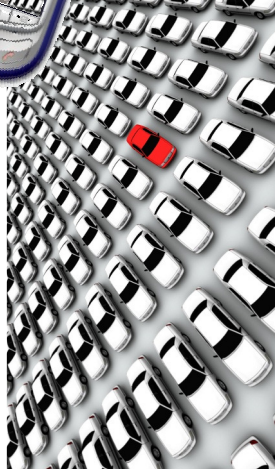


W

hy buy a van when a sports car will do?



When asked about implementing RFID, Operations Managers state they need:

- **Affordable, reliable system**
- **Fast tag reads**
- **Moderate data traffic**

No one can afford a system that won't work or a bottle neck caused by inherently slow tag reads and latency in the reader, poor database optimization, network inefficiency and system architecture. Oh, and Operation Managers want a scalable system to add handset applications and link to the greater supply chain over time—so please don't recommend a stand alone 'silo'. They need the speed of a sports car with the scalability of a family van.

Not so much to ask, is it?

The reality is the combination of hardware and software is best selected by a team of experienced RF engineers and software specialists.

Best practices involve a system focus to include process review and overall logistic goals rather than focus on one outcome such as inventory cycle counts . A supply chain process perspective helps to ensure the best ROI from RFID, wireless and logistic technology .

This document reviews prominent real time locating (RTLS) technologies in use versus 433 MHz RTLS with MOBILEFusion™ integration from AppLocation Systems .

Convergence of RFID and other wireless technologies is inevitable.

Aim Global, RFID: 5 predictions - Control Engineering, 12/28/2007

RTLS—Key features required in supply chain applications:

- **FAST tag reads to process thousands of tags in just a few seconds on an optimized database**
- **Rapid tag acquisition at dock doors to allow high volume transactions**
- **Small tags with tamper control and excellent performance in metallic environments**
- **Track people, assets, trucks on the same platform**
- **Ability to rapidly integrate mapping, database, inventory, cellular/satellite backhaul, ERP, line of business apps, mobile forms, wireless communication networks**
- **Link to Yard and wide area tracking systems for end-to-end supply chain track & trace**

Real Time Locating Technology Review

Every form of locating technology has it's pro's and con's and its place for locating. Why has 433 MHz endured and evolved?

WIFI (802. 11b, 802.11g)

WiFi or 2.4 GHz systems have large, expensive, power hungry tags. The tags are large because WiFi relies on a complex communication protocol which requires lots of processing power and on-board components adding to the cost. For short range wireless, power consumption and communication speed are directly related; high communication speeds draw high power. In terms of rating the technologies from highest to lowest in speed & power, they are; High speed Ultra Wide Band (UWB), 802.11.g, 802.11.b, Zigbee, and active RFID. With WiFi RTLS, density of tags is another potential cost factor as each access point supports limited numbers of clients. When more access points are added, the problem of overlapping channels becomes critical as 802.11b has only 3 channels to work with. Using 802.11g is not a likely option as it is more power hungry than 802.11.b. Further, it is difficult to multipurpose a WiFi network both from the IT manager's perspective due to priority of mission critical data and potential degradation of throughput with large numbers of tags on the same network. This may be overcome by Quality of Service (QoS) protocols and allowing more priority to certain applications. However, Wi-Fi tags may be pushed back and latency collisions would then become an issue. Finally, Wi-Fi tags are not suitable for on approach of an egress as they cannot be detected instantly (within 2 milliseconds) particularly if there is more than one.



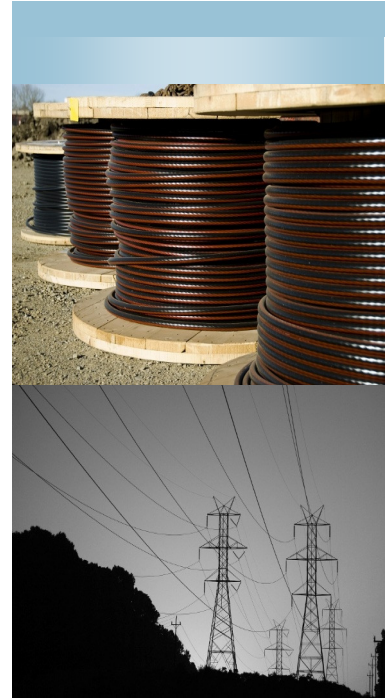
Real Time Locating? Technology Review, Con't

UWB Ultra Wide Band (UWB) in the 6 GHz to 8 GHz range has two forms: high speed UWB, designed for very high data rate (up to Gigabit range) and low power for highly accurate (millimeter) location. Primarily relying on Time of Arrival and Angle of Arrival of Tag messages for determining tag location, both forms of UWB are based very short RF signals from the tag (picoseconds) received by Receivers before any reflections of the same signal arrive to the Receiver. These reflections are the main reason why RSSI in 433 MHz and 2.4 GHz bands are not accurate to more than 10–15 feet. However, while UWB is very accurate, infrastructure is expensive, not only to manufacture but to deploy as well. This limits the use of UWB to mission critical applications while in most locating circumstances,

finding items to within 10 feet is sufficient for the application and budget.

UWB accuracy is dependent on surroundings. If large stationary items are moved after the system calibration, accuracy will be affected. UWB tags are more expensive and more power hungry than 433 MHz tags.

