Advanced Manufacturing Expo

FREE EXPO

THURSDAY - AUGUST 26TH, 2021
DEVOS PLACE - GRAND RAPIDS, MI
8:00 AM - 4:00 PM

FRIDAY - AUGUST 27TH, 2021
DEVOS PLACE - GRAND RAPIDS, MI
8:00 AM - 1:00 PM

ADVANCEDMANUFACTURINGEXPO.COM

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INSIDE

ADVANCED MANUFACTURING ARTICLES

FIRST ROBOTICS COMPETITION

*20 First Robotics High School Teams will compete on a full robotic field on **Thursday August 26** from 9 AM until 3 PM. Bleachers are setup, so come join the excitement and cheer them on! It's a great time to bring your young children to experience the energy and technology.*

Advanced Manufacturing Expo

SHOW INFORMATION

SHOW HOURS:

THURSDAY, AUGUST 26: 8 AM - 4 PM
FRIDAY, AUGUST 27: 8 AM - 1 PM

SHOW LOCATION
DEVOS PLACE • GRAND RAPIDS, MI

FREE* PARKING
Free 2 hour parking voucher valid at City of Grand Rapids parking ramps, limited to the first 2,000 attendees between both days.

MISSION: CONTROL

Modern sensors can detect a 'bewildering array' of data for unmatched precision in manufacturing processes

When it comes to Industry 4.0, remember what your parents said: "Look, but don't touch," and "A place for everything, and everything in its place."

Companies engaged in advanced manufacturing are now running their shop floors like air traffic controllers at Chicago's O'Hare International Airport. They know exactly where everything is by number, and whether it's coming or going.

Only they don't rely on an army of clerks with clipboards and pencils to track raw material, work in process, and finished goods. Affordable automation systems compile the avalanche of data they receive daily from data hubs and I/O cables fitted with specialized sensors that are suited to environments hostile to humans.

And when it comes to "look but don't touch," modern sensors that have replaced old-style contact switches can now detect a wide assortment of materials at a distance, so there isn't any mechanical wear on the sensors or parts as they are read moving by.

For example, Turck Inc.-USA in Minneapolis responded to the demands of automotive, alternative energy and sporting goods industries by developing inductive sensors that accurately can detect carbon fiber materials and pressed carbon parts over a temperature range of 0-100° C. Turck also has come up with an entire line of non-contact inductive linear and rotary sensors that offer a long life, are more resistant to dust and dirt and are well suited to a range of environments.

Sensors do infinitely more work than part counting these days. They can identify a specific part as it winds its way through manufacturing processes all the way to its final resting place on a warehouse shelf, thanks to Radio-frequency identification (RFID) readers fitted right on to the forks of a lift truck.

In one application for an automotive supplier, Turck designed a system where RFID tags storing Vehicle Identification Numbers (VIN) are attached to car bodies and tracked by computer to ensure that the bodies go through all the production steps and receive all the necessary components. To succeed at the task, Turck developed high-temperature data carriers that are resistant to the aggressive chemicals in dip tanks, as well as to the high temperatures in drying ovens after painting.

In another application, a sheet metal fabrication business

Sensors connected by networks of cables and wireless connections greatly extend data gathering and troubleshooting.

uses RFID readers to make sure the correct dies are set in the press and that metal sheets are positioned correctly in the press before it can be cycled.

Engineers and technicians are using sensors to detect variations in a bewildering array of processes: whether industrial drum washers have the right amount of solvent flow for proper washing, whether a whole bank of CNC machines are running with the correct level of lubricants, and whether all the rubber washers have been installed on a piece before it is conveyed to the next operation.

Tracking a component or monitoring a process is only part of the total puzzle of Industry 4.0. In addition to sensing, companies use a robust network of cables and wireless connections to send the information to PLCs (Programmable Logic Controllers that are small, rugged computers used for automation) for analysis and action.

The challenge is to connect sensors with computers with actuators without creating a mass of wires that look like a bowl of spaghetti.

For example, a gear manufacturer had to create hundreds of two-way electrical connections that tied sensors to information hubs and then PLCs that then control stack lights, solenoid valves, clamps, and other devices on the manufacturing line. The loop is called I/O for input and output signals.

But hundreds of wires from sensors to PLCs added a lot of cost and complexity to the automation project. Each customized cable would have been expensive to fabricate, installing the cables would take many man-hours, and the mass of wires would make it a headache to troubleshoot for broken wires or shorted circuits. IO-Link uses standard, inexpensive 3-wire M-12 cables – so one type of cordset can replace proprietary and analog cables.

Because the customer used a Siemens PLC with Profibus-DP, Turck greatly reduced the cost and complexity of the design with its BL20 PROFIBUS gateways, TBIL IO-Link hubs and IO-Link master that are all tied together using the IO-Link communication interface. These I/O hubs use IO-Link to bring up to 16 binary signals to the IO-Link master via a standard sensor cable. The 16-bit process signal of the IO-Link protocol transfers 16 individual switch signals for digital input or output signals.

The customer also realized after the system was installed that other types of sensors that measured pressure and temperature could be connected with the IO-Link as long as they had interfaces. Sensor parameters can then be set directly from the controller. Other types of systems need special analog input modules if the sensors send analog signals rather than digital signals.

Other features of the system made it easier for the customer's maintenance department to install new sensors and troubleshoot problems. The customer standardized the types and models of sensors that it used on the shop floor, but that presented a problem in troubleshooting because the cable markings are also identical apart from one or two digits, making assignment errors likely. Finding and correcting wiring errors would in turn be very time consuming and complex.

But with the IO-Link system, information about each sensor such as its manufacturer, model number and operating parameters are entered into the IO-Link system to help ensure that the right device is installed if a component is replaced. When a replacement device connects to the system, IO-Link automatically uploads the correct parameters for easy installation and programming

In addition, the same unshielded, three-wire standard cable with an identical pin assignment can be used as with conventional I/Os, which eliminates problems with devices that do not have pin assignment standards and multi-pole connectors. Devices can be installed in the machine in the exact location that makes sense for the application because the user does not need to access the display or switches.

Sensors do infinitely more work than part counting these days. They can identify a specific part as it winds its way through manufacturing processes all the way to its final resting place on a warehouse shelf, thanks to Radio-frequency identification (RFID) readers fitted right on to the forks of a lift truck.

Engineers can benefit from the IO-Link system because it can act as an interface to replace older analog sensor technology to improve data quality. In analog systems, data collected at the sensor level must go through multiple analog-to-digital conversions before reaching the PLC. IO-Link uses only one conversion for better data accuracy. ■

Q&A

MARK ERMATINGER

CEO, Industrial Control
Founder, Advanced Manufacturing Expo

What started out as a private open house for customers of Industrial Control at its Zeeland offices has evolved into the year's most anticipated, public exposition of manufacturing technology and automation in West Michigan: the Advanced Manufacturing Expo (AME).

AME Founder and Industrial Control CEO Mark Ermatinger shares some of his thoughts on why the exposition continues to grow in size and prestige and what it means to keeping Michigan competitive. This year's AME to be held Aug. 26-27 at DeVos Place in Grand Rapids is a far cry from the company's customer appreciation day in 2014. Thousands of visitors, exhibitors and students are expected to attend this year's event.

PHOTO: KATY BATDORFF

What gave you the idea that there was a demand for a local exposition on manufacturing technology?

Our experience with customers and vendors showed us the way. Michigan thrives on innovation, so there has always been a hunger to learn about the latest and greatest.

We started out small: an open house for our customers at our Zeeland offices. It was such a huge success that we booked 17,000 square feet the next year at the Pinnacle Center in Hudsonville and called it the Advanced Manufacturing Expo, created the logo and website.. Before we even closed the doors for that event, we already were looking for a larger space, so we booked space at the DeltaPlex.

For the next four years, we just continued to grow: bringing on Creston Industrial Sales as the sponsor of the Metalworking Hall, launching AME-East in Novi, adding Motion Industries as the sponsor of the Mechanical Hall. And now for the first time we are at DeVos Place, the premier convention center in downtown Grand Rapids.

It's been quite a ride, and it's all based on listening to what our customers wanted and what our vendors could deliver.

So what is the secret sauce of the AME?

AME appeals to our vendors on several different levels. A primary reason is that exhibitors are burnt out on large, expensive shows, and they are diverting their marketing dollars to more local venues. AME allows them to get in front of their customers right here in Michigan at a low cost.

Another reason is that we make exhibiting easy for them, and we do that on purpose. We provide lunches for them during the show so they don't have to worry about going out to get something to eat. We provide lead generation software to them for free, so they don't have to worry about how they will keep track of their leads or pay for generation software. When they are at the show, they can scan a badge with their phone, put in what the customer is looking for and download that later.

We also have an exhibitor party the night before the show so that they can network with each other. The machine builders, integrators, and solution providers all get to talk to each other as a community, which adds value to the event. We offer a great location: they want to experience all that Grand Rapids has to offer.

It seems that AME always has some fun things happening too. What is in store for us this year?

From the beginning, we've always lined up some fun things as well – everything from having Scottish bagpipers parade though the hall to golf outings to benefit the FIRST high school robotics teams.

PHOTO: KATY BATDORFF

This year we're hosting a full FIRST robotics competition all day Thursday, complete with bleachers so attendees can watch 24 teams compete. We did this Novi, and the kids had a ball. And the students had the opportunity when they weren't competing to walk the show. Their coaches were walking the floor with them and explaining the technology behind what they were seeing. They are used to building robots to win a game, but here they can see what real robots do in an industrial setting. Potentially they can see if they want to get into that industry.

And everyone will want to catch the real life demonstration of GRAVITY, where someone will get into a real life version of the Iron Man suit in the movies, lift off from the front of DeVos Place, fly up and down the Grand River and return. This demo is going to be awesome! Representatives from GRAVITY will have a booth at the back to explain the technology and photos.

We also have three companies bringing in CNC machines that will be making chips. It's really expensive to transport these heavy, big machines so we are extremely excited to have live machinery running in the metalworking hall.

Who knows? Next year we may have concerts at the show — played by robots!

Did you have to make some adjustments because of COVID?

We didn't hold AME last year because of the COVID restrictions, and we had to take our best guesses in January as to whether we'd have it this year. When I was talking with our leadership team, I made the argument that if we wake up this year and all of sudden COVID is gone, we were going to be very upset at the missed opportunity. So we decided to do the Grand Rapids show, but skip the Novi show this year.

It was a good call because now everybody is super excited — the show is on, and we can meet in person.

What are the driving factors of advanced manufacturing today?

