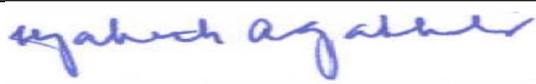


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<b>Signature of Submitting Official</b>	

## 1. Accomplishments

METRANS UTC is a partnership of the University of Southern California (USC) and California State University, Long Beach (CSULB). Its purpose is to conduct a multidisciplinary program of research, education, and technology transfer aimed at increasing the economic competitiveness of large metropolitan areas through improved transportation system performance across all surface transportation modes and across passengers and freight. Passengers and freight often share the same infrastructure and compete for the same capacity. The research challenge is how all urban functions can best be managed together. By developing strategies that promote productivity and better integrate modes and users, METRANS contributes to more efficient, sustainable metropolitan transportation.

### 1.1 RESEARCH

METRANS research program aims to generate a body of knowledge that makes a significant contribution to solving urban transportation problems. Our approach is uniquely integrative: we address passengers and freight across all surface transportation modes. By designing policy incentives to implement effective strategies to address the needs of both freight and passengers system efficiency outcomes are achieved.

#### 1.1.1 Research Program Themes

Our research program is organized around two themes and a set of associated topics. Theme 1 is Understanding Passenger-Freight Interactions, the basic forces underlying supply and demand, developing more comprehensive data for analysis and better methods for monitoring the performance of the urban transportation system. It has three topic areas: Relationships between spatial patterns and transportation, Characteristics of freight and passenger demand, and Better data for analysis of passenger-freight interactions. Theme 2 is Achieving System Efficiencies. Theme 2 develops efficiency strategies by exploring the potential for efficiencies within and across modes and user classes and identifying policy strategies that facilitate and promote these efficiencies. It includes two topic areas: Integrated management across users and modes, and Policies for more efficient urban transportation.

#### 1.1.2 Research Program Selection and Management

For Year 1 our research program had two parts. The first was a set of pre-selected Launch Projects, selected from short proposals submitted and reviewed during the proposal preparation process. These projects and their status are listed in the following table.

<b>Theme 1</b>	<b>Understanding Passenger-Freight Interactions</b>	<b>Funding</b>
Topic 1-1	Spatial Patterns and Transportation	
1-1a	<i>Urban Spatial Structure, Employment Sub-Centers, and Passenger and Freight Travel</i>	Caltrans
1-1b	<i>The Freight Landscape: Using Secondary Data Sources to Describe Metropolitan Freight Flows</i>	USDOT
Topic 1-3	Better Data for Analysis of Passenger-Freight Interactions	
1-3a	<i>Tracking Truck Flows with Programmable Mobile Devices</i>	Caltrans
<b>Theme 2</b>	<b>Achieving System Efficiencies</b>	<b>Status/ Funding</b>
Topic 2-1	Integrated Management Across Users and Modes	
2-1a	<i>Efficiencies in Freight and Passenger Routing and Scheduling to Reduce VMT</i>	USDOT
2-1b	<i>Freight-Passenger Transportation Simulation Testbed</i>	USDOT
Topic 2-2	Policies for More Efficient Urban Transportation	
2-2	<i>Mitigating Urban Freight Through Effective Management of Truck Chassis</i>	Caltrans

As noted in PPR 1 and 2, two projects were cancelled and one new project was added (1-1b) due to availability of researchers. There are a total of 6 launch projects, all in progress. Caltrans established new policies for match funding which require approval of every project as a “task order,” adding 3 to 6 months to the contracting process. Caltrans funded projects were delayed to August 2014. Funds from deferred projects were moved into the funds for open solicitation research projects (see Section 1.1.2, Table 2).

#### Year 1 Launch Project Progress Reports

##### **USC 1-1b: The Freight Landscape: Using Secondary Data Sources to Describe Metropolitan Freight Flows (Giuliano, USC) (Project start/end dates: 1/1/2014 – ~~12/31/2014~~ 6/30/2015 (no cost extension))**

This research develops a method for describing the spatial variation in freight supply and demand within metropolitan areas using widely available data. We hypothesize that spatial distribution of freight activity is related to the spatial organization of economic activities. We estimate models of freight activity as a function of local and regional spatial characteristics. Tasks 1 through 4 (literature review, data collection, and LA region analysis) are complete. Tasks 5, 6 and 7 (San Francisco regional analysis, comparative analysis, final report) are in progress. Scope of work was modified to reflect data availability. We could not obtain truck flow data from the San Diego metropolitan area, so estimate models of the relationship between land use and freight flows only for LA and San Francisco. We estimated two sets of models, one using categorical dummy variables as measures of development intensity (employment, and population density), and the other using employment and population characteristics. The models generated similar and consistent results. We find a significant relationship between development intensity and truck flows, supporting the concept of “freight landscape” as a proxy for freight flows.

