IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006

OmniAir ADVANCING DSRC TECHNOLOGY

Standards Activities: What do they mean for Texas?

5.9GHz DSRC & the OmniAir Program on behalf of Tolling

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006

OmniAir ADVANCING DSRC TECHNOLOGY

Topics

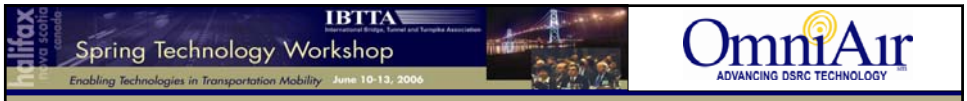
1. OmniAir Overview
2. 5.9GHz and Tolling
   - A Revolution in the Technology
   - An Evolution in Business and Your New Partners
3. The Certification Program

OmniAir Overview

- OmniAir Consortium, Inc.
  - A non-profit association advancing the national deployment of interoperable DSRC systems through Certification.
- Device Certification Program
  - A third-party test of compliance with 5.9GHz DSRC device standards & interoperability requirements.
- EPS National Interoperability Specification
  - EPSNIS - a document specifying a standard, uniform transaction process and network interfaces from OBU and RSU to Service Provider, Clearinghouse and Issuer.
- OmniAir Member Goals
  - Public Standards
  - Private Competition
  - National Interoperability
  - Lower Cost

Public/Private

- E-470 (Chair)
- IAG (Treasurer)
- MTA Bridges & Tunnels
- FL Turnpike Enterprises
- TTA Div. TXDoT
- ISTHA
- OOCEA
- PANYNJ
- NTTA
- Tampa X-Way
- NYS Bridge Auth
- IBTTA
- SW Research Institute
- TransCore (Vice Chair)
- Caseta Technologies
- Kapsch TraffiCom
- MARK-IV
- Traffic Technologies
- HNTB
- EFKON USA
- ACS
- SIRIT
- Raytheon
- TRMI
- PBS&J
- Vollmer
- Transportation Innovations
- JAFA Technologies
- Booze Allen Hamilton



Public/Private Directors

- E-470 (Chair)
- IAG (Treasurer)
- MTA Bridges & Tunnels
- FL Turnpike Enterprises
- TTA Div. TXDoT
- ISTHA
- OOCEA
- PANYNJ
- NTTA
- Tampa X-Way
- NYS Bridge Auth
- IBTTA
- SW Research Institute
- TransCore (Vice Chair)
- Caseta Technologies
- Kapsch TraffiCom
- MARK-IV
- Traffic Technologies
- HNTB
- ACS
- EFKON USA
- SIRIT
- Raytheon
- TRMI
- PBS&J
- Vollmer
- Transportation Innovations
- JAFA Technologies
- Booze Allen Hamilton

