Understanding Real-Time Location Systems

Frequently Asked Questions

What is the difference between RFID and RTLS?
RTLS is how the location of an item is determined. An RTLS system typical have robust software that calculates the location of an item by using Angle or Arrival (AoA), Time Difference of Arrival (TDoA) and/or Radio Signal Strength Indicator (RSSI). A real-time location system (RTLS) is one of a number of technologies that detects the current geolocation of a targeted item, which may be anything from a vehicle to an item in a manufacturing plant to a person. RTLS-capable products are used in an ever-increasing number of sectors including supply chain management (SCM), health care, the military, retail, recreation, and postal and courier services. RTLS utilizes at lease one communication technologies (identify and communicates to the tag) such as RFID, WiFi, Bluetooth, Sonar, etc.

Radio Frequency Identification (RFID) is how the item is identified. RFID encompasses a broad range of identification technologies that can be one of the components of an RTLS use to identify and communicate with the targeted item. These include Active RFID, Ultra-Wide Band, and even passive RFID depending on the equipment and application.

Why can't I just use GPS to track my assets?
The Global Positioning System, or GPS, is a type of RTLS technology, very useful for tracking vehicles as they move across the globe. But GPS is not appropriate technology for tracking hundreds or thousands of tags in a fixed space, especially indoors. GPS-based tracking applications are mostly limited to vehicles that have a need for a cell phone and are integrated with the cell phone.

Despite extraordinary advances in GPS technology, millions of square meters of indoor space are out of reach of Navstar satellites. Their signals, originating high above the earth, are not designed to penetrate most construction materials. So the greater part of the world's commerce, conducted indoors, cannot be tracked by GPS.

Even for outdoor applications, GPS does not provide the accuracy of location that is possible with Local Location Systems. Some of these systems are capable of providing asset location accurate to a radius of 10 feet. GPS systems are not capable of providing this level of accuracy.

Additionally, GPS does not provide a cost-effective way to track thousands of assets. GPS chips are highly complex and require a substantial power source for operation. Additionally, although GPS can determine its own location, a second radio system is needed to report this location to a central computer.

What is the difference between RTLS and LLS?
RTLS (Real Time Location System) is any wireless technology that can be used to continuously determine and track the real-time location of assets and personnel. LLS (Local Location System) is a particular type of RTLS, designed to track objects in a constrained indoor or outdoor area. LLS readers are installed in a

facility, and those readers periodically communicate with all tags in range to confirm that the tags are still in range and estimate the tag locations.

Some LLS technologies utilize the concepts underlying GPS to locate tags. In GPS, satellites transmit a signal, and receivers on the ground estimate objects' locations by calculating the time for the radio signal to travel from the satellites. (A radio signal travels about one foot per nanosecond, or billionth of a second.) LLS inverts this process; a tag transmits a signal, and an LLS receiver estimates the tag's location by measuring the signal's time of flight.

Why can't my 802.11 Wireless LAN locate my assets?
The IEEE 802.11 standard was developed for high-speed data communications. The architecture was designed to operate at data rates of a minimum of 1Mbps. In order to communicate at these data rates over ranges of hundreds of feet requires about 100mW. Therefore, these radios are normally installed in devices that have rechargeable batteries and have an operating period of one to two eight hour shifts. Locatable tags must operate for years in order to be maintenance free and cost effective. Consequently the data rates of these tags are much slower, trading data rate for range, while still requiring only very low power transmissions from the tags.