We added Sacramento to our study so that we could conduct qualitative comparisons of the four largest metro areas in California to support the development of a city logistics typology. Population and employment density is generally correlated: there are few zones with high population density but low employment density, or with low population density but high employment density. However, the extent to which population and employment density are spatially correlated varies, with higher correlation observed for Los Angeles and San Francisco. Density patterns are also related to the transportation network. For example, industry concentration is observed along major highway corridors. We use these spatial patterns to show how the general contours of freight activity may be imputed. We expect to complete the project within the next reporting period.

##### **USC 2-1a: Efficiencies in Freight and Passenger Routing and Scheduling**

##### **(Dessouky, USC) (Project start/end dates: 1/1/2014 – ~~12/31/2014~~ 6/30/2015 (no cost extension))**

Three tasks have been completed. We have reviewed the literature on dynamic and stochastic vehicle routing problems (task1) and developed the model formulation for partial routing (task 2). Inputs to the model include, for each request, the historical probability distribution of the call-in time, the desired delivery time window, and the delivery amount (demand). We have also finished developing a solution framework to solve the developed model (task 3). The solution procedure consists of solving a series of vehicle routing problems formed sequentially in time. Each vehicle routing problem consists of both confirmed and forecasted information. The primary parameters of the solution procedure are the frequency of updating the vehicle routes and the length of the horizon of the model. High uncertainty levels favor frequent updates with short horizons and the opposite for low uncertainty levels. The solution procedure is being coded in C++ and we are near completion of the software coding. Once the coding is finished, the plan is to test the sensitivity of the results to changes in the parameters on randomly generated problem instances based on Solomon benchmark vehicle routing problems. The performance of our solution approach will also be compared to static vehicle routing (based on full information) and total reactive dynamic vehicle routing, each corresponding to one end of the uncertainty solution spectrum.

**USC 2-1b: Design and Evaluation of Impact of Traffic Light Priority for Trucks on Traffic Flow (Ioannou, USC) (Project start/end dates: 1/1/2014 – ~~12/31/2014~~ 5/31/2015 (no cost extension))**

We developed two control strategies for traffic light control that take into account the two different classes of vehicles in areas where the truck volume is relatively high. The two classes are trucks and other vehicles. The other vehicles include light duty and passenger vehicles. Buses and any other type of vehicles have not been considered due to their relatively low volume when compared with trucks in certain areas. The first approach is based on estimating the average traffic delays using a neural network approach. The delay is the difference between the ideal and actual travel times of vehicles. We evaluated the proposed model using MATLAB and VISSIM software. The simulation results for a 9 intersection network where trucks constitute 20% of the traffic volume indicate that the average delay of all vehicles is reduced by 25% while the number of truck stops is reduced by 61% compared to the traffic light control approach that treats all vehicles the same. The traffic light strategy is currently under evaluation using a realistic traffic network in an area close to the ports of Los Angeles/Long Beach. The second approach relies on real time simulations and involves the combination of passive priority and active priority strategies. The results show that the network traffic performance criteria that include reduced traffic delays, number of stops and environmental impact have been improved with the proposed scheme when compared with fixed traffic control signal and optimized traffic light control with no truck priority.

**USC 1-1a Urban Spatial Structure, Employment Sub-Centers, and Passenger and Freight Travel (Boarnet, USC) (Project start/end dates: 8/25/2014 - 8/24/2015)**

The impact of polycentric metropolitan development patterns on passenger traffic and freight flows is poorly understood. In this research, we will examine freight traffic along the road network in Los Angeles to assess how the sub-centered pattern of employment is associated with freight flows. Our initial literature review indicated a much larger gap in understanding freight flows and employment sub-centers – a topic almost absent from the literature – and so we are focusing our research on that question. After searching for appropriate freight traffic data sources we have identified data developed by the Southern California Association of Governments as the best available information on truck traffic flows on road/arterial links in the Los Angeles region. During this reporting period, we also analyzed freight flows descriptively and visually, and are now able to identify locations of high freight traffic and high freight traffic density. We are proceeding to assess the characteristics of those locations and the relationship to the spatial location of employment, including employment sub-centers.

