

QUARTERLY REPORTING CATEGORIES
University of Idaho
June 2012

1. ACCOMPLISHMENTS:

A. University of Idaho:

1. Subawards submitted & funding decisions complete.
2. Tranliveutc.org website set up with projects added; added projects to RiP database.
3. Ahmed Abdel-Rahim attended the Applications for the Environment: Real-Time Information Synthesis (AERIS) User Needs Workshop in March, 2012 sponsored by US DOT. The objective was to establish a TranLIVE research program that does not duplicate US DOT's AERIS efforts, but at the same time complements them.
4. Hosted TranLIVE kickoff meeting with RITA and partners.
5. Completed planning for joint graduate seminar series/class among all five partner universities for fall semester.

B. Old Dominion University:

6. Three faculty members (Dr. Asad Khattak, Dr. Mecit Cetin, and Dr. Mike Robinson) also attended the AERIS Workshop in Washington, DC.
7. Two faculty members from ODU participated in the TranLIVE kickoff meeting at University of Idaho.
8. ODU established final projects for funding. These include five small projects, and one large project.
9. ODU submitted research project descriptions to the University of Idaho.

C. Syracuse University:

10. Two workshop sessions were held on June 4-5 and June 7-8 on Sustainable Engineering, organized at the Syracuse Center of Excellence in Environmental and Energy Systems in partnership with Syracuse University.
 - a. Sustainability of transportation systems constituted one of the core areas in these workshops.
 - b. Tenure-track faculty members participating in these workshop sessions were encouraged to cover significant aspects of sustainable transportation systems in the courses that they develop.
11. Dr. O. Sam Salem traveled to Moscow, ID to attend TranLIVE Kickoff meeting, April 8-11, 2012.
12. Proposals were prepared for research projects that will be undertaken by the Syracuse University as the lead institution.
13. Efforts to establish a high-end computer laboratory that will be used for the research projects under the TranLIVE program have been finalized. These computers will be equipped with the necessary software programs to conduct various types of analysis such as Life-Cycle Assessment Analysis, Life-Cycle Cost Analysis, and User Cost Analysis.
14. Search for graduate students and a research associate, who will be participating in the research projects that will be initiated in the next reporting period, has started.
15. Instructional modifications have been made to an existing Graduate Level Course on "Sustainable Development and Infrastructure Management: dividing the class into two major

portions: (1) Infrastructure Asset Management and (2) Sustainability Aspects of Infrastructure Systems.

D. Texas Southern University:

16. Established final projects for funding. These include two individual projects, leading one large project, and working with other institutions on two other collaborative projects.
17. Submitted project descriptions to the University of Idaho.
18. Successfully organized the “Joint Maritime and TranLIVE Summer Transportation Academy” at Texas Southern University for two groups of high school students (18+24=42 students) in greater Houston area. The student participants were almost all from minority populations.

E. Virginia Tech:

19. Attended the Applications for the Environment: Real-Time Information Synthesis (AERIS) User Needs Workshop to establish a research program that does not duplicate AERIS efforts but at the same time complements it. Hesham Rakha was one of the presenters at the workshop
20. Established final projects for funding. These include three small projects, one large project, and support on two other large projects.
21. Submitted project descriptions to the University of Idaho.

2. PRODUCTS:

A. University of Idaho:

1. Website – www.tranliveutc.org is now active. Research projects that have been awarded are listed on this website.
2. A prototype tool in Excel VBA was created that estimates signalized intersections turning movement counts from different combinations of lane-by-lane stop-bar-detectors and exit lane detectors.
3. Also developed part of a VISSIM micro-simulation model to conduct lab tests of the tool.

