



the
Journal
from Rockwell Automation and our PartnerNetwork™

E HANDBOOK

2024 Trends in OEM & Control Design

In this educational resource, learn how modern HMI software helps users improve collaboration and business agility; and how OEMs help increase capacity and streamline operations across various industries, including packaging mills and craft breweries. Also, learn about autonomous robotics systems and the evolving role of OEMs in securing smart vehicles from cyberattacks.



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HMI Helps with the Heavy Lifting

Modern HMI software removes barriers to valuable data and empowers OEMs and end users through improved operation, business agility and time to market.

Susan Burtch

Lead Commercial Portfolio Manager, Visualization Software
Rockwell Automation





Project visibility in real-time is important during the design phase, especially when multiple team members are involved.

IT'S essential to remove barriers for industrial firms to be more efficient and productive in our rapidly evolving digital landscape. Workforce shortages and skills gaps are perhaps some of the biggest threats to any manufacturer or producer. A way to combat these issues is by introducing new technology.

By incorporating modern technology into the workplace, manufacturers are helping employees work more efficiently and in roles that are more fulfilling and valuable. Digital transformation is advancing all technologies within organizations, driving innovation, streamlining and optimizing operations, and improving business agility and flexibility.

Let's explore modern human-machine interface (HMI) software and how the tools supported by that software are empowering software designers and operators.

OPTIMIZING DESIGNER COLLABORATION

Working on the same project at the same time is common for designers and their colleagues, whether they're in-house or working with an OEM. To make the design

work, designers need easy, flexible, secure and transparent collaboration, whether they're working in an office or remotely from home or in the field.


When working on a project with multiple designers, everyone needs consistent access to high-quality tools and a seamless user experience.

Project visibility in real-time is important during the design phase, especially when multiple team members are involved. A lack of visibility can lead to difficulties tracking progress, identifying who is making changes and understanding the reasoning behind those changes. Duplicated efforts and overwriting can cause project delays and wasted design resources and money.

This is where modern HMI software collaboration tools come into play. They provide comprehensive project visibility within a collaborative design environment, connecting designers with timely, pertinent information necessary for quick and informed decision-making.

Streamlined collaboration and version control means fewer opportunities for errors down the road. It also means shorter project timelines.



 Modern HMI software collaboration tools provide comprehensive project visibility within a collaborative design environment, connecting designers with timely, pertinent information for quick and informed decision-making.

An HMI's integration with cloud or web-based tools empowers teams to design and deploy applications remotely and implement changes or updates seamlessly within the production environment.

EFFICIENCY THROUGH A CENTRALIZED REPOSITORY

With multiple developers augmenting, creating and testing each other's work, real-time or sequential collaboration calls for robust code management and version control mechanisms. A centralized project repository, such as GitHub, assumes a pivotal role.

With a centralized project repository, design tools and code can seamlessly integrate into the centralized repository within the HMI, allowing multiple users to make changes and merge the changes into the master version. It also helps identify and resolve potential duplication of efforts.

Centralized integration provides teams with a holistic view of a project's status. Teams can easily identify who made changes and access different versions of individual components and the entire application within the design tool. This empowers OEMs to provide valuable services for end users through a shared, centralized repository, including:

- **Engage with customers.**
- **Facilitate application building.**
- **Share ideas.**
- **Exchange code snippets.**
- **Troubleshoot solutions.**
- **Evaluate objects and demo applications.**

Another significant advantage of HMI design tools is the creation of reusable code libraries stored within the centralized code repository. This readily accessible code can be reused within the organization and customized for various applications. It allows designers to drag-and-drop into code blocks and build the application's distinguishing features around them.

Reusable libraries help engineers avoid rework and allocate more time to innovative, true revenue-generating projects instead of rebuilding code that already exists. And this helps drive increased productivity.

EMPOWER OPERATORS

HMI software is key in helping OEMs address their clients' workforce challenges.



For example, once a project has been deployed and is running on the plant floor, it moves into the jurisdiction of operators. If an alarm or some other problem occurs, operators need a way to notify the right people that they need help troubleshooting. If the maintenance engineers aren't on-site, remote assistance is crucial for continuity.

