Transport Data Integration and Fusion

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TDI – What is it?

• Data Fusion Process for Transportation System
  – All Forms of Inputs
    • Agency Provided Detector Data
    • Cell Phone Data
    • Transit Schedules

• Provides 24/7 Regional Operational Picture
  – Cars
  – Trucks
  – Buses/Trains/Transit
  – Bicycles/Peds
TDI – What Does It Do?

• Operational Data
  – Speeds
  – Volumes
  – Congestion Points
  – Origin-Destination Information for all Travel

• Can Separate by Mode
  – Buses/Trains/Transit
  – Cars/Trucks
  – Bicycles/Peds
TDI – How Does It Do It?

• Collects all “MOTION” Data
  – Detectors
  – GPS
  – License Plate Recognition
  – E-Tags
  – Cell Phones
  – Etc (Open System)

• Data Fusion Process
  – Determines What Data Good/Bad
  – Uses Good Data
  – Creates 24/7 Operational Representation
TDI – How Can It Be Used?

- Operators and Regional Agencies
  - Continuous Update on State of Transportation
  - All Facilities/modes, All the Time
  - Performance Measurements, Continuously
  - Peak Hour Traffic Counts
  - Operational Efficiency of all Forms of Transportation
  - Environmental Readings
  - Instantaneous Readouts of any Changes
  - Accurate Impacts from Incidents/Accidents
  - Ability to Report Changes or Events, Instantly
  - And to predict if linked to a simulation environment.
TDI – How Can It Be Used?

• Research
  – Automatic Traffic counters
  – Simulation of new concepts (before)
  – Impacts of changes on entire system
  – Automated measurements of test (after)
  – Impacts due to incidents can be catalogued
  – Impacts due to ITS devices (DMS, etc) can be measured
  – Environmental Impacts of Modal shifts
  – Benefit / cost analyses, true time savings estimates
TDI – How Can It Be Used?

• Travellers
  – Personal Travel Predictions
    • By Mode
    • Intermodal
    • Future Travel
TDI – Information can assist;

- Personal Travel, Vehicles and Goods Transport
- Congestion Management
- Incident/Accident Detection and Management
- Roadwork Planning and Management
- Emergency Planning
- Transport, Urban and Environmental Planning
- Traveller Behaviour Analysis
- Traveller Safety and Sustainability
- Cost Benefit Analysis of Road Schemes and Their Monitoring
Why we need it?

- Development in our Cities
- Utilizing ITS for Congestion
- Modelling future Transportation
- Road Safety and Emergency Planning
- Bus/Rail Transit Systems
- Active Network Management
- Travel Demand Management
- Improving Environment and Quality of Life
- Technology Convergence
- Economic Engine/Competitiveness
What is required?

• New Thinking

• Innovative Approach

• Techno-Convergence
Cutting Edge Technology
Unique Transport Data Integration

• Basic models and components
  – Conventional TMC and wireless traffic data fusion
  – Real-time dynamic multimodal O-D matrix estimation
  – JT, classified flows and close resolution at turn level
  – Models of driver response to guidance

• Our innovation
  – Guidance on all roads with even those without real-time data and adaptive guidance in presence of uncertainty
Benefits

- Fast, accurate and convenient dynamic data acquisition
- Reduced physical infrastructure investment
- Quick solution to existing highway problems
- Real-time multimodal traffic models with
  - Comprehensive real-time information
  - Multimodal planning and interchange policies
  - Sustainability due to pedestrians/cyclists in planning
  - Improved monitoring and benefit assessment
  - Short, medium and long term travel predictions
- Improved Road Safety
- Improved Disaster Management
- Wider coverage
Thank You

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