PASSIVE RFID SOLUTIONS FOR HEALTHCARE:

Improving Key Hospital Processes with Smart Deployments of Passive RFID

BENEFITS

- Passive RFID is the most efficient technology for deploying innovative, process-centric solutions in hospitals
- Passive RFID allows for targeted deployments that scale as additional critical needs and resources are identified
- The flexible form factors of Passive RFID readers and tags allows for more diverse applications of the technology
- Passive RFID has a lower total cost of ownership than alternative technologies
- Rapid improvements in Passive RFID technology will increase the potential for new and innovative deployments in the future

IMPROVE PATIENT SAFETY AND REDUCE COSTS

Radio frequency identification (RFID) has been promoted as a key tool for achieving these dual objectives for the last decade. With RFID technology, hospitals can increase the visibility and awareness of medical equipment, patients, and staff, helping to locate lost or misplaced assets, monitor high-risk patients, and protect staff in emergency situations.

To date, the most common approach for achieving such visibility has been through capital-intensive, enterprise-wide deployments of a single active RFID (commonly referred to as RTLS) technology to achieve "real-time" location information. Today, a new paradigm is emerging.

Hospitals are increasingly taking a process-centric (versus a technology-centric) approach to improving patient safety and reducing costs. While some applications require high precision and frequency of location data (e.g., infant tracking), many hospital processes can be improved with periodic location and identification data at key points and times. For example, if a hospital accidentally discards surgical probes following certain operations, deploying a Wi-Fi-based RTLS system throughout the operating room (OR) will not solve the problem. Wi-Fi tags are too big to attach to surgical probes and "real-time" location data will not prevent their accidental disposal.

A more efficient and cost-effective solution is to deploy Passive RFID tags designed specifically for surgical tools and low-cost Passive RFID "loss prevention" portals placed at key "choke points" in the OR (e.g., laundry chutes). This simple deployment alerts hospital staff if a probe is accidentally discarded and

captures sufficient data to analyze and improve the process in the future. Greenville Hospital System implemented a similar solution and prevented about 6.4% of its tagged surgical assets from being accidently discarded in just 12 months, providing approximately $300,000 in savings and an ideal starting point for RFID implementation.

A thoughtful Passive RFID implementation in the hospital focused on improving key processes can do as much, or more than, an RTLS implementation, at a significantly lower cost. This is based on four unique attributes of Passive RFID, as outlined below.

1. **Targeted deployments with minimal IT administrative involvement:** A Passive RFID solution does not need to be implemented hospital- or even department-wide. Hospitals can select a single or a small number of areas to deploy a Passive RFID solution – based on their immediate needs and prioritized for quick wins – and expand as resources become available and critical needs are identified. For example, a hospital can install a single Passive RFID reader in an Emergency Department soiled room. Clinical Engineering can then be notified if a pump in need of preventative maintenance enters the room or if the total number of tagged soiled assets exceeds a maximum threshold.

   Passive RFID also scales efficiently across the hospital as additional needs and resources are identified. Just a few years after placing Passive RFID loss prevention portals in OR laundry chutes, the Greenville Hospital System solution has scaled to over 80 Passive RFID readers covering major access points to hospital departments and service areas. Greenville plans to deploy an additional 80 readers in the next 12 months. These readers provide the Clinical Engineering and Maintenance Management team sufficient visibility to find, service, and distribute critical care equipment without the need for an enterprise-wide RTLS deployment.

   Both the simple and scaled deployments of Passive RFID can be achieved with minimal IT administrative involvement. Connecting the readers to the hospital's network is as simple as connecting a new Wi-Fi or Ethernet enabled medical device. Once connected, the readers utilize just a few kilobytes of bandwidth, communicating the unique ID of Passive RFID tags entering or exiting the reader's radio-frequency field.