With HMI tools, operators are empowered through remote-access tools for maintenance. Accessing these tools allows issues to be flagged and notifications sent to the maintenance engineer to contact the operator.

Tools like built-in chat available in some HMI solutions can serve a valuable role in communicating around the issue and potential solutions. Resolution might require escalation, so remote access to the HMI tools is crucial in letting the maintenance engineer see what the operator sees on the screen.

Together, they can work through and identify the problem, make application changes if needed and deploy that change remotely. A maintenance change to an application that's running is saved into the cloud repository, so teams know that they're running an updated version of the application. Together, they can work through and identify the problem, make application changes if needed and deploy that change remotely. A maintenance change to an application that's running is saved into the cloud repository, so teams

know that they're running an updated version of the application.


Important objectives for an OEM when designing and developing a smart machine are to:

- **Reduce complexity in equipment operation.**
- **Make the system easier to maintain.**

Alignment with these objectives can make the end-user's workforce as productive as possible, and it allows the OEM to provide additional value. For OEMs, the ability to connect remotely with customers via the HMI delivers business value in terms of remote support and issue resolution. This saves time and of course, the money it takes to travel to a site.

The net benefit of this to both OEM and the customer, of course, is that the quicker problems can be triaged and solved, the more uptime there is, and that enhances business continuity.



 Modern HMI tools allow operators to be notified remotely about any production issues so they can respond to production issues quickly.



Another significant advantage of HMI design tools is the creation of reusable code libraries stored within the centralized code repository.

BIG-PICTURE BENEFITS

A modern HMI can empower an industrial firm's workforce by removing barriers to valuable information and providing access to data and applications independent of location. Applications can be designed collaboratively and transparently, with development coordinated and stored in a shared centralized repository.

Clarity provided by HMI collaboration tools optimizes and speeds the development cycle as all stakeholders have up-to-date status, with updates and changes clearly defined, avoiding redundant and duplicate work.

On the operational side, HMI tools allow operators to see and respond to production issues quickly. Instead of monitoring screens to know when alarms happen, operators can be remotely notified and take immediate action or escalate for remote maintenance support and resolution.

The big-picture benefits for enterprises are optimization of design, operational and maintenance resources, faster design cycles, improved time to market, and faster issue resolution, which can drive improved revenues, operational excellence and customer satisfaction. ●



DOWNLOAD THE WHITE PAPER

Improve Processes, Gain Greater Control with High-Performance HMI

In this insightful white paper from Rockwell Automation, "[Improve Processes, Gain Greater Control with High-Performance HMI](#)," learn how upgrading to high-performance human-machine interfaces (HMIs) help operators better see what's happening, manage operations and increase response time to alarms and other abnormal situations.

Also find out how to design a useful HMI; get tips for operator training & buy-in; learn how to get started on an upgrade project; and more.

Visit <https://bit.ly/wptjpas7> to download the white paper.



ROBOT MECHANICS FOR **EVERY CONTROLLER**





How a Packaging Mill Doubled Production Capacity

See how Green Bay Packaging built a new plant and upskilled its workforce to increase production, improve system uptime and meet sustainability goals.



WHEN Green Bay Packaging broke ground in August 2018 to build its new paper mill, it was the first paper mill to be built in the state of Wisconsin in more than 35 years, replacing the original mill built in 1947. And that's not the only milestone: The mill was built by Voith, an OEM Partner in the Rockwell Automation [PartnerNetwork™ program](#) — the first time in *U.S. history* that a single company has provided machinery to support a complete paper production facility.

And Voith chose Rockwell Automation as their automation partner — a key role, because [Green Bay Packaging](#) is an integrated packaging manufacturer.

"By integrated, we mean that we've got our own paper mills to manufacture paper, and then that gets converted into corrugated packaging and used in various applications from point-of-purchase displays to packaging a dishwasher," says Matt Szymanski, vice president of Mill Operations for the company.

Szymanski has been with Green Bay Packaging for almost 30 years and has seen the company grow organically and through acquisitions as market demand for paper products increases.

