i-Virtualize

Real-Time Location Services Empowers Industry 4.0 Transformation

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REAL-TIME LOCATION SERVICES EMPOWERS INDUSTRY 4.0 TRANSFORMATION

Manufacturing is in the midst of its most significant transformation. Industry leaders who have embraced the next step in digital transformation are not only creating new opportunities powered by Industry 4.0, but are also evolving to factories where the physical and virtual worlds meet succinctly.

With managers under pressure to improve operational efficiency and utilize IoT technologies in order to keep pace with consumer demand for their products as well as outpace competitors, the promise of Industry 4.0 is enticing. In fact, the introduction of Industry 4.0 technologies into manufacturing has been seen to reduce the amount of defects in products and diminish downtime by almost 50%[1]. It’s not a big surprise then that 68% of companies see Industry 4.0 as a top strategic priority today and 70% of companies have already started to pilot Industry 4.0 solutions[2].

Using unparalleled machine intelligence, connectivity, and data gathering capabilities, Industry 4.0 is where Information Technology (IT) and Operational Technology (OT) converge, enabling companies to design and engineer intelligence and sustainability into both the things they make and the processes they use for making them.

1. Cisco; Between an idea and production, there’s a bridge; https://www.cisco.com/c/m/en_ca/digital-manufacturing/index.html
2. McKinsey & Company; Industry 4.0 Capturing value at scale in discrete manufacturing; https://www.mckinsey.com/~/media/mckinsey/industries/advanced%20electronics/our%20insights/capturing%20value%20at%20scale%20in%20discrete%20manufacturing%20with%20industry%204%200/industry-4-0-capturing-value-at-scale-in-discrete-manufacturing-vf.pdf

Real-time Location Services (RTLS) is considered an essential part of the Industry 4.0 revolution, since locating and tracking assets, inventory, and people are necessary to obtaining real-time feedback about process performance. Taking that one step further, the amount of data that can be collected through RTLS enables better decision-making and more fine-tuned production processes where resources can be optimally utilized and quality can be ensured through constant monitoring.

Unlike assumptions into how employees interact and where assets are allocated through a plant, RTLS provides clear visibility into everything—from the office to the factory floor to the surrounding yard and parking areas—giving plant managers a thorough data-driven understanding of their entire facility. This gives them the ability to optimize business processes, streamline workflows, enhance employee safety, and increase business revenue opportunities.

In this paper, we'll explore the dramatic influence RTLS is having on driving process efficiencies and workforce productivity, the significant impact location tracking and tracing has on the financial bottom line, and how asset and personnel tagging enhances employee safety throughout the facility.

We'll also explain how i-Virtualize's TRACE Sensors — the first RTLS solution of its kind to use sub-metre tracking and cutting-edge historical tracing analytics—is an essential element for Industry 4.0 transformation success.

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USING REAL-TIME LOCATION DATA TO DRIVE FACTORY EFFICIENCY

Though manufacturers view making sure everything and everyone is in its place as key to maintaining plant efficiency, it's often a guessing game. During production peaks especially, manufacturers may store their pallets of raw materials and semi-finished goods around the shop floor instead of taking the time to put them in their allotted locations.

This is a way to keep up with demand and save time when that is a limited commodity. However, this also introduces a problem when they later need to find that inventory. Often more of an everyday occurrence as part of the accepted process, reorganizing and locating misplaced products means reassigning workers to move pallets from one production phase to the next in an effort to find what they are looking for. What saved a few minutes during busy hours is now a waste of time and money, and an increase in frustrations.

Any missing or lost component inside a facility can severely affect the production cycle, resulting in:

- Substantial production delays
- Increase in lead times
- Wasted labor hours as reassigned workers look for missing items
- Jobs are mis-prioritized as workers move to the nearest job
- Misaligned planning and scheduling

Inevitably, any items lost or duplicated negatively impact the bottom line.

Even planned events, like annual inventories, can slow down and interrupt production activities as the entire plant is surveyed, and all pallets are identified and verified against the data registered in the internal ERP system. This often can take a week or longer as crews work round-the-clock to manually inventory all materials within the facility.