One of the biggest driving factors is that manufacturers are forced to do something because of the lack of people. It's a crisis — and it's a labor crisis. Some of the national distributors that I talked to last week are seeing companies that never automated before now coming out of the woodwork. They cannot find enough people to do the basic things, and they are struggling to keep the people that they have. The only way of doing that is through automation. And it is to the employees' benefit that they can get a better job and more money, instead of doing what they've done for years pushing a cart back and forth across the plant.

I think another driving factor is that COVID has caused everyone to become more comfortable with remote data, with remote meetings. You may be able to monitor and service 10 plants from home as a maintenance guy. There's a lot of things that people are willing to try now that they wouldn't before. IT guys — and I am a recovering IT guy myself –were pretty strict on data, and rightfully so. But at the same time they were too restrictive and that was causing them expenses. They would say you have to fly to my plant to fix something that literally takes minutes to fix online. Now I think that is gone. The smart factory is finally going to evolve. ■

Affordable, easy-to-use machine vision technology welcomed by manufacturers

From candy canes to wood grains, manufacturers that couldn't afford to use machine vision and artificial intelligence to improve quality are now embracing those technologies as they have come down in price and become easier to use.

"I've been in the industry for 25 years, and there have been tremendous strides in cost, processing speed and resolution," said Chris Hooper, Territory Manager – Midwest for LMI Technologies (USA) Inc. based in Royal Oak, Mich. "About 20 years ago this technology was largely cost prohibitive in industries like food processing and, to some extent, packaging and logistics.

"Today we are into all kinds of very specialized industries — we are scanning candy canes for quality control. It's obviously a very inexpensive product, but there is an ROI there."

Andy Reed, Vice President of Sales for DeepView Corp. in Mt. Clemens, Mich. concurred that both machine vision cameras and artificial intelligence software have come down dramatically in price, yet they offer blazing processing power packed into a small footprint. DeepView, a division of Automotive Dynamics Corp., makes the DeepView Ai smart camera in Michigan, and it employs its own smart cameras to inspect PCB boards that are used to make the products.

The DeepView AI camera being introduced at the Advanced Manufacturing Expo is a completely self contained unit that has computing power enough to perform 12 trillion operations a second, 1 terabyte of memory for retaining a million images, and the power of a server farm, Reed said. The cameras and AI software have been field tested for the last 18 months by partners such as Industrial Control in Zeeland.

"DeepView AI gives the customer an intuitive web-based programming interface that can be deployed very quickly, all in a package that fits in the palm of your hand," said Rick Slater, Senior Sales Engineer at Industrial Control who tested the camera package. "This technology puts AI machine vision inspection in reach for all companies, regardless of their budgets and technical capabilities."

Reed said one company is using a DeepView AI camera to check real wood components used to assemble the interiors of high-end automobiles.

"They have a variety of different hardwoods that are used in these vehicles, and they want to be able to tell the difference from woods such as oak, hickory and cherry," he said, "and they want to make sure that the grain pattern matches piece to piece. A typical machine vision system can't readily discern the difference in varieties of woods based on grain, but our system has been able to do it."

Machine vision systems like DeepView now pack more computing power in smaller footprints. PHOTO: KATY BATDORFF

Reed said his company has developed some impressive artificial intelligence software had made it easy to train the DeepView AI camera, without the need of a server or cloud, or designated PC with strong graphic computing. "In many manufacturing environments, if you need a designed computer for something, your IT department often needs to be involved – IT owns the computer," Reed said. "With our system, it's self contained, so there's no IT overhead at all."

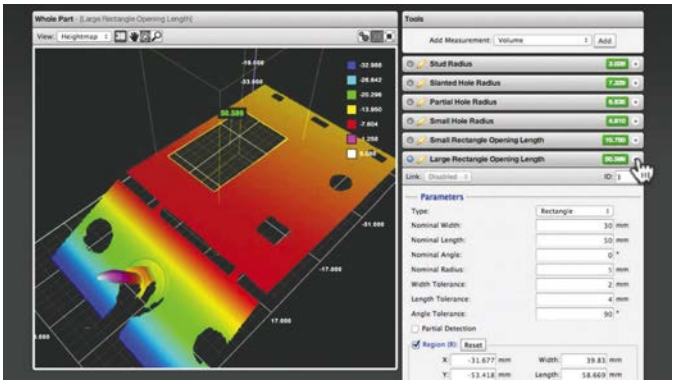
Since it is a web-served architecture, the customer can use a computer, tablet or certain other web-enabled devices to connect with the DeepView via an IP address. When the connection is made, the user can set the parameters of the camera to obtain proper images of products so flaws can be detected. The camera can then be trained by showing it good and bad parts.

Industrial Control engineer Rick Slater goes through a training process with DeepView system.
PHOTO: KATY BATDORFF

DeepView has taken a different path from other machine vision and AI companies in terms of licenses, server fees and development costs, Reed said. Some camera companies will allow customers to only run networks that have been developed for them, and they require customers to purchase a developer's license if they want to create their own networks. That particularly can cause difficulties when a customer can buy only one license, but has several engineers to set up jobs.

Reed said DeepView doesn't have licensing fees and customers can develop their own networks on an unlimited number of jobs.

Hooper at LMI Technologies said his company specializes in sales and development of 3-D camera systems under the Gocater® brand that have traditionally been used in dimensional applications, such as the size and location of a hole or the distance between features on a part. But that is changing with LMI's acquisition in January of FringeAI in Boston, which developed a software suite that leverages integrated deep learning, dedicated edge devices, and IIoT/5G connected cloud services.



Drop down menus simplify the programming of machine vision systems. PHOTO: KATY BATDORFF

The FringeAI acquisition "really allows us to take on applications that perhaps in the past we couldn't," Hooper said. "It's really going to broaden our capabilities. For instance, one industry that we have seen the most activity so far is the food processing industry." In one application, a meat packer is using AI to identify features of meats such as fat, cartilage and bone.

Hooper said another rapidly growing market for LMI is packaging and logistics, due in part to the large field-of-view 3-D triangulation sensors that the company offers. Consumers and industrial customers alike expect short delivery times of products, a trend championed by giant online retailer Amazon.

To meet those shipping deadlines, companies are automating their packaging operations, and LMI sells sensors and systems to machine builders that can visually measure the length, width and height of this box. Customers combine the dimensions of the box with weight data from scales to automate postage and labeling. Other customers use LMI sensors to measure items in an open box to determine the amount of fill needed before the box is sealed.

To expand its toolbox of solutions, LMI also is starting to bring in 2-D machine vision solutions that can be run on its 3-D cameras. "Our customers can get more bang for their buck if they are able to use all their sensors for both their 3-D and their 2-D applications," he said. "2-D has its place, where some applications you need 2-D grayscale to solve the production problem. Pattern matching and blob tools are good examples of that."

AME Founder and Industrial Control CEO Mark Ermatinger said his company pioneered 2-D machine vision in 1996, jumped into 3-D machine vision solutions after it was satisfied that the technology was mature, then started offering Artificial Intelligence machine vision systems starting in 2015. "Each technology has its place and allows us to provide customers with choices that fit their applications," he said. ■

This automated "goods to service" system helps to maximize productivity in Motion's Birmingham distribution center. IMAGE COURTESY MOTION

MAINTENANCE MATTERS

Managing MRO effectively can reduce downtime and excess inventory

It's all the things in your plant that get no respect — until they stop working or don't get reordered. It's the gear reducer at the end of the conveyor line, the drum of floor degreaser, the FRL that keeps air cylinders moving, the hose that safely holds 2,000 psi of hydraulic fluid.

In short, all of the Maintenance, Repair and Operation (MRO) supplies that can stop production on the shop floor as easily as a power outage.

Just like consumers are drawn to the sexy new features of a smart phone, companies pay a lot of attention to the latest whiz-bang technology that promises to boost production or improve quality. But they can easily overlook the importance of having MRO items available at a moment's notice or the hidden cost of holding inventories of hundreds of items — only to find that the one part that's needed isn't in-house.

Dave Kennedy, manager of the Grand Rapids branch of Motion (formally known as Motion Industries Inc.), can sympathize with the difficulties that companies face when they are trying to determine what items are critical to their operations and what items they should keep on hand.

In Kennedy's case, he's helping to manage the MRO of hundreds of West Michigan customers spread throughout a territory bounded along the lakeshore roughly by South Haven and Fremont, then east to Ionia. A subsidiary of Genuine Parts Co. (NYSE: GPC), Motion on a corporate level has more than 500 locations throughout North America and holds $750 million of inventory — more inventory than the next three competitors combined.

"Some of our local companies have critical pieces of equipment that, if they go down, the downtime costs can be $10,000 or more an hour — and that gets their attention quickly," Kennedy said. "So the Grand Rapids branch itself stocks about $1.5 million of inventory of spare equipment that our customers say is critical to the operations."

The second layer of spare part protection is the MRO inventory stocked at Motion's distribution center in Chicago, and then 15 other distribution centers in North America. Yet a third layer is Motion's online access to the inventory

of its major vendors, where Motion customer service representatives in Grand Rapids can locate and determine delivery times for items worldwide. Mindful of the costs of downtime, Motion staffs service representatives 24/7 so customers can always reach a human being in an emergency.

Due to its expertise in inventory management, Motion helps customers to determine what items should be stocked in-house and at the Grand Rapids branch, or to rely on the fact that the items will be available at distribution centers. This evaluation helps customers to reduce the dollars that they sink into inventory and yet provides a reasonable comfort level that parts will always be available.

In addition to inventory management, Motion provides technical expertise and services in a number of areas, including automation, conveyance, machine rebuild, hydraulics, and pneumatics. "Our employees visit customers to help troubleshoot issues and introduce new technology – always with an eye to increase production, decrease downtime or lower operating costs," Kennedy said. Out of 15 full-time employees, Motion in Grand Rapids has seven account managers "who are out on the road and in the plants 40 hours a week."

Motion corporatewide supports the Grand Rapids branch with engineering centers throughout the country that specialize in fabricating hose assemblies, repair of hydraulic and pneumatic components, rebuild of mechanical items such as gearboxes, and fabrication of conveyor belting.

"We are a tech supplier, rather than a catalog fulfillment company," Kennedy said. "Our specialists are available to every branch office to serve their local customers, and all of these specialists have been certified in their field if there is a certification process."

For example, Motion in Grand Rapids is helping several plants in the area to combat the worker shortage by tapping its specialists to automate several processes to remove the labor component altogether.

Motion's expertise includes the fabrication of systems and components used in industry.

IMAGE COURTESY MOTION

Even the lowly MRO items such as gearboxes, FRL assemblies and blow guns are starting to show a bit of high-tech sophistication. Visitors to the Advanced Manufacturing Expo will be able to see some of these latest advances at the Mechanical Hall.

"In years past, a gearbox or gear reducer was just a dumb product: they did what they are supposed to do, but they don't provide feedback," Kennedy said. "But the big move now with mechanical items is the IIoT: the Industrial Internet of Things."