"A lot has changed in our business," says Szymanski. Although upgrades to control and electrical systems had been performed throughout the past 70 years, the system was aging and causing issues with reliability. In some cases, spare parts were unattainable, making maintenance a challenge.

The company also faced a new market reality: their buyers expected 110-in. paper rolls, but the existing machinery was 164-in. wide, causing a trim issue.

"I was fortunate to be in the room in 2017 when we had a brainstorming session," says Bob Mihalski, director of Mill Sales, Trades, and Continuous Improvement. "The decision was made to build a new mill. The president and CEO was committed to building in Green Bay and transferring the existing

staff to the new mill. We also knew this was our chance to deepen our commitment to innovation and sustainability."

REDUCING RISK

Paper and packaging machinery provider [Voith](#) took on the project to provide all the machinery to support a complete paper production facility. The project's scope was so large there were days when more than 1,100 people worked together to bring the new plant online.

Voith and Green Bay Packaging chose Rockwell Automation to lead the network design, provide engineering and design consulting, and coordinate commissioning and installation of power and automation equipment.

"Rockwell Automation was very involved with the engineering and design of the new mill," Szymanski shares. "They helped us manage integration of the various project pieces, so we knew we were covering the important bases and not missing anything as we went through the process."



The new mill operates at a speed of 3,940 ft./min., producing 685,000 tons per year — doubling production capacity compared to the old mill.



The new paper packaging mill, which began production a month ahead of schedule in March 2021, includes a 300-in.-wide paper production line for producing testliner, a recycled base liner for container board. It operates at a speed of 3,940ft./min., producing 685,000 tons per year — doubling production capacity compared to the old mill.

ENABLING THE WORKFORCE

The company's focus on retaining existing staff meant upskilling was needed.

"We had challenges in terms of training. The staff all knew how to make paper. They knew how to drive the car, right? But they were driving a 1957 Chevy, and the challenge was teaching them how to operate and maintain a 2022 Corvette," notes Mihalski.

The Rockwell Automation Lifecycle Services team developed a training curriculum and hosted classroom and field training for the employees to get them up to speed. "Rockwell Automation was instrumental in our success," says Mihalski.

OPTIMIZING OPERATIONS

The new mill contains modern equipment with embedded

diagnostics and more than 800 sensors that measure equipment and process performance.

"This data allows us to use predictive analytics to maximize and optimize all of our quality specifications in real time as we're producing the paper, so we can ensure we deliver the highest-quality product for our customers," explains Mihalski.


The data also supports predictive maintenance, and the ability to schedule work orders before equipment fails, saving the company time and money by reducing downtime.

Allen-Bradley® motor control solutions from Rockwell Automation, including [PowerFlex® 755TM](#) drives and [CENTERLINE® motor control](#) centers (MCCs) that use [IntelliCENTER®](#) software, power the new mill (see Figures 1 and 2).

Automation is implemented using [ControlLogix®](#) and [GuardLogix® controllers](#), and operators monitor system performance and issue commands using the [PlantPAX® distributed control system](#) (DCS).

A new centralized control room allows operators to collaborate, share information and make



 Figure 1. Allen-Bradley® motor control solutions, including PowerFlex 755TM drives and CENTERLINE® motor control centers that use IntelliCENTER software, power the mill.



📷 Figure 2. An overhead crane — positioned by a PowerFlex drive — moves a roll of new paper for processing and printing.

better operational decisions. The DCS control screens are built with a grayscale design that aligns with industry standards and makes important information easily visible to operators.

Maintenance staff can visualize equipment status using ThinManager®-enabled mobile tablets. The mill uses

[FactoryTalk® AssetCentre](#) on a centralized server for automated software change management control and in the event disaster recovery is needed.

Pairing these technologies with a larger production board machine allows the new plant to achieve more than twice the output of the old plant.

DRIVING SUSTAINABILITY

In addition to optimized operation, the new mill is built with safety and sustainability in mind.

Power equipment was designed to meet the safety requirements specified by Voith and the mill layout was designed to minimize forklift traffic.

