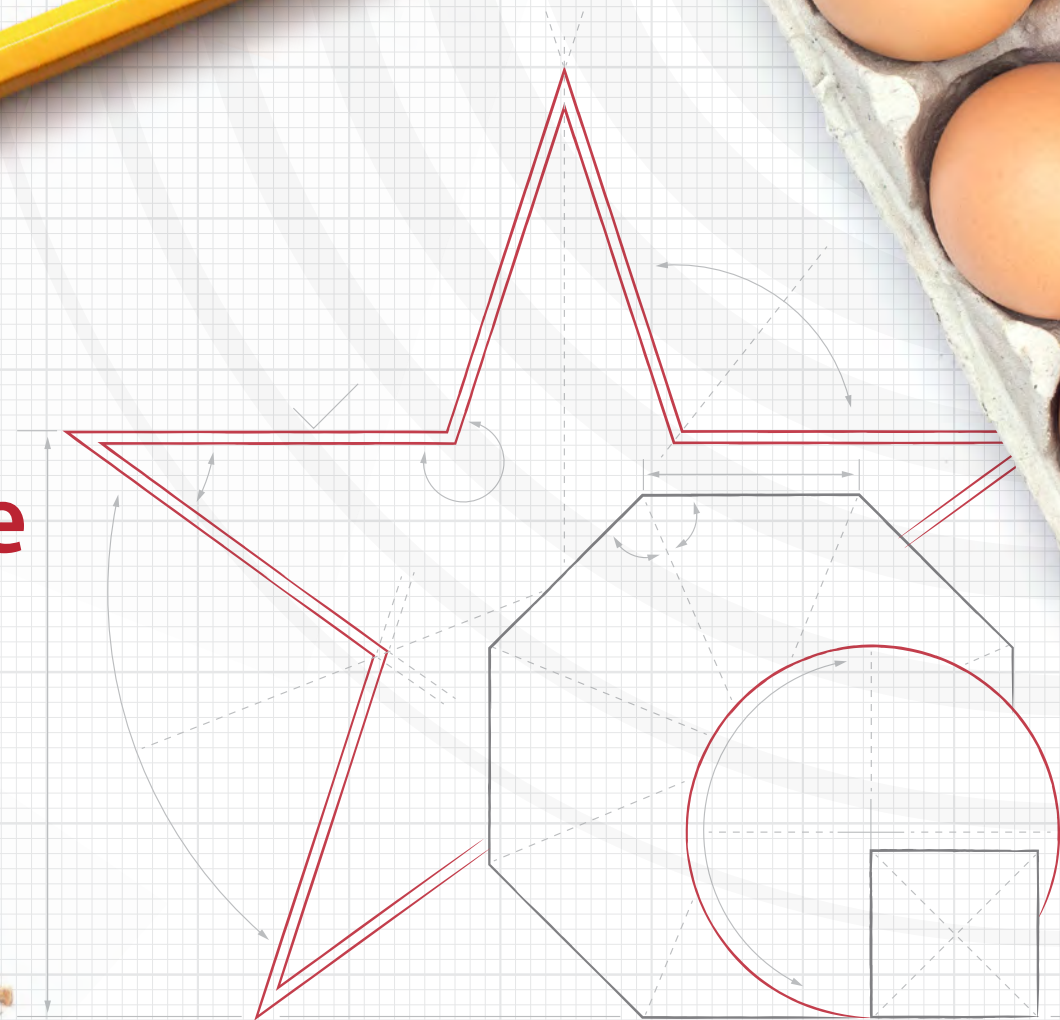
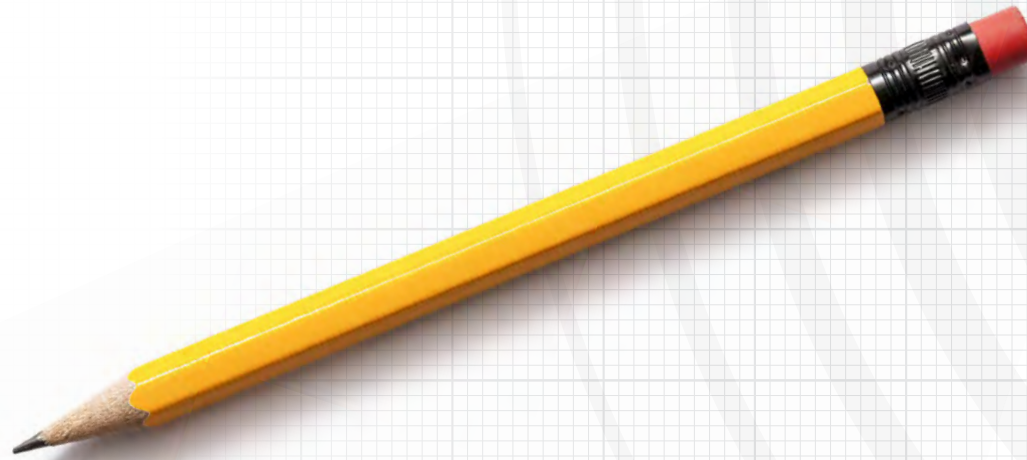


LISTEN.  
THINK.  
SOLVE.®

# The Future of Packaging Takes Shape

How new technologies can help  
address your customers' most  
pressing packaging challenges



**Rockwell  
Automation**

 Allen-Bradley • Rockwell Software

# A New Era in Packaging

Packaging machines today need to address two primary areas for manufacturers.

