

# THE RECORD

Published by the National Tooling and Machining Association

OUR BIGGEST ISSUE YET

## INSIDE THIS ISSUE

Robotics And Automation... Where Are You on the Journey? pp 24-25

Machine Tending Automation Workbook. 10 Questions To Ask. pp 26-27

*and so much more ...*

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# ENGAGE 2022

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October 25 - 28, 2022 - Kansas City, MO

*More information on pages 32-33*

# AUTOMATION & ROBOTICS

## WHERE ARE YOU ON THE JOURNEY?

# DMG MORI Manufacturing USA

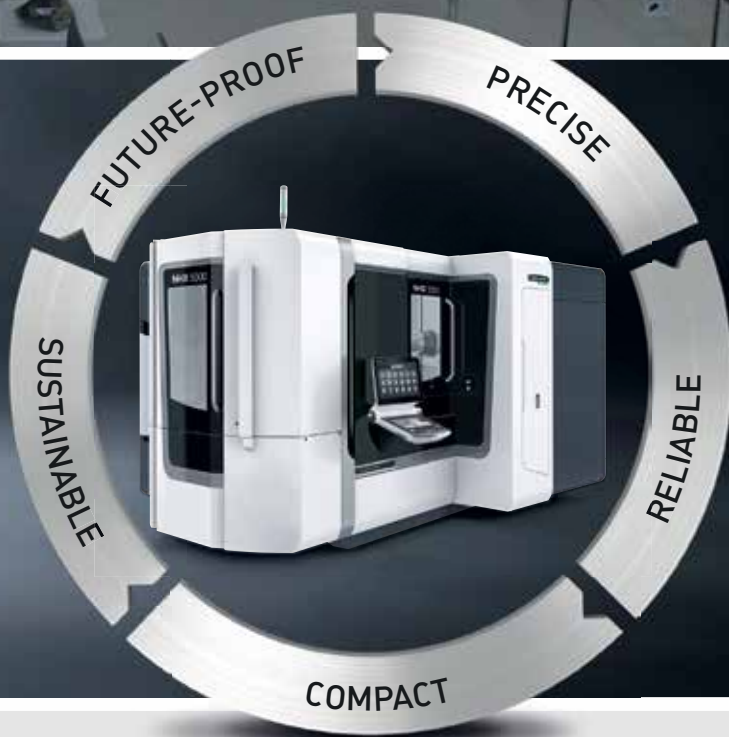
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## THE RECORD

### OPERATIONS & EDITORIAL

Roger Atkins, President  
Doug DeRose, Editor  
Rena Montedoro, Editor

### ADVERTISING INQUIRIES

To advertise in The Record, or for information on publishing your corporate newsletter or sales literature, contact Rena Montedoro at 716-290-1925 or [rmontedoro@ntma.org](mailto:rmontedoro@ntma.org) for advertising and editorial content.

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## Upcoming NTMA National Events



**MFG Day**  
October 7

THE PRECISION MANUFACTURING CONFERENCE



**Manufacturing Engage 2022**  
Tuesday, October 25 – Friday, October 28  
Kansas City, MO



**Chapter Leadership Summit 2022**  
Date & Location TBD

## What's Your Story?

### Send Us Your Story

Each issue of The Record will feature stories from members – and we want to hear from you. Send us stories of success, or those that fit the theme of the month's issue. The submission deadline is the first of the month prior to publication.  
**Contact Rena Montedoro at [rmontedoro@ntma.org](mailto:rmontedoro@ntma.org)**

### Upcoming Themes for The Record

#### NOVEMBER

Workforce Development, Training, Grants... Attracting, Retaining and Developing Your Workforce

#### DECEMBER

The Year In Review



# PRESIDENT'S UPDATE

This month our focus is on “Automation and Robotics.... Where are you on the Journey?” However, I think the real question for manufacturers is “where are you at on the journey”, or rather, “your journey.”

Almost all of our members and shops have at least been contemplating, researching, or in many cases implementing robotics and automation. In a recent NTMA survey, of those responding 65% said they had not purchased any automation equipment in the first six months of this year and 58% say they do not plan to purchase any over the next six months. While those numbers surprise me somewhat, they could mean that many had already bought and implemented automation and robotics before this year. I do know that to be true for many shops. But, if this is not true for you, I would highly encourage you to start or progress in your journey.

While business may be good or very good for most members, and in a time where we all struggle to find skilled workers or even workers wanting to enter manufacturing, automation and robotics can be a part of that solution. We are now seeing companies able to run partial, if not completely lights out for their second shift all due to automation.

Having just attended IMTS 2022, my first comments would be WOW!!! Wow on how good it was for manufacturing to be back together, wow to the number

of attendees, wow to the exhibitors, and double wow to the technology on display. There was no doubt that there was a buzz in the air and that people had come with a purpose. Some to buy, some to research, and some to find the latest in technology. I do not think anyone went home disappointed. If you missed IMTS, you missed a big opportunity; however, if you were unable to attend, many of those exhibitors who exhibited new technology, automation, and robotics are industry partners to NTMA and many will be at our **ENGAGE 2022 in Kansas City October 25-28**. And you still have time to register, you do not want to miss this opportunity.

We live in interesting times in manufacturing. Just two short years ago we wondered if we would survive and yet today most are very busy with more work coming on the horizon. In our industry, one must have a short memory of both the good and the bad, and instead be ready for what's around the corner. How quick the global landscape has changed. Today we have unplanned wars, energy supply challenges, supply chain issues, global strife among super powers, and unsettled major economies. Despite these incredible challenges US Manufacturers seem to be the most stable of the lot and therefore whether directly or indirectly will be expected to carry the load. Which means us. The question then is, are we ready or getting ready?

Considering the ongoing need for skilled workers and new workers to enter the industry, the most obvious course of action does seem to be automation and robotics. Not that either always solves the whole problem, but they can solve part of the problem. So as the old saying goes; How do you eat an elephant? One bite at a time. The same holds true for automation and robotics. When looking at your operation, look for opportunities to solve one problem, one challenge, or one improved efficiency at a time. I might remind each of us that some of those opportunities for automation may be in the office, procurement, or engineering as well as the shop.

For those that are further down the journey, most started slow and deliberate. However, today they have multiplied those opportunities into increased output, increased efficiencies, increased revenue and increased profitability, many with the same number of employees. So as I close, the question remains; **Where are you on the Journey?**

Let us all remember that as an industry and as an association, “**There is Strength in Numbers...**”

Roger Atkins, President – NTMA



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# NEW MEMBER HIGHLIGHTS

## HELIOS PRECISION TECH St. Louis Chapter Member



Helios Precision Tech offers a wide range of manufacturing services with a focus on medical device components for the ophthalmic field. Founded in 2012 by Doug Parr, Helios was built upon a vision of creating a company that produces high quality products and exceptional customer service. We are proud that vision became possible by focusing on a culture where employees work together as a team to continuously drive corporate innovation. Based in St. Louis with over 23 years of manufacturing experience, Helios is strategically placed to serve companies across the US, and we are excited to announce the expansion of our services to meet demands across other medical divisions. With an open consulting approach, we ensure each product, from prototype to full scale production, meets and exceeds expectations to build long lasting partnerships.

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## HIBSHMAN SCREW MACHINE PRODUCTS, INC. Michiana Chapter Member



For 55 years, Hibshman Screw Machine Products has provided high-quality, custom precision machined parts and components for customers across the country in a wide range of industries including oil & gas, manufacturing, and Recreational Vehicles, as well as military parts and components for the US military. Since 2014, under the second generation leadership of Chad Vanderbeek, the company has grown 200% through the addition of many new customers and pieces of equipment, including CNC milling and swiss machining. Hibshman Screw Machine continues to seek growth opportunities with both new and existing customers.

69351 Union Road, Union, MI 49130  
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## JMC TOOL & MACHINE CO. Southern At Large Member



JMC Tool & Machine Co. is an ISO 9001:2015 and ISO 13485:2016 Certified leader in providing precision machined components and assemblies to a wide variety of industries including aerospace, medical, and industrial. JMC serves regional and global manufacturing companies with locations throughout the United States from its production facility in Sanford, North Carolina. JMC has created a first-class business structure to facilitate strong growth and superior product featuring extensive CNC milling, turning, swiss, machining capabilities, fabrication and welding, and manual and proto typing, high quality machine tools, turnkey solutions, a high caliber work force, and award-winning customer service. In 2019, JMC joined B-Square Precision Group.

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## TURBINEAERO ENGINES TECHNICS (TET) Arizona Chapter Member



TurbineAero Engines Technics (TET) has been manufacturing and repairing gas turbine components for over 45 years across multiple markets. Our customers are diverse and include Aerospace and Industrial Gas Turbine OEMs, OEM suppliers, Airlines, Military, Cargo, MRO shops and operators across multiple industries. TET is a subsidiary of TurbineAero, which includes an APU MRO shop in Chandler, and an APU MRO shop and component repair facility in Thailand. The component business is distributed around 4 segments: Component Repair, Component Manufacturing, Specialized Coatings and Special Processes. TET is an FAA, EASA, CAAC certified Repair Station offering overhaul, advanced repair development and production of Aerospace, Industrial Gas Turbine, and Aero-derivative components. With a long history of manufacturing complex geometry parts for multiple OEMs, TET manages the entire supply chain, from buying the raw material all the way to final product. This offers our customers a reduced cost, faster turnaround time and elimination of the complexity of managing multiple suppliers. TurbineAero also offers multiple specialized Coating solutions, including Metallic and Thermal Barrier Coatings, Low Pressure Plasma Spray and Abradable coatings.

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**LUX PRECISION MANUFACTURING**  
Arizona Chapter Member



LUX Precision Manufacturing is a Phoenix Company that manufactures components for Aerospace, Medical Device and Defense companies. LUX, the parent company of LUX Precision Manufacturing, was originally founded by Weston Smith as an electric longboard manufacturing company (LUX Longboards) in 2017 out of a dorm room at Grand Canyon University. This is where he was introduced to CNC machining. Four short years later, at the age of 25, Smith embarked upon launching a division of the company into a full fledged machine shop. LUX Precision Manufacturing is unique because the main workforce is comprised of college students from Grand Canyon University where the company's goal is to train and be "The new generation in manufacturing." LUX specializes in multi-axis milling, turning, laser engraving and much more!

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**WALERKO TOOL & ENGINEERING**  
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Walerko is the shop of choice for precision components that go into the biggest, fastest, and toughest machines on earth. We're experts in a wide range of industries, and our work covers the spectrum of medium to large turning and machining. We have 70+ years of expertise in aerospace, defense, earth moving, mining, pump housing and more, mastering materials as stainless/alloy/hardened steel, titanium, nickel, and bronze. Our process-driven approach is backed by a lineup of large CNC Boring Mills (max 78" vert x 118" horiz), Turning Lathes (max 43" dia x 80"), Vertical Machining, and full CMM capabilities. Located in the heart of manufacturing Midwest, Elkhart, Indiana, we are registered ISO 9001:2015 and Caterpillar MQ11006 certified. We are also well-versed in FAIR documentation. Our dedication to accuracy and compliance makes all the difference.

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## NEW NTMA TEAM MEMBER INTRODUCTIONS



**Shelley Zuber**  
Accounting Assistant

As our organization grows, the need for more support within our departments continues. With an educational background in accounting combined with over four years of experience, Shelley assists in our day-to-day operations, helping streamline our financial procedures. Alongside the Accounting Manager, Shelley's knowledge will continue to improve accounting efficiency and the overall NTMA budget.



**Marissa Murphy**  
Marketing Specialist

Marissa initially came to NTMA in July as a marketing intern and recently began her role as our Marketing Specialist. She attended Kent State University where she graduated with honors in Fashion Merchandising and Marketing. Marissa has been instrumental in keeping our in-house departments, partners, and members connected through marketing techniques she learned as an undergrad. Marissa is particularly interested in the power of social media marketing and how we can continue to pique the interest of younger audiences within the marketing industry.



