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Automation & Robotics

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Cobots:
Automation Reinvented

Universal Robots, the leader in collaborative robots, delivers advanced robotic automation without the traditional added costs associated with programming, set-up, and dedicated, shielded work cells. Unlike traditional industrial robots, UR's lightweight robots can be moved around, automating high mix/ low volume production runs. They are surprisingly affordable, easy to program, and handle payloads up to 16 KG (35 LB), perfectly suited for packaging and palletizing applications. Request a cobot demo today!

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Universal Robots Unveils Enhanced UR10e with 25% Greater Payload

ODENSE, DENMARK, MAY 18, 2021: Universal Robots (UR) is launching an **enhanced UR10e** with an increased payload of 12.5kg (27.55lbs), creating new possibilities for applications such as palletizing, machine tending, and packaging. The robot's price remains unchanged.

"Universal Robots is committed to continuous improvement based on meaningful conversations with customers and our ability to address critical market opportunities. Our customers have already deployed UR cobots on a wide variety of palletizing applications. Over time, they have identified opportunities to utilize our UR10e cobot in handling tasks with heavier items," says Kim Povlsen, President of Universal Robots. "In response to

this demand, we have enhanced the UR10e to support greater payloads, providing customers with exciting new deployment capabilities."

The enhanced UR10e retains the small footprint, intuitive programming experience, uncompromising repeatability, commitment to quality, and trusted performance that Universal Robots customers have come to expect, but its increased payload capacity means that users can now do more:

The UR10e can now be used in palletizing applications with cartons weighing up to 10kg and a 2.5kg gripper.

The UR10e is now more versatile for other material handling tasks, too, such as loading and unloading heavier workpieces in machine tending deployments and packaging of heavy items.

The enhanced UR10e's greater payload takes more weight from the hands and shoulders of humans, leading to improved ergonomics and working conditions. With overexertion and repetitive motion accounting for an estimated 24% and 8% of workplace injuries respectively in the U.S. alone, this provides significant relief to human workers.

"Humans are not designed to lift heavy goods repeatedly, but our cobots handle these tasks with ease. By taking over unergonomic activities, UR cobots boost productivity, improve product quality, and help businesses rethink how to best use the creative and problem-solving abilities of their workforce –all while keeping people safe," says Kim Povlsen.

Feedback from UR partners has been extremely positive; MBO Postpress Solutions in Germany has integrated the UR10e as part of its CoBo-Stack stacking cobot. "Increasing the payload of the UR10e will make our MBO CoBo-Stack much more profitable for our customers by expanding their application possibilities to include larger packages and heavier products, such as perfect bound or saddle stitched catalogues and brochures," says Sebastian König, Head of Research & Development at MBO Postpress Solutions GmbH.

In addition, the updated UR10e also provides plug-and-play compatibility with products from Universal Robots' UR+ ecosystem of hardware and software peripherals, ensuring that users can quickly and easily get started with collaborative applications.

Nicolas Lauzier, Senior Product Manager at Robotiq comments: "The greater payload of UR10e makes a big difference to palletizing applications by enabling users to handle loads up to 12.5kg in weight. And with 25% greater automation potential, it also means that the UR10e can help whenever there is a single line that needs to palletize a wide range of products of different weights."

Orders can be placed with UR distributors globally now, with shipments of the new UR10e scheduled to start in the second half of June.

For further product details, please go to **https://www.univer-sal-robots.com/products/ur10-robot/**

Universal Robots Power Flexible, Easy to Deploy Palletizing Automation

By Joe Campbell, Senior Manager of Applications Development, Universal Robots

Collaborative robots (or 'cobots') from Universal Robots are a proven technology for palletizing applications at companies of all sizes. Building on Universal Robots experience as the world's most successful cobot maker and spurred by customer demand, Universal Robots and its partners have developed a range of easy to deploy **palletizing-focused Application Kits** designed to provide users with all the hardware and software required to get started on palletizing applications. Available through the UR+ platform, Universal Robots' palletizing Application Kits provide manufacturers with a wide variety of ways to get cobot-powered palletizing tasks up and running quickly, easily and at a fraction of the cost associated with traditional, competing palletizing systems.

Palletizing's Pain Points

Manual palletizing requires workers to bend, lift and twist for hours on end. Over time, this unergonomic task can cause repetitive strain injuries and musculoskeletal disorders, endangering worker health and driving up labor costs. With manufacturers already facing challenges around hiring and retaining skilled labor, the case for freeing workers from palletizing tasks through the use of cobots is compelling. Some

L'Oréal India deployed a UR10-powered system for palletizing at its Pune facility. Source: Universal Robots

manufacturers have found that cobot-powered palletizing can act as an effective tool **for attracting new workers**, due to the ergonomic enhancements it brings and the 'Wow' factor associated with safe and flexible collaborative robots.

Traditional industrial palletizing systems have been around for decades, but they are inflexible and difficult to reconfigure, making them a poor fit for high mix/low volume and seasonal manufacturing. Traditional systems also require fencing, have a large footprint, are time consuming to operate and require outsourced expertise for programming and maintenance.

By contrast, cobot-powered palletizers provide faster cycle times, faster ROI, lower TCO (Total Cost of Ownership), greater flexibility and come with a small footprint. Additionally, cobots can be deployed in close proximity to humans without the need for safety fencing. Thanks to different flavors of intuitive palletizing control software, cobots are also easy to deploy, regardless of your company's level of prior robotics experience.

Proven cobot-powered palletizing solutions

Universal Robots make palletizing automation accessible to companies of all sizes, from global brands to small, family-owned manufacturers. At L'Oréal India's Pune plant, for example, manual end-of-the-line operations involved operators lifting approximately 18,700 lbs of product per 8-hour shift. Concerned about the ergonomic risk, **L'Oréal India deployed two UR10s** on palletizing tasks, enabling the cosmetics giant

Unilever has deployed UR10 cobots to handle palletizing tasks at the company's Katowice, Poland facility. Source: Universal Robots

to improve worker health and safety and increasing overall equipment effectiveness in the plant by 5%, thanks to the time saved in pallet replacement.

