

# Applications of RFID Technology in Route & Scale Management

A Presentation for the  
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# Background

- Industry Jargon used in this Presentation
  - Active: Battery Powered
  - Passive: Non-Powered
  - RFID: Radio Frequency Identification
  - AVI: Automated Vehicle Identification
  - ITS: Intelligent Transportation Systems
  - PROX Card: Short Distance RFID Card

# Background

- History
  - First Commercial Applications in early 1980's
  - Patent Granted in 1983 for Credit Card-Sized Device
  - Transportation Industry Were Early Adopters
  - “Hard Tags” in Limited Use by 1987
  - Flexible Tags in Use by 2000
- Primary Industries Utilizing RFID Technologies
  - Asset Management
  - Supply Chain Management
  - Transportation Management

# Background

- Asset Management
  - Used Extensively in Retail
- Supply Chain Management
  - Used Primarily in Manufacturing
- Transportation Management
  - Transportation Payment
  - Transaction Logging
  - Logistics / Tracking

# Background

- Primary RFID Components
  - Readers (Antennae)

Reader Type	Application Example
LowFID	Animal Identification, Transportation
HiFID	Product Coding / Inventory
UltraFID	Rail & Intermodal Tracking

- Tags

Tag Type	Application Example
Passive	Building Security , Transportation
Active	Transportation
Extended Capability	Smart Cards

# Current Industry Applications

- Transportation Management / AVI
  - Waste Collection
    - Electronic “License Plates”
    - In-Yard Vehicle Identification
    - On-Route Container Identification

# Current Industry Applications

- Transportation Management / AVI
  - Waste Disposal
    - Increased Transaction Efficiency
    - Self-Service Point of Sale
    - Company-specific lanes / gate houses
    - Aid in Compliance Management

# Current Industry Applications

- Waste Collection
  - Vehicle Movement
    - Track In & Out of Yard Times
    - Tie into Yard Security Systems
    - Match Vehicle to Container (Rolloff)
    - Match Vehicle / Driver Location to Payroll System
    - Readers Mounted at Yard Entry / Exit Locations



# Current Industry Applications

- Waste Collection
  - Management of Containers
    - Tags are Bolted, Welded (under shroud), or Embedded (composite or plastic containers)
    - Commercial, Rolloff or Toter Tracking
    - Match Container Movement to Route Management System
    - Readers Mounted on Truck or at Yard Entry / Exit Locations

# Current Industry Applications

- Waste Disposal
  - Management of Gatehouse
    - Differentiate Intercompany & Third Party Customers
    - Apply Default Customer, Materials & Pricing to each Transaction
    - Tie into Site Access / Security Systems
    - Readers Mounted at Gatehouses or Site Entry / Exit Points

# Current Industry Applications

- Waste Disposal
  - Proximity Cards
    - Pros:
      - Lowest Cost
      - Portable
      - No Battery
    - Cons:
      - Operational Distance < 3'
      - Easy to Lose
      - Can be Cloned, Easily Subject to Fraud & Vandalism



# Current Industry Applications

- Waste Disposal
  - Key / Keri Fobs
- Pros:
  - Low Cost
  - Portable
  - No Battery
- Cons:
  - Operational Distance < 3'
  - Easy to Lose
  - Minimally Subject to Fraud & Vandalism



# Current Industry Applications

- Waste Disposal
  - Windshield Tags
    - Pros:
      - Medium Cost
      - Easy Installation
      - 5 Year Battery
      - Operational Distance < 15'
    - Cons:
      - Can be Moved Between Vehicles
      - Minimally Subject to Fraud & Vandalism



# Current Industry Applications

- Waste Disposal
- “Metal Mount” Tags
  - Pros:
    - 10 Year Battery
    - Best Operational Distance < 20’
    - Vehicle or Container Mounted
    - Not Subject to Fraud, Minimally Subject to Vandalism
  - Cons:
    - Requires Rigid Installation
    - Higher Cost



# Current Industry Applications

- Waste Disposal Transaction Details
  - “Metal Mount” or Windshield Tag Configuration
    - Reader / Antenna identifies Truck and/or Trailer
    - Scale Management Application can Default Customer, Materials, Route, Speeding up Process and Ensuring Compliance
    - Transaction can be Completed Automatically or with Operator Assistance

