Dr. Erick C. Jones, PhD, PE, CSSBB

University of Texas at Arlington RFID & Auto-ID Deployment (RAID) Labs

An overview of RFID and Auto-ID, and Transportation Logistics Center and future research opportunities for automating Health-care, Manufacturing, and Logistics

RfSCL NEW TECHNOLOGY RESEARCH
RFID & SUPPLY CHAIN LOGISTICS

February 24.2011

Presenters Background

- Industrial Experience (14 years)
  - Companies: UPS, Academy Sports, Tompkins Associates, Arthur Anderson, LLP
  - Positions: IE Specialist, IE Manager, Director of Engineering, Senior Consultant, Project Manager, Senior Manager
- Academia
  - Texas A&M (BS), Univ of Houston(MS,PhD)
  - University of Nebraska-Instructor
  - Courses: RFID, Logistics Optimization Modeling, Six-Sigma, Facilities Planning, Production Planning and Control, Advanced Manufacturing Systems, Simulation
  - Research Areas: RFID and ADC Technologies, Supply Chain Procurement and Logistics, Lean Six Sigma Strategies

National RFID Programs Appointments

- Current RFID Certification Chair for International Alliance
  - ISCEA RFID Certification Chair
- RFID Journal Live Best in Show Judge
- Member of RFID National Certfication Groups
  - GS1, EPC Global, AIM

Introduction to Radio Frequency Identification & Auto-Identification (RAID) Center

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RAID Center Facilities Plan

- Mission:
  - "*Providing integrated solutions in logistics and other data driven environments through automatic data capture, real world prototypes, and analysis*"
- Objective:
  - Attract Recognized Funding from notable federal agencies and nationally recognized organizations
  - Provide a research facility that inspires future STEM researchers from K-12 and undergraduate students
  - Attract national attention from academic rankings and research recognition

RAID Center Facilities Plan

- Room 411/413 Wolf Hall – RFID Lab
- Room 309 Engineering – Auto ID Lab
- Future – Transportation Logistics Lab
- Equipment (Previous/Planned) Equipment
  - Military grade Fixed and Mobile Active RFID Systems (Lockheed Martin – Savi technologies, RF Code)
  - Industry grade high speed automated conveyor (Hytrol conveyor)
  - Industry recognized RFID edgeware, ERP and WMS systems, (Global Concepts)
  - Walmart/DOD mandated standard fixed and mobile passive RFID systems (Alien Technologies, Matrics)
  - Hospital tracking location systems (Ubisense Ultra Wide Band Real Time Location System)
  - Building modifications – automated locks and MavID

Auto-ID Lab Facility (Plan)