First, machines need to be designed to **take advantage of smart manufacturing** to give manufacturers a competitive edge.

This means machines that:

- Are information-enabled.
- Can deliver real-time diagnostics.
- Use contemporary safety technologies.
- Are easy to integrate.

Smart manufacturing is only in its infancy and still being shaped by the emergence of smart devices. Because of this, smart machines must be **future-ready, with the capacity to easily scale up** with additional connections and expansions.

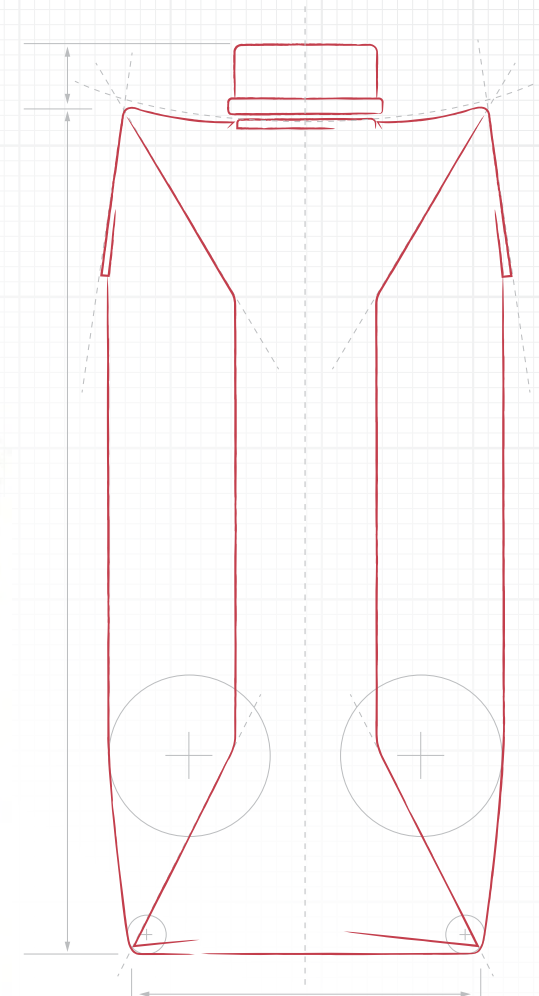
*PMMI forecasts the U.S. food packaging market will grow at a 2.9% CAGR through 2022.<sup>1</sup>*

Second, machines need to be **high-performing** and help manufacturers meet their most pressing business needs to:

- Maximize productivity and efficiencies to remain competitive.
- Improve packaging flexibility to accommodate expanded product varieties and more diverse packaging sizes.
- Meet the needs of an aging and evolving workforce.

Your job is to meet these dual expectations with advanced smart machines that incorporate the latest automation technologies and allow you to use innovation as a competitive differentiator. You can use the inherent benefits of smart technologies to reduce the complexity, time and cost of designing machines.

*4 of 5 companies have more than 100 product SKUs and over half predict SKUs will continue to grow, driving the need for faster changeover.<sup>2</sup>*