The alignment with modern corrugator sizes reduces waste. The boiler now runs on natural gas instead of coal, and leftover heat is reused throughout the facility. Finally, the new mill's water treatment system uses recycled water, reducing the amount of freshwater required to support the process and eliminating the discharge of waste into natural waterways.

"With our new mill, we're able to make more quality product and get it to our customers when they need it. We're environmentally efficient, sustainable, and as we continue to use the data we're collecting, it's only going to get better," concludes Mihalski. ●

▶ WATCH THE VIDEO

Green Bay Packaging collaborated with Voith and Rockwell Automation to build its new paper mill designed to increase production, improve system uptime and meet sustainability goals.

Watch the video about the project at <http://tinyurl.com/2s3p6ksj>



How Controller-Free Robots Boost Operational Performance

Learn how standardized components and independent control systems can help simplify integration, enhance process control and improve production efficiency.



TO optimize processes and enhance competitiveness, manufacturing companies frequently turn to automation as a first step, integrating corresponding solutions into their existing production systems. And robots are proving to be very efficient.

Controller-independent robot mechanics can be integrated with any control and automation platform. They represent a significant development on the journey to autonomy, supporting holistic access to the system and even facilitating the use of artificial intelligence (AI).

Simplifying the direct integration of mechanics into the machine control allows users to take advantage of entirely new production possibilities.

ROBOTICS ROLE IN AUTOMATION

Typically, several of these precise and flexible robots work together on a production line to achieve a shared goal. However, each robot uses its own proprietary control system. There is also a higher-level machine control system that manages all other process components and communicates with the individual robots.


Because they are based on closed manufacturer platforms, different systems often must work together. Interface issues are inevitable, leading to an increase in the number of solutions required and a growing need for additional control systems. This not only extends the time required for system commissioning but also complicates operations and increases the risk of data loss.

CONTROLLER-INDEPENDENT ROBOTS

One approach is to make robotics and other hardware independent of the control system. Open mechanics remove the need for interfaces and additional controls. These solutions leverage a standardized architecture paired with sensors to operate autonomously and perform complex tasks, allowing AI algorithms to be used more efficiently.

Founded in 2002 and based in Willstätt, Germany, autonox Robotics GmbH develops controller-independent robot mechanics that are compatible with any automation platform.



 autonox Robotics' controller-independent robot mechanics can be integrated with any automation platform.

The control independence allows operators to manage all components directly through a single system and using one machine language. This reduces the need for control components, saves time during both commissioning and servicing and also makes machine maintenance simpler. Additionally, there are several software-related benefits:

- **Reduced training time**
- **Reduced data interfaces**
- **Lower susceptibility to errors during data exchange and updates**
- **Direct control access to robot drive technology**



- **Simpler process control**
- **Direct process optimization**
- **There are also some hardware-related advantages:**
 - **Standardized spare parts stock**
 - **The same components can be used throughout the machine**
 - **Reduced system footprint**

MOVING TO OPEN MECHANICS

The highly standardized components and independent control systems allow for the selection of mechanics and degrees of freedom that best fit the specific process requirements. Additionally, various mathematical robot models can be integrated into a single control system.

Compatibility with any control system simplifies the process of finding the ideal solution for end users. It optimally implements processes without relying on pre-made control packages from a provider, which can increase a machine's unique selling point.

The trend is moving toward open mechanics and software platforms, which are fueling the so-called independence of robotics. In other words, direct control of robots through open mechanics allows for new automation solutions and opportunities. ●

AUTONOX ROBOTICS

autonox Robotics, based in Willstätt, Baden-Wuerttemberg, Germany with offices in Suwanee, Georgia, United States, is a Technology Partner in the Rockwell Automation PartnerNetwork™ program. The company specializes in developing and producing control-independent robot mechanics, that can be connected to any automation platform.

Its customers are mechanical engineering companies and robot integrators interested in an end-to-end control platform. Its product line consists of more than 300 different mechanics.



Collaboration with Rockwell Automation

autonox Robotics and Rockwell Automation are collaborating to integrate Kinetix® motors and drives from Rockwell Automation with autonox's robotic mechanics.



