

NTC Program Progress Performance Report (PPPR) Information Form

For P.I.'s Use

On a semi-annual basis the NTC sponsored P.I. must report Program Progress Performance Report (PPPR) using the format specified in this PPPR Information Form. The form must be submitted electronically to the corresponding NTC Associate Director by **3/10/2015**.

Cover Period: 10/1/2014 – 3/10/2015

NTC Funded Project Information (Round/Year 1, 2013-2014)	
University Name	Louisiana State University
Project Title	Quantifying the effects of manual traffic control on evacuation corridors
Principal Investigator	Brian Wolshon
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The form includes the following six parts:

- Part I – Accomplishments: What was done? What was learned?
- Part II – Products: What has the program produced?
- Part III – Participants & Collaborating Organizations: Who has been involved?
- Part IV – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?
- Part V – Changes/Problems

Supplementary documents/materials can be attached to this form with the submission.

Part I – Accomplishments: What was done? What was learned?

The information provided in this section allows the OST-R grants official to assess whether satisfactory progress has been made during the reporting period.

Reporting Period

10/1/2014 – 3/10/2015

1. What are the major goals of the program?

The National UTC aims to promote strategic transportation policies, investment, and decisions that bring lasting and equitable economic benefits to the U.S. and its citizens. The Center is concerned with the integrated operations and planning of all modes serving the nation’s passenger and freight transportation system, including the institutional issues associated with their management and investments. A balanced multi-modal approach will be used that considers freight and passenger travel mobility, reliability, and sustainability, as well as system operations during periods of both recurring and non-recurring incidents, including response to major emergencies. The modes in this theme include highway, transit, rail, and inter-modal interfaces including ports, terminals and airports. In particular, the center focuses on research, education, and technology transfer activities that can lead to (1) Freight efficiency for domestic shipping and for our international land, air, and sea ports; (2) Highway congestion mitigation with multi-modal strategies; and (3) Smart investments in intercity passenger travel facilities such as high speed rail. Major center activities are as following:

- **Advanced & Applied Research Promoting Economic Competitiveness:**
Our research activities are multimodal/intermodal and multidisciplinary in scope, with the aims of addressing nationally and regionally significant transportation issues pertinent to economic competitiveness and providing practice-ready solutions.
- **Education, Workforce Development, Technology Transfer, & Diversity**
The consortium is committed to providing high-quality transportation education and workforce development programs for a broad and diverse audience. Center’s efforts will support the development of a critical transportation knowledge base and a transportation workforce that is prepared to design, deploy, operate, and maintain the complex transportation systems of the future.

<p>2. What was accomplished under these goals?</p>	<p>The major activities completed during this performance period have been:</p> <ol style="list-style-type: none"> 1) Completion of decision choice model 2) Analysis of decision choice model results 3) Development of the manual traffic control model algorithm <p>The major findings of the choice model analysis have been: The choice model analysis suggested police officers in Baton Rouge, LA and Miami Gardens, FL, tended to direct traffic in a similar fashion; extending green time for high demand directions while attempting to avoid long gaps or waste in the traffic stream. This was expected and is quite consistent with the general concept of a traffic signal. The research also found that <i>Phase, Time</i> and <i>Gap</i> variables estimated by the various logit models were, in general, statistically similar at a 95% confidence interval irrespective of the data collection day or location. While some level of similarity was expected, this degree of consistency was remarkable and indicates that when officers are placed in similar situation they are likely to make the same primary control decisions. This was important because it suggests that a properly trained and experienced police officer in Baton Rouge, LA would be just as effective directing traffic in Miami Gardens FL, and vice-versa.</p>
<p>3. How have the results been disseminated?</p>	<p>Dissemination of the choice model results are being prepared at this time. It is anticipated the findings will be presented at the Human Factors and Ergonomic Society annual meeting as well as Transportation Research Boarding meeting in 2016.</p>
<p>4. What do you plan to do during the next reporting period to accomplish the goals? (10/1/2014 – 3/10/2015)</p>	<p>During the next period the simulation model will be developed and the manual traffic control algorithm programmed into the software API. It is also expected that the final results will be completed and ready for prepare the final report.</p>

Part II – Products: What has the program produced?

Publications are the characteristic product of research projects funded by the UTC Program. OST-R may evaluate what the publications demonstrate about the excellence and significance of the research and the efficacy with which the results are being communicated to colleagues, potential users, and the public, not the number of publications. Many research projects (though not all) develop significant products other than publications. OST-R may assess and report both publications and other products to Congress, communities of interest, and the public.