RFID in Healthcare

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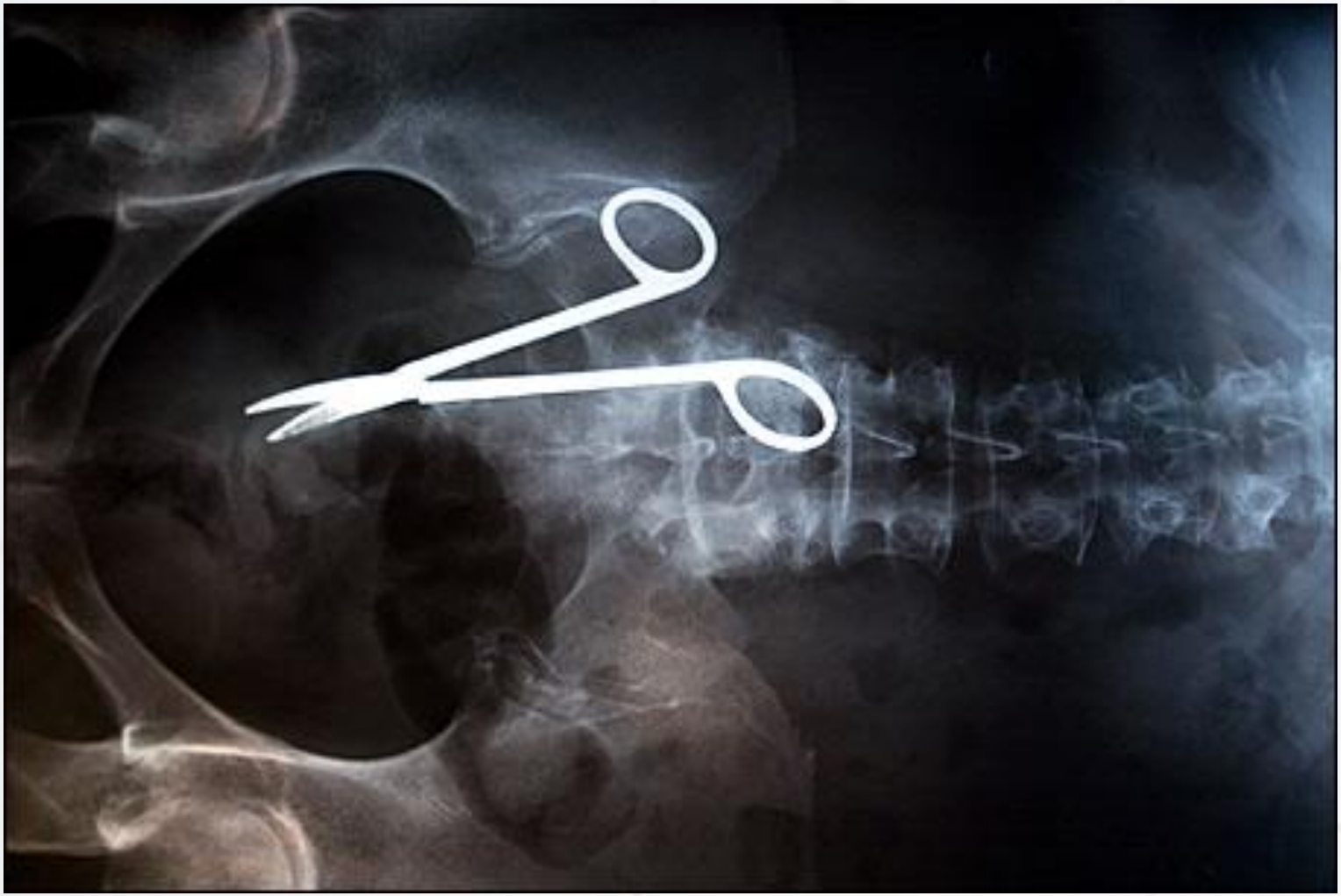
