



# Real-Time Location Systems Finding Your Way to the Best Solution

*November 2009*

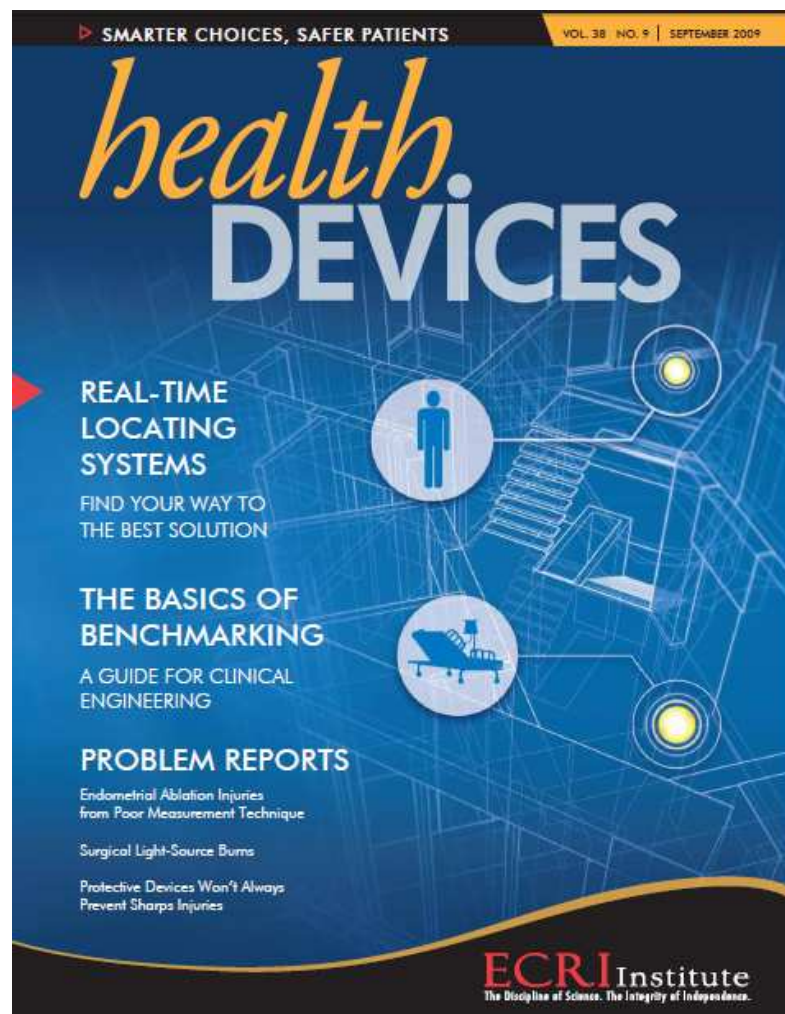
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# Introduction

- ▶ Overview of RFID systems and how they work
- ▶ How are these systems being used?
- ▶ Real and potential impact on patient safety
- ▶ Issues with planning and implementation
- ▶ Is there a return on investment?
- ▶ General advice on adopting this technology

# What's It All About?

- ▶ Automatic identification technology providing real-time updates on the location of devices, patients, or staff
- ▶ RFID is in the news
- ▶ Big potential upside
  - Time saver finding equipment
  - Potential cost savings re lost equipment
  - Readily available status on patients or staff and therefore better overall communication and work flow



# A quick history of RFID

- 1940s – military IFF
- 1960s – theft control
- 1990s – electronic toll collection
- 2000s – growing number of applications – today is associated with locating and identifying
  - used in many industrial/commercial applications

## Areas where RFID is being considered or being used in hospitals:

- ▶ Emergency Departments
- ▶ ORs
- ▶ General care floors
  - Infusion pumps (most common)
  - Wheelchairs
  - Stretchers
  - External pacemakers
  - Portable patient monitors
- ▶ Supply storage areas