2. **Flexible form factor of tags and readers:** Relative to other RFID technologies available to drive process changes, Passive RFID offers significant flexibility. For example, it can be implemented at fixed read points or embedded into mobile and stationary devices (e.g., pharmaceutical cabinets, housekeeping carts, bedside devices, etc.) to perform a variety of functions. These functions include asset loss prevention and management, surgical tray and instrument track-and-trace, pharmaceutical control, specimen tracking, document management, patient tracking/throughput, infection control, inventory control and even inventory or personnel management in ambulances.

   The deployment flexibility of Passive RFID readers is complemented by the many different types of low cost tags that can be affixed to, or integrated into, a large variety of items. For example: consumable inventory, handheld surgical tools, critical-care equipment, metals, liquids, patient wristbands, and photo ID badges. Since Passive RFID tags do not include a battery, they are available in significantly smaller form factors than active RFID tags.

3. **Low total cost of ownership:** A Passive RFID solution is also very inexpensive to maintain. The readers do not require periodic re-calibration to maintain location accuracy and the tags have no batteries to replace. More importantly, Passive RFID tags only cost $0.30 to $5.00 each depending on the size and materials used. Hospitals can tag a much larger number of assets compared to a RTLS solution at a considerably lower cost. In addition, given the nominal cost, hospital administrators do not need to worry about retrieving Passive RFID tags from returned rental equipment or discharged patients.

3. **Rapid improvements in Passive RFID are increasing the potential for new deployments:** In the past three years, the read range of Passive, ultra-high frequency (UHF) tags has quadrupled, meaning that UHF devices can now "see" objects at distances from millimeters to tens of meters. Read rates have increased from 200 to 1,200 tags per second, and read accuracy is near 100% in most use cases. The cost of Passive RFID tags has also decreased by a factor of five over the same period.

   Passive UHF reader and tag functionality is also expanding. In addition to reading a unique ID, Passive UHF devices can remotely query the state of the device. For example, they can measure the temperature of an object, determine its direction of travel and velocity, and even turn devices connected to the tag on or off. In addition, since Passive RFID is based on industry-wide standards, the hospital is never tied to a single vendor. The hospital may select the best tags and readers without concern for whether they will work on its current system.

SUMMARY

Passive RFID's leading balance of low cost, easy to deploy reader and tag offerings gives hospitals a cost effective way to start with a single or a small number of critical areas and then expand the Passive RFID deployment when desired. In today's uncertain economic environment, this flexibility allows hospitals to innovate without taking the risk of an expensive long-term commitment.

For hospitals, this step-by-step approach means focusing more on the processes and workflows that can benefit from improvement, and less on the enabling technology. As a result, less time and fewer resources will be spent on proving the technology and more time will be spent on driving outcomes, such as improved patient safety and satisfaction, lowering costs, and meeting compliance requirements.

Passive RFID for Healthcare

A TRUSTED RFID PARTNER

Many suppliers can offer a wide variety of RFID products to choose from but unlike most data collection manufacturers, JADAK has one of the broadest RFID product portfolios in the industry, backed by engineers with the resources and technical expertise to help customers implement solutions to meet their specific needs and requirements.

ABOUT JADAK:

JADAK, a business unit of Novanta, is a market leader in machine vision, RFID, barcode, printing, and color and light measurement products and services for original equipment manufacturers. The company designs and manufactures embedded detection and analysis solutions that help customers solve unique inspection, tracking, scanning and documenting challenges. The company is ISO 9001 and ISO 13485 registered.

Novanta is a trusted technology partner to OEMs in the medical and advanced industrial technology markets, with deep proprietary expertise in photonics, vision and precision motion technologies.

ThingMagic is JADAK's RFID line of products and services.

www.jadaktech.com

JADAK
A Novanta Company

USA Office
phone:+1 315.701.0678
email: info@jadaktech.com
web: jadaktech.com

European Office
phone:+31 (0)76.522.5588

Asia Pacific Office
phone: +86 512.6283.7080

Novanta