



Technologies for  
Safe and Efficient  
Transportation

A U.S. DOT UNIVERSITY TRANSPORTATION CENTER

**Carnegie Mellon University**

UNIVERSITY of PENNSYLVANIA

## Program Progress Performance Report for University Transportation Centers

**Agency:** US DOT  
Office of the Secretary of Transportation – Research  
UTC Program

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**Project Title:** **Technologies for Safe and Efficient Transportation (T-SET)**  
National University Transportation Center

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**Recipient Organization:** **Carnegie Mellon University**  
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**Reporting Period End Date:** April 30, 2014

**Report Term or Frequency:** Semi-Annual

Signature: \_\_\_\_\_

## **Major Goals and Objectives of the Program**

### **Research, Development, Deployment**

The CMU-Penn T-SET UTC focuses on safety. Our research is specifically targeted at improving the safety of automotive drivers and passengers, bicyclists and pedestrians, and the safe usage of trucks and mass transit vehicles.

The thrusts of the T-SET UTC are structured along 5 core areas: In-Vehicle Technologies, Infrastructure Technologies, Human-Vehicle Interactions, Mobility/Data Analytics and Policy.

#### **Metrics:**

- Faculty scientific leadership as reflected by the number of publications and citations of faculty work in transportation-related areas;
- The number of staff, faculty and students involved in leadership positions in academic, industry and government transportation organizations;
- New research collaborations in fields related to this work;
- Successful technology deployments and their impact; and
- Patents and start-ups.

### **Education and Workforce Development**

Education and workforce development are important complements of the T-SET research program.

#### **Metrics:**

- Number of transportation-related courses,
- Students participating in transportation research projects,
- Advanced degree programs funding T-SET UTC students,
- T-SET UTC-funded graduate students,
- T-SET UTC-funded students who receive degrees,
- Institutional educational partnerships, and
- Participants in workforce and educational programs.

### **Technology Transfer**

The CMU-Penn UTC will fully use the resources and the experience of these university centers to promote enterprises arising from its research program. Faculty who already created startups in the past, serve as mentors to colleagues interested in this activity.

#### **Metrics:**

- Simple adoption of the innovation by a transportation operator, company or public, to more formalized outcomes such as licensing, patents, commercialization, and spin-off companies.
- Quantify numbers of meetings, attendance, publications, and social media and website activity.

### **Collaboration**

Collaboration is the heart of the entire T-SET program. CMU and Penn seek to ensure our research and development program leads to deployment of technologies in the transportation systems serving our communities and state, providing pilot applications for global use. The CMU-Penn team will collaborate with related centers on the two campuses, state and local public partners, non-profit community partners and industry partners.

- Number and diversity of members of both the T-SET Consortium and Advisory Council, and by the
- Number and impact of deployments achieved through collaboration.

## **Accomplishments Under Major Goals**

### **Research, Development and Deployment**

Nothing to report on research project accomplishments, as during this period national UTC funding was not yet available for funding of research projects

Below is a listing of outreach efforts T-SET staff and management personnel have engaged in over the past six months in support of advancing Research Development and Deployment projects:

- Attended DOT Connected Vehicle Pilot Program Public Meeting in DC
- Attended New Cities Foundation Urban Mobility Conference, Mountain View, California
- Hosted Fuel Freedom Foundation Natural Gas to Liquid Fuels project kick off
- Attended TRB Executive Committee Meeting
- Attended NRC Committee on Assessment of Federal Railroad Administration Research
- Ongoing meetings with Barry Schoch, Secretary of PennDOT, for Vision 2040 Autonomous Vehicle Research
- Met with Beth's Barricades to discuss Mobility Analytics Center
- Met with Lyft to discuss research partnership possibilities
- Met with Ellen McLean New Executive Director of the Port Authority of Allegheny County to discuss Mobility Analytics Center
- Met with Lenore Williams of the Baum Center Corridor Coalition to discuss Surtrac expansion
- Met with Janet Scullion of Bloomfield Citizen Council to discuss Surtrac expansion
- Visit the CATT Lab at the University of Maryland to discuss the Mobility Analytics Center
- Met with Allegheny County Deputy Manager Barbara Parees to discuss Road Surface Monitoring
- Met with Jeff Adler from Open Roads Consulting to discuss Mobility Analytics Center
- Presented to Monique Evans at Turner Fairbank Research Center
- Takata visit to campus to discuss connected vehicles
- Met with City of Pittsburgh Chief Innovation Officer Debra Lam
- Met with Red Light Enforcement Camera Company
- PennDOT Connected and Autonomous 2040 Vision Workshop, Harrisburg PA
- ITS Connected Vehicle Public Meeting Moving From Research Toward Implementation, Arlington
- Met with Pitt Ohio trucking company CEO Chuck Hammel III to understand the current state of the art of trucking communication data systems as well as continuing challenges that might be opportunities for PennDOT to consider as part of CMU's commissioned project to prepare PennDOT for a connected/automated vehicle future

### **Education and Workforce Development**

Participated as a member of a panel advising on a training program for Michigan DOT engineers. The program is broad-based and includes ITS components, freight logistics and multi-modal integration. Some of the T-SET UTC research helps provide input for the training components.

