

Indiana Department of Transportation

INDOT TRAFFIC SIGNAL PROGRAM OVERVIEW



TRAFFIC SIGNAL SYSTEMS CAPABILITY MATURITY SELF ASSESSMENT

	Level 1 Ad-Hoc, High Risk	Level 2 Established, Risk Acknowledged	Level 3 Measured, Managed Risk	Level 4 Managed, Low Risk
Business Processes				✓
Systems and Technology				✓
Performance Measurement				✓
Organization and Workforce				✓
Culture				✓
Collaboration				✓

Traffic Signal Systems Capability Maturity Self-Evaluation Tool: <https://ops.fhwa.dot.gov/tsmoframeworktool/tool/tssc/>

ATSPM CAPABILITY

The Indiana Department of Transportation (INDOT) pioneered development of an automated traffic signal performance measures (ATSPM) system as well as the application of ATSPM in real-world decision-making. INDOT piloted ATSPMs in 2003 and, by 2008, had implemented systemwide performance metrics supported by high-resolution data. INDOT led the Transportation Pooled Fund Program's Traffic Signal Systems and Operations and Management TPF-5(258) from 2013 to 2017. The study developed best practices for implementation of ATSPM systems and usage of the data collected. INDOT's ATSPM system is successfully used to evaluate signal retiming efforts, manage unplanned detour routes and diversions, and monitor programmatic performance measures. INDOT's ATSPM detection system includes:

- Stop bar detectors on minor movements
- Dilemma zone and other detection five seconds prior to stop bar
- In-pavement detection technologies
- "Lane-by-lane" detection
- Product approvals based on performance-based testing
- Emergency vehicle preemption
- Railroad preemption



Photo Credit: INDOT

"Our partnerships with the state and local agencies that were part of FHWA Transportation Pooled Fund Study TPF-5(258) were instrumental in developing consensus definitions that the industry could focus on to provide the required data collection capabilities."

Jim Sturdevant, PE
Director of Traffic Management
INDOT



INDOT AND PURDUE UNIVERSITY PARTNERSHIP

INDOT and Purdue University have formed a longstanding partnership that has greatly benefited ATSPM. The partnership was established in 1998 to advance INDOT and Purdue University's common goal of guiding infrastructure development and procedures to systematically monitor performance and prioritize investments that provide the greatest benefit to mobility.

1998	INDOT and Purdue University partner on signal cabinets
2001	Study of video detection
2003	Performance measurement test facility
2005	Intersection subsystem metrics developed
2008	High-resolution data logging
2009	NCHRP 3-79a and signal performance metrics
2014	Published widely accepted <i>Performance Measures for Traffic Signal Systems: An Outcome-Oriented Approach</i>
2015	Published <i>Integrating Traffic Signal Performance Measures into Agency Business Processes</i>

INDOT and Purdue University led research that serves as the basis for present day ATSPM programs across the country. In *Performance Measures for Traffic Signal Systems: An Outcome-Oriented Approach*, the INDOT and Purdue University research team established a methodology for performance evaluation of traffic signal systems using high-resolution controller event data. INDOT and Purdue University share insights regarding the collection and management of signal event data and the infrastructure needed to support ATSPM systems. Performance measures encompass system maintenance, asset management, multimodal signal operations, and assessing the impact of signal retiming activities.

INDOT and Purdue University's *Integrating Traffic Signal Performance Measures into Agency Business Processes* outlines requirements for implementing data collection and processing into ATSPM programs. This publication uses example performance measures for communication and detector system health, capacity allocation, safety, pedestrian performance, preemption, advanced control analysis, and quality of progression.



ADDITIONAL RESOURCES

- To learn more, visit <https://www.in.gov/indot/3252.htm>
- More information on Automated Traffic Signal Performance Measures is available on the Every Day Counts website at https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/atspm.cfm

For additional information please contact:

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Every Day Counts (EDC), a State-based initiative of FHWA's Center for Accelerating Innovation, works with State, local, and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery.



U.S. Department of Transportation
Federal Highway Administration

INTEGRATING TRAFFIC SIGNAL PERFORMANCE MEASURES INTO AGENCY BUSINESS PROCESSES



Christopher M. Day, Darcy M. Bullock, Howell Li, Steven M. Lavrenz,
W. Benjamin Smith, James R. Sturdevant



Source: *Integrating Traffic Signal Performance Measures into Agency Business Processes* (2015, Purdue University)

PERFORMANCE MEASURES FOR TRAFFIC SIGNAL SYSTEMS

An Outcome-Oriented Approach



Christopher M. Day, Darcy M. Bullock, Howell Li, Stephen M. Remias, Alexander M. Hainen,
Richard S. Freije, Amanda L. Stevens, James R. Sturdevant, and Thomas M. Brennan



Source: *Performance Measures for Traffic Signal Systems: An Outcome-Oriented Approach* (2014, Purdue University)