



Developing Decision Support Tools for Florida's Traffic Management Centers

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Research by the Florida Department of Transportation (DOT) has produced a data analytics tool that combines archived intelligent transportation systems (ITS) data collected at the state's regional transportation management centers (TMCs) with data from other sources to inform transportation planning and operation decisions. With traffic analysis, simulation modeling, data fusion and mining, and optimization, the accumulated data can support performance measurement, planning, operations, and management.

Problem

Florida DOT has implemented SunGuide, an advanced traffic management software system that collects information on the traffic conditions of limited-access roadways in urban areas. SunGuide allows Florida's TMCs to monitor and control roadside equipment and incident management vehicles. Each TMC collects and archives a wealth of local data on traffic and event conditions. Tools and methods are needed, however, to exploit the vast amounts of data collected by SunGuide.

Solution

Florida DOT staff have worked with researchers at Florida International University on several projects to develop software tools to help transportation practitioners analyze ITS data more effectively. These developments have been incorporated into an integrated web-based tool called ITS Data Capture and



PHOTO: DOUG KERR, FLICKR

Interstate 4 in Florida. SunGuide, a data analytics tool developed by the Florida Department of Transportation, has improved transportation operations and planning.

Performance Management, or ITSDCAP. Tool functions include the following:

- ◆ Fusion of SunGuide and other data, including point detector and vehicle identification reader data, incident databases, and private-sector data, along with Florida DOT's work zone database, Crash Analysis Reporting System data, planning data, 511 calls, website hits, weather data, ramp metering data, and dynamic toll pricing data for managed lanes;
- ◆ Provision of data for developing and calibrating traffic models;
- ◆ Decision support for traffic management center operations, including the prediction of incident impacts, calculation of the probability of breakdowns, and assistance in construction management, with several modules to be added;
- ◆ Estimates of measures for mobility, reliability, safety, and environmental performance; and
- ◆ Support for benefit-cost assessments of advanced strategies.

Application

Researchers demonstrated the new software tools for a segment of the Interstate 4 corridor in Orlando, Florida. Some of the uses of the tools were to

- ◆ Visualize the recurrent, day-to-day locations of

TABLE 1 Incident Duration, Maximum Queue Length, and Secondary Incident Probability for One-Lane Blockage Incidents

Direction	Time Period	Incident Duration (minutes)	Data-Based Analysis		Queuing Analysis	
			Maximum Queue Length (miles)	Secondary Incident Probability (%)	Maximum Queue Length (miles)	Secondary Incident Probability (%)
Eastbound	a.m.	16.92	1.7	7.02	1.29	6.55
		7.52	1.15	4.4	0.11	3.68
	Midday	37.7	2.45~4.5	4.59~13.61	0.64~3.29	3.37~11.1
Westbound	a.m.	12.62	2.25	4.29	0.56	3.22
	Midday	2.03	1.7	1.7	0.13	1.3
		30.23	0~2.7	2.36~7.95	0.06~0.55	1.94~5.92
	p.m.	7.58	1.7	2.42	0.47	1.96

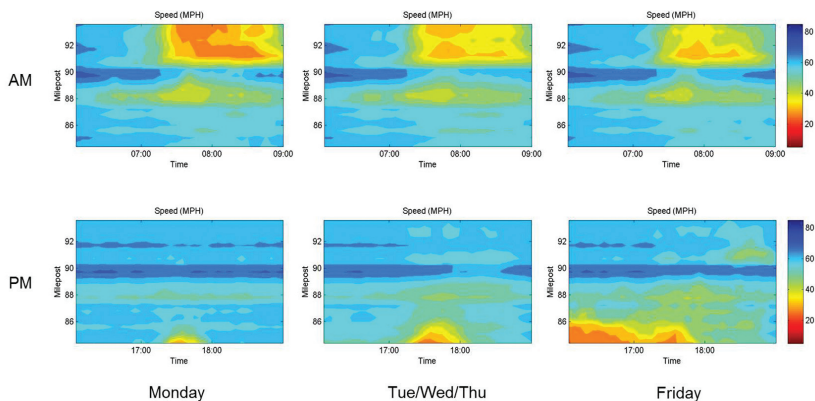


FIGURE 1 Average speed under normal traffic conditions, I-4 Westbound.

