

PROGRAM PROGRESS PERFORMANCE REPORT

Awarding Federal Agency: US Department of Transportation, Research and Innovative Technology Administration

Federal Grant Number: DTRT12-G-UTC16

Project Title: Center for Advanced Infrastructure and Transportation (CAIT) Tier I UTC Consortium Led by Rutgers, The State University of New Jersey

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Name of Submitting Official, Title, and Contact Information (e-mail address and phone number), if other than PD: Dr. Patrick Szary, CAIT Associate Director. **E-mail address:** szary@rci.rutgers.edu **Phone number:** 848-445-2999

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Recipient Organization (Name and Address): Rutgers, The State University of New Jersey, Center for Advanced Infrastructure and Transportation, 100 Brett Road, Piscataway, NJ 08854-8058

Recipient Identifying Number or Account Number, if any: Rutgers' account #434310

Project/Grant Period: January 1, 2012 through January 31, 2014

Reporting Period End Date: June 30, 2012

Report Term or Frequency: This first report covers the first 6 months of the project (1/1/12-6/30/12)

Signature of Submitting Official:



1. **ACCOMPLISHMENTS**: What was done? What was learned?

What are the major goals of the program?

The major goal of the CAIT Tier I UTC Consortium is to build a program that will: 1) have a sharp focus on maintaining state of good repair of the nation's infrastructure and the interrelated activities of the Secretary of Transportation's strategic goals where the consortium can make significant impacts, and 2) foster intelligent, effective, and meaningful leveraging between institutions and stakeholders to achieve program goals and objectives.

State of Good Repair (SGR) has been identified as the consortium's **primary area of research** and Safety and Economic Competitiveness as secondary areas in which we believe our team's capabilities, resources, past experience, and track record qualify us to make significant impacts toward reaching the goals of the USDOT. To help fulfill these goals and objectives we will:

- **Sharply focus our research portfolio** to make significant and meaningful impacts during the lifetime of the grant. The UTC designation will be a catalyst for generating relevant and sustainable operations that can aid USDOT in fulfilling the objectives of its strategic plan.
- **Develop effective leveraging** with centers of critical mass and establish networks of researchers, laboratories, test-beds, proving grounds, and all other resources necessary to address the objectives of the strategic plan. Through intelligent leveraging, we will minimize potential duplication of effort and promote and encourage meaningful team work and collaboration.
- **Develop and enhance meaningful relationships with local, regional, national, and international stakeholders** to stay abreast of new problems and best practices; work together to address local challenges and needs; and partner in implementing research results and products.

The consortium will cultivate interest in the transportation industry through a comprehensive **education and workforce development program**. The education and workforce goals are to:

- Develop an educational program that will prepare current and future transportation professionals and researchers to be responsive to changes in the transportation field.
- Develop a strong multidisciplinary component that reflects changes in the organizational, intermodal, and global character of transportation, as well as the use of advanced materials and technologies relative to infrastructure.
- Develop a program that informs high school students about transportation studies and encourages undergraduates to pursue advanced transportation studies.

The consortium supports knowledge sharing and is committed to move research results into practice through its **technology transfer initiatives**. The technology transfer goals are to:

- Ensure all research proposals include feasible implementation plans.
- Provide a forum to discuss the state of practice and innovative new technologies that support State of Good Repair, through conferences and symposiums.
- Continuously post reports and research findings in multiple online repositories and clearinghouses, such as the USDOT Research Clusters and CAIT website.

What was accomplished under these goals?

Major Goal Area	Major Activities	Specific Objectives	Significant Results	Key Outcomes
Research	Research Selection	Select projects that make significant and meaningful impacts during the lifetime of the grant.	Several projects have cleared the pre-proposal stage and are now being developed by the PI's for full submission and review.	The Research Advisory Board has already reviewed and approved seven new research projects
Education and Workforce Development	Hosted CET meeting to prepare current and future transportation professionals and researchers to be responsive to changes in the transportation field	Generate knowledge and skills to foster a world class workforce for the transportation sector	Host a one-day immersion program for new Civil Engineers in training (CETs) to showcase not only the local research resources available at Rutgers but the capabilities and synergy that exist at our consortium schools.	NJDOT CETs left with an understanding that CAIT's research correlates with projects at the local and state levels.
	Supported Transportation YOU Youth Summit, a joint effort between Women's Transportation Seminar and USDOT (March 28- April 1, 2012).	Generate knowledge and skills to foster a world class workforce for the transportation sector	26 women from across the nation attended the first annual Transportation YOU Summit in Washington, DC	CAIT staff were part of both the steering committee that worked for 8 months solely by teleconference and email, and a Summit workshop presenter.
	Active participant in UTC Workforce Summit (April 24-26, 2012)	Generate knowledge and skills to foster a world class workforce for the transportation sector	The start of a National Transportation Strategic Framework to link workforce needs to workforce development policies and programs	CAIT was well represented by three showcase presentations: "NJ's Work Zone Safety Partnership: Bringing All the Stakeholders Together", "Continuing Education for Construction Professionals: Cradle to Rehabilitation", and "Mapping the Structure of Work in Public Transportation".