**CSULB 2-2 Mitigating Urban Freight through Effective Management of Truck Chassis (O'Brien, CSULB) (Project start/end dates: 8/25/2014 - 8/24/2015)**

This research project assesses the potential benefits of shared chassis management at the Ports of Los Angeles and Long Beach as well as the jurisdictional and institutional issues surrounding coordinated equipment management. Chassis facilitate the movement of intermodal cargo from the ocean vessel to truck and freight rail. Chassis storage has typically occurred at maritime terminals and rail yards. Ocean carriers operating in the US have traditionally owned the chassis and provided it to truckers for their use in transferring containers between the ports and distribution and intermodal facilities as part of local trips (drays). Truckers are then required to reposition the chassis back to the terminal. Carriers are realizing that the current model is not sustainable and are establishing different equipment. This project involves five tasks: (1) Review of equipment management literature - (2) Survey of chassis management practices in Southern California - (3) Institutional assessment of Chassis Operations Group - (4) Impacts of changing chassis management practices on regional supply chains - and (5) Final Report - Tasks 1 and 2 above have been completed. Tasks 3 and 4 are underway.

### CSULB 1-3a Tracking Truck Flows with Programmable Mobile Devices for Drayage Efficiency Analysis (Lam, CSULB) (Project start/end dates: 8/25/2014 - 8/24/2015)

Inefficient use of drayage trucks results in pollution and congestion. A full measure of the current state of drayage efficiency and future changes as trade volume grows can only be obtained through detailed tracking of drayage activities. Recent emergence of tablet computers provides an ideal platform for the design of an Electronic On-Board Recorder (EOBR) for such tracking. CSULB researchers have built a prototype of an EOBR that would perform GPS tracking of the truck locations periodically as well as during certain activities, with all logs time stamped. The data collected on the device can then be transmitted to a server and maintained in a database. This project consists of eight tasks: (1) Survey the latest programmable mobile devices, compare and evaluate them against the prototype in terms of capability, usability, ease of development, and future enhancement, (2) Produce detailed specifications of the EOBR based on our development and field experimentation experience of the prototype as well as feedback from the truck drivers involved in the test runs, (3) Develop the software for data logging, (4) Identify and negotiate with truck drivers for the device deployment and data collection, (5) Train drivers for the use of the device and deploy the device to contracted drivers, (6) Enhance the software required for the mapping of the GPS data and display, (7) Develop/enhance the database for housing the collected data, and (8) Develop software tools for accessing the database for data analysis and display and a Website for accessing the database. We have completed tasks 1 to 3 as well as task 6. We are working with a drayage company on details regarding the deployment of the logging device.

#### Year 1 Open Solicitation Research Program

The second part of our Year 1 research program was the open solicitation. About half of the research funding available (USDOT and Caltrans match) was reserved for the open solicitation, issued in March 2014 with proposals due in April 2014. The RFP process described in our proposal was followed, and we received 15 valid proposals. Five projects were approved for funding. The projects are listed in Table 2 and started January 2015. Remaining Year 1 funds were rolled over and made available for Year 2 research.

<b>Table 2: Year 1 Open Solicitation Projects – All in Progress</b>		
<b>Theme 1</b>	<b>Understanding Passenger-Freight Interactions</b>	<b>Funding</b>
Topic 1-3	Better Data for Analysis of Passenger-Freight Interactions	
14-06	<i>Development of Micro Wireless Sensor Platforms for Collecting Data of Passenger-Freight Interactions.</i>	Caltrans
14-13	<i>Smart Truck Driver Assistant: A Cost Effective Solution for Real Time Management of Container Delivery to Trucks</i>	Caltrans
<b>Theme 2</b>	<b>Achieving System Efficiencies</b>	<b>Funding</b>
Topic 2-1	Integrated Management Across Users and Modes	
14-09	<i>A Dynamical Framework for Integrated Corridor Management</i>	Caltrans
14-11	<i>Vehicle-to-Vehicle Communications in Mixed Passenger – Freight Convoys</i>	Caltrans
Topic 2-2	Policies for More Efficient Urban Transportation	
14-04	<i>Analysis and Prediction of Spatiotemporal Impact of Traffic Incidents for Better Mobility and Safety in Transportation Systems</i>	Caltrans