Industry 4.0 systems, such as RTLS, capture a wide range of data that can be used in a number of ways to improve performance and productivity, including helping manufacturers avoid production interruptions by directly improving asset utilization, optimizing operations, and improving productivity and energy efficiency[3].

[3] ISA Interchange; How Industry 4.0 and Digitization Improves Manufacturing Responsiveness, Quality, and Efficiency; https://blog.isa.org/industry-40-digitization-improve-manufacturing-responsiveness-quality-efficiency-iot

RTLS combines software and hardware that delivers transformative business analytics in the form of actionable occupancy and location data that scales and expands based on the need of the facility. This enables the efficient tracking of pallets using a real-time view of where they are located in the facility, with a number of supporting services to easily and rapidly locate them and manage the production cycle.

Utilizing a "digital twin", or the digital representation of the facility, factory managers can not only clearly identify the locations of people, assets, tools, and inventory, but also uncover valuable business insights into how changes in equipment specifications, scheduling, downtime, and maintenance affect production workflows

Having a holistic view—of the entire factory floor, as well as office, yard, parking, and entrances, plus views of any other of the organization's properties — provides real-time insights 24/7 and can impact more than just what is going on within the plant's walls.

Tagged assets, such as forklifts, palettes, and other vehicles within the facility, enable the real-time monitoring and historical tracing of this equipment both on the floor and in the yard to improve workflows, monitor the time it takes for palettes to be loaded and unloaded on transports, and optimize scheduling of check-ins and check-outs of suppliers and distributors.

With the pinpoint accuracy RTLS provides in locating tools, equipment, employees, and inventory coupled with the highly reliable business analytics collected from all tagged items and employees, plant managers can:

- Track workflows and evaluate them to strengthen efficiency
- Increase workforce coordination and productivity
- Provide predictive and remote asset maintenance
- Monitor deviations from expected processes and perform root-cause analysis

RTLS also affords manufacturers the benefit of knowing who is in and around their facility at all times to monitor sensitive areas and set up virtual security zones with automated alerts and alarms when these areas are breached. Integration with third-party systems provides access to information about when employees and visitors enter or exit the building, the location of employees throughout the facility, how long they are in certain spots, and the current occupancy on the floor or in a room should an emergency occur and occupants need to be evacuated.

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CREATING LONG-TERM AND SHORT-TERM REVENUE OPPORTUNITIES.

It's the main goal of every manufacturing business to increase revenue and profits. Research conducted by McKinsey & Company in July of 2019, estimated the value-creation potential of manufacturers and suppliers implementing Industry 4.0 in their operations at $3.7 trillion USD in 2025[4].

"POTENTIAL OF MANUFACTURERS AND SUPPLIERS IMPLEMENTING INDUSTRY 4.0 IN THEIR OPERATIONS AT $3.7 TRILLION USD IN 2025[4]."

By streamlining plant efficiencies and enhancing workflows, companies can sell more products, which in turn increases profits and stock prices, and ensures the future availability of investment capital to grow the business and compound revenue opportunities.

The productivity and efficiency benefits of RTLS enable factory managers to achieve their performance goals, driving long-term competitiveness and growth, as well as cut costs in a variety of areas to boost their bottom line in the short term.

On the factory floor, being able to reduce the time spent searching for assets, tools, or inventory—and the subsequent time wasted by employees in chasing down lost or misplaced items instead of doing more profitable tasks—can expand a factory's output and therefore its ability to make more money.

With sub-metre accuracy, real-time asset and product inventories can be done more quickly, eliminating the cost of inventory errors, while at the same time optimizing asset management and inventory control. RTLS integration with reporting analytics software saves even more time by consolidating this information into reports that can be easily shared and archived.

[4] McKinsey & Company; Industry 4.0 Capturing value at scale in discrete manufacturing; https://www.mckinsey.com/~/media/mckinsey/industries/advanced%20electronics/our%20insights/capturing%20value%20at%20scale%20in%20discrete%20manufacturing%20with%20industry%204%200/industry-4-0-capturing-value-at-scale-in-discrete-manufacturing-vf.pdf

These long-term revenue benefits can also be found out in the yard, from the streamlined management of trailers and docks to reducing costly wait times in logistics. A reduction of minutes adds up to hours each day, opening the door to opportunities to move more products. OpEx budgets can be reduced as RTLS integrates with third-party systems, such as smart lights, doors, and cameras, to trigger on-and-off switches, helping companies lower overhead and reduce energy budgets.