The robot mechanics feature a well-defined mechanical interface for connecting to Rockwell Automation motors at the gearbox input. This provides users with flexibility in selecting drive technology and motor suppliers for their machine.

The robot solutions are programmed using a shared environment with Logix-based controllers and Studio 5000® design software. This removes the need to coordinate traditionally separate machine control and robot systems.

The recommended Rockwell Automation motors are listed with catalog numbers in the autonox Finder. The digital online catalog includes motor recommendations/specifications for both parallel and serial mechanics.

Users can also select suitable robot structures, degrees of freedom, payload capacities, work areas and more. The range includes over 300 different mechanics, most in a modular design. A simulator designed to predict application performance is in development.



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How a Craft Brewery Switched from Bottles to Cans

A streamlined can-filling system with updated PLCs, drives and HMIs helped improve system visibility, filling accuracy and product quality.



MICROBREWING began expanding rapidly across the United States in the 1980s. And Lakefront Brewery was one of the first craft brewers to set up shop in Milwaukee — a city known for its rich beer heritage.

Established in 1987, Lakefront offers more than 20 different beers in over 30 states and distributes to multiple countries. The brewery is known for its ales, lagers and brewery tour.

From the beginning, Lakefront packaged its shelf-stable offerings in glass bottles. Recently, company leaders opted to transition to cans as a more economical, efficient and environmentally friendly choice. Cans also maintain better quality, because no light can enter the can and degrade the product.

To make the switch, Lakefront contacted [KHS Group](#), the same original equipment manufacturer (OEM) that delivered the existing bottling line 10 years ago. KHS Group is a global manufacturer of filling and packaging systems for the beverage and liquid food industries. The company's subsidiary, KHS USA, is headquartered in Waukesha, Wisconsin, and is an OEM Partner in the Rockwell Automation PartnerNetwork™ program.

CONSERVING SPACE

Transitioning from one packaging paradigm to another is challenging under any circumstances. But space constraints at the Lakefront operation, housed in a historic 1908 power plant, added to the complexity.

"Our space is quite limited," says David Karrer, director of brewing operations. "That was a driving factor in our technology decision. We required a solution with a compact footprint."

In addition, Lakefront didn't have the space to run the existing bottling line and new canning application concurrently.

"We had to remove our entire bottling line and start over with the new system," Karrer adds. "To maintain as much productivity as possible, we obviously needed a solution that was easy to install and use."

To simplify installation and integration with other equipment in the brewery, Lakefront leaders specified a Rockwell Automation control solution for the entire canning line.


ONGOING IMPROVEMENTS MATCH REQUIREMENTS

KHS installed its updated Innofill Can C filler, designed for craft brewers, at Lakefront's plant. The filler fills and seals between 10,000 and 60,000 cans per hour. In addition, the machine's compact design accommodates the 13-ft. x 7-ft. space available at the facility.



The tight footprint at Lakefront Brewery, housed in an historic 1908 power plant, added to the complexity of installing a new filling system.



 KHS replaced its existing bottling system with this compact can-filling machine running on a single control platform.

“Our Innofill Can C system [fits] in one self-contained skid,” says Brian Anderkay, electrical engineering manager, KHS. “Its combination of size and speed allows higher output capacity when space is at a premium.”

Coincidentally, KHS USA was already working on transitioning the machine’s control system to a Rockwell Automation solution when Lakefront approached the company about the project. The original system included Rockwell Automation components, but also a third-party HMI system and fill computer. The dedicated fill computer provided inputs and outputs, but the logic used to generate the output was not visible. As a result, the system was difficult to maintain.

To improve system visibility, usability and troubleshooting, the updated filler includes an Allen-Bradley® [GuardLogix® safety controller](#), [Kinetix® 5700 servo drives](#) and [PowerFlex® 525 AC drives](#). The system runs on an EtherNet/IP™



LISTEN TO THE PODCAST

Control Intelligence Guest Podcast: Insights from the 9th Annual State of Smart Manufacturing Report

We’re bringing you a surprise this episode of our “Automation Chat” podcast by providing a guest episode from our sister publication *Control*. Rockwell Automation just released its [9th Annual State of Smart Manufacturing Report](#), and for their “Control Intelligence” podcast, *Control* Group Publisher Keith Larson did a great interview about the results with Gerry Abbey, Rockwell Automation Manager of Analysts, Relations and Insights.