**Amanda Wakeman Patton**  
Creative Content Manager

You may recognize Amanda as a familiar face, photographing various events as a contractor for NTMA over the past 8 years. Amanda has a strong professional background in marketing, particularly brand awareness and elevation. In her previous role, she was responsible for both management and creation of several private labels for one of the largest greenhouses in North America. With the support from the in-house Marketing Specialist, Amanda will be responsible for maintaining and improving our social media accounts, creating design assets for marketing materials, initiating organizational advertising campaigns, and more.

## BOSTON CENTERLESS ANNOUNCES OPENING OF SECOND MANUFACTURING PLANT IN INDIANA

Second Facility in Fort Wayne, IN Expands Reach and Ensures Quality for Customers in Midwest and Western United States



Boston Centerless, a supplier of precision ground bar materials for close tolerance CNC Swiss machining applications, announced the opening of a second manufacturing plant in Fort Wayne, Indiana. This latest expansion represents continued robust growth in key market segments in the Midwest and Western United States. The Fort Wayne facility increases manufacturing and distribution capacity substantially with over 16,000 additional square feet and state-of-the-art equipment.

---

“No matter where we go or what we do, the quality of our materials and services is never compromised”

---

A variety of raw materials is in stock at the Fort Wayne location, facilitating reduced lead times to customers in that part of the country. Precision grinding, straightening and bar end chamfering services are provided at the new plant. “Our Midwest and Western customers in the U.S. will now benefit from even shorter lead times,” says Laurent Cros, Chief

Commercial Officer of Boston Centerless.

“This investment in a substantial amount of increased capacity and an additional strategically located base of operations represents our commitment to continuously strengthening our supply chain services for our customers.”

The fast-growing team at the Fort Wayne facility has a Plant Manager and a full crew of certified grinder operators. Moreover, the Fort Wayne workforce was carefully trained by the skilled personnel at Boston Centerless’ headquarters in Massachusetts, to ensure that the world-class quality that Boston Centerless is known for is maintained at the new plant. The Fort Wayne plant carries the same certifications as the headquarters including ISO 9001, ISO 13485, and AS9100.

“No matter where we go or what we do, the quality of our materials and services is never compromised,” says David Mersereau, Chief Operations Officer of Boston Centerless. “We knew with our expansion to the second facility that maintaining Boston Centerless’ impeccable quality was priority number one. That’s why we took the time to fully train our new operators to achieve Boston Centerless’ level of expertise before producing customer orders.”

### **About Boston Centerless**

*Boston Centerless provides solutions that enhance its customers’ manufacturing processes. With over 60 years of experience, Boston Centerless is a leading manufacturer and distributor of precision raw materials and preparation services. Whether the end product being manufactured is a spinal implant, fuel injection valve seat, or fluid control component, Boston Centerless knows that ultra-precision is integral to the success of product performance. Boston Centerless is proud to serve customers all over the world in a variety of industries.*



Learn more at [www.BostonCenterless.com](http://www.BostonCenterless.com).

**Are you interested in joining a dynamic manufacturing team?** Boston Centerless is hiring for several open positions at our new Ft. Wayne facility!

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# BUCKEYE INDUSTRIAL SUPPLY MARKS 75 YEARS IN BUSINESS

Buckeye Industrial Supply Company (BIS), a Columbus-based industrial products distributor with a branch location in Cincinnati, is celebrating 75 years in business. “I am proud of reaching this milestone and look forward to recognizing the many people who have contributed to our good fortune,” says Rick Meizlish, president of BIS, which carries nearly 200 brands in more than a dozen product categories.

“Being a third-generation family business for three-quarters of a century is possible because we have continually invested in team members, treated our customers like family, and created strong relationships with our suppliers.”

To make sure everyone in the company has the knowledge, skills, and attitude to serve customers to the best of his or her ability, BIS provides in-house and outside training to the greatest extent possible. That commitment to helping team members reach their potential has resulted in a culture of collaboration in which everyone is always dedicated to the goal of providing customers with an exceptional experience every time they deal with someone at BIS.

By treating everyone as if he or she were a brother, sister, father, mother, uncle or aunt, the company has won a high degree of trust with its customers. That level of confidence has resulted in more sales over the long term with those customers, and with customers who do business with BIS based on the recommendations of loyal customers they know. In some instances, BIS has worked with customers for 25 or 30 years, or more. The length and quality of those relationships are a testament to the company’s high level of service, including responsiveness to customers’ needs and value proposition.

BIS provides measurable and demonstrable benefits to every customer by developing honest, personalized, cost-efficient solutions instead of taking a cookie-cutter approach that is common throughout the

industry. BIS’s belief that suppliers deserve to make a fair profit off the products BIS distributes for them has allowed the company to form exceptionally close ties with manufacturers. Those relationships often allow BIS to obtain favorable pricing that they pass along to customers.

The company began as a scrap materials dealer and, after about five years of operation, evolved into an industrial products distributor serving customers throughout the Midwest. Over the years, BIS has acquired other industrial distributors, including Ray Industrial Products, Inc. in Van Wert, OH, last year.



### About Buckeye Industrial Supply Company

*Buckeye Industrial Supply Company (BIS -- [www.bisbuckeye.com](http://www.bisbuckeye.com)) is a supplier of industrial products and supply chain solutions that help customers maximize productivity, improve efficiency, and add value to their operations. The company is a third-generation family-owned business that was established 75 years ago. BIS is headquartered in Columbus, OH, and has a branch location in Cincinnati. BIS’s two sister companies are Tru-Edge ([www.tru-edge.com](http://www.tru-edge.com)) and MetalCut ([www.metalcutservices.com](http://www.metalcutservices.com)).*

*Tru-Edge is a leading provider of made-to-print carbide tooling and of services that include regrinding, reconditioning, and coating. MetalCut restores indexable tooling to like-new condition. Those companies are based in St. Henry, OH, and Centerville, OH, near Dayton, respectively.*

**For more information, contact Rick Meizlish at 614.864.8400 or [rick@bisbuckeye.com](mailto:rick@bisbuckeye.com)**



Buckeye Industrial Supply (BIS), a Columbus, OH-based industrial products distributor with a location in Cincinnati, is celebrating its Golden Anniversary this year. BIS is a third-generation family-owned business that began as a scrap materials dealer.



Buckeye Industrial Supply (BIS) is a Columbus, OH-based industrial products distributor with a location in Cincinnati. BIS is a third-generation family-owned business that was established 75 years ago and provides indexable cutting tools, coolants, abrasives, and wide range of MRO supplies.



Images from Buckeye Industrial Supply’s proud past as the company celebrates its 75th anniversary this year.



Images from Buckeye Industrial Supply’s proud past as the company celebrates its 75th anniversary this year.



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# C&M PRECISION TECH EARNS ISO 13485 CERTIFICATION TO WORK WITH MEDICAL DEVICE MANUFACTURERS



Dan Villemaire is President of C&M Precision Tech.

C&M Precision Tech, a manufacturer of precision engineered and manufactured components and assemblies, is now ISO 13485:2016-certified.

This qualification demonstrates C&M's

ability to provide medical device manufacturers with precision parts and assemblies by meeting standards that go beyond the ISO 9001 requirements and other quality standards that most manufacturers meet.

“Our ISO 13485 certification makes us a partner for complete medical machining and assembly solutions. It is the result of our team members’ hard work and dedication to the products’ end users,” says Dan Villemaire, C&M’s President. “This certification is one of the highest standards to meet and the most difficult to attain. As a company that serves

customers in the defense and optics industries who have stringent quality requirements, this certification is a logical extension of our business that can help medical device manufacturers as the U.S. looks to localize its supply chain.”

**C&M’s ISO 13485 certification is complemented by the company’s investments in:**

1. C&M Team member development (training and promoting from within)
2. A cleanroom that meets Class 8 standards
3. State of the art machinery, equipment & capabilities

A key reason Villemaire believes the company has been able to adapt to customers’ needs and technological changes over the past four decades is that everyone at C&M lives the company’s 5C Values every day. Those principles are Customer Focus, Can-Do Attitude, Collaboration, Continuous Improvement, and Community.



C&M’s cleanroom meets Class 8 standards.



C&M’s cleanroom meets Class 8 standards.



**About C&M Precision Tech**

C&M Precision Tech is a manufacturer of precision engineered and manufactured components and assemblies. C&M is equipped with a wide range of high-tech, multi-axis machinery that has an array of quality- and productivity-enhancing features. C&M has the experience and strategic capabilities to move up in customers’ value streams to alleviate pain points and allow them to focus on product development.

The company holds ISO 13485 certification (quality management for medical device manufacturing), AS 9100D/ISO 9001 certification (quality management for aerospace/defense products manufacturing), ISO 9001:2015 certification (general quality management) and is also compliant with NIST-800-171 standards for best practices in cybersecurity. C&M is a veteran-

and family-owned company based in Hudson, NH, and has been in business for more than 40 years. During that time, the company has manufactured more than 350 million parts and assemblies for applications in the aerospace, defense, flow control, industrial, medical, optics, and semiconductor sectors.



**For more information:** contact Dan Villemaire at [dv@cmprecisiontech.com](mailto:dv@cmprecisiontech.com) or 603.889.1330 or <https://www.cmprecisiontech.com/> and read the blog post.

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## NEW ACU-RITE METROLOGY DRO INTRODUCED – MEET “THE Q”

By: Tami Adams, NWPA Chapter, NTMA

The new metrology-focused digital readout by ACU-RITE was introduced in the HEIDENHAIN booth this past month at the IMTS Show in Chicago. The new ACU-RITE-brand DRO203Q known as “the Q” utilizes the power of the established ACU-RITE DRO203 hardware to integrate geometric metrology functions from the past iconic QUADRA-CHEK series.

Users of optical comparators and measuring microscopes and more will find this of particular interest as it meets the need for basic 2D metrology functions. The Q functions as an entry-level readout, providing the user with geometric feature construction, basic part view detail and data output via USB-C connection. This enables users to quickly gather the needed points, construct desired features, and export them easily over a modern interface.

The ACU-RITE DRO203Q is plug-and-play, walking the user through initial set up parameters and display options on first power-up.



### About HEIDENHAIN

*DR. JOHANNES HEIDENHAIN GmbH, headquartered in Traunreut, Germany, develops and produces linear encoders, angle encoders, rotary encoders, and CNC controls as well as software solutions for the Digital Shop Floor. More than 8,600 employees worldwide are working on products that often lay the groundwork for technological advances in the most innovative global industries, including semiconductors, electronics, machine tools, and production equipment automation. The North American subsidiary is HEIDENHAIN CORPORATION, headquartered in Schaumburg, IL, and San Jose, CA.*

*ACU-RITE is a brand of HEIDENHAIN consisting of digital readouts, linear scales and controls. ACU-RITE DROs and controls are manufactured in the U.S. [www.acu-rite.com](http://www.acu-rite.com)*

## HEIDENHAIN

Learn more: [www.heidenhain.us/about-us](http://www.heidenhain.us/about-us)

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## NTMA'S PITTSBURGH CHAPTER BOTS IQ PROVIDES YOUTH WORKFORCE DEVELOPMENT

According to a recent study by Deloitte and the Manufacturing Institute, manufacturers need to fill 4.6 million jobs by 2030. More than 2 million of these jobs could remain unfilled due to lack of advanced technology skills, misconceptions about manufacturing jobs, and the retirement of baby boomers. That's where BotsIQ comes in--providing industry-quality technical training and hands-on, project-based learning experiences that encourage students to consider manufacturing as a viable career option. Last year, 80% of BotsIQ students expressed interest in or plans to explore a STEM or manufacturing career, and 94% reported learning at least one technical skill such as machining, welding, electrical engineering, mechanical engineering, or Computer-Aided Design.

