AASHTO Technology Implementation Group

Nomination of Technology Ready for Implementation

**2011 Nominations Due by Friday, September 17, 2010**

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| **Sponsor** | *Nominations must be submitted by an AASHTO member DOT willing to help promote the technology.* | 1. Sponsoring State DOT: California Department of Transportation |
| 2. Name: Asfand Siddiqui |
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| 3. Date Submitted: 09/16/2010 |
| 4. Is the Sponsoring State DOT willing to promote this technology to other states by participating on a Lead States Team supported by the AASHTO Technology Implementation Group? Please check one: [x]  Yes [ ]  No |
| **Technology Description (10 points)** | *The term “technology” may include processes, products, techniques, procedures, and practices.* | 5. Name the technology: Real-time Signalized Intersection Monitoring |
| 6. Please describe the technology: Technology involves a cost-effective solution to retime traffic signals to reduce delay and fuel consumption and improve air quality. The system collects traffic volumes and signal timing information from existing traffic signal equipment at signalized intersection, and computes average vehicular delay on a cycle-by-cycle basis. Well-established procedures as per the Highway Capacity Manual are used to compute average delay, which can be converted to Level of Service. This would allow agencies to determine if existing traffic operations are unacceptable and the traffic signal needs retiming. It also helps determine what times of the day need new signal phasing and timing plans. The technology provides the necessary information for traffic engineers to determine new optimal signal timing and the means to upload the new timing plan on to the traffic signal controller. Most importantly, the technology provides the means to confirm if the new traffic signal timings resulted in any improvement. The cycle-by-cycle delay information can also be used to compute arterial travel times as part of a metropolitan traveler information system. |
| 7. If appropriate, please attach photographs, diagrams, or other images illustrating the appearance or functionality of the technology. (If electronic, please provide a separate file.)Please check one: [x]  Yes, images are attached. [ ]  No images are attached. |
| **State of Development (30 points)** | *Technologies must be successfully deployed in at least one State DOT. The TIG selection process will favor technologies that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.* | 8. Please describe the history of the technology’s development. Earlier in this decade, TrafInfo worked with a few state agencies to use existing loop detectors at signalized intersection for traffic counts. Through this agencies were able to derive additional value from their existing assets by utilizing a traffic signal as a source of continuous traffic counts. Once the process to collect traffic volume information from existing traffic signals was established, the next step that agencies wanted to explore was to also collect traffic signal timing information from the controllers. In 2006, as a pilot study at a major international airport, TrafInfo developed a proto-type of the technology that collected both traffic volumes and signal timing information on a cycle-by-cycle basis from existing traffic signal equipment, and computed average vehicular delay in real-time. |
| 9. For how long and in approximately how many applications has your State DOT used this technology? The technology was recently deployed in late 2009 as part of RITA's SafeTRIP-21 project in a private-public partnership with CalTrans and TrafInfo. The technology was demostrated for the first time at an intersection on El Camino Real in Redwood City in the San Francisco Bay area. |
| 10. What additional development is necessary to enable routine deployment of the technology? The technology is ready for routine deployment at traffic signals with a 2070 controller and inductive-loop based detection system. However, development of some additional features may prove beneficial such as: a) greater flexibility for the user to download the raw data itself (traffic volume and signal timing); b) interface to other types of signal controller in addition to 2070; interface to other types of traffic signal detection systems especially video detection. It would be ideal to develop the technology to make it entirely controller-independent and detection-independent.  |
| 11. Have other organizations used this technology? Please check one: [ ]  Yes [x]  NoIf so, please list organizations and contacts. |
| *Organization* | *Name* | *Phone* | *E-mail* |
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| **Payoff Potential (30 points)** | *Payoff is defined as the combination of broad applicability and significant benefit or advantage over other currently available technologies.* | 12. How does the technology meet customer or stakeholder needs in your State DOT or other organizations that have used it? The technology has the potential to provide CalTrans with a cost-effective method to evaluate current traffic operations at signalized intersection and determine if signal retiming is warranted. Furthermore, the technology provides the means to verify if the new signal timing retime signals, and document the level of delay reduction achieved. |
| 13. What type and scale of benefits has your DOT realized from using this technology? Include cost savings, safety improvements, transportation efficiency or effectiveness, environmental benefits, or any other advantages over other existing technologies. The technology was recently developed as part of RITA's SafeTRIP-21 project as a public-private partnership between Volpe, CalTrans and TrafInfo. The technology has the potential to result in cost-savings to agencies looking for an effective method to assess traffic operations at signalized intersections, retime the signals if necessary, and confirm/document the level of improvement achieved. Signal retiming has been amply demostrated in literature to result in reduction in delay, reduction in fuel consumption and improve air quality. The traffic volume data collected by the technology has other utilities including studying traffic volume trends, general transportation planning and air quality/noise analysis.  |
| 14. Please describe the potential extent of implementation in terms of geography, organization type (including other branches of government and private industry) and size, or other relevant factors. How broadly might the technology be deployed? This technology can be implemented at any traffic signal in the state. The unique aspect of the technology is that depending upon availability of funds, it can be deployed either as a permanent system at a traffic signal, or can be used as a portable system deployed temporarily for a certain period of time at a signalized intersection. |
| **Market Readiness (30 points)** | *The TIG selection process will favor technologies that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.* | 15. What actions would another organization need to take to adopt this technology? The technology was developed using a traffic signal system based upon a 2070 controller using the standard CalTrans software. Another organization would only need to work with the vendor to provide the interface protocols to their specific traffic signal controllers such as 170E or NEMA. The system was developed based upon a inductive loop-based detection system. Another organization may need to work with the vendor to provide the interface protocols to their specific detection system if different from the traditional inductive loop-based detection system. A truly cost-effective action would be for a "pooled" project by several organizations to make the technology controller-independent and detection technology-independent to enable the deployment of this technology at virtually any signalized intersection through the United States irrespective of the controller and detection system used. |
| 16. What is the estimated cost, effort, and length of time required to deploy the technology in another organization?  The level of effort to deploy the technology by another organization would be fairly minimal and would be the effort needed to develop and test the necessary interface to the specific type of traffic signal controller and detection system (other than inductive loop-based) used by the specific organization. The estimated cost for developing the interfaces would be less than $10,000, and would approximately take less than 2-3 weeks. The actual deployment of the technology at a traffic signal is fairly simple, taking about 1-2 hours per intersection. The equipment cost would roughly be $1500. Some additional equipment cost may be involved to make the existing detection system "count-capable".  |
| 17. What resources—such as technical specifications, training materials, and user guides—are already available to assist deployment? Technical specifications, and instruction manuals are available to deployment.  |
| 18. What organizations currently supply and provide technical support for the technology? This technology was recently deployed as part of the SafeTRIP-21 as a demostration project through a private-public partnership with RITA, CalTrans and TrafInfo (the technology vendor). At this time, technical support is provided by the vendor. With greater deployment, potentially other organizations would be available for technical support of this technology. |
| 19. Please describe any legal, environmental, social, intellectual property, or other barriers that might affect ease of implementation. There are no barriers that need to be overcome for deploying this technology. |
| ***Submit Completed form to*** | [***http://transportation1.org/tig\_solicitation/Submit.aspx***](http://transportation1.org/tig_solicitation/Submit.aspx) |