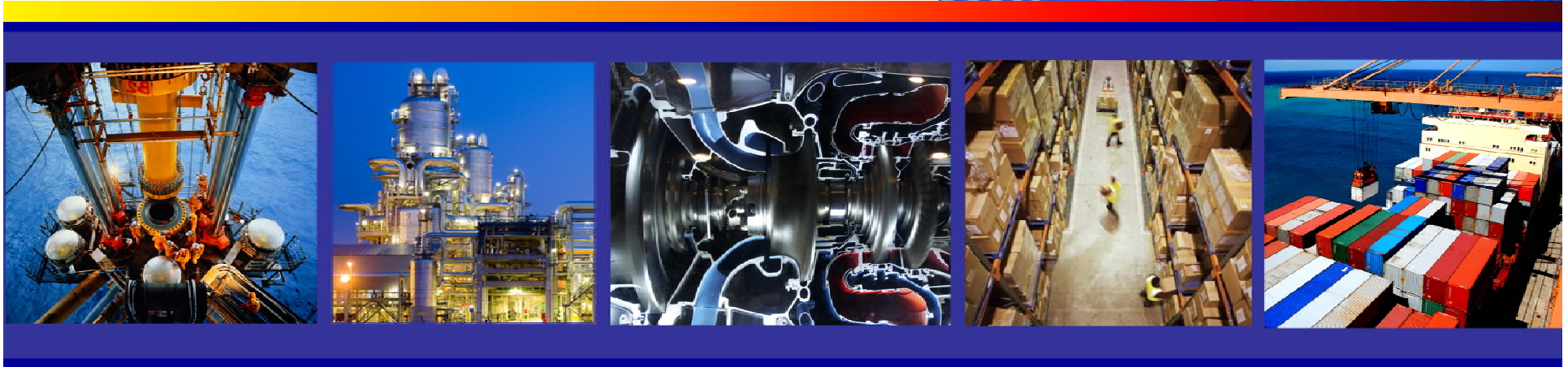




North Shore Chapter
9/12/06



Is There ROI in RFID?

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Agenda

- Background on RFID
- The ROI Vision
- Case Studies
- Projected Improvements in ROI
- Implications for Users and Suppliers

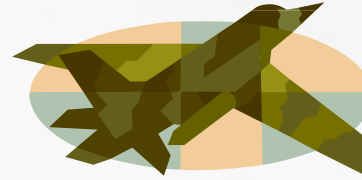
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Background on RFID

RFID Has Been In Use for 65 Years

- 1940s – Friend or foe



- 1960s – Electronic Article Surveillance (EAS)



- 1970s – Automated toll collection



- 1980s – Automatic Equipment Identification



- 1990s – Keyless entry, 1990s – Speedpass™



- 2000s – EPC, Smart cards, and more



Technology – Important Distinctions

- **Active vs. passive**
 - Sensors: Temperature, Light, Humidity, Pressure, Vibration, Sound, Acceleration, Existence, Draw, Motion, Air exchange, Explosives, Location, Radioactivity
- **Read vs. read-write**
- **Finite vs. rechargeable battery**
- **Continuous vs. intermittent transmission**
- **Middleware vs. numbering systems**

Mandates

- **1981: Military (LOGMARS barcode standard)**
- **2003: Consumer Goods (EPC standard)**
 - Albertson's
 - Best Buy
 - Coca-Cola
 - Department of Defense
 - Gillette
 - Target
 - Wal-Mart



The Wal-Mart Experience to Date

- **12 DCs**
- **Top 200 suppliers**
- **23,753 tagged pallets**
- **663,912 tagged cases**
- **5 million tag reads**
 - > 90% for cases on carts
 - 95% on conveyors in DCs
 - 66% on cases in pallets
- **RFID data available to suppliers within 30 minutes via extranet**
- **Some top Wal-Mart suppliers**
 - Gillette/P&G
 - HP
 - Johnson & Johnson
 - Kimberly-Clark
 - Kraft Foods
 - Nestle
 - Purina
 - Unilever

Other RFID Implementations

- **Tesco**
- **Marks & Spencer**
- **TNT Logistics**
- **Port of Long Beach**
- **Las Vegas airport**
- **Hong Kong airport**
- **Purdue Pharmaceutical**
- **MasterCard**
- **Shanghai Masters Cup**
- **UPS**
- **Passports**
- **Drivers licenses**
- **Hospitals**
- **Danish bus terminal**
- **Automobiles**
- **Cellphones**

The RFID Vision

Changing the Way We Think

- Innovation from outside
- Collaborative selling
- Supply networks
- Standardized subassemblies

“We’re moving towards a world where operations are network-centric. There used to be vertical silos, [but in the future we’ll] have horizontal businesses that can integrate with each other.”

