TRANSCORE

IBTTA
International Bridge, Tunnel and Turnpike Association
DRIVING CHANGE SINCE 1932

RFID – The evolution of economic interoperability in Electronic Toll Collection

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TransCore

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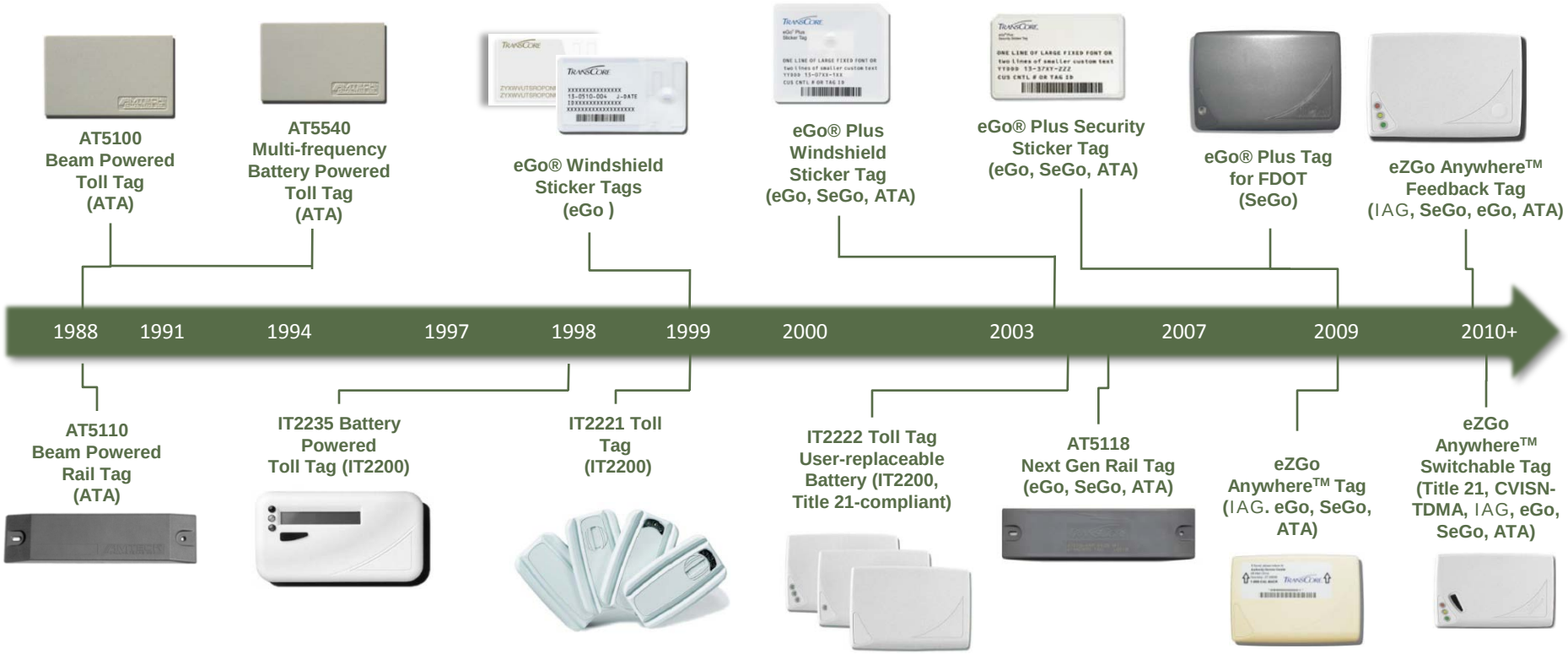
Holy Cow.

Historic Evolution of Tag Technology



Collaboratively Moving the Industry Forward

- High performance, **battery-free sticker tag**
- **Lowest cost of ownership**
- Drives down violations
- Eco-conscious solution
- 2010 Best of ITS Finalist
- **13.5 million** deployed worldwide (Dec 09)

Going Green is Easy – Everyone Benefits from Sustainability

3,500 Hard Case Battery Tags

- 3,500 hard case battery OBUs in 4 coffin boxes
- 700 lbs.
- 42.5” x 17” x 20.5” per box
- *$1,776 estimated freight cost*
- ***93 times higher freight cost***

3,500 Windshield Sticker Tags

- 3,500 battery-free sticker tags in 1 box
- 16 lbs.
- 14” x 11.5” x 10” per box
- *$19 estimated freight cost*
- ***Consumes 3% of the storage space***

Historic Evolution of Reader Technology

AI200 Reader (ATA)

