



6th International Symposium on Highway Capacity and Quality of Service
Stockholm, Sweden June 28 – July 1, 2011

Arterial Performance Evaluation on an Adaptive Traffic Signal Control System

Zong Tian^a, Fred Ohene^b, Peifeng Hu^c 1*

^{b,c}*Department of Civil & Environmental Engineering
University of Nevada, Reno
Reno, NV 89557*

^b*Regional Transportation Commission of Southern Nevada
600 S. Grand Central Pkwy. Ste. 350
Las Vegas, NV 89106, U.S.A.*

Abstract

This paper documents the evaluation of Sydney Coordinated Adaptive Traffic System (SCATS) at a major signalized arterial in Las Vegas. The evaluation was based on various performance measures, including primarily travel times and stops at selected routes along the arterial. Extensive travel time runs were conducted during the weekday and weekend peak periods. Arterial performance was compared between SCATS and conventional time-of-day (TOD) coordination plans. Based on the data and analysis results, a general conclusion was reached that no significant improvement on arterial progression was achieved with SCATS under normal traffic conditions. However, this conclusion was made based on a major limitation of using video detection in the field, which may have significantly limited SCATS from achieving its best performance.

© 2011 Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Keywords: SCATS, Arterial Performance, Adaptive Traffic Signal Control, Coordination, Travel Time

1. Introduction

The performance of signalized arterials is generally assessed under coordinated signal control and operations. Conventional coordination is generally achieved by implementing a set of time-of-day (TOD) coordination plans. A TOD plan is characterized as a fixed-cycle plan often obtained through minimizing total delay or maximizing arterial bandwidth based on given traffic volume and other variables. Several predetermined timing parameters (cycle lengths, offsets, and splits) are imbedded in the signal controllers and the plans run according to a time base regardless of traffic demand variance. In recent years, adaptive traffic signal control systems have emerged as an alternative to signal coordination. Unlike TOD coordination, adaptive traffic signal control systems can rapidly

* Corresponding author. Tel.: +1-702-676-1725; fax: +1-702-676-1713.
E-mail address: ohenef@rtcsonv.com.

respond to traffic flow changes through active vehicle detection and communication (Gordon and Tighe, 2005; Abdel-Rahim, 1998).

Aimed at identifying advanced signal control systems to reduce urban traffic congestion, the Regional Transportation Commission of Southern Nevada (RTC SN) initiated a pilot program to implement and evaluate Sydney Coordinated Adaptive Traffic System (SCATS) in Las Vegas, NV, U.S.A. This study documents a before-after study regarding the system's performance. The study site was a section of Boulder Highway, which is one of the major arterials in the area. SCATS was implemented at ten signalized intersections as shown in Figure 1. Two intersections (E. Flamingo Rd./S. Nellis Blvd., and E. Flamingo Rd./Perry St.) were not on the main arterial, but were included in SCATS because of the critical triangle area formed by these two intersections. The arterial segment was approximately 3.5 miles (5.6 kilometers) involving eight signalized intersections. The speed limit was 45 mph (72.4 km/hr) in both directions. Protected left-turn controls are used at all the intersection approaches on Boulder Highway. Two intersections have geometric constraints (Boulder Highway/Flamingo and Boulder Highway/Desert Inn) where simultaneous dual left-turn movements are prohibited and a lead/lag phasing sequence must be used. The vehicle detection system was the Vantage video detection system by Iteris Inc.

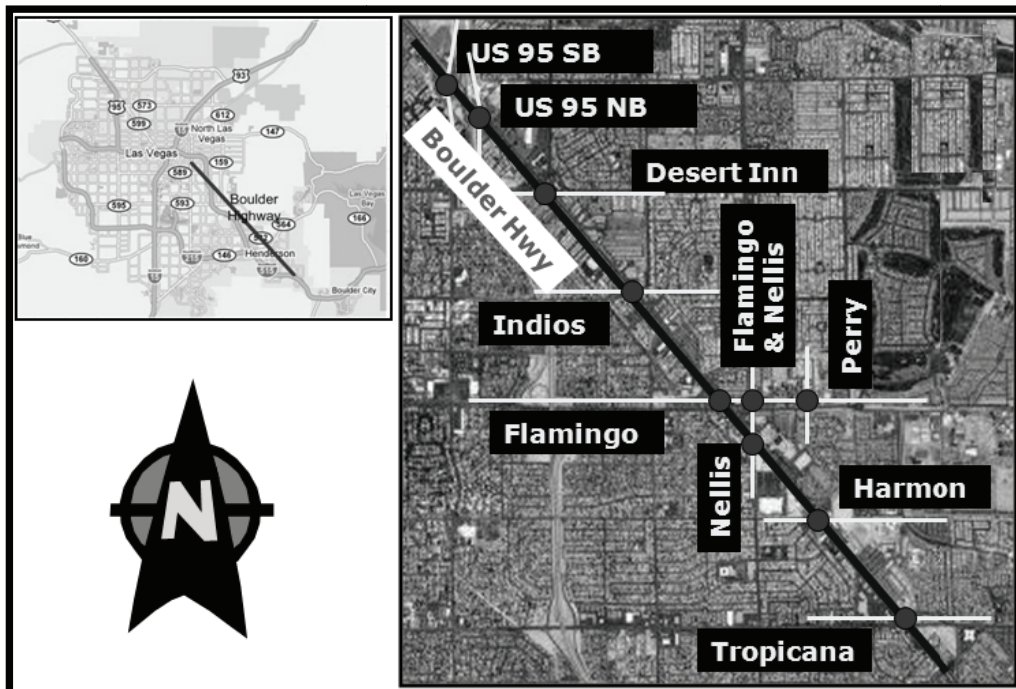


Figure 1 Site Location Map

Download English Version:

<https://daneshyari.com/en/article/1124156>

Download Persian Version:

<https://daneshyari.com/article/1124156>

[Daneshyari.com](https://daneshyari.com)