

2006 *Canadian RFID
Conference*
SHARING THE FACTS; DISPELLING THE MYTHS.



Workshop:

Multi Applications

**Asset tracking, Document & File
Tracking, Library, Luggage Tracking**



Moderator:

**Lou Smyrlis, Editorial Director
Canadian Transportation and Logistics**

Speakers:

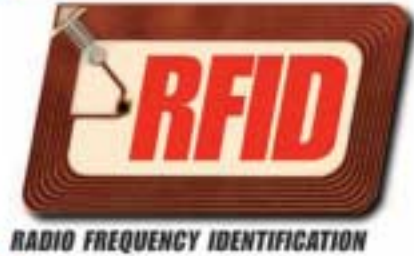
Asset Control: Christian Stephan, Consultant

**Document & File Tracking: John Avgeris, Ministry of Finance
for Ontario – Financial Services Commission**

**Library: Patricia Eastman, Toronto Public Library & Moe
Hosseini-Ara, Markham Public Library**

**Baggage Tracking: Bo Helmer Larsen, Vice President, Sales &
Marketing, Lyngsoe Systems**

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Asset Tracking

Christian Stephan

Consultant

RFID AND ASSETS CONTROL

April 4, 2006

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AGENDA

- What are the Issues ?
- Why can RFID be appropriate?
- How does RFID compare with Bar Code for Assets Control ?
- RFID Strategies for Assets Control - Three examples
 - The Basics – Assets Tracking within the Enterprise
 - Locating Assets with Traditional Means
 - A glimpse at the Future : RFID and RTLS
- How to Approach an RFID Assets Control Initiative
- How to build the Business Case

What are the issues ?

- Value of Assets is an important element of the Balance Sheet at Year End.
- Assets Valuation is also key for insurance purposes
- Inventories of Assets are often cumbersome, time consuming and costly
- Controls of Assets movements are frequently not effective leading to:
 - Theft
 - Misplacement
 - Loss
 - Damaged but recorded as good,
 - Etc..
- All this leads to provisions or write-offs which can quickly add up to hundreds or even millions of dollars.


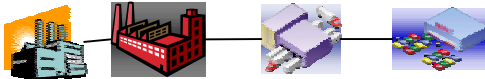
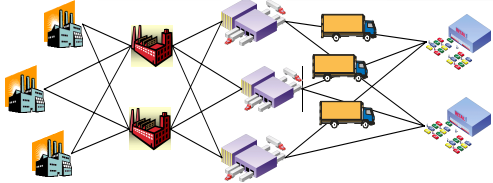
Why can RFID be appropriate ?

- The ROI may not be the prime factor in deciding to go for RFID
 - Risk avoidance (Sarbanes-Oxley)
 - Maintenance records
 - Other events records (e.g. deployment status)
- Initial Applications can be self contained to the company's facilities and therefore require lower investment level.
 - Greater Immediate return
 - Great learning ground
- An ROI can be more easily found for High Value/Highly Mobile Assets
 - Containers
 - Trolleys
 - Computers
 - Heavy Engineering Equipment
 - Trucks, Buses, Cars
- Make full use of non-EPC tag capabilities

RFID vs. Barcode for Assets Control

| | Bar Code | RFID |
|--------------------|--|---|
| Price | <ul style="list-style-type: none"> • Lower cost | <ul style="list-style-type: none"> • Currently expensive in particular "smart" tags |
| Capability | <ul style="list-style-type: none"> • Limited space – typically only simple identifiers • Read-only | <ul style="list-style-type: none"> • Substantial amount of data storage • Unique material identifiers • Read-and-Write |
| Flexibility | <ul style="list-style-type: none"> • Line-of-sight reading required • One simultaneous scan per read | <ul style="list-style-type: none"> • No line-of-sight required • Simultaneous multi-tag scans per read |
| Accuracy | <ul style="list-style-type: none"> • Human intervention opens the possibilities for errors | <ul style="list-style-type: none"> • Fully-automated & nearly error-free • O.H.I.O. principle |
| Durability | <ul style="list-style-type: none"> • More easily subject to wear and tear, stains, destruction | <ul style="list-style-type: none"> • More durable tags • Tags can be operated in harsh environments – no visibility needed |