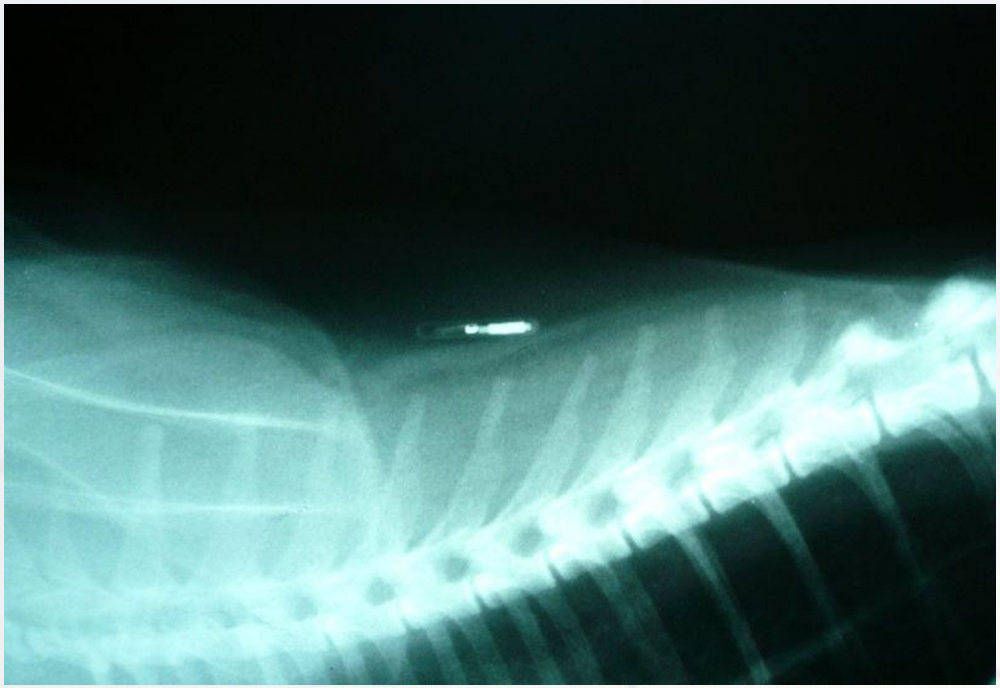
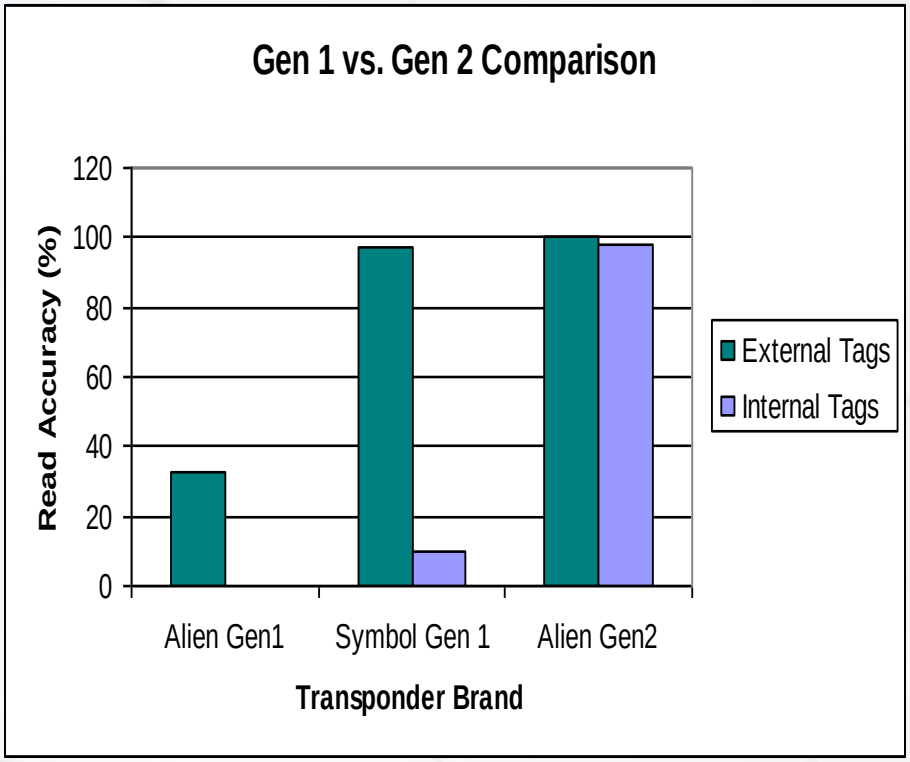
How do you prevent this from happening to you?