- Stephen Miles, MIT

Case Studies

The ROI Equation

Potential Benefits

- Fewer out-of-stocks
- Labor savings
- Less equipment needed
- Inventory reduction
- Increased revenues
- Greater customer loyalty
- Fewer claims and damages
- Synergies (pooled inventory, reduced congestion, etc.)

Potential Costs

- Tags
- Readers
- Systems integration
- Power systems
- Installation

What is Your Problem?

Case Studies

International

- **Implants**
- **Consumer goods**
- **Retailing**
- **Document management**
- **Perishable logistics**
- **Promotion management**
- **Fleet equipment**

Domestic

- **Emergency or safety item location**
- **Picking management (warehousing)**
- **Security (chain of custody)**
- **Quality management/manufacturing process control**

Inventory: Solid ROI for Valuable Items

- **Orthopedic implants**
- **Problem: Pipeline stock of high-value items**
 - Multiple sizes sent, returns a necessary evil
 - \$50-\$3,000 items (600 SKUs), 25-30 boxes per crate
- **Solution and Cost: \$260,000**
 - 250,000 items tagged @ 50 cents/tag
 - 7 tunnel readers @ \$15,000
 - \$60K software
- **Benefit: \$250,000**
 - 5% savings on \$50M inventory @ 10%
- **ROI: 101% (3 years)**

Inventory: Marginal for Others

Consumer Goods Company

- **Problem: Compliance**
- **Solution and Cost: \$23M**
 - 18M tags @ \$0.10/tag
 - 250 readers @ \$1,000
 - \$19 million software
 - \$300K management costs
- **Benefit: \$9M**
 - 10% of warehouse operating cost
- **ROI: 2% (3 years)**

Retailer

- **Problem: Out-of-stocks**
- **Solution and Cost: \$188M**
 - 1B tags @ \$0.10
 - 21K readers @ \$1,000
 - \$82M software, integration, and management
- **Benefit: \$78M**
 - 16% fewer out-of-stocks
- **ROI: 14% (3 years)**

Other Inventory Applications

■ Document management

- Problem: Lost documents / no audit trail (300 people)
- Solution: Dual-mode RFID chip to read overlapping documents. Long battery life.

■ Perishable logistics

- Problem: Substandard fresh produce rejected by customer
- Solution: RFID bins to monitor task times since picking

■ Promotion management

- Problem: Time sensitivity leads to stock-outs
- Solution: Event management using RFID

