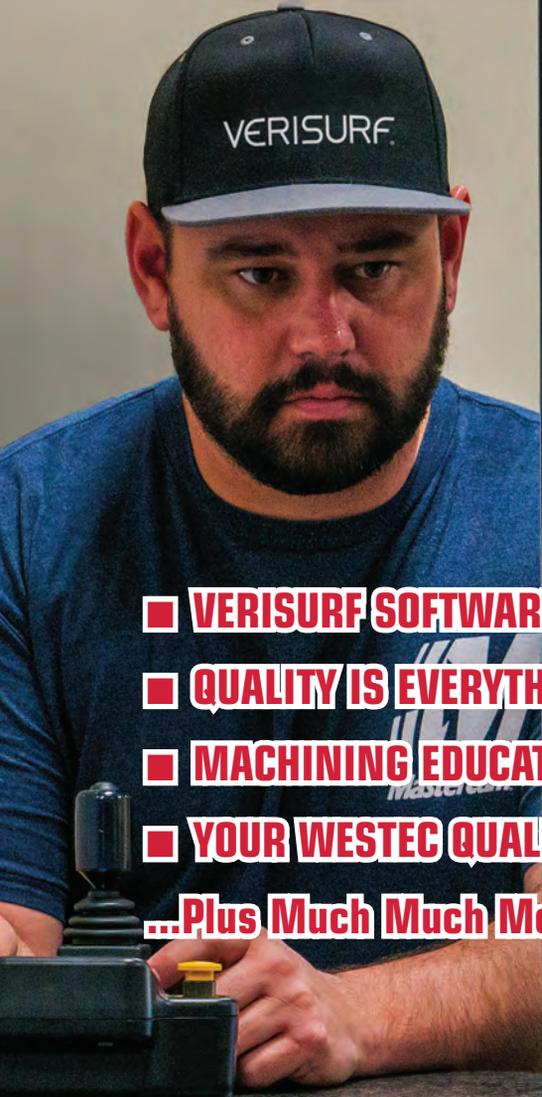


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Volume 40 - Issue 2

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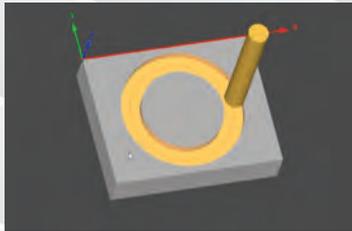
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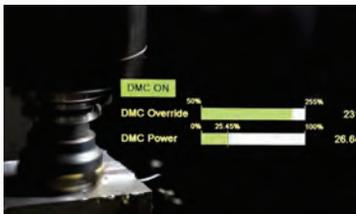
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Holiday **SWAT** Wish List

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Garner Products management team never want to see their products once they leave the shop....Page 28



Sean Buur does a Q & A with a few of the most well known metrology companies at Westec..Page 34

Coming in February/ March 2022

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

Editorial: Jan 18, 2022

Ad Space: Jan 22, 2022

Ad Material: Feb 1, 2022



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Dec 21/January 2022

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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It is Easy to Make My Day

Right before I started working on this issue I spent three days at the Long Beach Convention Center as an exhibitor at WESTEC. It felt so good to talk to people in the industry again. I saw many people that I had not seen in a few years and it was wonderful. The show itself was OK. Nothing more, nothing less. I am glad I had a booth there and most exhibitors I talked to felt the same way too. I did have a few companies ask for ad information and that made my day.

It made my day to hear 4 or 5 attendees thanking me for sending them the magazine. One gentlemen said he has received it for over 30 years and loved the articles and even like the ads too. He also mentioned that over the years he has bought 4 machines from ads in the magazine. That made my day.

I also had someone in an exhibitors booth tell me he got into the industry via an ad from George Schortz. George is mostly retired now but was well known for job placement for many years. This application engineer for a large well known distributor said he was working at a shop doing programming and his shop was about to close down and contacted George from his ad in CNC WEST. George told him that he did not have any programming jobs for a shop but did have something similar for a machine tool distributor. An interview was done and 20 years later he is still an engineer. While it is with a different dealer he said life is great and he has that ad in CNC WEST to thank for it. That really made my day.

Our cover story was provided to us by Verisurf. We normally don't do that with the cover story as that is usually a Sean Buur story but it was so well written and the photo on the cover was so good, Sean Buur did not mind at all giving up his top billing. In fact he suggested it. A story that Sean did write was on Garner Products in the Sacramento area. The company does some unusual and interesting work and I think their story is one worth checking out.

Sean also went to Westec and talked with a few of the Quality/Metrology companies there since this is our theme this issue. He shares some of the things he found out from these leaders of industry in his article.

This issue marks the return of a Tim Paul column. Tim would like to write even more but it takes a lot of work and time which is what he already does in his day job at Autodesk. He normally sends me two pages but felt so strongly about the topic of his article he asked if he could send four. I am glad I said OK as Tim really hits the nail on the head about Machining Education. Read it and then re-read it. I am sure you will enjoy it. It made my day when I did.

I would like to take this time to thank all of our loyal readers and advertisers and wish you all a Merry Christmas (or what ever it is that you celebrate) and a Happy Happy New Year. It would make my day if you did.

Sincerely,

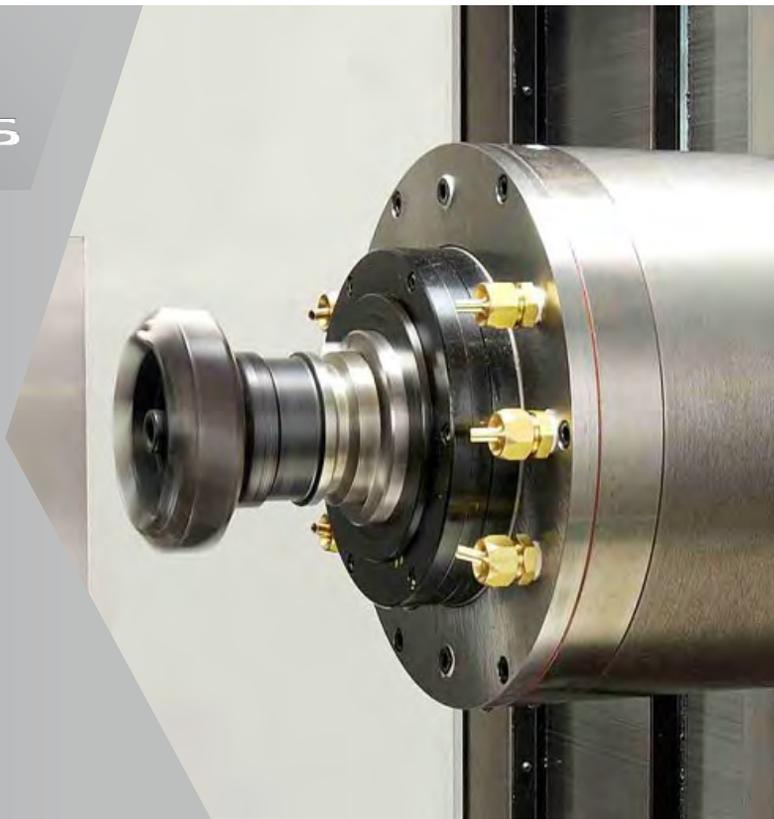
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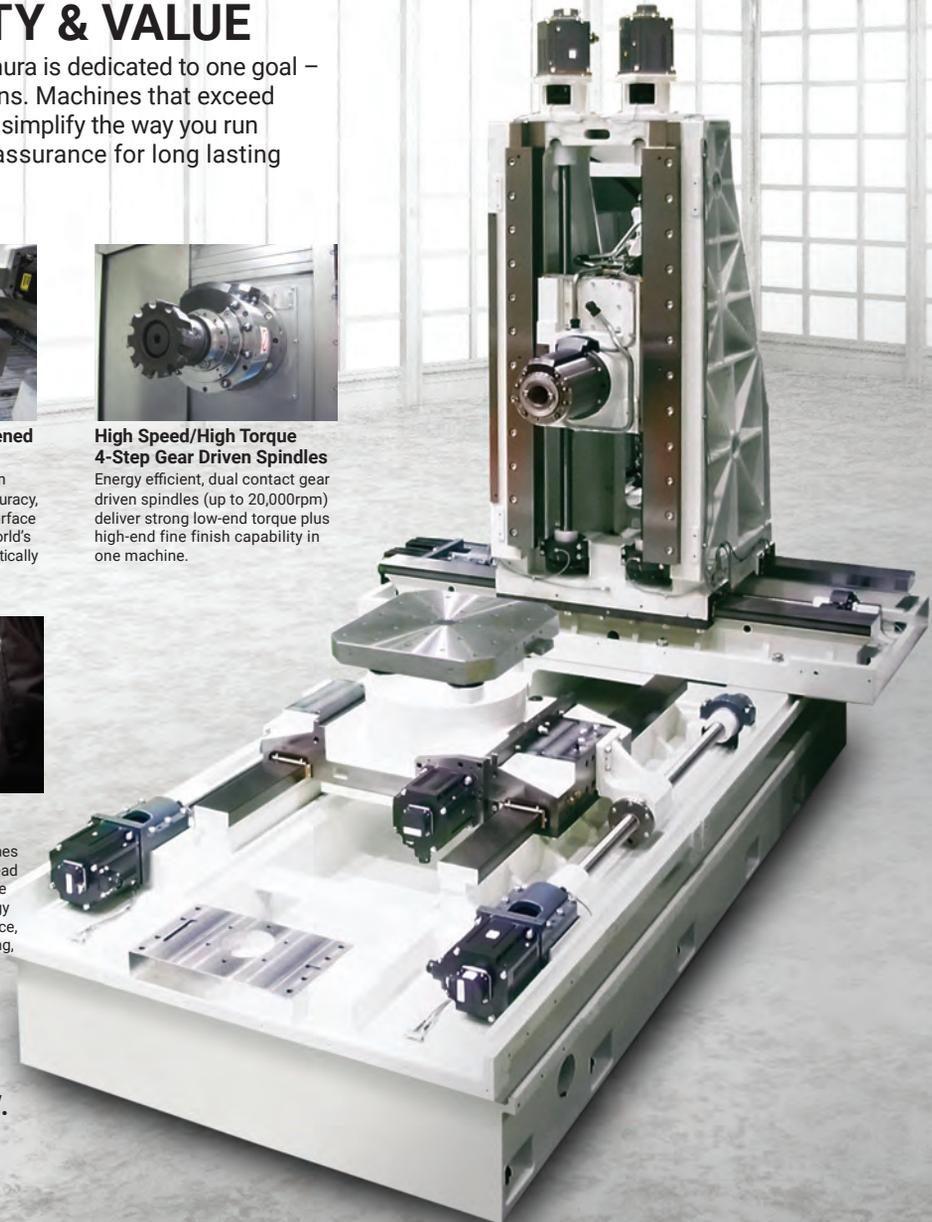
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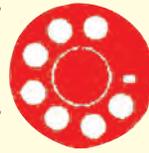
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for Endmills



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Fresno Manufacturer Plans to Create 209 New Jobs

A Fresno company plans to create 209 new jobs in the next five years thanks to a \$2.5 million tax credit from the state.

Infinity Energy, Inc. secured the award from the Governor's Office of Business and Economic Development (GO-Biz) as part of its California Competes program to keep jobs in the Golden State. The Rocklin-based company manufactures electric vehicle charging stations.

Infinity Energy currently employs 361 people but has plans to invest upwards of \$11 million as part of an expansion that will increase its workforce to 570 by 2025. Some 75% of the net increase in full-time employees will work at least 75% of the time in Fresno, according to the tax credit agreement.

Altogether, GO-Biz recently announced \$150 million in tax credits that are projected to create more than 7,600 new, full-time jobs in California. The funding will bring more than \$1.2 billion in new investments across the state over the next five years, according to a news release.

Alliance to Support Aircraft Depot Work

The U.S. Navy awarded Aircraft Readiness Alliance LLC, a small business from Anchorage, Alaska, a \$57.5 million modification to a previously awarded cost-plus-fixed-fee contract. Some 75% of the work will be performed in Coronado, CA. in support of the aircraft depot at Naval Air Station North Island.

This modification exercises an option to provide depot-level maintenance services for aircraft, aircraft engines and associated systems, equipment, components and materials involving rework of existing aviation end items, systems and components and the manufacture of items and component parts that are otherwise not available. These services also include modernization, conversion, in-service repair, disassembly and other associated services.

Work will be performed in San Diego (75%); Lemoore (11%); Camp Pendleton (5%); Miramar (3.5%); Whidbey Island, Washington (2.5%); Cannon, New Mexico (2%) and Kaneohe Bay, Hawaii (1%), and is expected to be completed in October 2022.

Rocket Lab Surpasses Revenue Expectations Amid Successful Rocket Launch

Aerospace company Rocket Lab USA Inc. surpassed third-quarter revenue expectations and announced it has entered into an agreement to acquire Planetary Systems Corp. in a cash and stock deal.

The Long Beach-based firm released the report Nov. 15 and said it saw revenue of \$5.3 million, up from projections between \$4 million and \$5 million. The strong performance was largely due to its space systems unit, which grew 360% from the same quarter in 2020 and represented 27% of total revenue for the first nine months of 2021.

Autonomous Delivery Vehicle Company Udelv Secures Award

Udelv, a Silicon Valley venture-backed company, announced in November that they have been selected by the United States Air Force (USAF) AFWERX program for a Phase II Small Business Innovation Research (SBIR) contract to improve flight line readiness by enhancing the delivery turnaround time of critical equipment to and from maintenance tool rooms and back shop areas. By providing an autonomous delivery solution, Udelv will reduce the delivery turnaround time of critical equipment and tools to and from maintenance tool rooms and other back shop areas that support aircraft maintenance to increase flight line readiness.

A pioneer in fully autonomous delivery technology, Udelv produces middle- and last-mile electric cab-less autonomous delivery vehicles for multi-stop delivery runs, called Transporters. The first fully electric cab-less autonomous vehicle for multi-stop delivery feature Udelv's patented cargo robotics comprised of a suite of hardware and software for intelligent loading and unloading, state-of-the-art telematics and fleet management, and are "driven" by Intel's Mobileye autonomous driving sensors and computers. Udelv will produce more than 50,000 Mobileye-driven Transporters by 2028, with commercial operations beginning in 2023.

Continued on page 66..