RFID Previous Research Microchip



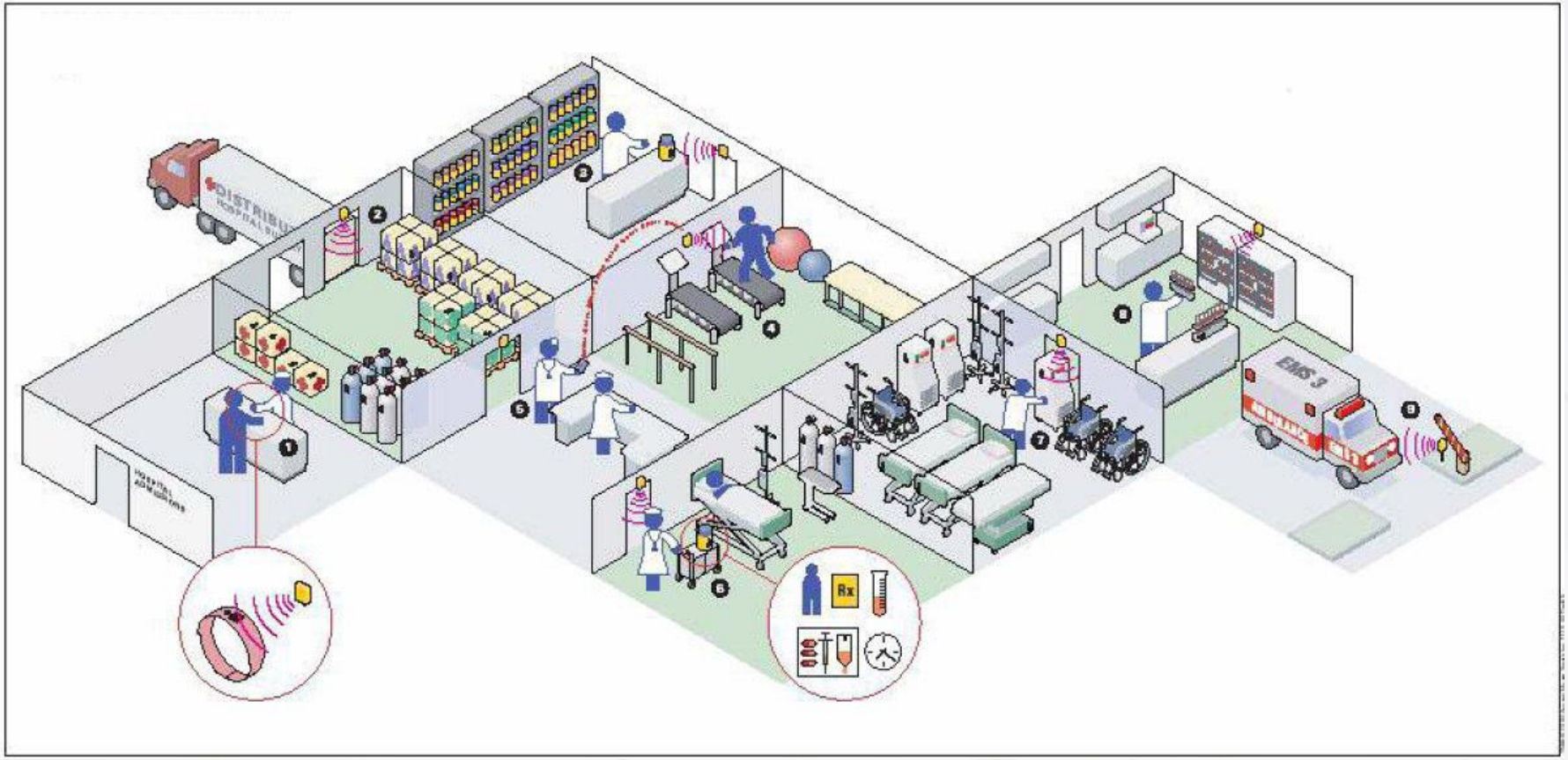
RFID Surgical Sponges



RFID in Healthcare

- RFID has been envisioned in Healthcare for
  - Patient Tracking
  - Personnel Tracking
    - Nurses
    - Surgeons
  - Inventory Tracking
    - Assets
      - IV Pumps
    - OR Sponge Tracking
  - Integration with Barcodes for
    - Electronic Medical Record Enablement
  - Current Research in Medical Error Reduction