IT2001 High-Performance Reader (Read/Write) (IT2000, Title 21)

AI1620 Low-cost Parking Reader (ATA)

Encompass® 5 Multiprotocol Reader read-only (SeGo, eGo, IAG, IT2000, Title 21, ATA)

Encompass® 6 Multiprotocol Reader read/write (SeGo, eGo, IAG, IT2000, Title 21, ATA)

Encompass® 1d Multiprotocol Handheld Reader (SeGo, eGo, IT2200, Title 21, ATA, EPC, IAG)

1990 1994 1995 1998 1999 2000 2003 2007 2009 2010+

AI1601 Medium-cost Parking Reader (ATA)

AI1831 GAPS Rail Interrogator (Proprietary F2F Protocol)

AH1101 Handhold Reader (ATA)

Encompass® 2 Low-cost Dual-protocol Reader (eGo, ATA)

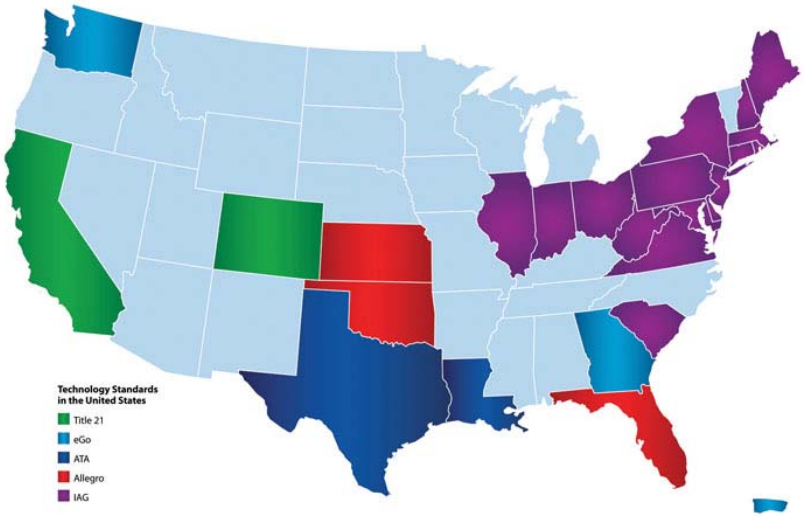
Encompass® 1 Dual protocol Handheld Reader (eGo, ATA)

Encompass® 4 Low-cost Multiprotocol Reader (SeGo, eGo, ATA, IAG)

Encompass® 1i Multiprotocol Handheld Reader (SeGo, eGo, ATA)

Customers Insist on Convenience – Give Them Choices

- Multi-protocol tags
- No lane modifications
- Coast-to-coast freedom
- One tag/account

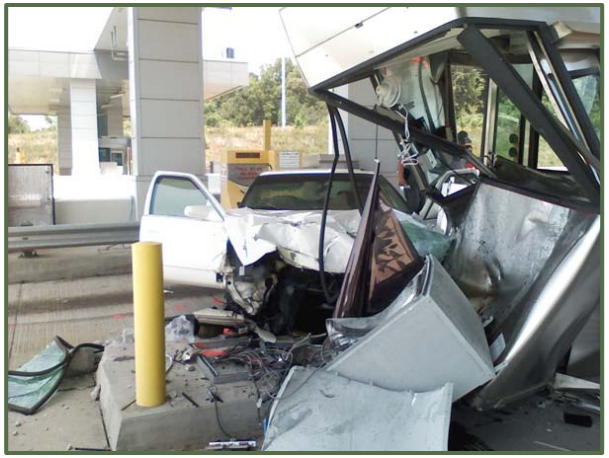


Latest advances in RFID Reader Technology

- IAG Plug and Play Reader System
  - Proven technology
  - Scalable up to 8 lanes
  - Individual processors for lane independence
  - 2010 Best of ITS Winner

Southern Connector – 2010 Best of ITS Winner

- Nation's first nationally interoperable toll technology platform
- Reads any U.S. toll tag – IAG PnP Reader



