

Interoperable Technologies

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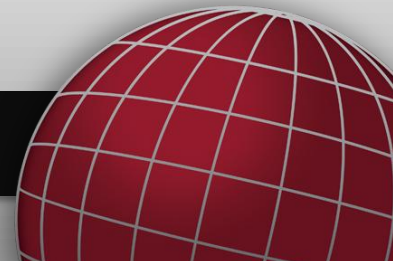
About Federal Signal Technologies

- New division of Federal Signal Corporation, formed to expand brand technology and provide Intelligent Transportation Solutions
- Made up of companies experienced in Electronic Tolling, Parking and ITS technology and services
- Parent company is a 100+ year Illinois company
- Based in Irvine, CA



Interoperability trends – ATI perspective

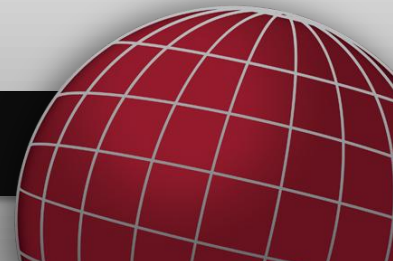
- “Currently interoperability between toll systems is limited by transponder technology”
- “the use of windshield mounted and keychain transponders, swipe cards, license plate readers and GPS, as well as cell phone applications for customer payments through one account”
- “the ability to utilize one "transportation account" to pay for their services. The opportunity to incorporate additional payment options for services such as fast food and car washes could be close behind”
- “This mission is becoming increasingly important as electronic nonstop toll systems are deployed”



Interoperability History of ISO 18000-6C



- ISO-6C development began at MIT Global ID in 2001 – G0/G1
- ISO-6C Global standard introduced in 2005 by EPC Global
- Top RFID companies in world involved
- Billions of tags distributed with numerous reader providers worldwide
- The biggest and best retailers, companies in the world implementing ISO-6C
- Sirit/FSTech IN510 reader used by MetLabs as the benchmark for ISO-6C certification worldwide in 2007
- Application use accelerating



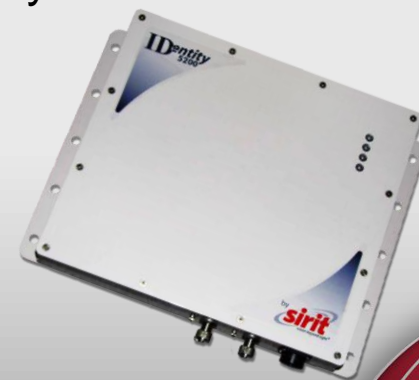
ISO 18000-6C ETC System Installs

- More than 1500 lanes installed in 15 countries
- Installation of ISO 18000-6C ETC systems since 2008
- Proven MLFF operation
- Successfully worked with over 20 System Integrators illustrating the flexibility
- The trend is growing globally – legacy and new installations



