

# COLLABORATIVE EFFORTS, UNIVERSAL GAINS

## The Future of Robots in the Industrial Space

By Gareth Noyes, Senior Vice President, Products at Wind River

Cobots. The word is a union of *collaborate* and *robots*, and the increasing popularity of these autonomous machines in the manufacturing space is a result of the benefits of that union. Like never before, robots are working with—often alongside—human counterparts. And they’re changing the modern industrial workplace. Historically, industrial robotic applications deployed at scale have been geared toward mass production. In these scenarios, the (historically expensive) robots are optimized for a specific task that can be carried out independently. These robots are normally physically isolated from people for safety, often by barriers or cages. Think of an assembly line that might have a robot that lifts and places material; another that can perform high-speed and precise welds; and another that can paint beautiful, blemish-free surfaces. These are traditional industrial robots. Steer clear!

Contrast this with cobots designed to assist or augment the capability of flesh-and-bone workers, whether guided by—or responding to—humans interacting with them to perform tasks jointly. These cobots share the same workspace as humans, interact with people (both deliberately and randomly), and move independently of their human coworkers. At the core of this newfound adaptiveness and responsiveness are increased levels of automation and a focus on enhanced safety considerations.

For the foreseeable future, these two distinct classes (robots, cobots) will likely remain, as there is additional cost and overhead in implementing the advanced capabilities of cobots. New skills come at a cost. As technologies mature and price points reduce, however, it is likely that the distinction will become more and more blurred.

## SO, WHAT’S PROMPTING THIS SHIFT TOWARD COBOTS?

The factors are as varied as the tasks they can perform, enabled by emerging technologies (new computing power, cheap sensors, complex software) and propelled by business and personnel needs.

Business drivers boil down to efficiency (cost reduction or increases in throughput) or flexibility (moving from high volume/mass production to customized high-mix/low-volume production). Personnel factors include the demand for safe working environments (assisting workers in manipulating objects that could injure them), shortage of personnel with specific skills, and geopolitical factors such as onshoring. Progressive business leaders are capitalizing on new capabilities afforded by cobotics—capabilities that were not possible with traditional robots—and optimizing efforts on both the business and personnel fronts.

**Progressive business leaders are capitalizing on new capabilities afforded by cobotics and optimizing efforts on both the business and personnel fronts.**

## MEET YOUR NEW COWORKER (HE DOESN'T TALK MUCH)

Production environments are the easiest location for envisioning how human workers are collaborating with robots. While material handling on a production line works well with traditional robots (be the materials as small as a computer chip or as large as an automotive chassis), some tasks, such as installing wire looms in cars, require both might and finesse. In such a scenario, cobots assist workers by supporting the heavy weight of cables being installed, while responding to guidance from humans for detail work and placement. Human judgment—an essential workplace asset that isn't going

anywhere anytime soon—can be combined with automated tasks that improve precision, reduce errors, and mitigate injuries. If those benefits sound to you like significant ROI elements, you are correct.

## NEXT-GEN COBOTS

Robots have historically been employed for automating tasks. The difference with cobots is that we are using these next-generation machines to execute tasks autonomously. That's an important distinction. While an RTOS such as [VxWorks®](#) is used as a robot's software "brain," software governing cobots must be expanded to ensure a higher level of safety and to enable the addition of further intelligence to increase the machines' freedom, range of motion, and number of sensors that prompt them to respond to their surroundings.

While these underlying technology elements will have to be built into the system, ultimately it is the ability to make a more flexible and responsive system that will define the cobot as being "next gen." Here we rely on advances in machine learning related to object recognition and problem-solving, in addition to basic, reliable, safe control functions.

All of this changes the underlying software architecture required to build cobots. Here at Wind River®, this entails a combination of traditional embedded technologies, such as [VxWorks](#), working in tandem with general-purpose computing environments, such as [Linux](#), to enable a modern approach to programming and the deployment of new technologies such as [Tensorflow](#) or [OpenCV](#) for machine learning and image processing.

## COBOT EDUCATORS

This is all heady stuff, and it's new to many, even the smartest minds in industry. So there remains a great deal of confusion about implementing cobots in the manufacturing world. How do they work? How much do they cost? How would my enterprise benefit from some newfangled machine that controls itself? While the capabilities of modern robotics are generally well understood among business leaders, the accessibility and availability of cobot systems is not. The perceived complexity can be overwhelming. There might be a lack of skills to make use of and deploy these systems (though a pool of talent for outsourced help is increasingly available). On the other hand, another aspect is affordability, which becomes better year after year. These factors must be communicated to executives pondering cobot initiatives. They are common concerns with attainable solutions.

Ultimately, deployment of cobots is most often limited by lack of a compelling business case. Yet in high-volume markets (consumer electronics, automotive manufacturing), there are compelling opportunities to build such business cases. Flexible manufacturing, allowing consumers to customize their sneakers or their entire car, rounds out the other end of the spectrum. Cobots and higher degrees of flexible manufacturing can drive real benefits.

Naturally, large enterprises with deep pockets are implementing robotic infrastructure at a faster clip than smaller businesses lacking the domain knowledge to be early adopters.

## COBOTS 101

We at Wind River are happy to play the role of educator in Cobots 101. While our customers (OEMs, system integrators) often educate end users on how and when to deploy cobots, our role is to showcase how to easy it is to implement and deploy the underlying technologies and software that enable the creation of autonomous systems featuring cobots. As with all advances in technology that have the potential to impact humans, demonstrating how to create systems that are secure, safe, and reliable is paramount. Wind River can rely on nearly 40 years of doing just that.

**The drive toward flexible, optimized supply chains will soon make robotics/cobotics more prevalent across industries.**

## REAPING THE GREATEST (COLLABORATIVE) REWARDS

As mentioned, industries that are driven by mass-market applications are most aggressively leveraging advanced robotics currently. Cobots and the democratization of intelligent autonomous systems are enabling those agile, customizable manufacturers to get in the game, reaping benefits from robotic systems that will only grow more collaborative, and more lucrative, over time.

Traditional manufacturing sectors such as consumer and automotive will dominate this trend in the short term, but the drive toward flexible, optimized supply chains will soon make robotics/cobotics more prevalent across industries. Consider niche applications, such as search-and-rescue or emergency response to situations such as toxic spills, that will emerge as a result of the growth of intelligent, cobotic systems.

Now, while it is tempting (and fun) to ponder new features and capabilities of cobotics, the true mark of success will be the increased deployment of autonomous systems that drive unforeseen flexibility and productivity, all while making the workplace safer. I am thrilled to see the spillover of robot/cobot technologies and know-how across applications—just consider the recent explosion of artificial intelligence as a practical tool. I am excited about a future in which robots and cobots provide us exponentially productive industrial environments that boast unprecedented safety.

And as we progress down this path, the distinction between the two terms should fade as collaboration between humans and machines evolve. In fact, that term—cobot—might just replace its predecessor entirely.

*“Hey boss,” asks the new employee on the factory floor of the near future, where autonomous cobots seamlessly work alongside him. “What was a robot?”*

**TO LEARN MORE ABOUT COMPUTER VISIONS AND ROBOTICS, READ THIS [USE CASE](#) OR CONTACT WIND RIVER AT [salesinquiry@windriver.com](mailto:salesinquiry@windriver.com).**