BotsIQ is a youth workforce development program of the Pittsburgh Chapter National Tooling & Machining Association (NTMA) that was created by manufacturers to solve its biggest issue: recruiting

a skilled workforce. For over 17 years, BotsIQ has remained focused on the importance of engaging the next generation of manufacturing and STEM leaders while successfully preparing them with the technical skills needed to fill gaps in the current and future labor market. Today, BotsIQ is the Pittsburgh Chapter NTMA's most visible program. As youth prepare for their future, they face a new world of work that requires advanced skills and technical knowledge. According to Jobs for the Future, advancements such as robotics, artificial intelligence, and automation are expected to eliminate many entry-level jobs that serve as on-ramps to careers for underrepresented people, especially youth.

In a time when manufacturers are challenged to find skilled workers to meet their workforce needs, high-quality education and training programs like BotsIQ are necessary to provide youth with a supportive system to explore manufacturing career opportunities and build in-demand skills.



The pre-apprenticeship is divided into six skills-based competencies: safety, math and measurement, manufacturing, electronics, robotics, and career readiness. It utilizes Tooling U-SME's online training platform to deliver the curriculum's knowledge portion and includes experiential learning opportunities through hands-on activities and project-based learning led by high school teachers, post-secondary instructors, and industry professionals. Additional career-related opportunities such as company and post-secondary tours, career interviews, job shadowing experiences, internships, and employment are available for all students.

### Would you like to learn more?

Please contact Chapter Leader Michel Conklin at [conklin@botsiqpa.com](mailto:conklin@botsiqpa.com)



# FASTEMS INTEGRATES AGVS AND AMRS FOR VARIOUS CNC AUTOMATION APPLICATIONS WHILE ADDING EXTRA VALUE WITH INTELLIGENT CONTROL

Within the past few years the number of Fastems' CNC automation solutions utilizing automated guided vehicles (AGV) or autonomous mobile robots (AMR) has multiplied, and the demand keeps rising. Most typical AGV applications include material intralogistics, delivering tools to machines, and moving machining pallets between production process phases. The common goal of all the AGV projects is timely, safe, and economical transfers of production items and Fastems is actively developing ways to utilize these technologies efficiently with CNC automation.

"Today, the majority of our customer industries are using AGVs or AMRs in some way. Whether in aerospace, defense, machine building, medical or subcontracting, there are automated vehicles in many production shops", said Mika Laitinen, Solution Sales Director at Fastems. "When it comes to CNC automation and AGVs or AMRs, they can be of great help in reducing manual transfers and forklift operations, reducing buffer sizes, increasing the automation level, and making production flow more predictable and reproducible."

Fastems' Manufacturing Management Software (MMS) brings higher intelligence for AGV use by overseeing all production orders and resources and scheduling every piece of this complex puzzle for timely customer deliveries. In practice, MMS schedules production based on customer orders and available production resources such as machine tools, cutting tools and raw materials then prompts the AGV's fleet management software to perform the right transfers at the right time.

"We can ensure that all the AGV transfers are done just-in-time," says Laitinen. "The benefits include reduced buffer storage sizes between process phases, and employees being able to prepare the right production resources in advance to reduce machine waiting times. And, when the unexpected happens such as a tool goes missing, an urgent customer order comes in, or a machine breaks, MMS adjusts the

production – including the AGV movement – so that the most urgent jobs still get done in time and all the needed resources are in place when needed." In addition to customer deliveries, Fastems has multiple R&D projects in progress to understand and find the most productive and economical ways of AGV and AMR use in CNC automation.

The scope of research involves not only current customer applications but also looks further beyond. With interfaces already created for several AGV fleet management software programs, and a dedicated in-house interfacing team, Fastems can integrate any AGV brand of the customer's choice.

**To read more about this and view examples of AGV implementations, visit <https://www.fastems.com/agvs-with-cnc-automation>. For more information, visit [www.fastems.com](http://www.fastems.com), or call toll-free 866-702-0611.**



## About Fastems

*Fastems supplies intelligent automation and digitalization solutions for high-mix-low-volume CNC manufacturing. We are an open integrator and a family-owned business with 40 years of automation experience, over 4,500 installations and main markets in Europe, North America, and Asia. Our mission is to help metalworking manufacturers improve their productivity and profitability. Fastems' main application fields are pallet and robotic automation – always equipped with our industry-leading production planning and execution software MMS. We also have solutions for automating the production and resource planning of stand-alone machine tools. We support our systems with a wide range of services. Read more at [fastems.com](http://fastems.com).*

## ONE VOICE: FEDERAL GOVERNMENT ADVOCACY PROGRAM

As US manufacturing continues to navigate the unique challenges and changes brought on by the last year – and a change in administrations – it remains important to have a partner in advocacy. NTMA helps provide this support by working closely with the team at One Voice: the combined federal government advocacy program representing small-and-medium-sized business manufacturing in the US.

With regulations, policy, and shop safety all constantly evolving, One Voice has a wealth of fantastic resources, developed to help keep your shop informed and prepared for whatever comes next. In addition to ongoing COVID-19 response information – in line with any and all changes that our industry may need to know – the team at One Voice also provides informative policy webinars, news releases, educational materials, video recaps, and much more. Don't forget about the Talking With One Voice podcast – every episode, the One Voice advocacy team breaks down how the latest news from Washington impacts manufacturing businesses across the country.

It's yet another way your shop can get quick, concise information on everything from tax development to loans and even workforce development issues. You can send in your key questions to be answered by emailing [onevoice@policyres.com](mailto:onevoice@policyres.com). We hope you continue to utilize this key partner in One Voice – one that ensures that millions of manufacturers across the country have their voices heard.

**Please visit [www.metalworkingadvocate.org](http://www.metalworkingadvocate.org) for more information.**

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## GRINDERS AND SMOOTHIES INSPIRE GEN Z STUDENTS



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**Organized. Fun. Lit. Generous. Sleek.** These are some of the words students and teachers used to describe United Grinding's open house tour of its high-tech industrial facility in Miamisburg, Ohio. It might just be the playbook for other manufacturers to use when they host engaging and meaningful events for students.

AMT member and IMTS exhibitor United Grinding hosted nearly 200 high school students and their teachers, taking them on a tour with a dozen stations to hear employees from various departments – logistics and shipping, service engineering, customer care, sales, marketing, IT, and human resources – share the skills they use, describe their careers, and answer questions.

The tour ended in United Grinding's showroom, where students measured and peered into some of the firm's high-tech grinding machines. The young visitor faces really lit up when they were offered an assortment of freshly made fruit smoothies.

"We have a huge, collective responsibility to educate, inform, and engage the next generation of workers

in our industry," says Markus Stolmar, president and CEO, United Grinding North America. "That's why we hosted a MFG Day and engage partners in the community, such as the Dayton Region Manufacturers Association, Montgomery County Educational Services Center, schools at the local and regional level, and working on a national – even global – level with partners like AMT to make sure the future of our industry is bright."

Dayton Region Manufacturers Association (DRMA) and the Montgomery County Educational Services Center helped connect the schools with United Grinding.

"We were excited to work with DRMA member United Grinding to launch MFG Day Spring Edition to grow the manufacturing workforce pipeline," says Angelia Erbaugh, DRMA president. "Almost 200 high school students attended to see the vast array of careers in contemporary manufacturing – from high-skill technical positions, like precision machining and industrial engineering, to 'front office' positions in accounting and sales." (United Grinding hosted the event last spring knowing much of its machines and displays would not be unpacked from IMTS 2022 in time for an early October MFG Day.)

"Many employees had been all over the world using innovative problem-solving skills! What came into focus even more was the opportunities a company like United Grinding provides: a super clean, safe, beautiful environment with the opportunity to travel and develop in-demand skills while making great money. It doesn't get any better than that!" says Yvonne Kaszubowski, workforce development coordinator for Warren County Career Center which operates an Advanced Manufacturing and Robotics Program.

"It's really cool to think about how the parts of a plane I've flown or will fly have been made on machines like the ones here," says one Dayton-area high school girl who is also enrolled in an Air Force JROTC and Advanced Manufacturing and Machining program.

### AMT Smartforce

*Looking for resources and activities as a jumping off point to engage students with experiences centered around the manufacturing technology classroom of the future? Visit [IMTS.com/Smartforce](https://www.imts.com/Smartforce).*

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## NOT YOUR FATHER'S SUMMER CAMP

By Molly West, Pittsburgh Chapter NTMA

Summer camp isn't just campfire songs and popsicle stick crafts anymore. Southwestern PA BotsIQ, a program of the Pittsburgh Chapter NTMA, designed and hosted several innovative programs for students across the region.

The goal: to teach young people high-tech manufacturing skills that are not only fun, but also open a whole new realm of possibility when they dream beyond summer and into the future.

These regional camps introduced students to the in-demand skills of robotics and advanced manufacturing and demonstrated how those skills translate into fulfilling and financially rewarding careers. The BotsIQ Robotics Camp, held at locations in Bellvue and Homestead, PA, brought 32 seventh, eighth and ninth graders together to design, assemble and code their own mini-vehicles. They used Micro:bit,

3D printing and laser cutting technologies. JoAnna Dehler, BotsIQ youth services manager, was one of the leads for this summer program. "It was really great to see their brains totally take off with the coding. From day one to day four-- total change. We were using Micro:bit, then MakeCode. Right away they started digging through the coding gallery. They were super creative in how they were manipulating the code to satisfy what we were asking in a totally different way," Dehler said. In fact, according to Dehler, some of the kids built their own attachments to develop a front plate on their vehicles to hold an iPhone, creating their own GoPro-style device.

Oula Abdul Ghani, BotsIQ teaching fellow, was instrumental in designing the program. "We create hands-on activities based on the demands of the industry. Our activities help students acquire new career related skills in fun interactive methods."

Across the region in Westmoreland County, the BotsIQ team utilized the Westmoreland – Advanced Technology Center to host the same age group at

Engineering Camp. This time, the students tackled VEX robots. They honed their critical thinking skills by designing, assembling and battling the bots. Campers learned to write code long-hand, how to operate a CNC mill and the ins and outs of additive manufacturing. The BotsIQ team watched the students improve their trouble-shooting skills as they identified what they wanted their robots to do and how to get there. Campers across all three locations had the opportunity to see the skills they were learning applied in a real-world environment. Based on their camp location, students toured one of three companies: Aethon, Intervals or Penn State Tool and Die Corporation. South of Pittsburgh in Uniontown, PA, fourth, fifth and sixth graders attended BotsIQ 3D Printing Camp. This group conceptualized and designed their own games—then 3D printed pieces and cut their own game board.

Through the generosity of the Arconic Foundation and Chevron Corporation, all of these camps were offered free of charge.

## PRECISION PROFILES, LLC SUPPORTS CONSTRUCTION OF NEW USS ENTERPRISE AIRCRAFT CARRIER

On Saturday, August 27, when the ceremonial keel is laid on the U.S. Navy nuclear-powered aircraft carrier, Enterprise (CVN 80), in Newport News, Virginia, members of Precision Profiles will be watching the formal start of a ship's construction with pride knowing they are part of the industrial base that constructs the most advanced warships in the world.

Precision Profiles, LLC ("Precision Profiles") in Titusville, PA is one of more than 2,000 supply-chain companies in 45 states delivering products and services to build and maintain the U.S. Navy aircraft carrier fleet, which are built at HII's Newport News Shipbuilding division in Virginia. In total, between the shipyard and the related supply-chain, the industrial base is comprised of more than 92,000 essential workers who design, weld, build, and maintain the components that go on these cutting-edge warships.

