PROGRAM PROGRESS PERFORMANCE REPORT

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Center Director:	Josias Zietsman, Ph.D., P.E., j-zietsman@tti.tamu.edu (979) 458-3476
Submitting Official:	Marcia Walker, Program Coordinator m-walker@tti.tamu.edu (979) 458-0373
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Signature of Submitting Official:	

Overview

The Center for Advancing Research in Transportation Emissions, Energy, and Health (CAR-TEEH) was established on November 30, 2016. This report covers the work performed and key accomplishments during the Center's initial six months. Much of the activity in this period was administrative in nature, required to successfully launch the Center.

During this time, agreements between partners were finalized, staff members and students hired, and planning and strategy sessions held. Cooperative research projects were also initiated, and regular CAR-TEEH Executive Committee (EC) meetings were organized to provide monitoring and oversight of Center activities. At the conclusion of the current reporting period, the groundwork is laid for continued productivity and innovation in CAR-TEEH's work.

Accomplishments

Leadership and Communications

A key requirement for CAR-TEEH's success is the establishment of a robust collaborative effort among its partners. To this end, CAR-TEEH leadership held a two-day Center kickoff meeting at Texas A&M Transportation Institute (TTI) headquarters in late February 2017. Members of the CAR-TEEH EC, as well as potential collaborators, graduate research assistants, and representatives from partner institution sponsored programs offices participated in the meeting in person or by WebEx.

The primary goals of the meeting were to familiarize the larger group with CAR-TEEH's objectives, look for collaborative opportunities, and to plan the Center's implementation and upcoming activities. Approximately 40 individuals were in attendance for the overview and introduction to CAR-TEEH. Participants spent the afternoon not only learning about the new UTC but making recommendations on impactful activities and emphasis areas for continued success.

The kickoff meeting also included a half-day planning workshop specifically for the CAR-TEEH EC. This workshop provided the opportunity for the EC to develop a group synergy, brainstorm ideas, and discuss numerous aspects of the UTC initiatives in detail. During this time, the group focused on collaborative efforts among the partners, each of the Center goals, and the creation of guidance instruments such as a strategic plan, and a communications plan.

The structure and expectations for the CAR-TEEH Advisory Board were also preliminarily agreed upon during this workshop. The advisory board will be comprised of distinguished, high-level professionals who are strategically positioned to offer guidance on emerging trends, partnerships, leveraging opportunities, and scientific activities and research. Since the workshop,

individuals have been identified to serve in this capacity, and a CAR-TEEH Advisory Board Terms of Reference has been finalized.

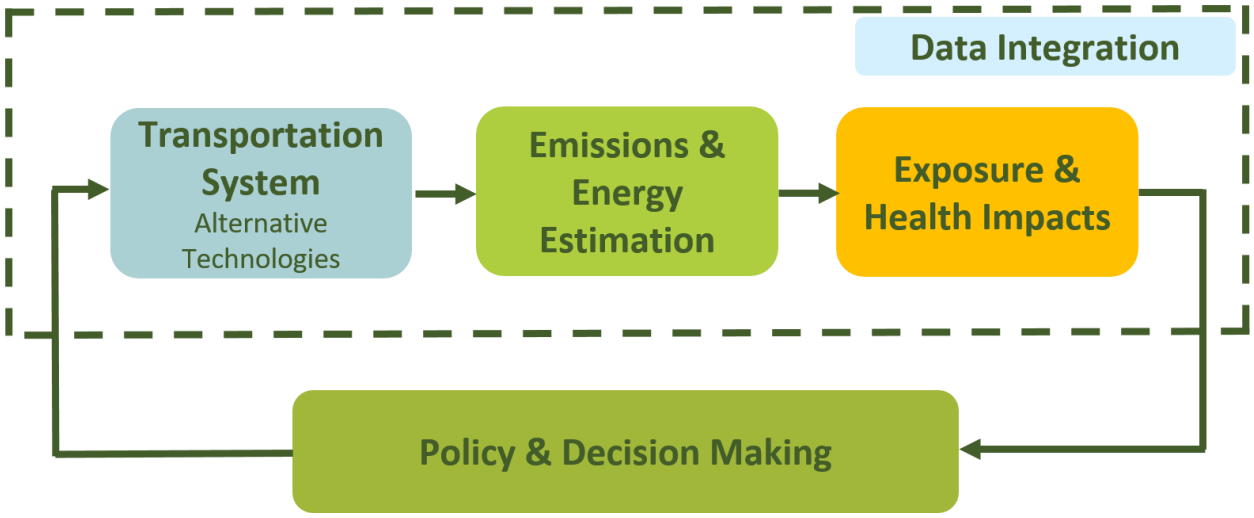
Progress in each CAR-TEEH goal area for this reporting period is explained in further detail in the following sections.