	Organized Asphalt Paving Conference (March 6-7 2012)	Generate knowledge and skills to foster a world class workforce for the transportation sector	350 professionals (representing NJ, NY, PA, and DE) attended the Asphalt Paving Conference.	Attendees learned about the latest in design, construction, technologies, and maintenance from top researchers, suppliers and practitioners in the asphalt paving industry.
	Hosted First "Traveling Distinguished Lecturer Series" (April 20, 2012)	Generate knowledge and skills to foster a world class workforce for the transportation sector	Pierce Homer, transportation director at Moffatt & Nichol and former Virginia Secretary of Transportation shared real-world challenges of maintaining state of good repair in multimodal environments and a growing economy, and how the political environment influences the ability to keep the nation's infrastructure healthy and operational.	Exposure to transportation issues and interaction of graduate and undergraduate students, researchers and professionals with experts in the transportation industry.
	Annual Work Zone Safety Conference, hosted by NJLTAP in cooperation with NJ Work Zone Safety Partnership (April 25, 2012)	Generate knowledge and skills to foster a world class workforce for the transportation sector	Interactive roundtable discussion on recent case studies on improving work zone safety practices.	Conference promoted work zone safety awareness with a multidisciplinary panel on internal traffic control, basics of traffic control from the Manual on Uniform Traffic Control Devices (MUTCD) Part 6, as well as a discussion on the financial implications of an accident in the work zone.

	<p>Short Course on Structural Health Monitoring using Fiber Optic Sensors sponsored by Princeton University (March 23, 2012)</p>	<p>Generate knowledge and skills to foster a world class workforce for the transportation sector</p>	<p>The aim of this course was to transfer the knowledge on Structural Health Monitoring (SHM) and Fiber Optic Sensing (FOS). Attendees included civil engineers, practitioners, consultants, contractors, researchers, infrastructure managers, and owners.</p>	<p>Participants were introduced to the SHM process which is generally used to increase the safety, plan and design maintenance activities of the structure being monitored. They also gained knowledge about available FOS technologies, and SHM methods based on FOS technologies.</p>
	<p>I-95 Freight Academy Immersion program (April 15-20, 2012)</p>	<p>Generate knowledge and skills to foster a world class workforce for the transportation sector</p>	<p>This program included participants along the entire I-95 Corridor and can be considered an “eastern seaboard program” which addresses large increases in freight movements; dynamic changes in the goods movement industry; the need to understand freight as an integral part of the transportation system; and an increasing need to integrate freight facilities and operations with community goals.</p>	<p>Freight Academy class consisted of 30 freight professionals selected from a pool of applicants expected to be the next generation of public sector staff tasked with managing freight system and included participants from the majority of the CAIT UTC home states of DE, NJ, NY, and VA.</p>
	<p>Well represented in the Women’s Transportation Seminar Annual Conference (April, 2012)</p>	<p>Generate knowledge and skills to foster a world class workforce for the transportation sector</p>	<p>The consortium sent Thanh Le of Rutgers; Lourdes Taveras of Utah State University; Laura Black of UD; and Patty DiJoseph of NJIT.</p>	<p>Through this program, the consortium provided a unique and meaningful experience to four female students interested in the field of transportation.</p>

	Sponsored summer State DOT internship program (June-August, 2012)	Generate knowledge and skills to foster a world class workforce for the transportation sector	For example, Sean Weeks was selected to participate in the program working on-site at UDOT	Intern is currently working in Region 1 and gaining valuable hands-on experience and skills related to the transportation field.
Technology Transfer	Participated in the LTAP Directors Meeting (June 2012)	Create workforce training opportunities for local government	The LTAP Directors met for the first time of an ongoing dialog about how to maximize the benefits of the research and best practices generated from the UTC program for the local audience.	Participants will work on developing opportunities that will range from webinars to offer continuing education credit to actual training on research product. This link from research to local operatives will expedite the implementation of research products to the local government level.