Unilever's Katowice, Poland facility, which specializes in tea packing processes, deployed six UR10 robots to handle palletizing tasks. Prior to the implementation, operators spent around 70% of their time packaging and 30% palletizing. With cobots palletizing around 1,100 boxes during an eight-hour shift, throughput and productivity at the facility improved and operators are now free to focus on more ergonomically friendly tasks.

Darex deployed a UR5 cobot from Universal Robots to handle packaging and palletizing tasks. Source: Universal Robots

Meanwhile, Darex, a family-owned USA-based manufacturer of drill and knife sharpeners, **successfully deployed UR5 cobots** on screwdriving, box erecting and palletizing tasks in its Oregon facility. Two employees with no previous robotics experience took UR's free online training course and were able to program the entire solution themselves. The deployment resulted in a 30% optimization of Darex's packaging & palletizing processes.

Empowering productivity

UR+ is the industry's largest and most comprehensive eco-system of certified peripherals — including software, vision systems and accessories such as grippers– designed to integrate seamlessly with UR cobots. UR+ Certified Application Kits are hardware and software packages focused on a specific application, such as palletizing, assembly and inspection. Universal Robots' palletizing Application Kits include all the software and hardware you need to quickly deploy palletizing automation.

The Cross Palletron 300 Application Kit comes with a 7th axis, which increases the cobot's work envelope compared to 6-axis systems. Source: Universal Robots

The miniPAL's compact design includes a lifting column for all tall loads, dual stacking locations for continuous load building and built-in fork pockets for easy mobility. Source: Universal Robots

The Vention Cobot Palletizer Application Kit allows users to design palletizing configurations online. Source: Universal Robots

Intuitive cobot palletizing

Powered by a UR10e cobot, the **Cross Palletron 3000 Application Kit** is a fully collaborative palletizing system with user friendly software that eliminates need for complex robotic programming. Developed by seasoned robot integration specialists Cross Automation, the Kit is extremely mobile (it is easily moved using a dolly), can handle payloads of up to 18lbs and can pick eight boxes a minute. This Kit comes with **Rocketfarm's** remarkable **'Pally'** palletizing software, which

provides UR cobot users with an easy-to-use interface for creating palletizing patterns and programs.

Safety first

Developed by Columbia/Okura, a company with decades of traditional palletizing automation experience, the **miniPAL Application Kit** is a UR cobot-powered palletizing solution that can handle a payload of up to 22 lbs and can palletize up to twenty boxes per minute depending on pattern, prod-
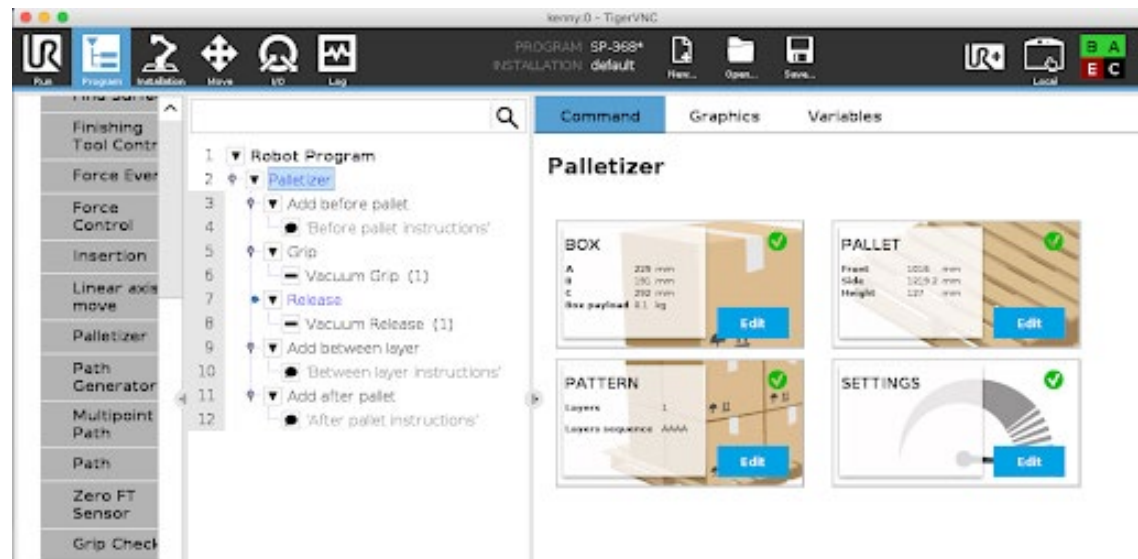
uct and payload. The miniPAL Application Kit comes with Pally software, safety area scanners, safety mats and infeed conveyors, all of which are designed to speed palletizing automation deployments while ensuring safe operations.