Major Goals of the Program

CAR-TEEH will advance research that addresses transportation emissions in the context of public health. CAR-TEEH brings together experts from transportation and public health, two disciplines that have not traditionally worked together.

By promoting interdisciplinary collaboration and communication, CAR-TEEH will advance transportation research, technology transfer, and education and workforce development in each of the following focus areas:

Figure 1: CAR-TEEH Focus Areas



CAR-TEEH Goal #1: Research Program

The emphasis of CAR-TEEH's year one research program is on the six cooperative research projects described in the Center's prospectus. Each project addresses one or more of the CAR-TEEH focus areas and was strategically chosen to leverage the strengths of each CAR-TEEH partner institution. All projects require collaboration among multiple partners, with the majority involving three or more institutions.

Cooperative Research Program

Extensive discussions were held during the February EC workshop, to complete the detailed scopes of work and determine resource requirements for each cooperative project. Work on

each project began on May 1st, with 18-month periods of performance. Prior to May 1st, detailed budgets, matching funds, and scopes of work were finalized, and Institutional Review Board (IRB) approvals obtained where needed. In future years, approximately 20 percent of available funds will be allocated for collaborative projects of strategic importance.

Table 1: Year One Cooperative Research Projects

Project	Lead Institution	PI	Partner Institutions
Transportation Emissions and Health Data Hub (#01-01)	TTI	Dr. Andrew Birt	All
Reconciles differences in characteristics of transportation and health data, and develops a platform to house datasets and link to relevant information related to transportation emissions and public health data.			
Truck Emissions Exposure Study in Ports (#01-02)	GT	Dr. Michael Rodgers	UCR, TTI
Assesses pollutant emissions at selected major ports and evaluates the potential reduction of exposure that can come from using alternative fuel and powertrain technologies for trucking operations at the ports.			
Border Crossing Emissions Impact Study (#01-03)	TTI	Dr. Tara Ramani	UTEP, JHU
Characterizes the emissions impact of border crossings in El Paso and identifies the population groups most affected by the emissions.			
Healthy Living and Traffic-Related Air Pollution in an Underserved Community (#01-04)	UTEP	Dr. Wen-Whai Li	TTI, JHU
Quantifies traffic-related air pollution and the associated respiratory health for vulnerable school children living in a near-road, underserved community in El Paso, Texas; develops guidelines on healthy living for the underserved, roadside communities.			
Development and Evaluation of Connected Vehicle Application for Alternative Fuel Trucks (#01-05)	UCR	Dr. Peng Hao	GT, TTI
Evaluates the energy and emission benefits of battery electric trucks and plug-in hybrid electric trucks over conventional diesel trucks; develops a connected vehicle application for these trucks.			
Health Risk Characterization for Transportation Users (#01-06)	JHU	Dr. Mary Fox	UTEP
Develops a cumulative exposure and risk profile for transportation workers and/or transportation system users considering chemical and non-chemical stressors.			

Competitive Research Program

The Competitive Research Program will be initiated in the second year of the grant. During the next reporting period, the CAR-TEEH website will be updated to provide information on the program's goals as well as application and review procedures.

Research Results Disseminated

Each of the year one cooperative projects had a May 1st start date. Therefore, there are no results to report for this period.

Plans for Next Reporting Period to Accomplish Research Goal

CAR-TEEH leadership will provide support, guidance, and assistance to project principal investigators to aid in achieving individual project objectives. Additionally, we will ensure that Center activities progress in accordance with the approved work plans.

CAR-TEEH Goal #2: Education and Workforce Development

CAR-TEEH's goal is to support the development of a transportation workforce equipped to deal with emerging needs in the areas of transportation emissions, energy, and health. The focus of the first six months was primarily on administrative activities and the launch of the cooperative projects. Education activities will become more prominent in future reporting periods.

During this reporting period, seven students (six graduate level, one undergraduate) have been hired or transferred onto the six cooperative projects. All partners plan to hire additional students in the fall semester, and these will be documented as part of the December 31st Performance Indicator report.

At the Center kickoff meeting, planning began for the creation of a course development initiative, comprised of a series of video lectures by professionals from the fields of health and transportation. Lectures will be organized into modules that can be assembled into graduate or undergraduate level courses on transportation, energy, and air quality. Course planning and creation are tentatively planned for a year two initiative.

In addition, at Texas A&M, the coordinator of the master of urban planning program and the assistant department head for graduate programs attended the CAR-TEEH kickoff meeting. They have since begun referring graduate students who are interested in transportation and health impacts to the Center. At Johns Hopkins University (JHU), CAR-TEEH goals and objectives were presented in two graduate level courses: Methods in the Exposure Sciences, and Transportation Policy and Health.

Education Results Disseminated

Nothing to report for this period.