Once built, the Enterprise is scheduled to serve the United States for 50 years. Gerald R. Ford-class aircraft carriers feature a redesigned island, electromagnetic catapults, and improved weapons movement. These next generation carriers are designed to be the centerpiece of the Navy's deployed battle force – defending freedom, preserving economic prosperity, and keeping the seas open and free.

"Some of the parts from our manufacturing facility will spend 50 years sailing with America's bravest men and women. The men and women of Precision Profiles take pride in helping to build ships of this magnitude, with a focus on delivering our parts on time and free of defects—for the taxpayer and Navy—even in the face of headwinds," said Matthew J. Lucco, President & CEO of Precision Profiles. "The contract for these components has had a substantial impact on our business, especially during the headwinds of the past few years. The multi-ship contract of CVN 80 & 81 provided stability to our employees and enabled us to invest in additional equipment for this and future carriers."

In January 2019, the U.S. Navy signed a two-ship buy contract for two Ford-class carriers, the Enterprise (CVN-80) and Doris Miller (CVN 81), which is the most efficient and affordable way to build carriers and ensure workforce and industrial base stability. This "two ship buy" helped the industrial base weather the storm of the past few years, enabling companies across the nation to save jobs, retain and hire skilled workers, and inject stability and local investment into the supply chain. This prudent procurement decision in 2019 helped preserve the workforce entrusted to design and build ships that evolve with our nation's

national security strategy. Proving multi-ship buys are good for the nation, Navy, industrial base, and taxpayer.



### **About Precision Profiles, LLC:**

*Precision Profiles, LLC is a custom manufacturer that has been producing high precision metal components for over 25 years. The Company specializes in producing tight-tolerance turbine components for OEMs and other companies within the power generation industry. Our value proposition is simple: we deliver high-precision OEM turbine components at a lower cost than our competitors – and with shorter lead times. This reduces the overall cost incurred by our customers for turbine builds/repairs and increases their production capacity. In addition to manufacturing steam turbine components, Precision Profiles offers a full suite of machining services, including: multi-axis CNC milling & machining, turning, saw cutting, wire EDM services, trepanning, boring, and honing. We are a locally owned and operated company COMMITTED TO delivering high-quality, high-precision products to our customers, on time and free of defects. For more information, visit: [www.precisionprofilesllc.com](http://www.precisionprofilesllc.com)*

## IN MEMORIAM – Phil R. Marsilius

Philip R. Marsilius, 100 years of age, passed away peacefully on September 1, 2022 at home in the Black Rock area of Bridgeport, CT where he had resided near the shore for the past 20 years with his second wife, Phyllis Gustafson Marsilius. The son of the late Helen Hansen Marsilius and Newman M. Marsilius, he lived in Bridgeport and later in Trumbull during his early years.

Philip graduated as president of his class at Harding High School and attended Norwich University in Northfield, VT, the nation's oldest private military college. President of his class at Norwich, as well as valedictorian, he was a member of Theta Chi Fraternity and chapter president. The class of 1943 graduated three months early to allow the cadets to enter WWII.

As a lieutenant with the 106th Cavalry in armored reconnaissance, he commanded six tanks on the front lines and behind enemy lines, moving through France and Germany and into Austria. At war's end, Captain Marsilius was decorated with: four Campaign Stars, Bronze Star and Purple Heart, both with Oak Leaf Clusters; Belgian Croix de Guerre with Palm, Chevallier to the Order of the Crown with Palm and a unit citation French Croix de Guerre with Palm.

Returning from Europe, Philip completed a masters degree in Engineering and Industrial Management at MIT. He married Esther Louise Harvey of Montpelier, VT, and they later settled in Fairfield, CT with their sons, Richard A. Marsilius and Norman R. Marsilius, Philip's entire career was with the family-owned Product Machine

Company founded by his father. Headquartered in Bridgeport, the company produced precision machine tools and tooling components used in a wide range of manufacturing operations, including automotive and aerospace. Under the management of Philip and his older brother, Newman M. Marsilius, Jr., the company expanded. Philip was instrumental in developing new facilities in New York, Michigan and in Canada, as well as national and international sales networks. Mr. Marsilius was 1958 NTMA National Chairman, NTMA Chairman and NTMA's oldest living chairman.



# CARR LANE MANUFACTURING CELEBRATING 70 YEARS IN BUSINESS



Colin Frost, President - Carr Lane Manufacturing

At Carr Lane Mfg., we are celebrating 70 years of business this year. During our 70 years, we have invested time innovating and adapting to change. Integrating automation and robotics into our facilities was the next step for us to continue to provide our customers with the

best products. Recently we saw an opportunity to launch an automated robot in our manufacturing facility. This project goal was to improve our production rate for two product lines while also continuing to keep production costs low while material costs are rising.

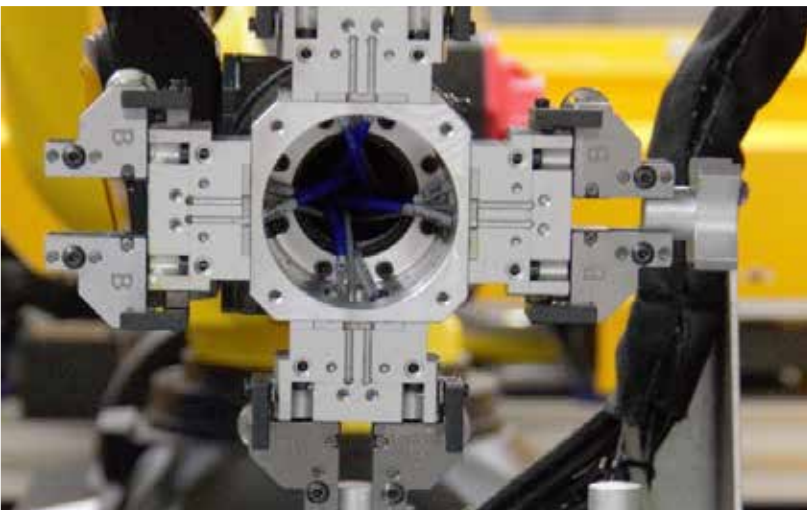
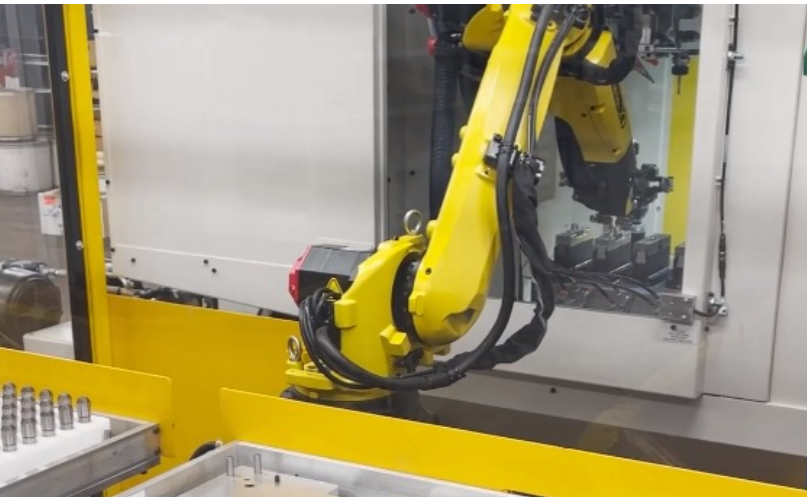
As we began to redesign our Extruded Hand Knobs, we saw an opportunity to improve our process for machining using automation. We saw a need to buy a FANUC Industrial Robot to improve our high-value, low-mix volume products.

Having an opportunity to redesign a product to fit the robot machining cycle better prepared our teams for deploying these systems. Using a robot in our manufacturing process enables us to machine more than one product line at a time, improving customer lead times.

Our machinists can run multiple machines with automated robots in use. As an American manufacturer, we must find ways to lower our costs to keep our prices competitive with international tooling companies. Using automated robots enables us to use each employee fully in the machining process. With a worker shortage in recent years, buying a robot has been pivotal to our production, aiding us in unattended machining.

As we continue to increase our automated solutions, next we are planning to add a collaborative robot, better known as a cobot, welding solution to our manufacturing facility. Improving our repeated machining tasks will greatly help with this cobot as we look to improve future manufacturing projects.

**Learn more at [www.carrlane.com](http://www.carrlane.com)**



# DISPELLING 4 BASIC MYTHS OF INDUSTRIAL AUTOMATION



Bruce Courtney, Tessa Automation, Managing Director.

## #1 NO MORE HUMANS

When robots were first introduced into American factories, there was understandable fear machine shops would be taken over by robots and factories would be overrun by automation making humans obsolete. As it turns out, things were never that dire and in the early days of robotics and humans are not going anywhere. However, we are still seeing many changes in industrial automation as Industry 4.0 emerges as a new manufacturing-data-automation hybrid philosophy. Of course, there are plenty of myths surrounding industrial automation and its effect on American manufacturing. Let's dispel a few of them.

## #2 AUTOMATION MEANS WORKERS WILL LOSE THEIR JOBS

We all heard the news this summer that robots are expected to take up to 20 million global manufacturing jobs by 2030, and that many of these replacements will happen in developing countries. Meanwhile, other experts predict 2.5 million U.S. manufacturing jobs will go unfilled. Can both of those predictions be true? If anything, automation will help more people keep their jobs, as decision-makers retain and retrain their current workforce. Companies that don't adapt to new technology and ideas, including automation, will only fall further

behind until they are forced to close. But yes, there will be people who lose their low-skill, low-wage jobs.

That said, automation is actually creating more high-skill, high-paying jobs. Workers who are trained on this new equipment are in increasing demand, commanding higher salaries and better job security.

## #3 INDUSTRIAL AUTOMATION IS TOO EXPENSIVE

Sure, replacing humans with machines is going to be expensive. But do you know what will be more expensive? Losing sales and contracts to companies that invested in industrial automation early on and have been taking advantage of increased productivity, with lower waste and production costs. Those companies will far surpass the factories that are still operating with 20th-century equipment and a 20th-century mindset. Plus, any industrial automation investment will likely have a positive ROI. New machines have a fixed cost, and if they can help you make financial improvements in other ways — lower labor costs, lower waste and rejects, increased productivity — those improvements can eventually pay for the new machines; everything you make after that will be pure profit. You'll rarely see that kind of ROI with an all-human workforce operating outdated machines.

## #4 ROBOTS CAN DO EVERYTHING

No, they can't. In fact, there are a whole slew of processes and procedures that humans can do better than robots, including manual dexterity, vision and comprehension, and language processing. Computers can do amazing things, however, they still have to be programmed properly to function as intended, and (for the moment) they don't have the same manual dexterity as a human hand.

While automation may seem like a magic bullet, manufacturing still needs people. Machines cannot repair and maintain themselves without programmers, designers, and other high-skilled people to keep them running. At the end of the day, technology will continue to evolve, but manufacturing will always require the human touch.

## ABOUT THE AUTHOR

**BRUCE COURTNEY** - Bruce Courtney is Tessa Automation's Managing Director. Tessa Automation specializes in designing, building, and integrating assembly automation solutions. For more information, please visit their website at [tessautomation.com](https://tessautomation.com).



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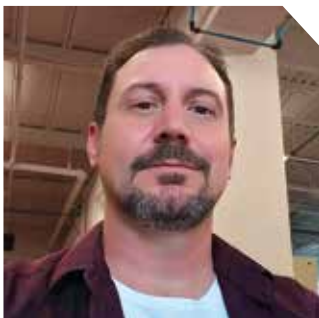


# Robotics And Automation... Where Are You On The Journey?

By: Adam Dunn, Acutec Precision



Post-pandemic for the manufacturing industry almost seems apocalyptic. The days of mass recruitment and lines out the door for applications are a thing of the past.