RFID Significance



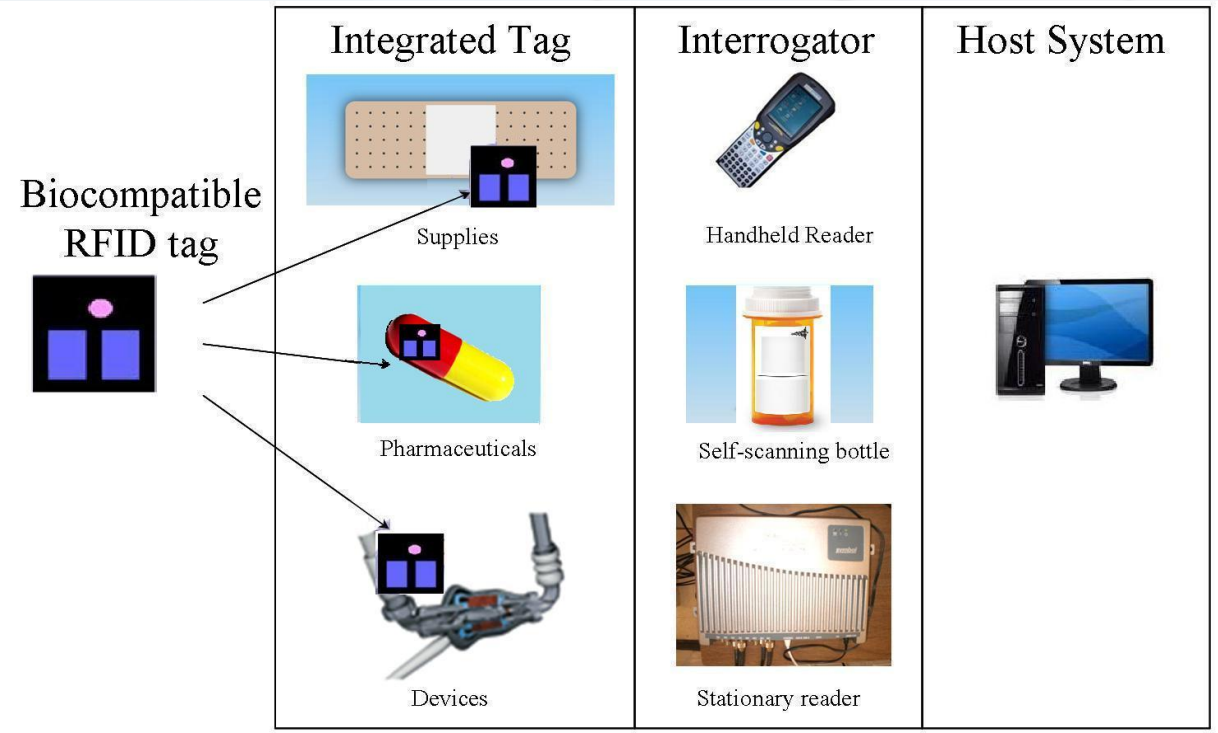
RFID Significance

Application	Benefits	Workflow
Medical equipment /instruments 1. Real time location 2. Boundary checking	a. Reduced time to find assets 1. Responsiveness 2. Idle time - staff waiting b. Increased utilization - Lower asset investment required 1. Reduced shrinkage/lost 2. Efficiency / process synchronization	a. Automatic routing for request for equipment b. Automatic notification / alerts / Interface with actuators (i.e Locks) c. Process triggers activation /expedition) by logic of asset moves
Pharmaceuticals Inventory 1. Pedigree	a. Safety b. Faster response to critical events	Automatic acquisition/ verification of product origin/history
Blood Product management	a. Safety b. Faster response to critical events	Automatic acquisition/ verification of product origin/history

RFID Opportunities

- Building from Previous Research in
  - Automation Initiative in Healthcare
  - Barcodes
    - an array of parallel, narrow, rectangular bars and spaces that represent a group of characters in a particular pattern.
    - A reader scans the barcode, decodes it, and transfers data to a host computer
    - Barcode Point of Care (BPOC)
    - Bar-code medication administration (BCMA) systems
  - Computerized Physician Order Entry (CPOE)
  - Medication Error Identification
  - Previous RFID research
    - Micro-Manufacturing RFID tags
    - Dosage level packaging
    - Surgical RFID sponges for ER
    - Biosensor RFID tags for ingestion confirmation

Research Concept



- **Figure 3: RFID embedded in Medical devices and on individual doses. (Jones, 2009)**