RFID Strategies for Assets Control vary in complexity and in technology implications

| | Within Organization | Across Organizations | |
|----------------------|---|--|---|
| | Point Solution | Linear Closed Solution | Network Open Solution |
| |  |  |  |
| Description | Stand-alone solution generally within the four walls of a company | A linear solution that does not have to be end-to-end | A solution that is deployed throughout an integrated network |
| Who Benefits? | A particular class of Assets and specific facilities | All parties in the chain that “touch” RFID | The benefits are gained by all parties in that network |
| Examples | Tagging of warehouse asset for yard management; | Tagging of returnable containers from suppliers to manufacturers | Many to Many tracking of containers or other mobile Assets |

Example #1 – The basics – Control Assets within the confine of the organization - El Paso County, Colorado

- **The issue:**
 - Increase the efficiency and accuracy of Assets location and utilization.
- **The stakes :**
 - To control almost 5,000 PCs, monitors and other units which can be moved around within the County.
- **The Solution :**
 - Replace Bar-Codes on IT equipment with RFID tags
 - Equip appropriate staff with Hand-held readers
 - Use middleware application (Data Systems International 's RFIDActivator able to determine whether data come from a Bar Code reader or a RFID reader
 - Integration with ERP system, in that case PeopleSoft EnterpriseOne

Example #1 - El Paso County (cont.)

- **The Results :**

- Ability to generate reports on how many equipments are located in a given department or in a county building
- Accurate calculation of Assets value for insurance purposes
- Significant Gain in time on inventory counts (no line of sight required):
 - no need to interrupt staff while they are using their computers
 - 10 minutes or less to inventory storage rooms or deposits as opposed to various hours with Bar Codes
- Improved Counts, increased visibility on replacement needs, improved Purchasing orders
- Ability to track maintenance work performed on a given device
- Pay back within 6 months
- Testing ground for further extension to other classes of Assets

Example # 2 – Assets tracking and location : Finland Post

- **The Issue:**
 - Need to increase the visibility of roll cages used to transport packages and letters in order to increase availability and utilization as well as reduce shrinkage
- **The Stakes**
 - Each year around 17,000 cages are lost at a cost of €1.3M
 - Lower availability impacts the quality of service
- **The Solution**
 - Passive 856 MHz tags from Philips Semiconductors encapsulated in plastic for each roll cage in the test
 - 3 Caen A928 UHF reader Portals in Post Terminal for in and out checking
 - Handheld readers for Terminal staff and for drivers delivering and collecting the cages to record events on their route together with RFID badges
 - BEA Middleware to collect data connecting into the existing Weblogic Software architecture
 - Software application environment to integrate with existing IT systems
 - Overall Integration managed by Cap Gemini

Example # 2 – Finland Post (cont.)

- **The results**
 - Circulation of roll cages could be viewed by event per customer or route, by cages delivered and returned per customer on given day or by number of cages requested by a customer for each day or week
 - Found that customers would be holding cages longer than warranted or use them for their own uses
 - Clear business case if only considering Finland Post cost management issue
- **The hurdle:**
 - Main focus is on customer service
 - Generalized roll-out to all customers requires agreed standards in terms of nature of tags and frequencies so that both parties can benefit
- **The conclusion:**
 - No extension yet but pursuing a strategy of small scale deployment
 - Testing RFID for crates loaded on roll cages for sorting purposes
 - Testing EPC Gen2 tags and make sure environment can be integrated with ERP systems
 - Foresee future as having RFID combined with RTLS and 2-D barcode symbols

Example #3 – A glimpse at the future : RFID and Real Time Location System- phEurope

- **The Issue:**
 - To improve control over Inventory, Location, Servicing and Redeployment of Intermediate Bulk Containers (IBC) used to transport pharmaceutical and chemical materials
- **The Stakes:**
 - Improve Quality of Service and Customer retention
 - Generate new revenues through Value Added Services
 - Increase Security through improve checks on re-usage incompatibility
 - Decrease operational costs
- **The Solution:**
 - Staggered Approach
 - Tracking IBC within Warehouses
 - Extend Tracking systems to Customers