For example, Dodge and ABB have teamed up to supply gearboxes and reducers with sensors to monitor vibration and temperature round the clock, then send a message to a computer or cell phone if readings suggest they are on the verge of failing. "The old school way of doing things was: 'Hey, that gearbox is getting a little warm, or the motor smells like it's burning, or it's starting to squeak or squeal,'" Kennedy said.

SMC has come out with smart FRLs that will track contamination, air temperature, pressure and moisture, then alert the operator if there's a problem with the air system. Other vendors are offering smart-link communication products for directional flow valves, proportional valves, linear transducers, and electric actuators.

About 50 different vendors will be represented at the Mechanical Hall this year, displaying a wide variety of products that span everything from power hand tools to janitorial cleaning and sanitation supplies.

"SKF, our largest bearing supplier, is going to be showing a complete line of bearing tools that can be used to install and maintain bearings and belt drives," Kennedy said. "Visitors can try out the tools at their booth." Other vendors will be showing how companies can save money by using energy-stingy blow guns and vacuum ejectors.

"It's going to be an eclectic mix of vendors in the Mechanical Hall. Just about anything that you can find that is used in a manufacturing facility, you will find in our hall." ■

TMS HABITS OF HIGHLY EFFECTIVE MANUFACTURERS

Tool Management Systems can become 'digital paperweights' if they aren't populated with good data

Companies that use hundreds of tools, holders and fluids to manufacture products get wide-eyed when they see demonstrations of sophisticated software programs that can keep track of inventory or notify operators when tools are ready for resharpening or disposal.

But tool management systems (TMS) can become nothing more than an expensive digital paperweights if companies don't fill them with good data, experts say.

On the other hand, companies that adopt TMS and populate databases with accurate information can reap huge benefits in increased productivity, improved quality and reduced downtime. In some cases, companies have even been able to implement lights-out manufacturing that can substantially reduce labor costs.

TMS systems are most effective when they are populated with detailed, standardized data.

IMAGE COURTESY CRESTON INDUSTRIAL SALES

"Our first customer was a large machine shop in Indiana that paid about $100,000 for implementation and launch of a TMS system" said David Darling, lead sales representative for CimSource-North America who formerly served as chief strategy officer for Creston Industrial Sales in Grand Rapids. "And for three years, they didn't' use it once."

TMS "is just the beginning of the process, and too many people think it's the end," he said.

While it made the commitment to purchase the TMS system, the company didn't factor in the cost of inputting all the critical information about tools and how they were used in the processes. Also, the customer didn't identify individuals in the organization whose primary jobs were to contact vendors to obtain information on the tooling, input the data and push TMS implementation over the goal line.

Learning from its initial mistake, the customer did a limited TMS relaunch in one of its machining groups by inputting of data on about 2,500 tools that relied on an international tool standard called Standard Open Base (StOB), Darling said. After years of inaction, the company was able to use its TMS in the group in a matter of weeks.

In approximate terms, StOB is a "master engineering standard"

that sits alongside ISO, DIN, and ANSI and serves to bridge the gaps in information that would have normally prevented a 3D model of a cutting tool from being read in and recognized by downstream manufacturing systems. Established in 1992, StOB is a more than 600-page document backed up with 50 staff that details standards of how cutting tools are defined on an international basis.

StOB has become essential because cutting tools are made globally, and cutting tool manufacturers use different methods of defining their products. For example, a customer may buy a step drill from Sandvik, an end mill from Garr, and a carbide insert from Sumitomo. All three manufacturers use a different combination of methods to measure and define their tooling. StOB documents rules so all the tools are defined in the same manner. More than 40 major tool manufacturers worldwide have signed on with StOB, generating a catalog of more than 1.4 million tools.

Without using StOB, companies that want to implement TMS systems are faced with having to acquire data from all of their different tool vendors, then translate all the data into a form that can be used by their in-house software.

CimSource-North America has services called ToolsUnited and ToolLink that access the database of tools defined by StOB so that all of the data can be downloaded into a company's TMS system. For tooling that hasn't yet been defined in StOB, CimSource products will send out automated emails to vendors, asking for the data so that it can be rendered into StOB format.

"We customize ToolLink to know what information the customer will need, based on the customer's installation," Darling said. "ToolLink goes into the ToolsUnited server and pulls down any information that the customer needs, then populates the customer's TMS.

"After it scrubs the ToolsUnited server, it then sends automated emails to the vendors to ask for the parameters on the tools that aren't in the system."

With services such as those provided by CimSource-North America, companies can develop a robust TMS, which leads to substantial savings from reduced downtime and the need for excessive safety stock. At the same time, companies can take advantage of all the powerful benefits of software such as collision avoidance and CAM optimization if they have a well implemented TMS, loaded with accurate and reliable 3D cutting tool data. Simply put, if the software doesn't reliably understand what is loaded in the machine spindle, these methods are for naught.

In addition to using their TMS systems to their greatest advantages, manufacturers can reap even greater benefits through greater productivity, improved quality, and reduced downtime if they consider the whole gamut of tooling processes on the shop floor.

"A really robust process looks at several aspects of production: the right tooling, the right holders, the right fluids and the right automation," said Scott


Scott Kudlack

Kudlack, director of sales at Creston Industrial Sales. "One of the biggest challenges in this type of environment is if the tooling is dependable. You can't thoroughly plan for your output if the tooling is not consistent."

While it plays at big part in overall production, tooling generally doesn't have a major impact on the total cost of the part – only about 5 percent, Kudlack said. "It really makes good sense to run a process with a tool changes set at maybe three-quarters of their full tool life," he said. "Run the tool too long and you run the risk of bad parts or creating enough wear on the tool so it can't be resharpened."

In some cases, manufacturers have developed such robust systems that they have been able to engage in lights-out manufacturing — a method of fully automating a manufacturing line so that it can run without human presence on-site for hours or shifts. "Lights-out manufacturing is especially pertinent now, when we are experiencing labor shortages," Kudlack said.

"One customer in Grand Rapids was having trouble finding people who were properly trained in running their CNC mills and specialty machines made for their operations," he said. To solve the bottlenecks, the company ramped up lights-out operations that were built upon a well implemented TMS, very robust manufacturing processes and well designed quality controls.

Paul Hendricks, chief executive officer of Creston Industrial Sales, said the cutting tool industry every year makes remarkable advances and finds new applications for current technology, as evidenced by the data services products of CimSource and lights-out manufacturing.

"Everyone sees that raw materials and labor have become more expensive, so Creston makes a dedicated effort to attend supplier training seminars and workshops to learn how we can help reduce cost, improve uptime or improve quality through our tooling," he said. "It sounds trite, but it still holds true: we need to work smarter, not harder. And that comes from good planning and teamwork with our suppliers and customers." ■

"A really robust process looks at several aspects of production: the right tooling, the right holders, the right fluids and the right automation. One of the biggest challenges in this type of environment is if the tooling is dependable. You can't thoroughly plan for your output if the tooling is not consistent."

— SCOTT KUDLACK,
DIRECTOR OF SALES AT
CRESTON INDUSTRIAL SALES

Speaking the same language

Affordable SCADA system IOhub® orchestrates data exchanges between machines from different manufacturers for Industry 4.0 applications

Small- and mid-sized manufacturers can be discouraged from embracing parts of industry 4.0 when they look over the seas of the equipment on their shop floors and only view "islands" that cannot communicate with each other.

These islands pop up when manufacturers buy equipment made by different companies that operate on proprietary softwares and various brands of sensors and PLCs — all speaking their own languages.

The dream would be to connect all of the equipment to improve throughput and preventive maintenance, but solutions have proven to be costly and cumbersome. Now recently introduced software and hardware may be up to 20 times cheaper than prior solutions with the same results — putting it squarely in the hands of just about any company that wants to implement some Industry 4.0 techniques.

"I have 25 years of experience in Information Technology and Operational Technology, and I can honestly say that the thing that impressed me the most about IOhub is that it actually did what they said it would do. It's very easy to deploy and can handle many devices at the same time."

— MICHAEL MCGRAY, INFORMATION SYSTEMS MANAGER AT THE MICHIGAN MANUFACTURING TECHNOLOGY CENTER, PLYMOUTH, MICH.

"In our experience of doing industry 4.0 projects for manufacturers, we've seen several quotes come in for a SCADA system at about $25,000, for the first sensor and first machine," said Michael McGray, Information Systems Manager at the Michigan Manufacturing Technology Center (MMTC) in Plymouth, Mich. "Now, here you have an $800 device that has the potential to do the same thing."

McGray said he has been testing the SCADA (Supervisory Control And Data Acquisition) system called IOhub® made by EZ VPN Inc. in San Diego for the past several months, and it's now been added to his toolbox of solutions that he recommends to small- and mid-sized manufacturers.

McGray's organization is about as close to a *Consumers Reports* laboratory as you can get in manufacturing. Funded with state and federal tax dollars and revenues from its own consulting services, the MMTC operates a lab in Plymouth that tests hardware and software. With five offices in Michigan, the MMTC provides free evaluations for small- and mid-sized manufacturers that look at operations, technology, and processes. After an evaluation, MMTC will make recommendations regarding the technologies that will make the most impact on a company's bottom line.

"I have 25 years of experience in Information Technology and Operational Technology, and I can honestly say that the thing that impressed me the most about IOhub is that it actually did what they said it would do," McGray said. "It's very easy to deploy and can handle many devices at the same time. Its limitation is essentially the data load on the device — the number of times it's pulling data from equipment on the floor."

