Quarterly Progress and Performance Indicators Report:
Project Number and Title: Safety Assessment of New England Roadways during the COVID-19 Pandemic
Research Area: Thrust Area 4
PI: Mohammadali Shirazi, Ph.D., Assistant Professor, University of Maine
Reporting Period: 4/1/2022 to 6/30/2022
Submission Date: 6/30/2022

****IMPORTANT: Please fill out each section fully and reply with N/A for questions/sections with nothing to report. For ease of reporting to the USDOT, please do not remove, or change the order of, any sections/text. You may remove/add each rows in tables as needed. Thank you! *****
The report is due on the last day of the reporting period in .doc format to tidc@maine.edu.

Overview:

*Provide **BRIEF** highlights of activities performed during the reporting period.*

- We continued to work on speeding models for Interstates in Maine and Connecticut using streetlight data.
- We modeled the impact of density and Covid-19 cases on speeding
- We modeled crash data during Covid-19 pandemic. Further work is needed to analyze data.

Meeting the Overarching Goals of the Project:

How did the previous items help you achieve the project goals and objects? Please give one bullet point for each bullet point listed above.

- The developed speeding models in Maine and Connecticut were analyzed and improved.
- We combined the crash data with collected data in Connecticut and Maine from the streetlight platform.
- We considered using speeding, speed and density in crash data modeling.

Accomplishments:

List any accomplishments achieved under the project goals in bullet point form…

- We developed models for speeding for Interstates and freeways in Connecticut and Maine.
- We revised the paper submitted for publication on modeling the traffic speeding at rural facilities in Maine during Covid-19 pandemic.
- We are working on drafting a new paper on modeling speeding using streetlight data for Interstates.

Task, Milestone, and Budget Progress:

Complete the following tables to document the work toward each task and budget (add rows/remove rows as needed, make sure you complete the Overall Project progress row and include all tasks even if they have ended or have not been started.

Table 1: Task Progress*			
Task Number: Title*	**Start Date**	**End Date**	**% Complete**
Task 1-1 Literature review	Nov 1, 2020	Jan 31, 2021	90%
Task 1-2 Collecting Data	Nov 1, 2020	Feb 28, 2021	90%
Task 1-3 Models-Speeding	Mar 1, 2021	Oct 31, 2021	90%
Task 2-1 Models -Crash	Nov 1, 2021	Jan 31, 2022	50%
Task 2-2 Models -Post Shut Down	Jan 1, 2022	Apr 30, 2022	65%
Task 2-3 Analyzing the results.	May 1, 2022	June 15, 2022	60%
Task 2-4 Recommendations	June 16, 2022	July 15, 2022	Not Started
Task 2-5 Final Report	July 16, 2022	Aug 31, 2022	50%
Overall Project:	Nov 1, 2020	Jan 31, 2021	70%
Phase 1 Overall	Nov 1.,2020	Oct 31, 2021	90%
Phase 2 Overall	Nov1, 2021	Aug 31, 2021	50%

*This table has been updated to reflect phase 2.

Table 2: Milestone Progress			
Milestone #: Description	**Corresponding Deliverable**	**Start Date**	**End Date**
1-Completing the literature review	Summary of Literature Review	Nov 1, 2020	Jan 30, 2021
2-Completing data collection	Summary of Data Collection	Nov 1, 2020	Feb 28, 2022 (expected)
3-Completing the statistical analysis and analyzing results	Summary of Models	March 1, 2021	Apr 31, 2022 (expected)
4-Analyzing the results	Summary of Results	May 1, 2022	June 15, 2022 (expected)
5-Completing the project recommendations	Summary of Recommendations	June 16, 2022	July 15, 2022 (expected)
6-Completing the final Report	Final Report	July 16, 2022	Aug 31, 2022 (expected)

Table 3: Budget Progress*		
Project Budget*	**Spend – Project to Date**	**% Project to Date (include the date)**
$70,000		
$59,650		

*This table has been updated to reflect phase 2.

Is your Research Project Applied or Advanced?

☒ **Applied** (*The systematic study to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.)*

☐ **Advanced** *(An intermediate research effort between basic research and applied research. This study bridges basic (study to understand fundamental aspects of phenomena without specific applications in mind) and applied research and includes transformative change rather than incremental advances. The investigation into the use of basic research results to an area of application without a specific problem to resolve.)*

Education and Workforce Development:

Answer the following questions (N/A if there is nothing to report):

1. Did you provide any workforce development or training opportunities to transportation professionals (already in the field)? If so, what was the training? When was it offered? How many people attended? (i.e. The research team provided an in the field training for the SAR technology for 3 maintenance crew members of the MassDOT on 3/31/2021. The members learned how to use the technology and interrupt the data.)