# Benefits of **Smart Manufacturing**

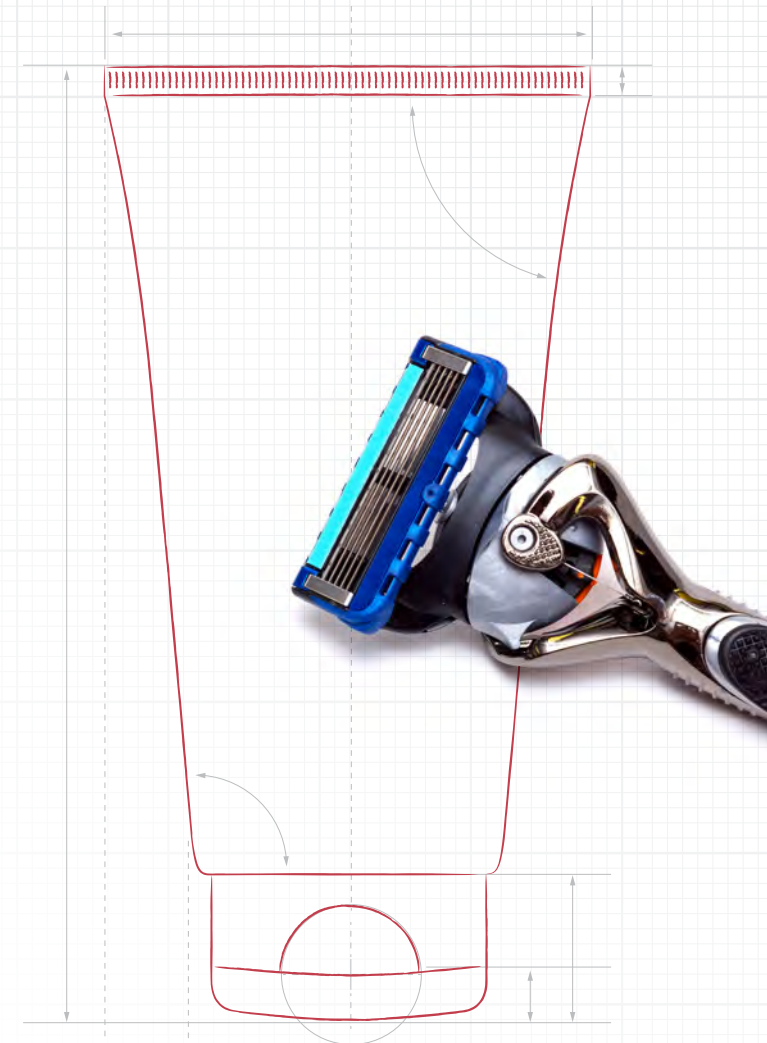
**The Connected Enterprise** converges plant and enterprise-level systems into a unified infrastructure and capitalizes on the power of connected technologies. This creates the foundation for greater connectivity and information sharing.



With this foundation in place manufacturers can experience the full benefits of smart manufacturing, as well as:

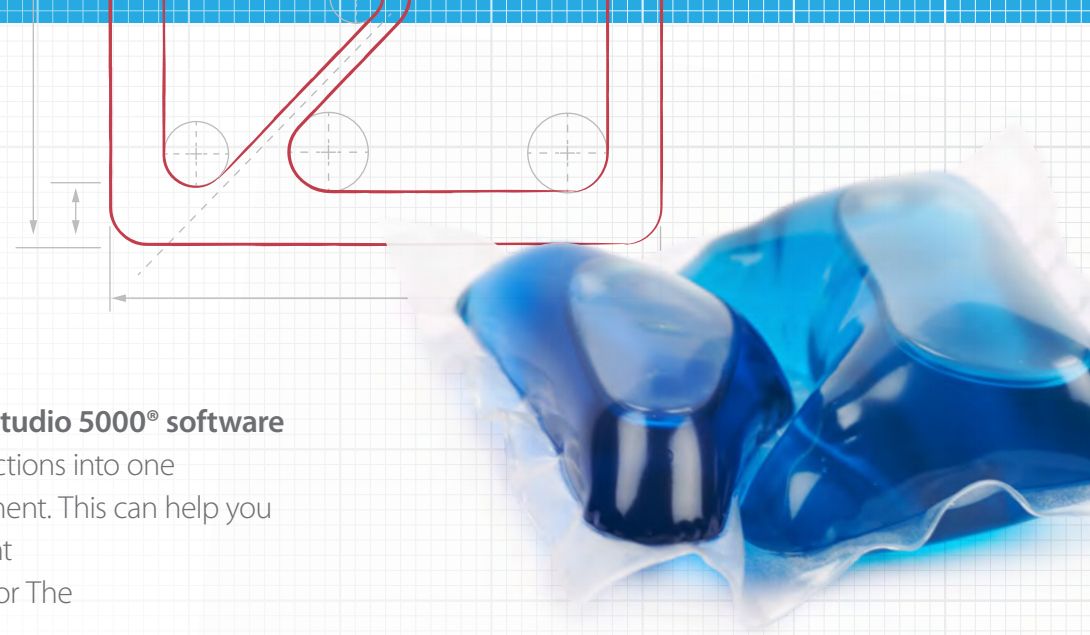
- Replace laborious, manual data collection with automated data collection, which can save time and reduce the risk of error.
- Use production intelligence to increase productivity, improve quality, address safety risks, maintain compliance and more.
- Securely connect people, processes and technologies to improve collaboration and decision-making at all levels.
- Use technologies, such as wireless, cloud computing and mobility, to transform operations and help drive down costs.

Manufacturers increasingly expect to realize these benefits in their operations. As a result, they expect machines that can thrive in The Connected Enterprise.



