Floating Car Studies Using GPS

- Vehicles equipped with GPS units and PDAs float with traffic
- Data stored every one second.
- Quantitative Measures of Effectiveness – Travel Time, Delay, Average Speed etc
- Applications in Congestion Management (CMS / CMP)
- Before / After Signal Co-ordination, Model Calibration
Examples

Examples
Advantages

- Only one person needed per car
- Mid-block congestion can be identified
- Stops and approximate queue lengths
- High accuracy estimates of MOEs
- Good Automation potential
- Flexible Segmentation
- No fixed infrastructure needed

Jacobs Process In a Nutshell

- Collect Roadway attributes by mapping
- Build a Linear Referencing System
- Collect GPS data
- Process GPS data, QA/QC
- Analyze data
- Identify congestion based on client defined thresholds
- Develop recommendations for mitigations
- Prioritize segments
Linear Referencing System

- Similar to mile markers
- Lines in GIS that are “measure” aware
- All data refer to route locations

LRS Example

2 Lanes with Two Way Left Turn Lane

School Zone
Floating Car Data Collection

- Custom Program for Windows Mobile OS on Dell Axim PDA
- Bluetooth GPS with real-time differential correction
- Stores RouteID, Driver Name apart from Lat/Long etc on each GPS Point
- Compressed XML

PDA Program
Data Management

- Web based data management for upload and download of field data
- No e-mail or FTP transfers
Automated Data Processing and QA/QC

- ArcObjects / ESRI ArcGIS®
- Route matching – Verify and correct driver assigned Route Identifiers
- Measure assignment
- Extraneous data exclusion
- Time Period checks
- Assign Segment Identifiers

Database Processing

- ArcSDE and Microsoft SQL Server®
- Additional QA/QC
- MOEs for all runs on all routes
- Average Speed, Travel Time, Delay etc
- Standard Deviation
- Outliers
- Views
Quality Assurance

Reporting

CAMPO 2008-2009 PM Congestion Index

Legend
PM Congestion Index

75% - 99%
1% - 20%

Jacobs Engineering Group
High Level of Detail

Reporting
Historic Comparison

CAMPO Change in Average PM Speed

Legend
Change in Avg PM Speed 2006 to 2009
Average PM Speed Change
- Decrease more than 10 mph
- Decrease between 2 mph and 10 mph
- No change
- Increase between 2 mph and 10 mph
- Increase more than 10 mph

Questions?