# Reality Check

- ▶ Still very early on the technology adoption curve
  - A few large installations (i.e., 25,000 tags)
  - Most are much smaller (a few thousand tags)
- ▶ Technology, work-flow, cost, implementation issues, etc. still evolving
  - And, it won't work if you are just “automating” a bad work-flow process
- ▶ ROI mostly falls into the “soft” category
- ▶ Despite very promising potential, limited adoption to-date



# ECRI Institute Survey Data

**Does your hospital plan to implement RFID (radio-frequency identification) technology for tracking the location of capital medical equipment?**

RFID system  
already in use

**5%**

Working on  
implementation  
now

**8%**

Plan to  
implement  
within 2 years

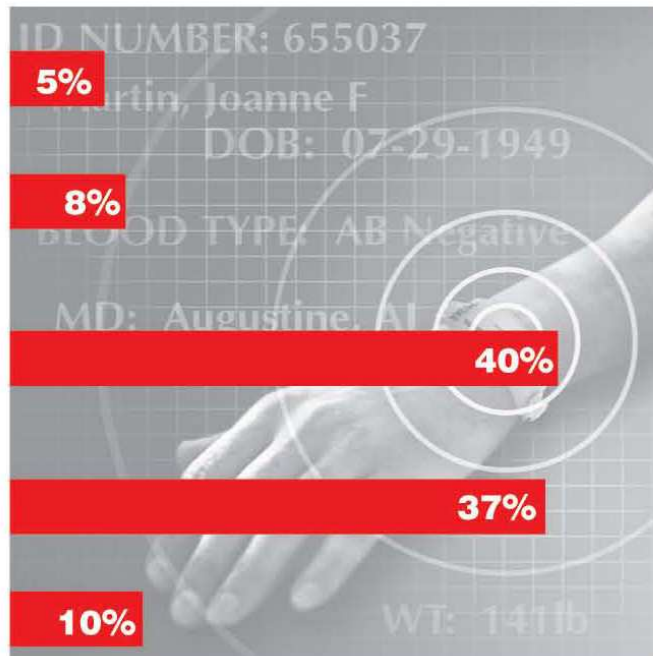
**40%**

Not in our  
immediate  
plans

**37%**

Don't know

**10%**



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The Discipline of Science. The Integrity of Independence.

