ARDOT TRC TRANSPORTATION RESEARCH COMMITTEE

**PROBLEM STATEMENT**
**No.** 34

## RESEARCH PROBLEM STATEMENT

| **DATE:** 09/02/2019 | **PROJECT AREA:** Planning |
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**TITLE:** Identifying and Measuring Causes of Nonrecurrent Congestion Using Big Data

**PROBLEM STATEMENT:**

Non-recurring congestion is caused by unexpected disruptions (weather, accidents, special events, and work zones), accounts for more delay than recurring congestion, and has greater affects on smaller population regions. Identifying causes of non-recurring congestion in AR and developing appropriate performance measures (PMs) to assess such causes will help ARDOT better identify and scope congestion management projects. Traditional PMs don't capture hourly and daily variations from non-recurring events. Thus, we need to investigate the degree to which non-recurring congestion affects travel time reliability, a PM that aligns with travelers' perceptions of roadway performance. By focusing on causes and related PMs of non-recurring congestion we can transition to Transportation System Management and Operations (TSM&O) solutions which are less expensive and easier to implement than traditional capacity expansions. And with increasing access to big data it is now possible to accomplish this. The purpose of this project is to identify, measure, and analyze the causes of non-recurring traffic congestion on AR highways using available big data (GPS, NPMRDS, iDriveArkansas, eCrash, etc.).

**OBJECTIVES:**

The objectives of this project are to: (A) identify the causes of non-recurring traffic congestion on Arkansas highways, (B) generate Performance Measures (PMs) and other quantitative measures of congestion causes, and (C) develop a tool to replicate the analysis as new data becomes available. Proposed tasks include: (1) identification, description, and cost assessment of available data sources, (2) determination of non-recurring congestion causes using mathematical modeling, (3) development of methods to calculate PMs from available data, and (4) creation of a software and mapping tool that will allow for new data sources to be incorporated into non-recurring congestion PMs.

**FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:**

For implementation, this work will produce a software and mapping tool to analyze and visualize the causes and patterns of non-recurring congestion on Arkansas highways. The tool will be adaptable as new sources of data become available. Examples of big data include: GPS data, NPMRDS, AR Construction and Travel Info. System (ACTIS). As budgetary constraints limit capacity expansion as a form of congestion management, this project will help ARDOT generate TSM&O strategies like travel weather management, traveler information systems, and work zone management programs. TSM&O solutions are often more effective, lower cost, and easier to implement than traditional capacity expansion projects.

**Estimated Project Duration:** 18 **Months**

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| Standing Subcommittee Ranking | Advisory Council Ranking | Statement Combined with Statement Number(s) |
|---|---|---|
| 4/7 | N/A | |