and job shops be more productive and profitable by supporting multiple programming methods: conversational programming; NC programming; and a Hurco-specific feature called NC/ Conversational Merge that optimizes efficiency.

UltiMotion is a motion control system invented by Hurco that determines the optimal trajectory to run the tool, offers consistent programmed feedrates and reduces cycle time. With UltiMotion, cornering velocity is 2.5

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times faster than conventional motion and machine jerk is reduced by half. UltiMotion includes up to 10,000 blocks of dynamic look ahead and is smart enough to adapt as required by the toolpath. UltiMotion is different than the smoothing features offered by CAD/CAM software. All Hurco CNC machining centers are equipped with UltiMotion.

Compact 5-Axis VMC's —Doosan

Doosan Machine Tools offers its DVF Series of compact 5-axis vertical machining center (VMC) specifically

designed for cutting diverse and complex shapes. The DVF 5000 comes standard with an 18,000 RPM integral 40 taper spindle. A Fanuc 31iB5 CNC controller makes full 5-axis simultaneous control possible, giving complete contouring capabilities. It also features a 500 mm diameter (630 mm option) built in rotary table.

Available table supports allow a maximum weight of 880 lbs. and minimize any table deflection. The rotary table is designed for user-friendliness and work efficiency, minimizing interference as the part is machined. Doosan also offers a DVF 5000 5 Face version with a Fanuc 0iMF CNC controller and a 12,000 RPM directly-coupled

spindle.

The DVF 8000 is a larger full 5-axis machining center that incorporates many of the features of the DVF 5000, but has a larger (800 mm diameter) rotary table that can support a maximum weight of 3,086 lbs.

Each machine comes with a 60-tool servo-driven automatic tool changer that can be expanded up to 120 tools, giving the customer more tooling to take on complex parts with varying profiles. An oil cooled spindle controls heat. The DVF Series also incorporates roller LM guideways. The machine has a compact footprint.

These VMCs offer a diverse range of tailored options and automation that

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make them suitable for unmanned machining. They come automation-ready and supplied with an optional/retrofit-table auto workpiece changer (AWC) that provides additional productivity by offering up to 12 pallets to feed the machine for unattended machining.

Quill-Spindle Horizontal Boring Machine —JTEKT Toyoda

JTEKT Toyoda Americas Corporation's newest addition to the boring line-up, the Wele HB1620 horizontal

boring machine, combines structural stability and geometric precision for enhanced performance reliability.

"From the base to the spindle to the technology, our Wele HB Series integrates all of the carefully engineered components that you would expect to see within the design and construction of any WELE product," said Randolph Ragnini, director of sales at Toyoda. "What makes this machine stand above its competitors is the hydro-static B-axis table, allowing the machine to smoothly and optimally handle excessive table loads, capacities in excess of over 44,000 lbs., an absolute necessity

for most boring mill users."

A combination of cast iron and stress relieved fabricated support structures have been designed for an optimum balance of thermal stability and rigidity during cutting. The machine also features heavy duty linear roller guides and standard linear scale feedback in all axes with a patented backlash-free mechanism on the B-axis.

The HB series was designed with the machinist in mind, offering a fully loaded Fanuc 0iM control, CE safety guarding and direct ATC access.

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Utilizing a BIG Plus spindle (CAT #50 taper) allows for critical tool applications on an as needed basis. The optional 60 tool magazine also extends the facility of the machine for a variety of workpieces.

Five-Axis HMC —Makino

Makino has announced the newest addition to its family of high capability horizontal machining centers (HMCs),

the 5-axis a500Z. This versatile machine adds a factory built and fully integrated "Z-type" fifth axis to accommodate today's more complex part geometry challenges in a minimum number of workholding set-ups and machining operations.

The kinematic arrangement of the a500Z minimizes the force path lengths through both the spindle as well as through the workpiece, transferring both cutting loads and reactive forces into the machine's three point leveled bed.