# What is an RFID system?

## ► Basic components

### ■ Tags

- Passive
- Semi-passive
- Active



## ► Basic components:

### ■ Readers

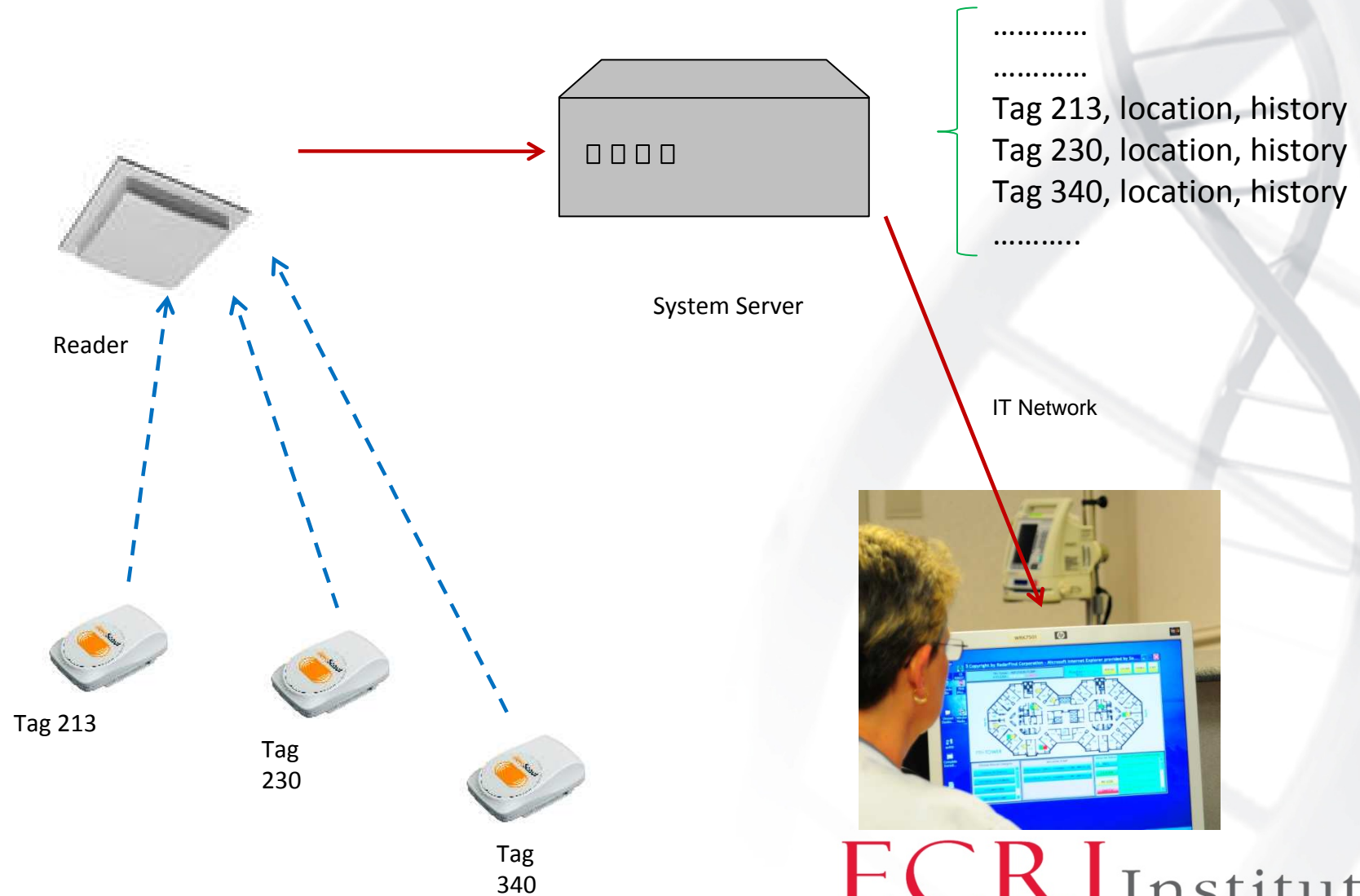
- Purpose
- Types – *form follows function*

