

# **Measuring the Effects of Traffic Congestion On Transit Signal Priority Call Distances**

Matt Dorado  
Erin Qureshi  
River Hwang  
Peter Koonce  
Robert L. Bertini

Department of Civil & Environmental Engineering  
Portland State University  
P.O. Box 751  
Portland, Oregon 97207-0751  
Phone: 503-725-4249  
Fax: 503-725-5950  
Email: bertini@pdx.edu

## **ABSTRACT**

The city of Portland, Oregon has deployed Transit Signal Priority (TSP) at more than 300 intersections, in cooperation with TriMet, the regional transit operator. TSP is used on particular routes and only within the city limits. Benefiting from TriMet's "smart" buses, using global positioning systems (GPS), each vehicle "knows" whether it is on route and on schedule. Therefore, using the on-board technology, TSP is only activated when it is needed—when a bus is late. For each intersection there is a predetermined distance at which the TSP call is made. While this distance is particular to each intersection it does not vary throughout the day in coordination with traffic flow patterns. Of the numerous factors that contribute to varying dwell times, one of the most important is the magnitude of traffic congestion on the road being traveled. The purpose of this paper is to describe the relationship between the effective call distance and the traffic congestion on the bus route. It is believed that by coordinating the call distance with the amount of roadway congestion will improve transit performance as well as a decrease the proportion of TSP calls that are not fully utilized. The analysis uses varying approach volume to capacity (v/c) ratios while measuring bus delay. Using a hardware-in-the-loop simulation system for evaluating TSP in Portland, this research has been performed by modeling intersections using VISSIM traffic modeling software and varying the call distances over various v/c ratios.