

# 2019 UDOT RESEARCH PROBLEM STATEMENT

\*\*\* Problem statement deadline is Feb. 6, 2019. Submit statements to [UTRAC@utah.gov](mailto:UTRAC@utah.gov). \*\*\*

**Title:** Analysis of Performance Measures of UDOT's Traffic Incident Management Program: Phase II      **No. (Office Use):** 19.03.05

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Select **ONE** Subject Area     Materials/Pavements     Maintenance     Traffic Mgmt/Safety     Structures/Geotech  
 Planning     Perf Mgmt/Data Analytics     Public Transportation     Other

## 1. Describe the problem to be addressed:

All of the data collection and analysis of the study on “Analysis of Performance Measures of UDOT's Traffic Incident Management Program” have been completed and the preparation of the final report for the project is currently underway. This study (Phase I) found that UDOT and the Utah Highway Patrol (UHP) have the data necessary to conduct a study to evaluate incident management performance measures, with the exception of one data point related to incident management activities, the time when all lanes become open again (T5) and capacity is restored. The UHP maintains the Computer Aided Dispatch (CAD) that contains activities of both UHP officers and UDOT's Incident Management Team (IMT) units at crash sites. UDOT maintains two traffic related datasets including the Performance Measurement System (PeMS) which collects data from sensors and iPeMS which collects data from probe vehicles, both of which help the analyst to estimate the time of incident occurrence and the time of complete incident clearance. UDOT's Traffic Operation Center (TOC) maintains Transuite data that can be used for the analysis, but during the study, it was found that extracting the time of capacity recovery from Transuite was difficult. Instead, to accomplish the objective of the study, UHP officers were requested to collect T5 data from March to August 2018 manually as they assisted crash victims and IMT units in clearing congestion. This additional time data made the completion of the study possible. Using the data collected in the 6-month period, incident management performance measures were analyzed and extra user costs due to crashes were estimated under the current IMT program. It was found that decreasing even a few minutes in response time and roadway clearance time will result in a substantial decrease in user costs and the saving in user costs will make the IMT program a worthwhile investment.

While the Phase I study was underway, the Utah Legislature approved funding to expand the operation of its IMT program. The new funding allows UDOT to increase the number of IMT units, both personnel and equipment, by 13 units. The phase I study showed that reduction in response time will help UDOT reduce the delay due to crashes, thus extra user costs due to crashes. It is anticipated that the expanded IMT program will begin operation in April or May 2019 providing an opportunity to validate the outcome of the Phase I study using field data. By the time this proposed Phase II study will collect a new set of performance data (expected to be done in summer from May to August 2020), the new expanded IMT program will have been well established and ideal for field data collection. This proposed Phase II study will help UDOT evaluate the accountability of the expansion to the IMT program.

## 2. Write the project objective (25 words or less):

Evaluate the improvements in performance measures attributed to the expanded IMT program, both in personnel and equipment, made possible by the new funding.

## 3. Explain why this research is important:

(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

Non-recurring congestion accounts for a large portion of congestion taking place on interstate highways in the Wasatch Front. The current study on this topic has been completed and it concluded a potentially significant reduction in extra user costs caused by congestion due to crashes could be achieved by reducing some of the incident performance measures, including response time, roadway clearance time, and incident clearance time. The expanded IMT program, both in personnel and equipment, is expected to help the IMT units reduce values of these performance measures. With the expanded program expected to operate beginning in April or May 2019, the proposed Phase II study will be able to collect data in summer 2020 after the expanded IMT program has been established and quantify how much improvement could be achieved by the added IMTs. The outcome of this proposed study will help UDOT to assess its investment under one of the UDOT's Strategic Goals: Optimize Mobility, which states “UDOT

optimizes traffic mobility by adding roadway capacity and incorporating innovative design and traffic management.” Estimating user cost savings by the expanded IMT program is a way to evaluate the program’s accountability in meeting this strategic goal.

**4. List the major tasks:**

1. Kickoff meeting to determine the scope of the study
2. Conduct a literature review and investigate new developments that have taken place or are currently taking place since the Phase I study on this topic has been completed and review how other states are collecting incident management data and using such data for evaluating the outcome of their incident management programs
3. Reanalyze the data collected in Phase I of this study by adding lane closure data that can be extracted from the Transuite dataset managed by UDOT’s TOC and evaluate how lane-closure information can improve the outcome of performance analysis
4. Collect a new set of incident management performance data with the expanded IMT program with data from UHP officers for T5 data (time when all lanes become available for traffic flow) in the field and from lane closure data provided by Transuite
5. Analyze the new data for performance measures for IMT and UHP units
6. Analyze the new data for estimating user cost savings attributed to the expanded IMT program
7. Compare performance measures with the current IMT program and the expanded IMT program to determine the level of improvement achieved by the expanded IMT program
8. Write a final report and technical papers
9. Manage project

**5. List the expected deliverables (reports, manual, specification, design method, training, etc.):**

1. Results of the analyses of incident management performance measures (response time, roadway clearance time and incident clearance time) of the expanded IMT program
2. Impact of the expanded IMT program on reduction of extra user costs caused by crashes
3. Benefit-cost ratio of the investment for expanding the IMT program

**6. Describe how the research results will be implemented:**

**(In response, consider addressing UDOT leader support, process or standard improvement, etc.)**

1. UDOT will have a framework for collecting necessary data for evaluating the performance of the IMT program when a new study on this topic is necessary, using the CAD, PeMS, iPeMS and Transuite databases
2. UDOT will have a methodology for analyzing incident management performance measures and estimating user cost savings
3. UDOT will be able to share the incident management performance measurements obtained from the study with other state DOT’s to mutually improve the performance of the IMT program

**7. Requested from UDOT: \$75,000  
(or UTA for Public Transportation)**

**Other/Matching Funds: \$0**

**Total Cost: \$75,000**

**8. Outline the proposed schedule, including start and major event dates:**

It is recommended that this project begin in September 2019 with the initial tasks of finalizing the project scope of work and detailed cost estimates, followed with the literature review and inquiry to other states regarding their practices in collecting incident management performance measurement data. This is followed by an analysis of the existing data collected for Phase I of this study by adding lane closure information extracted from Transuite. This task is expected to be completed by spring 2020. Then, field data collection of the expanded IMT program is proposed to be carried out in summer 2020 (May to August). The new data analysis will be completed in fall 2020. It is anticipated that the project would take 16 to 18 months, including a 2-month report review period.