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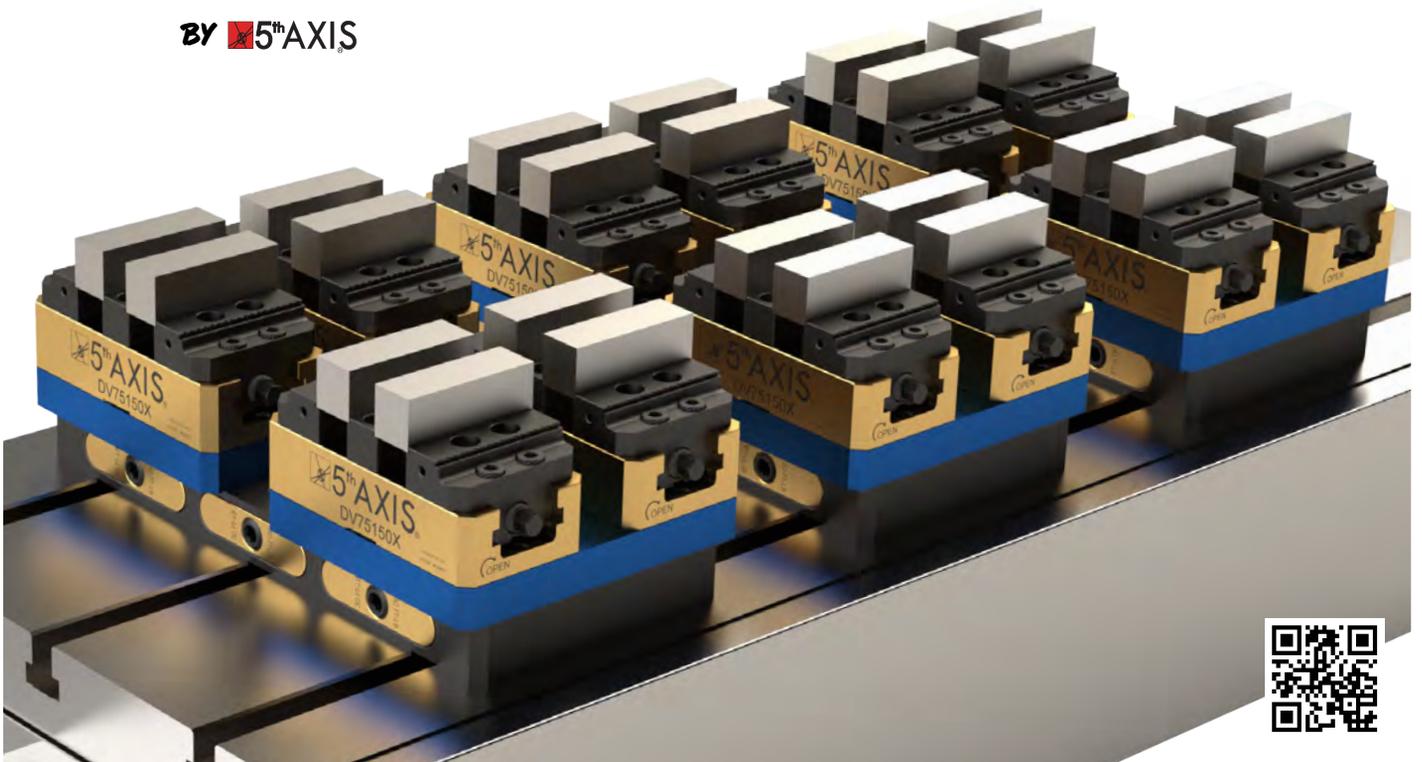
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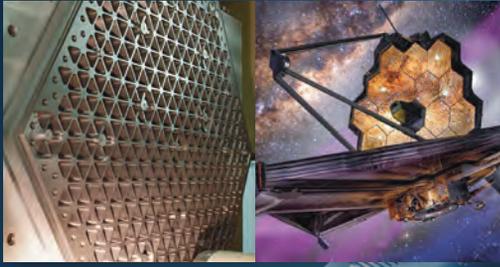
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1.5mm x 60° Serrations							
6"	0.472	10mm	0.787	6"	2.00"	RKT-6200A	\$ 87.07
	0.472	10mm	0.787	6"	4.00"	RKT-6400A	\$ 142.54
8"	0.551	12mm	0.984	8"	2.00"	RKT-8200A	\$ 102.36
	0.551	12mm	0.984	8"	4.00"	RKT-8400A	\$ 196.91
10"	0.630	12mm	1.181	10"	2.00"	RKT-10200A	\$ 151.40
	0.630	12mm	1.181	10"	3.00"	RKT-10300A	\$ 195.31
12"	0.709	14mm	1.181	12"	3.00"	RKT-12250A	\$ 234.40
	0.709	14mm	1.181	12"	4.00"	RKT-12400A	\$ 381.55
15"	0.827	16mm	1.181	12"	3.00"	RKT-12208A	\$ 213.35
	0.827	16mm	1.181	15"	4.00"	RKT-12408A	\$ 381.55
18-21"	0.866	20mm	1.690	15"	2.50"	RKT-15250A	\$ 570.70
	1.005	20mm	1.690	15"	2.50"	RKT-15251A	\$ 570.70
3.0mm x 60° Serrations							
18-21"	0.984	20mm	2.362	21"	4.00"	RK3-21400A	\$1,275.46
	0.984	20mm	2.362	24"	4.00"	RK3-24400A	\$1,775.07

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1.5mm x 60° Serrations									
6"	0.472	M10	0.787	1.50	3.00	KT-6150AF	\$ 32.11	KT-6150F	\$ 27.52
	0.472	M10	0.787	3.00	3.00	KT-6300AF	\$ 49.74	KT-6300F	\$ 53.94
8"	0.551	M12	0.984	2.00	3.75	KT-8200AF	\$ 46.64	KT-8200F	\$ 48.80
	0.551	M12	0.984	2.00	4.00	KT-8201AF	\$ 56.40	KT-8201F	\$ 56.19
10"	0.630	M12	1.181	2.00	4.50	KT-10200AF	\$ 54.35	KT-10200F	\$ 54.96
	0.630	M12	1.181	3.50	5.00	KT-10300AF	\$ 71.14	KT-10300F	\$ 79.49
12"	0.709	M14	1.181	2.00	5.50	KT-12200AF	\$ 89.57	KT-12200F	\$ 86.33
	0.709	M14	1.181	3.00	5.50	KT-12300AF	\$ 115.05	KT-12300F	\$ 129.45
15"	0.827	M16	1.181	2.00	5.50	KT-12208AF	\$ 89.57	KT-12208F	\$ 86.33
	0.827	M16	1.181	4.00	5.50	KT-12408AF	\$ 128.86	KT-12408F	\$ 156.37
18-21"	0.866	M20	1.690	2.50	6.50	KT-15300AF	\$ 155.87	KT-15300F	\$ 182.68
	1.005	M20	1.690	2.50	6.50	KT-15301AF	\$ 166.68	KT-15301F	\$ 182.68
3.0mm x 60° Serrations									
18-21"	0.984	M20	2.362	2.50	7.00	K3-21250AF	\$ 166.14	K3-21250F	\$ 207.54
	0.984	M20	2.362	6.00	7.00	K3-21600AF	\$ 412.81	K3-21600F	\$ 540.17

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

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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	Set Price
6"	.312	.499	3/8	1.500	2.00	TG-6200F	\$ 50.39	6"	RTG-6200A	\$ 91.92
					4.00	TG-6400F	\$ 86.71	8"	8-RTG-6400A	\$ 190.43
8"	.312	.499	3/8	1.750	2.00	TG-8200F	\$ 26.81	8"	RTG-8200A	\$ 124.47
					3.00	TG-8300F	\$ 77.97	10"	10-RTG-8300A	\$ 288.16
10"	.501	.749	1/2	2.125	2.00	TG-10200F	\$ 40.93	12"	12-RTG-10200A	\$ 221.74
					4.00	TG-10400F	\$ 91.15	15"	15-RTG-10400A	\$ 727.86
12"	.501	.749	1/2	2.500	2.50	TG-12250F	\$ 87.38	15"	15-RTG-12250A	\$ 592.44
					4.00	TG-12400F	\$ 123.85	18"	18-RTG-12400A	\$ 975.01
15"	.501	.749	5/8	3.000	2.50	TG-15250F	\$ 105.55	21"	21-RTG-15250A	\$1,039.59
					4.00	TG-15400F	\$ 137.62	24"	24-RTG-15400A	\$1,775.07

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Chuck Dia	Chuck Reference	Part Number	Set Price
6"	140/165/175/170	GBK-160-A	\$ 310.00
8"	200/210/215/225	GBK-200-A	\$ 340.00
10"	250/265/275	GBK-250-A	\$ 380.00
12"	315/340	GBK-315-A	\$ 470.00
15"	400	GBK-400-A	\$ 500.00
20"	500	GBK-500-A	\$ 970.00

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		Part Number	Price Per Set	Part Number	Price Per Set
B206, HS06	6"	KT-60HJ2-U	\$289.25	KT-60HJ2-X	\$301.96
B208, HS08	8"	KT-80HJ2-U	\$346.67	KT-80HJ2-X	\$368.06
B210, HS10	10"	KT-100HJ2-U	\$396.18	KT-100HJ2-X	\$436.01
B-12	12"	KT-120HJ2-U	\$461.37	KT-120HJ2-X	\$488.95
B-212, HS12	12"	KT-128HJ2-U	\$460.11	KT-128HJ2-X	\$489.97
B-15	15"	KT-150HJ2-U	\$594.26	KT-150HJ2-X	\$653.06



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POWER CHUCKS

Strong FREE SHIPPING!*



- STRONG® N200 Series Interchangeable With Kitagawa® B-200 Series Chucks
- Available in 2, 3 & 4 jaw models
- Higher gripping force and larger bore
- ISO 9002 certified
- STRONG® replacement parts available and interchange with Kitagawa® B200 series chucks

6" Chucks
w/ A2-5 Mount

\$1,781.00 each

Part # K-206A05-N-B

8" Chucks
w/ A2-6 Mount

\$2,040.00 each

Part # K-208A06-N-B

10" Chucks
w/ A2-8 Mount

\$2,678.00 each

Part # K-210A08-N-B

*Free ground shipping. Kitagawa® is a registered trademark of Kitagawa-NorthTech

SCROLL CHUCKS



SET-TRU

- Fine adjustment 0.0004" TIR
- Forged steel body
- 3 pinion design
- Each scroll is precisely balanced
- Two piece "master style" jaws
- Plain back

SAVE **10% OFF**
Mfg's List Prices

Size	Thru Hole	Part Number	Mfg's List	Our Price!
6"	1.654"	BI-7866-0600	\$ 1,163.25	\$ 1,057.50
8"	2.165"	BI-7866-0800	\$ 1,272.15	\$ 1,156.50
10"	2.992"	BI-7866-1000	\$ 1,443.42	\$ 1,312.20
12"	4.055"	BI-7866-1200	\$ 2,143.35	\$ 1,948.50
16"	5.354"	BI-7866-1600	\$ 4,349.07	\$ 3,953.70

USST JAW BORING RING

A Faster, Easier & Accurate Way To Bore Soft Jaws!



- 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 Number	Price
4"	JBR-04	\$176.58
5"	JBR-05	\$176.58
6"	JBR-06	\$200.83
8"	JBR-08	\$246.86
10"	JBR-10	\$278.68
12"	JBR-12	\$309.81
15"	JBR-15	\$465.50

Fits Kitagawa, Samchully, Strong, TMX, MMK, Howa, SMW, Seoam, Autoblock and other CNC chucks!

COLLET PADS & TOP JAWS



"S" Style • Warner & Swasey • Emergency Pads
Serrated, Squares & Hexes • Top Jaws • Made in the USA!

Warner & Swasey Collet Pads

Prices Starting At:
\$75.65 Set

Part # CP-WS3RM02500-Y

"S" Style Collet Pads

Prices Starting At:
\$76.73 Set

Part # CP-S12RM02500-Y

Top Jaws For 8" CNC Chucks

Prices Starting At:
\$635.25 Set

Part # CPJ-KT0800WS4-U

LATHE TOOLHOLDER BUSHINGS



Bush Rite™

- Type C, Z, J, LB, LBF, B & Boring Bar Sleeves!
- Concentric ground & diamond polished
- Wrench flats for easy removal
- "Easy Entry" feature on OD
- Large variety available

TYPE J
Starting At:

\$45.08 each

Part # TBJ-07-0250-B

TYPE C
Starting At:

\$58.80 each

Part # TBC-07-0250-B

TYPE B
Starting At:

\$48.02 each

Part # TBB-07-0375-B

EDGE TECHNOLOGY 5C COLLET STOP



NEW ITEM!

5C COLLET STOP
Part # EDGE-45000
Mfg's List: \$49.99

\$34.27 ea

- Fits standard 5C collets with internal threads
- 6 hardened steel stop rods included-1/16", 1/8", 3/16", 1/4", 3/8", 3/4"
- 3/4" stop rod keeps parts square to spindle axis
- Proprietary locking system prevents the possibility of the stop rod slipping in the body
- Body is red anodized 6061-T6 aluminum
- Body fits a 7/8" wrench

PH Workholding 16C & 3J COLLETS

With Internal Threads



- Crafted to exacting standards from alloy steel
- Heat treated threads and spring tempered body for accuracy and long life
- **Internal threads** for use with threaded collet stops
- Large variety of round, hex and square sizes
- **EMERGENCY COLLETS** also available in 5C, 3J & 16C

16C & 3J ROUND Collets
\$59.00 ea

16C & 3J SQUARE Collets
\$74.00 ea

16C & 3J HEX Collets
\$69.00 ea

PH Workholding 5C STEP COLLETS



- For OD workholding
- Allows for large diameter parts to be held in 5C collets
- Soft face for easy machining
- Diameters from 2" to 6"

Head Dia	Part Number	Price EA
2"	550-002-PH	\$45.16
3"	550-003-PH	\$52.42
4"	550-004-PH	\$76.40
5"	550-005-PH	\$109.90
6"	550-006-PH	\$128.34



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- AH120-The "Super Grade" for steels, stainless and super alloys!
- TM Chipbreaker-Medium cutting of steels and hi-temp alloys
- SM Chipbreaker- Medium cutting of mild steels and stainless

COMPLETE LINE AVAILABLE!

Insert No.	Rad.	Grade	Chip-Breaker	Application/ Material	Part Number	BOX QTY EACH
CNMG431	.015	AH120	TM	Super Alloys	TO-1285	\$8.94
CNMG432	.031	AH120	TM	Super Alloys	TO-1364	\$8.94
DNMG431	.015	AH120	TN28	Super Alloys	TO-1727	\$12.21
DNMG432	.031	T6130	SM	Stainless	TO-6805431	\$12.21
VNMG331	.015	AH905	HMM	Super Alloys	TO-6859407	\$11.55
VNMG332	.031	AH120	TM	Super Alloys	TO-3194	\$11.55
WNMG431	.015	AH120	TM	Super Alloys	TO-3277	\$8.94
WNMG432	.031	AH120	TM	Super Alloys	TO-3338	\$8.94

V7G HI-PERFORMANCE ENDMILLS

4 Flute • Variable Helix • Made From C10 Micrograin Carbide



Ideal For Stainless, Mild Steels, Cast Iron & Low/Medium Hard Steels up to 40Hrc

Dia	LOC	Shank	OAL	Part Number	Price EA
1/8	3/8	1/8	1-1/2	YG-EMUGMF68901	\$ 13.51
1/4	3/4	1/4	2-1/2	YG-EMUGMF68905	\$ 23.07
3/8	7/8	3/8	2-1/2	YG-EMUGMF68907	\$ 38.02
1/2	1	1/2	3	YG-EMUGMF68909	\$ 58.42
5/8	1-1/4	5/8	3-1/2	YG-EMUGMF68911	\$ 117.96
3/4	3/4	3/4	3	YG-EMUGMF68048	\$ 150.07
1	1-1/2	1	4	YG-EMUGMF68913	\$ 272.90

WOODRUFF KEYSEAT CUTTERS



- High speed steel
- Straight tooth
- 1/2" diameter shank
- Right hand cut
- Staggered tooth and cobalt also available

Am Std#	Dia	Width	OAL	Part Number	Price
202	1/4"	1/16"	2-1/16	KEO-62010	\$26.91
303	3/8"	3/32"	2-3/32	KEO-63030	\$26.91
204	1/2"	1/16"	2-1/16	KEO-62040	\$26.91
304	1/2"	3/32"	2-3/32	KEO-63040	\$26.91
405	5/8"	1/8"	2-1/8	KEO-64050	\$27.18
806	3/4"	1/4"	2-1/4	KEO-68060	\$28.48
608	1"	3/16"	2-3/16	KEO-66080	\$34.02

COOLANT-THRU BORING BARS

SCLCR/L Bars Using CCMT21.51 Inserts



MICRO 100

- Coolant-thru hole design
- Chrome nickel
- 90° boring & facing with 95° approach
- Uses CCMT 21.51 inserts (not included)

Shank	OAL	Min. Bore	RIGHT HAND	LEFT HAND	Price EA
1/4	3.00	.330	MI-200821	MI-200822	\$ 69.65
5/16	4.00	.380	MI-200823	MI-200824	\$ 71.50
3/8	4.50	.490	MI-200825	MI-200826	\$ 74.60
1/2	5.00	.630	MI-200827	MI-200828	\$ 77.75
5/8	6.00	.775	MI-200829	MI-200830	\$ 83.10

SOLID CARBIDE ENDMILLS



- 4 flute, single end
- TiAIN Coated
- Center cutting
- 30° helix, right hand



Dia	LOC	Shank Dia	OAL	4 Flute TiAIN Coated	Price Each
1/8"	1/2	1/8	1-1/2	MO-EM001067-4	\$ 7.40
3/16	5/8	3/16	2	MO-EM001107-4	\$ 11.34
1/4	3/4	1/4	2-1/2	MO-EM001137-4	\$ 14.19
5/16	13/16	5/16	2-1/2	MO-EM001153-4	\$ 18.30
3/8	1	3/8	2-1/2	MO-EM001177-4	\$ 21.90
1/2	1	1/2	3	MO-EM001207-4	\$ 35.58
5/8	1-1/4	5/8	3-1/2	MO-EM001226-4	\$ 66.51
3/4	1-1/2	3/4	4	MO-EM001244-4	\$ 88.88

CARBIDE DRILLS
STUB LENGTH • TiAIN Coated

- 135° drill point
- Right hand cut
- Made from premium submicron carbide with 10% cobalt
- For steels, stainless, titanium & nickel alloys



Size	LOC	OAL	Part Number	Price
3/64	1/2	1-1/2	SRTA-3/64-MO	\$10.04
1/16	5/8	1-5/8	SRTA-1/16-MO	\$10.12
7/64	13/16	1-13/16	SRTA-7/64-MO	\$10.80
1/8	7/8	1-7/8	SRTA-1/8-MO	\$10.82
3/16	1-1/8	2-3/16	SRTA-3/16-MO	\$14.68
1/4	1-3/8	2-1/2	SRTA-1/4-MO	\$22.66
3/8	1-13/16	3-1/8	SRTA-3/8-MO	\$44.26
1/2	2-1/4	3-3/4	SRTA-1/2-MO	\$77.94

COMBINED DRILL & COUNTERSINKS



- Plain type
- 60° angle
- HSS or M42 cobalt
- Additional sizes available

Size	Body Dia	Point Dia	OAL	HSS M2	Price
#1	1/8"	3/64	1-1/4	MAG-1150100	\$5.85
2	3/16"	5/64	1-7/8	MAG-1150200	\$5.94
3	1/4"	7/64	2"	MAG-1150300	\$6.30
4	5/16"	1/8	2-1/8	MAG-1150400	\$6.48
5	7/16"	3/16	2-3/4	MAG-1150500	\$10.22
6	1/2"	7/32	3"	MAG-1150600	\$15.12
7	5/8"	1/4	3-3/4	MAG-1150700	\$22.14
8	3/4"	5/16	3-1/2"	MAG-1150800	\$34.29



HAND PADS



- 6" x 9" size
- Scotch-Brite™ material never rusts and can be used with water solvents
- For cleaning, deburring or finishing by hand

7447 20/ct ONLY \$18.00!

