2023 UDOT RESEARCH PROBLEM STATEMENT

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Problem Statement submittal deadline is March 13, 2023. Submit statements to UTRAC@utah.gov

Only UDOT and UTA champions may submit problem statements. Others may help write the statements.
All submitted problem statements become the property of UDOT, and authors are not guaranteed a contract for related work.

Title: Using Unmanned Aircraft Systems to Facilitate Traffic Incident Management **No. (Office Use):** 23.03.02

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Select ONE Subject Group: ☐ Materials/Pavements ☐ Maintenance/Stormwater ☒ Traffic Mgmt/Safety ☐ Planning ☐ Aeronautics ☐ Public Transportation

1. Write a brief research project objective:

Conduct a synthesis of practice on the use of unmanned aircraft systems (UAS) to send data to the Traffic Operations Center (TOC) to facilitate Traffic Incident Management (TIM).

2. Explain the problem and why this research is important: (*Importance reflects 50% of the statement score*)

Since 1992, the Utah Department of Transportation (UDOT) has used Incident Management Teams (IMTs) to aid hundreds of thousands of motorists on Utah's highways. One of UDOT's goals is to *KEEP UTAH MOVING* and the IMTs do exactly that with their staff of 25 full-time incident management trucks covering the Wasatch Front and one truck in St. George (https://udot.utah.gov/connect/public/highway-incident-management-team/). The IMTs are supported in their work by the UDOT Traffic Operations Center (TOC) control staff. The TOC control room operates 24/7/365 and is responsible for traffic management throughout the state. The control room operators have a sophisticated network of device that help them to message the traveling public when there are weather events, special events, or crashes that could cause delay (https://udot.utah.gov/connect/about-us/operations/traffic-management/).

The TOC control room staff utilize traffic cameras to assist in incident management and guiding the IMTs in their efforts. Occasionally, traffic cameras are not available in the area where an incident has occurred, and the TOC control staff are not able to assist as effectively in this effort. One tool that could be used to assist the TOC control staff is the use of unmanned aircraft systems (UAS) that would be deployed by the IMTs to stream video from the incident site to the TOC to facilitate overall traffic incident management (TIM). UAS has also been used to assist in the documentation of crashes, especially to document fatal crash scenes. The Federal Highway Administration (FHWA) *Every Day Counts Next-Generation Traffic Incident Management* program identifies that there is "great potential for [UAS] application to other traffic incident management (TIM) related purposes, including, but not limited to: situational awareness, detour route monitoring, incident verification, queue detection and monitoring, secondary crash detection, and response vehicle routing" (https://ops.fhwa.dot.gov/tim/docs/EDC-6_Factsheet_TIM_UnmannedAircraft_v2_508.pdf).

The purpose of this research is to conduct a synthesis of practice to document the use of UAS to assist TOC control staff in evaluating situational awareness of crashes by sending video to the TOC to assist with TIM. The research team would identify what other states are doing, how they are doing it, and the overall capabilities of the current UAS fleet in the state and the capability of this fleet to send data to the TOC. The results of this would be used to help UDOT understand what might be missing from a resources/systems standpoint to allow this to be used more efficiently. This research would be anticipated as a first step for conducting a pilot study to use UAS and see how effective they could be.

By providing better data to the TOC for all traffic incidents, the UDOT Traffic Management Division will be better able to *KEEP UTAH MOVING*.

3. Describe how the research results will be implemented: (*Implementation reflects 50% of the statement score*)

The results of this research will allow UDOT to better understand how UAS can be used to assist the TOC in incident management and operations. The research would be implemented by the Traffic Management Division to better understand the process of using UAS to send video footage to the TOC so that TOC control staff can assist IMTs with effective incident management. By documenting the state of the practice in this area UDOT can better understand what might be missing from a resources/systems

standpoint to implement this practice. Upon completion of this project, a second project could be done to conduct a pilot study to use UAS and determine how effective it could be.

4. Describe how this new research would build on related past studies, including links or references to relevant publications:

This research is not directly related to any past studies; however, it does build upon research conducted by BYU to evaluate the effectiveness of the IMT program:
UDOT Report No. UT-21.13 – Analysis of Benefits of an Expansion to UDOT' Incident Management Program
UDOT Report No. UT-19.01 – Analysis of Performance Measures of Traffic Incident Management in Utah

5. List the major tasks for the new research:

1. **Kickoff Meeting** – Kickoff meeting to develop a project scope of work and detailed cost estimate
2. **Literature Review** – Review the use of UAS in TIM
3. **State of the Practice** – Summarize synthesis of practice results and identify states (or other locations) where UAS have been effectively used in TIM
4. **Evaluation and Summary** – Compare and evaluate the different ways in which UAS have been used to assist with TIM including evaluating the capabilities of the current UAS fleet and "receiving" systems in Utah
5. **Conclusions and Recommendations** – Develop conclusions and recommendations based on the synthesis, evaluation, and summary to help UDOT understand what might be missing from a resources/systems standpoint to implement a pilot program using UAS in the TIM process
6. **Report Preparation** – Provide the results to UDOT in the form of a written report
7. **Project Management**

6. List the expected research deliverables (reports, manual, specification, design method, training, video, etc.):

1. Technical report documenting the research results
2. A synthesis of practice for the use of UAS in TIM
3. A list of recommendations on how the state of Utah could utilize UAS for TIM

7. Requested from UDOT: $50,000 **Other/Matching Funds:** $ **Total Cost:** $50,000
Briefly explain funding sources:

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

It is recommended that this project begin late summer/early fall 2023 with the project scope of work and detailed cost estimate, followed with the literature review. The work will continue with the remaining tasks as outlined. The results of the research will then be reported to UDOT in the form of a written report. The research is anticipated to take 16-18 months.