What opportunities for training and professional development has the program provided?

This information has been integrated into the table above for the “what was accomplished under these goals?” section. Please see table above.

How have the results been disseminated?

This information has been integrated into the table above for the “what was accomplished under these goals?” section. Please see table above.

What do you plan to do during the next reporting period to accomplish the goals?

- **MANAGEMENT AND COLLABORATION ACTIVITIES:**
 - **Partner Meeting (~September 25, 2012):** Encourage collaboration within the consortium not only on the UTC funded projects but also on NCHRP initiatives. The main topic will be to discuss research projects and ideas to be funded with the collaborative pool. In addition, the group will review candidates for the Student of the Year (SOY) award.
- **RESEARCH ACTIVITIES:**
 - **Ongoing Review of Research projects by the Research Advisory Board:** As previously described.
 - **Modify Agreements to Approve expenditure of Research Funds:** No research activities can start until the projects have been reviewed and approved as outlined in the prime proposal submitted to RITA. Therefore CAIT will issue modifications to the master agreement with each partner as research projects are approved.
 - **Ongoing Research:** Each of the consortium members will continue to perform SGR oriented research.
- **EDUCATION AND WORKFORCE DEVELOPMENT ACTIVITIES:**
 - **Schedule with the Partner Schools the Fall “Traveling Distinguished Lecture Series”:** This will include scheduling facilities at each school and coordinating the logistics of broadcasting

the webinar at each location. A promotional poster will be developed and broadly distributed within the consortium.

- **Summer Transportation Institute/Governors School (July 2012)**-NJ: CAIT will work within a pair of summer residential program for students who have shown an excellence in the field of engineering to further educate them in the field of infrastructure.
- **Intersection Safety Webinar (July 25, 2012)**: FHWA Resource Center design engineer and award-winning subject matter expert John McFadden, Ph.D., presented a two-hour address of intersection-related roadway management operations. Attendees gained federal perspectives on intersection safety issues as McFadden defined and explored effective crash reduction options for engineers and planners who want to use federally-approved crash reduction applications to improve intersection safety
- **TECHNOLOGY TRANSFER ACTIVITIES:**
 - **Meet with LTAP Directors (August 2012)**: The CAIT UTC Local Technical Assistance Programs (Delaware, New Jersey, Utah, Virginia) will meet at the summer National Local Technical Assistance Program conference as part of their ongoing dialog about technology transfer opportunities for their local government constituents.
 - **Coordination and Logistics for the State of Good Repair Summit**: CAIT will convene a planning committee of its consortium partners to plan and determine the featured speakers for the conference. The consortium will look to leverage its regional prominence to attract both significant players and major participants. All logistics for hosting the event will be handled; including location reservations, advertising, promotion, and speaker recruitment efforts.

2. **PRODUCTS**: What has the program produced?

Research projects awarded

The Research Advisory Board has reviewed and approved seven new research projects:

- "Development of a Bridge Resource Program for the New Jersey Department of Transportation" (Rutgers University)
- "Development of a Comprehensive Hot Mix Asphalt Pavement Specification" (Rutgers University)
- "Improved Connection Details for Adjacent Prestressed Bridge Beams" (Virginia Polytechnic Institute)
- "Development for Transportation Asset Management Inventory & Management Tools" (Utah State University)
- "ABC Deck Panel Testing" (Utah State University).
- "Forensic Testing of Prestress Concrete Girders after Forty Years of Service" (Utah State University)
- "Virginia Bridge Information Systems Laboratory" (University of Virginia)

Publications, conference papers, and presentations

Journal publications.

"Nothing to Report"

Books or other non-periodical, one-time publications.

"Nothing to Report"

Other publications, conference papers and presentations.

"Nothing to Report"

Website(s) or other Internet site(s)

CAIT has established two internet sites:

- <http://cait.rutgers.edu/cait/research> to disseminate research results
- <http://cait.rutgers.edu/cait/program-sites> to inform about consortium program activities

Technologies or techniques

- TRB appointment of Ms. Janet Leli to the ABG30 Committee on Technology Transfer

Inventions, patent applications, and/or licenses

“Nothing to Report”

Other products: outreach activities, courses and workshops

- The Traveling Distinguished Lecturer Series has been implemented, with one lecture/webinar broadcast conducted and two currently scheduled
- 72 continuing education workshops delivered
- Outreach events to the general community that showcased State of Good Repair related research activities have occurred, including Rutgers Day (Rutgers University), exhibited at National Transportation Workforce Summit, High-School Engineering Expo
- ITE Transportation Education Council 2012 Innovation in Education Award for CAIT’s K-12 educational programs
- ITE Transportation Achievement Award for Safety for Plan4Safety

3. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS:**What individuals have worked on the program?**

Program Director: Dr. Ali Maher

Project Directors: Dr. Sue McNeil (University of Delaware), Dr. Paul J. Barr (Utah State University), Dr. Raimondo Betti (Columbia University), Dr. Lazar N. Spasovic (NJIT), Dr. Branko Glisic (Princeton University), Dr. Soheil Nazarian (University of Texas at El Paso, Dr. Steven B. Chase (University of Virginia), Dr. Carin Roberts-Wollmann (Virginia Polytechnic Institute)

Individuals Who Have Worked on the Program

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY	
Name	Dr. Ali Maher
Program/Project Role	Director
Number of Hours worked during reporting period	716
Contribution to Program/Project	Dr. Maher provided overall leadership of the consortium
Funding Support	Rutgers University
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	Taiwan, Republic of Georgia
Traveled to foreign country	Taiwan* No UTC Funds were used to fund this travel
If traveled to foreign country(ies), duration of stay	7 days
Name	Dr. Patrick Szary
Program/Project Role	Associate Director
Number of Hours worked during reporting period	37.5
Contribution to Program/Project	Dr. Szary worked closely with the Director and acted as liaison with partnering universities and agencies. He attended the UTC Directors’ meeting.

Funding Support	UTC
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	China and Nigeria
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Allison Thomas
Program/Project Role	Associate Director of Marketing and Communications
Number of Hours worked during reporting period	66
Contribution to Program/Project	Ms. Thomas was responsible for outreach and communication activities
Funding Support	UTC
Collaborated with individual in foreign country	N/A
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Janet Leli
Program/Project Role	Associate Director of Technology Transfer
Number of Hours worked during reporting period	41
Contribution to Program/Project	Responsible for continuing education, technical assistance and knowledge transfer activities and principal investigator for project entitled "Technology Transfer Special Projects"
Funding Support	UTC (17 hours) and NJ-DOT (24 hours)
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Sherif Stephan
Program/Project Role	Senior Business Manager
Number of Hours worked during reporting period	39
Contribution to Program/Project	Mr. Stephan was responsible for financial management
Funding Support	UTC
Collaborated with individual in foreign country	N/A
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Marta Zurbriggen
Program/Project Role	Project Coordinator
Number of Hours worked during reporting period	67.5
Contribution to Program/Project	Ms. Zurbriggen was responsible for the execution and monitoring of the consortium subcontracts and supported data collection for reporting purpose.
Funding Support	UTC
Collaborated with individual in foreign country	N/A
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Theodore Green
Program/Project Role	Transportation Infrastructure Engineer
Number of Hours worked during reporting period	23
Contribution to Program/Project	Responsible for coordinating the CAIT Traveling Lecture Series with the consortium partners of in-house and webcast seminars on the theme of State of Good Repair of our infrastructure. Included with the responsibilities

	has been the research and implementation of the technical requirements for the nationwide seminar webcast.
Funding Support	UTC
Collaborated with individual in foreign country	N/A
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Azam Kalantari
Program/Project Role	Administrative coordinator
Number of Hours worked during reporting period	26.4
Contribution to Program/Project	Supported managerial and business operations
Funding Support	UTC
Collaborated with individual in foreign country	N/A
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Tahereh Khodabandehlooie
Program/Project Role	Administrative Assistant
Number of Hours worked during reporting period	26.4
Contribution to Program/Project	Supported day to day business operations
Funding Support	UTC
Collaborated with individual in foreign country	N/A
Traveled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A
Name	Andres Roda
Program/Project Role	Engineering Research Project Manager
Number of Hours worked during reporting period	137
Contribution to Program/Project	Principal investigator for project titled "Development of Local Concept Development Training Course"
Funding Support	North Jersey Transportation Planning Authority
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Dr. Tayfur Altiok
Program/Project Role	Faculty
Number of Hours worked during reporting period	155
Contribution to Program/Project	Education, technology transfer and research
Funding Support	Rutgers University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Dr. Mohsen Jafari
Program/Project Role	Faculty
Number of Hours worked during reporting period	207
Contribution to Program/Project	Education, technology transfer and research
Funding Support	Rutgers University
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	China* No UTC Funds were used to fund this travel
Traveled to foreign country	China

