Detector Life-Cycle Costs and Considerations
Mobility Measurement in Urban Transportation Pooled Fund Study
Tool Available at: http://mobility.tamu.edu/resources (under "Data Collection and Management")
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Researchers developed the corresponding spreadsheet tool of typical data collection devices along with estimated life-cycle costs. The objectives of the cost-estimating detector tool are:

1. Provide an overview of the key issues and cost elements one needs to consider for a given detector technology/method, and
2. Provide a range of costs for each detector cost element, as well as overall costs (including Year 1, 5-year life-cycle cost, 10-year life-cycle cost) per mile and for a given segment length.

Development of such a tool includes a number of assumptions, clarifications, and user-inputs. These are highlighted throughout the spreadsheet, and each worksheet of the spreadsheet corresponds to a detector technology/method. The following detector technologies/methods are included in the spreadsheet:

1. Bluetooth® probes
2. Private-sector probe data
3. Toll tags
4. Radar
5. Dual Loops
6. Magnetometers
7. Video

Using user-entered "low" and "high" estimates of each cost element within a detector technology, the spreadsheet estimates a "low" and "high" estimate of the Year 1 costs, 5-year life-cycle cost, and 10-year life-cycle cost. Costs are shown in table and graphic form in the "Summary" tab of the spreadsheet as "per mile" and "for a given segment length." Costs were developed considering a freeway environment.

Researchers built the initial version of the spreadsheet with the vision/intent of the practitioner who ultimately desires a real-time data feed for traveler information. While costs for the actual data integration by a system integrator are not currently included, there is a place for them to be added. This application provided a good starting point for developing the spreadsheet and considering the necessary cost items. The tool can be used for other applications by editing the available inputs.

For any application, users should first consider system design and what they want to ultimately do with the data. This will assist in determining what data are needed and subsequently where/how the data are collected. The system design will also determine ultimate installation and/or licensing costs if provided through a vendor. The detector technologies included in the spreadsheet provide a range of data elements (and a range in quantity of data). For example, dual loops, magnetometers, video and radar provide lane-by-lane data that is vital for operations (e.g., active traffic management, ramp metering), while technologies like Bluetooth®, private-sector data, and toll tags are not disaggregated by lane.

The results of the tool are best used to identify the relative cost of the technologies to one another, given the user-inputs. As an example, users can input different roadway lengths and detector spacings to identify the impact on the estimated costs. In some cases, there is a rather large difference between the final "low" and "high" cost estimates due to the number of assumptions that go into the calculations.