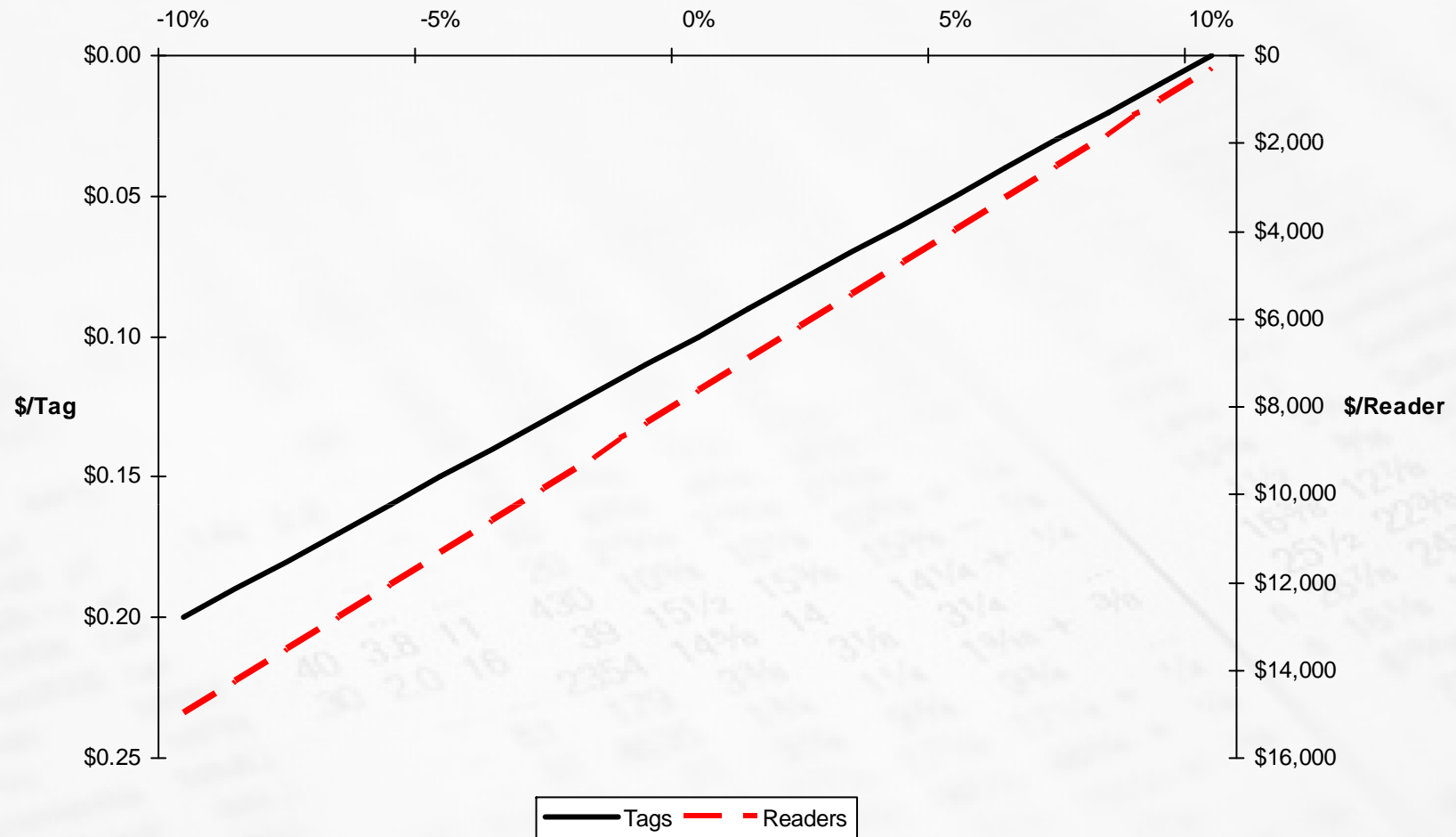
Inventory: Challenges

- **Competition with barcodes (small package)**
- **Unequal sharing of benefits**
- **Imperfect read rates (baggage handling)**
- **Privacy concerns**
- **Systems integration work**
- **Concerns over sharing data**
- **Difficulty of quantifying “soft” and “secondary” benefits**
- **Interference (liquids, metals, avionics)**

Transport Equipment Has Potential

- **Success in closed loops**
 - Car dealerships
 - Bus terminals
- **Challenges in ocean shipping**
 - Slow rotation of ocean containers limits asset reduction
 - Shipper not willing to pay for carrier efficiencies
 - Tracking trail lost outside of port
 - Limited battery life

And Positive ROIs Are in Sight



Hospital

- **Problem: Misplaced medical equipment inflates rental costs.**
- **Solution and Cost: \$560,000**
 - 5,000 tags \$35
 - 600 readers @ \$400
 - \$60,000 software
 - \$50,000 installation and \$25,000 power supplies
- **Benefit: \$1.1 million**
 - 5% reduction in 30-day leases @ \$4,500 each
- **ROI: 101% (3 years)**

Pharmaceutical Company

- **Distribution center operations**
- **Problem: Looking for more efficiency**
- **Solution and Cost: \$15K**
 - 700 SKUs/Bins @ \$20/tag
 - 1 reader @ \$1,400
- **Benefit:**
 - 0.1 FTE savings @ \$30,000
 - Reduced picking errors
- **ROI: - 42% (3 years)**

Professional Services Firm

- **Office security**
- **Problem: Risk of stolen laptops and data loss**
- **Solution and Cost: \$11K**
 - 10 tags @ \$32
 - 2 readers @ \$800
- **Benefit: \$2K**
 - 2% reduction in risk of \$100K loss
- **ROI: - 52% (3 years)**

Quality and Process Management

- **Caterpillar**
 - Reduction in rework and assembly errors
- **Harley-Davidson**
 - RFID process control on transmission, engine, and final assembly lines
- **Volkswagen**
 - RFID tag in rearview mirror on assembly line
 - Identify bottlenecks with red/yellow/green controls
- **Animal and human implants for research and control**

Projected Improvements in ROI

ROI Varies by Application



ROI Varies by Environment

- Low-value vs. high-value product
- Open vs. closed loop system
- Legacy systems vs. ERP
- Many vs. few gates