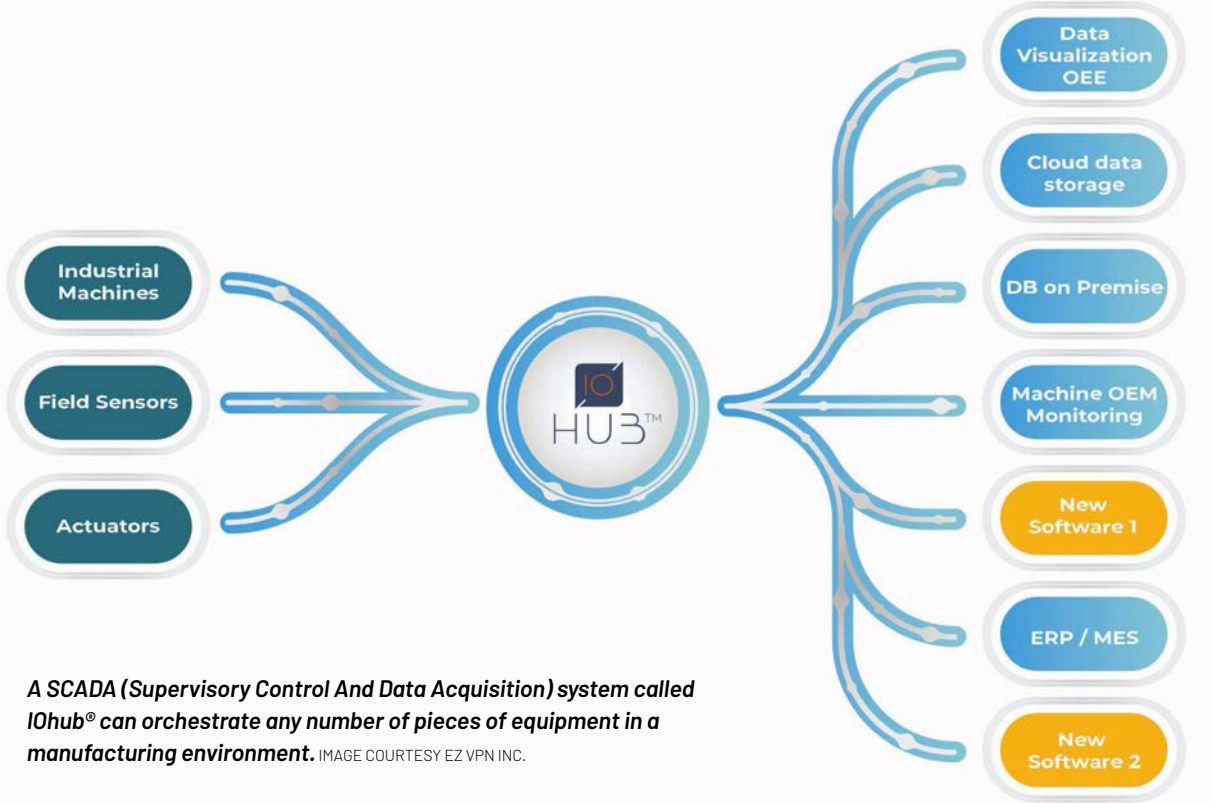
Mark Ermatinger, founder of the AME and CEO of Industrial Control Services Inc. in Zeeland, was equally impressed with IOhub — a device he said he has been searching for during the past two years.

"Once in a while, you will hit upon something that will make you cock your head to one side and say: 'What, it really can do that?'" Ermatinger said. "So when EZ VPN called me about IOhub, I got a loaner unit and sent it off to Michael at MMTC for testing.

"When we talked a few weeks later, Michael said: We have a problem — I can't find anything wrong with it."

Ermatinger said an engineer he dispatched to Plymouth to check the MMTC tests confirmed that IOhub was performing what EZ VPN described in its literature.

Graziano Pestarino, chief financial officer and chief operating officer at EZ VPN, said IOhub is sold in the United States, Europe and Australia to businesses in the sectors of machine tool manufacturing, agriculture



A SCADA (Supervisory Control And Data Acquisition) system called IOhub® can orchestrate any number of pieces of equipment in a manufacturing environment. IMAGE COURTESY EZ VPN INC.

and transportation. Founded in 2017, EZ VPN has offices in San Diego and Italy.

IOhub is a centralized location for all the inputs and outputs of equipment, and it orchestrates how applications utilize the data.

"IOhub as a centralized place where you can orchestrate all the equipment that you have within your factory, and an endless number of equipment pieces can be connected," Pestarino said. "It doesn't depend on the amount of machinery on the floor, it depends on the amount of data that you want to pull and how often you want to pull it."

IOhub differs from other SCADA solutions that require writing custom computer codes at the start of projects and then having to rewrite codes when equipment is added later. "Custom applications are very inflexible and extremely expensive because of the development time," he said.

IOhub is easy to implement because it leverages Docker containers, roughly similar to the way that apps are downloaded and run on a mobile phone. Docker describes a container as "a standardized unit of software that allows developers to isolate their app from its environment, solving the 'it works on my machine' headache."

By using these containers, technicians can put all the pieces of equipment in communication with each other, connect with the cloud services such as AWS and Microsoft Azure, provide inputs to Manufacturing Execution Systems, create a custom data dashboard using Grafana, handle remote cameras so machine problems can be viewed remotely, and create logics for data so if a machine can send a notification via text or email to an individual if it faults.

Equipment in remote locations can even be linked together as if they were in the same place, Pestarino said. One EZ VPN customer in Australia manufactures pumping stations for agricultural irrigation. The manufacturer incorporates IOhubs to monitor flow and pressures of water at various pumping stations, filtration stations and other equipment. The challenge is to maintain constant flows and pressures throughout the entire system.

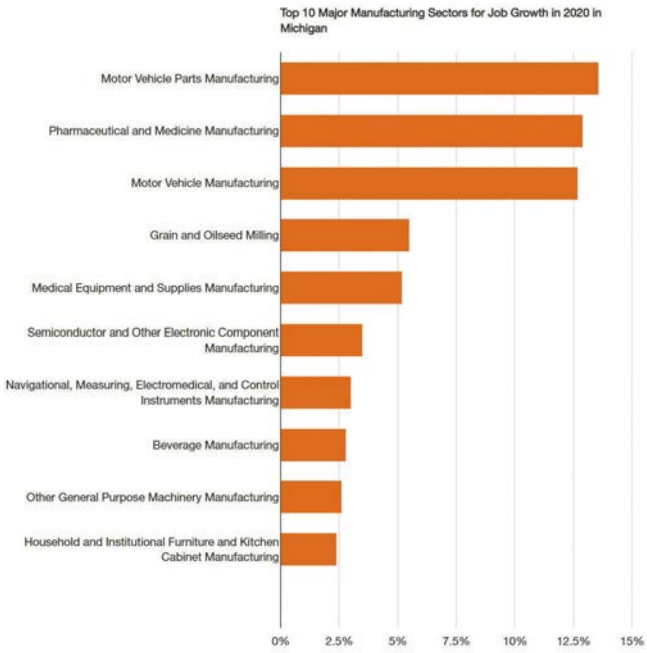
If the flow or pressure drops to an unacceptable level at one station, the IOhub orchestrates another station to make up for the shortfall.

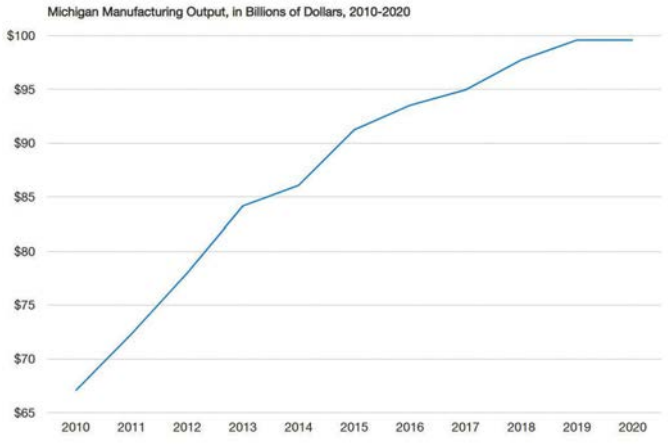
Ermatinger said he believes IOhub will prove to be a game changer for smaller companies that can't afford custom coding or specialized in-house staff. But besides finding a new, useful product, he also was impressed with the long-term collaboration with the MMTC and its role in shaping manufacturing in Michigan.

The experience with the IOhub "is a great example of how we can work together to find practical solutions and share ideas that benefit manufacturing," Ermatinger said. "They are experts in the area of boosting efficiencies on the plant floor, and we are more experts on deploying products to make that happen. We work very well together." ■

Michigan Manufacturing is on the *MOVE*

Some might say things are bad in Michigan now, but according to the National Association Manufacturers (nam.org), manufacturers here account for 18.6% of the total output in the state, employing 14.3% of the workforce — down from 19.4% total output and up from 14.2% in the workforce compared to 2019.





Experts forecast the auto industry will increase 8-10% in the next 12 months. The NAM shows our output for the last 10 years growing and strong. I've heard from manufacturers that reshoring production back to Michigan is a high priority. I guess one thing this pandemic has taught us, is to be more reliant on our own supply chain and logistics.

Everyone knows that finding workers is one of the largest challenges we face, so here's another NAM chart showing the Job Growth area. I am surprised by the pharmaceutical growth and other industries in this list, but it shows our diversity.

So what does the future look like? As I speak to more and more manufacturers and machine builders, I see the traditional workforce retiring quickly and a rapid growth of younger workers who are doing things differently. This new breed of workers are asking "why" with every aspect of their job. Recently, I received a call from a customer that had changed jobs. He was complaining that his new company would not try new things and he asked us for help. Within a few days, he was in our automation lab where we did some testing that showed us we could solve a major labor issue at his company with new 3D vision technology. The new tech offered a solution for the company's requirement of an operator to match each machine for three shifts. The economics looked like this:

- $200K of labor cost times 50 machines = $10 million cost per year
- 3D camera cost per machine $75K = $3.75 million
- **Total savings = $6.25 million first year, $10 million each year thereafter**
- Frees up 25 employees per shift to be trained for higher-paid jobs

Our efficiencies are dramatically increasing with new technology, and this will continue to expand faster than ever during the next decade. Just last week I introduced a new Smart AI camera to some of my top customers. It's called "Deepview" and here are some of the stats of this amazing technology.

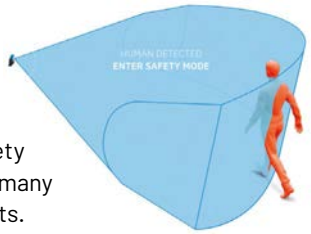
- Built-in 400 core GPU (graphical accelerator)
- It can commutate 12 trillion operations a second
- Stores 2 million Images with 2TB of storage
- Web-browser User-Interface (UI)
- Made in Michigan

I programmed this factory-ready artificial intelligence camera in 30 minutes, simply flagging a few hundred images as good or bad and pressed the "Train" button, and BANG... the AI neural network was built right on the camera. It's amazing how much computing power this camera has!

Self-driving Autonomous Mobile Robots (AMR) are hitting the manufacturing markets fast and furious. These little robots are becoming a game-changer for anyone that is just moving stuff around. Built for the younger generation, you teach it by walking behind the AMR as you drive it with your cell phone!

The robots learn the building walls and objects from two laser scanners seeing 360 degrees. Once the map is created and stored, you program in your stop locations, then you create mission (programs) for the robot to run, and oh by the way, it can find that programmed location within +/- 10 mm and it can figure out another way to get to that location if the path is blocked. Yikes!

Another new disruptive technology for manufacturers is the Safety Radar from InXpect. Unlike traditional safety systems like fencing, light curtains, or laser floor scanners, these little sensors can see in 3D! They only see the moving large metal objects or people but are immune to optical disturbances like smoke, dust, heat, fluids, and other airborne debris. Lightning-fast in milliseconds and SIL2 safety rating, they are changing safety for many industries with difficult environments.



