IntelliDrive℠ Listening Session

Gathering User Needs

October 5, 2010
Topics

• Defining terms:
  – ITS
  – IntelliDrive
  – Systems Engineering
  – User Needs

• Discussion on your transit related needs

• Next Steps

[Diagram showing flow from User Needs to System Architecture]
First, What is ITS?

• Intelligent Transportation Systems (ITS) include the electronics, communications or information processing used singly or integrated to improve the efficiency or safety of surface transportation.

• Examples:
  – Traffic signal controllers
  – Traffic Management Centers
  – “511” (traveler information)
  – Electronic payment
National ITS Architecture Covers a Wide Range of Services, Communications

Travelers
- Remote Traveler Support
- Personal Information Access

Centers
- Traffic Management
- Emergency Management
- Toll Administration
- Commercial Vehicle Administration
- Maintenance & Construction Management
- Information Service Provider
- Emissions Management
- Transit Management
- Fleet and Freight Management
- Archived Data Management

Vehicles
- Wide Area Wireless (Mobile) Communications
- Fixed-Point – Fixed-Point Communications
- Vehicle
- Emergency Vehicle
- Transit Vehicle
- Commercial Vehicle
- Maintenance & Construction Vehicle
- Field – Vehicle Communications
- Field
- Roadway
- Security Monitoring
- Toll Collection
- Parking Management
- Commercial Vehicle Check

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Transit ITS Services

- Transit Vehicle Tracking
- Transit Signal Priority
- Transit Passenger Counting
- Transit Fixed-Route Operations
- Demand Response Transit Operations
- Fare Collection Management
- Transit Security
- Transit Fleet Management
- Multi-modal Coordination
- Transit Traveler Information
What is IntelliDrive?

• Suite of technologies and applications that use wireless communications to provide connectivity:
  – Between vehicles (of all types)
  – Between vehicles and roadway infrastructure
  – Between vehicles and wireless communication devices
  – Between wireless communication devices and roadway infrastructure

• Focused on Safety, Mobility, and the Environment
It’s All About Connectivity

- E-payment Transactions
- Signal Phase and Timing Information
- V2V Safety Messages
- Real Time Network Data
- Situation Relevant Information

“The Network”

Opportunity for Innovation

Infrastructure Communications

Probe Data
When is IntelliDrive Taking Place

FCC allocates 5.9 GHz spectrum for DSRC
VII Architecture developed based on Day 1 Use Cases
Prototypes for V2V (safety applications) and V2I (public applications) developed based on DSRC 5.9 GHz and tested in a POC test bed
“VII” rebranded as “IntelliDrive” to reflect new assumptions
IntelliDrive SE Program initiated to re-baseline
Re-baselined IntelliDrive Concept of Operations, Requirements, & Architecture completed

User Needs
Concept of Operations
System Requirements
System Architecture

Aug/Sep 2010
Oct-Dec 2010
Jan-Mar 2011
Summer 2011
IntelliDrive SE Program

- Revisit and update the IntelliDrive concept of operations, requirements, and architecture
- Provide the technical foundation for future activities: testing, deployment, continuing research
- Focused on Core system, enabling applications with cooperative data exchange capabilities
How does DSRC fit in?

• Dedicated Short Range Communications (DSRC)
  – Remains one of the important technologies used within the IntelliDrive System
• 75MHz of spectrum in 5.9 GHz range allocated by FCC to:
  – “[provide] vehicle-to-vehicle and vehicle-to-infrastructure communications, helping to protect the safety of the traveling public. It can save lives by warning drivers of an impending dangerous condition or event in time to take corrective or evasive actions.”
  – “The band is also eligible for use by non-public safety entities for commercial or private DSRC operations.”
VII vs. IntelliDrive

**VII**

- 5.9 GHz DSRC only
- OEM only
- Light vehicles
- National interoperability
- Must not compromise safety, security
- Must protect privacy
- Probe data, publish-subscribe

**IntelliDrive**

- 5.9 GHz DSRC and others
- OEM, aftermarket and retrofit
- All vehicles
- National interoperability
- Must not compromise safety, security
- Must protect privacy
- Probe data?
IntelliDrive Context

- Roadside Devices
- Vehicles
- Other Mobile Users
- Back office Users
- Administrators
- External Data Sources
What is a User Need?

• A “User Need” is defined as a capability that is identified to accomplish a specific goal or solve a problem that is to be supported by the IntelliDrive System.

• “A user requirement for a system that a user believes would solve a problem experienced by the user.”
  – IEEE Std 1362-1998, Section 3.26 - User Need

• Describes “what” is needed and not “how” it is to be implemented
Characteristics of User Needs

• Scoped to the appropriate level
  – Too general -- needs to be further defined
  – Too specific -- may imply design

• Not Application specific

• May include notional latency, security, size or bandwidth (if applicable) needs
  – Not the solution of any specific interface or protocol
User Need Example

• **Who?** Transit Manager
• **What is the problem?** I can’t ensure that my transit vehicles stay on schedule.
• **Why is this a problem?** Late transit vehicles has resulted in a drop in ridership.
• **What do you need to solve the problem?** I have a need for the signals to be modified in order to accommodate a bus that is behind schedule.
• **Why should IntelliDrive solve this problem?** IntelliDrive could provide a way for my transit fleet to communicate with the signals and reduce my reliance on proprietary signal priority equipment.
Gathering User Needs:
What have we heard so far?

• Give me the data – current traffic, all roads, all the time
• Standardize it
• Support multiple modes – include Cyclists, Pedestrians, other vulnerable users
• Set driver’s expectations: inform them when IntelliDrive/safety services are available
• Support targeted broadcasts to sets of vehicles – by location, type, individual
• Support back-office brokering of data sets via standardized interfaces, services
• Support roaming for users devices
• Provide authentication, ensuring users that messages are from legitimate sources
What have we heard from Transit?

• Same as above. In addition, consider the following safety related needs
  – Support broadcast of complete vehicle characteristics
    • Special vehicle types like articulated buses, light rail operating at grade, trolleys,
  – Provide warnings when entering and exiting lanes of traffic
  – Provide warnings to vehicle operator when pedestrians approaching vehicle
  – Provide precise positioning of BRT vehicles to maintain train-like spacing, scheduling
What else have we heard from Transit?

• Consider the following mobility related needs
  – Support transactions with passengers having special needs (availability of bus with bike rack, wheelchair access)
  – Provide alternate communications path for provision of operational data: schedule adherence, current passenger counting, security

• Consider the following environmental needs
  – Support V2I signal priority to maintain smooth flow, reduces emissions
Today – Let’s Hear Your Needs

• Who are you?
• What is the problem?
• Why is this a problem?
• What do you need to solve the problem?
• Why should IntelliDrive solve this problem?
Next Steps

• The inputs from this workshop will be collected and organized

• Findings Report provided to USDOT
  – DOT will disseminate to the participants

• Next step for the program will be to update the IntelliDrive System Concept of Operations

• Stay tuned!
Thank you for your participation!

http://www.intellidriveusa.org/