In the office, data gathered by RTLS sensors and locators can be transformed into customizable reports that integrate with CRM and ERP systems, providing data-driven business intelligence without manually collating disparate information from a variety of reporting tools.

Tracking employees as they move through the facility unlocks valuable information into who is working where, for how long, and with whom. The insights provided by transformative analytics can help in accurately calculating employee hours, efficiently scheduling workers, and reducing non-value-added time that might appear on a traditional timecard, to cut unnecessary payroll costs. With the addition of tags, factory managers can also mitigate time theft by monitoring real-time and historical data around a suspected occurrence. In the long run, the use of this information could save companies a lot in wasted wages, and even provide incentive for employees to be more productive.

Another long-term cost benefit of RTLS is the ability to reduce healthcare costs by hindering the spread of illness. We all learned more than we wanted to know about the spread of contagious viruses during the COVID-19 pandemic.

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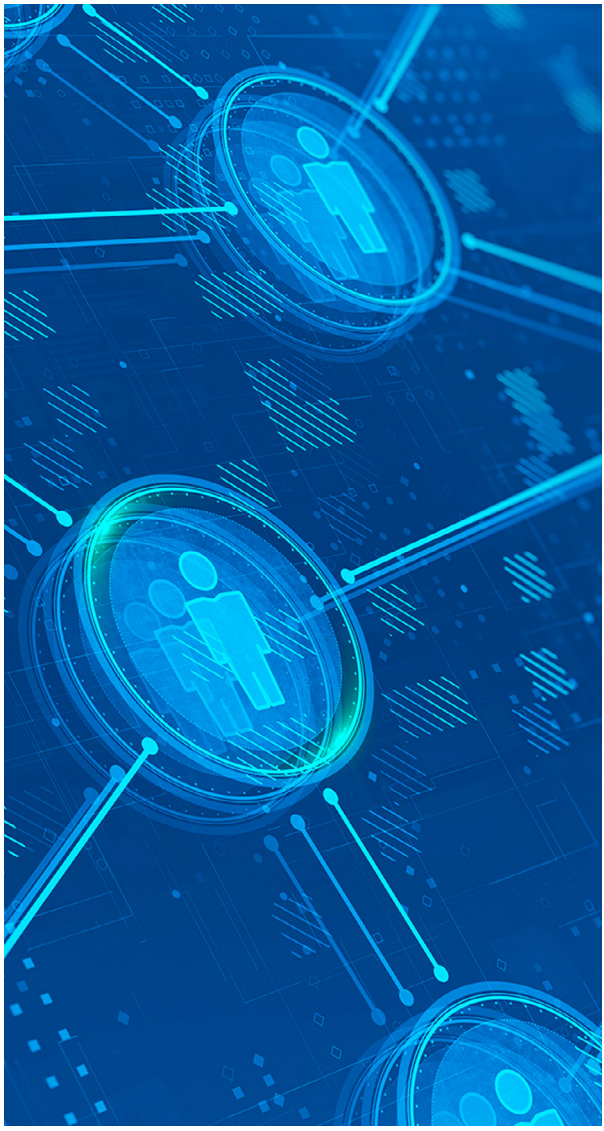
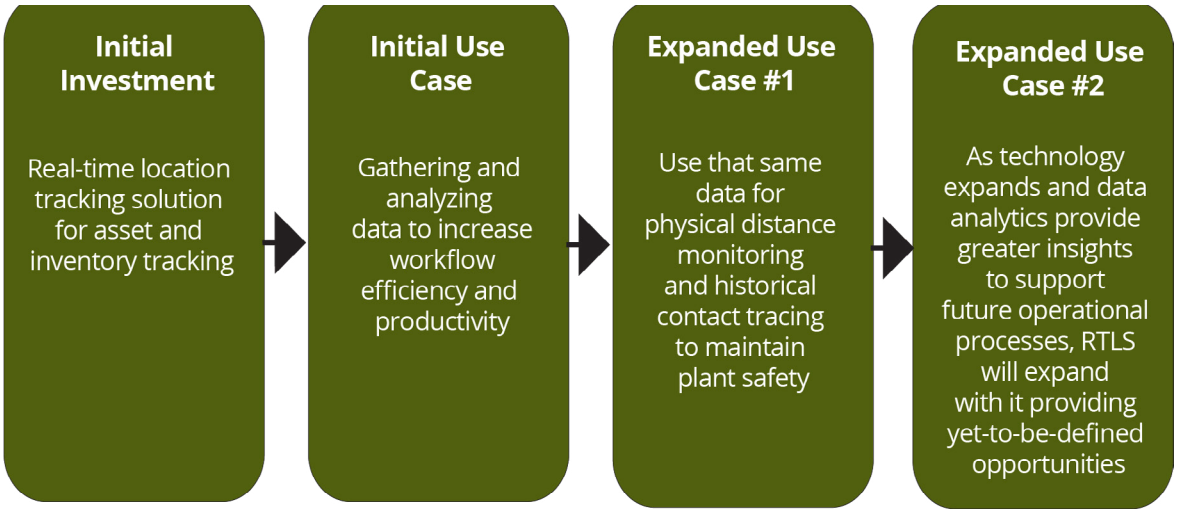
Those same infectious transmission rules apply to the common cold and the flu, which infect millions of people each year. Employee tags with alerts can help those who may be infected steer clear of others, and can even create an environment where workers avoid contact with one another during those seasons when illnesses like the cold and flu are most prevalent. This can save employers thousands if not more each year in healthcare costs, overtime pay to cover those out sick, and employee productivity.