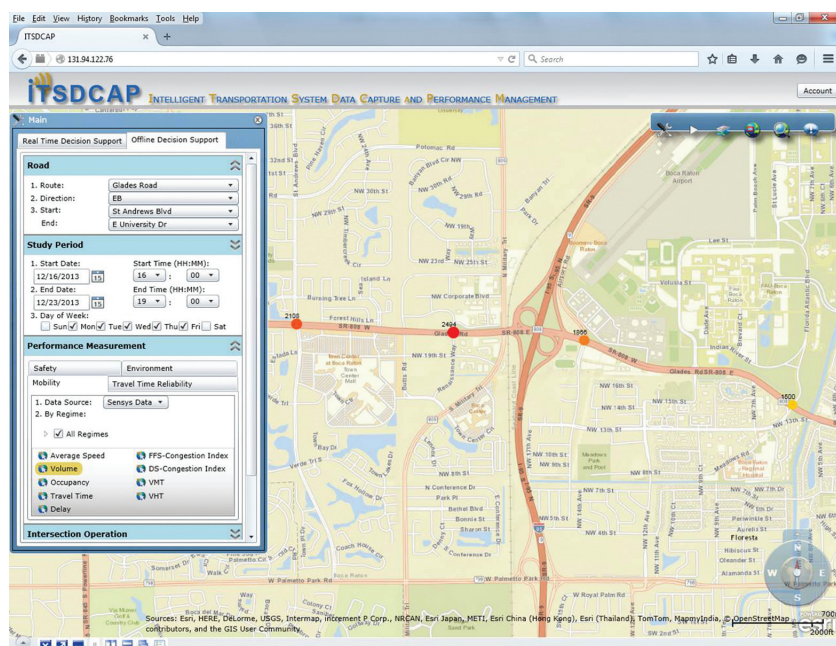
bottlenecks and the effects on mobility, as shown in Figure 1 (above)—the color indicates the speed of the traffic; and

- ◆ Estimate the effects of incidents on queue lengths and on secondary crashes (Table 1, page 47)—that is, crashes that probably would not have occurred without the first crash.

Researchers have converted the tools produced in these projects to web-based applications (Figure 2, below). The tools also constituted a platform for a pilot project under the second Strategic Highway Research Program¹ and for other Florida DOT research projects. Florida DOT District 4, in Broward County, is using the tool, and District 6, in Miami-Dade County, will soon follow. Other agencies also have expressed interest in deployment.

¹ SHRP 2 Project L38C, Pilot Testing of SHRP 2 Reliability Analytical Products: Miami-Dade Pilot Site. <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3457>.

FIGURE 2 ITS Data Capture and Performance management interface.



Benefits

The tools developed in these research projects can support decision making by transportation planning and operations agencies. For example,

- ◆ Monitoring the performance of the system;
- ◆ Determining the safety, operational, and environmental effects from bottleneck improvements;
- ◆ Determining the effectiveness of advanced strategies and providing decision support; and
- ◆ Analyzing active traffic and demand management strategies.

These improved capabilities potentially will help Florida DOT and local agencies make the best decisions with limited resources to improve safety and operations on the system.

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Resources

- Hadi, M., C. Zhan, and P. Alvarez. *Traffic Management Simulation Development*. Final Report BDK80 977-03, prepared by Florida International University, Florida Department of Transportation, Tallahassee, January 2011.
- Hadi, M., C. Zhan, Y. Xiao, and H. Qiang. *Decision Support Tools to Support the Operations of Traffic Management Centers (TMC)*. Final Report BDK80 977-02, prepared by Florida International University, Florida Department of Transportation, Tallahassee, January 2011.
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Suggestions for Research Pays Off topics are welcome. Contact G. P. Jayaprakash, Transportation Research Board, Keck 488, 500 Fifth Street, NW, Washington, DC 20001 (202-334-2956; gjayaprakash@nas.edu).