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 9/15/2014.

Cover Period: 4/1/2014 – 9/15/2014

NTC Funded Project Information (Round/Year 1, 2013-2014)	
University Name	University of Maryland, College Park
Project Title	Efficiency and Reliability in Freight Transportation Systems
Principal Investigator	Prof. Paul Schonfeld
PI Contact Information	pschon@umd.edu Tel: 301-405-1954

The form includes the following six parts:

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

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

Part I – Performance Indicators	
Reporting Period	**4/1/2014 – 9/15/2014**
1. Transportation-related courses offered during the reporting period that were taught by faculty and/or teaching assistants who are associated with the UTC	N/A
Undergraduate courses	ENCE 472 – Transportation Engineering
Graduate courses	ENCE 674 – Urban Transit Planning and Rail Transportation Engineering ENCE 672 – Regional Transportation Planning
2. Students supported by this grant	N/A
Undergraduate students	
Masters students	
Doctoral students	Roozbeh Yousefzadeh Linxi Chen
3. Students participating in transportation research projects funded by this grant (but not supported by this grant)	N/A
Undergraduate students	
Graduate students	Yanshuo Sun, supervised by Dr. Paul Schonfeld
4. Students supported by this grant who received degrees	N/A – None yet
Undergraduate degrees	
Masters degrees	
Doctoral degrees	

Part II – 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	**4/1/2014 – 9/15/2014**
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.

2. What was accomplished under these goals?	This study is developing a modeling framework and some specific component models for optimizing freight transportation systems, with emphasis on operations at transfer terminals. This framework should eventually be usable for designing and operating complex freight transportation systems as efficiently and reliably as possible, while dealing with various uncertainties and disruptions. The main accomplishments in this period have been a review of the relevant literature, and the development of a model for analyzing transfer terminal operations and optimizing the dispatching of vehicles from such terminals in ways that advance both efficiency and reliability. The results obtained to date indicate how such dispatching decisions can be optimized and how they depend on various system characteristics and external factors.
3. How have the results been disseminated?	The work has been discussed in two classes and in meetings with graduate students. A paper is being prepared for submission to a journal.
4. What do you plan to do during the next reporting period to accomplish the goals? (10/1/2014 – 3/31/2015)	The main activities planned for the next period are (1) improving the dispatching model developed to date, (2) extending the analysis framework to consider the planning and scheduling of vehicle flows, (3) analyzing the propagation of delays in logistic systems under various circumstances and (4) submitting to a journal at least one paper document this work.

Part III – 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	**4/1/2014 – 9/15/2014**
1. Journal publications:	None yet.
2. Books or other non-periodical, one-time publications	None yet.
3. Other publications, conference papers and presentations	None yet.
4. Website(s) or other Internet site(s)	N/A
5. Technologies or techniques	
6. Outreach activities	
7. Courses and workshops	The problems, analysis methods and results have been presented in existing undergraduate and graduate courses.

8. Inventions, patent applications, and/or licenses	Nothing to report.
9. Other products	A model for analyzing transfer terminal operations and especially dispatching decisions has been developed and documented in a paper that is being prepared for submission to a journal.

Part IV – 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	**4/1/2014 – 9/15/2014**
1. What organizations have been involved as partners?	The work at UMD has been discussed with researchers at other universities, especially North Carolina State University and Morgan State University. Discussions are continuing on how the work can be coordinated and integrated with related activities at those two universities.
2. Have other collaborators or contacts been involved?	The main collaborators have been Prof. George List at North Carolina State University and Dr. Hyeonshic Shin at Morgan State University.

Part V – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?	
DOT uses this information to assess how the research and education programs: • **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	**4/1/2014 – 9/15/2014**
1. What is the impact on the development of the principal discipline(s) of the program?	The products of this work should eventually be useful in improving the reliability and efficiency of freight logistic networks relying on transfers at hub terminals. They will help determine the most effective reserve factors (or "slack" times in schedules) and optimize dispatching times for outbound vehicles when some connecting inbound vehicles are late by trading off the various benefits and costs of waiting for delayed vehicles.
2. What is the impact on other disciplines?	The results of this work should also be applicable to public transportation systems and airline networks. The developed methods may have useful application in the evaluation and optimization of other large systems.
3. What is the impact on the development of transportation workforce development?	This project is helping educate undergraduate and graduate students in transportation engineering, including women and underrepresented minorities, and thus prepare them for careers in transportation fields.
4. What is the impact on physical, institutional, and information resources at the university or other partner institutions?	Such impacts are not yet substantial.

5. What is the impact on technology transfer?	The findings and methods of this project will be disseminated to professionals through the technical literature. Efforts will be made to identify freight transportation operators who will agree to implement and test the methods developed in this project.
6. What is the impact on society beyond science and technology?	Improvements in the efficiency and reliability of freight transportation improve the entire U.S. economy and, hence, the living standards throughout the U.S. They can also improve the competitiveness of the U.S.
7. Additional impacts	Additional impacts of this project will include a greater body of knowledge, additional well-trained transportation professionals, improved productivity due to the travel time and reliability improvements, reduced energy use and reduced environmental impacts.

Part VI – 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	**4/1/2014 – 9/15/2014**
1. Changes in approach and reasons for change	Due to the interests of the students involved in the project there has been a greater than expected focus on optimizing dispatching decisions and on analyzing the propagation of delays in freight transportation systems.
2. Actual or anticipated problems or delays and actions or plans to resolve them	Nothing to Report.
3. Changes that have a significant impact on expenditures	Nothing to Report.
4. Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards	Nothing to Report.
5. Change of primary performance site location from that originally proposed	Nothing to Report.