B. Old Dominion University:

4. Publications, conference papers, and presentations
 - a. Bandeira J., T. Almeida, A. Khattak, N. Rouphail, and M. Coelho, Generating Emissions Information for Route Selection: Experimental Monitoring and Routes Characterization, Forthcoming in Journal of Intelligent Transportation Systems, Taylor & Francis Publishers, 2013.
 - b. Dr. Khattak worked on putting together a Special Issue titled “Intelligent Transportation System Applications for the Environment and Energy Conservation” in the Journal of Intelligent Transportation Systems, Taylor and Francis Publishers
 - c. Dr. Cetin is working with other faculty on putting together a special issue on “Cyber Transportation Systems and Connected Vehicle Research” for the Journal of Intelligent Transportation Systems.
 - d. Khattak, A., The role of intelligent transportation systems and smart growth, Invited presentation at Conference on Sustainability and Transit Oriented Developments, Seoul, Korea, April 2012.
 - e. Cetin, M. and C. A. Jordan, “Making Way for Emergency Vehicles at Oversaturated Signals under Vehicle-to-Vehicle Communications” 2012 IEEE International

Conference on Vehicular Electronics and Safety (ICVES'12), Istanbul, Turkey, July 24-27, 2012.

- f. Chen, C.-H., C. Chang, J.-M. Li, J. Allen, X. Huang, G. Zheng & K. M. Iftekharruddin, "Vehicle Segmentation and Recognition for Estimating Exhaust Emissions based on Automated Video Traffic Systems", The 4th International Forum on Systems and Mechatronics, to be presented, August 2012, Virginia Beach, VA.
 5. An ODU website dedicated to the TranLIVE UTC was established, containing research, education, and outreach efforts. (eng.odu.edu/transportation/tranlive_project.shtml)
 6. Technologies or techniques: A new technique for generating emissions information that can help in eco-friendly route selection has is being developed. This technique will be shared through a research paper in the Journal of Intelligent Transportation Systems.
- C. Syracuse University:
7. Nothing to report at this time.
- D. Texas Southern University:
8. Nothing to report at this time.
- E. Virginia Tech:
9. Nothing to report at this time.

3. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS:

A. University of Idaho: Individuals Who Have Worked on the Program

- I.) NIATT's program director is Karen Den Braven. Principal investigators are Ahmed Abdel-Rahim, Michael Dixon, B. Brian He, Axel Krings, Armando McDonald, David McIlroy, Judi Steciak, Steve Beyerlein, Ralph Budwig, Michael Kyte, Edwin Odom, and Joe Law.
- II.) Individuals who have worked on this program (no international collaboration unless noted):
 - a) Faculty
 - Karen Den Braven administrative duties as director of TranLIVE for two calendar months. Also funded by the University of Idaho.
 - Ahmed Abdel-Rahim administrative duties and PI of Idaho eco-driving project for one calendar month funded by the University of Idaho.
 - Axel Krings, PI for traffic cyber security project, for 80 hours focusing on investigating how hybrid-fault models can be exploited in the representation of the infrastructure and the distributed data and investigating the networking infrastructure that can be used to prototype an experimental system.
 - b) Research Staff:
 - Dan Cordon- Research and Lab Support Engineer; support for Dan began on June 24, 2012. He is responsible for lab operations and safety, and assists students and student groups in lab and shop operations. Funded 40 hours through June 30.
 - c) Graduate students
 - Amanda Battles investigating methods of adding eco-driving capabilities to traffic simulators for 57 hours.

- Zheting Bi is working on developing and testing an applied technology that produces algal biodiesel directly from microalgae through in situ transesterification without pre-oil extract so that cost for microalgae pre-processing can be significantly reduced for 140 hours.
 - Courtney Quinn is working on a nano-spring catalyst surface to study the impact that the increased surface area per nominal geometric area has on fuel-catalyst reactions for 60 hours.
- d) Undergraduate students
- Jordan Anderson is working on the fuel injection system for the formula hybrid car and exploring the possibilities of using the Motec ECU for 70 hours.
 - Cody Brumett is working on the fuel injection system for the formula hybrid car and exploring the possibilities of using the Motec ECU for 77 hours.
 - Kristian Henrickson is researching and documenting ways to improve the input to two different emission modeling software applications for 197 hours.
 - Amanda McDowell is doing literature review for 127 hours.
 - Christopher Patterson is developing tools to derive turning movement counts from controller detector data, controller phase status data, and intersection lane geometry data for 210 hours.
 - Michaela Petersen Petersen is working on figuring out which Road Weather Information System in the state of Idaho is the closest to each signalized intersection for 140 hours.
 - Mitch Skiles is developing a tool for a geographic information system (GIS) that displays field-collected turning movement count data at intersections for 200 hours.
 - Kelsey VanderWaal is working on developing the idea Co nanoparticle size and distribution of said nanoparticles on the surface of the nanosprings and helping to construct and characterize a new nanospring coating system for 46 hours.

