FEDERAL SIGNAL TECHNOLOGIES

Presentation To:

IBTTA

May 16, 2011

Why ISO 18000-6C?

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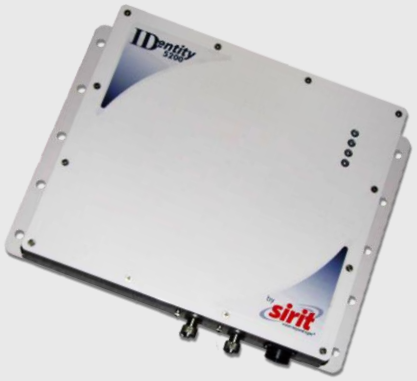
CTO

Interoperability With Legacy Systems

Multi Protocol RFID Reader

- Ability to read legacy tags dictates multiple protocol reader
  - ISO 10374 (ATA) – Mixed throughout the world, Texas, & railways
  - Title 21 for Western US
  - ISO 18000-6B and its derivatives for Southeast US (Sirit logistic readers incorporated 6B protocol prior to 2004)
  - IAG for Northeast US (presently being added)
- Reader can embed any number of protocols (7 presently)
- Enhanced ISO 18000-6B, IAG, and ISO 18000-6C required for East corridor (I-95 from New York to Florida)
- Able to communicate with all lane controllers.



ISO 18000-6C Implementations

- More than 800 lanes installed in 10 countries, more than 10% are ORT
- Successfully handling 7 different protocols today
- Proven multilane multiprotocol operation at **155 MPH**
- Installation of ISO 18000-6C ETC systems since January 2008
- Successfully worked with over 20 System Integrators illustrating the flexibility of the FST product line/install team
- We continue to install new and convert legacy installations (presently scheduled for 1,000 lanes in 2011)

Passive UHF Advantages

- Lower cost components equates to lower cost readers
- Lower cost tags
- Longer life due to no battery – reduce operation costs
- Allows for above the lane or lane side reader installation
- Large selection of commercially available antennas for narrow or wide beam width
- Variety of tag construction and mounting options
- Phase shift detection
  - Speed determination
  - Position determination

ISO 18000-6C Advantages

- Not proprietary
- Protocol enhancements to address deficiencies in various legacy protocols
  - Increased user memory
  - Improved anti-collision
  - Secure access via password
- Higher sensitivity than legacy passive tags leads to improved range and/or lower operating RF power
- Higher speed communications between the reader and tags allows transfer of more data, larger number of tag access operations, or reduced transaction time
- Physical layer designed for dense reader environments leads to easier deployments

ISO 18000-6C Advantages (cont')

- Widespread usage worldwide leads to lower costs than legacy solutions and long term availability
- Class selection available (screen unwanted tags)
- Features such as higher security (Hummingbird, AES 128, etc.) continuously being added
- Full capability to satisfy the needs of EVR, VMT, parking, and Congestion Pricing – new revenue options
- Interoperability path
- Many sources for both tags and readers
  - Competition results in lower cost
  - **Continual technology enhancements**

SRTA (Georgia) Test Results

- Four day trial utilizing nine vehicles (one bus)
- Three lanes controlled by two readers
- Two protocols (ISO 18000-6C and 6B 80K) were read
- Normally one tag per car but one test used two tags per car
- Three cars passed through the gantry at one time
- Straddling vehicles passed through the gantry two at a time
- Speeds ranged between 40 and 80 MPH
- 5,600 tag transitions through the gantry
- **100% Accuracy – Never missed a tag**

Summing Up

Federal Signal Technologies provides a new RFID system capability to the ETC market – unique price/performance position.

- Customer-Focused
- Best of Breed Technology
- Open Architecture
- Interoperability

www.fstech.com

http://www.youtube.com/watch?v=o9Tos8jKaAw

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