Impact of New Data Sources on Transportation Safety and Mobility

Transportation CPS Workshop
November 18, 2008

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Impact of New Data Sources

A Data Revolution is Coming!
Agenda

• Historical Context
• Market Developments and New Data Sources
• Opportunities to Improve Transportation
  – Safety Services
  – Mobility Services
• Future Challenges
**Traditional Data Solution**

**Traditional Solution:**
- Fixed sensors (e.g. loops)
- Public investment through
  - Federal-Aid Program
  - State and Local Funds

**BUT**
- Trust Fund is Going Broke
- Funding is Insufficient for Basic Needs
  - Technology Investments Typically are Low Priority
  - O&M funding is typically insufficient
Slow Pace of Deployment

- Freeways and transit have moderate ITS deployment.
- Deployment on arterials is even less.

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Source: ITS Deployment Statistics Database (www.itsdeployment.its.dot.gov)
Slow Pace of Deployment

- At the present rate, full deployment will not be achieved for years.
  - Not until 2035 in freeways, 2019 in transit

Source: ITS Deployment Statistics Database (www.itsdeployment.its.dot.gov)

- 70-77% of agencies collect volume data
- 61% of agencies collect speed data
- 39% signalized intersections covered by electronic surveillance
- 38% freeway miles in metro areas with R-T traffic data collection
- 27% of agencies display travel time on DMS
- 14% states disseminate transit data on agency web sites
- 13% of agencies deploy parking data collection systems
- 8% of agencies disseminate parking information
Information Technology is Booming

At the Same Time:

- Information Technology Explosion
  - Smaller
  - Faster
  - Ubiquitous connectivity
  - Market driven
  - Based on industry standards

![Bar chart showing the number of different devices: Mobile Wireless Devices (2B), TVs (1.5B), PCs (820M), Game Boys (190M), iPods (50+M), PDAs (50M).]
Automotive Adoption of Real-Time Traffic
Number of OEM Models with available factory-installed XM NavTraffic

<table>
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<th>OEM</th>
<th>Traffic Intro</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tr>
<td>Honda/Acura</td>
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<tr>
<td>GM/Cadillac</td>
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<td>2</td>
<td>8</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Ferrari</td>
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<td>0</td>
<td>0</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>19</td>
<td>40+</td>
<td>50+</td>
</tr>
</tbody>
</table>

OEM NavTraffic Annual Production

Source: Vehicle Traffic Information Coalition
Consumers Expect Traffic with Navigation

Traffic is the #1 content feature requested by consumers for navigation systems

Q: How important are each of the following features in an installed or portable GPS vehicle navigation system or in a cell phone based navigation service?

- **Traffic Conditions Along Route**: 62%
- **Weather Conditions**: 41%
- **Local Gas Station Prices**: 22%
- **Many POIs**: 39%
- **Display of Available Parking**: 31%
- **Detailed POIs**: 29%

Each red dot on the map represents a vehicle reporting data to INRIX on 5/6 at 3:53 PM
New York City, 8/4 at 5:20 PM
We Can Leverage the Market or Be Left Behind

- We live in an information rich world, and
- Public agencies are information poor for real-time travel information
Public Agencies Are Making the Change

- Agencies are purchasing real-time data from private providers
What Would We Wish For?

- End-to-end transportation trip information for traveling public
- Transportation network is managed for optimal performance
- Technology-enabled performance measures support outcome-based investment decisions
- End-to-end freight movement is seamless and secure
Probe Data Brings New Opportunities

Probe Data From Multiple Technologies
- Cell phones, AVL and after-market devices
- Provides GPS data, speeds and travel times

Probe Data From Vehicle CAN Bus
- ABS
- Airbag
- Rain Sensor
- Wipers
- Headlights
- Temperature
- Traction Control
Safety Services

• Improved Situational Awareness
  – Adverse weather or road conditions
  – Accidents or stopped traffic ahead
  – Work zones

• Active Safety Warnings (VII-enabled)
  – Intersection safety
  – Curve speed warnings
  – Lane departure warnings
Mobility Services

- Mobility Management
- Performance Measurement
- Transportation Planning
- Traveler Information
Mobility Management

- With better data, we can manage network better
- Network Management
  - Traffic (freeways and arterials)
  - Transit
  - Parking
  - Freight

- New modeling capabilities (predictive)
- New operational tools
Performance Measurement

• With better data, we can measure performance
• Enables System Monitoring
• Suite of performance measures
  – Nationally
  – Regionally
  – Locally
  – Usable for day-to-day management
Transportation Planning

• With better data, we can inform our investment decisions
  – Archived data
  – Origin-destination studies
  – Trip generation

Supports:
  – **Outcome-based Investment decisions**
    • Infrastructure
    • Maintenance
    • Operational performance
    • Safety needs
Traveler Information

• End-to-end trip information
  – Traffic
  – Transit
  – Parking
  – Weather

• Private Sector uses
  – Navigation systems (PND)
  – Hand-held devices and cell phones

• Public Sector uses
  – 511 (phone and web)
  – Dynamic Message Signs (DMS)
Average trip speed for fastest route was 18.5% Faster than with conventional navigation.

Comparison of average trip speed during Feb ‘07

Nissan Motor Co.
Future Challenges

- Understanding data quality
- Understanding how data be used – need for new applications
- Are there standards issues? What about data ownership?
- Need transit & parking data, too!
The Role of ITS and Better Data

• Technology can provide **information & visibility**.
• Technology can facilitate **performance measures**.
• Technology can facilitate **management tools**.
• Technology can provide **safety**.
• Technology can provide **customer choice**.

Capturing Transportation’s Imagination through Technology