You’ll learn how generative artificial intelligence (GenAI) rocketed up the technology priority list over the last 12 months. Why cobots, AMRs, AGVs and wearables ranked highly for technology investments. How cybersecurity continues to increase as OT and IT work together more closely. And more.

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network and is monitored by [FactoryTalk®](#). [View HMI software](#) on an Allen-Bradley [PanelView™ graphic terminal](#).

To incorporate the fill computer logic into the main controller, KHS rewrote the program from the ground up.

“Our goal with the rewrite was to keep all functionality of the original machine, while simplifying the actual troubleshooting of the code and overall operation,” notes Matthew Herrick, electrical engineer, KHS.

FAST INSTALLATION, IMPROVED ACCURACY

With the Rockwell Automation platform in place, KHS completed installation and commissioning in under two weeks. The 21-valve system runs at a rate of 230 to 235 cans per minute to match upstream processing speed.

The switch from bottles to cans also improved fill accuracy. Instead of measuring the product, the bottler used vent tubes to achieve a specific fill level. The canning technology measures product volume using flowmeters.

“As a result, we can individually dial in every single valve to improve consistency,” explains Tom Giese, plant engineer at Lakefront Brewery.

In addition, Lakefront leaders anticipate they’ll be able to handle most maintenance issues with in-house staff.

“Luckily, we haven’t had to really troubleshoot yet,” Giese notes. “But I can see that troubleshooting and maintenance will be much easier, since everything uses one software and control platform.”

And Lakefront knows they can rely on KHS for support if needed. ●

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from *The Journal*

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How OEMs Drive Cybersecurity in Smart Vehicles

The evolution of software-defined vehicles requires automotive industry OEMs to get ahead of data encryption, IT security, and AI to thwart cyberattacks.





AS the automotive industry speeds toward the dream of software-defined vehicles, IT systems are becoming more embedded in the driving experience — opening new attack routes for hackers.

Financial services firm and researcher [Evalueserve](#) claims connected cars could exchange up to 4 terabytes of data per day, or the equivalent of around 8 million digital photos. The need to secure this massive data flux is creating an entirely new branch of cybersecurity devoted to the automotive sector.

It's a branch concerned not only with securing data while a connected car is in use, but also across the automotive life cycle, from manufacturing to aftersales.

Automotive industry cybersecurity is evolving rapidly, because OEMs have not traditionally faced IT security threats in the manufacturing or use of their products. Nor has the industry been a major target for hackers, beyond the malware threats faced by all enterprise operations.

The arrival of software-defined vehicles means the auto industry now needs to get ahead of data encryption, IT platform security and the use of AI and other tools for the enhanced identification of vulnerabilities.

Yet, as things stand, "Vehicle-to-everything and vehicle-to-grid communication security development is reactive, as most technology is still pilot phase and requires strong hardware and software integration," said an executive interviewed by Evalueserve.

FACTORY CYBERSECURITY

OEM manufacturing does boast several cybersecurity strengths. For example, the industry is already encrypting communications within internal components and uses an architecture design based on isolated zones that minimizes the risk of malware transmission in vehicles.

Similarly, devices that the car might connect to, including cellphones, already use secure technologies such as elliptic curve cryptography. And manufacturers

rely on secure cloud providers for data storage and over-the-air software updates.

However, as vehicles add more data entry points, concern is growing about the vulnerability of an expanding attack surface. The industry collaborations required for software-defined vehicle development, often involving small or start-up companies, could also create openings for hackers.

Software-defined vehicles will interact with a growing number of IT systems, any one of which could be compromised by a determined threat actor. It's uncertain whether the legacy systems currently being integrated into connected cars have all the security they might need.