Plans for Next Reporting Period to Accomplish Education Goal

Activities will continue as planned, including planning for the 2018 summer internship programs, and curriculum course development.

CAR-TEEH Goal #3: Technology Transfer

The CAR-TEEH technology transfer activities aim to make research results and knowledge available to the research community and beyond. The technology transfer will ensure that the knowledge gained by CAR-TEEH researchers can be shared, implemented, utilized, commercialized or otherwise applied.

Cooperative project #01-01 ("Transportation Emissions and Health Data Hub") is a key component of CAR-TEEH's technology transfer vision. It will provide a means to reconcile different methods of data collection and analysis in the fields of transportation and public health. Where applicable, data sets will be de-identified and shared in compliance with the

relevant institutions' IRB policies. Data will be available in the future for novel research applications. This project output and data sharing capability will serve as one of the products of our technology transfer goals.

Construction of the Data Hub is progressing; software has been selected, and the project's IT infrastructure is underway. Provisional IRB approval has been obtained from the TAMU IRB.

In parallel with Data Hub activities, a Data Management Plan (required grant deliverable) was also developed, outlining CAR-TEEH's plans for data management and compliance with the DOT's Public Access Plan. This document was submitted to the DOT on time and was officially approved on May 30, 2017.

Discussions began at the February kickoff meeting for a symposium that will bring together experts in the fields of transportation and health. Planning for this event will continue in the following reporting period, and target dates for the conference will be determined.

CAR-TEEH's website was created and is being updated on a bi-weekly basis; project information has been entered into the Research in Progress (RiP) database, and the addition of detailed information by project is ongoing.

Technology Transfer Results Disseminated

Nothing to report for this period.

Plans for Next Reporting Period to Accomplish Technology Transfer Goal

Activities will continue as proposed, including planning for the symposium and continued development of the Data Hub.

PRODUCTS

Publications/Conference Papers/Presentations

Name: Dr. Josias Zietsman, Center Director, TTI
Event: 96th Annual TRB Meeting
Title: "Translating Transportation Measures into Health Outcomes - Sustainability."
Location: Washington, D.C.

Name: Dr. Josias Zietsman, Center Director, TTI
Event: Technical Working Group for Mobile Source Emissions meeting
Title: "Center for Advancing Research in Transportation Emissions, Energy and Health – an Overview."
Location: College Station, Texas

Name: Dr. Wen-Whai Li, Partner Lead, UTEP
Event: The 69th Ordinary Meeting of Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juarez, Chihuahua, El Paso, Texas, and Dona Ana County New Mexico Air Basin
Title: "US DOT Center for Advancing Research in Transportation Emissions, Energy, and Health (CAR-TEEH): Research Activities in El Paso."
Location: El Paso, Texas

Name: Dr. Kanok Boriboonsomsin, Partner Lead, UCR
Event: California Energy Commission's 2017 IEPR Lead Commissioner Workshop on Publicly Owned Utility Integrated Resource Plans Transportation Electrification, Medium- and Heavy-Duty Vehicles Sector.
Title: "Research in Support of Transportation Electrification in California: Medium – and Heavy-Duty Vehicles Sector."
Location: Sacramento, California

With the announcement of the CAR-TEEH UTC award, local media and the partner institutions announced the following press releases:

- The Bryan/College Station Eagle:
  Texas A&M Transportation and Health Researchers Combine Forces on Air Pollutants

- Texas A&M Transportation Institute:
  New University Transportation Center Focuses on the Impact of Transportation Emissions on Human Health

- UCR Bournes College of Engineering, Center for Environmental Research & Technology:
  UCR Part of CAR-TEEH that Wins Competitive Tier 1 UTC Grant

- UTEP News:
  UTEP Team Awarded Grant to Study Transportation Emissions, Air Quality and Public Health

- UCR Today:
  New Center to Focus on the Impact of Transportation Emissions on Human Health

- Traffic Technology Today:
  New University Transportation Center Focuses on the Impact of Emissions on Public Health

A list of media contacts for each institution has been compiled and will be maintained by TTI Communications (TTI COMM). TTI COMM will reach out to each institution with new press releases, so these may be edited to focus on each institution and shared with their local news sources.

Website

The CAR-TEEH website (www.carteeh.org) containing the required elements was created within the program deadline. It continues to be refined, with the addition of the cooperative projects, and relevant news or press articles updated on a regular bi-weekly basis.

Technologies

Nothing to report for this period.

Inventions

Nothing to report for this period.

Other Products

As discussed earlier, a strategic plan for the CAR-TEEH UTC is in development. This plan will provide a blueprint for the growth and sustainability of the Center during the initial five-year grant period and beyond.

In conjunction with TTI COMM, a CAR-TEEH Communications Plan will guide our press and social media presence. Our goal is to appeal to a variety of audiences, from the general public, to researchers and potential collaborators, and to policy makers. To do this, we must adopt a strategic approach to sharing information and communicating results to stakeholders.