Adam Dunn, Acutec Precision

Owners of manufacturing facilities have been faced with some difficult options. As manufacturing begins to take the upward trend on recovery, how do they continue to take on new business with limited capacity? How do

they continue to strive for on-time delivery with machines sitting idle due to manpower issues? If downsizing a company to match its volume vs. labor is not an option, what options are there

for the owner of a world class aerospace manufacturer?

For Acutec Precision Aerospace, the answer was simple. Automate. To protect our current work force, we were tasked with finding innovative ways to free up labor. However, there were a couple of issues: We had no automation department, the company had no experience with automation or robotics, and there were a lot of mixed opinions on where to start.

So, how did our journey begin? In September of 2021, the management team decided to purchase a new collaborative robot from Fanuc, which was the CRX 10iA/L (aka, robot in a box). Since I came from extensive experience with automation and robotics, I was chosen as the lead for the new Automation department. My background was mostly building machines and automated workcells for outside companies. These projects were completed with specialized teams of engineers, electrical gurus, mechanical designers, and full support from our vendor base.

Now, here I am, with a robot in a cardboard box, no experienced employees to lean on, and no real support for integrating into a pre-ethernet CNC machine. My first task was to install/integrate this new robot into 2 Mazak lathe centers and utilize the robot to run both lathes simultaneously. I could easily write 10 pages of lessons learned and cause/effect

of failures along the way, but the best way to explain our journey is to breakdown the process.

**BUILD A TEAM.** The worse thing that you can do is pull 40 people into a room and ask what/how to accomplish the job of installing this first robot. Trust me, I know this from experience. It is best to look at the items needed for integration and find one team member that can assist in that specific part of the project. For me, I chose the maintenance manager for the electrical interface end of the machine, and the team leader of the cell for the machining end.

## DO NOT UNDERESTIMATE

**INTEGRATION.** There are minimal plug and play options in most pre-2010 machining centers. The first thing you want to do is understand your robot I/O, and understand what signals are available on the machine side. Think about what is needed for the cell to operate and flow correctly. Keep these 3 simple conditions in mind: I need to know when the machine is running, I need to know when the machine is idle, and I need to know when the machine has a fault. These 3 items need to be established through I/O for the robot to be programmed properly. The other items (door open, part inspection... etc.) can be completed through peripheral devices (some type of external I/O).

## THINK ABOUT WHAT THE OPERATOR DOES DURING THE PROCESS THAT IS REACTIVE.

Being that the robot does not have the ability to see, feel or think... we must program its intelligence. A machine operator can see issues, hear problems, and make decisions based on what their brain tells them. Our wonderful CRX 10iA/L is only able to do the functions that are programmed. Make sure you spend plenty of time out at the machine center before the robot is installed, and while the operation is still a manual process. Document every move that the operator takes to complete that operation.

## BE PROACTIVE ON THE MACHINING SIDE TO MITIGATE CHIPS AND MINIMIZE POST PROCESSING OPERATIONS.

One of the hardest items to



tackle on integration is how to handle chips and/or foreign debris. In an operator driven process, they can use a blow off to help remove chips, but for the robot to accomplish this, the chips need to be in a constant area (or eliminated). Make sure the cutting programs are refined prior to installing the robot, and use every method needed to mitigate debris before you expect the robot to run “lights out”. Do not be afraid to think out of the box.

### SET UP A TRIAL AREA TO SIMULATE THE PROCESS PRIOR TO INSTALLING.

There is nothing worse than putting a robot in place, and then taking 2 months to work out the bugs. We did this, and it was certainly no fun. Since then, I have learned to mockup the work cell and have everything roughed out and simulated prior to tying up a cell. With the modern-day programming methods, the entire system can be running in a simulated environment before it is placed at a machine for production use.

### END OF ARM STRATEGY IS CRITICAL.

Pick your EAOT’s wisely. They are costly, and non-returnable. Make sure you know enough about the process and part handling to choose an end of arm tool that works with (and aids) the process. Our project requires us to place a solid billet into a lathe chuck. At a quick glance, it appeared that a 3-jaw gripper would be the best solution. Easy, right? Round part...and a gripper made for picking up round parts. However, since we did no mockup or pre-testing from the machining end, we did not have enough knowledge of what the final process would look like. By the time we tweaked the operation to be “robot friendly”, it was discovered that a 2-jaw gripper would be much more efficient. That was a \$5,000 mistake.

**DO NOT EXPECT SUCCESS.** Success does not come quickly, and it follows failure. Once you establish the process stated above, you can begin to get small wins. Every automation project is unique, and each project has an equally unique solution.

As of writing this (Sept 2022), Acutec Precision Aerospace has purchased 8 robots. 7 Fanuc collaboratives, and 1 Fanuc industrial. We have installed/integrated 5 robots in less than 8 months. Our goal is to have all 8 installed a running by the end of 2022. During this journey I have learned some very valuable lessons, but the best lesson I learned..... you must have a solid team of people who are willing to struggle and fail. Once you get through the struggle and fail, you begin to see the long-term success.



**Company:** Acutec Precision Aerospace, Meadville PA

Adam Dunn has 23 years of experience in robotics, automated design, and electrical engineering. Adam is currently the automation engineer for Acutec Precision Aerospace in Meadville PA.

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# MACHINE TENDING AUTOMATION WORKBOOK. 10 QUESTIONS TO ASK WHEN CONSIDERING A MACHINE TENDING COBOT

By: John Tuohy, National Account Manager Machine Tool Authorized Systems Integrator Network for FANUC America

With the global robotics market now predicted to reach \$150 Billion by 2030, more businesses in many different industries are seeing the benefits of adding automation to their operations. Traditionally, however, smaller machine shops have been reluctant to make an initial investment in robotics – until cobots. Major production disruptions in the aftermath of the pandemic paired with the growing availability and affordability of flexible collaborative robotics have spurred a growing interest in this type of automation, especially for high-mix, low-volume applications.

To help create a successful roadmap to automation, answering the following 10 questions can help clarify whether adding cobots could be the right solution.



John Tuohy, National Account Manager, FANUC America

## #1 WHAT ARE YOU TRYING TO DO?

Consider first your business challenges and answer the following questions to see if a cobot could help solve these problems. Think about the machine tending application you'd like to automate. For example, would you like to automate loading and unloading of parts to free up people and resources? If so, cobots could be the answer to your automation efforts.

# \$150 Billion By 2030

GLOBAL ROBOTICS MARKET

**#2 IS YOUR WORKSPACE COBOT FRIENDLY?**

This might seem like a simple question, but the answer to this question is key to whether adding a cobot will be a straightforward process. For example, cobots work best in very structured and predictable workspaces, so consider whether parts will be able to be picked up exactly in the same spot or not by the cobot. Also, is the area free of clutter and obstacles? That is crucial to easily deploying cobots!

**#3 DO YOU HAVE A TIGHT OPERATIONAL AREA OR OTHER SMALL FOOTPRINT RESTRICTIONS?**

If you are working in a smaller space, as long as it adheres to the guidance laid out in #2, cobots can be an excellent candidate for these types of environments. With traditional industrial robots, the need for fencing became a no-go for many smaller shops. Of course, a proper risk assessment must be conducted, but cobots can usually operate alongside skilled workers in a shared workspace.

**#4 DO YOU HAVE JOB RECRUITMENT CHALLENGES?**

Workers of all types, skilled and unskilled, are becoming harder to come by. We've all heard that millions of manufacturing jobs could go unfilled by the next decade due to the skilled labor gap, so planning for the future to reduce your need to recruit, hire, train and retain workers for the long haul might be the safest bet to ensuring your growth plans stay on track.

**#5 DO YOU NEED TO ADD HOURS WITHOUT ADDING STAFF?**

Pursuing new business sounds ideal, but often aggressive bidding is pulled back because manufacturers aren't confident their operations can rise to the task. Cobots can help ensure large orders are met and even help catch up on work to get in front of big jobs. Plus, cobots can help fill contingency plans for workers unexpectedly missing time or on leave.

**#6 HOW MUCH DO YOU NEED TO LIFT?**

The amount of weight the arm can lift, including the weight of the gripper as well as total part weight before machining is the "payload." This is important to calculate so that the cycle time of total machining can be determined. The more the payload, the slower the arm might need to move, affecting the overall production throughput time. However, newer cobots on the market like FANUC's new CR-35iB collaborative robot has a 35kg payload.

**#7 HOW FAR DO YOU NEED TO REACH?**

Understanding how far a cobot's arm needs to extend will dictate the proximity of the cobot to the CNC machine. Also, understanding how the cobot will be loading or unloading a part into a machine, as discussed in #2 and #3, will help determine the axes of motion required. The more complicated this is, the more dexterous the cobot will need to be. However, reach capabilities of cobots are expanding in new models, such as FANUC's new CR-35iB collaborative robot, which has a 1831mm reach.

**#8 WHAT TYPE OF PARTS NEED TO BE GRIPPED?**

Using varying grippers for different applications is possible, but time consuming to change out. Consider choosing a gripper that can adapt to pick up different sizes, shapes and types of materials. Rectangular or cylindrical prismatic parts that have two parallel sides are perfect for a pincer-style gripper, while vacuum suction cups are suited for thin or flat items.

**#9 HOW ARE YOUR WORKFORCE'S PROGRAMMING CAPABILITIES?**

One factor that commonly deters shops from adding automation is the lack of robotics programming expertise. However, cobots are addressing this skills gap issue by allowing robot interaction via a drag-and-drop interface.

This way, operators "teach" the arm by physically moving it through each step. Also, if you have well-versed G-code programmers in your shop, consider adding a control feature like FANUC's QSSR G-code to help. This allows the robotic motion to be controlled in machine G-code through the FANUC CNC. A teach pendant is only needed for initial set up and jogging, while inside a safety fence.

**#10 HOW WILL YOUR ROBOT CONNECT TO YOUR MACHINES?**

Robotic machine tending often has to communicate with the CNC machine, so a seamless integration between the controls and the robot system is a must. But making sure all functions are performed in a single application can be challenging. FANUC addresses this need with our QSSR Connect feature, where the robot motion is programmed using a teach pendant. This enables the use of intelligent features like vision and FANUC's CNC iHMI interface to provide step-by-step robotic programming guidance.