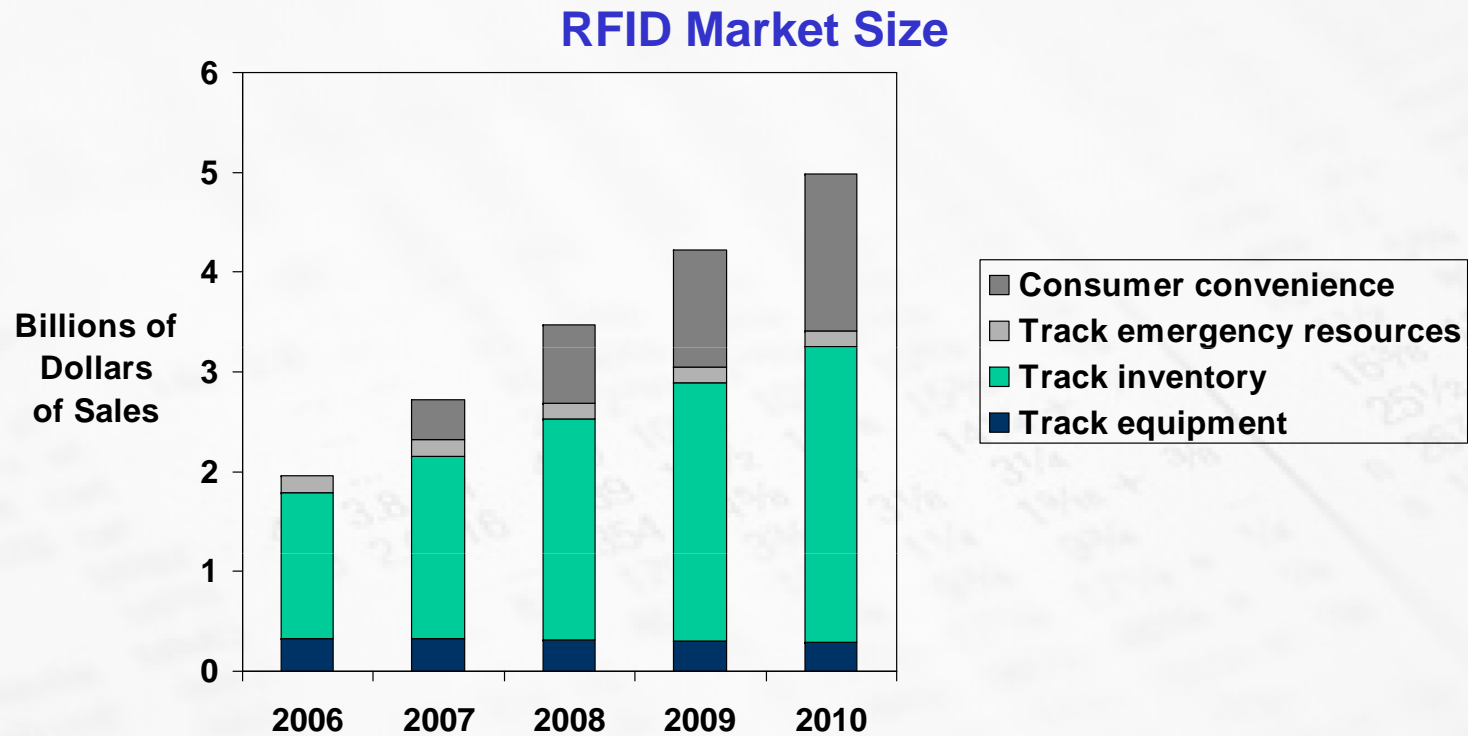


Costs Will Decrease Substantially

- **Tag costs decreasing**
 - Scale economies from a worldwide EPC standard
 - Fewer variations (Gen2)
- **Reader costs decreasing**
 - New suppliers, capacity
 - Learning curve
- **Systems integration costs increasing**
 - Tight labor markets
 - Visa restrictions

Past the Tipping Point

- New mandaters, compliance assumed
- New opportunities driven by lower costs



Source: Boston Logistics Group, Inc.

Implications for Users and Suppliers

Use RFID to Enhance Loyalty, Revenue

- Target specific benefits
- Establish specific improvement objectives
- Look for RFID to drive top-line benefit



Move Incrementally

- **Start small to establish accurate cost and ROI bases**
- **Invest in education**
- **Anticipate evolution of standards**



Scale Flexibly

- **Integrate with ERP**
- **Expect changes in the technology**
- **Align security and privacy policies**



Resources and Links

■ Study participants

- Alien
- Axxess
- Dyna-Sys
- HK Solutions
- Identec
- Kennedy
- Lowry Computer
- Magellan
- MIT
- Plitek
- Qualcomm
- RSA Security
- Sovereign
- Xterprise

■ Standards bodies

- AIM-UK (aimuk.org)
- EPCGlobal
(epcglobalinc.org)

■ Rfidjournal.com

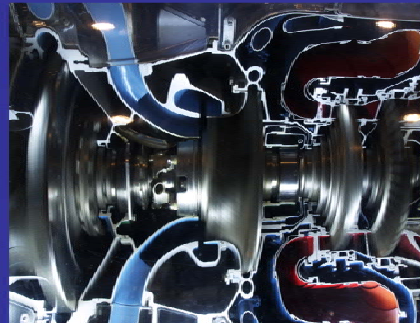
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