RFID: Getting the ROI on Paper

Goal
The RFID Value Proposition
Risks & Risk Management
Business Drivers
Applications

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RFID Applications

- Internal Supply Chain
- External Supply Chain
- Maintenance
- Asset Tracking
- Promotion Management
- Manufacturing
Promotion Management

• Product Opportunity for the Packaging Industry

• Manufacturers of Retail Products Report Significant Benefits from Tracking the Deployment of Promotional Displays to the Sales Floor.

• Case Study: Gillette – Reduced Time to Deploy Promotional Displays for Fusion Razor Launch by 90%
Asset Tracking

• Secure High-Value Assets, such as Portable Meters, Laptop Computers, Power Tools
• Determine Location and Utilization of Assets, Such as Fork Trucks, Golf Carts, Maintenance Carts, Trucks
• Case Study: MetroHealth Medical Center (Cleveland, OH) – Tracking Ultrasound Machines, EKG Machines, etc
Manufacturing

• Ensure Accurate Plant / Machine Configurations

• Case Study: Colder Products Co. – Hose Couplings that Ensure the Right Hose is Attached Before Dispensing
**Internal Supply Chain**

- Manage Movement of Products (Pulp, Paper Rolls, Box Board, Corrugate, etc) from One Facility to Another in a Vertically Integrated Enterprise
- Manage Logistics and Product Movement Visibility
- Ensures Accurate Shipments
- Case Study: Gillette – 20% Productivity Increase in Distribution Centers for RFID-Tagged Products.
- Case Study: TNT Logistics – Ensuring Accurate Shipments and Providing Visibility to the Transportation Process to Increase Efficiency
Maintenance

• Ensures that Tools are Tracked, Stored and Maintained Properly

• Track Critical Parts, to Monitor Repair History (Pedigree) and to Ensure Availability for Replacement

• Lean Manufacturing: Supports 5S and TPM Initiatives by Ensuring that a Manufacturing Cell’s Tools are On Hand and Stored Appropriately

• Case Study: General Dynamics Land Systems – Automated Tool Room for Tracking Tools and Technicians that Checked Them Out. Report Productivity Increases.
External Supply Chain

• Managing Raw Material Movement from Suppliers and Product Movement to Customers
• Supply Chain Visibility Reduces Working Capital for “Safety Stock” Inventory
• Customer Mandates: Protect Revenue Stream Through Compliance
• Case Study: Dow Chemical – Tracking Cylinders and Chemical Containers Globally
Business Drivers

Globalization

Financial Performance

Vertical Integration Strategies
Financial Performance

• Return on Capital Employed ~5.5% Globally
• Benchmark is 10 to 12%

ROCE = EBIT/(Total Assets – Current Liabilities)
ROCE Indicates the Efficiency at which Assets are Generating Earnings

Cost Reductions are Critical to Increase ROCE

Vertical Integration Strategies

- Major Corrugated Packaging Companies Declaring Integration as Key Strategic Initiatives
- Attempt to Drive ROI By Increasing Role in the Value Chain, Sometimes Including Graphics / Marketing Services

Internal Supply Chains Become More Complex
Globalization

- Reinvestment Ratio is > 2.0 for Asia-Pacific, Latin America, South Africa
- Reinvestment Ratio is < 1.0 for Canada, Europe, US, Japan
- As a Global Industry, the Reinvestment Ratio is Less Than 1
- Reinvestment Ratio = Capital Investment / Depreciation

Presentation Goals

Inform

Ways that RFID can Serve as a Enabler for Delivering Solutions to the Challenges Faced by the Pulp and Paper Industry

Educate

Details of the Technology and its Applications, to Guide Businesses Toward Successful RFID Implementations

Inspire

... You to Find the Hidden Value that RFID can Deliver to your Enterprise
The RFID Value Proposition

RFID Permits Business Resources to Automatically Inform a Business Process of Their Identity and Location
Risk... & Risk Management

- Obsolescence
- Reliability
- Compatibility
- Change

- Technology
- Project Teams
- Methodology
- Culture of Improvement
Improvement as an Existing Business Strategy

- Six Sigma
- Lean Manufacturing
- Other Quality Management Initiatives

Successfully Executed Strategic Initiatives are Positive Indicators for Success with RFID
Successful RFID Project Teams

- Executive – Level Participants
- Process Owners
- Process Subject Matter Experts
- Existing Information Technology Owners
- RFID Subject Matter Expert
- RFID Project Manager / Facilitator
- RFID Technology Vendors

RFID Overview Expertise for all Team Members is a Critical Success Factor
Clear Advantage

- Process Selection
  - Describe Strategic Vision
  - Define Expected Benefit
  - Identify High-Impact Processes
  - Re-engineer the Processes

- Site Survey
  - Characterize the Wireless Environment
  - Select RFID Technology (Tags, Readers, Antennas, etc)

- RFID Pilot
  - Establish Pilot Success Criteria
  - Design the Pilot
  - Execute Pilot
  - Verify RFID Solution

- Solution Design
  - Create the Detailed Solution Design

- Solution Delivery
  - Develop the Solution
  - Develop the Training Program
  - Test the Solution
  - Deliver Training
  - Implement the Solution

- Solution Validation
  - Measure to Demonstrate the Benefits
The State of the Technology