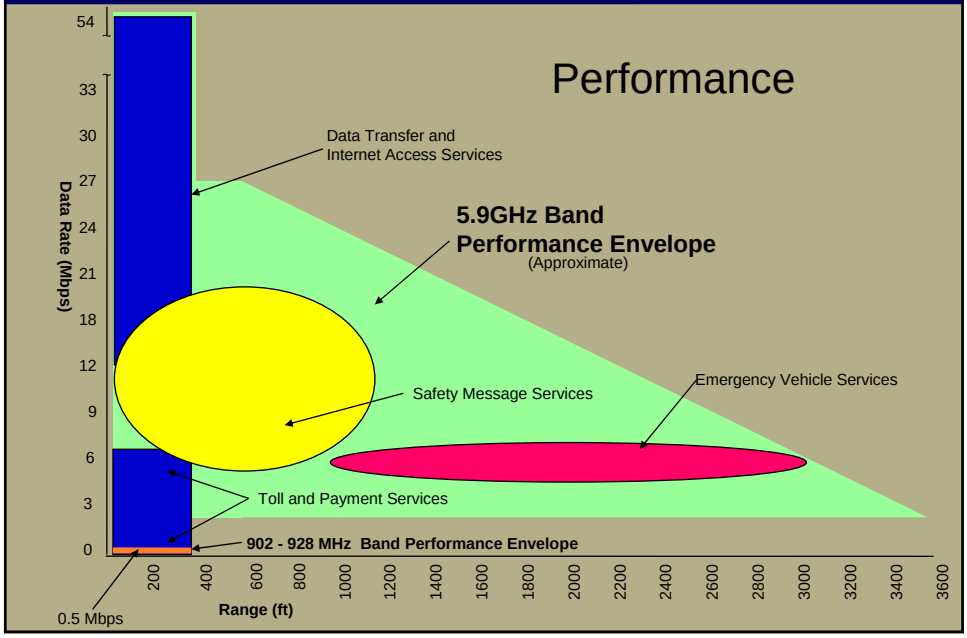
5.9GHz & the *Tolling* Application

1. A Revolution in the Technology
2. An Evolution in Business Model

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

Revolutionary = new, substantial

- 5.9GHz DSRC technology is a revolution in:
  - Performance Attributes
  - Applications
  - Method



IBTTA
Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir
ADVANCING DSRC TECHNOLOGY

National Interoperability	vs	Disjointed Regions
Exclusive Lic/Non-Interf	vs	Subject to Interference - 900MHz Phones - Rail-Car AEI Readers - spread spectrum devices
Rapid Access (50ms)	vs	not-so rapid access
27Mbps Data Rate	vs	.5Mbps
Private & Secure	vs	?
7 Channels	vs	1-2 channels
Pub Saf Message Priority	vs	no enforced priority scheme
Operator Driven	vs	Manufacturer Oriented
3000 feet range	vs	300 feet

Applications: Safety, Management & Data

- ACCESS CONTROL
- DATA TRANSFER / INFO FUELING
- TRAFFIC INFORMATION
- INFRASTRUCTURE BASED PROBE DATA COLLECTION
- CURVE SPEED ASSISTANCE [ROLLOVER WARNING]
- INFRASTRUCTURE BASED - STOP LIGHT ASSISTANT
- INTERSECTION COLLISION WARNING/AVOIDANCE
- COOPERATIVE COLLISION WARNING [V-V]
- VEHICLE BASED PROBE DATA COLLECTION
- COOPERATIVE ADAPTIVE CRUISE CONTROL
- COOPERATIVE VEHICLE SYSTEM – PLATOONING
- HIGHWAY/RAIL [RAILROAD] COLLISION AVOIDANCE
- IMMINENT COLLISION WARNING
- EMERGENCY VEHICLE VIDEO RELAY
- ROAD CONDITION WARNING
- WORK ZONE WARNING
- MAINLINE SCREENING
- BORDER CLEARANCE
- ON-BOARD SAFETY DATA TRANSFER
- UNIQUE CVO FLEET MANAGEMENT
- DRIVER'S DAILY LOG
- VEHICLE SAFETY INSPECTION
- TRANSIT VEHICLE DATA TRANSFER (gate)
- TRANSIT VEHICLE REFUELING MANAGEMENT
- ROLLOVER WARNING
- LOW BRIDGE WARNING

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

Applications: Opt-In*

- Electronic Payment Services
- Auto-maker CRM Services
  - Remote Diagnostics
  - Towing Service Notification
- Rental Car Processing
- Emergency Services and Medical Information
- TBD E-Commerce & 'Info'-tainment

*Opt-In:

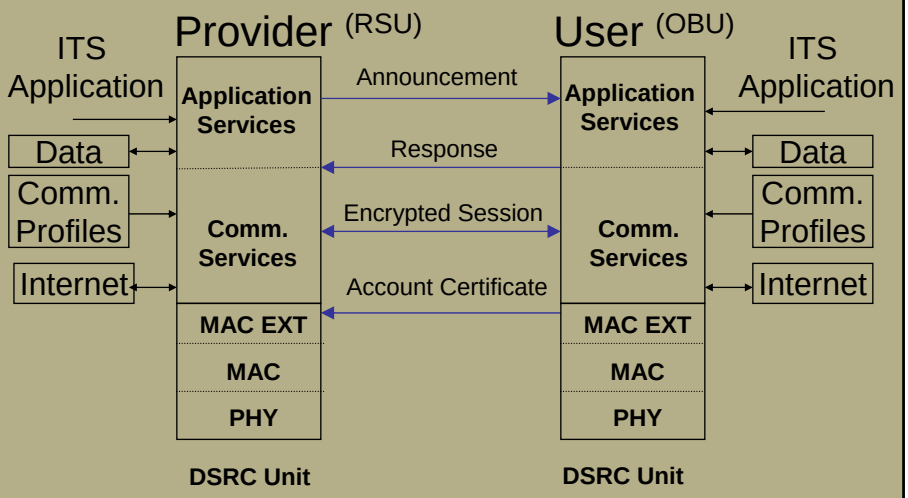
Voluntary Provision of Identifying Data in exchange for a service you want to have.