*The ARC Advisory Group estimates that there will be 20 million connected industrial devices by 2019.<sup>1</sup>*

# Embracing **Smart Machines**



Key considerations when designing smart packaging machines for The Connected Enterprise include identifying how you can achieve the desired levels of connectivity and performance.

**At the network level:** A smart packaging machine should be able to communicate in real time across an IP-based, standard and unmodified Ethernet network infrastructure. **EtherNet/IP™** is a proven and complete industrial Ethernet solution. It helps **enable a simple network architecture** and can handle discrete, continuous process, batch, safety, drive and motion applications.

**At the system level:** The packaging machine should take advantage of the next-generation Rockwell Automation Integrated Architecture® portfolio. It can reduce complexity, give users easier access to information, and improve responsiveness to changing market demands. Key elements in the Integrated Architecture portfolio include the following:

- **Rockwell Software® Studio 5000® software** integrates multiple functions into one development environment. This can help you speed the development of packaging systems for The Connected Enterprise.
- The **Allen-Bradley® CompactLogix™ 5380 controller** provides up to 20 percent increased application capacity and is ideal for small to midsize applications that require low axis motion and I/O point counts. For larger applications, the **Allen-Bradley ControlLogix® 5580 controller** provides up to 45 percent more application capacity. Both controllers include embedded 1-gigabit Ethernet ports to support the growing demands of smart manufacturing.
- The **Allen-Bradley Bulletin 5069™ Compact I/O™ module** provides high-performance control in a compact design. It uses two 1-gigabit Ethernet ports for faster scanning and connecting up to 31 modules without the need to expand.



*With the Rockwell Automation platform and Ethernet, we can also tie into a customer's manufacturing platform to obtain web material-sourcing information, such as lot and serial numbers. Really, the sky is the limit in terms of connectivity. Whatever the customer wants to do, we can do.*

Sean Dotson, President and CEO, RND Automation & Engineering<sup>1</sup>



# Improving **Productivity** and **Efficiency**



First, manufacturing end users are looking for **The Connected Enterprise** to help them get the most from their packaging machines.

They can do this by connecting machines, sensors and devices, and using intelligent software to improve control. Standardized machine functionality that is combined with standardized information reporting can help drive continuous OEE improvements across multiple sites.

## Remote Access

Remote monitoring provides new ways for overseeing operations, performing real-time diagnostics, and troubleshooting problems. This can help your customers improve productivity while potentially reducing your warranty costs.

You can use enabling, remote-access technologies and services, such as the **Allen-Bradley Stratix® 5700 managed industrial Ethernet switch**, which manages secure, remote-access connections on the plant floor. Also, the **remote monitoring and analytics service** offers a simple and secure approach to monitoring equipment remotely. In addition, several members of the Rockwell Automation PartnerNetwork™ program provide cloud-based and remote-monitoring solutions.

## Mobile Access

**Mobile technology** expands traditional HMI system access to let operators be more productive. It can empower manufacturing operators, managers and supervisors to make timely decisions no matter where they are.

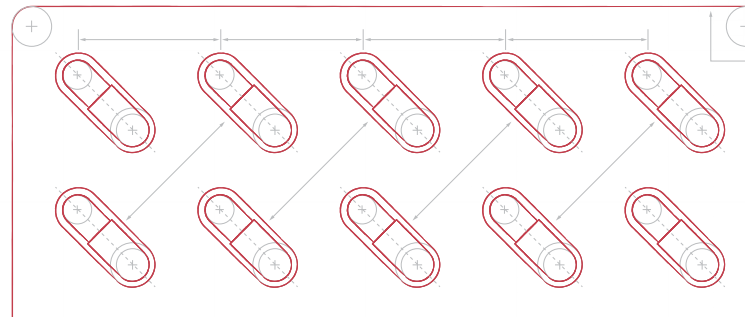
## Remote Monitoring Supports Proactive Maintenance

Premier Tech Chronos worked with Rockwell Automation to develop a cloud-enabled, remote-monitoring solution for its packaging equipment.

The solution enables mobile access to machine statuses and the sharing of diagnostic information. If an issue arises, it can provide the required part numbers – and even fulfill part orders and schedule maintenance.

**W** *Now, our customers will be able to monitor equipment parameters both on the plant floor and through mobile technology,” said Louis Brochu, engineering aftersales manager, Premier Tech Chronos. “And we will be able to offer equipment-monitoring services designed to better maintain the health of their machines – and improve overall performance.”*

**77% of food manufacturers report allowing at least some remote access today<sup>2</sup>**



1 Solutions in Action: Premier Tech Chronos, Rockwell Automation case study, May 2015  
2 2017 PMMI Trends in Food Processing Operations | Market Research Report

# More Flexible Packaging Options

Higher SKU counts and more diverse packaging sizes have led to shorter production runs. As a result, manufacturers need greater machine flexibility and faster changeovers to maximize throughput.