Mfg Ref.	Description	Color	Pkg Qty	Part Number	Pkg Price
7447	Gen. Purpose Hand Pad	Maroon	20	3M-04029-5	\$ 18.00
7447B	Gen. Purpose (Bulk)	Maroon	60	3M-04229-9	\$ 73.18
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
7445	Light Duty Cleansing Pad	White	20	3M-16976-7	\$ 27.44

EXL DEBURRING WHEELS



- The top choice for high performance and durability
- Finish, debur or polish metals and composites
- SC-Silicon carbide
- AO-Aluminum oxide
- 6,000 max RPM



OD x W x AH	Density	Mineral Type	Grade	Part Number	Price Each
6" x 1/2" x 1"	8	SC	Fine	3M-09548-6	\$ 53.58
	9	SC	Fine	3M-05790-3	\$ 53.58
6" x 1" x 1"	8	AO	Medium	3M-13617-2	\$ 75.01
	8	SC	Fine	3M-09549-3	\$ 75.01
	9	SC	Fine	3M-05132-1	\$ 75.01



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LATHE WORKHOLDING



6" MACHINE VISE



- 6" vise, full 9" opening
- Narrower body style allows for more vises on the machine
- Recessed pocket for easier lifting
- Thru-body chip evacuation
- Same bed height as D688
- 4 bolt stationary design fastens from the top



SAVE \$122.00!

KURT DX6

6" Vise w/ 9" Opening

Mfg's List: \$721.00

\$599.00 each

Part # KURT-DX6

ALUMINUM 10 PACK VISE JAWS



- Fits KURT Dx6, D688 and other standard machine vises
- Machinable aluminum- customize jaws for your application
- Buy the 10 pack and save BIG!
- Made in USA

FREE SHIPPING!

Prices Starting At Only \$16.05 per pair!

SAVE UP TO 15%!

Length	Height	Width	Part Number	Reg. Price	PROMO!
6"	2"	3/4"	VJ-601-10	\$187.70	\$160.52
6"	2"	1"	VJ-602-10	\$208.40	\$178.20
6"	2"	1-1/4"	VJ-603-10	\$246.50	\$210.77

CAT-40 BALANCED TOOLHOLDERS

KINGSTON: Balanced to 15,000 RPM @ g6.3

SPIN TRU: Balanced to 20,000 RPM @ g2.5

- Balanced on a HAIMER machine
- Includes certificate of balancing
- Runout 0.0002" TIR or better
- Manufactured to ISO 9002 standards
- Traverse ground taper to AT3 specs
- H5 bore tolerance
- Collet chucks, Shell mill, Jacobs/Morse Taper holders available



BUY 10 OR MORE-GET 10% OFF!



CAT-40 BALANCED COLLET CHUCKS

KINGSTON: Balanced to 15,000 RPM @ g6.3

SPIN TRU: Balanced to 20,000 RPM @ g2.5

- Balanced on a HAIMER machine
- Includes certificate of balancing
- Runout 0.0002" TIR or better
- Manufactured to ISO 9002 quality control standards
- Traverse ground taper to AT3 specs
- H5 bore tolerance
- Collet chucks, Shell mill, Jacobs/Morse Taper holders available



BUY 10 OR MORE-GET 10% OFF!

Collet Series	Proj	BALANCED TO 15,000 RPM		BALANCED TO 20,000 RPM	
		KINGSTON Part Number	Price Each	SPIN TRU Part Number	Price Each
ER 16	2.50"	C40-16ER250-K	\$ 91.94	C40-16ER250-KB	\$ 102.39
	3.12"	C40-16ER312-K	\$ 94.81	C40-16ER312-KB	\$ 102.39
ER 20	2.50"	C40-20ER250-K	\$ 90.69	C40-20ER250-KB	\$ 102.39
ER 25	4.00"	C40-25ER400-K	\$ 94.81	C40-25ER400-KB	\$ 101.74
ER 32	2.50"	C40-32ER250-K	\$ 94.81	C40-32ER250-KB	\$ 102.39
ER 32	4.00"	C40-32ER400-K	\$ 94.81	C40-32ER400-KB	\$ 101.74
ER 40	2.50"	C40-40ER250-K	\$ 94.81	C40-40ER250-KB	\$ 102.39

TOOLHOLDER TIGHTENING FIXTURES



- Change retention knobs, collets, drills and end mills quickly
- For CAT & BT taper toolholders
- Crafted from 6061 anodized aluminum
- For vertical or horizontal use

Taper	Part Number	Mfg's List	Our Price
CAT/BT 40	TF-4001-K	\$ 89.00	\$ 74.99
CAT/BT 50	TF-5001-K	\$ 110.00	\$ 93.50

RETENTION KNOBS

Your VALUABLE Machine Deserves A Premium Knob!



QUANTITY DISCOUNTS
10% OFF!
10 or more knobs

- Individually Magnetic Particle Tested
- Made in the USA!
- LARGE VARIETY Available!
- Made of 8620, Heat Treated to Rc 56/58
- Exceeds Industry Standards For Tolerance (ANSI, DIN, JMTBA)



Machine	Thread	Head Dia	Angle	Coolant	Part Number	Price EA
Fadal BT40	M16-2.0	.740	90°	No	B40-4501S	\$ 18.61
HAAS BT40	M16-2.0	.590	45°	Yes	B40-4500H	\$ 23.94
HAAS CAT40	5/8-11	.589	45°	No	C40-4501S	\$ 18.61
Fadal CAT40	5/8-11	.740	45°	No	C40-4500S	\$ 15.96
Okuma CAT40	5/8-11	.589	60°	No	C40-6000S	\$ 18.61
Mazak CAT40	5/8-11	.740	45°	Yes	C40-4500H	\$ 16.54
Mori Seiki CAT50	1-8	.905	90°	No	C50-9000S	\$ 22.94

EDGE TOUCH OFF GAGE



- Accurately establishes tool length offsets for CNC milling machines
- The contact face is lightly spring loaded to protect against overrun
- Contact face diameter is 0.250"
- Rectangular base fits between vise jaws on a pair of parallels
- Offset height 4.000 in (101.6mm)
- Large 2.2" easy to read indicator face
- Easy calibration check using 1-2-3 blocks
- Gage graduations 0.001"-repeatability 0.0002"
- Body and contact face are red anodized 6061-T6 aluminum
- Base: 2.4" wide x 1.3" depth x 4" height
- Padded case and manual included

TOUCH OFF GAGE

Part # EDGE-52000

Mfg's List: \$134.99

\$114.27 ea



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ALTERA M

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5-Axis Multi-sensor CMM for Speed & Flexibility w/ REVO & MODUS



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Gantry CMM ideal for medium to large volume precision components (Available in AEROS S & AEROS P versions)



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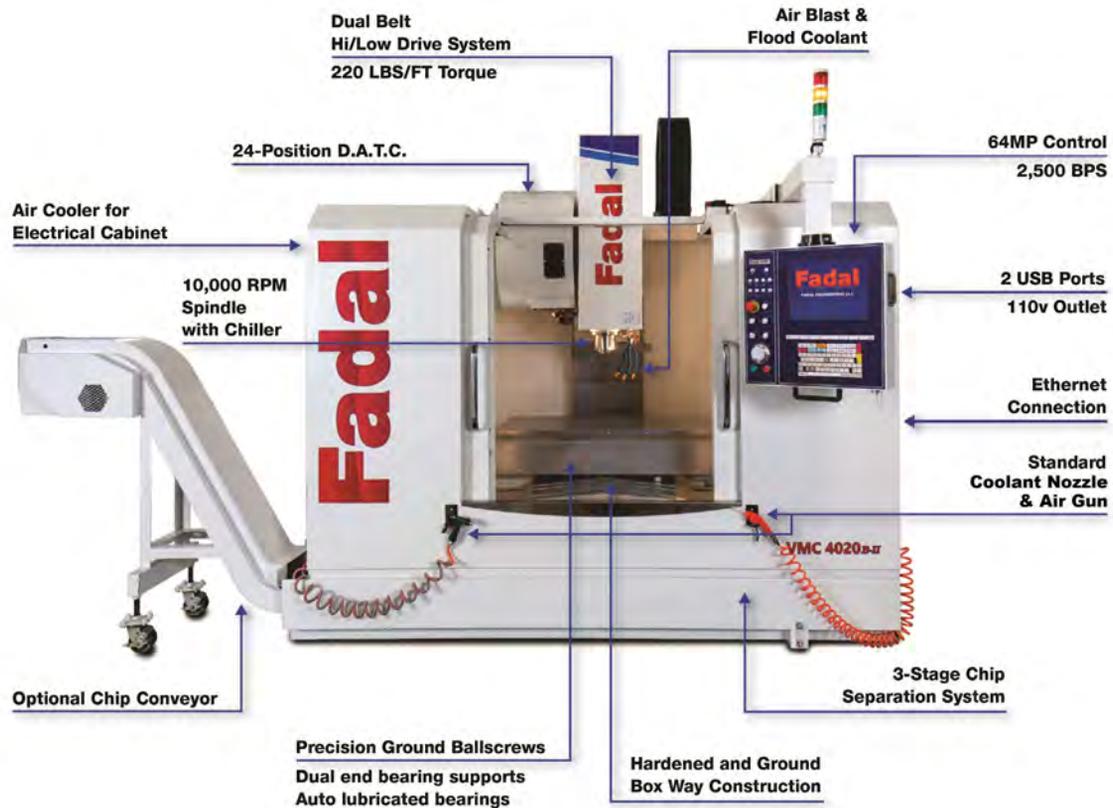
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- Dual belt high / low drive system
- Best in class 220 lbs/ft spindle torque
- Dual supported & pretensioned ballscrews
- Auto lubricated ballscrew & bearings
- Monitored lubrication system
- Three stage chip separation
- Coolant nozzle & air gun

Fadal 64MP Control

- 2500 BPS processing speed
- High speed software
- Coordinate rotation and scaling
- Custom macros
- Spare M functions
- Ethernet port plus two USB ports
- 2nd home position
- Color 15" monitor

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Manufacturer of vertical turret and bed-type mills

E-mill 3VS II

- Spindle 3HP
- Table Size 9" x 49"



E-mill 3VK

- Spindle 3HP
- Table Size 10" x 50"



E-mill 3VKH

- Spindle 3HP
- Table Size 10" x 50" or 54"



E-mill 5VK

- Spindle 5HP
- Table Size 10" x 50" or 54"
- (6VK model available 12" x 59")



ATM-1054

- Spindle 5HP
- Table Size 10" x 54"



ATM-1054+

- Spindle 7.5HP
- Table Size 10" x 54"



ATC-1054

- Spindle 7.5HP
- Table Size 10" x 54"
- Auto Tool Change



ATM-1454

- Spindle 5HP
- Table Size 14" x 54"



ATM-1454+

- Spindle 7.5HP
- Table Size 14" x 54"



ATC-1454

- Spindle 7.5HP
- Table Size 14" x 54"
- Auto Tool Change



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 NJ Office: William or Chris 732-752-9100, acer_klim@yahoo.com

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Fagor, Fanuc, and Acu-Rite



THE TOOLS TO MEET YOUR MANUFACTURING NEEDS!

PRESETTERS

THERMAL STABILITY COUPLED WITH HIGH PRECISION!



- Precision ground granite is used for the base and column. This provides the utmost thermal stability for high repeatability and reproducibility during tool measuring and inspecting applications.
- Interchangeable spindles eliminate the need for adapters which can introduce additional errors.
- All units come with fifty of the most common post processors for today's CNC controls.

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TURN YOUR LATHE INTO A MILLING MACHINE!

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- Dual radial and thrust bearing design for added rigidity.
- Live and Static tools offered in coolant through, adjustable, and multi-output.



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THE INDUSTRY'S HIGHEST QUALITY SHRINK FIT LINE!



- Fastest shrinking time ranging from 2-7 seconds.
- Widest range available for a desktop unit 2-40mm (0.078" to 1.575").
- Can shrink most Cutting Tool materials from high speed steel to solid carbide.
- Special Shrink Fit machine and tool holder packages available.

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Blue Laser Technology: Renishaw Expands Range and Improves Repeatability of On-Machine Tool



Building on the success of the original NC4+ Blue, the latest evolution of the non-contact tool setter features an ultra-compact design and is now available in four sizes, with operating gaps ranging from 55 mm to 240 mm. Measurement repeatability has also been improved across the range, now down to +/- 0.5 micron on smaller separations.

Improved machining accuracy

Featuring what Renishaw says is industry-first, blue laser technology and improved optics, Renishaw's NC4+ Blue systems deliver significant improvements in tool measurement accuracy, ensuring components can be machined more accurately and efficiently.

According to Renishaw, compared to red laser sources found in conventional non-contact tool setters, blue laser technology has a shorter wavelength resulting in optimized laser beam geometry. This enables the measurement of very small tools, whilst minimizing tool-to-tool measurement errors – a critical consideration when machining with a wide range of cutting tools.

Rapid, robust and reliable measurement

NC4+ Blue systems use Renishaw's non-contact tool setting software package, which continues to evolve to ensure rapid, robust and reliable measurement even in wet conditions. Auto-optimization technology within the software automatically adjusts the movement of the tool in and out of the beam to minimize any wasted movement and therefore cycle time. While features such as a dual measurement mode, where the tool is measured as it exits

the laser beam and an advanced tool cleaning option, help ensure the tool is free from debris and coolant during measurement. Further enhancements to tool run-out and profile measurement cycles deliver increased functionality and reliability to advanced users.

Superior optical protection

The interior of a machining center is a hostile environment with coolant drips, swarf chips and dust commonplace. Coolant mist can saturate the air and quickly coat any exposed optical surfaces. Whatever their optical design, laser tool setting systems need clean optics and an unobstructed beam path in order to function.

The NC4+ Blue uses MicroHole™ and PassiveSeal™ optical protection technologies, enabling fast and reliable tool measurement, even in wet conditions.

MicroHole technology ensures the optics are protected from contamination during measurement by delivering a continuous stream of compressed air through a very small and precise laser-drilled hole in the transmitter and receiver heads. The PassiveSeal system provides an additional layer of protection, automatically shielding the optics from contamination in the event of air supply failure. It uses a simple pneumatic installation that minimizes any need for maintenance.

Simplified programming and reporting – Industry 4.0 ready

NC4+ Blue support is now embedded into Renishaw's extensive range of graphical user interfaces, including on-machine and mobile apps such as Renishaw Set and Inspect and GoProbe. These consistent, easy-to-use programming platforms are perfect for users who are new to probing or have little machine code knowledge, whilst still offering operational benefits to more experienced users.

Renishaw technologies provide the data that enables intelligent decision-making for Industry 4.0. On-machine tool measurement allows manufacturers to automate and optimise their processes and minimise quality problems and CNC machine stoppages. With the latest version of Renishaw's on-machine Reporter app, users can now view historical tool data captured by the NC4+ Blue and stream the measurements in real-time. Results can also be exported via CSV file or PDF report and either stored for traceability or imported into in-house quality analysis software.