   N/A

2. Did you hold meetings with any transportation industry organizations or DOTs? If so, what was the meeting's purpose? When was it offered? How many people attended? (i.e. The research team held a meeting with MaineDOT to update them on the progress of the research findings and how the findings can be implemented on 3/31/2021. 15 DOT maintenance members were present at the meeting.)

   - We plan to meet with the DOT in July to share our latest results.

3. Did you host/participant in any K-12 education outreach activities? If so, what was the activity? What was the target age/grade level of the participants? How many students/teachers attended? When was the activity held? (i.e. 25 8th graders and 2 teachers visited the concrete lab and created small concrete trinkets like Legos on 3/31/2021. They learned about the different types of fibers that can be used in the concrete.)

   N/A

Technology Transfer:

Complete all of the tables below and provide additional information where requested. Please provide ALL requested information as this is one of the most important sections for reporting to the USDOT. ***ONLY provide information relevant to this reporting period.***

Use the table below to complete information about conference sessions, workshops, webinars, seminars, or other events you led/attended where you shared findings as a result of the work you conducted on this project:

Table 4: Presentations at Conferences, Workshops, Seminars, and Other Events					
Type	**Title**	**Citation**	**Event & Intended Audience**	**Location**	**Date(s)**
N/A					

Use the table below to report any publications, technical reports, peer-reviewed articles, newspaper articles referencing your work, graduate papers, dissertations, etc. written as a result of the work you conducted on this project. Please list only completed items and exclude work in progress.

Table 5: Submitted/Accepted Publications, Technical Reports, Theses, Dissertations, Papers, and Reports				
Type	**Title**	**Citation**	**Date**	**Status**
Peer-reviewed journal	(Tentative Title) Modeling the impact of the COVID-19 Pandemic on Speeding at Rural Facilities in Maine using Short-Term Speed and Traffic Count Data.	Shahlaeegilan, A., Shirazi, M., Marshall, E., Ivan, J.N. (2021)	June 2022	In review (received positive comments from first review- addressed the comments)
Conference presentation	Speeding during Covid-19 pandemic in Maine	Shahlaeegilan, A., Shirazi, M., Marshall, E., Ivan, J.N. (2022)	May 29-June 3, 2022	Presented at the ITCD (ASCE conference

Answer the following questions (N/A if there is nothing to report):

1. Did you deploy any technology during the reporting period through pilot or demonstration studies as a result of this work? If so, what was the technology? When was it deployed?
   N/A

2. Was any technology adopted by industry or transportation agencies as a result of this work? If so, what was the technology? When was is adopted? Who adopted the technology?
   N/A

3. Did findings from this research project result in changing industry or transportation agency practices, decision making, or policies? If so, what was the change? When was the change implemented? Who adopted the change?
   N/A

4. Were any licenses granted to industry as a result of findings from this work? If so, when? To whom was the license granted?
   N/A

5. Were any patent applications submitted as a result of findings from this research? If so, please provide a copy of the patent application with your report.
   N/A

6. Did industry organizations or DOTs provide cost-share (cash or in-kind) to your research during the reporting period? Who was the organization? Please provide an in-kind support invoice from the organization with your report (this is kept confidential and used for record keeping purposes only).
   N/A

Please add figures/images that can be included on the website and/or in marketing/social media materials to further clarify your research to the general public. This is very important to our Technology Transfer initiatives.

Describe any additional activities involving the dissemination of research results not listed above under the following headings:

Outputs:
Definition: Any new or improved process, practice, technology, software, training aid, or other tangible product resulting from research and development activities. They are used to improve the efficiency, effectiveness, and safety of transportation systems. List any outputs accomplished during this reporting period:

- We revised speeding models in Maine and Connecticut to understand the impact of density and pandemic on speeding in interstates and freeways. Our latest results show that the odds of speeding significantly increased during pandemic in both states. Also, as density increases, speeding decreases. Speeding continued to happen in both Connecticut and Maine, even one year after the start of pandemic.
- The initial crash models were developed. These models help to understand crash pattern after pandemic.

Outcomes:
Definition: The application of outputs; any changes made to the transportation system, or its regulatory, legislative, or policy framework resulting from research and development activities. List any outcomes accomplished during this reporting period:

- Speeding models can provide insights about the change in odds of speeding after pandemic.