Many businesses have found that they don't have to wait months or years for return on their RTLS investments. With the rash of plant closures across both Canada and the U.S. due to the rapid spread of the coronavirus, factory owners and shareholders looked for ways to keep their businesses open. From small shops of only a few employees to large enterprises, a day or more of production loss can be felt almost immediately when it comes to revenue. Being able to tag, track, and trace employees throughout a facility can prevent shut downs, giving enterprising businesses a competitive edge in just one day.

Evolving uses of RTLS positions businesses to benefit from their initial investment several times over as the solution's uses expand throughout the facility.



PROVIDING EMPLOYEES WITH A SAFER WORK ENVIRONMENT

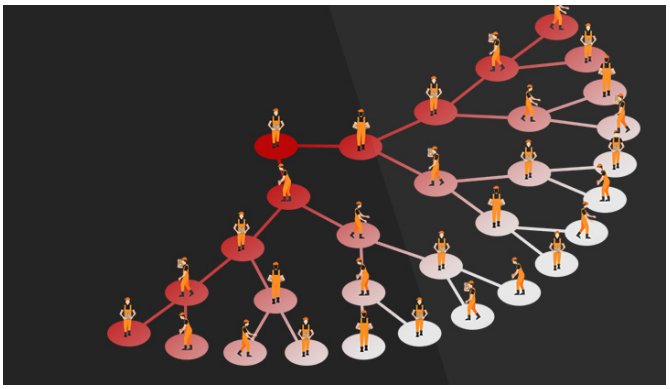
In the U.S., every seven seconds, a worker is injured on the job[5]. Many of these injuries are due to employee contact with objects and equipment that resulted in the employee having to take time off from work[6]. In Canada in 2019, there were more than 260,000 recorded injuries that resulted in loss of work time, and unfortunately almost 400 injury-related fatalities[7].

These numbers are staggering, and the worst part is that most of these injuries were preventable.

Industry 4.0, powered by data analytics acquired through RTLS, has been proven to enable faster and more precise decision-making, taking entirely new approaches to production, and enhancing performance, all leading to a significant influence on the health and safety of workers.

From forklift and other vehicular collision accidents to unskilled workers being injured while operating machinery, every factory has faced some form of preventable accident—mishap or catastrophe. This can unleash a variety of troubles for the business, including healthcare costs, lawsuits, regulatory fines, lack of employee and consumer confidence, and a damaged brand reputation.