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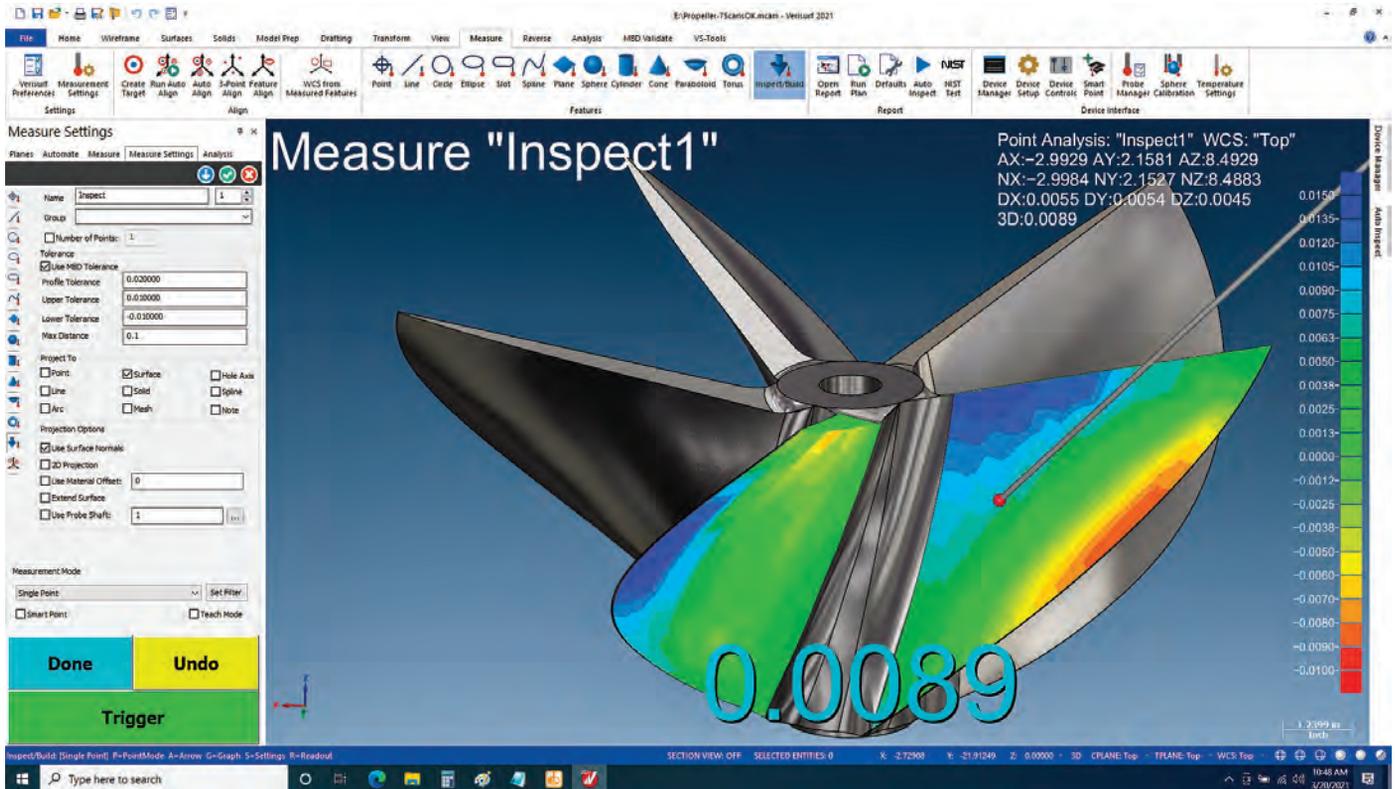
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VERISURF SOFTWARE HELPS FIVE-AXIS INDUSTRIES CHAMPION QUALITY

Article Supplied by Verisurf



Verisurf software is built on a CAD platform and maintains digital continuity between design, manufacturing, and quality inspection.

“Our roots are in racing, and we are driven to win. This breeds performance, focus, drive, and quality, which is what makes us the best in the world at what we do.”

- Erick Ellstrom, President and CEO, Five-Axis Industries

Washington state Five-Axis Industries and sister company Ellstrom Racing trace their roots back to 1960 as part of the Ellstrom Manufacturing Company. Started by Sven Ellstrom, Erick's Dad, the company established a legacy of innovation, performance, and a winning attitude that is apparent today.

Ellstrom Racing came on scene in the early '90s to dominate the highly competitive and high-risk sport of unlimited hydroplane racing. These 30-foot power boats, weighing over 7,000 pounds, are more like airplanes than boats; most of the time the propeller is the only part of the boat that is in the water. As with everything the Ellstrom's do, they came to compete and win. And win they did. Today, Ellstrom Racing is the winningest team ever in the unlimited hydroplane class, winning three season high-point honors and setting single lap speed records, yet to be broken, at every race venue on the circuit. Ellstrom

Racing clocked the fastest single lap speed average ever recorded during a race in Nashville, topping 171 MPH, with straightaway speeds over 200 MPH - ON THE WATER! The success of the unlimited hydroplane campaign can be attributed to focus, drive, innovation, and a commitment to excellence. “In our minds 2nd place is the first loser; we are always out to win,” said Ellstrom.

When it came to raising the bar on the status quo in unlimited hydroplanes, Ellstrom Racing knew they needed to innovate and improve the design and manufacturing of high-quality components that stand up to the demands of the sport. So, they started Five-Axis Industries, which in the beginning was essentially a hobby shop capable specializing in 5-axis machining to make difficult to manufacture parts from hard metals, including titanium and stainless alloys.

It was not long before Five-Axis started making specialty performance parts for other teams and today they build props for most of the unlimited hydroplanes racing. “We cut our teeth in the high-performance marine industry producing hard-to-manufacture parts and gained a reputation as the ones that can get it done with no one else can. This propelled us into producing



Excellence in the performance marine industry propelled Five-Axis Industries into producing parts for other demanding applications, like aerospace and spacecraft in particular.

parts for other demanding applications, like aerospace. We now produce large structure parts as well as high-performance components, including propellers, blowers, gas turbine engine parts, thrust cones for rockets, air turbine assemblies and more,” said Ellstrom.

Five-Axis Industries has grown from its albeit humble but high-performance beginnings to a full-size manufacturing facility. “We are not always the first choice, but we are the best choice. Difficult parts can be expensive to manufacture, and our high-performance mindset does not allow for cost-cutting shortcuts,” said Ellstrom.

CAD/CAM/CAI

The design, build, and quality verification processes at Five-Axis Industries are strategically linked to provide a consistent digital thread throughout. This allows the company to effectively comply with preferences, and in many instances requirements, of prime contractors they work with. But more importantly, it supports the company’s mantra of delivering high-performance, high-quality components.

Designers, manufacturing engineers and machinists at Five-Axis Industries have been using Mastercam exclusively to program parts for machining since 1982, well before Five-Axis emerged from Ellstrom Manufacturing. Most of their design work, especially high-performance engine components, is also done using Mastercam and its integration with SOLIDWORKS. They are also capable of working with other CAD formats such as CATIA, Siemens NX, PTC Creo and others.

Computer Aided Inspection (CAI) is provided by Verisurf Software. Being model-based and built on top of the Mastercam platform, Verisurf allows the team at Five-Axis Industries to open and work with any CAD file including, intelligent models with associative GD&T to support the development of automated inspection plans. The net result is efficient quality verification, regardless of CMM type, capable of producing first article inspections within minutes. The Verisurf Device Interface (VDI) lets operators choose from any of their portable arms or CNC CMMs (3-, 4-, or 5-axis) to conduct quality inspections, reverse engineering, tool-building, or assembly guidance using the Verisurf software.



Left - Ellstrom Racing is the winningest team ever in the unlimited hydroplane class, winning three season high-point honors and setting single lap speed records, yet to be broken, at every race venue on the circuit. On the water, Ellstrom Racing clocked the fastest single lap speed average ever recorded during a race in Nashville, topping 171 MPH, with straightaway speeds over 200 MPH. Right - Ellstrom Racing continues to out-think and out-build the competition as it adds harsh and competitive world of modified pro turbo UTV racing to its achievements. Sven Ellstrom, a chip off the old block, is lead driver for Ellstrom Racing UTV Team.

HIGH QA

As part of the overall Quality Management System (QMS), Five-Axis Industries uses a management and connectivity platform called High QA. The solution automates the entire quality process creating a seamless partnership and collaboration with supply chains. Verisurf software is integrated within the High QA platform through Inspection Manager. The integrated solution automates the measurement, inspection and reporting process providing real-time comparisons of finished parts based on submitted design authorities, whether received as 3D CAD models, annotated PDFs or 2D drawings. Inspection Manager allows for the automatic ballooning of drawings and creation of bill of characteristics in minutes, while CAD-based Verisurf 3D measurement and inspection software, provides measurement data collection and analysis.

MODEL-BASED DEFINITION (MBD)

Verisurf is dedicated to MBD and built on a CAD/CAM platform. This enables greater compatibility, workflow integration, and more complete end-to-end solutions customers require.

Verisurf software serves as a common measurement and inspection platform across 5-Axis Industries' manufacturing enterprise. Whether for inspection, reverse engineering, tool-building, or assembly guidance, the entire design/build team is trained to use Verisurf. This increases productivity, reduces bottlenecks, standardizes reporting, and lowers overall software and training costs - regardless of measurement hardware device, everyone uses the same software. "Verisurf is so easy to use; we all picked it up quickly and now the software is indispensable to us. I consider myself CMM stupid and even I can use it," said Ellstrom.

5-AXIS MACHINING, 5-AXIS METROLOGY - PERFECT MATCH FOR EFFICIENCY AND PRODUCTIVITY

Five-axis is in their name so it should not be a surprise to know the company has been using 5-axis machining capabilities for more than 20-years. Machining complex shapes and features such as propellers and other helical shaped parts are easier and more accurately machined using 5-axis technology. This is due to continuous 5-axis movement which produces better results on contoured or curved shapes. 5-axis machines are also easier to set up with fewer clamp changes, and you can typically access five sides of a part with a single set up. These and other benefits of 5-axis machining are clear and have pushed adoption of the technology among shops at a rate of 7% compounded annual growth in recent years.



Five-Axis Industries specializes in making difficult to manufacture parts from hard metals, including titanium and stainless alloys.

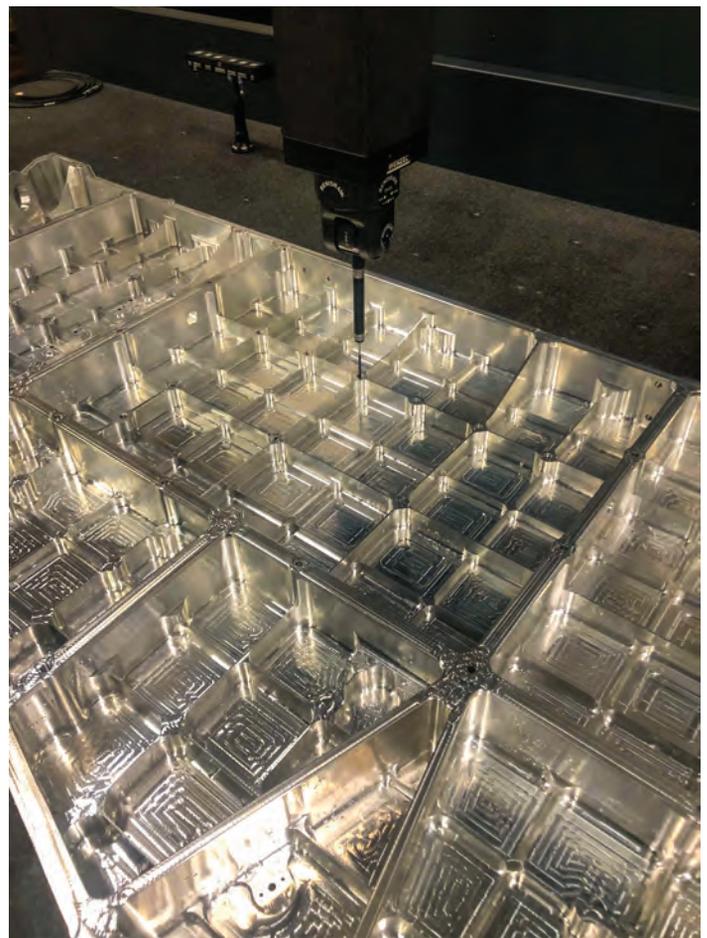
“For us, 5-axis capabilities are all about moving the part less and articulating the machine to move around the part. We were an early adopter of 5-axis machining; finally, CMMs have caught up and can offer the same productivity gains in measurement and inspection. 5-axis workflow from machining through quality verification just makes common sense. We realize up to 50 reductions in cycle time, and added flexibility, using 5-axis machining, and the savings are comparable when it comes to inspection using our 5-axis CNC,” said Ellstrom.

Verisurf software increases overall measurement and inspection productivity, from CMM plan creation through execution. Users have the unique ability to create a single inspection plan, using Verisurf, and execute that plan on any measurement device across their manufacturing enterprise, including 5-axis CMMs. The team at Five-Axis Industries currently use the Renishaw PH20 5-axis touch-trigger probe and are considering upgrading their primary CMM to the Renishaw REVO 5-axis scanning probe, which will enable them to perform continuous scanning of complex surfaces for enhanced inspection and reverse engineering purposes. Verisurf software seamlessly supports the entire line of Renishaw probe heads and is currently one of only a few companies that can program and run the REVO 5-axis head, including two exclusive scan patterns developed by Verisurf.

MAINTAINING DIGITAL CONTINUITY WITH THE FLEXIBILITY TO CHOOSE

Change is the only constant in manufacturing, and this applies directly to Five-Axis Industries. In recent years the company’s commercial customer base has grown to include more high-stress applications associated with aerospace and spaceflight in particular. And while still a dominant supplier in high-performance marine applications, the company continues to support the Ellstrom racing team, which has shifted from the water to the desert, building and racing modified pro turbo UTVs in one of nature’s harshest environments. As you might have guessed, Ellstrom Racing is consistently a top-5 finisher in a field that averages more than 100 starters.

Though the business has expanded and shifted a bit, the design build process has remained constant. The company is dedicated to a model-based environment that maintains digital continuity from beginning to end, with the CAD model serving as the design, manufacturing, and quality inspection authority. “While Mastercam is our preferred CAD/CAM platform, Verisurf software verifies every part we build and is our final say on quality,” Erick Ellstrom.



The exclusive Verisurf 5-axis pocket scan type is particularly useful when it comes to inspecting orthogrids and other weigh reduction techniques used in aerospace manufacturing.

