

QUARTERLY PROGRESS REPORT

Fiscal Year 2015/2016 , Quarter 2nd

Caltrans Task Manager: John Slonaker Task ID/Project ID (for Caltrans use only): 2808

Task Order No.: TO 023 Contract No.: 65A0529

1. Task Title: Performance Analysis and Control Design for Onramp Metering of Merging Bottlenecks
2. Describe last quarter's tasks/deliverables:

During the second quarter of 2015-16 from October to December, we have focused on the third task, which to analyze and design on-ramp metering algorithm. The results have been included in two conference papers.

In "System Performance and Controller Design of the PI-ALINEA Ramp Metering Scheme", which was presented in the Transportation Research Board Annual Meeting in January, 2016, we theoretically derived the range of demand levels when a ramp metering algorithm can effectively eliminate capacity drop and found the range of coefficients for a stable Proportional-Integral (PI-ALINEA) controller.

In "Paradoxical behavior of traffic control systems", which will be presented in CICTP 2016, we demonstrated that myopic control can lead to worse system performance and identified the conditions for such a phenomenon to occur.

Both studies provide us useful insights for where to install ramp meters and what parameters we want to choose.

3. Describe next quarter's tasks/deliverables and their due dates:

Next quarter we will focus on Task 3, Simulation Studies. For this task, we will set up microscopic simulations with Paramics and then verify the analytical results in the first paper with simulations.

The specific tasks are:

1. For a specific site, verify the existence of capacity drop with PeMS data;
2. Use the observed data, set up microscopic simulations with Paramics;
3. Verify the range of demand levels when ramp metering is effective;
4. Verify the stability of the control system.

The results will be included in a report.

4. Describe Project Status:

- Are you on time with your schedule?
 - YES
 - NO

- Are you on budget?
 YES
 NO

- Are you on scope?
 YES
 NO

If the answer to any of the above is NO, please explain below:

5. Estimated percent of work completed: 75 %
 Estimated percent of budget expended: 75 %

6. What are your expenditure projections for the next four quarters or until the project's end?

FY 15/16; Q1	FY 15/16; Q2	FY 15/16; Q3	FY 15/16; Q4
\$	\$	\$	\$

Use this area for any additional information. Clearly identify which Section this information applies to.

N/A

Submitted By: Wenlong Jin

Date: 2/10/2016