Design your palletizing cell online

Vention's Cobot Palletizer is based on an ingenious CAD platform that allows you to design your entire palletizing system online. Users can choose from a library of turnkey designs or design a palletizing cell from scratch using different types of box feeders and grippers. The kit includes a choice of vertical actuators, a choice of box feeders and grippers, Pally palletizing software and a choice of safety equipment. The ability to design your system online provides extra flexibility and assurance that the final deployment will be a good fit for your facility –this is an especially important consideration for companies where floorspace is at a premium.
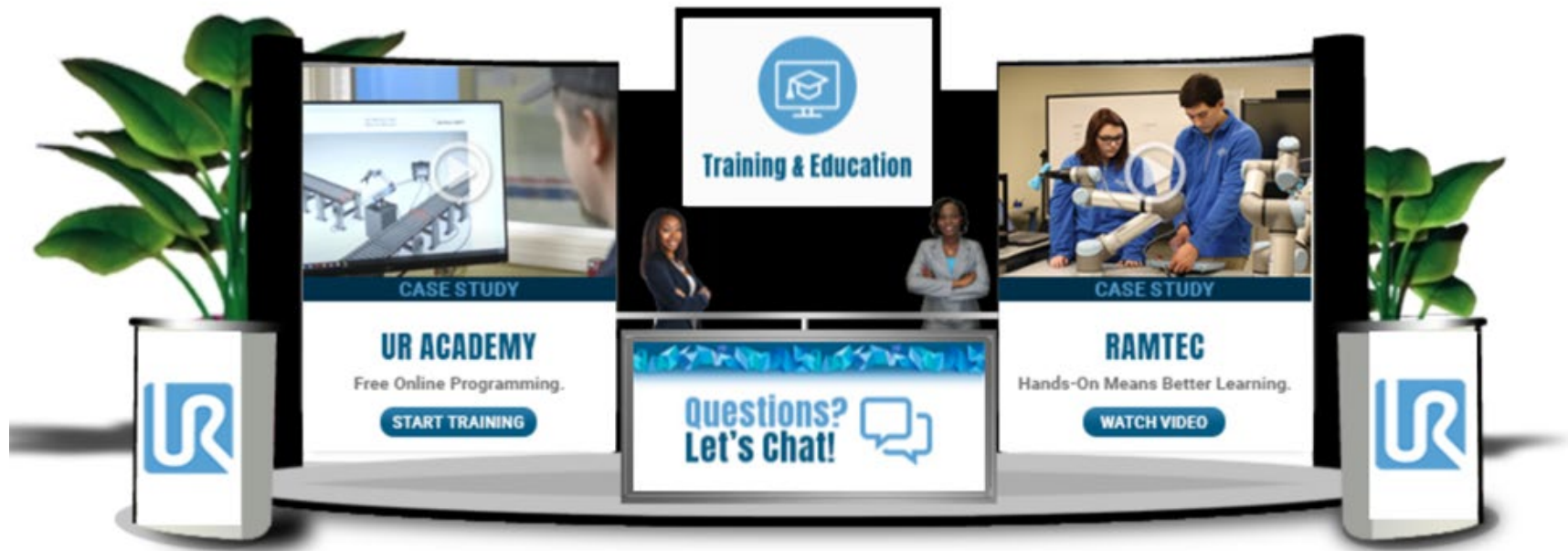
Easy to use cobot palletizing

Robotiq collaborated with Universal Robots on the development of the **Robotiq Palletizing Solution**. This Application Kit comes with Robotiq's unique Material Handling Copilot software, which enables synchronized motion between the Kit's 7th axis and the cobot so they can both move at the same

Robotiq's Material Handling Copilot software, provided as standard with the Robotiq Palletizing Solution Application Kit enables quick and easy setup in three steps, based on box dimensions and height, pallet dimensions and pallet pattern. Source: Universal Robots

time. This ease to use software allows users to reduce cycle times. This Application Kit can handle a payload of up to 17.5 lbs and can palletize 13 boxes per minutes depending on weight, dimensions, surface, pallet dimensions and layout.

These UR-cobot powered palletizers are now being rolled out at a wide range of manufacturing sites. Universal Robots has seen that especially smaller companies, that find it difficult and time-consuming to source and integrate all these different elements into a cohesive palletizing system, are benefitting from this new turnkey palletizing approach.

Universal Robots Launches First Accredited Collaborative Robot Certifications for Schools and Industry

As collaborative robots emerge as the fastest growing segment of industrial automation, cobot curriculum developed by an accredited provider is increasingly sought after in both schools and manufacturing industries. "With the Education Program we're addressing a tremendous need to provide cobot training as part of an integrated, accredited course," says Joe Campbell, senior manager of applications development at **Universal Robots** (UR). "This hands-on learning initiative will be instrumental in addressing the skills gap and get state-of-the art cobots into classrooms, offering students instant employability and manufacturers access to an upskilled workforce."

Universal Robots has been **accredited** by the International Association for Continuing Education and Training (IACET) and is now authorized to issue the IACET CEU (Continuing Education Units). The Education Program provides a clearly defined pathway for students to master cobot programming and deployment as part of an Industry 4.0 career in robotics and advanced manufacturing. Schools can now purchase the ready-to-go package that includes the complete curriculum, a UR cobot arm, and the hardware and software required to build actual industrial applications.

Accelerates student access to cobots

The 32-hour course has been developed with assistance from Ritch Ramey, coordinator of RAMTEC, (The Robotics and Advanced Manufacturing Technology Education Collaborative) overseeing robotics training at the 24 Tri-Rivers career centers in Ohio, representing the largest, most comprehensive robotics education center in the nation. "Being able to offer a complete, turnkey training program with an industry-recognized credential gives schools increased access to both private grants and government funding when bringing cobots into classrooms," he says. "It will make all the difference in the acceleration of student access to a real industrial robot that is both safe to operate in a classroom and easy to use."

Upon completion of the course work, a student receives 32 course credit hours and a Universal Robots industry-recognized certification. The course can be taught in high schools, dual-enrollment courses, and in colleges.

Manufacturers can upskill workforce, attract and retain talent

The program will also be offered to manufacturers seeking certified cobot training for employees; industry professionals can attend classes either through local schools and career centers or in classes offered by Universal Robots' authorized partners. Sending employees for certified robotics training developed by an accredited provider is often encouraged by local and state governments that increasingly reimburse companies for the training costs.

"This is really a win-win," says UR's Joe Campbell. "Manufacturers struggling to attract and retain skilled workers within automation can now easily train and encourage existing staff – while employees now get a unique opportunity to receive a recognized certification that they can add to their resume for future career advancements."

In addition to the formalized core curriculum, the Universal Robots Education Program Package consists of:

- UR Cobot Unit (UR3e or UR5e)
- 24 course licenses
- Gripper Demo Kit
- UR Academy Hardware Set:
- One conveyor assembly including conveyor, encoder,

"What separates Universal Robots from everybody else is the powerful, unique UR+ platform that enables manufacturers to build their complete cobot application by choosing UR compatible products that are tested and proven"

two sensors and I/O simulation test box
- Ten 3D printed training elements for exercises
- One 3D printed dual TCP
- Six 3D printed workpieces

For institutions that already have cobots, a retro package is available with course curricula, classroom support hardware and software.

Showcased at Universal Robots' Virtual Expo

Attendees at Universal Robots' free on-demand virtual event **Cobot Expo Series | Picking, Packaging and Palletizing** will learn more about the Education Program, as it is featured in a dedicated booth. Event visitors will also see videos of cobots doing fulfillment, box erection and palletizing tasks, along with keynote presentations focused on key industry topics and challenges. Booth hosts are Universal Robots as well as accessory and integrator partners.