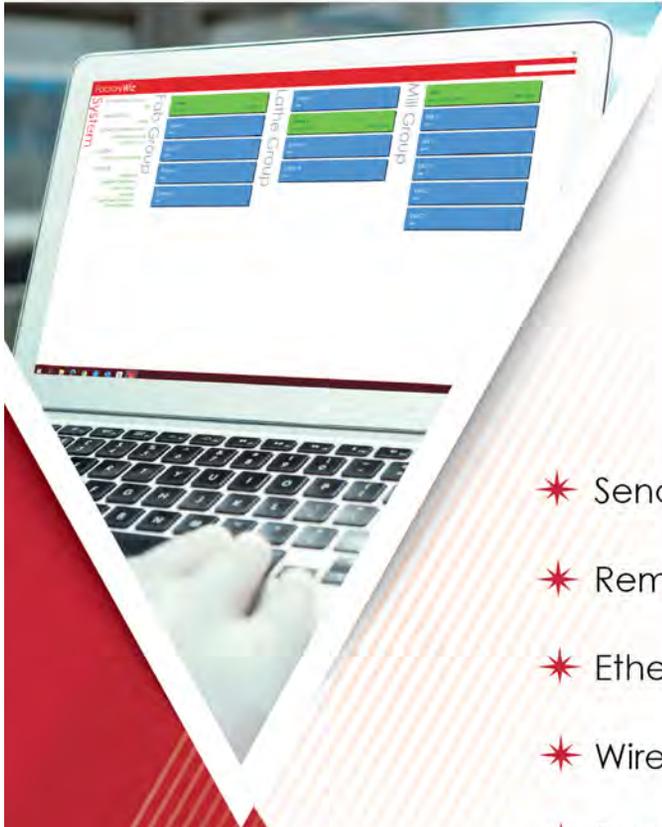


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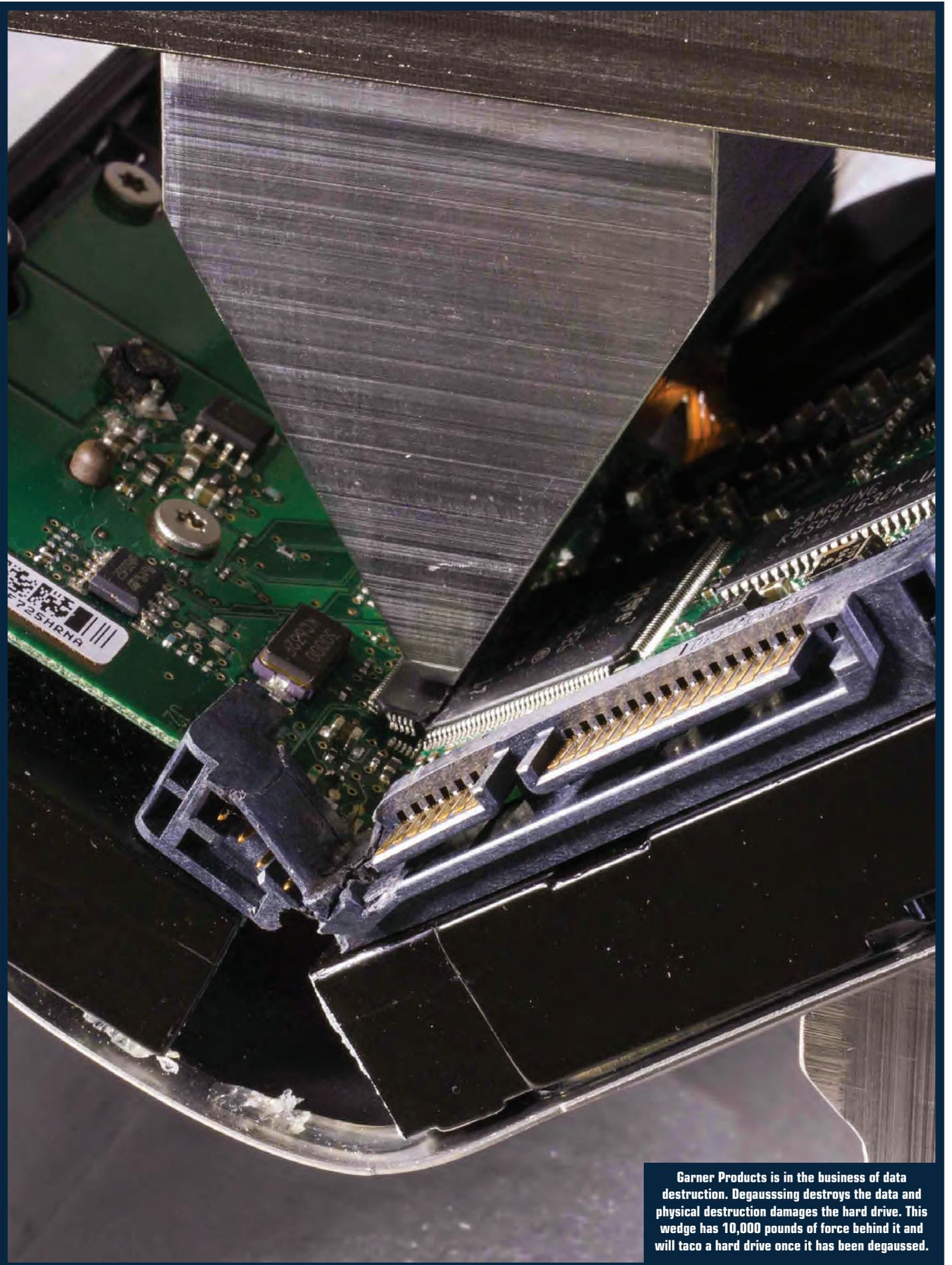
The company started out in 1959 as a recording studio by Bob Stofan called Audiolab Electronics, Inc. Bob's son Ron and Ron's wife Michelle own and manage the company now. Their son Justin manages the machine shop.



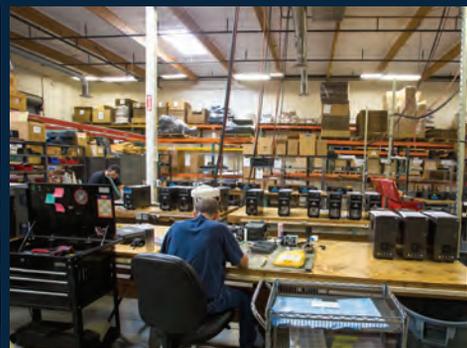
Current technology degausser alongside the original TB-1B circa late 50s.

Bob's love of radio started early, listening to WW2 on his short-wave radio from his childhood home in New Jersey. He later joined the Airforce setting up radio stations and radio communications during the Korean War. "Dad was proud of what he was doing during Korea," chuckles Ron Stofan, president and CEO of Garner Products Inc. "He was especially proud that the importance of his job meant he got his own Jeep. As an enlisted man that was a big deal." Bob was a sound engineer at Sacramento's channel 10 TV station before becoming chief engineer for KRAK Hercules broadcasting company. Media companies needed to have an easy and effective way to erase the cue tone on broadcast tape cartridges "carts", so he began manufacturing degaussing machines.

A broadcast cart is a continuous loop of tape wound inside a cartridge with a "beep" recorded on a separate track indicating the beginning of the recording. That beep is a cue tone. When the machine recognizes the beep, it stops, and it is at the beginning of the recording cycle. The DJ hits play and "Go See Cal" commercial would come on all queued up. Before new content could be recorded you needed to get rid of the cue tone. The only way to do that is by demagnetizing the tape in a process called degaussing. "Degaussing leaves the magnetic field in a random state with no readable data," explains Ron. "We manufactured and sold degaussing machines to the broadcast companies. Video followed radio, diskettes came along and so forth. It was similar technology, but harder to erase the data because the tape was larger with a higher coercivity, requiring a stronger magnetic field to remove the recordings. Basically, in a perfect world If the coercivity is 500 you need to have gauss strength larger than 501 to overcome it."



Garner Products is in the business of data destruction. Degaussing destroys the data and physical destruction damages the hard drive. This wedge has 10,000 pounds of force behind it and will taco a hard drive once it has been degaussed.



Garner Products manufactures brackets, coils, frames, plastic bezels, PVC holders, PVC tubes, gate pins, wire up all the electronics, make harnesses, and so forth. They even custom cut and make the shipping containers and shoot product photos and videos ensuring quality every step of the way.

One of Audiolab's first products was the TD-1B. It was sold to the radio stations to degauss tapes in the 350 coercivity range and cost \$77. Coercivity for current data storage solutions is around 5000. "Our top-of-the-line NSA Listed TS-1XT unit has been evaluated by the NSA and sanctioned to erase top secret data. It produces approximately 20,000 gauss," describes Vice President Michelle Stofan. "There are only 12 other products in the world that hold that kind of certification. The TS-1XT operates like a camera flash where the energy is stored up and then released in a burst."

Back in 1959, the original TD-1B was mostly manufactured on site. They wound the coils, filled it with tar, machined parts, and assembled everything. "Only the box and label were outsourced back in the day," details Ron. "That is still our practice now." Having control of the process has always been important to Garner Products. Their level of vertical integration gives them flexibility and adaptability to better serve their customers. Garner Products got their first CNC machine back in 2003, a remanufactured Fadal 4020. "Our first Fadal is still out there running," touts machine shop manager Justin Stofan. "It's machine #1 and has a 4th axis table on it now." "We had manual machines from nearly the beginning," adds Ron. "But as a small company I get really excited about getting new equipment that makes all our lives and products better." "He isn't kidding," jokes Michelle. "Ask him about how much he loves the cherry picker and forklift. The forklift was almost on our family Christmas card that year." "She's right," smiles Ron. "Improving processes or capabilities on anything

bigger and more interesting than the floor jack is awesome."

The shop consists of a Flow water jet, a Hyundai WIA L 150A lathe, Fadal 3020 and 4020 mills, three YCM NXV 1020A mills, Shop Sabre router, and multiple Raise 3D printers. "About ten years ago we had an issue with a vendor that really changed the way we do business," details Ron. "We had a new product failure on a Thursday and by Friday I was on my way to a large data center in Ireland to investigate. It shouldn't have failed, after all the successful testing it made us really ask the question why." At that time Garner Products didn't have a CNC lathe, so any part that needed turning was outsourced. "Our design calls for a specific hardness of the materials and all throughout testing that material was used," explains Michelle. "Unbeknownst to us the vendor used a softer material than what was spec'd, and the main shaft was deforming. We had products go out all over the world and we were going crazy trying to figure out why we had a failure. As a small family run business, we are really proud of our products and how they are made."

"We love all our products," adds Ron, "But we never want to see them again after they've been shipped to customers. This was a big deal that we had a failure. Quality is everything, national security agencies rely on our products to perform and keep America's data safe by destroying it. Once the vendor fessed up to the materials being out of spec, we knew we had to bring it all in-house. Within a few weeks we purchased a Hyundai Wia CNC 150 with a bar feeder from Clancy Machine. John met with us, we explained what it is we needed to manufacture, and he made the recommendation. We had zero experience with CNC turning, it was a big jump for us, but a required one."

Quality isn't necessarily measured in microns at Garner Products, but their quality is measured by the NRTL test UL CE labs and by customers like the NSA. Ron's found over the years that their products respond best by having a tighter tolerance than a loose one. So, although microns don't come into play, they operate at about the same level as most aerospace shops when it comes to +/- on the gauge. Garner's products are designed for one thing: destroying your data.

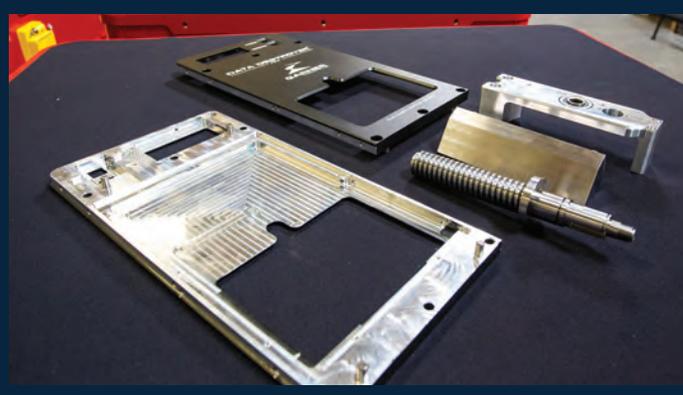
They manufacture essentially two types of physical destruction devices. One is for solid state drives, and one is for



Justin Stofan, Ron Stofan and Michelle Stofan.



Top Left - This acme shaft was the reason Garner added CNC turning.
Top Right - The Hyundai Wia CNC 150A with bar feeder runs only 6 part numbers, but each one of them is critical to the trouble free operation of their products.
Right & Right Middle- Garner Products has three YCM NXV 1020A mills and two Fadal's. The Fadal 3020 has a 4th axis.
Bottom Right - A sampling of internally produced parts shows the variety of shapes and materials used in their data destruction devices.



magnetic drives. Both end up with the drive either broken into a taco shape or have 90 spikes driven through it. Both require tremendous amount of force coming from a small footprint. “We produce 10,000 pounds of downward force without the use of hydraulics,” explains Justin. “It all comes from that shaft we talked about earlier. Our products are tabletop size, so it is no easy task.”

People tend to think of hard drives as delicate. We’ve all had one go bad in our computer and “lost” that data. They are actually very resilient. One of Garner Products’ long-time customers does the exact opposite of them. “Our customer is in the business of recovering data,” explains Ron. “I’m talking airline crashes, space shuttle disasters and 911 terror attacks. They can recover data from the worst-case disasters, but they use our products to ensure once they recovered what they needed that the hard drive is destroyed, and the data is no longer recoverable. Think about that for a minute, think about the responsibility we have to our customers to provide a quality product. Our quality starts at design, goes through manufacturing, and all the way through to delivery and support. We don’t take those responsibilities lightly.”

“What we do here is tangible,” concludes Michelle. “These are products that impact people’s lives. Our products are essential to national security, essential to your daily life. It is really rewarding. Looking back and sharing these memories with you is a tremendous sense of pride for us. You don’t always remember the old milestones and pizza parties, and it isn’t often we get to tell a story about Ron’s dad listening to the war on his short-wave radio. But that is who we are. We really are still a family run business, but one whose products have a global impact.”

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2021

Westtec has come and gone, but for many it was the first major industry get together in almost two years. Everyone we spoke with was pleased to be face to face with partners, clients and potential new customers. The masks could hardly contain the big smiles from seeing old friends and making new ones. Quality was at the forefront of the show, with booth after booth offering software, measurement devices or both. Lots of vendors were showcasing hand held devices and touches scanning features. There were big CMM's, small CMM's and anything your quality lab or shop floor could desire. We hit up a couple of the most respected names in quality to get a quick take on how their show was going and what they had in their booths. We spoke with: Todd Johnson of Total Quality Systems - Exclusive Distributor for Zeiss in Southern California and the Four Corner States, Devon King - Regional Sales Manager & Jeff Seliga - Marketing Manager Renishaw Inc., and Ingo Helmelt - West Coast Sales Manager & Art Whistler - Vice President of Sales and Marketing Helmelt Engineering Products Inc.



WESTEC Q&A

With Todd Johnson of Total Quality Systems - Exclusive Distributor for Zeiss in Southern California and the Four Corner States

CNC West - What are you most excited about seeing here at Westec and what excites you most in your own booth?

Todd Johnson - It is great to be back at a show for sure. So much has changed since the last time we were here, but it is exciting to see and talk to people again. By the looks of it hand held scanners are pretty popular this year. And walking around you see a lot of the larger booths are geared towards quality. No surprise since quality has been important since the dawn of time, but we are seeing a lot of new tech to speed up the processes. I feel PMI is where the industry is headed in the future. Basically, PMI is embedding things like the GD&T directly into the CAD model. All the dimensions are part of the CAD model, but PMI isn't just limited to GD&T. Lots of different data can be part of the PMI from surface finishes to proprietary/legal notices and material specs. So if we are just talking about having the GD&T as the PMI, all the information associated with a print is now embedded. By embedding the GD&T into the CAD model the programming is 80% done when you

bring it. Boeing and all the big aerospace companies are already pushing this and even smaller shops are having to adapt. This is a huge time saver. Something that might have taken you 4 hours to program before can be done in half hour or so.

The other wave of tech is CT scanning. Lawrence Stricklan is the CT manager for Zeiss and can explain it a little. "The ZEISS METROTOM 1 is basically an x-ray machine that can measure your part inside and out without tearing it apart," explains Lawrence. "In the old days if we wanted to measure your phone we would have to tear it apart to do so. That sometimes could actually destroy details you were trying to find out. With the METROTOM 1 you basically put the part in the machine and it will scan it with an x-ray and you can measure the components that you want to." "This is the way the future is heading in my opinion," continues Todd. "This technology is still in its infancy, but 10 years from now we will see a lot of this technology. The METROTOM 1 takes up very little space in the QC lab, is easy to use and is precise."





WESTEC Q&A

With Devon King -
Regional Sales Manager
& Jeff Seliga - Marketing
Manager Renishaw Inc.

CNC West - What's it like being back in person after a long time between shows.

Jeff Seliga - Face to face will never go away and is a part of our marketing arsenal. It's good to get out and see customers and colleagues and grow our brand on the west coast.