Traditional motor solutions that use rotary-driven chains, belts and gears can be rigid, with complex designs and little flexibility. New machine solutions – such as **robotics technologies**, and the **iTRAK® system and MagneMotion® conveyor systems** from Rockwell Automation – are better suited for today's production needs.



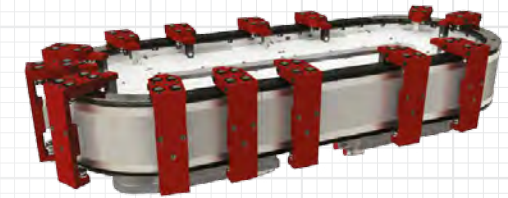
*The speed and independent motion of the iTRAK movers enable us to achieve speeds and precision that are unachievable with conventional collation methods.*

Rick Gessler, Director of Marketing, Delkor Systems<sup>2</sup>



The iTRAK system replaces traditional mechanics with simple and effective software profiles. This can improve speed and flexibility in a diverse range of packaging applications. The MagneMotion high-performance conveyor systems with servo-controlled, independent cart technology help more safely, quickly and easily transport products and heavy loads between machines and throughout a plant.

Integrating robotic technologies into a packaging system can allow for faster communication of control, safety and process information, and more accurate control of machine movements. Rockwell Automation provides a preferred level of robotic integration and control over EtherNet/IP that simplifies machine design, operation and maintenance.



## Cama Group Uses iTRAK System to Reduce Changeover Times

Italian company Cama Group incorporated the iTRAK system from Rockwell Automation for its IF318 robotized, monoblock loading unit.

The iTRAK system provides independent control of the machine's magnetically propelled movers and supports automation changeovers on the IF318. This cuts down changeover times that are compared to manual intervention. The IF318 also reduces the need for system restarts following emergency stops.



*While in traditional packaging systems, motors need some seconds to find their home position in case of a restart after a stop. The absolute encoders set on each iTRAK mover retain position data during loss of power and allow the machine to restart immediately,*

Riccardo Panepinto, Operations Director at Cama Group.<sup>1</sup>



<sup>1</sup> Solutions in Action: Cama Group, Rockwell Automation case study, July 2016

<sup>2</sup> Solutions in Action: Delkor Systems, Rockwell Automation case study, July 2015

# Designing Machines for an Evolving Global Workforce

The global manufacturing workforce is in the midst of a massive transition. Skilled worker shortages have emerged as a threat to growth and productivity in multiple regions around the world. To help end users cope with these challenges, packaging machines should be designed for easy use by both newer and experienced workers, while also optimizing worker safety and productivity.

## Maximize Productivity

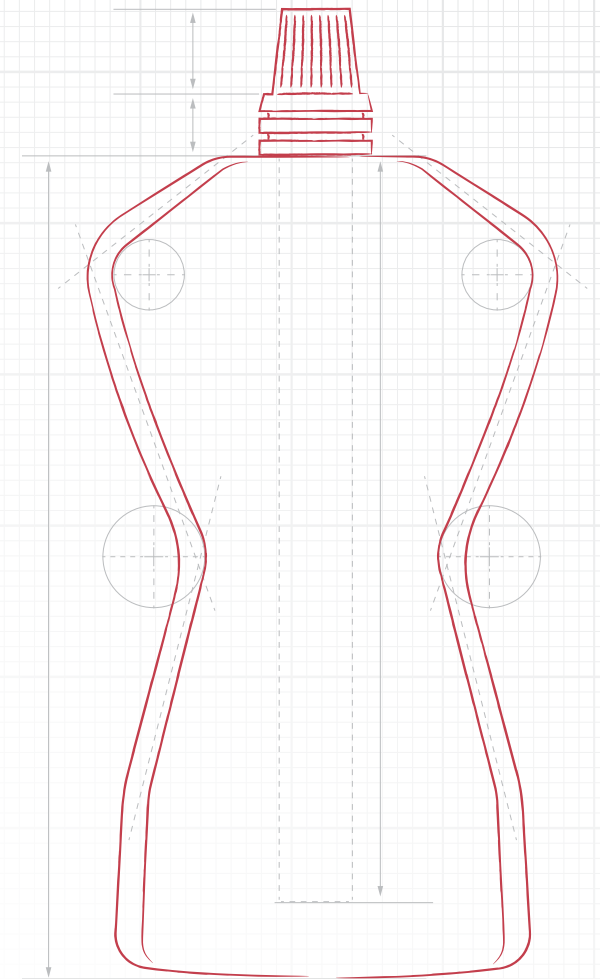
HMI faceplates with systemwide diagnostic functions and easy-to-understand display screens can **help workers better detect issues and ease troubleshooting**. Embedded help functions and user manuals can also help improve machine familiarity for inexperienced operators.