Example 3 – phEurope (Cont'd)

- **The Solution (cont'd)**

- A platform that could be stand alone or integrated with any ERP system
- Long Range (more than 100m) battery powered 433Mhz Mantis Tags (from RF Code)
- RF Code readers – Stationary readers for the Warehouse and Hand Held readers with reading and writing capabilities.
- RF Code Tavis middleware to collect not only RFID data but also GPS and Bar Code data
- Data are processed by CALTS, a JDS enterprises Software fulfilling 2 functions: Assets management and Assets Location
- For each new rental order, available assets are identified and located in the warehouse
- Status of each Assets is monitored : Rented, Overdue, Returned, Awaiting Cleaning, Being cleaned, available for rental) and updated by employees through a PC linked to the handheld readers to overwrite the tags

Example 3 – (cont'd)

- **The results:**

- Elimination of human errors and guess work for redeployment with Operational cost savings for both the company and its customers (lower loss ratio)
- Greater availability, greater security, greater utilization, more containers rented
- Greater client retention – system is available to clients who are able to monitor their use of the rentals.
- Pay back period :30 to 36 months
- Extension to tracking while in transit. Each trailer is equipped with:
 - GPS location device and at least one RFID reader which captures the signals from the tagged assets being transported
 - A General Packet Radio Service Connector from a UK telecom company allows data to be sent to an Assets Management server though an Internet link.

What is the method ?

- The decision to decide whether or not to implement RFID has to be taken within the overall Assets Control Framework of the Company
- The process for establishing an appropriate asset tracking and inventory control framework requires consideration of the existing processes, technology and people running the operations.



Method (1) : Assessing the Assets Control Framework

Assess
Current
State

Identify
Issues,
Evaluate Risks
& Prioritize

Define
Mitigation
Strategies &
Implications

Develop
Business Case
Define
Implementation
Plan

Activities

- | | | | | |
|------------|--|---|---|--|
| Activities | <ul style="list-style-type: none"> • Understand context of operations in scope • Collect information re; historical loss of assets • Understand existing processes and technology used to track assets • Categorize assets according to size, value and likely risk • Identify likely scenarios that contribute to loss via theft, misplacement, or accounting error. | <ul style="list-style-type: none"> • Rank risk of loss for each asset class based on the following criteria: <ul style="list-style-type: none"> -Book value -Proprietary tech -Mobility -Regulatory penalty -Attractiveness -Mission critical -Top-of-mind • Determine most likely risk (theft, misplacement, accounting error) | <ul style="list-style-type: none"> • Leverage industry practices, security best-practices and technology options • Determine appropriate mitigation strategies for each asset class considering: <ul style="list-style-type: none"> -Prevention -Inspection Frequency -Detection -Reporting -Recovery • Identify implications re people, process, technology and policy / security | <ul style="list-style-type: none"> • Evaluate cost, benefits and risks of each option • Provide recommendation on course of action / next steps • Identify collateral benefits associated with recommendations • Develop implementation plan |
|------------|--|---|---|--|

Milestones

- | | | | | |
|------------|---|---|--|--|
| Milestones | <ul style="list-style-type: none"> • Loss scenarios • Prioritized list of assets for consideration • Understanding of weaknesses associated with current processes | <ul style="list-style-type: none"> • List of strategic options for each asset class • Qualitative risk assessment for each asset class • Prioritized list of assets by level and type of risk / threat | <ul style="list-style-type: none"> • Definition of appropriate mitigation strategy for each asset class • List of organizational, process and technology for each strategy | <ul style="list-style-type: none"> • Business Case • Implementation Plan with roles and responsibilities |
|------------|---|---|--|--|