Attributes of 915, Cen, 5.9, 6C

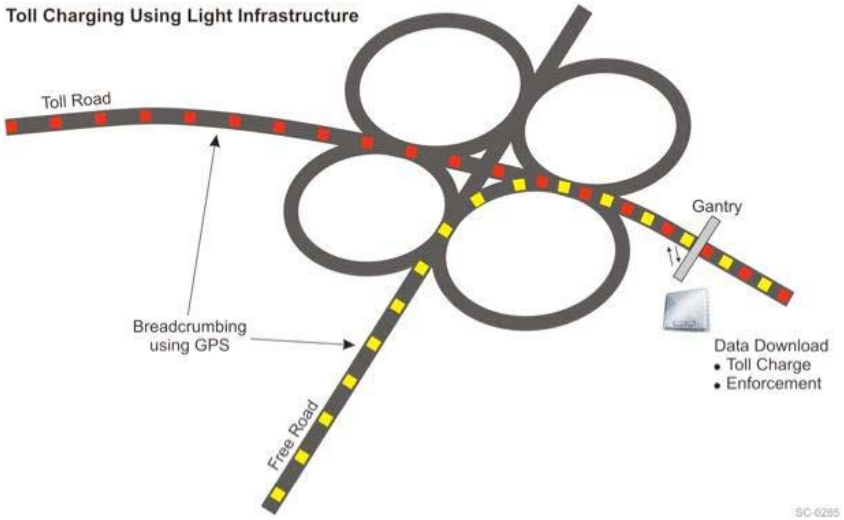
	Current USA Passive Systems	Current USA Active Systems	Current CEN Systems	ISO 18000 6C	DSRC
Operating Frequency	915 MHz Band	915 MHz Band	5.8 GHz	860-960 MHz	5.9 GHz
Technology Level	Low/Medium (system dependent)	Low	Low	Low	High
Tag Power Source	Battery-free (some older tags have batteries)	Battery required	Battery required	Battery-free	Vehicle powered
Communication Range	5-30 meters (system dependent)	~100 meters	~30 meters	~20 meters	Up to 1000 meters
Vehicle Speed	>100 mph	>100 mph	>80 mph	>80 mph	>200 mph
System Security	Low - older systems Medium – newer systems	Low	Low	Low	High
Tag Price	$5 - $20 (system dependent)	>$20	~$20	Under $5	High
Current USA Tag Deployment	~40 million	~30 million	~ 40 million	None in highway applications	<100 Test units
Remarks	1. Generally considered as best value of deployed systems 2. Battery-free design gives unlimited lifetime without maintenance	1. Old technology in comparison to all modern systems 2. Battery issues add cost and complexity to deployed systems	1. 5.8 GHz (CEN) and 5.9 GHz (DSRC) are very different technologies. 2. Migration from 5.8 to 5.9 will be difficult due to near-frequency interference	1. Low security adds substantial risk to fee collection applications 2. Unproven in highway applications	1. US DOT making safety the exclusive focus of DSRC. Fee collection not classified as safety 2. Expensive 3. Deployment timeline is very uncertain

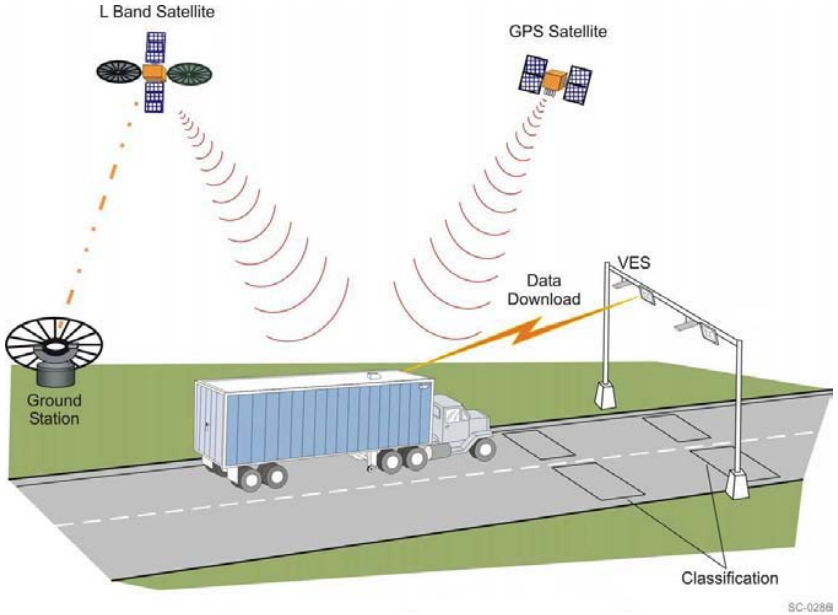
New Tools to Protect and Generate Revenue

- Multi-protocol tags and readers
- Maximum value
- Added functionality for growing applications like ORT, HOT, AET
- National U.S. Toll Interoperability

Bridge to Move Industry Forward

- Technology foundation for VMT
  - RFID with GPS, wide area radio, local area radio link





Summary

Bridge to Move Industry Forward

One Tag – One Account

Coast-to-Coast