Finally, I believe the most drastic new tool for manufacturers is moving data! Industry 4.0 is upon us. The pandemic forced us to work differently, and we need data for every aspect of our job and life in general. The products to monitor machines for preventive and predictive maintenance and collect data for traceability have been around for some time. The missing piece was moving the data around the enterprise without being a software programmer.

Here is one appliance (computer in the control panel) called IO Hub from EZ VPN that can talk to any database, machine, device, or cloud *and* control where the data goes *and* at a great price of $780.

While writing this article, a customer wanted to have IO Hub integrated into Quickbooks to watch for new incoming orders, then start scheduling production, and also send an email to the customer for material pickups, while sending purchase orders to Quickbooks when under a certain level of inventory... everything within IO Hub with no custom programming.

Sending and retrieving data from the front office to the shop floor and back is no longer difficult and there are many products that are making this easier than ever. Don't miss the boat because of fear, get started now.

Six years ago, I imagined what it might be like to pull LEADERSHIP, NETWORKING, RESOURCES, and TECHNOLOGY together all in one place to celebrate our talents together.

Advanced Manufacturing Expo

This year's event is larger than ever, bringing together an Automation Hall, Mechanical Hall, Metalworking Hall with multiple CNC machines running, along with FIRST Robotics high school teams competing during the show. We also expanded our speaker rooms so attendees can take away real learning opportunities.

Don't miss the "Smart Technology Zone" in the main exhibitor hall in a special cul-de-sac layout and is presented by the Michigan Manufacturing Technology Center (MMTC) on Thursday. They will discuss real-world ways to improve efficiencies, fill talent gaps, increase profitability and stay competitive, featuring multiple Industry 4.0 companies and technologies.

Thank you for being a part of this event and supporting us over the years. Let's continue to make Michigan great to live and work in!

Mark Ermatinger
616-836-5536
Mark@IndustrialControl.com
Founder of the Advanced Manufacturing Expo
Chief Executive Officer, Industrial Control
Executive Board/Treasury, Association of High Tech Distributors (AHTD.org)

SPEAKER/BREAKOUT ROOM AGENDA

— AUTOMATION —

AUTOMATION ROOM 1

8:00 AM - 9:00 AM

"THE EASY WAY TO MOVE PLANT FLOOR PLC DATA TO DASHBOARDS AND APPLICATIONS - NO CODING REQUIRED"
SOFTING INC. - JIM RALSTON

Learn how in-chassis CompactLogix and ControlLogix modules provide fast and easy IoT/Cloud and SQL database connectivity — no coding, no protocol translation, no PC in the middle. Demonstrations will show how the in-chassis PLC module collects tags over the backplane, and from other connected PLCs, for bi-direction data movement from PLC to SQL Server, Azure, and AWS IoT (MQTT). Example applications include downloading recipes, monitoring production and quality metrics, and track & trace. Learn how to ensure connectivity through transaction monitoring and store & forward buffering.


John Hibma

9:30 AM - 10:30 AM

"INTRODUCTION TO THE POLARIS DATA NETWORK"
SUPERIOR INTEGRATED SYSTEMS - JOHN HIBMA

Today SIS is introducing our new SCADA platform, the Polaris Data Network (PDN). Polaris is designed to be a robust yet low-cost data collection and retrieval system which can be connected to various industrial control platforms, including AB and Siemens PLCs, various motion and environmental controllers, PC-based systems, and most any controller or data point. Data is transmitted to an Amazon Web Services server, where users with appropriate credentials can retrieve data. Real-time system status can be monitored, fault annunciation added, and historical data can be retrieved for trending and other data analysis.


Paolo Denti

11:00 AM - 12:00 PM

"IMPLEMENT A FULL-FLEDGED INDUSTRY 4.0 WITH IOHUB™"
EZ VPN - PAOLO DENTI

As a system integrator, building Industry 4.0 applications requires intensive coding and extensive man-hours with a consequently high cost. At times, the cost to implement these applications is so high that it discourages the customer from implementing Industry 4.0 solutions. During this event, you will learn how to implement a complete Industry 4.0 environment using IOhub™ to communicate with different machines, auxiliary equipment, and software typically present on a factory floor.


Marty Reyes

12:30 PM - 1:30 PM

"IIOT & INDUSTRY 4.0 AND BEYOND"
EMPIRE - MARTY REYES

What is IIoT and why do I need it? Is it a project or a strategy? What is the difference between Industry 4.0 and IIoT? If you have questions like these, this is the session for you. Come and get a better understanding of what this IoT, IIoT and Industry 4.0 is all about. Do you need it? Should you do it? Can you do it? This session will explore all this and more.


Jaymes Kyle

2:00 PM - 3:00 PM

BETZ MACHINE - JAYMES KYLE

Betz Machine is a full turnkey automation company from initial design in Solidworks to full robotics integration and system build. Our demo shows some of our wheelhouse capabilities in a small footprint machine.

AUTOMATION ROOM 2


Scott Marsic

9:30 AM - 10:30 AM

"INTRODUCTION TO PARTS FEEDING"
EPSON ROBOTS - SCOTT MARSIC

Parts Singulation for Robotic Automation — If you have an assembly application and need to build parts, chances are, you will need parts feeding. From bowl feeders to vibratory feeders, there are many solutions available today. Figuring out which one to go with can be daunting. With nearly 4 decades of automation experience, Epson Robots has the expertise to walk you through the process and explain the various feeder types available in the market. We will also take you through areas to consider and how to get started:

1. Select the Right Parts Feeder
2. Trends
3. Know the Essentials
4. Pitfalls to Avoid

You will come away with a good understanding of how to get started with parts feeding and the key aspects to consider.

Grant Zahorsky

9:30 AM - 10:30 AM:

"SEMI-STRUCTURED VS RANDOM PILE BIN-PICKING: HOW TO GET STARTED WITH INDUSTRIAL AUTOMATION"
CANON 3D MACHINE VISION - GRANT ZAHORSKY

Canon's 3D Machine Vision system can reduce cycle time, increase productivity, and make applications more efficient in your facility. By being able to handle a variety of part types and pile types (semi-structured or even completely random part orientation), the 3D vision system can successfully recognize your parts and greatly improve your process as a whole. If you're looking to dive into 3D vision and industrial automation without the complexity of random picking, semi-structured picking is a great place to start as the majority of bin-picking applications are semi-structured and are running extremely successfully. In this webinar, we will discuss the benefits of all types of bin-picking and what you need to get started quickly and easily.

Tom Cruttenden

11:00 AM - 12:00 PM

"MOVING AUTOMATION AND INDUSTRY FORWARD"
RUGGED SOLUTIONS - TOM CRUTTENDEN

A brief overview of automation beginnings and how we got to the present. A "not too technical" look at practical insights/ideas on best practices moving forward. How to make a Rugged Solution.

- Security – Three letter acronym soup
- High-Level Architecture – The Purdue Model short history
- Interconnecting Islands of Automation/Processes - Clouds and unicorns
- Standard processes across machines
- Collecting OEE and continuous improvement – What is it? Why do we care? Case studies
- Quality Control and Maintenance – Digital Threading
- Digital Transformation – processes and problems. Twins!
- Edge computing – Why do it on the edge when the cloud is so cool?
- Moving data into the cloud and using AI / ML

Tim Whalen

2:00 PM - 3:00 PM

"HOW TO GET THE MOST FROM YOUR VENDOR REPS"
EMPIRE - TIM WHALEN

Do some vendor reps you have drive you nuts? Have you ever considered it might be your own fault? It might not...but...

Tim will discuss how to set your expectations correctly to get the most from your interactions with suppliers. Whether you are in purchasing, engineering, maintenance, or on the floor building equipment — you may benefit from Tim's 30 years of experience and have worked on both sides of this equation.

SPEAKER/BREAKOUT ROOM AGENDA

– MECHANICAL –


Caile Richards

8:00 AM - 9:00 AM

"REAL-WORLD ENERGY EFFICIENCY"
SMALL BUSINESS ASSOCIATION OF MICHIGAN - CAILE RICHARDS

Join SBAM Energy Solutions' Caile Richards for a conversation on practical ways small businesses can implement scalable energy efficiency updates. Caile will be joined by Consumers Energy and DTE Energy representatives to walk through their most popular small business programs, as well as Michigan small business owners who will share their experiences, savings, and more.


Ken Zebarah

9:30 AM - 10:30 AM

"HOW SOLAR ENERGY WORKS AND HOW IT APPLIES TO MANUFACTURERS"
HARVEST SOLAR - KEN ZEBARAH

In this enlightening segment, Ken Zebarah will lead an informative discussion regarding how solar energy works in Michigan, the beneficial application of solar for manufacturers, and the recent updates and changes in the industry. Since a solar investment also provides brand enhancement and a return on investment, Ken will also discuss how manufacturers can gain a competitive industry advantage by strengthening consumer, supply chain, and employee relationships while highlighting your business for the 88% of consumers looking for sustainable brands. Since many variables apply to each unique situation, Ken will outline the various factors that identify if solar energy might work for your facility.


Timothy Wilson

11:00 AM - 12:00 PM

"SYTRONIX: NEW DEMANDS REQUIRE NEW TECHNOLOGY"
MORRELL GROUP - TIMOTHY WILSON

Historically, machine systems have been designed to operate continuously at maximum performance capacity, even though it was required for only a portion of each cycle. Today, increasing energy prices and workplace environmental regulations have engineers rethinking their designs and focusing on systems that reduce energy consumption and factory noise. Sytronix servo-driven pump drive systems address these challenges. Sytronix variable-speed pump drives combine the reliability of high-performance hydraulics and the energy efficiency of powerful drives and electronics systems.

Join us to learn how one manufacturer:

- Saved 93% on Cycle Energy Costs
- Reduced Noise and Floor Space
- Improved Machine Performance by 15%

12:30 PM - 1:30 PM

HECO - ALL SYSTEMS GO


Dale Watkoski

2:00 PM - 3:00 PM

"RECOVERING VALUE OUT OF IDLE OR SURPLUS INDUSTRIAL MACHINERY"
BTM INDUSTRIAL - DALE WATKOSKI

Tired of trying to figure out what to do with idle or no longer needed machinery or equipment? BTM Industrial - Asset Recovery Partners specializes in assisting companies to recover value out of decommissioned or idle industrial machinery. We offer asset recovery experience that offers multiple options that depend on what your definition of "value" is on the project or certain pieces of machinery. Come listen and ask questions on how BTM Industrial Asset Recovery Partners can help be a partner in recovering "value" out of your surplus industrial machinery for your organization.

