

IntelliDriveSM Pooled Fund Study

Program to Support the Development and Deployment of Infrastructure IntelliDriveSM Applications

University of Virginia Center for Transportation Studies

Progress Report
August 2010

Project Activities/Progress

Project Management

1. *IntelliDrive website restructured*

- As more deliverables and reports are becoming available, the pooled fund study management team has restructured the IntelliDrive website (<http://cts.virginia.edu/IntelliDrive.html>). Now this site consists of three pages:
 - Main:
 - Contains PFS overview, News and Updates and the links to other two pages described below.
 - Year 1 Research Program:
 - Provides details of three Year 1 projects.
 - The schedules for deliverables – current and future – have been added here so that people can download the current deliverables and also know when future deliverables will become available.
 - Reports and Presentations:
 - Provides other reports/presentations categorized in three sections: meetings, quarterly reports for FHWA and monthly reports for VDOT.

2. *Deliverable from the year 1 projects received and distributed*

- The University of Virginia Center for Transportation Studies has submitted a report for Task2: Development of New Traffic Signal Algorithms. This deliverable was review by the pooled fund study management team and sent out to the pooled fund study members for feedback.

3. *Participated in related conference calls*

- Conference call on the MOU between PFS and US DOT on Dynamic Mobility Applications (DMA) funding guidelines on Tuesday, August 17 1:00-2:00PM EDT
- Conference call of AASHTO and FHWA on the V2I Safety Applications of US DOT on Monday, August 30th 11:00-12:00PM EDT.

IntelliDriveSM Traffic Signal Algorithms

4. *Task 2 and 3 Reports*

- The project team completed the Task 2 report on IntelliDrive algorithms, and continued work on the Task 3 report on signalized intersection performance measures with IntelliDrive.

5. *Algorithm coding in VISSIM network*

- The rolling horizon algorithm continued to be ported to a four-signal corridor based on a section of Route 50 in Chantilly, VA.
- The project team completed coding of the vehicle clustering algorithm (formerly the network optimization and platoon-based algorithms). The algorithm performed well against an optimized fixed time strategy. The algorithm is being refined to improve signal coordination and number of stops, which were higher than expected in preliminary simulations.

6. *Preliminary Results*

- For the oversaturation situation, the ECG algorithm and LSG+SSC algorithm were tested in detail, for 4 levels of market penetrations less than 100% (20%, 40%, 60% and 80%), and with three approaches to account for the lower market penetration levels:
 - Naïve approach: Assuming that the last IntelliDriveSM-equipped vehicle marked the end of the queue.
 - Surrogate Queue: Using a known IntelliDriveSM market penetration level, the number of vehicles in the queue was estimated, beyond the last IntelliDriveSM-equipped vehicle in the queue.
 - Surrogate Queue with Estimate Market Penetration: In this approach, the number of vehicles in the queue was estimated, as in the above approach. However, the actual market penetration was estimated based on the number of IntelliDriveSM-equipped vehicles in the standing queue.
- All the above three approaches produced comparable results. The benefits linearly increased with the market penetration levels.
- The IntelliDriveSM data may be subject to some errors. In these algorithms, the location and the speed of the vehicles are the data elements of value. The location error, up to 2 car lengths (5ft, 10ft, 20ft, 30ft, 40ft), and speed errors up to 40% (5%, 10%, 20%, 30%, 40%) were independently and randomly introduced for each vehicle, in the ECG algorithm. The deterioration of benefits were negligible even at 40ft. location error, or 40% speed error, illustrating the robustness of the algorithm.

Further experiments are currently planned for evaluating the effects of both the location and speed errors together. That will conclude the experiments. The next step

is to explore and identify the challenges of full scale deployment for the oversaturation algorithms.

7. *SAE J2735 Standard Review*

- The project team continues to track development of the SAE J2735 standard, the primary standard governing IntelliDrive Message Set Dictionary.

Project Status

The project is on schedule. A pooled fund study meeting will be held on September 23rd in Irvine, California. Tentative items for this meeting are 1) updates on the Year1 projects, 2) Year2 project selection and 3) MOU discussions with US DOT. Further algorithm development, refinement, coding, and simulation continue in September.

Invoice Notes

None