The Allen-Bradley Kinetix® 5700 servo drive can **ease commissioning and maintenance** for large machines. It uses Load Observer real-time tuning to lessen the need to tune each individual axis, which can reduce commissioning time by

days, weeks or even months. Tracking Notch Filter technology helps prevent machine failures by detecting and removing resonant frequencies, and automatically making tuning adjustments over time.

## Modernize Safety

Contemporary safety systems that are integrated with machinery control systems can help **reduce safety risks** while also improving productivity. These systems are less prone to nuisance shutdowns than hardwired systems. They are also more ergonomic, reducing the probability that workers will override the systems and put themselves at risk.



*Safety is a key priority for Columbia Machine and so is efficient performance. Our investment in Rockwell Automation products helps us build flexible, future-ready machines that meet our goals and those of our customers.*

Ted Yeigh, Sales Director, Columbia Machine<sup>1</sup>



<sup>1</sup> Solutions in Action: Columbia Machines, Rockwell Automation case study, September 2015

# Reducing Design Complexity

Machine design time is crucial to both meeting your customers' needs and improving your bottom line.

**Premier Integration** consolidates controller programming, device configuration, and machine-operation and maintenance activities into one software environment. This can help you reduce system complexity and cut design time in several key ways:

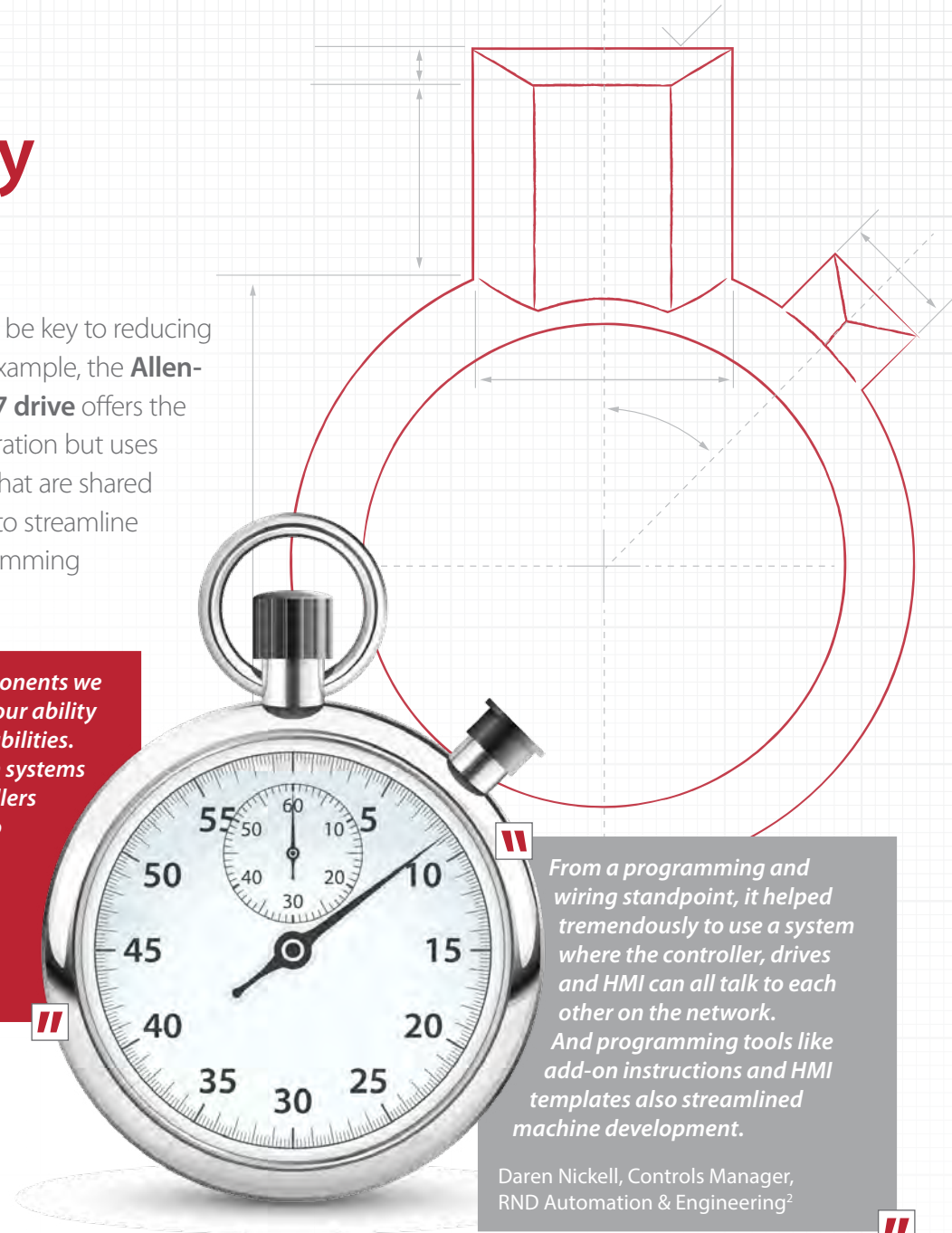
- The **Studio 5000 development environment** replaces the need for multiple tools with one platform for designing and configuring systems.
- **Logix-based controllers** can recognize specific Rockwell Automation components and automatically import their device profiles.
- **Library management** allows you to store, manage and reuse code from your programs, helping you cut development time and build on the outcomes of successful projects.