Impacts:
Definition: The effects of the outcomes on the transportation system such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits. The reported impacts from UTCs are used for the assessment of each UTC and to make a case for Federal funding of research and education by demonstrating the impacts that UTC funding has had on technology and education. NOTE: The U.S. DOT uses this information to assess how the research and education programs (a) improve the operation and safety of the transportation system; (b) increase the body of knowledge and technologies; (c) enlarge the pool of people trained to develop knowledge and utilize technologies; and (d) improves the physical, institutional, and information resources that enable people to have access to training and new technologies. List any outcomes accomplished during this reporting period:

- The outcome of our models will assist DOT to understand the impact of pandemic on speeding and possibly work on countermeasures to reduce speeding and decrease frequency and severity of crashes.

Participants and Collaborators:

Use the table below to list individuals (compensated or not) who have worked on the project other than students.

Table 6: Active Principal Investigators, faculty, administrators, and Management Team Members				
Individual Name & Title	**Dates involved**	**Email Address**	**Department**	**Role in Research**

*Use the table below to list **all** students who have participated in the project during the reporting period. (This includes all paid, unpaid, intern, independent study, or any other student that participated in this project.) **ALL FIELDS ARE REQUIRED.***

Table 7: Student Participants during the reporting period								
Student Name	**Start Date**	**End Date**	**Advisor**	**Email Address**	**Level**	**Major**	**Funding Source**	**Role in research**
Ennis Marshall	Oct, 2020	May 2022	Dr. Shirazi		BSc.	Civil Eng.	TIDC	Undergrad Research Assistant
Amirhossein Shahlaeegilan	Jan, 2021	May. 2022	Dr. Shirazi		MSc.	Civil Eng.	TIDC	Graduate Research Assistant
Ennis Marshall	May, 2022	Dec. 2022	Dr. Shirazi		MSc.	Civil Eng.	TIDC	Graduate Research Assistant

Use the table below to list any students who worked on this project and graduated or received a certificate during this reporting period. Include information about the student's accepted employment during the reporting period (i.e. the student is now working at MaineDOT) or if they are continuing their students through an advanced degree (list the degree and where they are attending).

Table 8: Students who Graduated During the Reporting Period			
Student Name	**Degree/Certificate Earned**	**Graduation/Certification Date**	**Did the student enter the transportation field or continue another degree at your university?**
N/A			

Use the table below to list any students that participated in Industrial Internships during the reporting period:

Table 9: Industrial Internships			
Student Name	**Degree/Certificate Earned**	**Graduation/Certification Date**	**Did the student enter the transportation field or continue another degree at your university?**
N/A			

*Use the table below to list **organizations** that have been involved as partners on this project and their contribution to the project during the reporting period.*

Table 10: Research Project Collaborators during the reporting period						
Organization	**Location**	**Contribution to the Project**				
		Financial Support	**In-Kind Support**	**Facilities**	**Collaborative Research**	**Personnel Exchanges**
Maine Department of Transportation (Maine DOT)	Augusta, ME				X	
University of Connecticut	Storrs, CT				X	

*Use the table below to list **individuals** that have been involved as partners on this project and their contribution to the project during the reporting period. (**List your technical champion(s) in this table.** This also includes collaborations within the lead or partner universities who are not already listed as PIs; especially interdepartmental or interdisciplinary collaborations.)*

Table 11: Other Collaborators				
Collaborator Name and Title	**Contact Information**	**Organization and Department**	**Date(s) Involved**	**Contribution to Research**
Dr. John Ivan		University of Connecticut*	November 1, 2020	Collecting Connecticut Data. Writing Papers
Mr. Dennis Emidy		Maine DOT	November 1, 2020	Technical Champion

Use the following table to list any transportation related course that were taught or led by researchers associated with this research project during the reporting period:

Table 12: Course List

Course Code	Course Title	Level	University	Professor	Semester	# of Students
CE 225	Transportation Engineering	Undergrad	UMaine	Dr. Shirazi	Spring 2022	56
CIE 598	Advanced Transportation Planning	Grad	UMaine	Dr. Shirazi	Spring 2022	5

Changes:

- N/A

Planned Activities:

- The research team submitted a paper for publication. We received the comments from the first round of review. We revised this paper based on reviewers' comments.
- We are working on another paper based on speeding (using Maine and CT data). We plan to complete this paper during the next few months and submit it for publication.
- We continue working on crash data analysis.