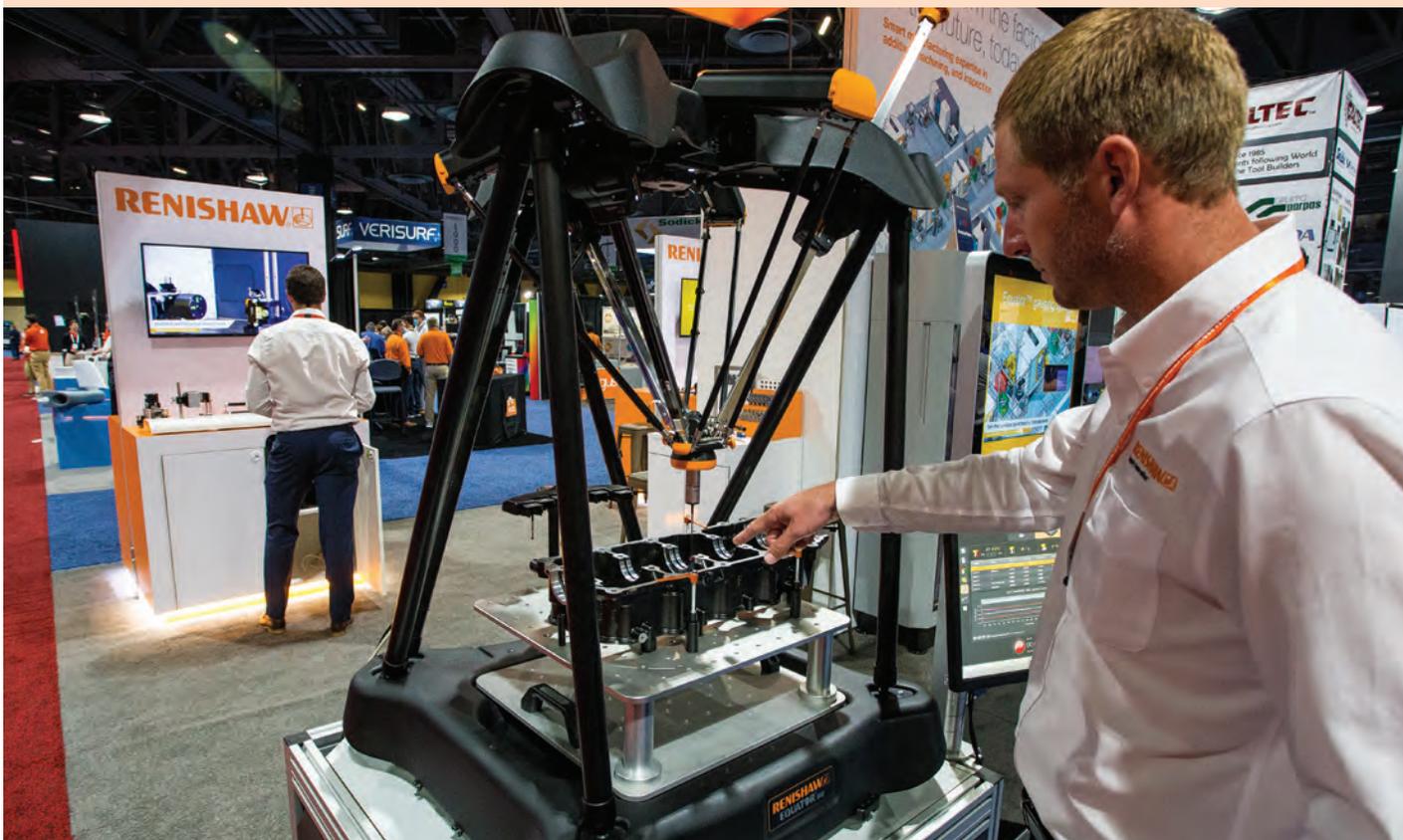
Devon King - It is great to be back at Westec. Collaboration with people I haven't seen in a long time is so nice. Getting in front of people from partners, customers and potential customers is fantastic. Plus we have the Equator™ 500 gauging system in our booth to show off.

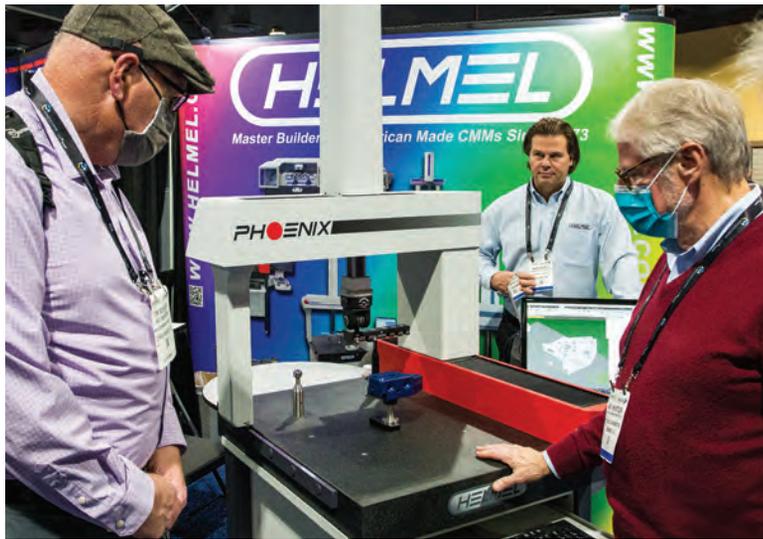
CNC West - Well the next question is perfect then. What's in the Renishaw booth that people really need to check out?

Devon King - Our Renishaw Equator™ 500 gauging system is one of the highlights this year in the booth. It is a

shop floor gauge aimed at larger parts like an engine casings or differential housings. It's meant to go right out on the shop floor next to the machine tool. The Equator™ 500 has 500mm in X and Y and up to 400mm in Z. The platform can handle parts over 200lbs. It is a bump up in size from our 300 series and has all the same features and accuracy.

We are also excited about the continued evolution of our REVO platform. Right now it is a 5 in 1 measurement system and growing. The 5 axis REVO 2 head does all the quick work while the 3 axis CMM rolls along at a reasonable speed. The removable probe system means you can go from one form of measurement to the next without changing machines and moving your part. So for example surface finish measurement and dimensional inspection can all be done from the same machine. It is a huge time saver, but also increases accuracy and repeatability.





WESTEC Q&A

Ingo Helmel - West Coast
Sales Manager &
Art Whistler - Vice President
of Sales and Marketing
Hemel Engineering
Products Inc.

CNC West - How is it being back at a trade show?

Ingo Helmel - Exciting to get back out on the show circuit after two years off. Great seeing existing customers and after a day and a half here we've already generated some good leads. I'm looking forward to the rest of the event.

Art Whistler - I was at the Eastec show before coming here and it was like crawling out from under a rock. It was old home week seeing everyone in the business.

CNC West - Tell me a little about the company and what you brought with you to Westec.

Ingo Helmel - All we do is CMM machines. Our large machine is 6'x10' but the one we have on display here at Westec is 8"x12". We design and build everything at our factory and headquarters in Niagara Falls, New York. We

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Art Whistler - We brought with us the shop floor ready PHOENIX 216-142 that features a Renishaw probe and the popular and powerful CMM Manager software. The Renishaw head is the only true 5 axis head on the market and something not all the CMM manufacturers offer as an option. This is a great system to exhibit at a trade show. It is a small footprint machine, but doesn't lack any features, and really showcases everything we have to offer.



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Machining Education ready for change

Should tool grinding, manual machining and G-Code still be required learning to be a CNC Machinist?

Is just-in-time learning our future?



By: Tim Paul
Tim.Paul@Autodesk.com
@OneEarTim

Why manufacturing education needs to change

Over the last century, American industry was built on innovation and manufacturing. But over the last 25 years, I believe we've lost our edge. Innovation in American manufacturing thrived while being pushed forward by the fledgling automotive industry, the defense and aerospace race, and most recently the tech boom. There are many indicators of a promising future for American manufacturing but there are equally as many concerning realities of unfilled jobs and predictions of a growing skills gap.

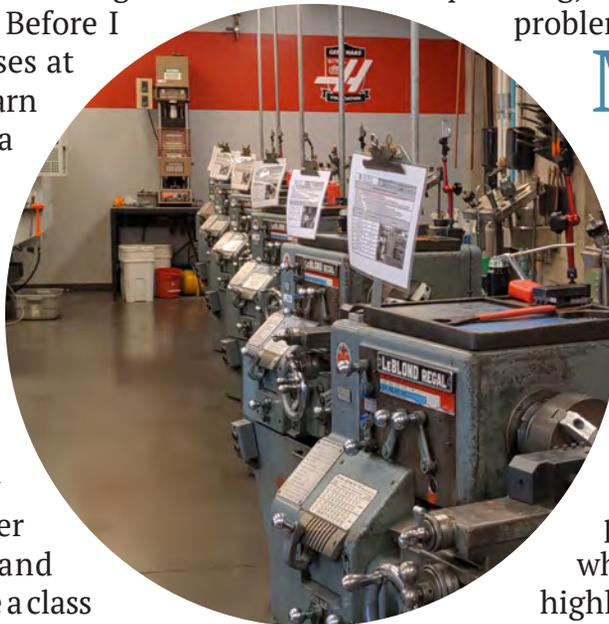
Forbes predicts the future of American manufacturing will provide more growth than we saw in the tech sector over the past 20 years. In March of this year, Reuters reported manufacturing activity soaring to its highest level in more than 37 years. As encouraging as these reports may seem, Deloitte and the Manufacturing Institute project as many as 2.1 million American manufacturing jobs going unfilled by 2030 due to a manufacturing skills gap, costing the U.S. economy as much as \$1 trillion in 2030 alone. How do we reconcile promising activity today with worrying predictions of the future? If we are willing to adapt and change what we teach and how we teach it when it comes to manufacturing, I believe we can ensure a bright future. Here are two areas that need to change.

1. What We Teach

As a machinist, I ask, do we really need to teach tool grinding, manual machining, trigonometry, and G-Code to produce productive machinists? When I started my education journey in machining as a freshman in high school, the very first thing I learned even before making chips was how to grind a turning tool from a high-speed steel blank. Before I was able to sign up for G-Code classes at Sierra College, I was supposed to learn Trigonometry. Today? I can't grind a respectable turning tool, calculate the side length of a triangle, or write more than the simplest of G-Code programs without referencing a machineries handbook or G-Code manual. But I'm still capable of being a very productive and innovative machinist.

The successful machinist of today and tomorrow is a flexible learner and a problem solver. To teach and promote these skills, we need to create a class environment that is less focused on following prescriptive steps and more focused on using resources to solve problems. I completely agree that there are many great lessons learned from grinding a tool or seeing and feeling how the chips are formed on a manual machine. I also won't argue against the value of knowing

trig and being able to write G-Code programs by hand. But, in the limited amount of time teachers have with students and the reality of decreasing enrollment, learning material should be modern, engaging, and focused on teaching general machining knowledge, process planning, measuring, and problem solving.



Many mechanical engineering students get little hands-on time making things and solving tangible problems while also facing highly theoretical, math intensive studies

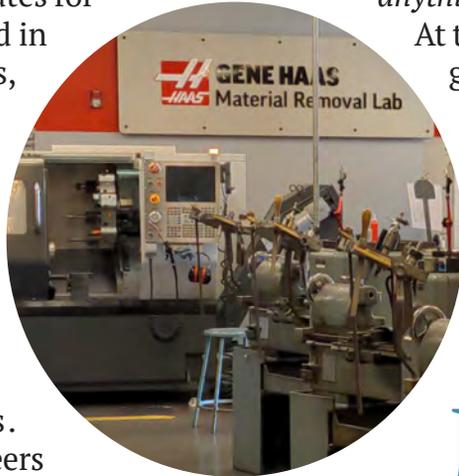
with several semesters of advanced calculus. This builds the perception that mechanical engineers are always working towards a computationally intensive career. I won't make any arguments that advanced calculus isn't needed for many mechanical

engineering positions. I just hate seeing smart young people avoid traditional engineering degrees because advanced calculus seems daunting to them when otherwise they would be productive additions to the manufacturing industry.

In hopes of increasing enrollment and reducing dropout rates for students disinterested in math focused careers, many colleges are looking to add manufacturing engineering degrees with more hands-on manufacturing focused work and problem-solving challenges. Manufacturing engineers can fill a big void in helping our industry progress towards becoming more efficient and modern manufacturing leaders. Manufacturing engineering programs are a great addition that will increase enrollment and decrease dropout rates in engineering programs while also providing technical leaders for American manufacturing.

2. How We Teach

In June I hosted a two-day Fusion 360 CAM Summit webinar for educators and commercial customer from all over America. In addition to deep dive CAM geek sessions, the webinar focused on the future of manufacturing education, diversity in manufacturing, and the skills gap our industry is facing. Along with nearly two hundred attendees, we had several great guests for opening and closing conversations including Carl Bass (former Autodesk CEO) and Mark Terryberry (well-known for his “Haas tip of the day” videos). All our guests had great perspectives to share in group discussions, but Carl and Mark had some interesting insights in line with how I believe we should be teaching machining differently than we have in the past.



When I asked Carl Bass if he had any thoughts on how people will learn machining in the future he said, “I think we will see more examples of just-in-time learning.” Carl went on to explain that he’s observed a major change in how people learn *everything* by having access to learning *anything* they need to know in that moment.

At the time I thought Carl had a moment of genius and invented a new term, “just-in-time learning” by playing on the well-known Toyota principle, just-in-time manufacturing. Carl has more than his share of genius moments, but “just-in-time learning” wasn’t one of them. After some research I found the “Just-in-time learning” concept has been around since at least the late 90’s.

Just-in-time learning is different from traditional structured training or professional development and shouldn’t be confused with just-in-time teaching (JiTT). Just-in-time learning provides small pieces of content in a short time when learner’s need specific information. People can absorb information more quickly when they need to, specifically when they come face-to-face with a knowledge gap that is preventing them from getting a job done. Having training tools that can anticipate a learner’s potential knowledge gaps and make the appropriate information readily available is the key to just-in-time learning. YouTube is a great example of how unstructured just-in-time learning works every day for millions of people. YouTube deserves partial credit for setting an expectation in society for easily and freely accessing knowledge when it’s needed.

Mark Terryberry from Haas reinforced Carl’s just-in-time perspective. In response to my question – “how should educators be teaching differently?” – Mark said, “CAM should be a day one tool.” Mark continued, saying, “Our CAM system is a road map to everything that needs to be taught for machining. From Work Coordinate Systems to Speeds & Feeds, our

CAM system has refined the whole machining process down to just the essentials. If we really understand what the CAM system is asking (Depth of Cut? Threads per inch?), we are machinists. And if we come across an input field in our CAM system that we don't understand, it's an opportunity to explore and learn." I've mentored and taught a lot of machinists throughout my 20+ years in the industry, most of that time I've been saying the same thing as Mark in a much less eloquent and organized way. Mark's point aligns to my belief that we need to be teaching students how to be resourceful learners and problem solvers over process followers with deep specific knowledge of what we try to anticipate they will face in an ever-advancing industry.

It's time to rethink what general or basic knowledge of our trade is.

We have limited insight into what challenges the future generations of manufacturing professionals will face in the future, so why are we still following teaching practices of the past 80 years?

Closing thoughts

Until recently, I was incredibly insecure and hesitant to share my struggles through primary and secondary school. If it wasn't shop class or a very select few other classes like art class, I had a terrible time focusing and completing my work. Basically, if I wasn't interested in it, or didn't see a direct reason for learning something, I didn't have the attention span to learn it. Until I got into my working life and post-secondary school, I often felt completely hopeless in a traditional classroom. Working as a clock repair apprentice while in high school, I remember feeling for the first time that maybe my future wasn't so bleak. I still remember the day my boss Gary said to me, "You're pretty smart," and wondering

if he was serious. It was at his shop, The Clock Doctor, where I realized I could be a productive learner when I learned what I needed to know, when I needed to know it. I also did well in my post-secondary education because I was able to take classes that I was interested in with direct links to important parts of the industry.

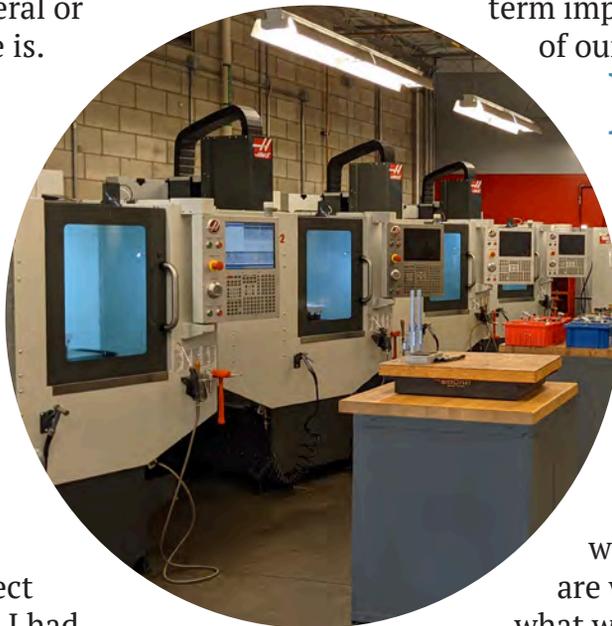
I left the most fulfilling job I've ever had – being a machinist making awesome space hardware – to come work at Autodesk because I wanted to be a part of changing our industry for the better. I've taken several positions at Autodesk, each time because I thought I could make a bigger positive impact on our industry. I joined the education team because I believe this is

where I can have the biggest long-term impact on the future of our industry.

I share my story because I've heard similar anecdotes from countless other talented and productive people in the manufacturing industry. The pool of potential machinists can be wide and deep if we are willing to adjust what we teach and how

we teach it. The world has changed drastically since the days of WW2 when the machining education curriculum was developed to train the masses. It's time for our industry to change to match a diverse and agile manufacturing future.

