

Sensors Mag

Modern Cargo Tracking

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Sensors Insights by Andy Souders, Guest Contributor



"The whole is greater than the sum of its parts." This expression has been used to describe business mergers and professional sports teams. It's also true of the role that sensors play in modern cargo tracking and asset management. Businesses can now drive operational improvements by leveraging advanced sensing and communications technologies, such as radio frequency identification (RFID), extracting and correlating data from multiple sensors, and analyzing that data against trends and established scenarios.

Technologies Enabling Change

As with many technological advances, necessity is the mother of invention. The first widespread application of RFID for cargo tracking was sparked by the U.S. Department of Defense's need to track military cargo during Operation Desert Storm in the early 1990s. Commercial tracking applications followed, but these were primarily focused on location of a given shipment or asset. Now, some 20 years later, cargo tracking is going through another metamorphosis, enabled by the marriage of advanced sensor technologies that provide more accurate, diverse, and timely data with widely available and inexpensive computing power.

Today's sensors increasingly leverage sensor-on-a-chip technologies, making sensors smaller yet more powerful. Sensors have greater range, longer battery life, and more data storage capacity, and they can capture entirely new types of data. These sensors are also less expensive to manufacture, making it affordable to track more assets than during the days of Desert Storm.

Likewise, the widespread adoption of cellular communications across the world has opened the door to tracking cargo in regions never before monitored. Remote regions and developing nations, which lack the infrastructure to support tracking technologies such as active RFID, can now leverage cellular communications to monitor cargo in new ways and in new areas.

For example, the customs and revenue organizations in countries such as Ghana, Kenya, and Tanzania have recently mandated the use of cargo tracking technologies to crack down on lost, missing, and stolen cargo shipments. The result has been phenomenal, as seen in Ghana, where nearly 40% of all cargo used to go missing. Today, thanks to innovative and advanced solutions put in place by SGS, the cargo loss rate is below 2%.

Data, Access, and Analytics

To truly understand how the advances in sensor technologies are changing cargo tracking, you have to also examine two major developments: information access and sensor-based analytics.

Access to information is at an all-time high. Real-time weather updates, automated port scheduling and prioritization, real-time traffic reports, supply chain monitoring, and enterprise planning systems—all these allow businesses to better understand the environment that cargo must transit to reach its destination. This is as true of cargo or equipment moving within a large, distributed manufacturing environment as it is for materials moving around the world.

Real-time sensors allow us to create data sets never before imagined. Temperature and environmental sensors enable prioritized offloading of high-value cargo at ports to reduce spoilage. Real-time traffic data allows companies to re-route overland cargo shipments to avoid traffic problems. Anti-tampering sensors and real-time location devices reduce theft and speed the recovery of goods. All of these advances have been made possible through the combination of sensor data with historical data and/or real-time information access.

Sensor-based analytics take this access to "new" information several steps further and demonstrate how sensors are vital for businesses that want to optimize performance and gain a competitive advantage. Sensor-based analytics take input from sensors, apply those inputs to historical data, and compare the information with sophisticated analytic models. In so doing, businesses can optimize cargo shipments by determining the best route, best time of day to travel, and the most reliable drivers.

What's Next?

Where does this go next? Real-time sensors that help to drive predictive analytics. As sensor technologies continue to evolve, they will increasingly become the nerve-endings that feed critical, immediate updates to enterprise systems—whether those systems are looking at cargo, manufacturing processes, logistics systems, or supply chains.

The better and more accurate the nerve endings are, the better and more accurate the information that they yield will be, proving that the whole *is* greater than the sum of its parts.

ABOUT THE AUTHOR

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