triax®

EBOOK

Demystifying the Industrial Internet of Things

How the Industrial Internet of Things works and why you need it

Imagine being able to track the exact location of a forklift on one worksite, a pallet of materials on another and a worker on a third—and doing it all in seconds, with just a few simple strokes on your laptop, smartphone or tablet.

It's possible, thanks to the Internet of Things (IoT), the tech term that describes how we connect everyday items and, even, individuals—like that forklift, pallet and worker—to the platform (and more importantly, to the computer systems that run our businesses) for automated data collection.

Big benefits with IIoT

A McKinsey report found that improvements in operations from **IIoT applications at worksites, including energy, industrial, and manufacturing sites, will be worth more than $470 billion per** year in 2025. The same report also found that the **economic impact of IIoT applications could be between $3.9 - $11.1 trillion** per year by 2025.

Industrial Worksite Challenges

IIoT is the key ingredient to the worksite of the future, but the industrial worksite brings its own unique set of challenges.

In a worksite IIoT solution, workers wear data-collecting devices, or these devices capture data directly from machinery, as well as other static and dynamic locations. The information collected then travels over a network to a cloud-based server for processing. That's no easy feat in a complex industrial environment.

Here are just a few of the conditions that can threaten IIoT on worksites:

Heavy machinery and materials

Big machinery and heavy materials can endanger hardware. It's not uncommon for devices to get stepped on, smashed and run over.

Environment

Vibrations, large temperature extremes, exposure to weather and dust cause damage. Hardware must stand up to all these conditions—whether it be a refinery, mining site, manufacturing facility or warehouse.

Power

Electricity can be in short supply. That makes it difficult to power the typical gateway—the hardware that connects the IIoT device with the cloud and usually requires a plug-in to an outlet.

Altogether, most IIoT-enabled devices that we might find in a home or office building would barely survive a day outside in the elements or in the rugged environments of many industrial facilities.

For IIoT in these conditions to work, solutions must include:

1. **Hardware that can resist extreme conditions** and stand up to the rough-and-tumble activity of an industrial worksite.
2. **Battery-powered infrastructure** and little need for a power outlet.
3. **Networks that can easily be reconfigured** as work progresses.
4. **A wireless frequency and protocol** capable of operating efficiently even in proximity to steel, concrete and other worksite complexities.

IIoT in Action: The Case of the Moving Equipment

At a large industrial facility, a supervisor, who's company had implemented IIoT tracking devices on equipment, noticed that a piece of machinery had started moving around the site on a weekend when no workers were on the job.

The supervisor had the Spot-r platform configured to send notifications about activity on the site. Thanks to the alert, they could quickly contact building security, who found one of the building's employees using the equipment—unauthorized and unsupervised. The unsafe situation was addressed immediately because the IIoT device gave the supervisor immediate visibility on the site.

Network Matters

As IIoT offerings grow within industrial worksite technology, providers are using a variety of network options to transfer data from the physical worksite to virtual dashboards and databases. But not all network solutions are created equal.

Here's a look at the network technologies on the market:

- **Ultra-Wide Band**
- **Long Range (LoRa)**
- **Bluetooth Low Energy (BLE)**

Ultra-Wide Band

These high-bandwidth and short-range applications are capable of very accurately pinpointing the location of various items, but, generally, they are best used on small, static sites because:

- Due to robust hardware requirements and related high price points, the system does not scale well on large sites.
- Current solutions are limited to about 100 devices per gateway, which can make them useless on large facilities that can require thousands of devices.
- UWB infrastructure is typically not battery powered and requires a constant source of electricity, which can be limiting in many work environments.

Long Range (LoRa)

LoRa is a low-power communications technology that works at an extremely long range—but comes with some major drawbacks.

- The solution is limited to just a few hundred devices per gateway, making it an expensive, and hardware-heavy, proposition on large sites.
- It's designed for low bandwidth and offers a low update rate, so continuous real-time notifications aren't possible.
- Because LoRa isn't effective as a real-time location technology, users must pair it with another solution to receive up-to-the-minute information.

Bluetooth Low Energy (BLE)

BLE must be paired with other devices (typically a smartphone), which can prove to be a distraction to workers.

- All workers, equipment and other site-wide, intel-gathering devices, such as environmental sensors, must have a smartphone or other Bluetooth gateway device attached to them, making BLE an expensive proposition.
- Some BLE solutions are not as low energy as they may imply. Devices that don't stay paired at all times are constantly searching for a signal. Because of this high-power consumption, BLE drains the device's batteries quickly and requires frequent recharges.
- Initially designed to connect accessories to smartphones, BLE was never intended to penetrate walls, much less host dense collections of devices across large site locations.

Proposed new features, such as Angle of Arrival estimation systems, may lead to better location capabilities in the future for BLE, but today's enterprises can't rely on it yet. Real-world applications are years away from being field ready.

What about Global Positioning Systems?

We use GPS on our smartphones daily, but the technology's use is limited on the worksite.

- **Tall buildings can block the signal**, which means it's not very accurate for tracking workers or machinery on a vertical plane and frequently doesn't work indoors.
- **Power consumption is relatively high**, which presents a challenge for long-term battery- powered solutions.
- **Workers may be less likely to adopt the technology** because they're worried about being tracked when they're off the job.

To make IIoT work in many industries, the network must:

- **Rely primarily on long battery life and easily rechargeable battery power.**
- **Be capable of supporting thousands of workers and equipment and materials at a single location.**
- **Route real-time information to the people who need it so they can make better informed decisions quickly.**

With our wearable IIoT-enabled sensors, users can quickly identify the location of workers and obtain new ways to bolster productivity, efficiency, risk management and security with an easy-to-use system that doesn't drain resources.

When they partner with us, industry-leading companies are building a connected work environment that provides full visibility into how their worksites are running, with plenty of insights into how to improve operations and safety.

- **Our hardware stands up to rough elements** on worksites and can be easily repositioned as needed—especially in the case of industrial worksites.
- **Our proprietary network solution requires minimal hardware installation and power requirements.** Rechargeable batteries last months between charges.
- **Our solution can support tens of thousands of devices** at the very same time at a single location.

How Spot-r® Can Help

Spot-r by Triax makes the world's most challenging worksites safer and more productive with innovative, people-centric technology that turns real-time data into actionable insights.

- **Our technology creates real-time visibility into your workforce**, with automated check-ins and time and attendance and insights into team productivity.
- **A critical part of your workforce's PPE**, the Spot-r Clip is a direct line of communication to report injuries, safety incidents and hazards with its push-button functionality.
- **Supervisors can instantly trigger an evacuation** through an alarm emitted by each wearable Clip, amplifying it with high-decibel, flashing EvacTags placed around the site.
- **Equipment usage can be tracked in detail**, and worker safety and productivity data can be filtered by group, subcontractor, trade or location.

Ready to learn how to implement IIoT in your work environment?

Discover Spot-r by Triax, a comprehensive worksite solution platform that offers a proprietary blend of IIoT devices, networks, applications, and insights to capture, synthesize, and act on field data. **Contact us today or request a free demo to gain access to unparalleled workplace safety & visibility into your labor analytics.**

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Learn More

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