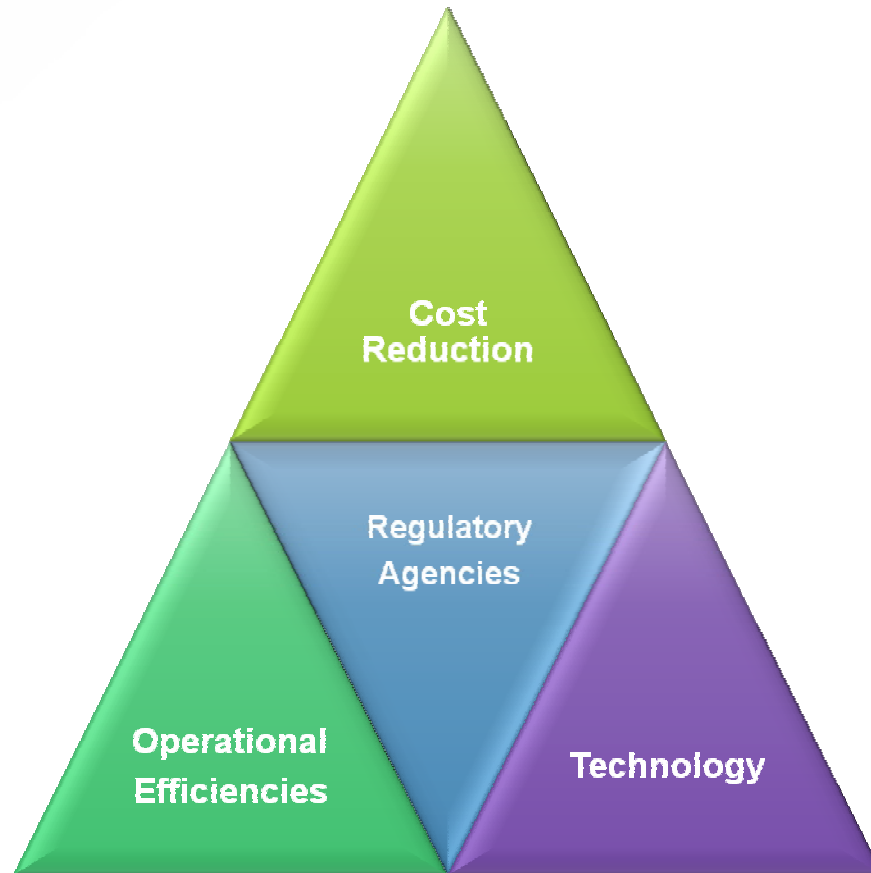
# Current Industry Applications

- Waste Disposal Transaction Details
  - Environmental Concerns
    - Avoid Placement near High-Tension Wires, Cell Towers, Other RFID Sources
    - Antenna can be 400' from Data Source (direct cabling) or up to 2,000' with Short Haul Modems
    - In Extreme Situations, Chain-Link Fences can Abate Cross-Talk Interference



# Industry Application Drivers

What Drives  
the use of  
RFID  
Technology in  
the Waste  
Business?



# Potential Industry Applications

- Waste Collection & Disposal
  - Deployment of Extended-Capability (Smart) Tags
    - On-Tag Memory: Read / Write at All Parts of Transaction
  - Weigh-in-Motion Processing
    - Reduce Queuing at Disposal Sites for Intercompany Vehicles

# Potential Industry Applications

- Waste Collection & Disposal
  - Consolidate “Electronic License Plates”
    - One Multi-Frequency Tag for Toll Roads, Disposal Sites, Highway Scales
  - Regulatory Compliance
    - Reporting Efficiency by Consolidating & Transmitting Vehicle Reports to Local, State & Federal Agencies

# Case Histories

- Montgomery County, OH
  - 350 RFID Tags in Use on 350 Vehicles
    - 2 Lanes in use for Commercial Traffic
    - 20 Customers issue Tags
    - Benefit: County Vehicles Have Own Lane
    - Benefit: Focus on Public, improve customer support
    - Increased Commercial Traffic

# Additional Information

## Questions / Comments