All axes on the a500Z have closed loop active temperature control standard, providing not only the enhanced dimensional control that is inherent to

this design, but also extended component life even in the most demanding production environments. With rapid rates for all linear axes of 2,362 IPM (60 m per minute) and a B-axis rotation rapid rate of 45,000° per minute, this agile platform allows for highly efficient machine movements.

The a500Z's standard 14,000 RPM high power spindle offers output capabilities of 49.6 HP (37 kW) peak power, and 223 ft-lbs. (303 Nm) peak torque, making it suitable for wide ranging material applications. Tool changer magazine sizes range from the standard 60 tool capacity ring to a 313 matrix magazine.

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changer on the a500Z increases machine utilization, allowing workholding fixture tending on one pallet while the other pallet's workpiece is being machined.

New Tool Program for Automatic Lathes -Heimatec

Heimatec announces the availability of their Citizen tool program. This line includes both live and static tools for most Citizen lathes. Designed to optimize the machine's parameters, these precision tools are efficient and cost effective.

Originally developed for the manufacture of precision parts in the watch industry, Swiss-type CNC automatic lathes are now widely used throughout the industry to produce automotive components, screws and pins for the medical industry, and precision parts for electrical engineering.



Heimatec's goal during the development of this line was to construct a series of tools that would offer the greatest possible processing quality and longest service life. To achieve this, Heimatec incorporates the highest quality bearings, ground gear components, spindles, and housings to produce superior tools with maximum rigidity.

In addition to Citizen, Heimatec is constantly striving to expand its tooling programs in an effort to maximize the machines capabilities and improve productivity.

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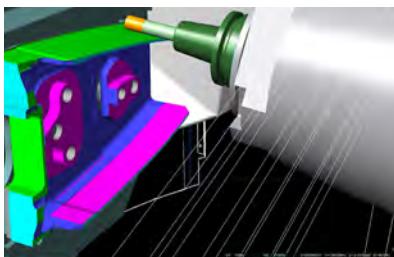
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NCSIMUL Machine Simulation and Optimization Software Helps Aerospace Manufacturers —Spring Technologies

NCSIMUL Machine simulation and optimization software from

SPRING Technologies helps aerospace and other manufacturers create “digital twin” process models that facilitate fulfilment of customer demands for higher production rates and unwavering product quality.

To meet the continual ramp-up in aircraft output, OEMs and subcontractors alike are employing leading-edge machine tools, tooling and CAM software in the Internet of Things (IoT) / Industry 4.0 environment.

A key element of the Industry 4.0 domain is creation of electronic “digital twin” models of product data and production processes. The virtual models correspond with the physical shop floor processes and allow manu-

faturing operations to be simulated, tested and altered to avert possible problems and downtime and while also facilitating process optimization.

NCSIMUL Machine software works directly with ISO NC machining codes to simulate, verify and optimize machining programs based on specific parts, tooling, and machine tool characteristics. Three-dimensional graphics help prevent crashes while complex algorithms and embedded process-based knowledge enable optimization of cutting conditions. Use of the software reduces time spent debugging programs, eliminates risk of spindle collision, tool breakage and scrap, and improves cycle times, process efficien-

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NCSIMUL Machine provides machining verification in three steps: it investigates and corrects coding errors, simulates to detect collisions and correct motion errors, and validates the machining results. The software also monitors production transfers, tool management and machine status. Spring Technologies reports that use of NCSIMUL software can help manufacturers meet delivery schedules, maintain aerospace-level product quality and reduce preparation times.

Self-Centering Vises Prevent Lift for Multi-Axis Machining

—Jergens Inc

Jergens Inc. has introduced a range of vises for multi-axis machining productivity. Available in 75 mm and 130 mm with a number of mounting options, the self-centering vises feature a low-profile design to allow for a greater part (machining) access.

Part of the Fixture Pro line of modular 5-axis workholding, the vises feature a pull-down jaw design to actively reduce jaw lift caused by flex and raising up during the clamping process. These vises have an easy

centering / re-centering adjustment and quick-change jaws that require no tools. Jaws are reversible and available in step jaws with serrated inserts, aluminum soft jaws, steel soft jaws and hardened step jaws.