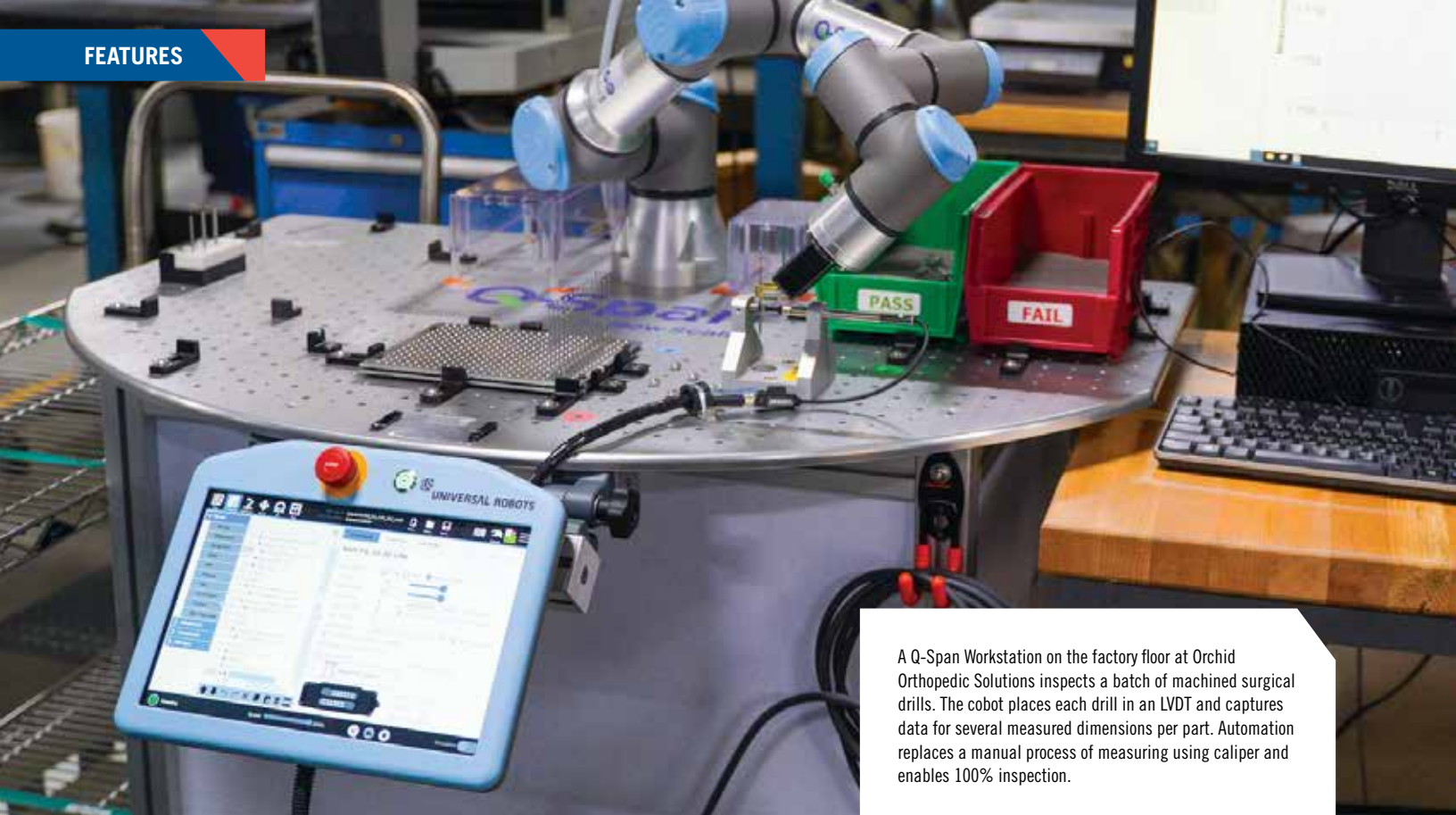
**ASSESSING YOUR WORKBOOK RESULTS**

If answering the above questions have shown that a cobot could make your operations more profitable and efficient, then consider our ever-expanding selection, including our CRXs. However, if that's not the case, there are other automation options. FANUC America has a robot finder tool that helps find the right robot for the application. If you're looking for a more standardized solution, perhaps a pre-engineered robotic work cell would be best to automate your process.

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To discuss any of these questions or other automation needs for your machining operations, contact us at [www.fanucamerica.com](http://www.fanucamerica.com). No job is too big or small or FANUC!



A Q-Span Workstation on the factory floor at Orchid Orthopedic Solutions inspects a batch of machined surgical drills. The robot places each drill in an LVDT and captures data for several measured dimensions per part. Automation replaces a manual process of measuring using caliper and enables 100% inspection.

# Automation & Robotics: Machine Tending Within-Line QC Leads to Lights-Out Manufacturing

By: Stefan Friedrich, New Scale Robotics, Authorized Systems Integrator Network for FANUC America

Many manufacturers have started their automation journey by using collaborative robots to automate simple production tasks, such as machine tending. With this first step, they may be closer than they realize to achieving “lights-out” operation on a particular machine.



## WHY COLLABORATIVE ROBOTS?

Collaborative robots (cobots) are ideal for high-mix production environments. Manufacturing teams can deploy cobots without the help of a systems integrator. They can configure, purchase and teach cobots to perform production processes in less than three months, for budgets in the \$100K range. They can easily teach cobots to perform additional different tasks, depending on production needs.

## AUTOMATED MACHINE TENDING – A NATURAL FIRST STEP

Machine tending is a natural first step for automation with cobots. Loading and unloading CNCs, lathes, mills, press brakes and other machines is one of production's biggest time sinks. But if you still need a QC inspector to walk over and check the parts that come off the machine, the benefits of automated machine tending are limited. For example, a CNC machine running a cycle time of one minute per part produces 60 parts in one hour of unattended, "lights-out" machine time, with almost no labor overhead.

## QC AND AUTOMATED MACHINE TENDING

Now suppose the outer diameter goes out of spec 30 parts into the run. The CNC will carry on for the rest of the hour, producing 30 more parts that will have to be scrapped or reworked.

Even if the process calls for QC to measure an AQL sample of one in every ten parts, realistically, manufacturing and QC are rarely going to be able to efficiently coordinate a QC person to walk over to the CNC several times during the one-hour "lights-out" run.

Production teams are short-handed and have all they can do to manage new machine setups, plan new jobs, train new people, and keep product moving on the floor.

QC teams are short-handed, too; they will measure one in ten as required, but probably only at the end of the run. And production often does not have the time to wait for the QC check before starting the next run.

## AUTOMATED TOOL WEAR COMPENSATION – THE FINAL STEP

While measuring every part as it comes off the CNC machine, the Q-Span Systems can feed measurement data into automated tool wear compensation software and then to the CNC control.

Rather than throwing alerts when the workpieces hit an upper or lower tolerance limit, the CNC machine can automatically adjust offsets and compensate for tool wear and drift based on real time data, keeping all dimensions closer to nominal. You can achieve full lights-out machining for that machine, without waste and scrap.

## MACHINE TENDING WITH IN-LINE QC CHECKS – A NECESSARY SECOND STEP

Machine shops are resolving this problem by using cobots to do QC measurement checks on every part, after it is unloaded from the machine.

A cobot system designed for this purpose is the Q-Span Workstation from New Scale Robotics. Each workstation comprises a collaborative robot from Universal Robots mounted on a sturdy mobile workstation table, along with teachable software for handling parts, making measurements, and collecting data.

As it unloads a machine, the Q-Span System measures each part - either by using its robotic caliper, or by placing the part into a standard gauge such as an LDVT or bore gauge. Any dimension out of tolerance can be used to trigger an alert and stop the run.

A machinist can respond by changing the machine tool, adjusting an offset, fixing any other issues, and restarting the program. Scrap is limited to one bad part, and labor is still kept to a minimum.

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# MACHINE SHOP COBOTS

# TENDING & TRENDING

More than half of the 4.6 million manufacturing jobs created over the next decade could go unfilled, creating a massive labor gap,

By: Joe Campbell, Strategic Marketing & Applications Development at Universal Robots

Collaborative robots (or ‘cobots’) help machine shops address labor challenges, improve ergonomics, and increase capacity while improving quality, and breathing new life into legacy equipment.

At the same time, cobot systems support reshoring initiatives, and provide the reassurance of 24/7 availability and consistency in a time of significant macroeconomic, supply chain, and labor market uncertainty.

No wonder then, despite being relative newcomers (the first cobot was launched in 2008) cobots are one of the fastest growing segments of the entire industrial robot market.

## Manufacturing’s Labor Crisis

More than half of the 4.6 million manufacturing jobs created over the next decade could go unfilled, creating a massive labor gap, according to a report from Deloitte and the Manufacturing Institute.

These shortages aren’t just limited to skilled positions such as welding but also involve line positions, including assembly, packaging, and machine tending.

For many machine shops, machine tending automation is the “low hanging fruit” in terms of ease of setup, deployment, and return on investment (ROI). Cobot machine tending involves automating the loading and unloading of parts from CNC machines, injection molding machines, press brakes, and others. Additional processes that benefit from automation include 3D printing, welding, grinding, deburring, deflashing, and quality inspections.

The manufacturing labor gap is forcing machine shops to leave their equipment idle, which limits revenue for a machine shop and weakens the value of machine tools. Cobots help manufacturers maximize machine uptime when labor isn’t readily available.

Collaborative machine tending automation handles the repetitive, low-value task of loading and unloading machines, so workers can focus on managing automation equipment and other higher-value-added tasks. Cobots also provide the reassurance of knowing that your processes can continue –even in extremely challenging environments.

## Versatile, Safe, and Easy to Use

Following a proper risk assessment, cobots can operate alongside skilled workers in a shared workspace. Cobots feature internal sensors, controls, and safety protocols that are designed to immediately and safely trigger shutdown upon unplanned contact.

Cobots are particularly well suited to machine tending tasks. Operators can program cobots very quickly, and upon deployment, cobots deliver higher throughput, consistent product quality, and lower cost per part than manual alternatives. Operators appreciate the improved ergonomics that result from cobot deployments too.

Cobots perform all or parts of a typical CNC process, including loading blanks into the chuck and finished part removal. In some applications, they conduct quality inspection. Consequently, machine tending has become one of the most popular cobot applications in recent years.

## No Programming Knowledge? No Problem

While many machine shops have had great results with robot integrators, many shops have successfully deployed collaborative automation in-house. Siouxland Fabricating Inc. is custom fabrication specialist that provides

laser, flame and plasma cutting, bending, assembly and welding services from its facility in Rock Valley, Iowa. The company deployed its first cobot on a stamping application that involves the cobot placing a part in a stamping machine and then palletizing the finished part.

To simplify deployment, Siouxland Fabricating chose a palletizing solution that comes with specialist palletizing software. This software enables the system to adjust seamlessly to high mix production environments – program it once and the system will automatically adjust to new product lines. The successful deployment enabled Siouxland Fabricating to cut cycle times in half and inspired the company to deploy a second cobot on welding tasks.

Meanwhile, Minnesota-based precision molds and molding company Dynamic Group had difficulty staffing a labor-intensive machine cycle that required high-consistency handling due to heat-sensitive molding material. Fast cycle times meant that operators had difficulty keeping up, resulting in ruined parts and downtime. Seeking a flexible and mobile solution for high-mix, low-volume production, the company installed three cobots in injection molding and kitting applications.

Dynamic Group previously used six to seven employees for post-mold kitting but now needs only two, providing ROI in under two months.

After installation, all the cobot cells were programmed in just two days.

In multiple-application scenarios like this, mobile floor or overhead/inverted track-mounted cobots may work. In this case, Dynamic Group needed to move its cobots between presses based on its current production schedule, so mobile bases became the better choice.

This level of versatility enables users to easily automate multiple part numbers and even multiple processes with the same cobot. Look for cobot systems that support a wide range of mounting configurations, including cart-mounted, gantry/track-mounted (overhead), machine-mounted, and inverted-mounted. Collaborative automation's small footprint goes a long way. For facilities where floorspace is at a premium, it can make the difference between being able to deploy automation or having to do without.

### Multiple In-house Deployments

Texas-based All Axis Machining struggled to automate the operation of its old machinery due to connectivity issues with traditional industrial robots and the large footprint of traditional machine shop automation.

By implementing cobots, which could communicate easily with the controllers on old equipment, the company was quickly able to automate no less than six different operations (CNC machine-tending, sanding, deburring, part inspection, laser marking and wire EDM) in-house.

When All Axis Machining deployed its first cobot, the company had a job slated to take four to five months of run-time on one machine. Using the cobot on CNC machine tending tasks enabled All Axis Machining to deliver the part almost two and a half months early, resulting in a 60 percent profit increase.

### Collaborative Automation Ecosystem

Reducing the time, cost, and complexity associated with selecting and deploying peripheral equipment like grippers, sensors, rails, and more, correlates strongly to a successful automation project.

Accelerate the deployment process by choosing cobots with a proven ecosystem of pre-integrated third-party kits and components that enable you to deploy cobot systems without having to develop custom solutions. Make sure that your cobot maker has certified these tools and accessories for use with your cobot – this will ensure quick to set up and a reliable user experience.