B. Old Dominion University:

ODU is doing projects that involve substantial (informal) collaboration with Virginia Tech:

1. Developing real-time prediction of queues at signalized intersections to support eco-driving applications
2. Reducing energy use and emissions through innovative community designs: methodology and application

Individuals that have worked on the program

The program director at ODU is Dr. Asad Khattak. The following faculty members have started working in a research capacity on various research projects:

1. Reducing energy use and emissions through innovative community designs: methodology and application
 - a. Faculty: Dr. Asad Khattak, Dr. Michael Robinson, Dr. Mecit Cetin
 - b. Research Scientist: Dr. Xin Wang
 - c. Graduate student: Mr. Samuel Rompis
2. A Study on the impact of parameter uncertainty on the emission-based ranking of transportation projects
 - a. Faculty: Dr. ManWo Ng

3. Develop real-time prediction of queues at signalized intersections to support eco-driving applications
 - a. Faculty: Dr. Mecit Cetin
 - b. Graduate student: Ozhan Unal (PhD Student)
4. Optimize freight routes and modes to minimize environmental impacts
 - a. Faculty: Dr. Michael Robinson
 - b. Research Scientist: Mr. Peter Foytik
 - c. Graduate student: Mr. Craig Jordan
5. Develop vision-based systems to track and classify vehicles at high fidelity to enable estimation of emissions,
 - a. Faculty: Dr. Khan Iftekharuddin, Dr. Chung-Hao Chen
 - b. Graduate student: Identified-will start in Fall 2012
6. New strategies for the emergency vehicle routing to reduce response time using vehicle-to-vehicle communications
 - a. Faculty: Dr. Mecit Cetin
 - b. Graduate student: Mr. Craig Jordan

Faculty and students are actively collaborating with international partners as indicated below:

- TOD-based Sustainable City Transportation Research Center, Ajou University, South Korea
- Transportation Technology Research Group of TEMA - Mechanical Technology and Automation Center, University of Aveiro, Portugal
- Collaborations with various universities in China are being developed

Dr. Khattak is collaborating internationally, as indicated below.

Name	Asad Khattak
Program/Project Role	PI
Number of hours worked during the reporting period	20
Contribution to Program/Project	Dr. Khattak has continued to manage Old Dominion University's effort in TranLIVE UTC.
Funding Support	Old Dominion University
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	South Korea
Traveled to foreign country	Yes
If traveled to foreign country(ies), duration of stay	1 week

C. Syracuse University:

The following individuals have worked on the program:

Name	Ossama (Sam) Salem
Program/Project Role	PI
Number of hours worked during the reporting period	179
Contribution to Program/Project	Dr. Salem has continued to direct Syracuse University's activities under the TranLIVE Program.
Funding Support	Syracuse University

Name	Cliff Davidson
Program/Project Role	Co-PI
Number of hours worked during the reporting period	129
Contribution to Program/Project	Dr. Davidson has worked on organizing the two workshop sessions on Sustainable Engineering and assisted Dr. Salem in directing Syracuse University's efforts.
Funding Support	Syracuse University

Name	Baris Salman
Program/Project Role	Post-doctoral Research Associate
Number of hours worked during the reporting period	30
Contribution to Program/Project	Dr. Salman has assisted Dr. Salem in directing Syracuse University's efforts.
Funding Support	Syracuse University

Name	Sharareh Pirzadeh
Program/Project Role	Graduate Student
Number of hours worked during the reporting period	27
Contribution to Program/Project	Ms. Pirzadeh started generating a pool of available literature on application of life cycle assessment techniques on transportation systems.
Funding Support	Syracuse University