In my next article I will explore what we can do as an industry to attract more people into the manufacturing trades, while discussing what we can do to respect, preserve, and share experience and tribal knowledge throughout the industry.



Industry News

The AMT Honors Mazak's Brian Papke for Lifetime of Industry Dedication

Recognized for his lifetime of dedication to the advancement of the manufacturing industry, Brian Papke, former chairman and now executive advisor to the Board of Mazak Corporation, received the prestigious Al Moore Award from The Association of Manufacturing Technology (AMT) during the recent MFG Meeting and MTForecast in



Denver. Throughout his career, Papke has promoted, supported and expanded applications of machine tools and manufacturing technology in ways that have proven instrumental to the success of North American manufacturers.

Papke's long, distinguished career in the machine tool industry began after his graduation from the University of Illinois. He entered the machine tool industry in a management training program, and then progressed through various sales and management positions, eventually becoming president of Mazak. In 2016, after 29 years of service with Mazak, he was named chairman.

While at Mazak, Papke sustained a pattern of continuous growth and improvement for the company through the establishment of three core busi-

ness strategies. Those strategies included a lean production-on-demand approach to manufacturing, implementation of the industry's first digitally connected Mazak iSMART Factory™, an all-encompassing customer support program and a unique network of eight Technology Centers and five Technical Centers across North America, anchored by a National Technology Center in Florence, Kentucky.

Harry Moser Inducted to Association for Manufacturing Excellence Hall of Fame

The Association for Manufacturing Excellence (AME) inducted Harry Moser, president of the Reshor-

Boom Aerospace Relies on Verisurf Software



"When you are designing and building a supersonic commercial aircraft, precision and quality verification of every part is critical."

Todd Wyatt
Metrologist, Boom Aerospace

"Verisurf software works with all our measuring devices and CAD files, and those used by our supply chain. Using Verisurf as a common measurement platform has improved quality and efficiency in inspection, reverse engineering, tool building and assembly guidance at Boom."



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Industry News

ing Initiative®, into the AME Hall of Fame during the 2021 AME International Conference. The AME Hall of Fame recognizes industry thought leaders and influencers who support the values, principles and practices found within leading enterprise excellence organizations. The nomination criteria include the significance of an individual's contributions to the growth of enterprise excellence within the lean, continuous improvement community.



“Lean/continuous improvement are keys to making U.S. manufacturing competitive enough to accelerate reshoring,” said Harry Moser. “To paraphrase Edwards Deming, Jim Womack and John Shook, one needed improvement is for companies to stop sourcing on the basis of price and instead, minimize total cost. I am honored to join Jim and John in the AME Hall of Fame”

Harry Moser founded the Reshoring Initiative to bring five million manufacturing jobs back to the U.S. after working for high-end machine tool supplier GF AgieCharmilles, starting as president in 1985 and retiring in 2010 as chairman emeritus.

Haas Factory Outlet in Anaheim Hires Tooling and Accessories Manager.

HFO Anaheim/Machining Time Savers, Inc. announces the hiring of Brian Harrigan as their tooling and accessories manager for Orange and San Diego Counties. In his new role, Brian will assist customers and support HFO's Haas district managers and OEM partners, to create quality

solutions optimizing new machine purchases and enhance manufacturing processes across the board.

Brian, a Finance graduate from Cal State Northridge, has been working

in the CNC industry since 2012. As regional manager for Chick Workholding Solutions, he bolstered process improvement related to setup changes and reduction. Prior to joining Haas

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Factory Outlet Anaheim, Brian served as the Western US sales manager for Caron Engineering. He assisted to develop smart factories, by providing smart manufacturing solutions to reduce cycle times, promote unattended operation, drive down tooling costs, and minimize expensive damage to machines and work holding.



Brian stated, "The mission of this new Tooling & Accessory position is to support our customers and provide a planned tactical response to new

machine purchases, that require all the tools and solutions to ensure immediate ROI realized on day 1 of putting the machine online. Every CNC manufacturing project is different, requiring specific functions that might not be available "out of the box." We have partnered with many quality machine tool accessory brands, that complement and enhance our machine tool offering." Brian adds, "I will serve as the advocate of our customers and guide them through a smooth one-stop-shop process of equipping their machine tool investment with most optimal ROI."

Haas Factory Outlet, a Division of Machining Time Savers, Inc. is the Southern California distributor for Haas Automation, Inc. Haas Automation manufactures a full line of CNC vertical and horizontal machining cen-

ters, CNC lathes, rotary products and Haas Tooling and Accessories.

Renishaw Announces Expanded CMM Software Offering with New Verisurf Agreement in North America

Renishaw has entered into an agreement with Verisurf Software Inc., allowing companies in North America to access Verisurf coordinate measuring machine (CMM) software from Renishaw. With an emphasis on the popular Verisurf CMM Programming and Inspection Suite, this agreement enables companies to benefit from Renishaw's advanced inspection technologies, including the REVO® 5 axis

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measuring system and the Equator™ flexible gauging system, and the support networks of both organizations.

“We have been converting Renishaw Equator gauging systems into CMM Master shopfloor CMMs, and supporting the PH10 and SP25 solutions for years, so adding value to the PH20 and REVO 5-axis systems was a natural progression. We recognize the continuing advancement of this technology and plan to support other REVO sensors,” said Ernie Husted, president and CEO of Verisurf Software, Inc.

“At Renishaw, we appreciate the continued support of our product line by Verisurf. Fast and easy CMM programming along with the value-added 5-axis Spiral, Edge, and Pocket scan types add to our customer promise of

5-axis efficiency and overall performance,” said Denis Zayia, president of Renishaw, USA.

Methods Machine Tools Set to Acquire Koch Machine Tool

Methods Machine Tools, Inc. has signed an agreement with an intent to acquire Koch Machine Tool, a machine tool dealer and Methods’ avenue into the Texas machining market since 2010.

Methods anticipates a definitive agreement by January 1, 2022. Both companies are preparing the proper structure and closing out final transactions to make the transition smooth for all employees and customers. Acquisition talks began when Mike Koch,

president of Koch Machine Tool, a 40+ year machine tool veteran, started planning for retirement and word got out that he was looking for the next owner of his business. Mark Wright, president and CEO of Methods, reached out to Mike earlier this year, and the two began negotiations.

The Koch offices in Dallas and Houston will gradually become Methods’ facilities, and Mike Koch has agreed to become a co-general manager of these locations. He is expected to remain in this position for about three years to help facilitate the acquisition. Methods will announce the other co-general manager at a later date.

“Mike and his father constructed one of the best machine tool dealers on a foundation of hard work, honest deal-



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Industry News

ings, great service, and support. Mike always takes care of his customers and is true to his word,” Wright said. “Mike built a great team, and we think there is room to seriously grow the market. Koch has tremendous knowledge of machining and the Houston and Dallas markets. We’re excited to see what the combination of Koch’s mindset and our expert technicians can do for the machining industry across Texas.”

NSH USA Announces New Manufacturing Technology Center

NSH USA Corporation (formerly Simmons Machine Tool Corporation) recently purchased the land and buildings at 47 Broadway in Albany, NY, for the construction of a new manufactur-

ing technology center. This property, which is located next to NSH USA’s headquarters, will support the expansion of the company’s current manufacturing footprint and accommodate the Niles Technical Application Center (NTAC).

Niles-Simmons designs and manufactures advanced precision CNC machining centers. Housing the NTAC in the new facility allows NSH USA to work closely with customers on manufacturing process development, training and software development. The new facility will also contain a Niles-Simmons N30 MC turn-mill machining center as well as other demonstration machines from the NSH Group’s members.

“The time is right for this expansion and investment by NSH USA and the

NSH Group. Our machines have been manufactured in Albany for over a century. This facility will leverage our company’s core skill sets for the benefit of an expanded set of industries and deliver world class technical service support for Niles-Simmons customers in North America and potentially beyond,” said David William Davis, NSH USA President and COO.

Walter Establishes Solid Carbide Drill Manufacturing Facility

Walter USA, LLC has announced that Walter will assume governance of the round tool production unit in Greer, SC, through an intra-company transfer within the Sandvik Group to strengthen



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its manufacturing presence in the U.S.

“The addition of manufacturing capacity underscores Walter’s commitment to the U.S. market and supports the long-term growth strategy for the company in North America. Having a dedicated production facility in the U.S. will enable Walter to provide both better responsiveness to customer demand as well as improve supply chain security,” said a company spokesperson. The transfer is expected to be complete during Q2 2022.

The round tool manufacturing facility in Greer, SC, already produces Walter Titex brand solid carbide drills for Walter. Solid round tools are a significant part of the product portfolio for Walter in North America, and the production capacity will be fully committed to Walter’s production during 2022. Both standard and special Walter Titex solid carbide drill products will be manufactured at the location.



BIG KAISER Changes Name to BIG DAISHOWA

BIG KAISER Precision Tooling Inc. is excited to share important news concerning the name of its company. BIG KAISER Precision Tooling Inc. will change its name to BIG DAISHOWA Inc., effective January 1, 2022.

“BIG DAISHOWA is a global leader of tooling systems, and we have been a member of the BIG DAISHOWA group of companies for many years,”

said Jack Burley, president & COO. “The name change is a natural evolution in this relationship. Being known as BIG DAISHOWA in North America will strengthen our corporate presence on a global scale.

“Our customers won’t notice any change in our business day-to-day,” Burley said. “They will receive the same superior products, personal support and performance guarantee we’ve been delivering for more than 30 years.”

The name change will not impact operations, product lines, staff, distribution or licensing agreements in North America. The company will continue to offer the same high-precision tool holders, cutting and boring tools, workholding, tool measurement systems and accessories manufactured in Japan, Europe and the United States.

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Koma Precision, Inc., and Sulli Tool & Supply, Inc., Have Entered Exclusive Agreement.

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sion, Inc., in the Southern California and Arizona market places and will advance sales, marketing support, and continue to provide excellent customer service to our Southern West Coast customers.

Mike Sullivan and Sulli Tool bring

to the table over thirty years of experience in providing solutions and support to manufacturing companies. In 2009, Mike decided to form his own company in order to bring new products and services to his customer base and work more directly with the people that have always depended on him for help and assistance.

Sulli Tool is based in Southern California and is a manufacturers' representation firm that specializes in providing high-end machine tool accessory solutions and helping original equipment manufacturers, machine tool dealers, industrial supply companies and end users manage their workholding, live tooling, part accumulation, as well as ensure clean and safe employee work environments.

With a variety of products and services such as off-the-shelf quality products, engineered solutions, and excellent support, Sulli Tool offers their services to several companies from around the world.

At Sulli Tool & Supply, they have designed the appropriate solutions to meet your manufacturing needs and concerns and you will find working with Sulli Tool & Supply, in conjunction with Koma Precision, Inc., to be a highly professional and very accountable partnership.

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The 9000-DGI Series control features 120 GB disk storage, 4 GB memory, up to 10x better graphic performance, mid-travel tactile keys and an enlarged 15" LCD touchscreen. It is a Windows-based platform and offers all the user-friendly features that Milltronics CNC controls are known for, such as the G-code visualization screen.

Features that allow quick operation of the CNC include solid model graphics allow the operator to see a completed part prior to cutting. A mid program restart and a handwheel run that allows the operator to run a program in a controlled mode where motion only occurs while the handwheel is turning.

New Swiss-Style Machine Series —Mazak

Mazak further expanded its machine tool technology portfolio with the debut of an all-new line of SYNCREX Swiss-style machines at the company's Discover 2021 event. The SYNCREX models feature seven, eight and nine-axis configurations and are optimized for high-production of small parts.

These new Swiss-type machines use a collet plus single-motor ball spline drive for heightened accuracy and reduced material waste. A 10,000 rpm spindle and a variable vibrating system ensure the utmost in stable, repeatable performance.



Mazak's SYNCREX machines accommodate a maximum of 35 tools in a standard configuration: 22 static and 13 live. An exclusively designed automated tool setter checks, measures and sets up tools.

Mazak reports a unique high-rigidity base casting creates greater stability, reduced vibration and thermal distortion. A twin-screen system with built-in AutoDesk software helps further speed part setups and production.

JS1118CNC Tool Room Lathe with TURNPWR

The new precision JS1118CNC Tool Room Lathe with the new Acu-rite TURNPWR is ideal for the Tool-Room and Model Shop. The onboard contouring control enables you to program conventional machining operations right at the machine in an easy-to-use conversational language.

The dual Handwheels allow easy set up and positioning like a manual machine. The 5C Collet Spindle is equipped with class 7 spindle bearings and the nose is precision ground to achieve better than .0001" T.I.R. on both the collet seat and quick-change chuck taper



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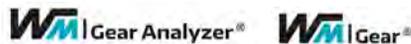


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New Products

Mazak SYNCREX machines sport the new MAZATROL SmoothSt CNC that features Mazak's Swiss Setup Assist (MSSA) for fast and easy job setups along with Mazak Turning Chip Control (MTCC) functionality. The control's soft key PLC functions include those for tool touch off, part cut off, retract point and start position. MAZATROL SmoothSt also allows for synchronous control, rigid tapping with all spindles and cross and front simultaneous machining.

Two Dial Indicator Stands With 220 lb. Capacity Released —BIG KAISER

BIG KAISER introduced the heavy-duty MU-VZ and SU-VZ dial indicator stands for precise, stable positioning of inspection devices. Both types have 220-pound (100 kg.) capacity magnets, rotate 360 degrees and can use DGH 3 or 4 adaptors.



The SU Type has a length of 235mm and rubber bellows. The larger MU Type is 360mm in length and has a reinforced ball joint with a large collar. Both use serrated washers instead of flat washers to reduce slippage and increase stability of the center joint.

A singular star grip locks and releases quickly for flexible positioning of the dial gage. The mechanical tensioning technique employed produces a very high clamping force, which enables the repetition of highly ac-

curate measurements. Manufacturing tolerances are extremely tight and high-quality materials result in practically no wear.

New PJ 303X 5-Axis Machining Center —Mitsui Seiki

Mitsui Seiki's new PJ 303X 5-axis machining center provides maximum precision and versatility in processing of workpieces up to 9" x 11", and 44 lbs. in weight. Typical applications cover an extensive range of critical parts such as lens molds, medical products, EDM electrodes and fuel cell components.

The machine's X-, Y-, and Z-axis travels are 11.8", 12.8", 7.9" respec-



tively. A-axis rotation is +40° to -100°, and the C-axis rotates a full 360°. High-speed linear motors move the X-, Y- and Z-axes, while the rotary axes employ direct-drive motors. Rapid



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traverse speed for the X-, Y-, and Z-axes is 66 ft/min.

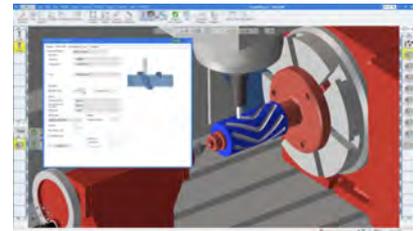
A 50,000-rpm, HSK-E25 taper spindle offers high-speed machining capability. An automatic tool changer engineered to store up to 24 tools as large as 1.57" in diameter and 4.7" in length provides tooling versatility.

To maximize precision, the sliding machine surfaces of the PJ 303X are hand-scraped. Advanced spindle thermal displacement technology is standard, including a symmetrical gantry column structure that accommodates thermal deformation fluctuations and a thermal compensation mechanism for the machine spindle/head.

Operator-friendly features further enhance precision, including a 15" color display with touch panel capa-

bility than can be moved to the most convenient position relative to the work envelope. The machine's double-stage rotary door provides wide access for visibility and setup.

The PJ 303X consumes a compact 15.75' x 7.77' x 8.7' (W x L x H) of floor space, and weighs approximately 9,900 lbs.



to create surfaces as a stitched body directly from closed 2D geometry.

In addition, users can automatically create trimmed planar surfaces in any orientation at geometry depth instead of the CS plane. Further developments include new alignment capabilities which allow straight edges of solid bodies to be easily aligned with the working coordinate system in preparation for machining, and a new sectional

Version 2022 Launched —GibbsCAM

Cambrio announces the new release GibbsCAM 2022. The latest release includes a number of CAD enhancements for solid and surface modelling which include the ability to extrude multiple bodies with taper, and



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New Products

view slicing plane.

Among the multiple CAM additions within GibbsCAM 2022, a number of usability enhancements have been included such as automated multi-shape predrilling, and extended control for start / end points of profiling toolpaths.