ONLINE MACHINE BUILDERS DIRECTORY

industrialcontrol.com/ machinebuilders

Use this list to find machine builders in your area to help automate your business or contact us and we will help you shape your automation needs and we will make multiple recommendations of machine builders that fit your needs best.

If you want to be added to the list or see a mistake, email us at sales@industrialcontrol.com

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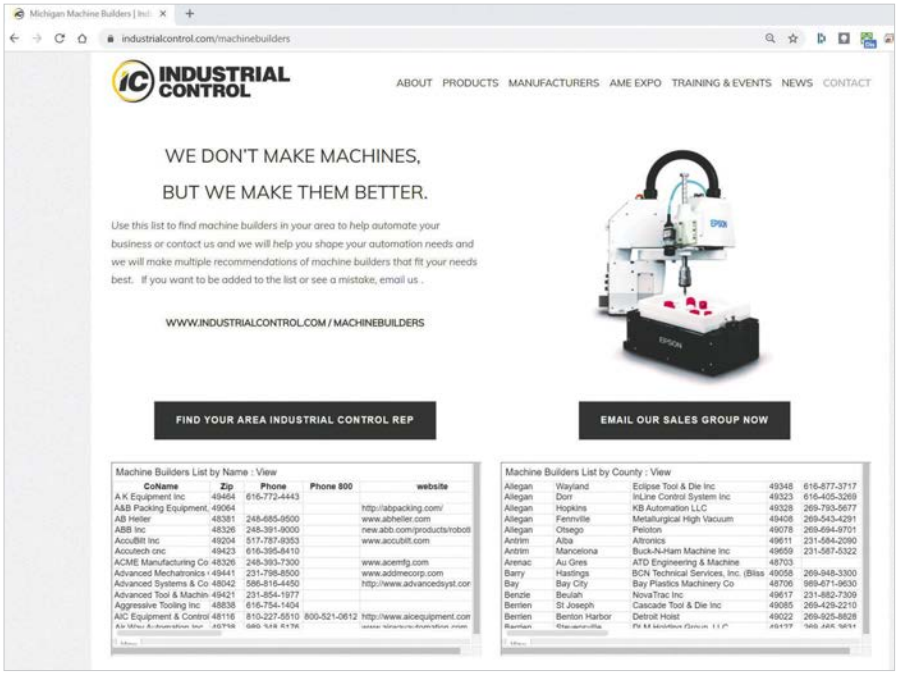
https://industrialcontrol.com



SPEAKER/BREAKOUT ROOM AGENDA

– METALWORKING –


Dr. Götz Marczinski

8:30 AM - 9:30 AM:

"DATA MAKES THE DEAL – HOW DIGITIZATION WILL DRIVE THE METAL CUTTING INDUSTRY"
TOOLS UNITED - DR. GÖTZ MARCZINSKI

After CORONA the " new normal" of value delivery in the metal cutting industry will look different than before. It will be even more digital, less personal than before. However, personal interaction will not become completely obsolete. Backed by practical examples Dr. Marczinski will frame his view of the "New Normal" by 4 statements, leading to the conclusion that data will make the deal. The concept of the "Information Supply Chain" from tool suppliers to tool users becomes tangible.


Greg Nemecek and Zachary Glascock

10:00 AM - 11:00 AM:

"INSIGHTS ON METAL AM"
ACTION MOLD & MACHINING - GREG NEMECEK & ZACHARY GLASCOCK

Getting additive manufacturing (metal or other) implemented into your business can be an arduous process, however, manufacturers must consider these technologies or risk being overtaken by this new wave of manufacturing. Understanding what it is you're trying to achieve or the challenge you're trying to solve is key.


Dr. Abdelatif Atarsia

11:30 AM - 12:30 PM:

"THE SKY IS THE LIMIT WITH COMPOSITE MATERIALS BUT IT'S NOT JUST FOR AEROSPACE"
YG1 USA - DR. ABDELATIF ATARSIA

Too many technical people always refer to the aerospace industry when talking about composites especially carbon fiber reinforced plastics (CFRP). In fact, we have seen during the last few decades that most of the innovations done on CFRP were focused on parts, sub-assemblies, and final assemblies (FAL) of aircraft structures of any size and category. This made scientists, technologists, business people and even editors asking the following question: will composite material developers be concentrating only on Aerospace? The answer is...


Danielle Schneider

1:00 PM - 2:00 PM:

"NAVIGATING MANUFACTURING AS A WOMAN: STEPS AND STORIES TO HELP YOU SUCCEED"
WOMEN IN MANUFACTURING WEST MICHIGAN - DANIELLE SCHNEIDER

What does it take to navigate manufacturing as a woman? When do your instincts overrule your education? How you deal with being labeled as difficult to work with? How do you change the stigma of women being labeled a secretary? How do you find your passion and continue to fuel it when support is lacking? Come and listen to one experience that encapsulates all these questions. We will discuss a few tips on how to keep your career moving forward and how to support other women when choosing a career in manufacturing.


Dr. Kevin Landmark

2:30 PM - 3:30 PM:

"CORROSION IN YOUR MANUFACTURING PROCESSES: CAUSES, RISK FACTORS, AND PREVENTION!"
ZERUST CORROSION SOLUTIONS - DR. KEVIN LANDMARK

Effective corrosion control requires more than rust preventives and VCI packaging. It is important to understand and address the root causes of rust introduced by the manufacturing process because a proper remedy is driven by an accurate diagnosis. We will review the different risk factors inherent to aqueous coolants, washes, and rinses and explore how these factors relate to the different fluid monitoring methods, e.g. refractometry and titration. Zerust's scientific approach to mitigate corrosion throughout the manufacturing process will be presented as the solution.

LIVE CNC MACHINE DEMONSTRATIONS

AUGUST 26, 2021 • METAL WORKING HALL

Three CNC Vendors running and making chips and showcase the latest metalworking technologies!

Braun (Hurco) BOOTH #1121 @ 9:35 a.m. & 3:35 p.m.

Braun Machinery is offering *Practical Job Shop Automation* and will be showing the popular 40" x 20" Hurco VM20i CNC with an integrated Universal Robot built and installed by ProCobots, a wholly owned subsidiary of Hurco Companies.

ProCobots offers turnkey automated machine tending solutions for high mix and low volume production that can be connected to any new or existing Hurco CNC. *No experience with robotics is required* — the world-famous Hurco Winmax Control makes integration & programming easy! **Learn more at www.Hurco.com/Automation**

Gosiger (Okuma) BOOTH #1123 @ 11:05 a.m. & 2:05 p.m.

Gosiger will be running an Okuma LB3000, using Esprit programmed Profit turning cycle Combined with AWR/"Load-N-Go" Robot load and unload. 4140HT Material, turned using Kennametal and Sandvik tooling. **Learn more at www.Gosiger.com**

Millennium (Citizen) BOOTH #1023 @ 12:35 p.m.

Millennium Machinery will be making a "king" chess piece on our Citizen L20 type X. The demonstration will showcase Citizens' patented LFV process while turning, milling, drilling, ID threading, and engraving. Our process will utilize the ARNO quick change tooling system as well as the JBS auto guide bushing system. Our goal is to educate on the flexibility, speed, and repeatability of the Citizen Swiss machine brand. **Learn more at https://citizenswiss.com/**

SMART TECHNOLOGY ZONE

MICHIGAN MANUFACTURING TECHNOLOGY CENTER (MMTC)
PRESENTATIONS THURSDAY, AUGUST 26: 9AM, 11AM, 1PM & 3PM
PRESENTATIONS FRIDAY, AUGUST 27: 9AM & 11AM

Located at MMTC B2B Roundtable Area in Hall C


Al MacKinnon


Michael McGray


Robert Scipone


George Singos


Chuck Werner


Mike Yost

As manufacturers work to improve efficiencies, fill talent gaps, increase profitability and stay competitive, a strategic advantage can be found in the application of relevant advanced manufacturing technologies. To ensure manufacturers of all sizes find success in their implementations, experts from the Michigan Manufacturing Technology Center's (The Center) Industry 4.0 team will provide informative, interactive presentations designed specifically for smaller manufacturers, complete with live demos of relevant technologies in their Smart Technology Zone at the 2021 Advanced Manufacturing Expo.

The Center's presentations will provide an overview of what steps to take to effectively implement technologies, starting with data collection to gain insight into current performance then growing from there to tackle the biggest opportunities for improvement. These presentations include:

Advanced Manufacturing Technologies — Michael McGray, Industry 4.0 Program Manager, and Robert Scipione, Applications Engineer, will provide an overview of the technologies that have changed the way businesses design, test, manufacture and service products and discuss how each type of technology — including 3D Scanning/Design, Product/Process Simulation, Smart Products and more — can be applied to continuously improve operations.

Digital Process Controls — Chuck Werner, Manager of Operational Excellence, will join Robert Scipione to explain how interconnectivity of process equipment enables better data collection, process/product improvement and process control. Once this is in place, manufacturers can gain a real-time, comprehensive view of current operations to identify key areas in need of improvement and make corrective actions in the moment.

Human Machine Interaction — For those seeking to fill talent gaps or improve employee engagement, Chuck Werner and Robert Scipione will discuss how technologies such as Robots/Cobots, Augmented & Virtual Reality and System Integration can support workers in dull, dirty or dangerous jobs and help eliminate sources of waste to increase engagement, productivity, quality and cost savings.

Enhanced Operations Management — To achieve more impactful business results overall, George Singos, Industry 4.0 Business Leader Advisor, along with Chuck Werner and Michael McGray will explain how Manufacturing Operations Management can be combined with technologies such as Big Data and Analytics or System Integration to make systems implementation easier and help improve business operations as a whole.

To more effectively demonstrate the applications and benefits of these technologies in person, The Center has invited select technology suppliers to provide hands-on demos for attendees in their Smart Technology Zone, including:

- **Feyen Zylstra,** a Grand Rapids-based company, will demonstrate how Big Data and data visualization can enable companies to make more informed, educated business decisions. Mike Yost - myost@fzcorp.com
- **Orka Automation** from Wyoming, Mich., will present on automated inspection and how to use Mobile Industrial Robots to bring inspection systems into work cells. John Amrhein - jamrhein@orkallc.com
- **Next Chapter Manufacturing of Grand Rapids** will demonstrate how digital design and Additive Manufacturing can help to reduce cycle times while improving quality and maintenance. Jason Murphy - jason.murphy@nxcmfg.com
- **CIMx Software** of Ohio and Canada-based **FreePoint Technologies Inc.** each will use their Manufacturing Execution Systems to show how automated data collection can improve aspects such as downtime and labor tracking. Kristin McLane kmclane@cimx.com and Al MacKinnon al.mackinnon@getfreepoint.com
- **OPS Solutions** from Wixom, Mich., will demonstrate how Augmented Reality can support the digitization of work instructions and inspection to ultimately increase quality, productivity and employee engagement. Chris Bala chris.bala@lightguidesys.com
- **Singh Automation** - Gurdeep Singh g@singhautomation.com

ADVANCED MANUFACTURING PRODUCT SPOTLIGHT

ARCH® Cutting Tools expand the Patriot High Performance® portfolio to include the all-new built-on 80 years of experience, Solid Carbide Drill. 100 percent American-made quality and reliability, increased productivity and operational efficiency – and a potential gain of 20 percent or more in process improvement, the expanded Patriot HP portfolio should be in your cutting tool "toolbox."