Method (2) – Assessing the Risk for Each Assets Class

| Evaluation Criteria | | | | | | | | | | |
|----------------------|---------------|------------------|-----------|------------|----------------|------------------|-------------|------------------|--------------|--------------|
| Asset Class | Book Value | Proprietary Tech | Mobility | Regulatory | Attractiveness | Mission Critical | Top-of-Mind | Current Security | Overall Risk | Type of Risk |
| | Pickup Trucks | Low Risk | Low Risk | High Risk | Low Risk | High Risk | Med. Risk | Low Risk | High Risk | Med. Risk |
| Production Vehicles: | | | | | | | | | | |
| - Heavy Trucks | High Risk | High Risk | High Risk | Med. Risk | Med. Risk | Med. Risk | Low Risk | Med. Risk | High Risk | Theft |
| - Production service | High Risk | Med. Risk | High Risk | Low Risk | High Risk | Med. Risk | Low Risk | High Risk | High Risk | Theft |
| - Specialty service | High Risk | High Risk | High Risk | Low Risk | High Risk | High Risk | Low Risk | High Risk | High Risk | Theft |
| Drilling Tools | High Risk | High Risk | Med. Risk | Low Risk | Low Risk | Med. Risk | High Risk | Med. Risk | High Risk | Lost |
| Surface Equipment: | | | | | | | | | | |
| - generators | Med. Risk | Low Risk | Med. Risk | Low Risk | High Risk | Low Risk | High Risk | High Risk | Med. Risk | Theft |
| - pressure equipment | High Risk | Low Risk | Med. Risk | Low Risk | Low Risk | Med. Risk | High Risk | Med. Risk | High Risk | Lost |
| Hazardous Materials | | | | | | | | | | |
| - Explosives | Low Risk | Low Risk | Med. Risk | High Risk | Low Risk | Med. Risk | Med. Risk | Low Risk | Med. Risk | Lost |
| - Chemicals | Low Risk | Low Risk | Med. Risk | High Risk | Low Risk | Med. Risk | Med. Risk | Low Risk | Med. Risk | Lost |

Method – (3) : Developing the Business Case

- Benefit Assessment
 - Increase in Revenues
 - Reduction in Operational Cost
 - Reduction in Assets Investments needs
 - Reduction in Assets loss
- Cost Assessment
 - Tag Costs
 - Hardware Costs
 - Middleware Costs
 - Software Integration Costs
 - Organization Cost
- Financial Summary
 - Return on Investment
 - Net Present Value
 - Internal Rate of Return
 - Sensitivity Analysis – Over Tag Price and Tag Volume

Conclusion

- Assets control has one of the best « fit » for RFID use
 - High Item Value vs. Cost of Tag
 - Limited investments required for readers (obviously a function of the number of facilities and of staff involved)
 - RFID read and write capabilities make it particularly attractive for the multiple dimension of Assets management and Controls
 - Characteristics of RFID tag/readers make Real Time Location and even Tracking on a consistent basis relatively easier to implement
 - The key is not the ID collection system but the Assets Control software and the Integration with the enterprise
 - The business case is fairly simple to determine given the finite context
 - For the same reason, pilot test are also relatively easy and definitely easier than for the much more hyped Supply Chain applications
- Assets Control is the most logical place to start when thinking about introducing and learning RFID.



Document & File Tracking

John Avgeris

Senior Manager of the Motor vehicle
Accident Claims Fund

Financial Services Commission of
Ontario in the Ministry of Finance

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Library

Patricia Eastman

Toronto Public Library

Moe Hosseini-Ara

Markham Public Library

RFID in Libraries

Canadian RFID Conference 2006

Why do libraries use RFID?

- To reduce materials handling
- To facilitate self check-out of library materials
- To simplify inventory control
- To automate material sorting

What RFID technology is being used?

At Toronto Public Library


- ISO 15693 tags
- EAS (electronic article surveillance bits) on tags
- Feig readers, antennae and security gates



Common issues - Privacy

- Information encoded in tag memory has been restricted to the item barcode assigned by the library
- No RFID customer cards (in the current implementation)
- Guidelines for Using RFID Tags in Ontario Public Libraries – Ontario Privacy Commissioner

Common issues – Health & Safety

- Research on Health & Safety issues so that questions can be answered
- Maintain current awareness
- Discussions with Joint Occupational Health & Safety Committee
- Reduced material handling 
Use of accommodated staff