### ■ Software/Server

- Middleware
- Host data management



# RFID System



# Technologies

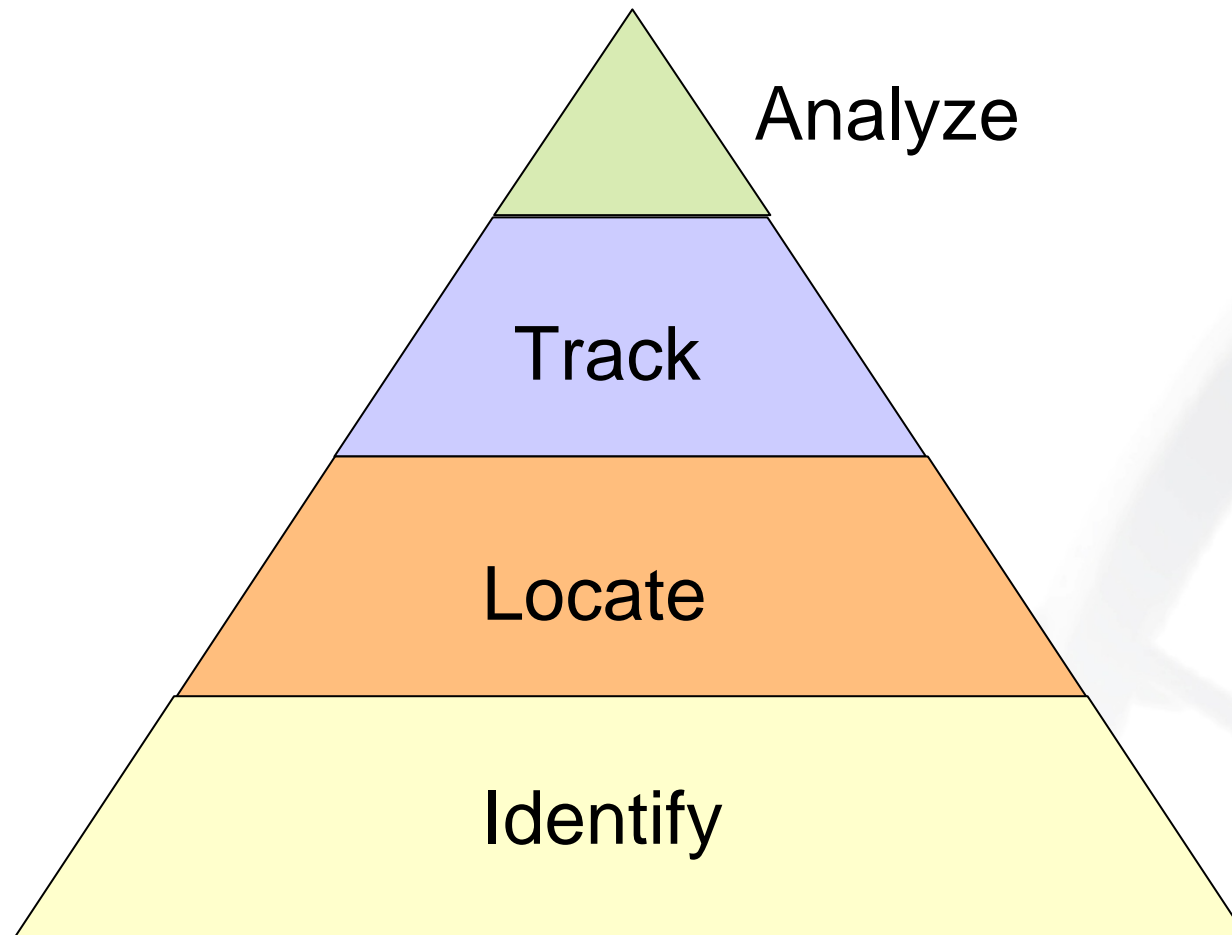
- ▶ *“RFID” is not always RF...*
- ▶ Today’s locating systems include:
  - RF – narrow band, ultrawide band, WiFi
  - IR
  - IR/RF hybrids
  - Ultrasound

# Patient Safety – Real and Potential

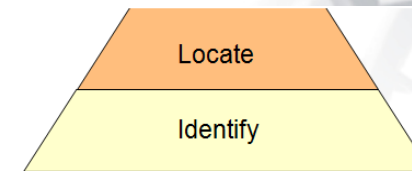
- ▶ Infant abduction – established
- ▶ Patient location – workflow and quality improvement
- ▶ Device location – availability when it is needed
- ▶ Retained foreign bodies – sponge counting systems
- ▶ Temperature monitoring – refrigerated supplies
- ▶ Home care – did Grandma take her pills?



# RFID Functional Hierarchy – Healthcare

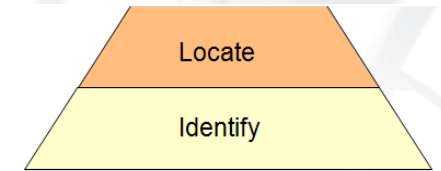


# Basic **Identification / Locating** Applications



- ▶ Common applications
  - Patient ID
  - Medication administration
  - Blood bank
  - Supply chain / consumables inventory
- ▶ Some overlap with barcode technology

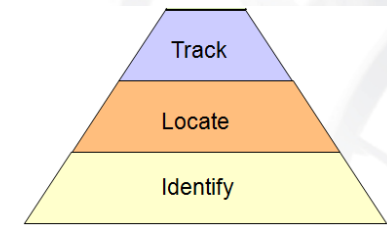
# Example – smart cath lab cabinets



- ▶ Consumables high priced, short shelf life
- ▶ Accurate charge capture important
- ▶ Can help with recalls
- ▶ Tracks:
  - Cabinet inventory
  - What is removed or returned
  - By whom
  - When