The precision through coolant and low friction coating provides the highest level of chip evacuation. Complemented with low thrust force design with a 140º point angle suited for multi-application drilling. Increasing tool life will provide greater process security and better machine utilization.

ARCH® CUTTING TOOLS
2600 S. Telegraph Rd., Suite 180 • Bloomfield Hills, MI 48302
http://www.archcuttingtools.com

The **Small Business Association of Michigan** (SBAM) is working with Consumers Energy (CE) and DTE Energy (DTE) to provide enhanced energy services to small business across Michigan with the SBAM Energy Solutions program.

Small businesses have access to special services that can help your small business become more energy efficient. The good news is that you don't have to do it alone! SBAM Energy Solutions provides you with personalized assistance as you navigate the ins and outs of energy management.

SMALL BUSINESS ASSOCIATION OF MICHIGAN
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Components Express is the leading manufacturer of IP67 rated cable assemblies and industrial camera enclosures and accessories for industrial applications. M12 Industrial Cables, Camera Link, CoaXPress, CLHS, Gig-E, USB 3.0, power supplies, LVDS along with BIT-MAXX products supporting digital and analog camera to frame-grabber devices. CEI's Enclosure and accessories offer unique advantages in cabling such as No cord grips and connector options, along with a light weight low profile design that provides outstanding performance and efficiency. CEI is ISO 9001 : 2015 registered and recognizes the importance of continual improvement and compliance. We invite you to visit us today!

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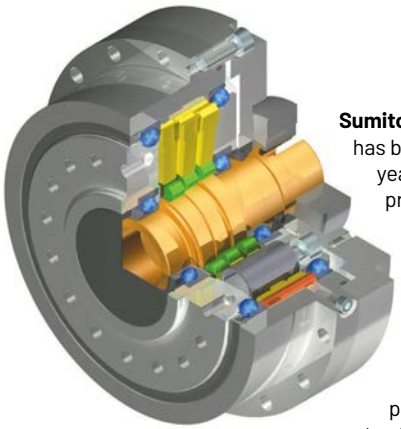
http://www.componentsexpress.com



Sumitomo Drive Technologies has been trusted for over 130 years to provide quality products and innovative solutions to help our customers solve their complex challenges. This rich history has made us a leading manufacturer of robotics, power transmission, and control products in a wide variety of applications for leading brands around the globe.

Since 1966, Sumitomo Machinery Corporation of America has served the United States by providing local sales and support to a variety of customers spanning the many industries that are unique to our region, such as robotics, medical, food and beverage, parcel handling, automotive, and mining.

SUMITOMO DRIVE TECHNOLOGIES
4200 Holland Boulevard • Chesapeake, VA 23323-1525
https://us.sumitomodrive.com/en
eric.schoonover@shi-g.com

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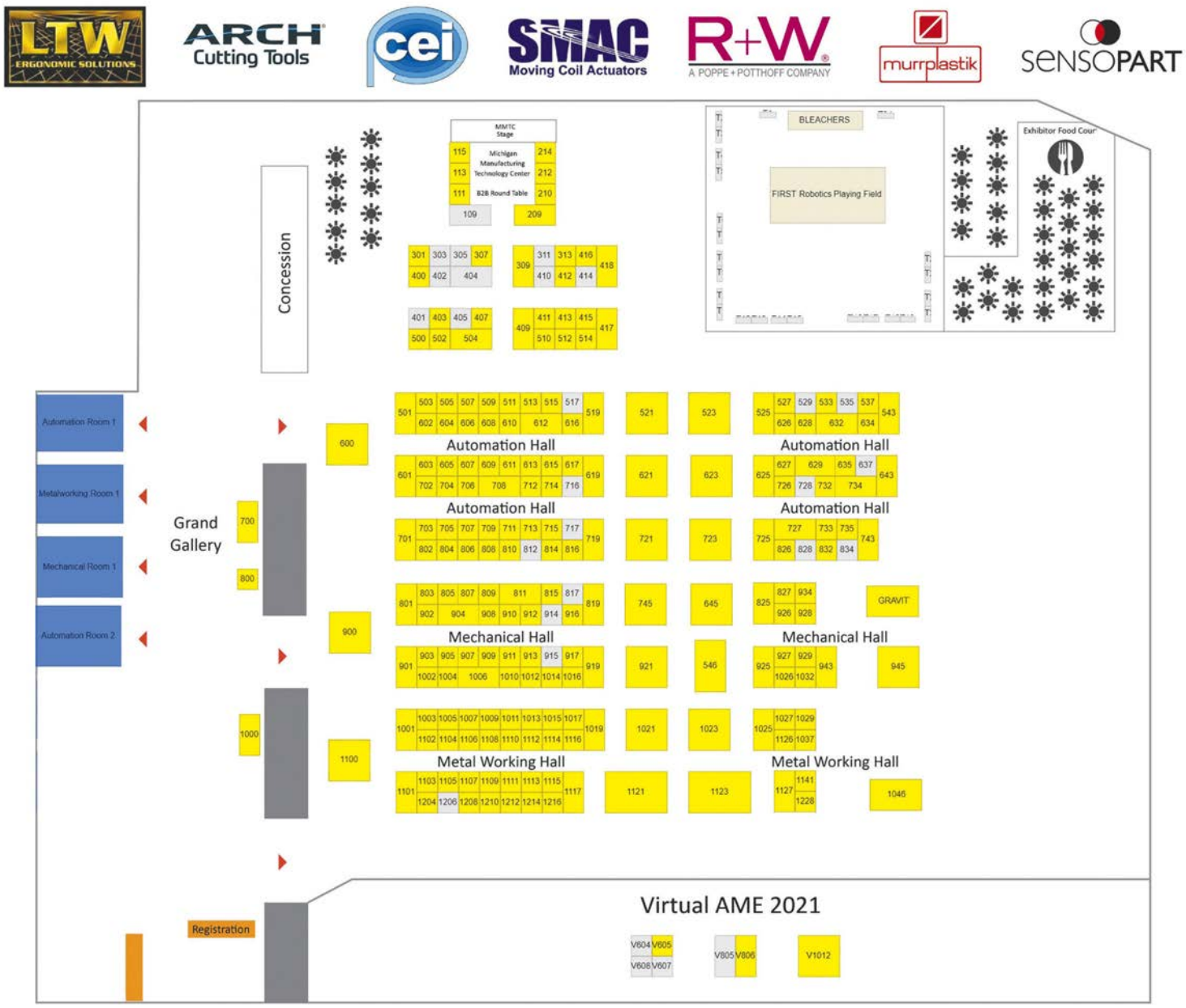
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Cutting Tools
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SMAC
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R+W
A POPPE + POTTHOFF COMPANY
murrplastik
SENSOPART
MMTC Stage
Michigan Manufacturing Technology Center
B2B Round Table
BLEACHERS
FIRST Robotics Playing Field
Exhibitor Food Court
Concession
Automation Room 1
Metalworking Room 1
Mechanical Room 1
Automation Room 2
Grand Gallery
Automation Hall
Automation Hall
Automation Hall
Automation Hall
Mechanical Hall
Mechanical Hall
Metal Working Hall
Metal Working Hall
GRAVIT
Registration
Virtual AME 2021

AUTOMATION HALL

Sponsored by Industrial Control

BOOTH #	COMPANY
1013	Action Mold & Machining
704	Active Inspection
505	Air Components, Inc.
706	Allison Park Group
702	American Industrial
826	Applied Motion Products, Inc.
610	Ardent Automation
734	Asyril US
723	Automotive Dynamics Corporation
523	Banner Engineering
825	BEHCO
309	Betz Machine
511	Bluewrist, Inc.
929	Broadview Product Development
400	Bronkhorst USA
407	Burton Precision, Inc.
617	BUSINESS INTELLIGENCE SOLUTIONS LLC
502	Canon 3D Machine Vision
616	CCS America
537	Challenge Manufacturing
712	Components Express, Inc.
809	Cone Drive
503	Contrinex
725	COUNTERPART ERP
816	Coval Vacuum Technology
625	Criterion Automation
701	Datalogic USA, Inc.
416	Discover Manufacturing / West Michigan Works
409	Donald Engineering
411	DTE Energy Efficiency Program for Business
621	Edgewater Automation
806	Emitted Energy Corporation
519	Empire
521	Empire
802	Encoder Products
745	EPSON Robots
726	Equitable Advisors
500	Essential Robot Products, Inc.
515	EZ VPN, Inc.
1006	FCI Automation
613	Forerunner 3D Printing
628	Frontline Technical Sales Group
533	Georg Utz, Inc.
512	GRIT Technologies
602	Gudel, Inc.
1011	Guhring, Inc.
1212	Haimer USA
707	HMS Networks, Inc.
705	HTE inc.
743	Hyperion Automation
719	IAI
600	Industrial Control
606	Industrial Resources
807	Inovatech Automation
629	Kassow
732	Kyntronics, Inc.
619	LMI Technologies
608	MB Kit systems LLC, Division of Weiss North America
514	MBI Automation
735	Mechatronics Solutions LLC
733	Mechatronics Solutions LLC
632	MFP Automation Engineering
313	Michigan Department of Corrections - Vocational Village
635	Michigan Manufacturers Association
832	Micropsi Industries
413	MiSTEM Network
700	MOBILE INDUSTRIAL ROBOTS Inc.
623	Morrell Group
721	Motion Index Drives
510	MSC Floors
709	Murrplastik Systems, Inc.
527	MVB Improvements
501	Nabtesco Motion Control, Inc.
611	Novastar Solutions
626	PANELBOY CONTROLS LLC Our mission is to provide professional, quality services to the automation industry. We strive to be the best option in on-site panel building & machine wiring in West Michigan. Our goal is to work together to make the best team to complete your project. Over 40 years of combined experience in machine wiring and panel building, we are electrically, mechanically, and pneumatically capable and ready to take on any project! In June 2019 we were granted a MBE Certification which will allow us to take on more jobs! PanelBoy Controls LLC ensures the quality of the work backed behind being UL listed. This UL certification ensures upon request all products made or supplied are tested internally at PanelBoy Controls for fit, form, and function before they are sold to customers. Customer therefore can be assured they are receiving the highest quality components consistently. **1615 Monroe Ave NW Suite A2, Grand Rapids MI 49505** **http://panelboycontrols.com**
627	Prime Controls, Inc.