T-SET Director, Raj Rajkumar presented a session on Autonomous and Connected Vehicles at ITSPA's 10th Annual Workshop and Conference

Approximately 20 township managers and PennDOT LTAP came to CMU to learn about the work UTC is doing. Chris Hendrickson presented on our work with PennDOT and the Autonomous and Connected Vehicle Vision 2040. Christoph Mertz showed LTAP around the NavLAB and discussed his upcoming project with PennDOT: Road Surface detection.

T-SET held three seminars as part of our Faculty Seminar Series that presents research to the CMU student body. These seminars are webcast and made available to Consortium members and the general public.

### Hosted Pro Walk/Pro Bike Transportation Summit at CMU and Sponsored by Traffic21/T-SET

Below is a listing of the additional education and workforce efforts that T-SET has been engaged in over the past six months:

- Established Women in Transportation Fellowship at Heinz College, value of \$80,000 for one student
- Designed and taught new class at CMU, Growth with Intelligent Transportation Systems, Profs R. Hampshire, S. Qian.
- Developed a Systems Synthesis Course entitled: Almono Site Transportation Planning
- Co-sponsored a Donald Shoup, author of *The High Cost of Free Parking*, lecture with the Pittsburgh Downtown Partnership
- Faculty Seminar Series presented T-SET research to student body at three lectures
- Engineers Society of Western PA Champions of Sustainability Conference, Pittsburgh PA
- CMU Urban Planning Osher Class
- Professor Hartkopf's design seminar presentation and discussion
- Met with Tepper student project group to discuss transportation issues
- Interviewed on "Our Region's Business"— a Sunday morning business affairs television program
- Selected First Women in Transportation Fellow
- Guest lecture on T-SET at Carlow College: Intro to Public Policy
- Guest Lecture on UTC in CMU Class: Design and Policy For Humanitarian Impact
- Hosted one meeting of the newly established Student Transportation Club
- Participated in a monthly research sharing and program coordination meeting with the faculty researchers involved in the T-SET UTC.
- CMU hosted Pittsburgh City Councilwoman Natalia Rudiak's Open Data Seminar that supports CMU's Mobility Analytics Center
- Participated as a member of an Advisory Board providing guidance to students in a Masters Systems Synthesis class addressing transportation impacts of a major new development.
- Attended the Washington DC annual meetings of the Transportation Research Board and the Council of University Transportation Centers (CUTC). CMU PhD student George Lederman received one of the CUTC Student Awards, which was presented by RITA Administrator Gregory Winfree.
- Met with Dr. Curtiss Porter, City of Pittsburgh Chief Education Officer, to discuss City Year
- Met with Kate DiSimone, City of Pittsburgh Law Department to discuss a data sharing agreement
- Presented to Pennsylvania Highway Information Association, televised on PCN

### Technology Transfer & Collaboration

In September 2013, T-SET hosted it's advisory committee for a daylong strategy meeting. In attendance were Doug Foy, Mike Meyer, Bill Millar, Jim Misener, John English, Gerry Mooney, Charles Hammel.

Hosted a meeting with USDOT and TRB Committee representatives to plan for a Fall 2014 Safety Conference that CMU will host.

Held T-SET Consortium Meeting in Philadelphia at the University of Pennsylvania

T-SET hosted the Pittsburgh BRT Stakeholder Advisory Committee meeting. The Committee reviewed their site visit to Cleveland and determined next steps.

Meeting with Turnpike Executive Director Mark Compton and his Chief Engineer to describe CMU's research capabilities and potential research projects of interest to the Pennsylvania Turnpike

Additionally T-SET engaged in the following technology transfer and collaboration efforts:

**Hosted or presented at the following:**

- Somerset County Rotary Club Luncheon speaker
- Retreat with PennDOT re 2040 project
- Moderated panel at ITS World Congress, Tokyo Japan
- Spoke at APTA Annual Meeting in Chicago
- Delegate to the Remaking Cities Congress
- PennDOT LTAP Community Advisory Committee
- UTC Presentation to Visiting Japanese Delegation
- Launch CMU tour of Nav Lab
- Project presentations to FISA Foundation; OBID coordinated meeting