- Tags
- Readers / Interrogators
- Software

- Standards
- RFID Industry Events
- RFID Industry Activity
RFID and Software

**Middleware**
- “Pureplay” RFID
- Enterprise Application Integration
- Standard interfacing defined (ALE)
- XML, Web Services Available for Universal Connectivity
- Graphical User Interfaces to Simplify Implementation

**ERP / Applications**
- All Major Vendors Have an RFID-Enabled Offering

**Analytics**
- Specific New Applications for Delivering Business Insight from RFID-Enabled Processes and Data
- Major Business Intelligence Vendors and RFID Software Vendors Represented in this Space.
RFID Standards

- EPC Tag Data Standard Version 1.1 rev 1.27
- EPCglobal Tag Data Standards Version 1.3
- EPCglobal Tag Data Translation (TDT) 1.0 Ratified Standard Specification
- Class 1 Generation 2 UHF Air Interface Protocol Standard Version 1.0.9
- Application Level Event (ALE) Specification Version 1.0
- Object Naming Service (ONS) Specification Version 1.0
- EPCglobal Certificate Profile

- 256 - Radio Frequency Identification (RFID)

- EN 302 208 - Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W
- TR 102 436 - Guidelines for the installation and commissioning of Radio Frequency Identification (RFID) equipment at UHF
- TR 102 449 - Overview of Radio Frequency Identification (RFID) Tags in the telecommunications industry
RFID Standards - ISO

- 14223-1 - Radiofrequency identification of animals
- 14443 – Identification Cards -- Contactless integrated circuit(s) cards -- Proximity cards
- 15693 - Identification cards -- Contactless integrated circuit(s) cards -- Vicinity cards
- 15961 - Radio frequency identification (RFID) for item management -- Data protocol: application interface
- 15962 - Radio frequency identification (RFID) for item management -- Data protocol: data encoding rules and logical memory functions
- 18000-1 - Radio frequency identification for item management -- Part 1: Reference architecture and definition of parameters to be standardized
- 18000-2 - Radio frequency identification for item management -- Part 2: Parameters for air interface communications below 135 kHz
- 18000-3 - Radio frequency identification for item management -- Part 3: Parameters for air interface communications at 13,56 MHz
- 18000-4 - Radio frequency identification for item management -- Part 4: Parameters for air interface communications at 2,45 GHz
- 18000-6 - Radio frequency identification for item management -- Part 6: Parameters for air interface communications at 860 MHz to 960 MHz
- 18000-7 - Radio frequency identification for item management -- Part 7: Parameters for active air interface communications at 433 MHz
- 18047 - Radio frequency identification device conformance test methods
- 19762-3 - Automatic identification and data capture (AIDC) techniques -- Harmonized vocabulary -- Part 3: Radio frequency identification (RFID)
- 24710 - Radio frequency identification for item management -- Elementary tag licence plate functionality for ISO/IEC 18000 air interface definitions
- 24730-1 - Real-time locating systems (RTLS) -- Part 1: Application program interface (API)

18000-6 Types A and B are ratified. Type C unifies this standard with the EPC UHF Class 1 Gen 2 standard. It is in Final Draft. The deadline for voting was May 3rd, 2006.
RFID Industry Events

Attendance at RFID Industry Events has grown 750% since 2003

Week of June 5 – 11, 2006

TAPPI RFID Boot Camp and Symposium – Atlanta, GA
U Connect Conference – Nashville, TN
IQPC RFID Conference – Sao Paulo, Brazil
RF-Enabled Sensor Networks Forum – Boston, MA
RFID Forum – Toronto, ON, Canada
Tags

- Hybrid UHF Gen 2 Tags (Near-Field / Far Field)
- Printed Antennas
- Printed Electronics Still Far Off
- Costs Under 10¢ in Volume for Dry Inlays
- 5¢ UHF Dry Inlays in Very High Volume
- HF Poly Media Labels ~$1.00
- Active Tags Range from ~$5.00 to $75.00
- WiFi – Compliant Active Tags for RTLS
- Surface Acoustic Wave (SAW) Tags
Readers / Interrogators

- Hybrid (UHF / HF) Readers Now Available
- UHF Gen 2 Readers Now Standard
- Basic Fixed Reader Prices Moving to ~$1,000
- Latest Technology Provides Reliable Read Rates in “RF-Noisy” Environments
- Higher-Level Functionality Being Bundled into Readers
  - Hardware Abstraction Middleware
  - Enterprise Application Integration (EAI) Middleware
# RFID Industry Business Activity

## 4th Quarter 2005

### Financing
- Ubisense: $3 Million (UWB RTLS Systems)

## 1st Quarter 2006

### Financing
- OATSystems: $12.5 million (Middleware)
- Tagsys: $35 million (Item-Level Tags)
- RCD Technology: $2 million (Custom RFID Inlays)

### Consolidation
- BEA Systems Acq. ConnecTerra (Middleware)
- TI Acquires Chipcon (Zigbee Devices)

### Public Offerings

## 2nd Quarter 2006

### Financing
- NCR Acquires ID Velocity (Middleware)
- Sirit Acquires Samsys (Readers / Interrogators)
- Lockheed Martin Acq. Savi (Readers / Interrogators)

### Consolidation

### Public Offerings
- Alien Technology Plans IPO (Tags & Readers / Interrogators)