Versatile mounting options are compatible with several Jergens platforms including Fixture Pro, Drop & Lock, Quick-Loc, Lang Quick Point and 5th Axis RockLock. Maximum clamping force is 3,600 lbs. @ 50 ft-lbs. In combination with the full line of Quick Loc pallet systems, the new vise offers versatility and quick-change on vertical, horizontal and multi-axis machining centers.



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...Hotline Continued From Page 8

Boom Supersonic Receives \$100 Million in Funding

Colorado-based Boom Supersonic says it has closed a \$100 million Series B investment round to support the development of a Mach-2.2 commercial airliner called Overture.

The funding includes \$56 million in new investment as well as \$44 million in previously announced investments. Total funding for Boom now stands at more than \$141 million. The round was led by Emerson Collective and includes funding from Y Combinator Continuity, Caffeinated Capital, SV Angel and individual investors, Boom said.

"This new funding allows us to advance work on Overture, the world's first economically viable supersonic airliner," Boom founder and CEO Blake Scholl said in a news release. "Overture fares will be similar to today's business class – widening horizons for tens of millions of travelers. Ultimately, our goal is to make high-speed flight affordable to all."

Boom says Overture will accommodate the use of next-generation alternative fuels and have a carbon footprint comparable to that of present-day business-class travel. The company is also working on technology aimed at making Overture's takeoffs and landings as quiet as those of subsonic aircraft.

A one-third-scale prototype called XB-1 is currently being assembled at Boom's production facility in Centennial, Colo. It's set to fly later this year.

Boom says it has more than 100 full-time employees and plans to double that number this year. The company is weighing potential manufacturing sites for Overture, which is scheduled to enter passenger service in the mid-2020s. Future customers include the Virgin Group and Japan Airlines, which have pre-ordered a total of 30 jets between them.

AeroVironment Moves Headquarters to Simi Valley

AeroVironment Inc. has moved its headquarters to Simi Valley, CA. from Monrovia, CA. according to media reports.

The Los Angeles Times reported in December that the drone manufacturer made the move official on Nov. 29 and that all employees at the Monrovia facility are being given the opportunity to move to Simi Valley by the summer.

AeroVironment has for years developed, manufactured and tested its drone aircraft in Simi Valley.

Boeing Contract for Second Japan KC-46 Tanker

The U.S. Air Force has exercised the option for the Japan Air Self-Defense Force's second Boeing KC-46 tanker through the Foreign Military Sale (FMS) process.

Boeing was awarded the initial FMS contract for Japan's first KC-46 aircraft and miscellaneous logistics services in December 2017 following the Japan Ministry of Defense's KC-X aerial refueling competition.

The KC-46 is a multi-role tanker designed to refuel all allied and coalition military aircraft compatible with international aerial refueling procedures and can carry passengers, cargo and patients.

Boeing began developing the KC-46A Pegasus tanker for the U.S. Air Force in 2011 and is assembling the 767-derivative aircraft at its Everett, Wash., facility.

Torrance Aerospace Firm Donates \$1.5M to Catalina Airport, Receives Naming Rights

Torrance aerospace firm Ace Clearwater Enterprises is donating \$1.5 million towards the cost of runway repairs at Catalina Island's Airport in the Sky, giving it naming rights to the airfield.

According to the Jan. 28 announcement from the Catalina Island Conservancy, the nonprofit land trust that owns and operates the airfield, the donation will help pay for concrete, transportation and other costs incurred by the Conservancy, to replace the runway's aging asphalt surface.

Ace Clearwater Enterprises was founded more than 60 years ago and has remained a family-owned business, now co-owned by Tim Dodson and his daughter, Kellie Johnson, who also is chair of the Catalina Island Conservancy's board of directors.

"At Ace, we like to say that if it flies, we have parts on it," Johnson said in the announcement. "We are excited to have the opportunity to add the name Ace Clearwater Airfield to the Conservancy's Airport in the Sky. This is a great legacy for our family and the Ace team whose hard work and 'attitude committed to excellence' have made this donation possible."

Continued on page 106.....