RTLS tagging and tracking capabilities help factory managers monitor the real-time positions of their workforce to prevent risky situations. Forklift drivers and employees walking on the floor can be notified immediately using an audible or vibration alarm on the tag when they are in proximity to avoid a collision. Supervisors can enforce skill levels so only workers with the right experience operate heavy machinery. With a clear view into factory floor traffic and work positions, using the digital twin of the facility, businesses can improve their regulatory compliance, stopping accidents before they happen and adjusting workflows to mitigate any risk.



[5]National Safety Council; https://www.nsc.org/
[6]Bureau of Labor Statistics (2020); Number of nonfatal occupational injuries and illnesses involving days away from work by industry and selected events or exposures leading to injury or illness, private industry; https://www.bls.gov/iif/oshwc/osh/case/cd_r4_2018.htm
[7]University of Regina; 2020 Report on Work Fatality and Injury Rates in Canada; https://www.uregina.ca/business/faculty-staff/faculty/file_download/2020-Report-on-Workplace-Fatalities-and-Injuries.pdf.pdf

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Throughout the pandemic, companies committed to following rigorous safety guidelines—hand washing, physical distancing, and wearing masks—many of which have become not only habitual, but found to be potent in mitigating the spread of the common cold and flu. Physical distancing however has been hard to maintain in many workspaces without protective gear or devices to alert workers when they are in too close to one another. Wearable tags on badges can provide an alert, letting employees know that they need to move away from one another. The data gathered from these tags can help management develop new workflows and layouts for their floor space in order to help employees keep a safe distance. This data can also provide historical contact tracing information should an employee become ill, and help to identify those who they may have come into contact with the infected person to help stop the spread of the virus.

Wearable tags can also be used to notify and identify employees if a wide-spread accident, fire, or emergency occurs. With sensor alerts, employees can evacuate the facility faster, making it easier for factory managers to do an instant headcount at assembly points, and identify those who have evacuated and those who may be missing. This helps first responders know if there are any people in harm's way within your facility and where they may be in order to quickly get them to safety.

RTLS tags can also be outfitted with panic buttons for those employees working alone in unoccupied areas or during sparsely covered overnight shifts. When pressed, the distress signal is picked up by locators and an alert can be sent to the dashboard to identify where the employee is within the plant. A notification can be sent to the supervisor or manager to call for emergency assistance. Automated alerts can also be set up to notify management in instances of prolonged personnel inactivity—such as in the case of a heart attack or stroke—so medical assistance can be provided right away.

Safety is also a factor in enhancing employee engagement. News travels fast within a factory especially when someone has been hurt or put into a harmful situation. This diminishes morale and can give a business a negative reputation as being indifferent about the wellbeing of its employees. In today's highly competitive market and very vocal social media environment, maintaining brand reputation and customer confidence in a company's work practices, as well as the safety of its products, is essential for sustainability.

TRACE SENSORS BY i-VIRTUALIZE

At the forefront of Industry 4.0 RTLS technology is i-Virtualize's TRACE Sensors. The first of its kind anywhere on the planet, TRACE Sensors is the most accurate real-time tracking and tracing solution with a precision of less than 2 metres. TRACE Sensors was created to empower Industry 4.0 and advance the potential of smart factories, utilizing IoT technology to provide accurate, real-time location services.

Using a digital map of the facility, users can accurately locate assets, materials, and workers in real-time. The data is securely stored on an off-premise, proprietary cloud-based location intelligence platform, making it easy to manage all locations—anywhere around the globe—using a single dashboard that can be accessed using any device. TRACE Sensors was developed to withstand a variety of rugged factory environments always maintaining the integrity of its location capabilities.

TRACE Sensors empowers smart factory transformation with a combination of the latest innovative technologies from ThinkIn and Quuppa—using Bluetooth Low Energy—and supported by a strong Cisco digital-ready network backbone. By giving manufacturers the ability to locate their assets and workforce anywhere in their environment, using powerful business-driven analytics, they can improve industrial processes to optimize their factory's efficiency.

TRACE SENSORS

Schedule a demo today and let i-Virtualize show you how TRACE Sensors can help you build a smarter factory.

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