Data Collection Applications

TexITE Fall meeting, 2014
Waco, TX
Data vs. Detection

- Current Practice (Common)
  - Presence detection
    - Designed in the 1970’s for use with traffic signal controllers
Data vs. Detection

- The rest of the story
  - Presence Detection is not enough
  - More information is needed to get an accurate picture of what is happening on the road
- Measures of effectiveness (MOEs) are tell the whole story
Measures of Effectiveness (MOEs)

- What are MOEs and what are they used for?
  - Measures of Effectiveness are data collection elements that can describe the characteristics of traffic movement or congestion
  - Can be collected for intersection and mid-block deployments on arterials or highways
  - Data types are typically counts, speed, occupancy, and travel times for individual lanes, approaches, or links
The need for MOE Data

- Moving Ahead for Progress in the 21st Century Act – “MAP 21” increased the need for MOEs
- Establishes a performance based program
  - Provides a means to more efficient investment of Federal transportation funds by focusing on national transportation goals
  - Increases the accountability and transparency of the Federal highway programs
- Establishes National Performance Goals for the Federal Highway Program
MAP 21 – Goals

- **Safety** - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads
- **Infrastructure condition** - To maintain the highway infrastructure asset system in a state of good repair
- **Congestion reduction** - To achieve a significant reduction in congestion on the NHS
- **System reliability** - To improve the efficiency of the surface transportation system
MAP 21 – Intent

- States and local agencies establish Goals
- Federal government will monitor performance measurements to see if agencies are working toward their goals.
- Monitoring the condition of roadway system is a requirement
Who is interested?

- Engineering and Operations Community
  - Operating Agencies
  - Planning Agencies
  - Transit Agencies
  - Tolling Agencies
  - Traffic Engineering Consultants
  - Bridge and Tunnel Agencies
What Is It Used For?

- MOE data is the root information for various studies and analysis
  - Traffic planning for agencies and developers
  - Warrant studies
  - Red light running studies
  - And other studies that can benefit from collected data
Innovation for better mobility

How is Data Typically Collected

- Agencies / consultants typically hire people to conduct manual counts
  - On an annual or as-needed basis
  - During peak traffic periods only
  - Usually for only motor vehicles and not bicycles
- Floating car studies
How does Iteris fill the need?

A Variety of tools

- Vantage
- Vector
- Abacus
- Velocity
How does Iteris fill the need?

- **Vantage**
  - Volume, Speed, Occupancy
  - Turning Movement Counts
    - Why the TS2 IM
    - Not just for TS2
      - SDLC Cable can be connected directly into a TS1 (TS2 Type 2) controller

- **Vector**
- **Abacus**
- **Velocity**
Vantage Data Capabilities

- Takes advantage of existing infrastructure
- Turning movement counts
  - Agencies already pay for this service (typically every 3 years per location)
  - Our standard equipment can provide counts that are greater than 90% accurate
  - Increased accuracy by use of the TS2 IM (in TS1 Cabinet as well as TS2)
  - Data available in standard formats
- Provides counts 24/7
  - Data can be gathered after an incident to plan for next time
- Count budget already exists
  - Agencies can leverage other budgets
The three most important factors for good data

- Location
  » In front of oncoming traffic (limits adjacent lane occlusion)
- Location
  » As close to the camera as possible (limits same lane occlusion)
- Location
  » In unique travel paths
Sample Video
Bike Differentiation Example
Accuracy Of Vantage MOE Data

- Depends on camera placement, zone placement, and camera angle

<table>
<thead>
<tr>
<th>Data Elements</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counts</td>
<td>+/- 5%</td>
</tr>
<tr>
<td>Average Speed</td>
<td>+/- 3 MPH</td>
</tr>
<tr>
<td>Occupancy</td>
<td>+/- 3%</td>
</tr>
<tr>
<td>Classification</td>
<td>+/- 5 ft.</td>
</tr>
</tbody>
</table>
How To Retrieve MOE Data

- Typical communication method used
  - Null modem cable attached to a computer
  - GDI serial modems over twisted pair
  - Broadband wireless modems
  - Broadband wireless services
    - i.e. AT&T, Verizon
Iteris XPetrapro Software

Turning Movement Counts in a format that engineers expect
Sample CSO Chart
How do we fill that need?

- **Vantage**
- **Vector**
  - Volume, Speed, Occupancy
  - Turning Movement Counts
    - Why the TS2 IM
    - Not just for TS2
      - SDLC Cable can be connected directly into a TS1 (TS2 Type 2) controller
  - Individual Vehicle Speed
- **Abacus**
- **Velocity**
How do we fill the need?

- Vantage
- Vector
- **Abacus**
  - Takes advantage of existing infrastructure
  - Multiple functions
    - Collects Data 24 / 7
      - Per Lane Volume
      - Vehicle speeds
    - Incident Detection
  - Wrong way vehicle identification
- Velocity
How do we fill that need?

- Vantage
- Vector
- Abacus

**Velocity**
- Travel Times
  - Freeway
  - Arterial
  - Routes
Applications of Velocity

- Planning Agencies:
  - Input to the Congestion Monitoring Process
  - Planning model calibration
  - Origin-Destination studies

- Transit Agencies:
  - Fleet Tracking
  - Next Bus Arrival

- Multi-agency Leveraging – one reader, many uses

- Traffic Engineering / Consultants
  - Travel Time Studies
  - Delay Studies
Travel-time Technology Development

- Utilizes either Bluetooth or Wi-Fi
- Based on experience with AVI, a new read & process method was developed to increase efficiency and accuracy
- Asynchronous I/O – The Velocity Advantage
  - As soon as a MAC address is read it is uniquely sent for processing and time stamped (or stored locally)
- More Data
- More Accurate
Velocity – What is the Difference: Synchronous vs. Asynchronous

**Synchronous: 8-10 second cycle (default process)**

- 00:56:AF:33:21:00 07:15:31
- 22:00:00:DD:14:88 07:15:32
- 12:CD:AC:35:01:76 07:15:33
- 00:56:AF:33:21:00 07:15:35
- AE:42:39:00:01:06 07:15:38
- 07:33:CC:36:00:AE 07:15:40
- 00:56:AF:33:21:00 07:15:40

**Asynchronous (unique to Post Oak)**

- 00:56:AF:33:21:00 07:15:31
- 22:00:00:DD:14:88 07:15:32
- 12:CD:AC:35:01:76 07:15:33
- AF:10:EE:07:21:56 07:15:33
- 00:56:AF:33:21:00 07:15:35
- AE:42:39:00:01:06 07:15:38
- 23:00:00:00:AF:CC 07:15:38
- 07:33:CC:36:00:AE 07:15:40
- 00:56:AF:33:21:00 07:15:40
- CC:42:00:21:12:DD 07:15:40
Summary: Performance Measures with Iteris Data

- Tracking performance has become a requirement
- The need for data is greater than ever!
  - Iteris provides a variety of tools to meet these needs
    - Vantage
    - Vector
    - Abacus
    - Velocity
- The key to success – The right tool for the job