Extending the Education Program to include UR+ components and application kits

Bob Graff, President of I4.0Strategies, an Education Workforce Development consultancy focused on implementing Industry 4.0 advanced automation training, career pathways and credentialing, has also been part of Universal Robots Education Program collaboration. His company is now working with several UR+ partners in developing curriculum for their products and application kits certified to work seamlessly with UR cobots.

"What separates Universal Robots from everybody else is the powerful, **unique UR+ platform** that enables manufacturers to build their complete cobot application by choosing UR compatible products that are tested and proven," he says. "Bringing courses on UR+ components and kits into the umbrella of UR's credentialed training approach will spark a revolution in educational access to these Industry 4.0 technologies." ∎

Universal Robots Debuted New Cobot-Powered Fulfillment Solutions

With eCommerce generating the greatest year-over-year **growth** of all U.S. retail industries, there is now more warehousing space being built in the U.S. than projected warehousing jobs required to fill that space. When thousands of supply chain professionals were asked in a recent Materials Handling Institute survey what technologies would yield the greatest boost to productivity, "Robotics and Automation" was their **answer**.

"Numerous factors propel the emergence of collaborative robots in the supply chain industry," says Joe Campbell, senior manager of applications development with **Universal Robots**. "This is a quickly evolving industry where fulfillment centers now have a need for robotic piece-picking processes that support a wide range of products and high throughput for the growing number of small-sized orders."

While traditional industrial robots usually stay bolted down in protective cages, dedicated to one handling task only, collaborative robots, or cobots, effectively address this automation challenge with flexible implementation and low upfront cost. At MODEX Universal Robots showcased its collaborative robot arms in new applications, giving attendees hands-on experience with the next generation of automation solutions for the supply-chain industry.

Quick Deployment Kit – helps sort out the supply chain

The Quick Deployment Kit (QDK) is a collaborative, accurate, and scalable solution for parcel induction, case packing, and goods-to-person tasks developed by **MDCI Automation**, a Universal Robots Certified Systems Integrator in partnership with Plus One Robotics. Utilizing a powerful vision engine powered by PlusOne's PickOne Software and Universal Robots' **UR10e cobot arm**, the QDK identifies the pick points for items in a pick zone and sends the points to the UR cobot that picks and places each item onto a place zone/conveyor. The QDK can keep up with fast-moving conveyor speed and is able to "learn" to pick targets via human assistance through a remote alerting technology.

"Universal Robots' collaborative robot platform delivers proven hardware, ease of programming, and a large ecosystem of UR+ partners providing industry-leading products that are tested and approved to work with UR cobots," says Kurt Scheffler, VP of Engineering at MDCI Automation. The company

MDCI Automation's Quick Deployment Kit

integrated a **UR+ certified gripper** from Soft Robotics and **cell equipment** from UR+ partner Vention in the QDK.

Cross Palletron – palletizing on the move

Also recently launched was the Cross Company's new **Cross Palletron**, a solution that utilizes the UR10e cobot to create a fully collaborative and mobile palletizer and de-palletizer.

The Cross Palletron

Cross' easy-to-use-software eliminates the need for complex robotic programming and makes redeploying the palletizer for a different production line or package size much quicker.

"We are excited to bring this solution to market as we hear from many of our customers that keeping these mundane tasks staffed is an ongoing challenge," says Lynn Crump, president of the Cross Company Automation Group. "In fact, our customers have reported to us that this system has an ROI of less than two years for single shift operations and even sooner for those with multiple shifts."

The Cross Palletron aims to keep workers from doing repetitive bending and lifting tasks that can lead to workplace injuries. Staff can then be allocated to higher-value decision-based work that is less mundane and can't be easily automated.

RightPick2 – record-setting picking platform

RightHand Robotics' UR-powered solution reportedly took the MODEX 2018 show by storm as RickPick **set a world record** of piece-picks delivered at a tradeshow, successfully picking and placing 131,072 items over the course of the three-day show. This year brings **RightHand Robotics'** new MHI Innovation **RightPick2** platform showcased at the company's MODEX 2020 booth featuring an intelligent gripper, a vision system, control software and a **UR5e cobot** handling the "3Rs"; the widest Range of products at high Rate and Reliability.

"With e-Series cobots from Universal Robots we're able to provide customers with the predictability they need to fulfill orders quickly and accurately," says Vince Martinelli, head of product and marketing at RightHand Robotics. "Universal's cobots are easy to work with and so is the team at UR. They've been a reliable and responsive supplier and partner to us at RightHand, giving us the confidence to incorporate their advanced technology into our platform."

The RightPick platform has successfully completed many millions of picks autonomously across numerous industries, including eCommerce, retail, pharmaceuticals, grocery, and more. Companies choosing to leverage these capabilities in their respective fulfillment operations include Japan's largest wholesaler of consumer-packaged goods, PALTAC CORPORATION, which is operating a multi-robot fleet in their new RDC Saitama facility. ∎

TAKING THE NEXT STEP IN PACKAGING AUTOMATION:

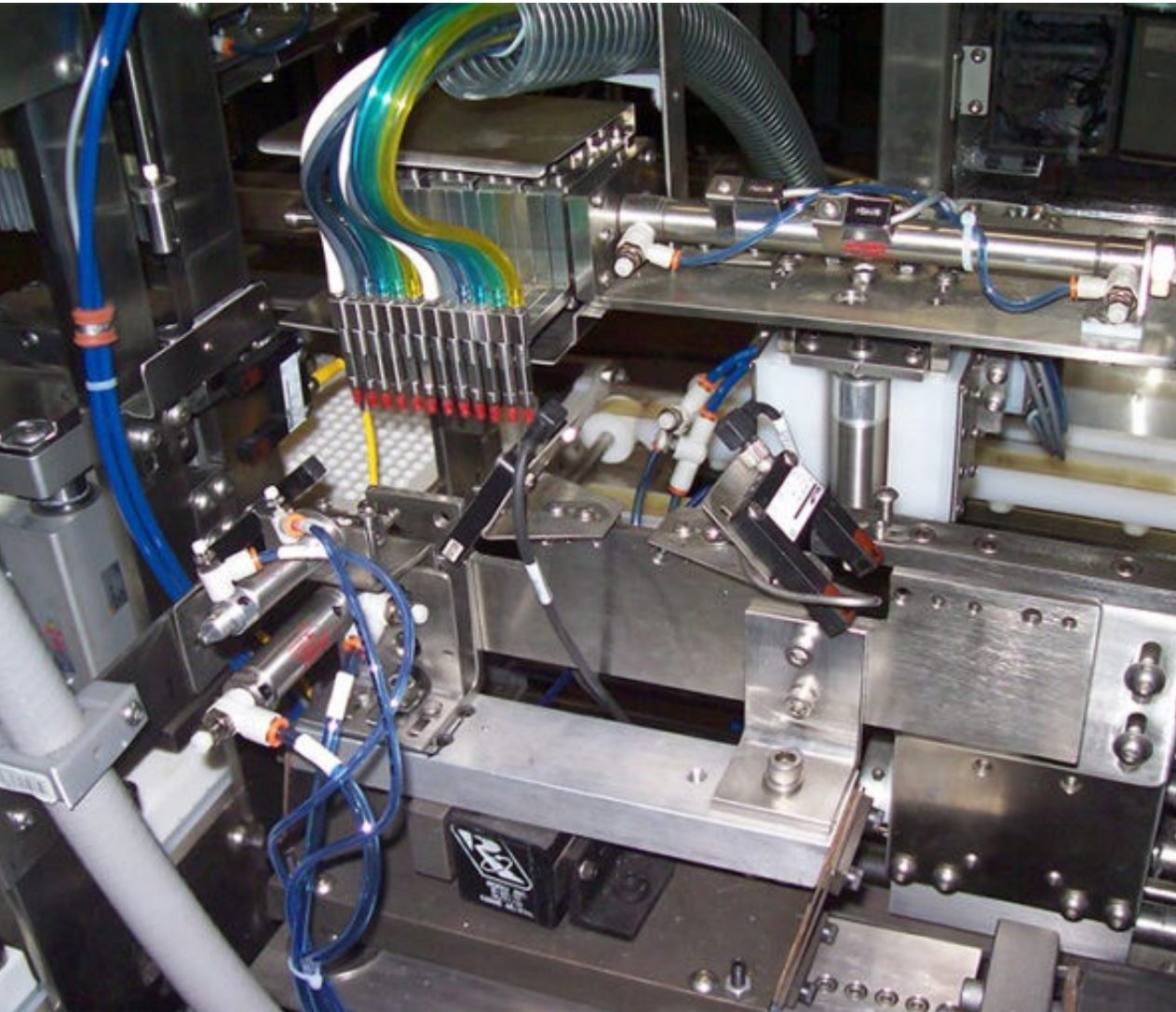# Overcoming the Challenges to Automate Manufacturing

Working with an expert packaging device fabricator and integrator that is flexible enough to customize can help meet requirements while expediting completion

By Del Williams, Contributing Writer

For packaging device manufacturers, the continual need to increase production speed and efficiency while reducing labor has spurred a shift toward implementing automated systems. However, off-the-shelf equipment will not accommodate every application, particularly those that are complex with robots and conveyors, as well as a host of equipment for manufacture and assembly in addition to packaging, labeling, and palletizing. that must be flawlessly

For projects of any size, it can be crucial to partner with an expert supplier such as Rapid Development Services to overcome obstacles such as meeting specifications, regulatory requirements, system integration, and necessary customization, as well as completing the work on time and within budget.

Off-the-shelf equipment will not accomodate every application, particularly those that are complex with robots and c onveyors, as well as a host of equipment for manufacture, assembly, packaging, labeling and palletizing, that must be flawlessly coordinated.

coordinated. For this reason, even some large automation companies will not take on applications considered too difficult.

In such cases, packaging device manufacturers looking to increase the speed and efficiency of their production and packaging lines need an automation partner that can quickly and cost-effectively deliver tailored, even custom solutions. This includes the ability to design, build, and integrate high-speed, high-volume automated equipment and systems for some of the largest companies in the world.

For projects of any size, however, it can be crucial to partner with an expert supplier to overcome a range of obstacles such as meeting specifications and regulatory requirements, system integration, and necessary customization, as well as completing the work on time and within budget.

"While implementing off-the-shelf solutions can be a starting point for some projects, automating and incorporating robotics frequently requires a custom solution that meets very specific process requirements. For this reason, even large suppliers in this space will often pass on opportunities if they are not
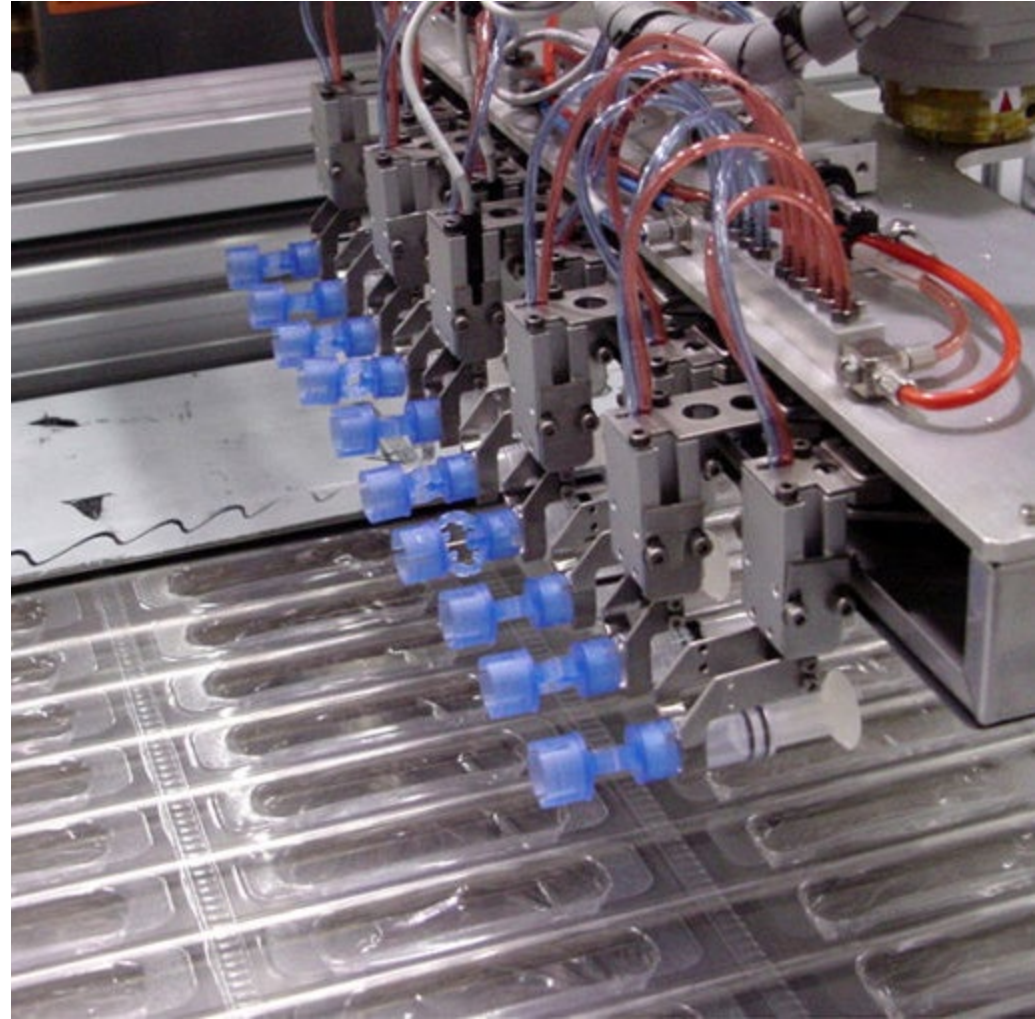
easily resolved," says Leon Gurevich, founder and chief technology officer of Rapid Development Services (RDS).