Strategic and communication plans will ensure that CAR-TEEH UTC remains true to its initial purpose, while the Center is strategically expanded and positioned to surpass its goals in the coming years.

Participants and Collaborating Organizations

CAR-TEEH is made up of a consortium of five institutions: TTI is a member of the Texas A&M University System and home to the Center. Faculty and students from other colleges such as the Texas A&M Health Science Center will also be involved. Johns Hopkins University, Georgia Tech, University of Texas – El Paso, and the University of California, Riverside complete the partnership.

Figure 2: CAR-TEEH Consortium Members

Partner Organizations and Other Significant Collaborators

CAR-TEEH's focus areas cross multiple disciplines, bringing opportunities for a unique collaborative effort with institutions and individuals. These partners are essential to the success of the Center. Organizations and individuals in the following tables have directly supported or collaborated on Center activities.

Table 2: Partner Organizations

Organization Name	Location	Contribution
Houston-Galveston Area Council	Houston, Texas	Collaboration
Central Texas Council of Governments	Belton, Texas	Collaboration
El Paso Independent School District	El Paso, Texas	Facilities
Port of Los Angeles	Los Angeles, California	Facilities
Port of Long Beach	Long Beach, California	Facilities
Port of Savannah	Savannah, Georgia	Facilities
Port of Galveston	Galveston, Texas	Facilities
Port of Houston	Houston, Texas	Facilities

Table 3: Significant Collaborators

Name	Affiliation	Contribution	Country
Dr. Mark Benden	TAMU Health Science Center	Collaboration	U.S.
Dr. Wei Li	TAMU – Landscape Architecture and Urban Planning	Collaboration	U.S.
Dr. Eun Sug Park	TTI – Mobility Analysis	Collaboration	U.S.
Dr. Teresa Qu	TAMU – Landscape Architecture and Urban Planning	Collaboration	U.S.

Dr. Andrea Strzelec	TAMU – Mechanical Engineering	Collaboration	U.S.
Dr. Qi Ying	TAMU – Civil Engineering	Collaboration	U.S.
Dr. Yunlong Zhang	TAMU – Civil Engineering	Collaboration	U.S.
Dr. Susan Chrysler	TTI – SAFE-D UTC Assistant Director	Collaboration	U.S.
Dr. Haneen Khreis	University of Leeds	Collaboration	UK
Dr. Mark Nieuwenhuijsen	Barcelona Institute for Global Health	Collaboration	Spain
Dr. Howard Kipen	Rutgers University Environmental and Occupational Health Sciences Institute	Collaboration	U.S.
Dr. Elizabeth Marshall	Rutgers University Environmental and Occupational Health Sciences Institute	Collaboration	U.S.
Dr. Soyoung Jeon	UTEP – Mathematics Dept.	Statistical Analysis	U.S.
Dr. Kelvin Cheu	UTEP – Civil Engineering	Collaboration	U.S.
Dr. Robert Osegueda	UTEP – Sponsored Research	Financial Support	U.S.
Dr. Carlos Ferregut	UTEP – Engineering Dean's Office	Financial Support	U.S.

As previously discussed, the EC has identified the initial group of individuals who will serve as members of the CAR-TEEH Advisory Board. This group will be comprised of distinguished, high-level professionals who are strategically positioned to offer guidance on emerging trends, partnerships, leveraging opportunities, and scientific activities and research.

The primary members of the advisory board will be one to two high-level officials from each institution. As they are identified, select participants from outside of the partner institutions will be strategically added. It is anticipated that the advisory board will meet on an annual basis, and members will be available on an ad hoc basis throughout the year. A final CAR-TEEH Advisory Board Terms of Reference document has been approved by the EC.

IMPACT

Impact on Development of the Principal and Other Disciplines

CAR-TEEH has just begun the development of its programs. Therefore, we have not yet generated impacts of enough significance to be included at this time.

Impact on Development of Transportation Workforce Development

CAR-TEEH has just begun the development of its programs. Therefore, we have not yet generated impacts of enough significance to be included at this time.

Impact on Physical, Institutional, and Information Resources at the University or Other Partner Institutions

As a result of CAR-TEEH and matching funds provided by the UTEP administration, ambient air monitoring devices have been purchased for use on project #01-04, Healthy Living and Traffic-Related Air Pollution in an Underserved Community.

Impact on Technology Transfer

CAR-TEEH has just begun the development of its programs. Therefore, we have not yet generated impacts of enough significance to be included at this time.

Society Beyond Science and Technology

Nothing to report for this period.

CHANGES/PROBLEMS

Nothing to report for this period.

SPECIAL REPORTING REQUIREMENTS

No special reporting requirements.