D. Texas Southern University:

- Texas Southern University is involved in three collaborative projects:
 - (1) Develop an integrated data management system at the microscopic, mesoscopic, and macroscopic levels to assess the environmental impacts of transportation systems (Lead: TSU; Collaborators: VT and UI)

- (2) Develop multi-scale energy and emission models (lead: VT; Other collaborator: UI)
- (3) Improve the environment for a livable community: advance the AERIS program by developing and testing eco-traffic signal system control applications (Lead: UI; Collaborators: VT ,ODU)

Name	Lei Yu
Program/Project Role	PI
Number of hours worked during the reporting period	60
Contribution to Program/Project	Dr. Yu managed TSU's all effort in the UTC and conducted the research on two collaborative projects.
Funding Support	Texas Southern University
Collaborated with individual in foreign country	Yes
Country(ies) of foreign collaborator	China
Traveled to foreign country	Yes
If traveled to foreign country(ies), duration of stay	2 weeks

Name	Fengxiang Qiao
Program/Project Role	PI of one collaborative project, one small project, and the education portion of TSU within TranLIVE.
Number of hours worked during the reporting period	100
Contribution to Program/Project	Dr. Qiao has assisted in managing TSU's effort in the UTC, conducted the research on one collaborative project, one individual project, and organized the summer transportation academy at TSU.
Funding Support	Texas Southern University

Name	Yi Qi
Program/Project Role	PI of a small project
Number of hours worked during the reporting period	60
Contribution to Program/Project	Dr. Qi works on an individual research project of TranLIVE, serves as PI of this project, and assisted in organizing the summer transportation program at TSU.
Funding Support	Texas Southern University

Name	Ursula William
Program/Project Role	Program coordinator of TSU Summer Transportation Academy for high school students
Number of hours worked during the reporting period	100
Contribution to Program/Project	Ursula recruited students from high school and assisted in organizing the summer transportation program at TSU.
Funding Support	Texas Southern University

Name	Fei Tao
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	100
Contribution to Program/Project	Fei worked on vehicle emission testing and emission data processing.
Funding Support	Texas Southern University and National Science Foundation

Name	Yang He
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	100
Contribution to Program/Project	Yang worked on vehicle emission data processing.
Funding Support	Texas Southern University and National Science Foundation

Name	Chelse Hoover
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	200
Contribution to Program/Project	Chelse worked on vehicle specified power (VSP) data collection in greater Houston area.
Funding Support	Texas Southern University and National Science Foundation

Name	Victoria Ndimele
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	200
Contribution to Program/Project	Victoria worked on evaluating the use of MOVE.
Funding Support	Texas Southern University and National Science Foundation

Name	Ziyue Li
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	200
Contribution to Program/Project	Ziyue worked on the use of driving simulator for emission estimation
Funding Support	Texas Southern University and National Science Foundation

Name	Jinghui Wang
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	200
Contribution to Program/Project	Jinghui is working on the impact of road network design on vehicle emissions.
Funding Support	Texas Southern University and National Science Foundation

Name	Xiaobing Wang
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	200
Contribution to Program/Project	Xiaobing is working on the impact of V2I system on emissions.
Funding Support	Texas Southern University and National Science Foundation

Name	Jing Jia
Program/Project Role	Graduate Research Assistant
Number of hours worked during the reporting period	100
Contribution to Program/Project	Jing is working on the impact of V2I system on emissions.
Funding Support	Texas Southern University and National Science Foundation

Other organizations involved as partners?

1. Organization Name: Port of Houston Authority and Texas Southern University
2. Location of Organizations: (both in Houston, TX)
3. Partners' contribution to the project
 - o Financial support by jointly organizing the "Joint Maritime and TranLIVE Summer Transportation Academy" at Texas Southern University for two groups of high school students on June 4-8, 2012; and on June 18 - 15, 2012.
 - o Texas Southern University offers working staff, classroom, computer lab and other accessories to support this program.