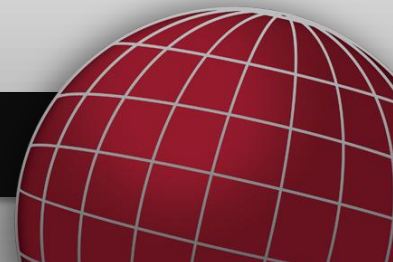
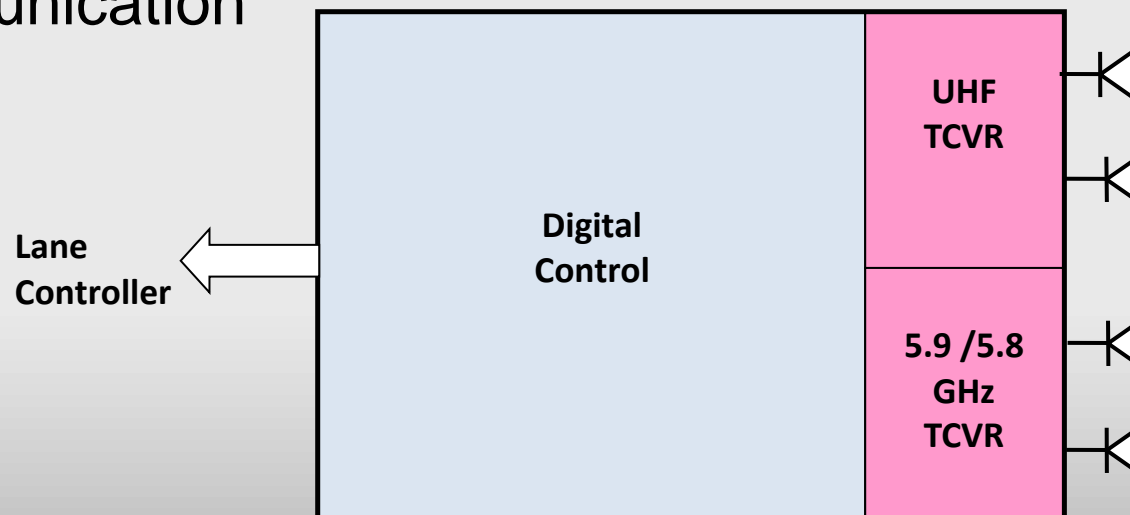
Multi Protocol RFID Reader - UHF

- Ability to read legacy tags for interoperability dictates multiple protocol reader
 - ISO 10374 (ATA) – Mixed throughout the world, Texas, & railways
 - Title 21 for Western US
 - ISO 18000-6B
 - IAG for Northeast US
 - ASTMv6 for commercial vehicles
- Reader can embed and operate any number of protocols
- Intelligent Digital Section allows for expanded communication with all lane controllers regardless of protocol or frequency

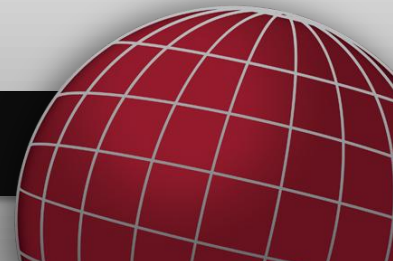


Multi Frequency RFID Reader

- RFID reader incorporating UHF and 5.8 or 5.9 GHz
- Retain multi-protocol capability
- Shared firmware/software
- Separate transceivers
- Intelligent Digital Section permits expanded communication



- **Plate Design**
 - Fonts & Graphics Variations
 - Repeated Alpha Numeric
- **Plate Construction**
 - Embossed vs. Flat Plates
 - Reflective Properties of Sheeting
 - Printing Inks
- **Camera**
 - Illumination Type (white light vs. IR)
 - OCR Software (regional optimization)