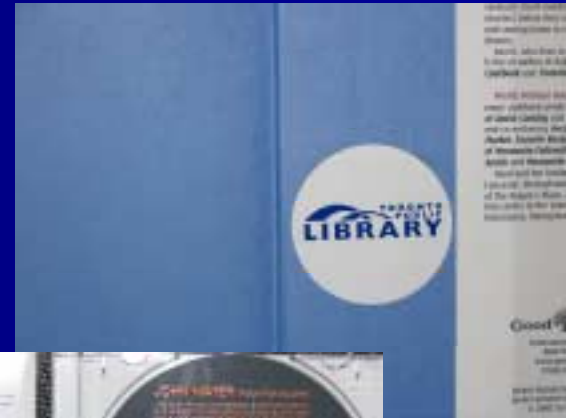
Common issues – worker concerns

- Dealing with higher volume of use without a concomitant increase in the number of staff (70-80% of check-out being done at self check-out workstations)
- Re-deploying staff to other tasks

Common issues - Costs

Tags

- No five cent tag
- Need a tag that will last for the life of the material – could be 10 years or more
- Application of tags



Common issues - Costs

Sorting systems

- allow material to be sorted into bins for various locations or onto book carts



Common issues – partial implementation

- Dealing with items from two streams – tagged and untagged
- ROI – impacted by partial implementation

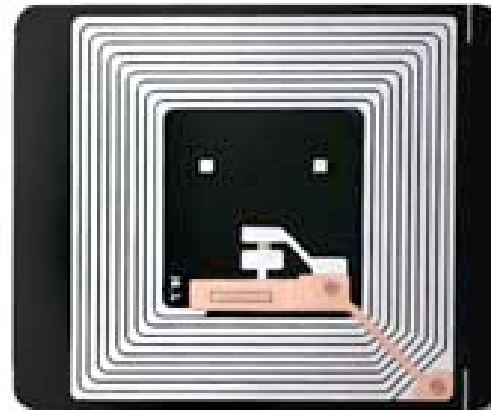
Common issues – Current awareness

- Maintaining current awareness of directions RFID technology in your industry and others is crucial to being prepared for changes and advances
 - RFID blockers
 - Associated industries using RFID