E. Virginia Tech:

Virginia Tech is involved in three collaborative projects as follows:

1. Develop multi-scale energy and emission models (lead: Virginia Tech)
2. Develop an integrated data management system at the microscopic, mesoscopic, and macroscopic levels to assess the environmental impacts of transportation systems
3. Improve the environment for a livable community: advance the AERIS program by developing and testing eco-traffic signal system control applications

Name	Hesham Rakha
Program/Project Role	PI
Number of hours worked during the reporting period	60
Contribution to Program/Project	Dr. Rakha has continued to manage Virginia Tech's effort in the UTC.
Funding Support	Virginia Tech.
Collaborated with individual in foreign country	Yes
Country(ies) of foreign	Belgium, China and Malaysia
Traveled to foreign country	Yes
If traveled to foreign country(ies), duration of stay	2 weeks

Name	Raj Kishore
Program/Project Role	Graduate Student
Number of hours worked during the reporting period	200
Contribution to Program/Project	Raj worked on developing an eco-cruise control system in the vicinity of signalized intersections.
Funding Support	Virginia Tech.

4. IMPACT:

A. University of Idaho:

1. Influencing the future of AERIS research through discussions with AERIS leaders at the AERIS webinar in March in Washington, DC.

B. Old Dominion University:

2. Development of the principal discipline
 A special issue on "Intelligent Transportation System Applications for the Environment and Energy Conservation" is being developed for the Journal of Intelligent Transportation Systems,. This will integrate technologies with sustainability/livability. The special issue will highlight a growing trend toward integrating the two areas of inquiry
 Influencing the future of AERIS research through discussions with AERIS leaders at the AERIS webinar in March in Washington, DC.

3. Development of transportation workforce
At Old Dominion University, several graduate students are working on TranLIVE research projects. In addition, TranLIVE is providing substantial opportunity for transportation research to students, research scientists, and faculty.
 4. Impact on physical, institutional, and information resources
TranLIVE UTC has provided ODU a strong impetus for establishing a new Transportation Center facility in the city of Virginia Beach, VA. The Virginia Beach City Council will soon take up the issue of providing space to the new center.
- C. Syracuse University:
5. The Sustainable Engineering workshops provide significant benefits to the faculty participants, by addressing concepts in sustainable engineering and sustainability of transportation systems, ways to incorporate these concepts into courses, comparisons of sustainable engineering education at schools across the country, federal programs for funding for research and education in sustainable engineering, and building a community of educators in this emerging topic. Participants will choose a course with a sustainable engineering component to be taught at their home institution in the 2012-2013 academic year. They will complete the component within one year and submit it to the Center for Sustainable Engineering Electronic Library.
 6. A new computer lab is being established as a part of this program.
- D. Texas Southern University:
7. Feedback from the high school students who attended the TSU summer transportation academy indicate that they like this great program and have learned about transportation activities and air quality. One student says in her in-class presentation that "I always thought driving in a car everywhere was so much easier, saving me lots of time and money. But (this workshop) has shown me that we might be causing a lot more harm than I could have ever imagined!"
- E. Virginia Tech:
8. Nothing to report at this time.

5. CHANGES/PROBLEMS

- A. University of Idaho:
1. Took longer than expected to establish subawards and distribute funding to partners and internally to University of Idaho.
- B. Old Dominion University:
2. Establishing funding and contract numbers took longer than anticipated. The projects were initiated on 4/18/2012.
- C. Syracuse University:
3. Nothing to report at this time.
- D. Texas Southern University:
4. Establishing funding and contract numbers has taken much longer time than that was originally anticipated. The projects were formally initiated on June 1.

E. Virginia Tech:

5. Establishing funding and contract numbers is taking much longer than was anticipated. The project was initiated on June 1.

6. SPECIAL REPORTING REQUIREMENTS

A. University of Idaho:

1. Financials will be sent by the University of Idaho's Office of Sponsored Programs as needed.

B. Old Dominion University:

2. Nothing to report at this time.

C. Syracuse University:

3. Nothing to report at this time.

D. Texas Southern University:

4. Nothing to report at this time.

E. Virginia Tech:

5. Nothing to report at this time.

Completed by:

University of Idaho: Karen R. Den Braven

Old Dominion University: Asad Khattak

Syracuse University: O. Sam Salem

Texas Southern University: Fengxiang Qiao

Virginia Tech: Hesham Rakha