RDS is an industrial automation equipment builder, providing design, engineering, integration and fabrication of production and packaging machinery. The company has implemented over 300 complex, robotic, assembly and manufacturing projects worldwide, and has been awarded more than 40 patents.

According to Gurevich, to avoid delays or failure on larger, more complex projects it is particularly important to work with a supplier that not only has expertise, but is also nimble and flexible.

"When it comes to automating production, equipment can range from very small to complete lines several hundred feet long that can consist of robots, conveyors, vision systems, server drives, etc.," says Gurevich, who has worked with companies such as Medtronic, Johnson and Johnson, Abbott Labs, and Pfizer. "So, automation suppliers and integrators need a 'tool box' full of solutions including the ability to design and build from scratch in order to fit together all the pieces of the puzzle."

In the case of RDS, the company typically uses standardized off-the-shelf solutions and integrates it with other systems, but can design and manufacture equipment and sub-systems from scratch, as needed. This includes machinery such as packaging equipment, labeling/marking systems and palletizing automation, as well as automated assembly

A distinct advantage can be gained when working with an integrator like Rapid Development Services that can couple the knowledge of custom machine building with standardized robotics, as well as develop specific control and communication support between production machinery and operator or inventory management systems.

solutions, inspection systems, filling systems and machine tending automation.

As an example, after a major medical device manufacturer received FDA approval of a real-time insulin pump for continuous glucose monitoring, the company needed to automate production with specific attention to packaging.

RDS was called on to develop an automatic system to package insulin reservoir-syringes into a Multivac Form Fill Seal machine, followed by carton and case packing for ready-to-ship product delivery.

The reservoir-syringe was presented to the system in a bulk form. The robotic system utilizes vision inspection to check for the presence of subcomponents before placing reservoir-syringes into the Multivac machine's formed web cavities. The vision inspection identified the presence of the plunger, guard and overall geometry pattern of syringes by inspecting a set of 10 units per cycle. The system used two, six-axis robots, two Vibro-feed bowls, and the Multivac web machine to feed, pick, place, and seal reservoir syringes.

With the robotic system, each of two cells packaged product at a rate of over 120 reservoirs per minute, for a total of 240 units per minute. The packaging system also had a carton erector, and the sealed packages were robotically inserted into cartons.

RDS initially installed the system in a California plant, which ran the robotic system trouble-free in a clean room for over five years. At the company's request, RDS disassembled, moved, reinstalled, and started up the system at a new facility in Puerto Rico, where it has continued to run trouble-free three shifts per day for another 10 years.

According to the market research and consulting company Grand View Research, the global medical automation market is expected to grow at a compound annual growth rate of 9.9 percent from 2016 to 2024 to reach $79.4 billion by 2024. The company cites the rising prevalence of chronic diseases and the increasing adoption of automated equipment for diagnosis and therapy as the factors propelling market growth.

So, whether packaging device manufacturers need help automating their production, or the equipment used in other settings, partnering with an expert in automation can be the surest route to ensuring compliance, reliability, and efficiency.

Companies sometimes shy away from automation when only focusing on direct labor savings or short-term ROI," concludes RDS President Sunit Mishra. "However, if you factor in increased production speeds and improved quality along with reduced waste, labor management savings, labor hiring and training savings as well as repetitive motion injury, the investment in automation usually provides an attractive ROI in the short term itself … not to mention, our history shows equipment life spans of well over 20 years, so the ongoing benefits continue to accrue to the bottom line for the life of the equipment." ∎

Influx of Robotics Ease End-of-Line Operations

By Sean Riley, Senior Director, Media and Industry Communications at PMMI

Typically, end of the line operations in packaging include secondary packaging machines like sleevers, tray loaders and case packers as well as transport packaging machines for palletizing and unpalletizing. Together these components provide a variety of functions but mainly are applied for pick and place, creating variety or multi-packs and loading or unloading products or finished packages. Next to processing operations, secondary and transport packaging have seen the most significant growth in robotics over the past five years, according to the Robotics: Innovation 2 Implementation report from PMMI Business Intelligence, a division of PMMI, the Association for Packaging and Processing Technologies. Seventy percent of companies surveyed for the report now employ robotics in secondary packaging with slightly more (73 percent) embracing automation for transport packaging.

Traditionally these steps occur at the end of packaging lines, which indicates a growth in robotic case packaging and automated palletizing to meet the rise of SKUs, shapes and sizes but also to meet increasing labor costs and skilled workforce shortages. Improvements in sensor technology, data analytics and robotic components are driving robots that are more intelligent and flexible than ever before, enabling the wider adoption and expansion of robotics into new applications and industries. Sensor technology, in particular, has opened the door for robots to perform more delicate tasks, such as placing variety packs of candy or potato chips into

cartons or retail-ready packaging.