Reporting Period	10/1/2014 – 3/10/2015
1. Journal publications:	None at this time
2. Books or other non-periodical, one-time publications	None at this time
3. Other publications, conference papers and presentations	Parr, S., Ericson, J., and B. Wolshon. Human Performance Modeling for Manual Traffic Control. Submitted for presentation at the <i>Human Factors and Ergonomic Society</i> annual meeting. 2015
4. Website(s) or other Internet site(s)	None at this time
5. Technologies or techniques	None at this time
6. Outreach activities	Associate Director, Dr. Brian Wolshon was a featured speaker for TEDxLSU which took place 02/28/2015. Associate Director of Research, Dr. Scott Parr served as the 2015

	Louisiana’s STEM Expo and K-12 science fair judge on 02/28/2015.
7. Courses and workshops	CE 3600 Introduction to Traffic Engineering CE 4600 Advance Design of Highways and Airports
8. Inventions, patent applications, and/or licenses	None at this time
9. Other products	<p>The development of a manual traffic control algorithm for implementing into a traffic simulation model.</p> <pre> graph TD A[VISSIM • Detector Information] --> B[VAP • Calculate Independent Variables • Calculate Phase Change Probability • Calculate Random Threshold Value] B --> C{Is the Probability of Change Greater Than or Equal to the Threshold Value?} C -- YES --> D[Change Phases] C -- NO --> E[Proceed to the Next Time-Step] D --> E E --> A </pre>

$$k_p = S_p \pm \alpha_p * \frac{(aX_n + c) \bmod m}{m}$$

Where,

k_p is the threshold value for phase p

s_p is the static cut-point value

α_p is the calibration parameter

X_n is a random number generated in the previous/initial time step

a is 1,597,

c is 51,749,

m is 244,944.

Part III – Participants & Collaborating Organizations: Who has been involved?

OST-R needs to know who has worked on the project to gauge and report performance in promoting partnerships and collaborations.

Reporting Period	10/1/2014 – 3/10/2015
1. What organizations have been involved as partners?	<p>Baton Rouge Department of Public Works</p> <ul style="list-style-type: none">• 1100 Laurel St, Baton Rouge, LA 70802 (225) 389-5623• In-kind support (Data Collection assistance and support) <p>Louisiana Transportation Research Center</p> <ul style="list-style-type: none">• 4101 Gourrier Avenue Baton Rouge, Louisiana 70808 225.767.9131• In-kind support (Provided access the GIS database and Library)
2. Have other collaborators or contacts been involved?	None at this time

Part IV – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?	
<p>DOT uses this information to assess how the research and education programs:</p> <ul style="list-style-type: none"> • increase the body of knowledge and techniques; • enlarge the pool of people trained to develop that knowledge and techniques or • put it to use; and, • improve the physical, institutional, and information resources that enable those people to get their training and perform their functions. 	
Reporting Period	10/1/2014 – 3/10/2015
1. What is the impact on the development of the principal discipline(s) of the program?	<p>The results of this research are expected to lead to innovative ways to manage evacuation corridors. If found to be promising, the results are planned to be presented to emergency management officials in Louisiana’s Governor’s Office of Homeland Security and Emergency Preparedness. It is also anticipated the finding of this research will provide new insight in directing emergency traffic. Potentially leading to new policies and procedures for police. Again if found to show potential, these results will be presented to police agencies at conferences such as the IACP and TCIPC within the State of Louisiana and elsewhere.</p> <p>Over the long term it is expected that this will incrementally advance the state of practice in improving the movement of traffic with evacuation corridors. Historically, improvements in emergency management and traffic operations have occurred through an evolutionary process with incremental changes made over long periods of time. The impact and benefits of this research to the management and operation of evacuation corridors will advance the state-of-knowledge making it possible to improve traffic management practices in the future.</p>
2. What is the impact on other disciplines?	<p>This research may have a significant impact in the disciplines of Disaster Management, as it can be used to update existing emergency traffic management plans or used in the development of new plans. Also a new avenue to explore is Human Factors and Performance Modeling.</p>

3. What is the impact on the development of transportation workforce development?	In addition to education and development of the undergraduate, master's and Ph.D. students involved in the project, the research may also be used to update training manual and workshops for training police officer on how to direct traffic more safely and efficiently.
4. What is the impact on physical, institutional, and information resources at the university or other partner institutions?	None at this time
5. What is the impact on technology transfer?	This research may lead to planning agencies adopting some portion of this research in the development/updating of their emergency traffic management plans.
6. What is the impact on society beyond science and technology?	This research could lead to decreased emergency evacuation times resulting in fewer fatalities associated with major disasters such as wild fires, flash floods, hurricanes, etc.
7. Additional impacts	None at this time

Part V – Changes/Problems

If not previously reported in writing to OST-R through other mechanisms, provide the following additional information or state, “Nothing to Report, if applicable:

Reporting Period	10/1/2014 – 3/10/2015
1. Changes in approach and reasons for change	None at this time
2. Actual or anticipated problems or delays and actions or plans to resolve them	Problems were encountered in calibrating and validating the traffic simulation network. The estimate time required to complete one observation was significantly underestimated. At this time, the procedure has been streamlined but it has ultimately delayed the completion of the final report.
3. Changes that have a significant impact on expenditures	None at this time
4. Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards	None at this time
5. Change of primary performance site location from that originally proposed	None at this time