Contact information

Patricia Eastman peastman@torontopubliclibrary.ca

RFID in Libraries: the MPL experience

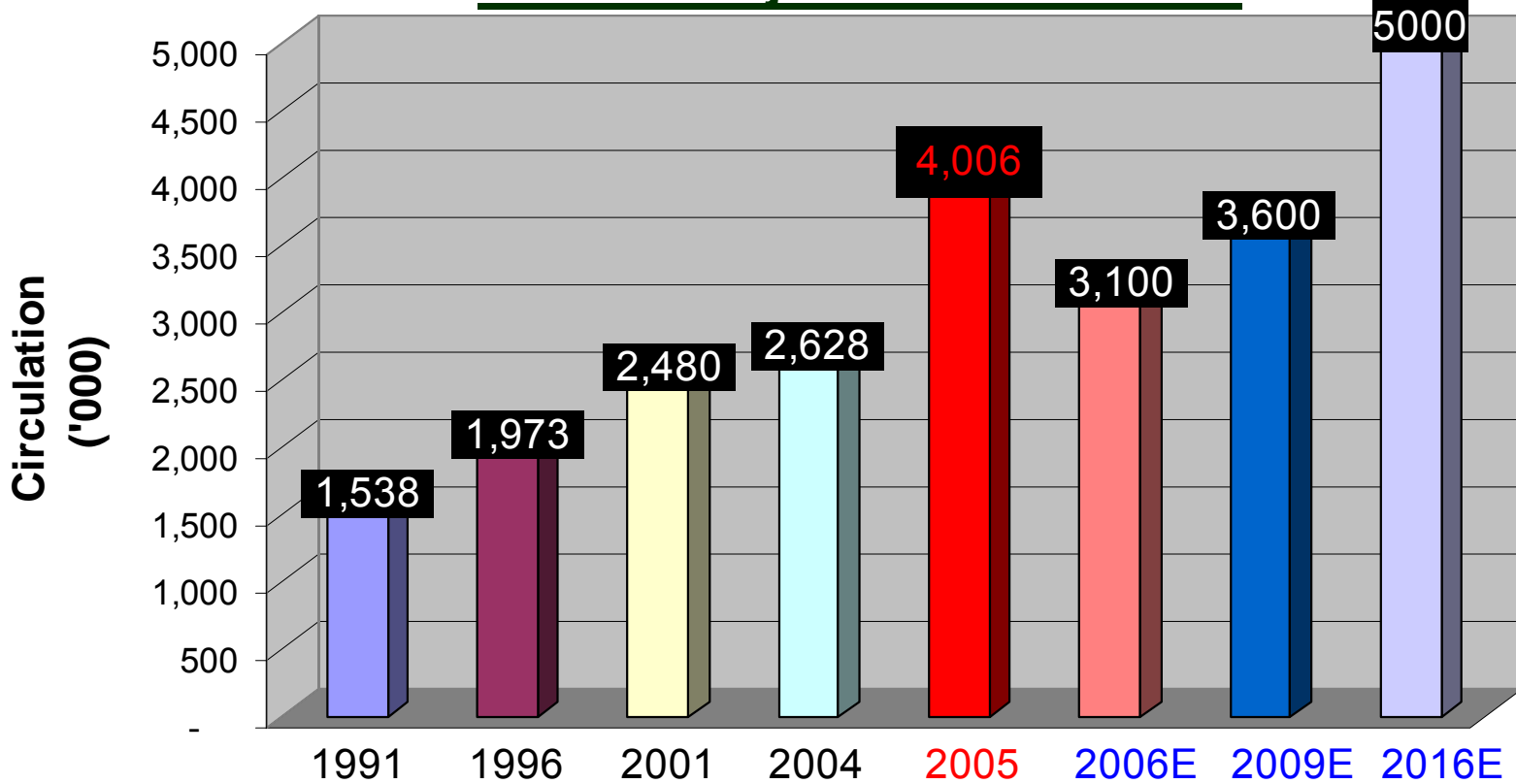


WHY RFID?

There was a need to:

- Improve customer service
- Keep up with:
 - increasing circulation/workload
 - increased demand for services
 - increased customer expectations
- Reduce/maintain operating costs & improve productivity
- Enhance safety and quality control

