

The Alternative to RFID's Incomplete Success

Optical technology picks up where RFID leaves off

By Mitch Silver

For years, the material handling and logistics communities have looked toward RFID for solutions to track movable assets indoors. Countless millions of dollars and years of development invested in RFID have sometimes ended in disappointment and frustration. Unlike the fabled story of the Emperor who wore no clothes, RFID often adorns part of the solution, but falls short of delivering its full expected potential. It would seem that the Emperor may be missing his belt and suspenders.

RFID has always presented great customer appeal, with its promise of reliable and consistent data capture, and a wide variety of end-uses and operating environments. RFID projects have produced well documented results for unit load identification, carton and item identification, and more recently, Real-Time Location Systems (RTLS). So long as customers research the technology, gain formal training, identify key engineering issues, and carefully procure or develop applications, actual results will fall in line with expectations. But RFID systems often represent major investments and somewhere along the project approval path, technical details regarding imperfect read rates, variability of environmental factors, and questionable data accuracy are smoothed over, and by project end, results do not match expectations.

Specifically, buyer's remorse can be felt in critical moments post-installation, when small technical problems and hidden challenges are suddenly revealed. As a case in point, RF transponders that function well on pallet loads of paper products may be unreadable on steel drums. Radio waves traveling between the transceivers and tags can reflect or attenuate due to the nearby materials; for example, metal objects that heavily influence radio propagation directly influence tag readability. Imperfect read rates result, and distort or degrade the data collection process.

In a second case, consider RFID-based RTLS systems, where RF tags placed on vehicles are monitored for their position within a facility by an array of transceivers and antennas. Accuracies can be as good as twenty feet under ideal conditions, but due to the same effects mentioned above, building contents can have a huge impact on accuracy and reliability. Steel racking, which interferes with radio waves, and the multitude of varieties of warehoused goods cause significant degradation. For instance, a warehouse full of televisions will create a very different set of challenges than a warehouse full of marshmallows. Consequently, inventory variability can lead to unexpected data collection errors, less than perfect capture data accuracy, and subsequent costly reconfiguration.

The bottom line is that RFID technology is not entirely accurate or reliable for this set of end-uses. By contrast, most RFID applications outside the logistics world do not aim for the same success criteria, or suffer from the same difficulties. But expense overruns in

the material handling industry have caused some companies to abandon the technology altogether after investing considerable time, money and effort in trying to apply RFID as a viable solution for indoor logistics.

After working with RFID for several years, the founders of Sky-Trax felt that a better solution, based upon optics instead of radio, existed. From that mindset came the Sky-Trax System, utilizing Indoor Positioning Sensing (IPS) technology. IPS offers advantages over RFID in almost every regard. It is less expensive to install, low maintenance, highly accurate and very reliable. In essence, it is a better technology for tracking moveable assets indoors.

Unlike RFID, IPS is based on optical technology. Optical Position Markers (OPMs) are installed on the facility ceiling, and sensor mounted on board each forklift tracks its exact location and feeds the information back to a server that keeps a “what/where/when” database, and displays a real-time animation of all vehicles in the facility. Where RFID has claimed accuracy within several feet, IPS measures accuracy in inches, often within an inch. Never before has this type of accurate, real-time location data been available for indoor objects. Given this accuracy, the vehicle’s load, as well as the vehicle itself, can be accurately tracked.

The advantages of real-time inch-accurate data are plentiful, and still being uncovered. Perhaps the biggest advantage is the new level of driver accountability, and operations visibility. With IPS, the movement of all fork trucks is tracked in real-time via the *Ops Man* feature, which allows managers to view warehouse operations live on a screen. They see the location of each truck and constantly monitor its activity. They see if vehicles are moving or stopped, how fast they are going; which direction they are traveling; how close to other trucks are they traveling; and the list goes on. Reports summarize activity for periods of hours, days, and months. In the event that a critical event occurs - say an unfortunate collision - the manager can replay the animation for the period of time in question. They can witness the chain of events leading up to the collision and take preventive measures.

This new element of driver accountability has enormous advantages. First, the fact that all vehicle movements are being watched and recorded has a definite impact on the drivers’ level of care. The next big advantage is that real-time inch accurate tracking affords *real* fleet optimization. The standard reporting package provides accurate data to help identify driver performance, operational practices, safety issues and event recording. It tracks and reports on distance traveled, operational hours, average speed, number of loads carried, proximity to danger zones and more. It clearly shows routing issues, congestion areas, and productivity problems.

For unit load identification, we have found the same story to hold true. Radio interference, building structures, and load content can degrade RFID tag reading and bring read rates down to the 90-99% range, which is simply not good enough for most data collection systems, and certainly not accurate enough for six sigma operations. Bar code read rates have historically been higher under even less than ideal conditions, with accuracy problems more often owed to operator error; for example, when the operator scans the wrong barcode.

The development and widespread acceptance of two-dimensional (2-D “matrix”) barcodes have brought about another alternative. Matrix scanners are able to read 2-D barcodes with accuracies equal to linear barcode scanners, but with an important additional benefit: label placement, orientation, size, and print quality variations can be accommodated much better by 2-D scanners.

Sky-Trax has developed a label reader that is able to find and decode a 2-D unit load barcode within its field of view in a few milliseconds. Data redundancy designed into the barcode makes the label readable even when partially obscured or damaged. Again, optics come to the rescue with reliable read rates, no susceptibility to radio interference, and lower label cost. By fitting 2-D label reading sensors to the forklifts, manual label scanning is obviated, saving a major fraction of the labor cost and improving data collection accuracy.

On a per-vehicle basis, RFID system costs can run as high as 25K per truck where the system automatically gathers load ID and vehicle position. A full Total-Trax System automatically tracks all vehicles and inventory and can be installed for less than half of this. This includes Optical Position Markers (OPMs), position and label reading optical sensors, and the associated equipment and software. To ice the cake, IPS has virtually no recalibration needs, damaged hardware can be replaced relatively easily, and printed labels are far less costly than RFID versions.

What does all of this mean? RFID is still a great choice for tracking animals, rail cars, and even people, but is not the best choice for demanding applications where goods must be tracked with great accuracy inside warehouses. The material handling industry is making way for new innovative technologies created by companies like Sky-Trax as alternative solutions to their RFID problems.

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More information can be found at the Sky-Trax website, <http://www.Sky-Trax.com>.*

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About Sky-Trax, Inc.

Sky-Trax develops revolutionary inch-accurate tracking systems for warehouse vehicles. Safety and productivity applications employing IPS are economical and practical to deploy, allowing warehouse professionals to substantially increase safety and improve warehouse efficiency. The results are fewer safety incidents, much lower operating costs, improved inventory accuracy, and greater throughput. Sky-Trax has just gone through its first successful installation and has tested out to be all that was expected. The accuracy, reliability and low cost combine to make it one of the most exciting technologies to hit the logistics market in years. For more information, please visit www.Sky-Trax.com.