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TCI Precision Metals Increases Workforce in CA. Plant

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TCI Precision Metals recently increased its workforce by 15%. This is in response to increasing awareness and preference for the company's value-added line of Machine-Ready Solutions, which are designed to help shops increase throughput of production machining jobs.

TCI Precision Metals is a, wholesale, Machine-Ready Metals Distributor for Alcoa, Kaiser and Hulamin Aluminum, including 6061, 2024 or 7075 aluminum plate and sheet, stainless steel plate and several other alloys and stocks over 500,000 lbs. of material.

Century Spring Corp. Achieves AS9100 Rev. D Certification for Custom Aerospace Parts

Los Angeles based Century Spring Corp., has achieved AS9100 Rev. D certification for its custom aerospace spring manufacturing, quality management system (QMS). AS9100 is an aviation, space, and defense quality standard based on the ISO 9001 quality management system and supported by the International Aerospace Quality Group. AS9100 Rev. D certification provides assurance that products are manufactured to the highest quality standard, ensuring reliability in the most demanding, mission-critical, environments.

Cubic Renovates San Diego Manufacturing Space

Cubic Corp. is wrapping up renovations of the space at its San Diego campus where it manufactures military training gear. Specifically, Cubic is improving the area where the company produces air combat training solutions.

Cubic's air combat maneuvering instru-

mentation business goes back to the 1970s. Since then, Cubic has delivered more than 5,000 aircraft-mounted "pods" for 40 different aircraft at 80 locations worldwide. San Diegans make components for aircraft-mounted pods, ground subsystems and secure components for the systems, which provide live, virtual and constructive (LVC) training – that is, training which combines real people with simulations.

Mike Knowles, president of the Cubic Global Defense subsidiary, said in a statement that Cubic plans to increase production of its new-style secure LVC pods in San Diego.

The Kearny Mesa-based corporation has contracts to produce such training systems for a variety of military aircraft, including the new F-35 Lightning II.

Tesla Agrees to Buy Maxwell Technologies for \$218M

Tesla Inc., the Silicon Valley automaker that also produces energy-generation and storage systems, has agreed to buy Maxwell Technologies of San Diego, a company specializing in industrial-grade and vehicle-grade capacitors, for approximately \$218 million.

Maxwell said it expects the deal to close in the second quarter of 2019. Regulators have yet to approve the deal.

"A capacitor is piece of equipment that stores electricity and releases it in a burst. Maxwell makes "ultracapacitors" that go on electric vehicles such as buses.

Boeing Receives \$2.4 Billion P-8A Poseidon Contract From U.S. Navy

The U.S. Navy has awarded Boeing a \$2.4 billion production contract for the next 19 P-8A Poseidon aircraft. The contract includes 10 aircraft to add to the current inventory of P-8As in the U.S. Navy fleet, all five jets currently under contract for Norway and the four aircraft remaining for the existing United Kingdom contract, bringing the total United Kingdom acquisition to nine aircraft.

The United Kingdom and Norway are acquiring the Boeing aircraft through the Foreign Military Sales process and will receive a variant designed and produced for the U.S. Navy called the P-8A Poseidon. The United Kingdom will receive their first aircraft in 2019 and Norway will begin receiving aircraft in 2021.



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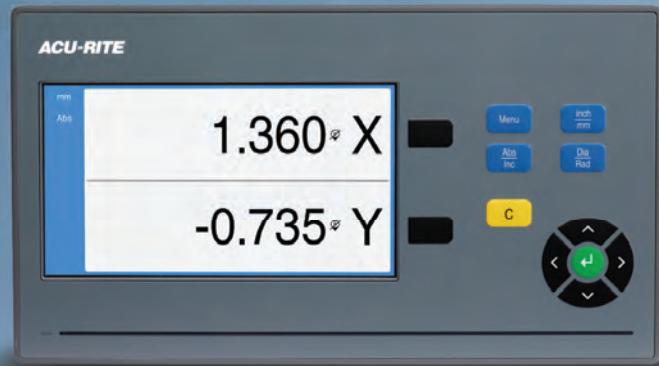
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