Device selection can also be key to reducing system complexity. For example, the **Allen-Bradley PowerFlex® 527 drive** offers the benefits of Premier Integration but uses embedded instructions that are shared with Kinetix servo drives to streamline the configuration, programming and control of the drives.



*Some of the control components we were using were limiting our ability to enhance machine capabilities. The Rockwell Automation systems and Allen-Bradley controllers we use have allowed us to provide increasing levels of machine performance.*

John Bailey, Vice President of Sales and Marketing, Inline Filling Systems<sup>1</sup>



*From a programming and wiring standpoint, it helped tremendously to use a system where the controller, drives and HMI can all talk to each other on the network. And programming tools like add-on instructions and HMI templates also streamlined machine development.*

Daren Nickell, Controls Manager, RND Automation & Engineering<sup>2</sup>



<sup>1</sup> Solutions in Action: Inline Filling Systems, Rockwell Automation case study, September 2016

<sup>2</sup> Solutions in Action: RND Automation & Engineering, Rockwell Automation case study, October 2016



# A Renewed **Focus on Security**

Creating connected, information-enabled packaging machines in support of a smart-manufacturing approach offers tremendous value. But it also comes with different security concerns.

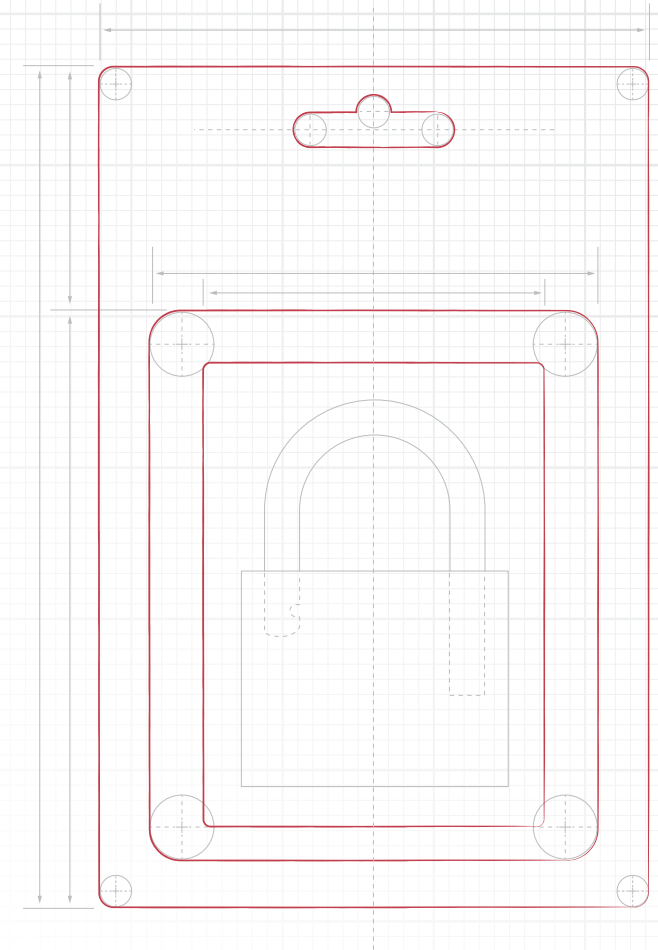
New connections on a machine present various opportunities for security threats. Those threats can be physical or electronic, malicious or unintentional, remote or on-site.

## **Defense-in-Depth Security**

Smart packaging machines should support a defense-in-depth security approach to help protect intellectual property, safeguard operations and secure remote-access connections. Defense-in-depth security is based on the idea that any one point of protection can and likely will be defeated, and uses layers of security to mitigate such threats.

## **Security measures at different layers can include:**

- **Physical:** Lockout devices can help prevent unauthorized access to USB ports and stop unwanted data removal. Lock-in devices can help prevent unauthorized cable removals.
- **Application:** A role-based access control system can restrict access to critical process functions, while authentication, authorization and accounting (AAA) software can track application access and changes.
- **Device:** Changing the default configurations for embedded devices can improve their security in areas, such as restrictive access and change management.