Expected Outcomes

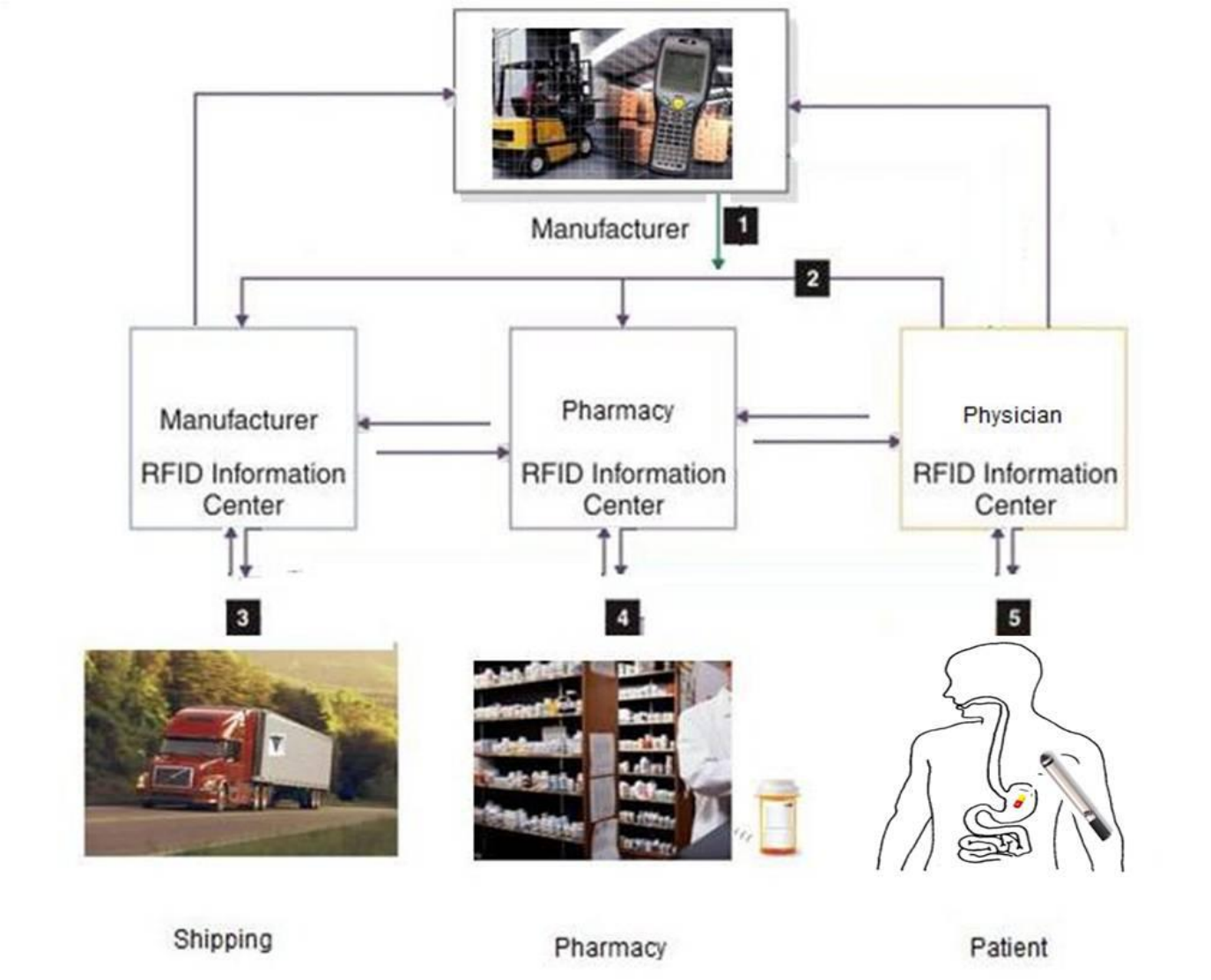


Figure 6: The future of integration of RFID technologies in hospitals. (Jones, 2009)

Drug Confirmation System

Medical Error Research Background

- The Institute of Medicine (IOM) estimates that medical errors cost the United States about $37.6 billion each year.
- Hospital errors rank between the fifth and eighth leading causes of death, killing more Americans than breast cancer, traffic accidents or AIDS.
- A specific example is of this is when an infant is given the wrong dosage of pre-packaged medicine.
  - Recently there have been several instances where adult doses of heparin have caused premature infant deaths (Wolf, 2006).
- Eliminating this type of dosage error is the primary focus of this research.