Reference Tag to Asset Tag: In this newest form of RTLS (915 MHz), the active tags are price competitive and the system requires fewer access points; reference tags are used as triangulation points. It is suited for industrial, manufacturing and yard applications where tag speed is not an issue. Expert placement of reference tags, system tuning and database management are critical to performance.



“Top developments will be: Open, Scalable, and Agnostic Software Platforms, Convergence & Complementary Solutions...”

Venture Development Corporation (VDC), 2007 RFID Trends, State of the Industry Report

Why 433 MHz RTLS ?

- **10– 15 foot accuracy suitable for most locating applications**
- **Works well in metallic environments**
- **Affordable components plus deployment**
- **NO special environmental configuration**
- **Lower power requirements than other locating technologies**
- **Multiple tag designs to match asset groups and application**
- **Supports a high density of tags**
- **Does not rely on multi-purposing an existing WiFi network**
- **Instant detection provides perimeter control capability**

Real Time Asset Tracking: The Inside Story

When tracking assets the first question is “what is the business problem to be solved?” The key is to start with process not technology. Does the application require millimeter accuracy? If not, what are the key features required in a system? Whether the application is in healthcare, industrial manufacturing or warehousing, there are similarities to be aware of, though the tag and system architecture may differ.

The RFID tag must be proven to perform well in rigorous difficult metallic environments. Medical and secure facilities require fast asset and personnel perimeter control so entry/exit are not missed.

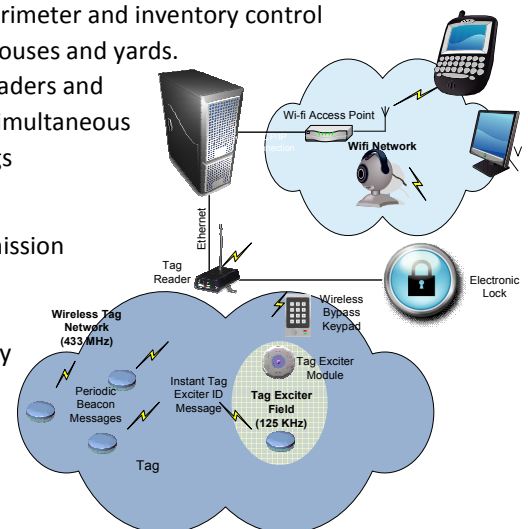
‘Fast’ tag reads increase throughput for perimeter and inventory control reducing collisions at dock doors in warehouses and yards.

The combination of fast tags, optimized readers and database means an increased number of simultaneous tag acquisitions and a higher density of tags supported on the system at one time.

In logistics, tamper control is needed for mission critical chain of custody applications.

Known battery life is a necessary feature in all applications. Any system requires fully scalable software that interfaces with line of business applications and wireless devices providing supply chain visibility.

Finally, the full package should be affordable matched to the application and business need.



433MHz RTLS—Sports Car Speed with Family Van Scalability

What do Operations Managers want?

A scalable, mobile resource management solution combined with speedy, affordable RFID locating for sport car performance and the flexibility of the family van.

AppLocation Systems integrates best of breed locating technologies with our MOBILEFusion™ platform. We suggest the Guard RFID 433MHz active RFID system for asset presence and location with web-based MOBILEFusion™ platform for most indoor warehousing and perimeter control applications.

GuardRFID provides an affordable active RF system with the smallest, fastest tag available today (1.1" x 0.33") - delivering 1 ms read rates or ~ 1000 tag reads per second.

With accuracies up to 10-15 feet, and the highest density of tags supported on a system, GuardRFID delivers reliable 433 MHz real time locating hardware for an affordable price.

Modular and web-based, MOBILEFusion is easily configured to pass filtered information to;

- ⇒ **Auto-fill mobile forms**
- ⇒ **Line of business applications**
- ⇒ **ERP**
- ⇒ **Remote locations and third parties**



= to achieve end-to-end or in transit supply chain visibility.

Not so much to ask after all...

ABOUT THE AUTHOR

GARY HARTWIG IS A WELL-KNOWN WIRELESS AND LOCATION BASED SERVICES (LBS) INDUSTRY SPECIALIST ON THE WEST COAST OF CANADA AND HAS BEEN A SPEAKER AT THE LBS WORLD FORUM AND VARIOUS WIRELESS INDUSTRY EVENTS. A FIXTURE IN THE CANADIAN TELEMATICS INDUSTRY, HARTWIG HAS LED APPLICON SYSTEMS AS PRESIDENT FOR THE PAST 4 YEARS. HARTWIG CONTINUES TO SPEAK AND WRITE ON ASSET TRACKING, LBS AND OPERATION MANAGEMENT ISSUES AND TRENDS.

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MOBILEFusion™ Features & Capabilities

- **Single, scalable platform regardless of locating technology delivering real-time supply chain**
- **Links supply chain to ERP, warehouse and yard management for in-transit visibility and wide area tracking with nationwide/ global locations**
- **CDMA, GPRS, satellite or WiFi backhaul to map remote locations on a single platform.**
- **Multiple built-in notifications, exception reports, filters, history and security**
- **Breadcrumb & Playback tag path**
- **Database optimized for high throughput applications**
- **Link to MOBILEForms and Dispatch for improved Field worker efficiency**



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