Application-centered kits can reduce deployment times to a matter of hours. Sanding kits, for example, come with libraries of pre-programmed routines, ready to use out-of-the-box. Welding kits come with all the equipment you need to take on even advanced welding applications involving plasma cutting, heavy deposition, and hardfacing. There are kits for metrology, inspection, screwdriving, and myriad other applications.

### SME-Friendly Automation

Whether a business needs help tending a CNC, press brake, or injection molding machine, cobots help increase productivity, improve quality, and allow employees to focus on more valuable tasks.

Companies of all sizes can benefit from cobot deployments, but what makes cobots so special for SME-size machine shops is that collaborative automation lowers the traditional barriers to automation adoption. On the financial side, leading cobot systems typically provide ROI in around a year. The Total Cost of Ownership for cobot systems is lower than that of traditional automation (in large part because of cobot's ease of use). Meanwhile leasing and Robots-as-a-Service options mean that SMEs can deploy cobots with minimal financial risk compared to traditional automation systems.

On the technology side, the complexity of traditional automation has put many SMEs off deploying robots in their machine shops. Well-designed cobot systems provide intuitive programming methods and interfaces that can quickly turn general operatives into robot operators. No wonder either, that the emergence of cobots is one of the most important trends in industrial automation in the past ten years.

And in a world where younger workers are less attracted to manufacturing positions than the retiring 'Baby Boomer' generation, sleek cobot designs and interfaces also provide a 'cool' factor that can help attract and retain today's technology-friendly younger workers.



Easy communication between old equipment and a cobot from Universal Robots enabled All Axis Machining to completely automate several machine tending processes. Credit: Universal Robots



All Axis Machining developed a mobile platform so that its cobot can quickly be moved through the facility and deployed on different applications. Credit: Universal Robots



Siouxland Fabricating deployed a UR10 cobot from Universal Robots on a High Mix/Low Volume stamping and palletizing application. The solution enabled Siouxland to overcome labor shortages and improve workplace ergonomics. Credit: Universal Robots



Programming the palletizing element of Siouxland Fabricating's stamping application is a cinch thanks to greatly simplified and highly graphical 'Palletizing Wizard' developed by cobot pioneer Universal Robots. Credit: Universal Robots

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**Director, Key Accounts, e-Mobility**  
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A 34-year veteran of the automotive manufacturing industry, Glenn Oshel has been on both the buying side while at Ford Motor Company and now on the selling side at Grob Systems, thus giving him a keen empathetic insight in the dynamics of the capital equipment market. In his 27-years at Ford, Glenn managed multiple transmission programs in the US and Europe and since serves as the e-mobility account manager at Grob Systems. In this role, he has been at the forefront of leading-edge technology with all things electric mobility and routinely interacts with the entire supply chain of most electric vehicle propulsion systems and components. Glenn currently resides in the Detroit area with his wife, Carol, and son, Samuel.

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Workers' wages are rising briskly, a factor contributing to the highest inflation levels in four decades. Wages and salaries in the U.S. grew 5.7% in the second quarter of 2022 from a year earlier, the fastest pace since 2001.

Precision machining shops are battling for the very few exceptional, skilled people out there.

### So how can you hire the best people?

One way to attract employees is to offer a compensation package that matches — or better yet, beats — the competition. A good wage and benefit plan not only attracts employees, it can also improve how well your company performs. When your employees take charge of themselves, they can be more productive at work. It's a virtuous cycle that improves your business in ways you may not even expect.

### The 2022 NTMA Wage & Fringe Benefit Study is now open.

Participate today and understand how your company's compensation levels and benefits practices compare to other precision machining manufacturers.

**Confidentiality:** Only the Mackay Research Group staff will have access to your Wage & Fringe Benefit information. Every precaution has been taken to protect the complete confidentiality of all information. The NTMA staff will never have access to your information.

### Participate in the NTMA Wage & Fringe Benefit Survey before November 1.

The Wage & Fringe Benefit Survey will provide you with the data driven results to make informed decisions about your workforce.

Wages and salaries in the U.S. grew 5.7% in the second quarter of 2022 from a year earlier, the fastest pace since 2001.

### Participants in the Wage & Fringe Benefit Survey will receive information related to:

- High/Low/Average Hourly wages for 34 shop floor job titles
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**Free Report!** NTMA manufacturers who submit their data to the 2020 study will receive the full Wage & Fringe Benefit Report at no cost.

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Contact Taylor Mackay — [taylor@mackayresearchgroup.com](mailto:taylor@mackayresearchgroup.com)

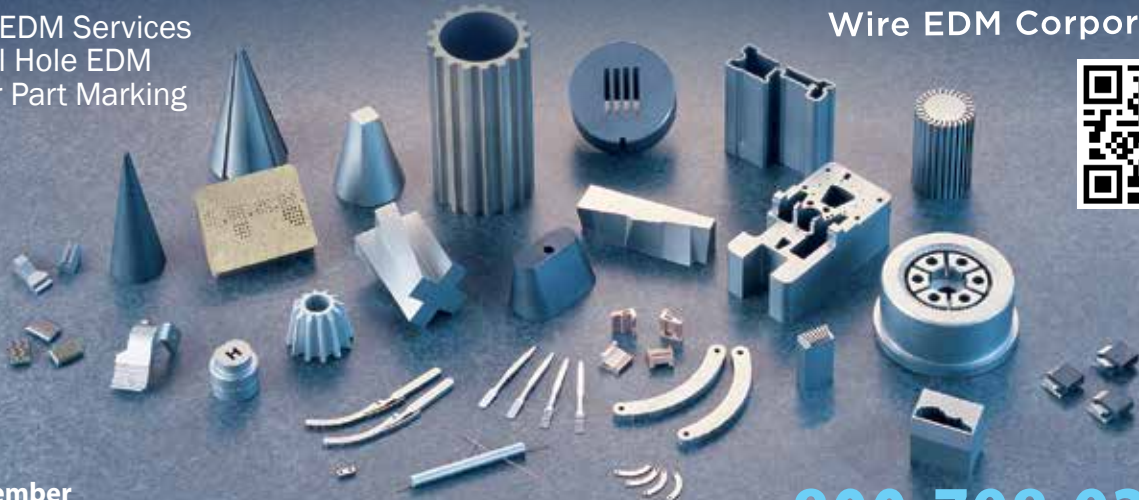
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# WHAT COMES NEXT? PLANNING FOR YOUR BUSINESS AFTER YOU LEAVE IT

By: Nate Ragolia, Strategist at Beanstalk Collaborative Community Wealth, LLC.

You may not think of your company like a kingdom, but you've probably heard troubling stories about the ways retirement, and the succession necessary to exit a business, can go wrong. Sometimes, things get... medieval with alarming stories of infighting, power struggles, failure, layoffs, broken relationships, and lost money. The ways things can go wrong without the right succession strategy are numerous and, honestly, a little bit frightening for any leader.

## If your heart lies with legacy, then you'll need to find and prepare your heir apparent.

How can you avoid the pitfalls and disasters, small and large, that come with transferring ownership of your business? How can you ensure that your amazing employees keep their jobs and have an opportunity to thrive going forward? How do you protect your legacy with customers and the community?

The first place to start is by asking yourself what future you want for the business. You may already have a successor in mind—like a manager on staff, or a family member, or maybe even an outside buyer—but unless you know what goals you're seeking, you could easily go off course. Ask yourself:

- Are you looking for a maximum financial return?
- Are you more concerned about family, employees, and the impact your business makes in its community?
- Are you hoping for a mix of both of the above?

However you answer these questions—and there's no wrong answers—will directly impact what you do next.

If you're planning to sell, then you will want to begin the long, but achievable process of maximizing its value. There are tons of valuation enhancers and industry best practices to follow that can make your business more appealing to buyers of all stripes, but it's important to get started right away. (You can, and should, embrace these valuation enhancers if you're focused on succession as well. The truth is, they just make good business sense, and will only make your kingdom stronger.)

If your heart lies with legacy, then you'll need to find and prepare your heir apparent. Maybe you've got a member of the team in mind, or a family member. Whoever it is they will need to know what will be expected of them, and be ready to take on the responsibilities. Can they guide your kingdom for another generation?

The tricky part to the above two paths is that it's hard to be objective without some help. Most of the time we see the value in our business in ways that buyers might not, and learning how to convey that value (and speak the language of a buyer) isn't easy without engaging some outside experts. And when we're dealing with staff and family, there isn't much objectivity either, but there are a lot of feelings and opinions. It's normal, and it's nothing to be upset about, but it's another good reason to get a little outside help. Especially the kind of help that will listen to what you want, and will help point you in the right direction.

If you choose the third path, with a mix of return on investment and legacy, then you get to combine both options, along with their challenges. Maybe you're willing to stay on part time for a couple years? Maybe you'll accept a unique structure for the sale? There are innovative ways to help you enhance the value of your business, while keeping it, and your employees, engaged and thriving.

Succession planning can make anyone's head spin, and we can help. At Beanstalk Collaborative Community Wealth, we help business owners—you kings and queens of manufacturing—to preserve your kingdoms. Our "buy, build, and hold" model allows us to purchase companies, grow them, and keep them going in their communities. We also provide advice, resources, and connections to make sure whatever succession plans you make can be successful ones. If you're looking for guidance, and for a partner to help make this complicated and confusing process more transparent, reach out to us.

At the end of 2021, we acquired a precision injection mold maker, in North St. Paul, Minnesota, from its retiring owners. They were keen to keep the business operating in the community, to take advantage of the unique succession opportunity our model provides, and were glad to know that our combined 65 years of precision manufacturing experience, between CEO Troy Roberts and Co-Founder Bill Smith, would ensure the company was in good hands. We'll be sharing more about this partnership later in 2022.



**Beanstalk Collaborative Community Wealth, LLC** (BCCW) is a holding company dedicated to providing attractive financial & legacy-protecting opportunities to transitioning owners in the manufacturing industry, while preserving and growing businesses, and jobs. Learn more at [beanstalkccw.com](http://beanstalkccw.com).

# TOP 5 REASONS TO AUTOMATE YOUR MANUFACTURING

The Manufacturing Industry is Investing More in Automation.

Manufacturers are looking to lower cost and increase speed without sacrificing quality. This means getting more done in less time, with less manpower, less scrap and fewer mistakes. To do this, the manufacturing industry is investing more in automation.

Specifically, automating the processes and tasks that machines can do quicker and better than humans and integrating them with a company's ERP system and other technology.

What once seemed to be the stuff of science fiction – manufacturing plants run by robots – is already a reality. FANUC Corporation of Japan uses a workforce of robots working 24 hours a day, seven days a week to produce up to 23,000 robots a month.

Most manufacturers are a long way from being able to automate the majority of their production processes. But as ongoing advances enable machines and humans to get better at talking to each other, more production lines and eventually more production plants will become more and more automated. If your manufacturing business hasn't yet jumped on the automation bandwagon, it's time, and here are the top five reasons why you should.

## ABOUT THE AUTHOR

*Daniel Carranco is the Director for the Continuous Improvement Department for Global Shop Solutions. He leads a department comprised of teams that deal with existing customer projects including consulting and custom development. A Global Shop Solutions team member for more than a decade, Carranco holds a master's degree in international business, and is a frequent speaker to manufacturing executives and industry groups on maximizing ROI with ERP software.*

## 1)

### TO REDUCE LABOR COSTS

For most manufacturers, labor costs represent the biggest expense and hardest cost to manage (or reduce).

**AUTOMATION IS PRODUCING SIGNIFICANT REDUCTIONS IN LABOR COSTS.**

## 3)

### FOR LIGHTNING FAST TURNAROUND TIMES

Slow turnaround on jobs can be a deal breaker for many manufacturing customers.