Improved vision sensors have allowed robots to become more accurate when picking objects, safer when operating around humans and more consistent in their ability to reject faulty products. The development of tactile sensors capable of gauging pressure and detecting contact allow robots to safely disengage when coming in to contact with a person or fixed object. Sensors also enable the manipulation of delicate objects without breaking them. The expansion of sensors on robotics has also created several new data collection points for manufacturing operations, creating opportunities to analyze and optimize production processes from new angles.

Robotics have also proven more adept with environmentally friendly packaging. With an expanding consumer focus on the sustainability of packaging, the higher precision and dexterity of a robot facilitates the consistent handling of thinner, less durable packaging materials without costly and time-consuming breakage. Multiple consumer packaged

goods companies cited in the report are using 100 percent robotics in their secondary operations, and 59 percent predict an increase of robotic use in their secondary packaging operations. While cobots have not broken through to a large degree in secondary packaging, they are viewed by many in the report as potential game-changers. Cobots are easy to teach and carry out dull, repetitive, dirty or dangerous handling tasks. They can lower the cost of a work station on lines with shorter runs or unusual package configurations. More accessible programming and force-sensitive sensors to protect the worker will free up staff to perform more complex and diversified tasks in the work station. This also has the added benefit of improving workers' skill levels by having them learn tasks they wouldn't otherwise partake in.

Small and medium-sized companies are particularly sensitive to workforce gaps and meeting increasing production demands. Doing more with less by supplementing manual processes with targeted robotics, can reduce human idle time

for SMEs, by as much as 85 percent.

For most packaging operations, robotics technology was first introduced to the packaging line via transport packaging. Robots continue to lift and stack cases onto pallets in preparation for transport, with nearly two out of three companies looking to add more robotics for palletizing. For many, the intention is to completely automate palletizing as the latest advancements allow for efficient pack patterns, reduced palletizing time, minimal carton gap and measurable productivity. These robots will need to be highly flexible, utilizing Artificial Intelligence (AI) enabled machine learning to operate in dynamic environments with ever-changing products. Lean manufacturing, international trade tensions, an aging workforce and the demand for rapid eCommerce order fulfillment are also contributors to transport packaging growth according to the report.

Low-cost solutions for robotics are continuing to appear, with cobots and smaller sized robots becoming attractive options, even for small and medium-sized operations. End of line robots are also becoming simpler to program and easier to changeover in response to an average skill level on the factory floor. Safety has also remained a key concern when evaluating robotics additions, especially with the burgeoning trend of humans and robots sharing the production space.
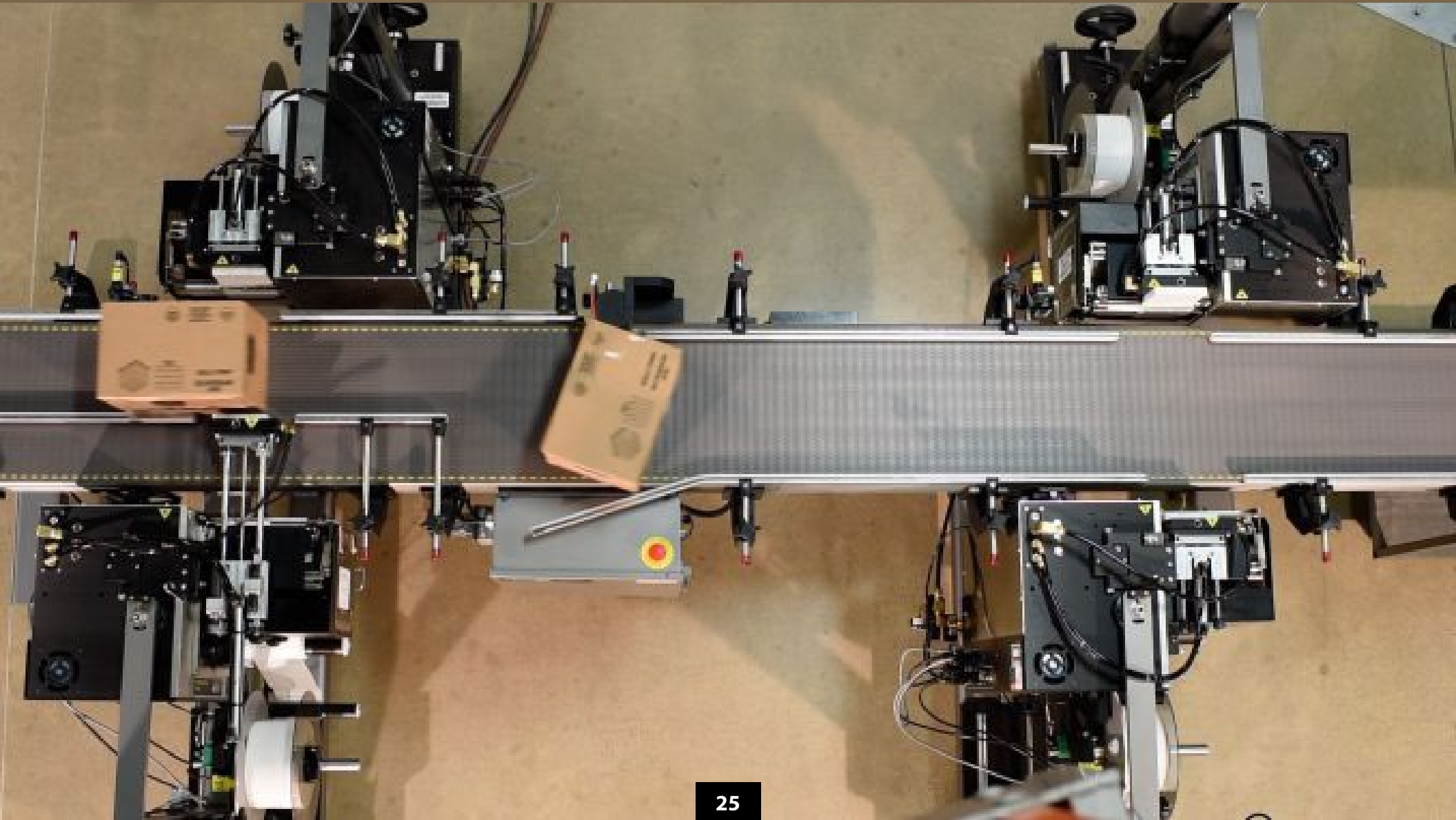
Robotics today are more affordable than they have ever