# Tracking / Locating Applications



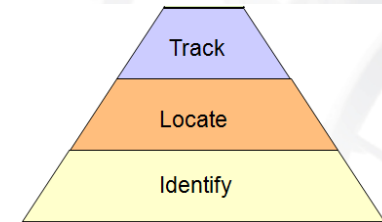
## ▶ **Asset tracking**

- Theft/loss prevention
- IPM / recall locating
- Clinical locating

## ▶ **People tracking**

- Patients
- Staff

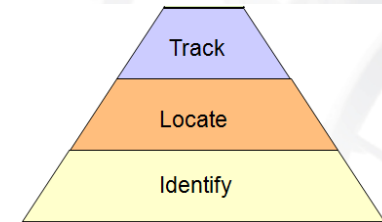
# Tracking / Locating Applications



## ► Asset tracking – considerations

- Likely first tracking application in many hospitals
- Most common use of tracking technology in healthcare
- Lots of competition between vendors in this space
- Installation cost varies widely and will be linked to goal of asset tracking application

# Tracking / Locating Applications



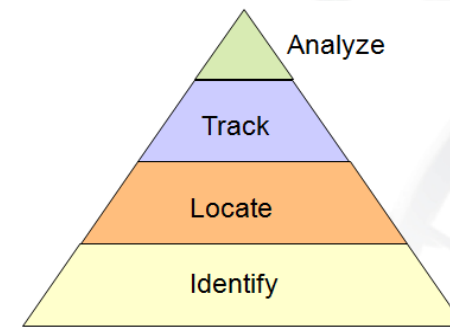
## ► People tracking – other things to consider

- Potential areas of use:
  - EDs, ORs,
  - Improve scheduling, workflow
- Staff are often reluctant to wear tags (“big brother” concerns)
- Cost /square foot monitored is probably high
- More accuracy required (i.e., than for device tracking)
- Despite widespread interest very few installations
- Future – tag-to-tag association to document events



# Analytical Applications

- ▶ Most advanced applications
- ▶ Require sophisticated & well designed software to:
  - Manage massive data files
  - Generate meaningful reports
- ▶ Application Examples –
  - Inventory Optimization
  - Workflow improvement
  - Automated Process Documentation



# ECRI's Read On Tracking...

## ► Consider waiting on this technology

- The technology is very new and is rapidly evolving
  - New and changing companies
  - New and different product offerings
- Significant changes (i.e., improvements) will be coming in the near future
- Interfacing with other information technologies is very limited

## Other Issues to be Aware of

- ▶ Standardization across the industry is currently inadequate or nonexistent
- ▶ Some technologies offer great promise, but are relatively unproven for more advanced capabilities
- ▶ Hospitals that purchase a proprietary system now may find that they'll need to install a completely new system later to accommodate future technologies

## Who Should Proceed?

- ▶ Hospitals with well-defined, immediate objectives that can be met with available systems
- ▶ First ask
  - Can the problem you are trying to solve be addressed by simpler and less-expensive methods?
  - Does your hospital fully understand both the capabilities, limitations, and costs of tracking?

# Some Early Positive Signs

## Emergency Department Experience

- ▶ Every staff member
- ▶ Every patient
- ▶ Dramatic workflow improvement
- ▶ When did Dr. Smith last see me?
- ▶ Who was helping me at 2:00?
- ▶ Is patient Jones on his way back from X-ray?
- ▶ Success has led to house-wide adoption of RTLS

## Wrapping Up

- ▶ Implementation will not be easy
- ▶ “Hard” ROI will be difficult to find and will not be easy to prove
- ▶ Hospitals and vendors are on a steep learning curve
- ▶ The wave is coming
  - Deciding on timing will be a key decision (i.e., where do you want to be on the technology adoption curve?)
- ▶ Order of adoption will likely be (1) devices, (2) patients, (3) staff, and then (4) supplies





▶ Thank  
You

Questions?