If traveled to foreign country(ies), duration of stay	11
Name	Dr. Eric Gonzales
Program/Project Role	Faculty
Number of Hours worked during reporting period	216
Contribution to Program/Project	Education and research
Funding Support	Rutgers University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Dr. Nenad Gucunski
Program/Project Role	Faculty
Number of Hours worked during reporting period	216
Contribution to Program/Project	Education and research
Funding Support	Rutgers University
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	China, South Korea
Traveled to foreign country	China and South Korea * No UTC Funds were used to fund this travel
If traveled to foreign country(ies), duration of stay	12 days
Name	Dr. David Hill
Program/Project Role	Faculty
Number of Hours worked during reporting period	216
Contribution to Program/Project	Education
Funding Support	Rutgers University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Dr. Monica Mazurek
Program/Project Role	Faculty
Number of Hours worked during reporting period	293
Contribution to Program/Project	Education, technology transfer and research
Funding Support	Rutgers University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Dr. Hao Wang
Program/Project Role	Faculty
Number of Hours worked during reporting period	216
Contribution to Program/Project	Education
Funding Support	Rutgers University
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	China
Traveled to foreign country	China* No UTC Funds were used to fund this travel
If traveled to foreign country(ies), duration of stay	10 days
Name	Dr. Trefor Williams
Program/Project Role	Faculty
Number of Hours worked during reporting period	216

Contribution to Program/Project	Education and research
Funding Support	Rutgers University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
Name	Dr. Jingang Yi
Program/Project Role	Faculty
Number of Hours worked during reporting period	147
Contribution to Program/Project	Research
Funding Support	Rutgers University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Traveled to foreign country	No
If traveled to foreign country(ies), duration of stay	N/A
PRINCETON UNIVERSITY	
Name	Branko Glisic
Program/Project Role	Program manager for Princeton U., PI
Number of hours worked during the reporting period	20
Contribution to Program/Project	1) Managing activities related to UTC CAIT and coordination with other Princeton University researchers. 2) Preparation of research proposal
Funding Support	Princeton University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A
Name	Dorotea Sigurdardottir
Program/Project Role	Graduate student
Number of hours worked during the reporting period	10
Contribution to Program/Project	Preparation of research proposal
Funding Support	Princeton University
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A
UNIVERSITY OF DELAWARE	
Name	Sue McNeil
Program/Project Role	Principal Investigator at UD
Number of hours worked during the reporting period	60
Contribution to Program/Project	Developed workplan for CAIT at UD Developed request for preproposals at UD Answers questions from faculty regarding preproposals. Engaged advisory group in selection of UTC Fellowship recipient (2012/2013 Academic Year)
Funding Support	University of Delaware
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A

Name	Laura Black
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	60
Contribution to Program/Project	Participated in WTS meeting
Funding Support	TBD
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A
UNIVERSITY OF VIRGINIA	
Name	Steven B. Chase
Program/Project Role	UVA Program Director
Number of hours worked during the reporting period	60 hrs
Contribution to Program/Project	Set up CAIT@UVA, defined SOW and obtained matching funds
Funding Support	UVA
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A
VIRGINIA POLYTECHNIC INSTITUTE	
Name	Kedar Halbe
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	140
Contribution to Program/Project	Developed connection details, designed and cast first set of test specimens
Funding Support	UTC
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A
UTAH STATE UNIVERSITY	
Name	Dr. Paul Barr
Program/Project Role	UTC Director and PI
Number of hours worked during the reporting period	160 hours
Contribution to Program/Project	Manage transportation center at USU and serve as PI on the Forensic Testing Project
Funding Support	USU
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A
Name	Dr. Marv Halling
Program/Project Role	PI
Number of hours worked during the reporting period	40 hours
Contribution to Program/Project	PI for ABC Precast Deck Project
Funding Support	USU
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A

Name	Dr. Kevin Heaslip
Program/Project Role	PI
Number of hours worked during the reporting period	40 hours
Contribution to Program/Project	PI for Sign Retroreflectivity Project
Funding Support	USU
Collaborated with individual in foreign country	No
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	No
If travelled to foreign country(ies), duration of stay	N/A

The university does not charge projects based on hours, but are charged based on "percentage of effort" in accordance with A-21. Based on OMB Circular A-21 the university confirms that compensation charged either directly or indirectly to a contract accurately reflects work effort expended. The information provided in the table above is for reference purposes.