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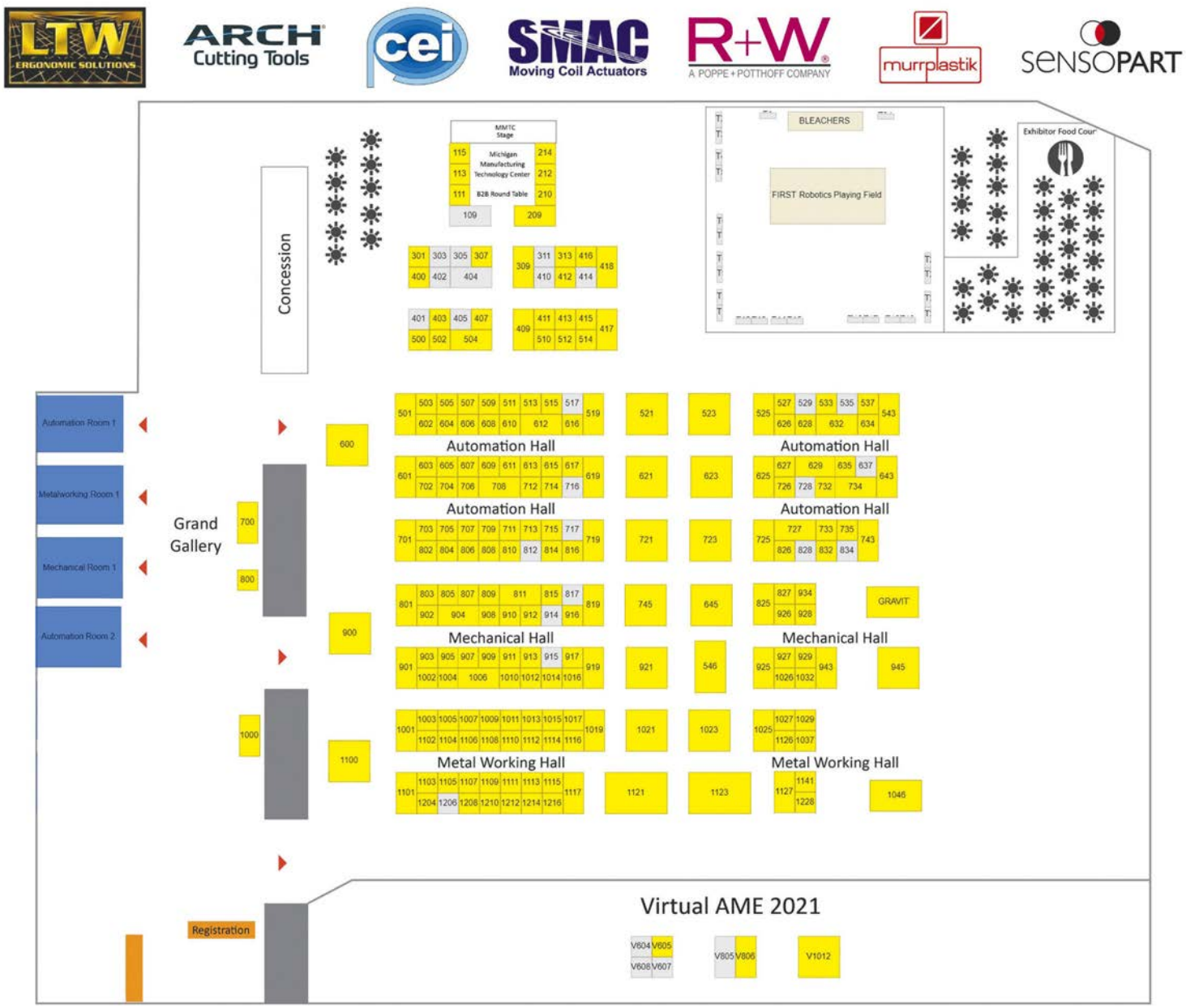
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Mechanical Hall
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417	PTR SALES
814	QA1
612	QC Conveyors
804	Rapid Coating Solutions
525	Rapid Control Service, Inc.
509	Real IT Solutions, Inc.
634	Ringnalda TenHaken Insurance Group
507	RLM Industries Inc
504	Rock Interface Systems
604	Rugged Solutions
1105	SCHUNK
714	SensoPart
805	SEW-EURODRIVE
415	Small Business Association of Michigan
307	Smart Klaus
711	Smart Vision Lights
819	SMC Corporation of America
715	Softing, Inc.
645	SOLOMON 3D
603	Spectrum Illumination
605	STEIN Automation
703	Steute Technologies, Inc.
713	Sumitomo Drive Technologies
811	Superior Integrated Systems, Inc.
615	SWYFT Solutions
810	Team Financial Group
412	Thompson M-TEC
643	TMI Supply Company
513	Tuff Automation
607	Turck, Inc.
301	United States Navy
1000	UVSheltron, Inc.
727	Weiss North America, Inc.
403	Worksighted
543	Youngblood Automation
808	Yunsheng USA

MECHANICAL HALL

Sponsored by Motion

BOOTH #	COMPANY
919	ABB Motors and Mechanical, Inc.
928	AMI Bearings, Inc.
943	AMMEGA
905	apex spring & stamping
907	AutoForm Engineering USA, Inc.
913	Bestorq Inc.
546	Cleco Production Tools
927	E&M Design Solutions
1012	Emerson
850	Gravity
1002	Harvest Solar
1016	HECO - All Systems Go
903	Hydraulic Parts Source
801	LTW Ergonomic Solutions
910	Master Lock Company
800	MiBiz
708	Midwest Automation Supply
803	Midwest PT Sales
900	Motion Industries
934	Motion Industries
945	Motion Industries
916	NSK Americas - Ann Arbor, MI
909	NTN Bearing
908	perma USA
921	Promess, Inc.
815	R+W Coupling Technology
911	RBC Bearings, Inc.
904	Regal Beloit
926	Rexnord
1026	Schaeffler Group
609	SKF USA, Inc.
601	SMAC
1032	Swagelok Michigan | Toledo
902	Tacmina USA
901	Tutelar Technologies ~ Ujigami - For Zero Defects
925	Unist, Inc.
827	US Tsubaki / KabelSchlepp
917	ZEISS Industrial Quality Solutions

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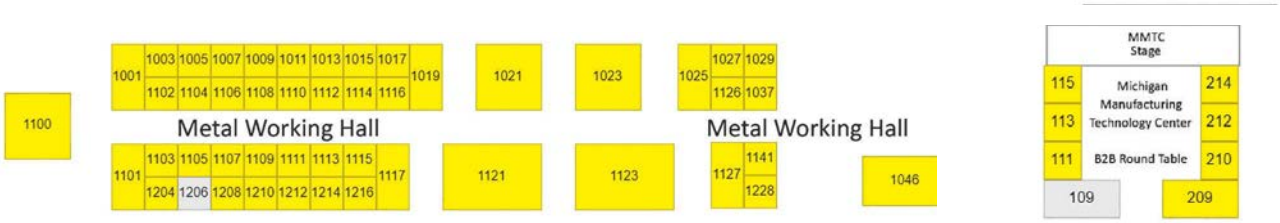

METALWORKING HALL

Sponsored by Creston Industrial Sales

BOOTH #	COMPANY
1046	Adenna / Afla Tools / Edge / Eklind / Fluke / Horizon Tool / MK Morse
1103	Allied Machine & Engineering
912	Apex Tool Group
1117	ARCH® Cutting Tools, the All-American cutting tool company building back American Manufacturing. Offering onsite engineering support to develop robust processes with your team as well as leveraging the heritage of KEO® and Ultra-Dex® product portfolios. KEO has evolved over 80 years to include Micro Tools, Milling Cutters, and the Patriot High Performance® cutting tool line, making ARCH Cutting Tools the most trusted American source for the multitude of industry machining needs that we service. Building on this, the broad portfolio of the Ultra-Dex® indexable product line supports strong manufacturing solutions in tool holding, indexable milling, boring, turning, threading, grooving, and hole-making. Adding to the pillars of strength is the ability to collaborate with the customer to enhance process and profitability with our engineered custom tooling solutions through ARCH Specials, from solid round, indexable, and PCD tipped to complex multi-function tools. **2600 S. Telegraph Rd, Suite 180, Bloomfield Hills, MI 48302 http://www.archcuttingtools.com**
1104	ASHBURN CHEMICAL TECHNOLOGIES
1121	Braun Machinery Company
1009	BTM Industrial
1014	BUILT Systems
1101	Caster Depot
1100	Creston Industrial Sales
1126	Crystallume
1108	Dynabrade, Inc.
1021	Edrich Products & Armor Protective Packaging
1029	Forkardt/Hardinge
1003	GARR TOOL CO
1010	Gates
1123	Gosiger Machine Tools, LLC
1115	Greenfield Industries & Wendt Abrasives
1110	GWS Tool Group
1109	H&R Mfg and Supply & Gorilla Mill & K-Tool, Inc.
1004	Hamilton Caster & Mfg. Co.
1005	Horn USA, Inc.
1114	JM Sales & Associates
1111	Mate Precision & Pioneer Toolholders
1141	Michigan Drill / Lavalle & Ide
1023	Millennium Machinery
1228	MPI - Magnetic Products, Inc.
1107	Nachi America
1116	Oemeta - The Coolant Company
418	Phillips Saw & Tool
1025	QualiChem, Inc.
1017	Radians Inc.
1127	Rego-Fix / Advent / IMCO / MicroCentric
1204	Riten Industries
1019	Scarlett, Inc.
1112	Schwanog, LLC
1214	Specialty Tools, Inc.
1015	Stanley Black&Decker
1210	The FactoryLink
1106	ToolsUnited
1208	Tsugami/Rem Sales LLC
1113	Vargus, Groovex, Shaviv
1037	ViewTech Borescopes
1102	Walter USA
1027	Women In Manufacturing Western Michigan
1001	YG1 USA
1007	Zerust Corrosion Solutions
1216	ZOLLER, Inc.

SMART TECHNOLOGY ZONE

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BOOTH #	COMPANY
212	CIMx Software and FreePoint Technologies, Inc.
210	Feyen Zylstra
209	Michigan Manufacturing Technology Center - West
113	Next Chapter Manufacturing
214	OPS Solutions
111	Orka Automation
115	Singh Automation

VIRTUAL AME EXHIBITORS

BOOTH #	COMPANY
V1012	GoEngineer
V806	Radley, LLC
V505	TAMRON

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