**Met with the following:**

- PennDOT Barry Schoch and a group of Penn DOT managers to discuss ideas for future research projects
- Indiana University of Pennsylvania to Discuss Research Collaboration
- Hillman Foundation
- Southwestern PA Community Profile meeting
- Dave Ruppensberger, CMU/Pitt Technology
- Steve Wray, Executive Director of the Southeastern Pennsylvania Economy Leagues
- University of Pittsburgh Institute of Politics Elected Officials Retreat
- AECOM to Discuss Collaboration
- Ted Vassar of Pittsburgh Public Schools to discuss Where's My Schoolbus
- PennDOT Meeting to Discuss Faculty Research in Transportation Modeling
- Super Computer Center Advisory Committee
- Pennsylvania Governor's Staff
- Southwestern PA Community Profiles Meeting
- Benedum Foundation
- ITS America Staff on Big Data Research
- State Senator Wayne Fontana
- Review committee for Steinfeld et al RERC grant proposal
- IBM Meeting on Connected Communities
- State Senator Jay Costa
- Congressman Shuster's Office
- State Representative Stern's Office
- Pittsburgh City Councilman Dan Gillman to Discuss Adaptive Signal Research Deployment
- CDM Smith on PennDOT Autonomous Vehicle Research
- Pittsburgh Community Reinvestment Group to Discuss Bus Rapid Transit
- City of Pittsburgh and IBM to Discuss Smart Cities Deployment
- East Liberty Development Inc to discuss Dynamic Pricing for Parking
- City of Pittsburgh Sustainability Director Grant Ervin to discuss developing a model similar to University of Oregon's Sustainable Cities Initiative.

- Consortium member Bike Pittsburgh
- Tepper student project group re autonomy
- Barry Maciak, World-Class Industrial Network, LLC
- Southwestern Pennsylvania Commission Regional Operations Planning Committee to discuss SURTRAC
- Penn State Pittsburgh Office
- Parsons Brinkerhoff to discuss consortium opportunities

**Participated in the following:**

- PennDOT SHRP2 Capability Self Assessment Workshop
- Congress of Connected Communities Annual Legislative Session
- PennDOT Connected and Autonomous Vehicle Workshop in Harrisburg
- Alpha Lab Demo Day
- Allegheny Conference on Community Development Annual Meeting
- Greater Pittsburgh Non Profit Partnership Annual Meeting
- Southwestern Pennsylvania Commission Public Participation Panel
- Pittsburgh Mayor Bill Peduto Transition Team Meeting
- Penn State Transportation Engineering and Safety Conference
- Pennsylvania Society Annual Meeting in New York
- Greater Pittsburgh of Commerce Annual Elected Officials Reception
- PA Chamber of Commerce Transportation Committee Meeting
- Mayor's Transition Team Subcommittee on Big Data
- Mayor's Transition Team Final Meeting
- Pittsburgh/Philadelphia Chambers of Commerce Joint Legislative Reception in Harrisburg
- ITSA Annual Reception in DC
- Mayor's Transportation Sustainability Committee
- Chamber meeting with PA House Majority Leader Mike Turzai
- Chamber Meeting with Mayor's Chief of Staff Kevin Acklin
- Fuel Freedom Foundation visit
- Harrisburg PennDOT State Transportation Innovation Council Meeting
- RITA Workshop in DC: ITS PCB University Workshop
- University of Pittsburgh Institute of Politics Infrastructure Committee
- ASCE Sustainable Infrastructure Conference Steering Committee
- Research Directors and Developers (RDD) Network Kick-Off Meeting

## **Plans for Next Reporting Period**

Activity Plans for April 2014 through September 2014:

### ***Research***

Conduct demonstration of autonomous vehicle in Washington, D.C.

Meet with the Pennsylvania Turnpike Commission to develop research projects

Enhance connected vehicle test bed Pittsburgh

### ***Education and Workforce***

Teach ITS course for the Pennsylvania Governors School for the Sciences

Showcase UTC at the Pennsylvania Safety Symposium in Harrisburg

Present T-SET research at the Annual Meeting of the Pennsylvania Highway Information Association in Harrisburg

### ***Collaboration***

Hold T-SET Consortium Meeting in Pittsburgh

Attend UTC and CUTC Summer Meetings in Lincoln

### ***Technology Transfer***

Conduct two T-SET Faculty Seminars

Plan UTC Safety Conference

### ***Diversity***

Pursue local chapter of Women's Transportation Seminar

Recruit female UTC work-study students

## **2. PRODUCTS**

NOTHING TO REPORT on specific research project products including publications, technologies, and inventions.

### **General Program Products**

Weekly distribution of T-SET newsletter with 992 subscribers and an above industry average open rate.

Presence on social media, 332 followers on Twitter

### **T-SET in the Media**

Efforts have been made to promote T-SET UTC activities through the media. Below are some examples of T-SET media exposure from September 2013 – April 2014. Click on hyperlink to view articles.

[Driverless Car No Longer Just Science Fiction CBS](#)  
[Main Roads Needs to Get Out of Slow Lane Yahoo](#)  
[Driverless Cars for the Road Ahead Wall Street Journal](#)  
[Texas Instruments View for the Future of Automotive Technology Texas Instruments Website](#)  
[Techvibe CMU Driverless Car TechVibe](#)  
[Researchers Improve Transportation Safety The Tartan](#)  
[A Car that Drives Itself CBS](#)  
[Smarter Traffic Signals Can Save Time and Money Inside Science](#)  
[Driverless Cars Predicted By End of Decade Politico](#)  
[Creating a Real Time Traveler Information System Power of 32](#)

### **Participants and Other Collaborating Organizations**

In February, T-SET hosted it's Consortium meeting at the University of Pennsylvania. The Consortium continues to grow and has over 45 members.