Consortium Universities Involved:

- Rutgers, The State University of New Jersey (Lead)**
- University of Delaware, Newark, DE**
- Utah State University, Logan, UT**
- Columbia University, New York, NY**
- New Jersey Institute of Technology, Newark, NJ**
- Princeton University, Princeton, NJ**
- University of Texas, El Paso, TX**
- University of Virginia, Charlottesville, VA**
- Virginia Polytechnic Institute, Blacksburg, VA**

What other organizations have been involved as partners?

Organization Name	Location of Organization	Partner's contribution to the project
New Jersey Department of Transportation	1035 Parkway Ave., Trenton, NJ 08625	Financial support; Collaborative research; Personnel exchanges
WTS International	1701 K Street, NW, Suite 800, Washington DC 20006	Female participation in the transportation field
Utah Department of Transportation	4501 South 2700 West, Salt Lake City, UT 84114	Financial support; Collaborative research; Personnel exchanges
Virginia Center for Transportation Innovation and Research	530 Edgemont Road, Charlottesville, VA 22903	Financial support; Collaborative research; Personnel exchanges
New Jersey Asphalt Paving Association	520 Horizon Drive, Trenton, NJ 08691-1907	In-kind support; Facilities; and Personnel exchanges
American Automobile Association of New Jersey (AAA-NJ)	1 Hanover Road, Florham Park, NJ 07932	In-kind support (provided safety related activity books that cover from K-6th grade)
I-95 Corridor Coalition	1390 Piccard Drive, Suite 200, Rockville, MD, 20850	Support of Freight Academy Immersion Program

Have other collaborators or contacts been involved?

• collaborations with others within the lead or partner universities; especially interdepartmental or interdisciplinary collaborations

- Several collaborations with the Edward J. Bloustein School of Planning and Public Policy (Rutgers) to generate proposals in response to both state and federal solicitations, including NJ

Department of Transportation ADA Paratransit Service Area Geographic Realignment project and the DOT Federal Highway Administration Highway Research and Development Program.

- LTAP Directors met for the first time to establish an ongoing dialog about how to maximize the benefits of the research and best practices generated from the UTC program for the local audience. Janet Leli, Director New Jersey LTAP at Rutgers; Rusty Lee, Director Delaware LTAP at UDel; Nick Jones, Director Utah LTAP at USU; and Bill Kelsh, Director Virginia LTAP at UVA.

- **collaborations or contact with others outside the UTC**

- RITA and the Western Transportation Institute (WTI) are in the process of creating an electronic resource that is designed to make it easier to find information about the advanced laboratory facilities available at University Transportation Centers in the country. At the request of WTI, the consortium has uploaded our laboratory research facilities into the newly launched database.

- **collaborations or contacts with others outside the United States or with an international organization (country(ies) of collaborations or contacts).**

- CAIT partnered with the Edward J. Bloustein School of Planning and Public Policy (Rutgers) and **Kvali Educational Advising Center from the Republic of Georgia** in a collaborative proposal where the deteriorating condition of Georgian roads, bridges and other heavily used infrastructure will be used as a topical teaching focus and basis for public policy development.
- Hosted Nigerian delegation in cooperation with the National Transit Institute (NTI) supporting USDOT-FTA strategic objectives related to best practices for Law Enforcement Training and Research.
- Faculty traveled to Taiwan to meet with potential collaborators and CAIT hosted 23 Taiwanese delegates of the 8th US-Taiwan Bridge Engineering Workshop for a half-day session in which CAIT and some of its industry and academic partners provided a snapshot of Rutgers bridge research activities. The Taiwanese delegates also got hands-on demos CAIT's large arsenal of nondestructive evaluation tools and methods and a tour of its AMRL-accredited pavement materials lab.
- In cooperation with the Bloustein School of Planning and Public Policy, hosted delegation from the Louis Berger Group and its Beijing affiliate-CHELBI. Based on 27 years of professional engineering activities, this is the oldest and most successful American-Chinese professional joint venture. Leadership of the Berger organization has strongly encouraged Rutgers to collaborate with them, thus benefiting from their experience, and position the university to play an educational role in China's expanding transportation, environmental planning, and related enterprises.
- CAIT faculty traveled to China to give lectures and discuss potential academic and research collaborations with Harbin Institute of Technology (HIT) and the Southeast University (SEU).
- CAIT faculty traveled to South Korea to explore interests and opportunities for collaboration between Rutgers and Korean Universities, Chungnam National University in particular. In addition, to explore opportunities for collaboration in research, learn about technologies in Korea, and present results from research activities.