Neonatal Intensive Care Unit

RFID in the Future

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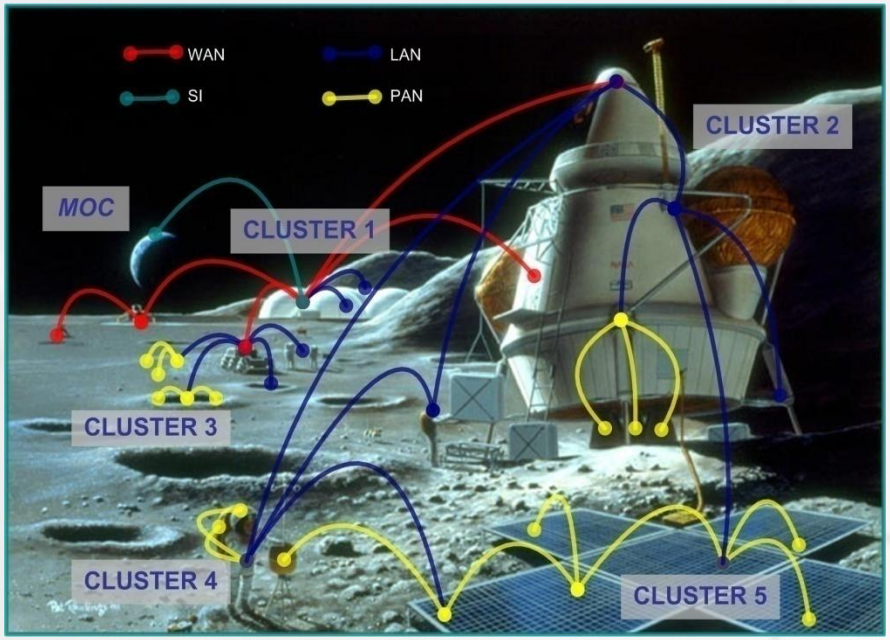
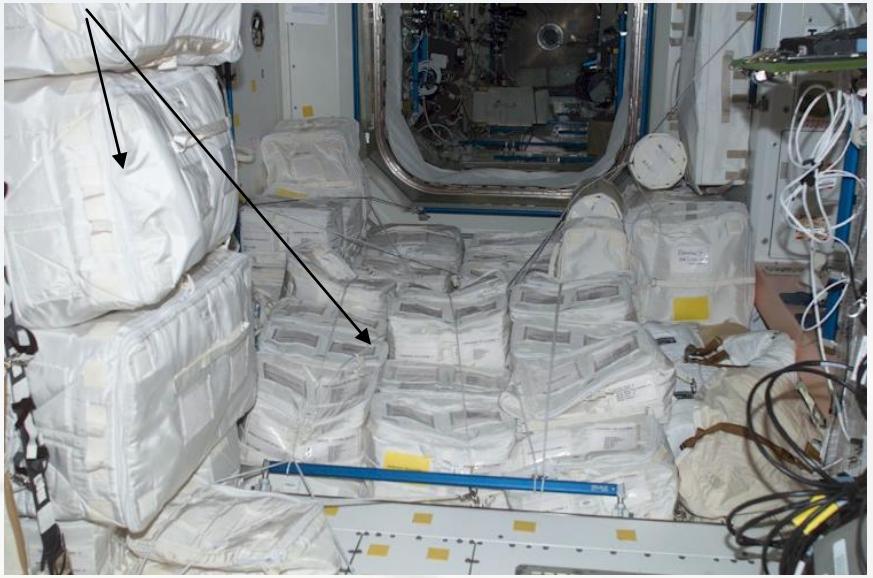
Future NASA



Cargo Transfer Bags (CTBs)



Kevin Gifford, CU-Boulder

What is Industrial Engineering ?

- Working with people, machines, materials
- Helping do things better, faster, safer

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Different Areas of IE

- Manufacturing Systems
- Operations Research
- Engineering Management
- Human Factors and Ergonomics
- Six Sigma and Quality Engineering
- Distribution and Logistics

Questions?

Contact Information

Erick C. Jones, PhD, CSSBB, P.E.
University of Texas Arlington
Industrial and Manufacturing Systems Engineering
Associate Professor
420 Woolf Hall
Arlington, TX 76019
ecjones@uta.edu
(817) 272-7592