5-axis enhancements include a new rotary machining strategy to cut parts with cylindrical or conical floors such as feed screws or augers. Advanced control of the tool includes off-centerline roughing, and front or back engagement of the tool point with automatic corner offset. New 5-axis deburring enhancements include the ability to generate multiple cuts to approximate a chamfer or fillet on an edge beyond traditional edge breaks. It is also possible to use cylindrical or

conical tools for chamfering by selecting a specific contact point to keep a straight tool section. Toolpath quality is also improved for 5-axis Geodesic operations. Other 5-axis updates include automatic tilting for collision avoidance for arc leads, the ability to select automatic tilt limits or set a fixed tilt angle relative to a selected surface normal.

Long Mill Holders with Smart Damper Vibration Control

—BIG Kaiser

BIG KAISER has expanded its lineup of Smart Damper-equipped, arbor-style face mill holders. This holder is the largest and longest milling



tool BIG KAISER has offered yet. It supports face mills with diameters of 3", 4", 80 mm or 100 mm with an arbor pilot diameter of either 1" or 27 mm.

"The Model SDF57 assembly has an outside diameter of 2.83 in. and allows users of 3 in. face mills to access up to 19.68 in. of reach, the longest tool assembly in the industry using standard



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components,” said a company spokesperson. “Face milling components used in construction equipment, aerospace and oil/gas industries will see the most opportunity for this toolholder with vibration dampening, where long reaches are common.”

Big Kaiser reports Smart Damper enables quiet, vibration-free milling, even in long-projection assemblies. The integral design of Smart Damper shortens the distance from the damping mechanism to the cutting edge. This produces higher damping effects to the tool assembly, minimizing chatter or vibration for better surface finishes and improved metal removal rates.

The Smart Damper face mill holder

is available for BBT50, BCV50 and HSK-A100 shank styles.

High Feed Milling Systems for Difficult-to-Machine Materials

—Seco Tools

Seco Tools offers a high feed cutter and insert series in size 14.

It is designed to increase tool life and maximize the value of every edge in stainless steels, titanium and super-alloys milling applications. The High Feed Square Cut size 14 milling system is suited for tough materials and comes in a full range of Seco Tools grades



engineered to achieve fully secure and optimized high feed milling.

“The single-sided straight edge insert geometries allow users to push their high feed milling speeds to new limits,” said a company spokesperson. “Ensuring high feed per tooth whether ramping, pocketing, plunging or performing face or copy milling, this solution creates great chip evacuation

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and makes it easier to handle difficult machining operations or milling in deep cavities.

Launch of “Industrial Statistics” —Quality Engineering Management

Quality Engineering Management announces the Launch of a New Hybrid Product – “Industrial Statistics.” Or Reverse SPC (R SPC - Reverse Statistical Process Control), specifically designed to define and control the manufacturing process, using the process mapping technique and ensuring that the quality is maintained

throughout the process.

Transformational Quality Management system consists of Industrial Statistics that is the R SPC software program and the Process mapping technique. Process mapping concentrates on maintaining the Contractual requirements and the Industrial Statistics Software that is R SPC Software program maintains the quality attributes during the manufacturing process, thus maintaining a total balance of the system to deliver quality products to the customers every time on a timely manner.

In this post-pandemic era where the world has turned digital, the company reports this is a cost effective, efficient

and time saving hybrid program.

“After several years of research and study of the manufacturing process and attending many classes on Statistical Process Control and taking the Green Belt program, I was not convinced that the statistical approach is the right way to manage and control the manufacturing process especially the mechanical parts and assemblies,” says Bob Matthew, the founder, and the owner of this Industrial Statistics System.

During the research, a computer program has created, namely a mathematical Bell Curve, created similar to the statistical bell curve and obtained the US patent – “Solid Model of Statistical Process Control”. The advantage

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with this program is that it starts with a contract and collects critical data from the contract and associated documents with the help of the R SPC software program. Manufacturers follow basic instructions per process map in order to use this system to program their Machines. Follow the basic procedures to setup the machine and run the machine to make the part(s). Operator should inspect the part(s) from the production run, feed the results into the R SPC software, that instantly displays the X-bar and R-Chart and the frequency distribution Chart, that tells all the quality details about that part. This Chart is available for the management as well as the Customers for their

review to understand the health of the quality attributes of the product.

Matthew states, "This is an ideal system in this post pandemic era that helps to facilitate the manufacturing process to make it more efficient, accurate, and reliable in order to meet the customer's expectations".



New Flexible Pallet Tower (FPT) for CNC Milling Machines —Fastems

Fastems LLC has announced the launch of their Flexible Pallet Tower (FPT), a compact pallet automation

solution for a single CNC milling machine with 300 to 630 mm pallets. FPT integrates with any machine with a wide library of ready-made machine tool interfaces and multiplies the machine tool utilization up by cutting down setup times and enabling lights-out manufacturing. The plug-and-play

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automation system also shortens the lead times and allows for higher part mix with smaller unit costs, no matter the production batch sizes.

Fastems FPT is compatible with any machine tool brand, and it integrates with milling machines whether or not they have automatic pallet changers. In addition, the system footprint is extremely compact: FPT-500 for 300-500mm pallets requires only 100 square feet, and FPT-1000 for 500-630mm pallets requires 175 square feet. Instead of having a fixed storage, like most of the comparable units, FPT can work with different load heights and pallet sizes with a configurable pallet storage that can store up to 24 pallets in two to four levels.

The first FPT-500 for 300-500mm pallets will be delivered to the first

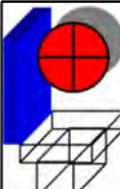
customer in February 2022, and the FPT-1000 for 500-630mm will launch in late spring of 2022. These solutions can be delivered within 16 weeks of order placement. The FPT completes the Fastems pallet automation offering for smaller pallets and even tightest shopfloor fitment requirements.

FPT is controlled by the completely new version of Fastems Manufacturing Management Software (MMS). MMS offers a single-view user interface with drag-and-drop production scheduling and allows bringing new workpieces into the system in under 60 seconds. The system automatically tracks and reports the key performance indicators in real time. With the plug-and-play installation and fast to learn use, FPT brings immediate automation benefits to the shop floor.

Wohlhaupter 465 (464) Fine Boring Heads Now Available —Allied Machine and Engineering

Allied Machine and Engineering announces the expansion of Wohlhaupter boring tools offered with the launch of the 465 (464) series of fine boring heads. These internally balanced fine boring heads include 3ETECH digital adjustment as well as analog vernier scale adjustment. One 3ETECH digital readout can be used on multiple adaptable 3ETECH boring head tools including VarioBore, 538 (537) large diameter cassettes, 465 (464) fine boring heads and custom tooling solutions.

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heads have a full diameter range of 1.968” – 8.070” with the light-weight aluminum Alu-Line boring heads ranging from 2.559” – 8.070” . Featuring the standard Wohlhaupter

MVS connection, these boring heads provide the capability to adapt to any machine. With the digital diameter adjustment located externally rather than internally, Allied reports maximum coolant pressure can be utilized, and there is no concern about damaging digital components inside the tool during operation.

In high production settings Allied reports that the customer will only need one 3ETECH module for all adaptable heads, which reduces machining costs. With the internal self-balancing mechanism, the tool remains stable throughout the tooling process and achieves tight tolerances and optimal surface finishes.

Debut of New 2022 Release —Verisurf

Verisurf Software, Inc. debuted its new 2022 release at WESTEC 2021, Long Beach Convention & Entertainment Center, Booth 937. Verisurf 2022 is the latest release of the popular universal measurement software for automated quality inspection and reporting, scanning, reverse engineering, and tool building. The new release builds on Verisurf’s advancements in performance, including the ability to process millions of measured points per second; fast and easy inspection planning; and open



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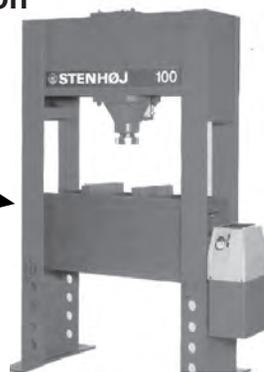
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platform compatibility, whether in the quality lab, on the shop floor, or in the field.

One of the new features included in the release, Model-Based Definition (MBD) for meshes, enables users to create intelligent polygonal meshes for part inspection. MBD mesh files can now serve as the authority, in place of a CAD model, to inspect additive manufactured parts, saving considerable time and resources. Verisurf is the only measurement software built on a CAD platform that works with any CAD file and all portable arms, laser trackers, laser scanners, and both manual and programmable CMMs.

“At Verisurf, we are actively involved with our customers, listening to their feedback and helping them solve measurement challenges. This interaction is what drives our ongoing development of the Verisurf open platform, making us the single most diverse and powerful software to drive all measurement and inspection applications across the manufacturing enterprise,” said Ernie Husted, President, and CEO, of Verisurf Software, Inc.

Verisurf 2022 has many new and powerful features to support all measurement types, including portable, laser scanning, manual and programmable CMM applications.



New MRS Angular Encoder Modules —HEIDENHAIN

HEIDENHAIN’s new MRS encoder module series for robot arms has been expanded and is now available with redesigned embedded bearings to better withstand outside tilting forces.



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This new compact and all-inclusive design also significantly simplifies the installation process.

The new MRS 2280 and 2281 encoder modules have been specifically designed for use in tilting and rotary axes with high tilting rigidity bearings, making them ideal for measuring arms and measuring robots. Overall, the MRS 2200 series provides options with an easily mountable ultra-compact design, system accuracy of $\pm 10''$, and tilt resistance of up to 52 Nm/mrad tilt resistance.

Such as with HEIDENHAIN's other angle encoder modules, each of the new MRP 2200 encoder modules consist of a high accuracy angle encoder and robust embedded bearings that form one compact module. Because the bearing and encoder components are

already ideally aligned and adjusted, builders can forego having to make those typical complex adjustments.

New High-Feed Milling Series with Larger Depth of Cut Capabilities —Kyocera

Kyocera Precision Tools introduces a new expansion to their most versatile indexable high-feed milling line. The MFH-MAX provides excellent chip removal performance in various applications, including automotive parts, difficult-to-cut materials, and mold machining. With the ability to take on deeper depths of cut (max. 0.098" / 2.5mm), the MFH-MAX wastes little



time getting to work and reduces the number of passes needed to machine the workpiece. The MFH-MAX also supports various milling operations including shouldering, slotting, helical milling, and ramping applications.

After the previous success of the MFH-RAPTOR, MFH-Mini, and MFH-Micro, Kyocera's introduction of the MFH-MAX provides a new alternative to conventional 90° end mills when roughing to medium-finishing.

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Small, Versatile and Fast GP4 Robot —Yasakawa

The GP4 robot is equipped with a 4 kg payload for high-volume, small component processing. Offering axis speeds up to 1,000 degrees/s and fast acceleration/deceleration control for all robot positions. It is engineered to provide agile operations for a wide range of applications.

The GP4 offers a wide work area for its size, making it a viable 6-axis



alternative to SCARA-style robots typically used in the electronics and small parcel sortation industries. The GP4 features a 1,008 mm vertical reach, 550 mm horizontal reach and ± 0.01 mm repeatability.

A compact footprint and slim body design minimize interference with peripheral devices. An IP67 rating and easy-to-clean surface facilitate use

in sanitary or harsh environments. A single cable is all that is needed to connect the manipulator to the controller. An optional location (bottom) for the manipular cable connection reduces interference with walls.

The smallest robot in the GP-series

product line, the GP4 is compatible with the YRC1000 controller or the compact YRC1000micro controller and utilizes a lightweight standard teach pendant with intuitive programming.

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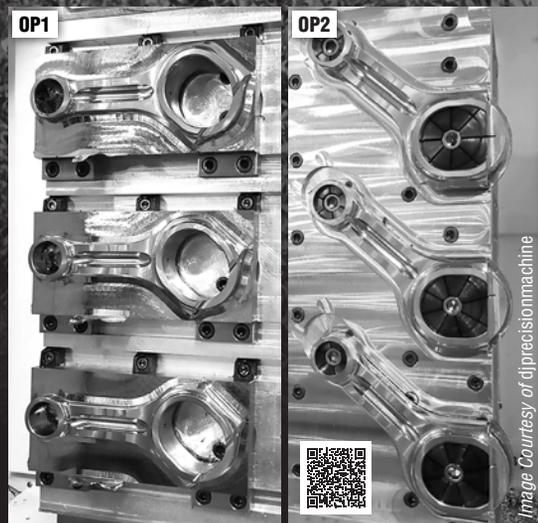
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...Hotline Continued From Page 8

Manufacturing Technology Lab Completes \$14 Million Series A Funding

Machina Labs announced in late November that it had closed a Series A financing round worth \$14 million.

The Chatsworth, CA. company that applies artificial intelligence and robotics to manufacturing will use the money to grow its team and to expand its research and development and manufacturing capacity.

Machina Labs has raised a total of \$16.3 million in financing.

Edward Mehr, chief executive and co-founder, said that manufacturing must be reinvented to keep pace with changes in a highly competitive market.

The company said that its manufacturing platform combines advances in robotics and artificial intelligence to democratize access to rapid manufacturing so that anyone with an idea can make parts quickly, efficiently and cost-effectively, Mehr said in a statement.

Founded in 2019, Machina Labs has done pilot programs with NASA and the U.S. Air Force and is now working on commercial engagements. It has begun work with NASA on using its technology for in-space manufacturing while with the Air Force its technology is accelerating the development of composite molds and the production of parts in applications such as drones.

GA-ASI Has New Air Force Project

The U.S. Air Force has selected two San Diego companies to design and develop an aircraft it calls Off-Board Sensing Station, or OBSS.

Poway-based General Atomics Aeronautical Systems Inc. announced on Nov. 2 that it received a \$17.8 million research and development award from the Air Force Research Laboratory. Its announcement was accompanied by a photo of its jet-powered Predator C aircraft.

Kratos Defense & Security Solutions Inc. based in Scripps Ranch, announced in late October that it received a similar contract, worth \$17.7 million, to conduct R&D related to an OBSS aircraft.

The Air Force lab is developing what it calls an open architecture concept Autonomous Collaborative Platform (ACP) to achieve its goals of rapid time-to-market and low acquisition cost.

Both contracts are for 12 months. The Air

Force has options to extend either contract. Options would provide for the design, development and flight demonstration of an aircraft, and carry work out to January 2024.

Voyager Space and Space Micro Inc. Announce Strategic Agreement

Denver based Voyager Space Inc. (Voyager) announced its intent to acquire a majority stake in San Diego-based Space Micro. Space Micro is a highly innovative engineering-driven business focused on advancing high-performance satellite communications, digital, and electro-optical systems with over 2.7 million hours of space flight heritage. Space Micro developed the world's highest data rate Laser Communications Terminal in orbit. As part of the agreement, Voyager intends to provide strategic operations support to help advance Space Micro's technology throughput to civil, commercial, and defense customers.

Founded in 2002, Space Micro delivers best-in-class satellite technology to the growing commercial market. Space Micro delivered its first computer and image-processing subsystem in space within the first four years as an organization, then went on to develop its first advanced Software Defined Radios for NASA's Interface Region Imaging Spectrograph (IRIS), Lunar Atmosphere Dust and Environment Explorer (LADEE), and The Transiting Exoplanet Survey Satellite (TESS).

Aerospace Robotics Market Worth \$4.9 Billion by 2026

According to a research report "Aerospace Robotics Market Robot Type Global Forecast to 2026", published by MarketsandMarkets™, the Aerospace Robotics Market is estimated at USD 2.9 billion in 2021 and is projected to reach USD 4.9 billion by 2026, at a CAGR of 11.4% from 2021 to 2026. The aerospace robotics market is growing at a significant rate across the world, and a similar trend is expected to be observed during the forecast period. Increase in global aircraft demand and manufacturing, increasing use of robots for efficient aircraft production processes, growing use of robotics to handle aircraft orders backlog, increasing manual labor cost are fueling the growth of the aerospace robotics market.

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1

INCREASE EFFICIENCY

While 5x can result in shorter cycle times and more accurate parts, the biggest benefit is reduced set-ups.

2

DECREASE LEAD TIMES

5-Axis will result in decreased production time (mostly due to reduced set-up), which means shorter lead times.

3

INCREASE ACCURACY

Flipping parts to machine another side in a 3x process can result in inaccuracies. 5x eliminates by machining up to five sides in a single setup.

4

BETTER PART FEATURE ACCESS

5x allows shorter tools, so they are more rigid, reduce chatter and improve accuracy and finish. Can also maximize best angle for cutting tool.

5

INCREASE SHOP CAPABILITIES

If you have 5x you can increase what you can offer your customers – meaning more market share and getting jobs not possible without a 5x machine.



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