Method

- 915MHz ETC uses a tag ID number associated with an account, both owned by the operator
- 5.9GHz Device: no tag distribution, mounting, or battery issues
- 5.9GHz EPS: will use Public Key Encryption to authorize a secure transaction - the account could be outside the operator's domain

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

Method

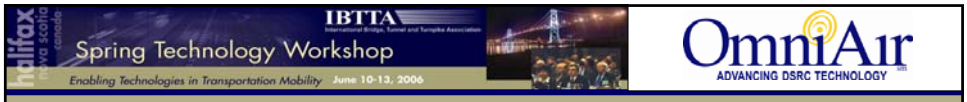


The Application Standard can be the EPSNIS

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

EPSNIS Background

- Industry sees that 5.9GHz DSRC device standards alone do not provide for interoperable toll collection
- Application Specifications are required for 'True' Interoperability
- DSRC deployment without an EPSNIS will result in divergent non-interoperable systems, thwarting deployment
- Only OmniAir is actively pursuing EPS Application Standards for DSRC



EPSNIS Rationale

Today:

- ETC Relies mostly on custom-built systems
- Multiple reading/processing standards exist
- Back-office financial processing is not standardized
- Operational costs for overall toll systems are comparatively price inelastic (installation, maintenance, labor, collection, processing) despite high adoption rates and large volumes

EPSNIS Rationale

Tomorrow:

- 5.9GHz DSRC uses an integrated 'OBU' with an application platform hosting numerous applications
- EPS will be a 'day-1' application on care shipped nationally
- Applications are activated and for EPS, accounts issued by multiple parties and processes – not always an operator
- Issuers and Users expect interoperability across all EPS Channels

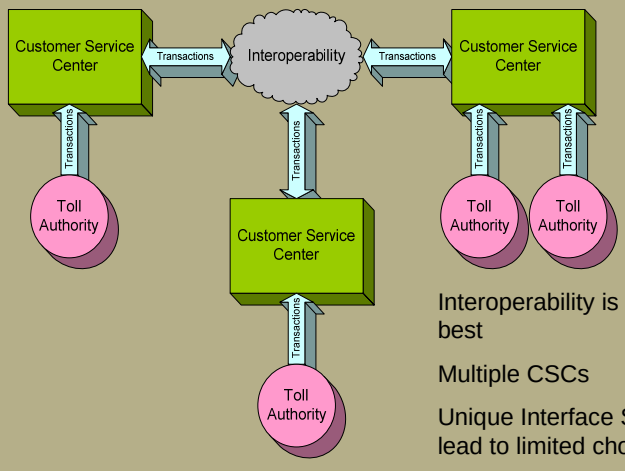
EPSNIS: To Prepare to Work with ETC's Future Partners

- Technology innovation reduces barriers between previously discrete business sectors and actors (a service's providers)
- 5.9GHZ DSRC is such an innovation
- The actors that will cross into the toll sector are:
  - Automobile Manufacturers
  - Banks
- An EPSNIS offers the opportunity to collaborate rather that compete
- An EPSNIS increases the potential for the business terms to be defined by OmniAir members

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

Goal is to Implement Incrementally

- Leverage current technology investments and through the EPSNIS, evolve from:



Interoperability is regional at best

Multiple CSCs

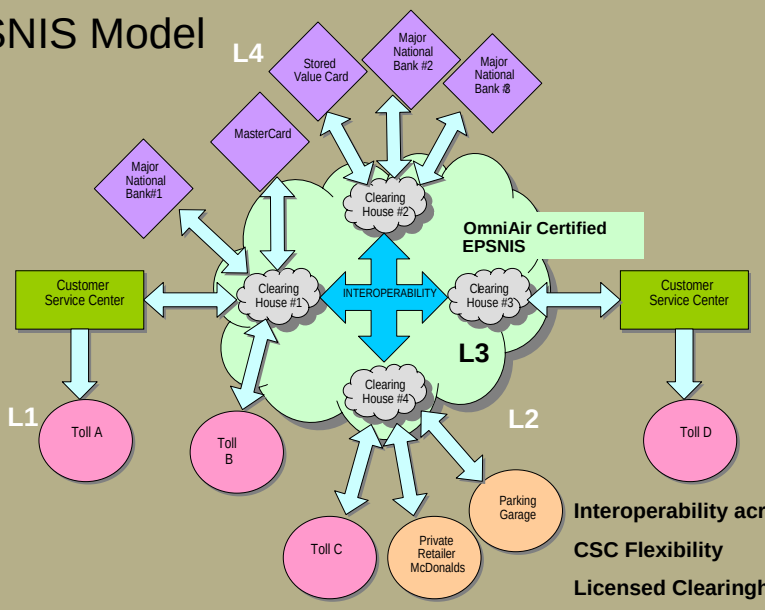
Unique Interface Specifications lead to limited choice

CSC 3rd Party Possibilities

1. Account Acquisition: no-yes
2. Account Maintenance/Mgt/Termination: no-yes
3. Tag Acquisition, Dissemination, Disposal: no-yes
4. Violations Processing, Exception Handling and Resolution: probably remains close
5. Transaction ID, Aggregation, Routing: no-yes

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

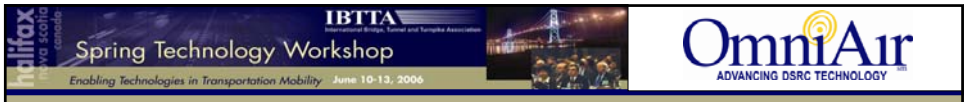
EPSNIS Model



Interoperability across EPS

CSC Flexibility

Licensed Clearinghouses



How

- Test Proposal: NYSBA test site, PANYNJ host, OmniAir EPS Committee support
  - Test application – two payment architectures - and DSRC prototype device co-located in-lane with 915
  - Provide output data and summary report from an operational system
  - Apply EPSNIS Program to other interested test sites
  - Work with VII effort, Auto, Banks to Develop Clearinghouse certification program and OmniAir manage the specification over time
- Funding: Seeking I-95 Corridor Coalition Contract
  - Received funding approval at June 20th EPS PT Committee
  - I-95 awarded additional $4.8million from SAFETY-LU
- IBTTA members: an opportunity to advocate an important project

Auto OEMs, the VII and the Tolling Application

- In the VII Program, EPS has three Use Cases
  - Tolling
  - Parking
  - Fuel/E-Commerce Payment

Conclusions: Tolling with an EPSNIS…

- Offloaded from Operators, EPSNIS allows Banks, Credit Card companies and Retailers to issue OBUs & accounts:
  - reducing or eliminating fixed and recurring infrastructure costs associated with current requirements for building, operating & maintaining exclusive and numerous CSCs.
  - provides for competition in transaction processing and better market availability and penetration
- For the Patron, improved service because they need fewer accounts and are able to contact their existing Banks or Card companies to receive tags and to seek customer service
  - Customer can assign payments from any existing account with no new account to manage, i.e. from direct bank debit or credit card

IBTTA Spring Technology Workshop
Enabling Technologies in Transportation Mobility June 10-13, 2006
OmniAir ADVANCING DSRC TECHNOLOGY

- Local Operator will still provide service specifically for their roads, but can choose not to for the patron's account.
- Does not appropriate an operator's unique identity
- Does not preclude operator's CRM functions
- Makes advancing toll collection easier by reducing barriers to the concept of user fees in general
- An example today is the VIA-T system in Spain (an IBTTA Award Winner).
- Result: the US toll industry can adopt EPS business model today for legacy technology and influence its evolution. And,
- It can prepare itself for the coming DRSC device revolution

Thanks for Listening!

www.omniair.org