



5G WIRELESS TECHNOLOGY DRIVES NEW INDUSTRIAL USE CASES

5G Technologies Promise to Increase Product Innovations,
Improve Performance, and Save Costs for the Industrial Segment

NEW 5G INDUSTRIAL USE CASES

- 5G transforming the manufacturing floor
- 5G enabling mobile industrial robots
- 5G remote monitoring and control of wind farms

WIND RIVER SOLUTIONS

- **VxWorks:** The world's leading real-time operating system, enabling deterministic applications for embedded solutions. Widely used for operating industrial equipment from control automation, energy processing, medical devices, robotics, transportation systems, and more, VxWorks is ready to be the real-time platform for high-speed 5G industrial applications.
- **Wind River Linux:** Industry-leading open source operating system for connecting, securing, and running embedded systems and applications. Wind River Linux provides an open operating system ready to provide a cost-effective foundation for 5G wireless connected industrial equipment and enables use of containerization for flexible, agile application installations.
- **Wind River Helix Virtualization Platform:** A flexible edge compute software platform that can manage unmodified guest OSes running industrial applications or workloads in virtual machines, consolidating workloads for equipment for control automation, energy production, medical, transportation systems, and more.
- **Wind River Cloud Platform:** An open source, production grade, distributed Kubernetes for managing edge cloud infrastructure. Based on the OpenStack StarlingX project, Cloud Platform represents a compilation of best-in-class open source technology that delivers the features needed to effectively deploy and manage distributed networks. Ready to provide 5G network capabilities.
- **Wind River Titanium Control:** An on-premise cloud infrastructure platform that enables digital transformation from legacy hardware to a virtualized automation environment, reducing OPEX and increasing agility. It uses either virtual machines or application containers to run industrial equipment connected via the 5G wireless network.

THE CHALLENGE

Industrial companies create the products and services that drive daily life for businesses, consumers, and economies, but in a competitive business world they need to produce innovative products in an efficient and cost-effective way. To give a few examples: It is essential to modernize equipment on the manufacturing floor to increase both speed and economy of production. Meanwhile, expanding the capabilities of industrial robots to better collaborate with humans and be mobile means that, with quicker access to data, they can increase production performance and also be functionally safe and secure while operating within the factory. And to expand energy production with technologies such as wind farms, for more reliable and economical energy production, intensive monitoring and control of equipment in often remote landscapes is vital.

How can industrial equipment companies keep pace with the push to economize and modernize, to be more data-centric, and to provide safety and security in the face of constant innovation?

THE APPROACH

One technology that shows promise for increasing security, cost-effectiveness, performance, and actionable data is 5G technology. 5G is the fifth generation of mobile networking technology, following 4G and working on the same principles. Yet 5G NR (New Radio) air-interface technology will provide higher levels of scalability and flexibility that will enable much broader functionality for industrial segments (not to mention the public) to utilize.

5G wireless technology will provide improved speed, reduced latency, and the ability to connect more devices at once. Additionally, 5G will bring a new level of wireless service that merges all the basic functions of previous wireless generations and delivers new networking technology offering the type of wireless coverage and new use cases that will stir the imagination.



5G Features and Benefits

Let's explore some 5G features that will optimize Industrial Internet of Things (IIoT) platforms and the industrial segment as a whole:

5G Features and Benefits for Industrial Uses

Feature	Benefits
High-speed throughput	Higher levels of user communications, plus higher capacity for number of users, connected devices, and traffic demands
Lower latency	Fast handling of time-bound VoIP traffic, applications that require low latency, and streaming videos
High-motion mobility	User support for fast, mobile methods of transport
High reliability	Low latency, high availability down to two nodes, providing reliable communication
Advanced manageability	Reduced operating expense and better management by operators and carriers
New spectrum	Use of millimeter wave bands and radio carrier aggregation
Ultra-low energy	10+ years of battery life
Improved and expanded security	Security built into the specifications

NEW INDUSTRIAL USE CASES WITH 5G TECHNOLOGY

With this new wave of 5G features, including high-speed throughput, low latency, high reliability, and the other features outlined in the chart above, industrial equipment will be able to offer innovative technologies and services to support critical applications for a variety of use cases.

Let's look at three industrial use cases that can use 5G technologies to increase production, improve operations and management, and be more cost-effective.

5G Transforming the Manufacturing Floor

If you were to visit a manufacturing plant or factory, in many cases you will find that its equipment is at least 10 years old and based on older technology. Most of these machines are operating and communicating through cables connected to other equipment or the computer network. The first area that can easily benefit from the introduction of 5G wireless technology is the replacement of cabling with wireless communication. With 5G, the network communication speed will be just as fast or faster than the communication via cables. Further advantages will include faster equipment movement and reconfiguration, updates and installations without need for cable installation or upgrades, and a large savings in cabling costs. Additionally, re-configuration of equipment within a facility can be completed much more rapidly without dealing with cable. As examples, think of updating a sewage treatment plant or updating a chemical processing system.

The next 5G benefit that manufacturing will see is that companies can vastly expand the sensors within their factories. 5G's wireless capability, high-speed capacity, low latency, and availability will allow more data to be transmitted quickly and more frequently, providing more data to the edge cloud computing system within the plant to operate the equipment at optimal



performance or to easily make adjustments for different processing runs. With more equipment data, this will enable a predictive maintenance system to foresee failures or the need for repairs, as well as reduce unneeded maintenance or shutdowns.

5G Enabling Mobile Industrial Robots—

Safe and Secure

5G technology will be a catalyst for driving advancements in mobile robots within the industrial segment (as well as other segments). With 5G wireless technology, robots will become more mobile, no longer tethered by cables or limited by the bandwidth of 4G wireless technology. Industrial robots will now be able to receive and send data via high-speed throughput, low latency, and broad data bandwidth to collaborate safely with humans and factories with expanded capabilities. Artificial intelligence and machine learning via the cloud using 5G will enable intelligence to navigate about facilities and people safely.

5G will advance robot capabilities through computer vision and sensors driven by 5G low-latency transfer of data to conduct safe mobile operational functions. Functional safety for robots will be strengthened through the use of real-time computer vision and sensors through 5G wireless.

5G Remote Monitoring and Control of Wind Farms

In Europe and the United States, wind farms are a significant component of energy generation. Wind farms need to have remote monitoring and control to manage their windmills along windy coastlines or in rural lands. Bringing in 5G wireless communication enables energy companies to get more detailed wind-farm

data faster, with lower latency, and over greater distances. The control automation and monitoring systems created by manufacturers will house 5G communications in the systems supplied to energy providers; this enables health monitoring of windmills, controlling and configuring remote systems with more data, and receiving rapid and prompt alarms when there are system issues, which all result in enhanced wind farm production, operation, and actionable data.

THE RESULT

5G wireless technology is coming to the industrial segment. 5G will bring advanced capabilities and innovation to the equipment, services, and performance of industrial equipment and operations that will be a catalyst to Industry 4.0. The new capabilities will transform how industrial and manufacturing equipment perform, their efficiencies, and the cost of operation—enabling new use cases that will change the way industries and business function, as well as the ways people work.

These three industrial use cases reveal just a fraction of the ways in which 5G will deliver innovation for advancing the next generation of industrial equipment and operations. As 5G rolls out, the industrial segment will see 5G usage expand across all components of control automation, manufacturing, logistics, robotics, and more.

To learn more about Wind River® and its product support of 5G innovations, visit our [website](#) or contact our [sales inquiry desk](#).