The need to shore up industry defenses is being addressed by an array of cybersecurity providers, operational technology (OT) security specialists and Tier 1 suppliers. These providers are helping introduce cybersecurity best practices such as standardization, code signing, penetration testing, controlled access and monitoring,



Connected cars could exchange up to 4 terabytes of data per day, or the equivalent of around 8 million digital photos.



tamper-evident hardware seals and secure software development life cycles.

In response to security concerns, some OEMs are using virtual security operation centers to aggregate, correlate, analyze and report on vehicle threat data to mitigate risks and manage vulnerabilities.

These centers are usually run by OEMs, for data privacy purposes, but developed by third parties.

Across all fronts, OEMs are seeking to beef up their cybersecurity capabilities, usually in partnership with specialist firms. Only about 5% of current cybersecurity initiatives are developed in house, although this could rise to 20% in the next 10 years as automakers gain experience.

SECURE STRATEGIES

Emerging automotive cybersecurity strategies focus on providing several layers of security. One major OEM has built its own vehicle operating system and uses secure wireless local area networks (LANs) to safeguard vehicle-to-infrastructure communication.

The company has also invested in a risk analysis and penetration

testing start-up and collaborates with third-party experts on areas such as the provision of a virtual security operation center, training institutions for cybersecurity skills and industry associations for guidance on best practices.

Another global manufacturer has created a dedicated cybersecurity unit and launched a bug bounty program to track down vulnerabilities. It has also invested \$4 million to improve its architecture, design principles and threat-analysis risk assessments.

Auto industry players work alongside a range of IT security bodies, including the [Automotive Information Sharing and Analysis Center](#), the [U.S. National Highway Transportation Safety Agency](#) (NHTSA), Alliance for Automotive Innovation and the [National Institute of Standards and Technology](#) (NIST).

They can also leverage the knowledge and technologies developed for traditional cybersecurity, such as using microservices architectures, to minimize potential attack surfaces and strengthen defenses with secure boot processes and hardware-based security modules.

Some companies are even exploring post-quantum cryptography technologies, in anticipation of traditional bit-based

encryption being rendered obsolete by quantum computing.

EVOLVING REGULATIONS

Standards and industry bodies offer the automotive sector a range of best-practice frameworks, from the International Organization for Standardization's ISO/SAE 21434:2021 road vehicles — cybersecurity engineering standard to Europe's UN Regulation No 156 provisions for software updates.

The ISO/SAE 21434 framework is of particular importance because it sets requirements for automotive cybersecurity processes and a common language for communicating and managing risks. One part of the framework concerns the structure, processes and governance involved in automotive cybersecurity management systems. Another offers guidelines on how to make sure vehicle architecture designs, risk assessment procedures and cybersecurity controls are executed correctly.

These cover factory and in-vehicle cybersecurity, respectively.

A third concern is how to secure charging infrastructure. Currently, most of this depends on the adoption of best practices such as security by design and blockchain-based data exchanges.



One challenge facing OEM efforts to secure connected cars is that regulations and best practices vary widely from one region to another.

At the same time, though, organizations such as the [Institute of Electrical and Electronics Engineers](#) (IEEE) and the [International Electrotechnical Commission](#) (IEC) are developing cybersecurity standards for emerging vehicle-to-grid and smart-grid implementations.

One challenge facing OEM efforts to secure connected cars is that regulations and best practices vary widely from one

region to another. Therefore, for example, automotive OEMs in Europe all need to comply with laws such as UN Regulation 165, while in the United States, there is a much heavier reliance on industrial development more than regulatory limitations.

For more on how the auto industry is driving the evolution of smart cars, download the [white paper](#) from Rockwell Automation. ●



LISTEN TO THE PODCAST

What's Really Happening with Industrial Cybersecurity & What You Can Learn

In this episode of our “Automation Chat” podcast from The Journal From Rockwell Automation and Our PartnerNetwork magazine, “What’s Really Happening with Industrial Cybersecurity & What You Can Learn,” Executive Editor Theresa Houck chats with Fortinet’s Richard Springer about a study on unprecedented cybersecurity risks. Learn key takeaways, cybersecurity trends, the role of IT/OT collaboration and more.

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