



System Performance Innovation FACT Sheet

Off-Pavement Detection that detects & distinguishes between bikes and cars/trucks

Description of the Challenge or Opportunity:

Off-Pavement Detection that detects & distinguishes between bikes and cars/trucks

Understanding the motivation.

- *Describe the pre-existing product/process that is the subject of the innovation:*
Currently Caltrans uses inductive loop detectors for vehicle detection almost exclusively; these cannot distinguish between bikes and cars. Caltrans policy (TOPD 09-06) requires additional bike green time regardless of whether a bike is present, in order to comply with the California Vehicle Code 21450.5 and the California MUTCD Section 4D.105(CA) and Table 4D-109 (CA).
- *Describe the innovation.*
Using an off-pavement radar technology (MS Sedco Intersector) that can distinguish between bikes and cars (or trucks) would allow us to give the additional bike green time when a bike is detected.
- *Was the innovation successful in improving the pre-existing product/process?*
The first phase of our testing (in Chico, District 3) showed promising accuracy between 95-98%. The radar detector data was recorded, alongside the loop detector data, and was compared and analyzed using VideoSync (software developed by DRISI), along with recorded video. The second phase will be an actual pilot project that operates a signalized intersection using these radar detectors.
- *Criteria for success?*
A high level of accuracy (95-98%) in detecting bicycles that are waiting during a red phase. Successful operation of a signalized intersection using the radar detectors (instead of in-pavement loop detectors).

Information Regarding the Innovation

Defining the need.

- *How does innovation support the Department's mission, vision, and goals?*

Mission: Providing additional bike green time only when bikes are detected enhances an efficient transportation system.

Vision: An organization that values its people would leverage off of technology that would decrease the need for sending staff to the field, and thereby decrease risk. Meeting new challenges with innovation would include the use of accurate off-pavement vehicle detection.



System Performance Innovation FACT Sheet

Goals:

Safety - Provide the safest transportation system for workers and users.

Objectives:

1. *Reduce employee injury rates* – capability of remote monitoring and diagnostics of detector operation will reduce the need for field visits.
2. *Increase mode share for transit and active transportation* - responsive to bicyclists' needs.
3. *Reduce transportation system emissions* – efficient arterial traffic results can result in fewer vehicle stops and promote bicycle trips.

Stewardship/Sustainability – Responsibly manage California's transportation-related assets, funding and environmental resources: Preservation of pavement integrity by eliminating loop cutting; Reduced lane closure during installation and detector maintenance. The cost of radar detection is significantly less than the cost of loop detectors; the cost of maintenance is also substantially less.

System Performance – Enhance the performance of the transportation system.

Objective: *Reduce travel times and delay for all modes through Intelligent Transportation Systems (ITS), operational strategies, demand management and land use/transportation integration* – by avoiding unneeded additional green time at signalized intersections.

- *How does the innovation improve safety and system performance?*
- *Did the innovation have widespread interest in the originating district?*
Although this off-pavement radar detector is still under evaluation, there is a high level of interest in the districts. After the second phase is successfully completed in West Sacramento, the units will be installed at a Caltrans signalized intersection.
- *Was there immediate acceptance of the innovation?* See above.
- *To what extent is the innovation being used in the originating district?* See above.
- *Have you been approached by other districts interested in implementing the candidate innovation?* Yes.
- *If the implementation of this innovation been attempted in another district, what was the outcome?* Not yet.
- *How broad is the interest?*
 - *Regions? Other states?*
The MS Sedco Intersector has already been installed in hundreds of locations throughout the state of California and throughout the country.



System Performance Innovation FACT Sheet

- *Is the implementation scalable? Yes.*

Estimating the cost.

- *Cost to implement the innovation in originating district?*
For an intersection with four approaches, each with 2 through-lanes, a left-turn lane and a bike lane, the cost for the MS Sedco Intersector is approximately \$20,000.
 - *All aspects including staff time.*
 - *Offsetting factors?*
- *Estimated lifecycle/maintenance costs?* The manufacturer's Meantime-between-failure (MRBF) is 10 years, or 87,600 hours.
- *Were you able to identified supporting resources?*
 - *Local partners?* City of West Sacramento
 - *Federal funding?* none
- *How long did it take to implement the innovation in your district?* Still under pilot project testing.

Quantifying the benefits.

- *Estimated annualized benefits to the originating district?* N/A

Understanding the risks.

- *Barriers to implementation of the innovation?*
Currently, the procurement would require a sole-source approval.
- *Risks associated with implementation?*
There would be a need for training for operations and maintenance staff for optimal use of the MS Sedco Intersector radar detectors.

What lessons were learned?

- *Lesson learned – What would you do differently?*
It will be very important for verification of proper installation and calibration of the units. Caltrans' VideoSync software would be extremely helpful to verify optimal operation (bike/car discrimination).
- *Do you believe that the innovation is best propagated to other districts by staff or contractor?*



System Performance Innovation FACT Sheet

Other considerations.

- *Are there any similar processes or products that you considered, but determined to be inappropriate?*
Yes there is another product but it is inappropriate; it is important that the number of detector channels needed be no more than those needed for loop detectors.
- Did the innovation follow a System Engineering process? No

About the Originating Author/Team

- *Describe the author and/or the team.*
HQ Traffic Ops: Martha Styer, Kai Leung,
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