been. Average prices have fallen by over a factor of three in the last decade. The initial machine cost of robotics has steadily declined, installation and integration service costs are falling, programming costs have been reduced and in some cases eliminated entirely, and the average time to achieve ROI has plummeted in the last decade. In addition to this, simplified programming and service routines are mitigating the need for retaining costly robotics experts as full-time employees. Sensor technology advancements, production improvements, programming simplification, modular out-of-the-box installation, physical size reduction, and machine learning will all contribute to the continued decline of robotics costs. ∎

Robotics, Automation and Industry 4.0: Striking the Right Balance

By Tim Wills, CMO, Peak-Ryzex, Inc.

Industry 4.0 was first coined by the German government in 2011 to reflect emerging methods of production where machines and products are networked together through the Internet of Things (IoT). With U.S. online sales of goods projected to surpass **735 billion by 2023** (according to a report from Statista), the packaging industry is feeling the pressure to assimilate Industry 4.0 into production with robotics and automation. The challenge lies in determining which future-ready packaging technologies should be merged with more conventional practices to increase productivity and optimize performance.

Robotics in the Packaging Industry

Challenges, such as shorter lead times, faster turn times and increased customization are forcing the packaging industry to find new and inventive ways to integrate and connect key processes. While robotics is beginning to play a role in the packaging supply chain, Industry 4.0 has yet to discover a way to merge human and robotic activities due to the risk of injury.

There are a few ways to overcome these challenges. One is through artificial intelligence, allowing humans to control the production activities of the robots via a remote location. In addition, chatbots are now being used to organize and prioritize information on the back end to track inventory levels, deliveries, returns, etc.

Another emerging technology for the packaging industry is machine learning. This involves creating a series of algorithms that teach machines to react to a variety of situations without the need for human interaction. This allows robots to proactively adapt to changes in production. Machine learning has already found its way into numerous market sectors. Although it may be several years until it reaches the packaging industry, it has great potential to reduce product defects, decrease downtime and increase production speed.

Automation and the Packaging Workforce

Smart factories are changing the employee landscape. Automation is eliminating the need for less skilled workers, while

Another emerging technology for the packaging industry is machine learning. This involves creating a series of algorithms that teach machines to react to a variety of situations without the need for human interaction.

advancing the need for higher-skilled employees, such as software engineers and programmers. Packaging facilities will have the ability to relocate closer to their distributors or customer base, since the need to seek out locations with a cheap labor force will be less of a priority.

Automation will also allow factories to manage multiple locations from a centralized hub. This will lead to greater consistency, control and uniformity throughout the packaging process. However, transparency needs to be a key component of automation to help determine system availability, increase flexibility within the packaging lines and support ongoing system improvements.

Production line automation allows companies to leverage efficiencies without sacrificing quality. Robots are tireless and require minimal maintenance. A robotic arm can work for countless hours before requiring maintenance or experiencing a mechanical failure. However, before fully embracing robotics and automation, there are a few areas of consideration when it comes to packaging.

Common Pitfalls of Industry 4.0

While there are many benefits to robotics and automation, companies should consider some of the drawbacks to this new technology. To begin with, many companies are simply not equipped to make the leap to Industry 4.0 without first implementing tested and proven practices including wireless warehouse connectivity and barcode data collection.

Companies who do make the switch to robotics often overestimate the capabilities of a robot and allow it to perform all of the functions previously accomplished by humans.

In addition, companies who do make the switch to robotics often overestimate the capabilities of a robot and allow it to perform all of the functions previously accomplished by humans. This can result in increased maintenance costs and loss of productivity if the robot fails to perform all the required tasks.

Another common pitfall is understanding the difference between accuracy and repetition. A robot performing a repetitive task may not always do it accurately. While accuracy is key for specific movements, repetition is necessary to consistently perform those tasks over and over again.

Many companies choose a robotics system based solely on the control features. However, its best to first analyze the specific needs of your company before choosing a system. Human implementation of robotics systems also plays a key role. If project engineers don't understand or embrace the technology, it could lead to deficiencies and inaccuracies in production.

> **While the concept of Industry 4.0 is appealing to many industries, packaging companies must understand the requirements of their lines before they decide if they should automate equipment to effectively get the job done.**

Striking the Right Balance

Today, most businesses are stuck in Industry 3.0 and are unsure how to make the leap to the next phase of the Industrial Revolution. While the concept of Industry 4.0 is appealing to many industries, packaging companies must understand the requirements of their lines before they decide if they should automate equipment to effectively get the job done.

Package engineering managers must weigh the need for production flexibility, limited numbers of skilled technicians and other challenges before selecting packaging machinery. Successful companies often apply a mix of automated, semi-automated and human-driven processes to ensure production lines are operationally optimized. For example, change in consumer behaviors are driving companies to increase personalization in addition to the overall service experience.

Industry 3.0 technologies including RFID, 2D and 3D scanning and machine vision sensors and scanners are helping to support consumer demands. Automated label printer applicators provide faster and more accurate label placements while eliminating the need for human intervention. The accuracy of the labels allow packages to move efficiently through the supply chain while providing complete traceability to the end user.

Successful Transition to Industry 4.0

Technology is advancing every day. Industry 4.0 will continue to drive changes in robotics and automation in the packaging world. The key to success involves using these new technologies to meet growing consumer demand in an increasingly competitive environment.

However, as we look forward it is always important to consider the technologies that deliver the best return on investment while mitigating risk. Warehouses that are fully optimized in Industry 3.0 will find the eventual transition to Industry 4.0 less challenging. While many packaging companies may not be ready for a completely automated facility, taking small, secure steps towards the next Industrial Revolution will ensure a stable business environment with increased productivity and greater customer satisfaction. ∎