4. IMPACT: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?

What is the impact on the development of the principal discipline(s) of the program?

Outputs	Expected Outcomes	Impacts
<p>“Development of a Bridge Resource Program for the New Jersey Department of Transportation” (Rutgers University)</p>	<p>The support from the UTC will help establish a program that is intended to become an integral component of the NJDOT’s bridge research activities. The products of this project will be a report on the state’s structural asset management activities as well as a pilot plan to provide enhanced nondestructive evaluation and inspection on a sample of the State bridges.</p>	<p>The USDOT Strategic Goal of State of Good Repair will be directly addressed with this research. Through improving asset management strategies and incorporating nondestructive evaluation strategies, the Bridge Resource Program will provide NJDOT with advanced tools to manage the state's structural assets. In addition, the Bridge Resource Program will incorporate advanced load rating analyses to evaluate ten bridges. The advanced investigation will provide NJDOT with a new tool that will enable engineers to determine precise load carrying capacities of bridges. While this clearly supports state of good repair, the tool also provides a means to maintain economic competitiveness for state routes for trucking by preventing overload truck permits being re-routed due to load carrying capacity limits resulting from “standard” structural ratings. New tools will determine if additional load carrying capacity exists in the selected bridges and to demonstrate the value of such advanced analytical approaches.</p>
<p>“Development of a Comprehensive Hot Mix Asphalt Pavement Specification” (Rutgers University)</p>	<p>The major goal of this study is to search and critically evaluate the literature to determine how the HMA quality characteristics can best be incorporated into the existing NJDOT HMA pavement specification to produce a comprehensive and effective multi-characteristic acceptance specification that can be easily understood and implemented. Particular attention will be paid to methods to develop a simple but scientifically-based performance-related pay adjustment methodology to</p>	<p>Improve the state-of-good repair of multimodal transportation infrastructure systems</p>

	<p>produce a new specification that is practical and effective, fair to both the highway agency and the construction industry, and legally defensible. It is expected that successful completion of this project will significantly advance the asphalt technology development in NJ and extend the service life of flexible pavements.</p>	
<p>“Improved Connection Details for Adjacent Prestressed Bridge Beams” (Virginia Polytechnic Institute)</p>	<p>The primary outcome of the project will be recommendations for improved connection details for adjacent precast/prestressed member bridges.</p>	<p>Bridges constructed with the new details are expected to have longer service lives with reduced maintenance costs. Safety is also addressed, because with the new detail the shear transfer between members will not break down and compromise the redundancy of the system. Collapses, such as that seen in Pennsylvania, will not occur with the new detail. Finally, Economic Competitiveness is also addressed because adjacent member bridges can be constructed rapidly and inexpensively.</p>
<p>“Development for Transportation Asset Management Inventory & Management Tools” (Utah State University)</p>	<p>Major expected outcomes are increased technology in the maintenance processes; data availability for decision makers; training workshops for LTAP customers and algorithms for optimization of maintenance investments.</p>	<p>This project strongly supports the USDOT goal of State of Good Repair by providing added value to the maintenance funding that is being expended by UDOT and other state DOTs. Also, this research will contribute to the goals of safety by providing roadways with better signage which will contribute to less driver confusion and less crashes on the roadways.</p>
<p>“ABC Deck Panel Testing” (Utah State University)</p>	<p>The research findings will result in design recommendations that can be used by state agencies for precast concrete deck panel connections.</p>	<p>Accelerated Bridge Construction techniques are a promising way of reducing the overall cost of bridge replacements. Specifically, the efficient use of precast concrete deck panels have been used by many states as a viable alternative. By providing a better method to post tension the precast deck panels, the potential benefit of these systems can be a nice tool for DOTs to have available.</p>

<p>“Forensic Testing of Prestress Concrete Girders after Forty Years of Service” (Utah State University)</p>	<p>It is anticipated that the research findings will result in design recommendations that will aid state agencies in better estimate the behavior of in-service bridges.</p>	<p>This project has direct implications for operation and maintenance practices as well as new construction planning.</p>
<p>“Virginia Bridge Information Systems Laboratory” (University of Virginia)</p>	<p>The support from the UTC will help establish this laboratory which is intended to become an integral component of the VDOT’s bridge research activities. The products of this project will be</p> <ol style="list-style-type: none"> 1. An annual report summarizing the activities and accomplishments of the laboratory. 2. Special reports produced in response to requests for VDOT and VCTIR. 3. Papers submitted and published in archival quality journals. 4. Conference papers and presentations. 	<p>This research supports the US DOT’s State of Good Repair Strategic Goal by utilizing data from the Long Term Performance Bridge program as one of the ancillary data sources for the proposed laboratory; by helping to develop, evaluate and explore new system performance indicators for bridges; by examining the trends in permits for weights in excess of legal limits and quantifying bridge damage costs associated with those loads; by studying specific aspects of bridge performance and helping to develop a comprehensive process to regularly document the condition of VDOT’s bridge infrastructure; supporting and advancing sound asset management principles for bridges through the deployment of new tools and techniques, the transfer of knowledge, and by providing technical assistance to more effectively manage the system; and by encouraging VDOT to use improved highway design and construction procedures, innovative quality assurance practices, innovative materials, and asset management practices by conducting special studies on the efficacy and cost effectiveness of such practices.</p>