Design Plates for Camera Readability

- **Improved Contrast Ratio**

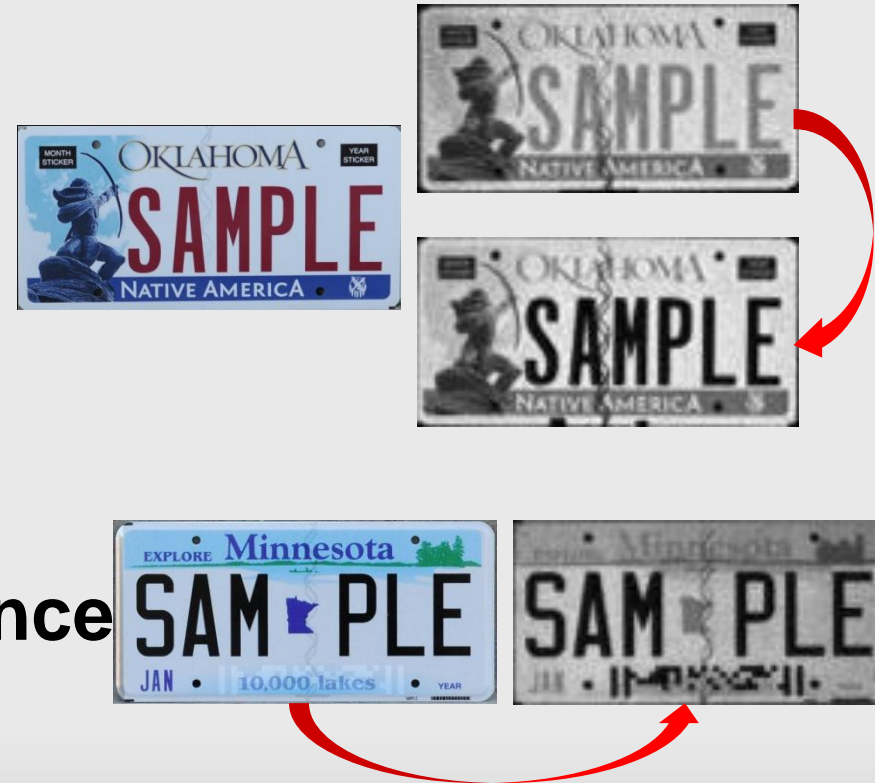
- Alphanumeric
- Background Graphics

- **Embedded Identifiers**

- State / Country
- Plate Type
- Unique Identifier

- **Improved Read Confidence**

- Self Check e.g. bar codes



Maintain Graphic Design & Improve Camera Readability

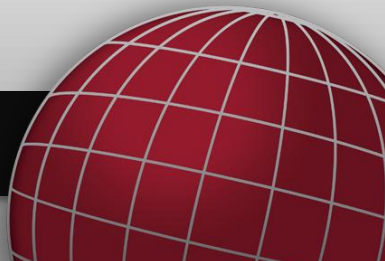
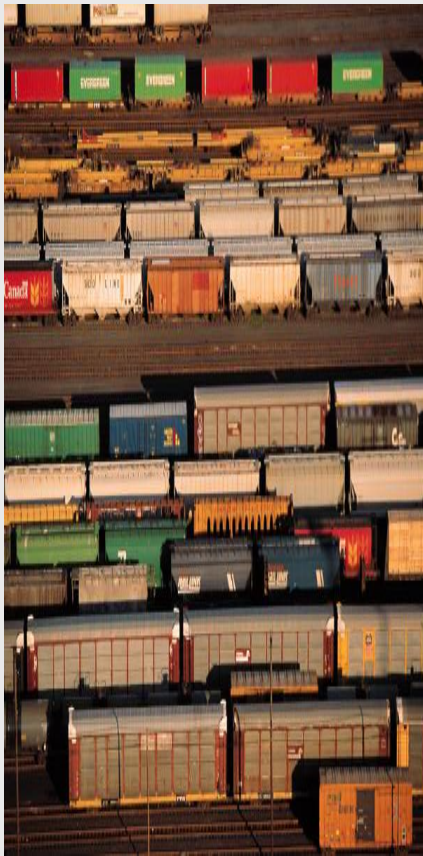
License Plate Barcode

- High accuracy in optically reading the vehicle license plate
- Campus trial conducted by 3M resulted in 100% read success.
- Designed to cover all of 7 digit alpha-numeric (US) plates, up to 64 states and up to 32 vehicle classes.
- Error-corrected 12 bit checksum for 99.975% confidence of an incorrect read being detected.
- Read successfully at 155mph



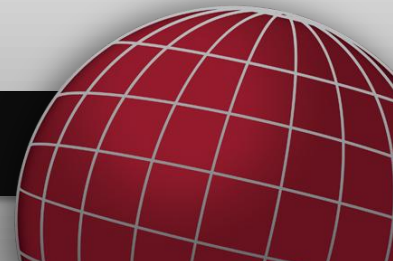
Emerging Applications will Drive Interoperability

- Electronic Vehicle Registration
- ORT/MLFF
- Emission Testing Validation
- Insurance Compliance
- Traffic Management Systems
- Congestion Pricing Charging
- Parking and Access Control
- Commercial Vehicles
- Public Transit
- Chain of Custody Validation



The Future of Interoperability

- Interoperable technology options emerging across numerous ITS/ETC applications
- Open standard options and multiple technology suppliers
- Breakthrough blend of performance and cost
- Is Interoperability Optional – the application market will drive us there



Thank You

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