Markham Pubic Libraries Past & Projected Circulation

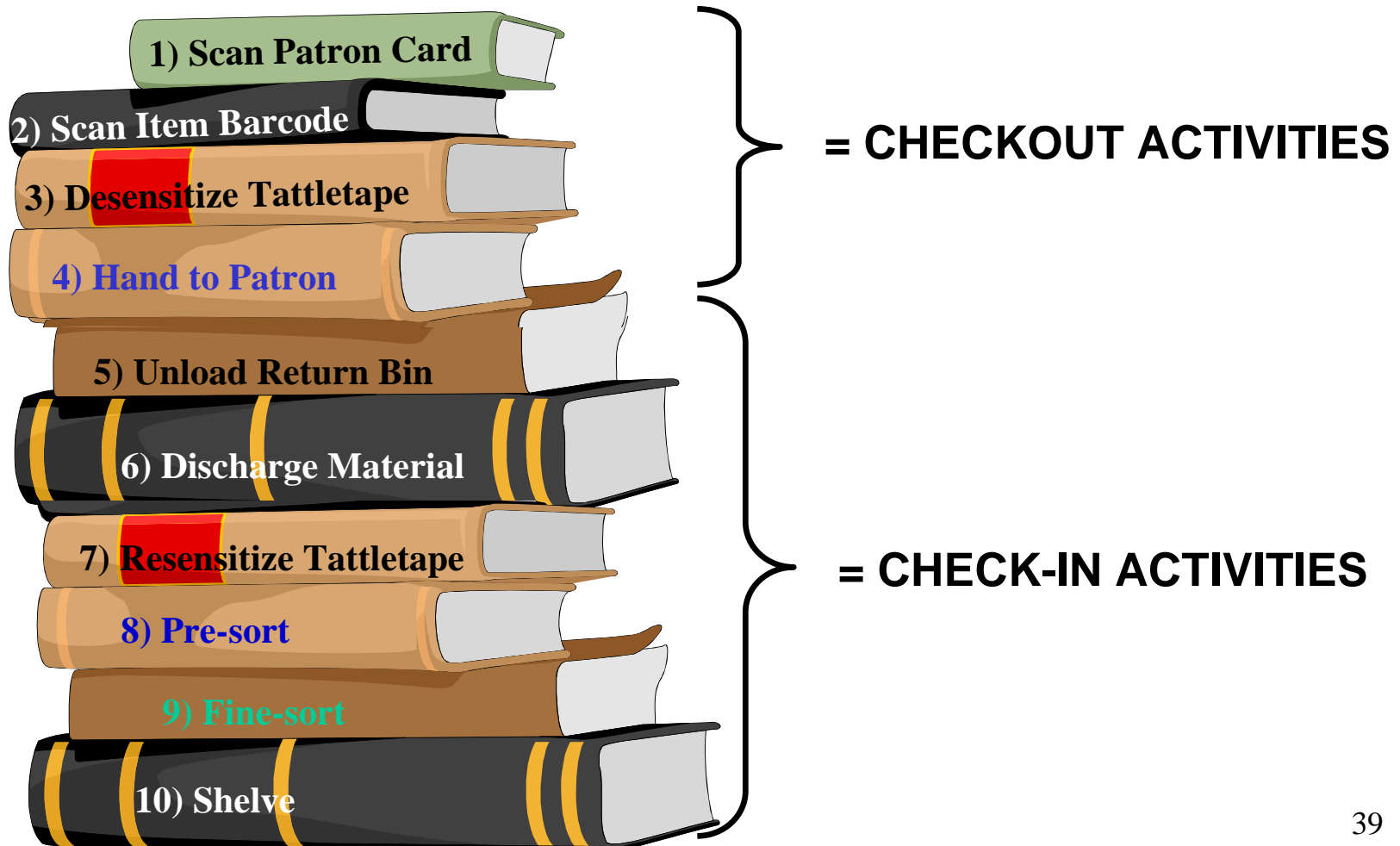


IT'S ALL IN THE NUMBERS

| In 2001: | In 2005: |
|-------------------------------------|-------------------------------------|
| 5 Libraries | 6 Libraries |
| 208,615 population served | 268,835 population served |
| 2,480,209 items circulated | 4,006,950 items circulated |
| 1,798,183 annual visits | 2,029,278 annual visits |
| 127,013 registered borrowers | 160,559 registered borrowers |

A TYPICAL CIRCULATION MODEL

10 BASIC STEPS FOR PROVIDING SERVICE:



HOW RFID IMPACTS SERVICE AND CONTROLS LABOUR COST



SelfCheck process
saves up to 80%

SmartCheck /
SmartSort saves
up to 70%

RFID
solution
can handle
significant
portion of
workload

MPL EXPERIENCE

- **4 Libraries equipped with RFID**
- **3 Libraries fully tagged**
- **8 express SelfCheck units**
- **10 staff workstations (9 fixed, 1 mobile)**
- **2 handheld scanners**
- **Circulation Associates**

EXPRESS CHECK OUT / IN



SelfCheck
with RFID and
Tattletape
security



3M SelfCheck 100%
RFID (with RFID
security)



EXPRESS CHECK OUT / IN



SmartCheck
automated
check-in

SORTATION SYSTEMS



3M Book Sorter

HANDHELD INVENTORY / COLLECTION MANAGEMENT TOOLS

3M Digital Library Assistant
(Handheld scanner)



Check Shelf Order

2/18 Ready to find item

1

701510764001 Da Vinci
Book

2 **Archive**

810710230001 Star Trek
Video document 45

Clear | Shelve | Save | Home

READER PADS



3M Digital Staff Workstation with Tattletape security

3M Digital Staff Workstation



CONVERSION STATIONS



WHERE IS THE MAGIC MACHINE?

Convincing staff and customers to
use the technology...

QUESTIONS?

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MARKHAM PUBLIC LIBRARIES

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Questions ?