What is the impact on other disciplines?

“Nothing to Report”

What is the impact on the development of transportation workforce development?

Outputs	Outcomes/Impacts
Civil Engineers in training (CETs)	NJDOT CETs left with an understanding that CAIT’s research correlates with projects at the local and state levels.
Participated and Helped Organize the Transportation You Youth Summit with WTS	26 women from across the nation attended the first annual Transportation YOU Summit in Washington, DC.
Participated in UTC Workforce Summit	CAIT was well represented by three showcase presentations: “NJ’s Work Zone Safety Partnership: Bringing All the Stakeholders Together”, “Continuing Education for Construction Professionals: Cradle to Rehabilitation”, and “Mapping the Structure of Work in Public Transportation”.
Asphalt Paving Conference (organized, coordinated, and hosted)	Attendees learned about the latest in design, construction, technologies, and maintenance from top researchers, suppliers and practitioners in the asphalt paving industry.
Traveling Distinguished Lecturer Series (organized, coordinated, and hosted)	Exposure to transportation issues and interaction of graduate and undergraduate students, researchers and professionals with experts in the transportation industry.
I-95 Freight Academy Immersion program (organized, coordinated, and hosted)	Freight Academy class consisted of 30 practicing professionals selected from a pool of applicants expected to be the next generation of public sector staff tasked with managing freight system and include participants from the majority of the CAIT UTC home states of DE, NJ, NY, and VA.
Sent students to participate in the Women’s Transportation Seminar Annual Conference	Through this program, the consortium provided a unique and meaningful experience to four female students interested in the field of transportation.
Summer Internship at Department of Transportations	Interns gained valuable hands-on experience and research skills related to the transportation field. Participation in this program provided the interns with a competitive edge when ready to enter the job market.
Hosted Annual Work Zone Safety Conference in cooperation with NJ Work Zone Safety Partnership	Conference promoted work zone safety awareness with a multidisciplinary panel on internal traffic control, basics of traffic control from the Manual on Uniform Traffic Control Devices (MUTCD) Part 6, as well as a discussion on the financial implications of an accident in the work zone.
Short Course on Structural Health Monitoring using Fiber Optic Sensors sponsored by Princeton University	Civil engineers, researchers, practitioners, infrastructure managers and owners were introduced to the SHM process which is generally used to increase the safety, plan and design maintenance activities of the structure being monitored. They also gained knowledge about available FOS technologies, and SHM methods based on FOS technologies.

What is the impact on physical, institutional, and information resources at the university or other partner institutions?

“Nothing to Report”

What is the impact on technology transfer?

“Nothing to Report”

What is the impact on society beyond science and technology?

Outputs	Outcomes/Impacts
<p>Outreach events to the general community that showcased State of Good Repair related research activities have occurred, including Rutgers Day (Rutgers University), exhibited at National Transportation Workforce Summit, High- School Engineering Expo, and various summer K-12 programs at partner universities.</p>	<p>Improving public knowledge</p>
<p>Guidance for Newark high school students, advising the students to look outside of advertising and media firms for creative careers specifically in the transportation sector.</p>	<p>The Newark public school system offers a wide range of career and technical educational programs including specialized tracks in in which students learn practical skills related to media, entertainment, publications, and advertising; which all can relate to and support the transportation industry.</p>

5. CHANGES/PROBLEMS

Changes in approach and reasons for change

“Nothing to Report”

Actual or anticipated problems or delays and actions or plans to resolve them

“Nothing to Report”

Changes that have a significant impact on expenditures

“Nothing to Report”

Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards

“Nothing to Report”

Change of primary performance site location from that originally proposed

“Nothing to Report”

6. SPECIAL REPORTING REQUIREMENTS

“Nothing to Report”