**PROCESS ORDERS FASTER, REDUCE SETUP AND PRODUCTION TIMES, AND GET YOUR PRODUCT OUT THE DOOR QUICKER.**

## 5)

### TO FUTURE PROOF YOUR BUSINESS

In today's constantly changing manufacturing markets, success often depends on seeing where customers are going and getting there first.

**AUTOMATION IMPROVES THE ABILITY TO FORECAST TRENDS**

## 2)

### TO ELIMINATE WASTE

To err is to be human. In manufacturing, human error leads to wasted time and resources.

**HUMAN ERROR LEADS TO WASTED TIME AND RESOURCES.**

## 4)

### TO IMPROVE QUALITY AND SAFETY

Rework due to poor quality acts like an anchor on production time and lowers customer satisfaction.

**AUTOMATING PROCESSES IN THESE AREAS CAN RAISE QUALITY RATINGS WHILE MAKING YOUR WORKPLACE**



To learn more about the Top 5 Reasons to Automate Your Manufacturing, call 800.364.5958 or visit [www.globalshopsolutions.com](http://www.globalshopsolutions.com).

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- ✔ Moseys reduces staff involvement in quoting

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# WHAT IS YOUR PATH TO EXPONENTIAL SUCCESS?

By David Capkovitz, EBITDA Growth Systems

Ask yourself this question... If you fold a piece of paper on itself 50 times, what is the measurement you will end up with from top to bottom? Would you believe that the distance from top to bottom would be the same as the distance from here to the sun? This is a perfect example of exponential growth. World leaders, leading companies, cutting edge technologies, and world financial indexes fully understand how this works. The data that you generate today has the potential to exponentially grow day after day if applied with laser focus and purpose. At EBITDA Growth Systems, our mission is to impact others by improving business performance. The lynch pin of this mission is impacting others for good using the combined 200+ years of experience to help maximize our client's opportunities. We stand on this because we realize what we do today really matters for tomorrow, and tomorrow really matters for the next day and so on... This is what gets us out of bed because when you see a life changed for good, it really makes a deep memory.

Have you ever procrastinated on doing something that is important but not urgent (yet), even though you know it's a needle mover? Is it because it's messy? Is it because it is something that you don't enjoy? Are you afraid of it not being successful on your first try? No matter what that is, think of the long-term implications of pushing this important task off. Think 3-5 years down the road.

## Does this resonate with you?

I can remember running my machine shop at 9000 RPM's and what that did to me, my family, and my employees. This hard realization as I grew, matured, and learned that surrounding myself with great men and women that invested in making me who I am today was that I was key in these circumstances. The outputs of the various situations were due to improper management of the inputs. I remember that my whole life was in "the whirlwind." Whether it was employees not showing up for work, a machine being down, a special tool not showing up when promised, a last-minute customer change, fill in the blank with

the latest emergency. This was before I leaned into "Process Thinking" and understanding its impact on the forced multipliers of day-to-day business.

## What is Process Thinking?

Process Thinking is a philosophy that emphasizes preparation and hard work (Input) over consideration of outcomes or results (Output). You have an input at the front of a process and the output is at the end of a process. If I let my co-worker know that they look sharp today (Input) they recognize the compliment (Process) and they will most likely respond with a "thank you" (output). The output is critical, but we should not get caught up in managing the output. If I told my co-worker that they looked like a slob the output would be much different. Do you see that input of this situation is what is managed by my behavior. When we try and manage the output we are considered "firefighters". This management style is unpredictable, and you need to be surrounded by "heroes" in order to manage it better than a 50% success rate because of its level of difficulty. The most effective way to manage a given task is to lay out the process, evaluate the optional inputs and work to predict what output each input will produce. Upon this evaluation, you choose the best input that will give you the output closest to your desired result. This takes more work, but the outputs of any given task will become more planned and predictable. In essence you will work to eliminate Murphy's Law in your business. Remember Murphy lives in the unplanned output.

## Why is Process Thinking tied to Forced Multipliers?

Think about making high quality parts on time. If you were to do this 100% of the time, what would your business look like? You would see a forced multiplier (Exponential movement). Your business would grow as fast as you wanted it to, and you would not be haggling over price. Your profits would grow exponentially, your employees would love winning and stick around longer, and your customers would never leave your side, not to mention all the other customers at your door wanting to give you their business. We also know if you were to make parts 100% on-time with 100% high quality you would need bulletproof processes. All your people would need to know exactly what to do, how to do it, and when to do it by in order to produce that result. You would need to understand each process and the time each one took to complete.

This would create a predictable pattern in your business that you would plan around.

As long as you could predict the processes in your shop, you would not have any surprises. This in turn would create fertile ground for exponential growth. You could not have this kind of "exponential" atmosphere without process-based thinking. On the other hand, had I made the decision to consume too much alcohol and then drive on the busy streets of Denver and have a severe accident, I could wind up with exponential negative repercussions. It is important to remember that decisions good or bad can have exponential outputs. This is where planning a process and surrounding yourself with wise counsel is critical.

## How can Process Thinking lead me to exponential success?

When Process Thinking is paired with a proper support system you can predict the proper exponential movement. The brightest people in the world think 2, 3, or even 4 steps past their current decisions. They look at what their inputs will produce years down the road. For example, if I could hire a business coach with the equivalent knowledge and experience I have today and employ that by my 27-year-old self, I would have sold my machining business for over \$90m in 2021. That bit of vision with a strategic plan executed along side wise counsel would have outputted exponential success. Or if we invested \$2,800 in Microsoft when it came onto the market your stock would be worth over \$3.7m today. To do this we would have had to do extensive research on the product and work hard to understand the impact that it would have on society. With this data along with a strong conviction we would have generated a prediction on a potential exponential output years from the time of our investment.

The question at hand is whether you will you make the time to pull yourself out of your day-to-day whirlwind, lean into Process Thinking, surround yourself with wise counsel, and build a set of processes that you can use to generate exponential success? Only you can answer that question. Maybe your success story is just a few decisions away, don't let it pass you by.



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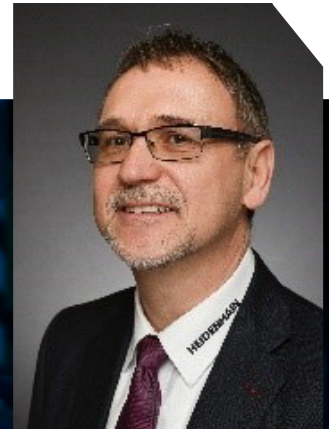
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## HEIDENHAIN

# WHAT'S HAPPENING WITH OUR COBOTS? MONITORING AND MANAGING LIGHTS-OUT AUTOMATION FOR UNIVERSAL ROBOTS

Written by: Chuck Smith, Director of Product Marketing, Datanomix

As manufacturers lean on advanced automation and robotics to deal with labor shortages and increased demand, the need to effectively implement and monitor these technologies has increased in urgency. And even though there are a number of benefits to effectively implementing robotics for unattended and operator assisted automation, there are challenges that impede the ability of manufacturers to get the most out of their robotics.

One of the biggest challenges is understanding factory operations at a granular level so you know where to focus your efforts when automating. Today's production monitoring delivers a more thorough understanding of your CNC operations, providing details on machine utilization and offering insights into overall factory trends as data is collected over time. With more data, factory management has the information to see which jobs would most benefit from automation and lights-out operation, providing a roadmap to implementing more automation and robotics.

But once you implement advanced robotics, how do you monitor their performance? Typical first-gen production monitoring software does not extend beyond the CNC machine, leaving a blind spot for monitoring robot performance. In addition, first-gen production monitoring requires operators to enter reason codes for machine downtime, which is completely useless when running unattended operations, especially with robots. In short, it's been really hard to monitor and manage your robots using traditional methods.

This gap in understanding is why Datanomix and Flexxbotics teamed up to deliver real-time visibility for Universal Robots performance. Universal Robots is a leader in collaborative robot (cobot) automation for precision manufacturers, and by partnering

with Flexxbotics, Datanomix extends its Automated Production Intelligence™ coverage to Universal Robots cells, helping power lights-out and automated operations at precision manufacturers.

With Flexxbotics, Datanomix gains access to real-time operational data for Universal Robots cobots via their FlexxConnect™ platform. Advanced utilization and performance data for Universal Robots is collected and displayed in the Datanomix platform, offering real-time insights into CNC machine cycle times, part counts, and run times, as well as machine and robot status to allow manufacturers to make better-informed decisions around automating their factory. In addition, FlexxConnect provides centralized and revision-controlled cobot and CNC program management, including guided workflows for operators managing cobots and CNC machines.

The combined Datanomix/Flexxbotics solution delivers advantages for manufacturers using Universal Robots in three important areas:

## **AUTOMATED PRODUCTION INTELLIGENCE™**

Understanding the performance of your robotic production cells in real time is a gamechanger. Datanomix provides next-generation production monitoring, showing the performance of every job on every connected CNC machine as parts are being machined. With Flexxbotics, this real-time monitoring is extended to cobots deployed at these connected machines. Operators and supervisors can now see how each of these robotic machine cells is performing, allowing them to react to issues that affect deliverability as they happen. In addition, Datanomix saves all of the performance data, analyzing it to uncover overall factory trends that help with job costing, hiring and personnel decisions, and capital expenditures. CNC shops now gain a

granular understanding of how their work cells are really performing and their capacity for new jobs and equipment.

## **PROGRAM MANAGEMENT**

Managing the programs that run on CNC machines and robots as they produce parts can be a hassle, rife with inefficiencies because a lot of the management and transferring of program files happens manually, either with a USB stick or a DNC system. This means changes in the programs are often not updated across all of the machines, which can result in inconsistent machining and increased waste. The solution offered by Flexxbotics and Datanomix eliminates these issues by providing centralized and revision-controlled program management for both Universal Robots and CNC machines. Manufacturers upload their program, change the program within the work cell, and then update the program in a central database. Now any changes made during one job are automatically updated for future jobs.

## **GUIDED WORKFLOWS**

With rising material costs and longer lead-times, it has been critical for precision manufacturers to build more reliable parts with better quality to reduce waste. In addition, with the current global labor shortage and skilled workers leaving or retiring, minimizing the training time on new capital equipment, like robots, has never been more important. Flexxbotics guided and gated workflows help eliminate defects with digestible work instructions and timely quality control alerts. The intuitive software can be run by operators at all skill levels seamlessly, with a security net in place to ensure correct, timely, and accountable operation. In addition, Datanomix delivers the insights needed to understand if production challenges are the result of



the machine or the operator, allowing management to provide training when operators are unsure of the job tasks.

### MORE DATA FOR BETTER DECISIONS

Unattended operations can be a lifeline for precision manufacturers struggling to keep up with demand during labor shortages. Advanced automation with Universal Robots cobots helps address some of the challenges, but not without creating challenges of their own, especially when it comes to monitoring and managing lights out operations. However, most precision manufacturers don't have the advanced analytics capabilities in-house to fully understand their CNC machine operations in real time, let

alone the ability to analyze the performance of their automated robotic operations.

With Flexxbotics, Datanomix pools data from Universal Robots with the associated CNC machines, offering real-time performance metrics for these robotic work cells, even during lights-out operations. Long-term trends are uncovered with continual analysis of job data, showing not only the performance of the robotic cells, but also offering insights into which jobs might benefit from robotic automation.

Datanomix is building the data engine for precision manufacturing by centralizing data points from sources across the factory floor and beyond. This begins with a direct connection to CNC machines,

but now includes Flexxbotics for Universal Robot performance, Caron Engineering for advanced tool performance, and ProShop ERP for data around job costing and other operational parameters.

When operational data is consolidated and analyzed holistically, a better picture of overall factory performance emerges, allowing precision manufacturers to make better decisions faster, based on actual performance data.



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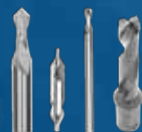


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