**II** The manufacturing industry is the most targeted victim of cyberespionage.  
2016 Data Breach Investigations Report<sup>1</sup>  
**II**

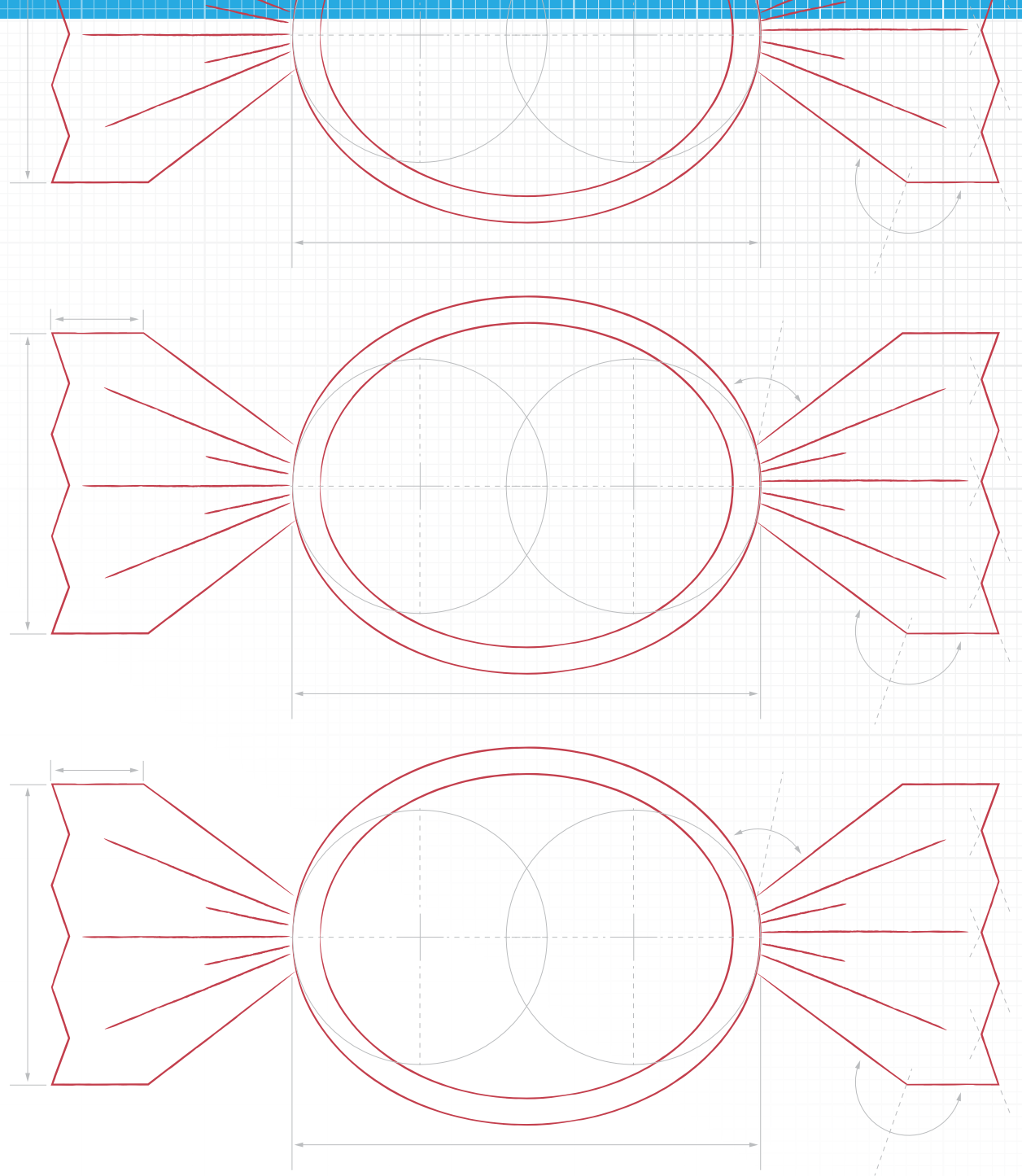
**Defense-in-depth security is recommended in the following:**

- IEC 62443 standard series (formerly ISA-99)
- NIST Special Publication 800-82
- U.S. Department of Homeland Security/ Idaho National Laboratory Report

<sup>1</sup> 2016 Data Breach Investigations Report, Verizon, 2016

# That's a Wrap

The future of packaging will be smarter and more productive. Your customers are driven by the need to understand their operations better and to keep up with global competitive pressures. And they will look to you for smart, secure and high-performing packaging machines that can improve productivity, flexibility and simplicity.



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