#### Year 1 Open Solicitation Project Progress Reports

**CSULB 14-06 Development of Micro Wireless Sensor Platforms for Collecting Data of Passenger-Freight Interactions (Mohammad Mozumdar, CSULB) (Project start/end dates: 1/1/2015 - 12/31/2015)**

In this project, we suggest a solution to build smart highways by implanting wireless Micro-Electro-Mechanical System (MEMS) sensors which act like *Neurons* to collect traffic data for freight and passenger vehicle movements. Collected data could develop more advanced models of urban freight flow and better policies to manage the impacts of freight on metropolitan areas. Our proposed smart sensing and data interpretation system for smart roadways is scalable, cost effective with a very small foot-print, and has capabilities to detect a vehicle's motion-state in real-time. We are purchasing necessary equipment, and one graduate student has been hired in this project. We are now exploring available components for Sensor Node design (MEMS magneto-resistive sensors, low-power micro-controller RF transceiver, energy scavenging module, high-capacity small battery) to build a Sensor node prototype.

**CSULB 14-13 Smart Truck Driver Assistant: A Cost Effective Solution for Real Time Management of Container Delivery to Trucks (Burkhard Englert, CSULB) (Project start/end dates: 1/1/2015 - 12/31/2015)**

In this project, we obtain accurate truck and port monitoring data at no additional equipment cost. Our system will utilize the rich sensors of ubiquitous smartphones to track all movements of trucks outside and inside terminals. It will allow us to measure truck turn times more accurately than before by using GPS, network antenna and the inertial sensors of truck drivers' smartphones. We developed a prototype of our app and are now in the process of testing it. Our algorithms will analyze collected data to derive real time and detailed models of cargo traffic flow in and around terminals. Our mobile phone application will provide information to drivers as well as port and terminal authorities. This will ensure the use of our application by port stakeholders and hence in turn allow us to collect the needed data. This cost-effective and efficiently collected data can be employed to build a comprehensive database of port transportation.

**USC 14-09 A Dynamical Framework for Integrated Corridor Management (Ketan Savla, USC) (Project start/end dates: 1/1/2015 - 12/31/2015)**

In this project, we develop dynamic traffic signal control and ramp metering strategies for Integrated Corridor Management (ICM) with provable performance guarantees. First, we perform control synthesis within a dynamical framework that allows dynamic route choice and mode choice by drivers, and as such is different than typical approaches that use very specific models. Second, we make connections between our dynamical framework and compartmental dynamical systems to leverage powerful stability analysis tools for control design. Third, we extend metrics for system efficiency beyond total travel time, to also include resilience, and relate these metrics to network parameters. Finally, we use stability analysis tools to design traffic signal and ramp metering control that require minimal information about dynamic driver decisions, and hence are well-suited for incidence response scenarios in the context of ICM. Our approach relies on a combination of tools from traffic engineering, dynamical systems and network flows. We supplement our analysis and algorithm development with case studies relevant to the Los Angeles area.

**USC 14-11 Vehicle-to-Vehicle Communications in Mixed Passenger – Freight Convoys (Andreas Molisch, USC) (Project start/end dates: 1/1/2015 - 12/31/2015)**

The purpose of this project is to investigate the characteristics of radio propagation channels in scenarios where both trucks and passenger cars are on the road, i.e. either between cars and trucks or between cars whose connection is blocked by trucks. These scenarios are clearly of great importance for mixed-traffic convoys, yet have not yet been explored or measured. To remedy this situation, extensive measurement campaigns (e.g. pathloss, dispersion) will first be conducted. Then, the simulation of system performance (e.g. latency, packet arrival rate) in these environments will be performed. It will constitute an important input for the design of convoy policies, enhanced automated driver assistance, etc. We are currently working on the following 3 of the 5 work-packages: (1) We have decided which equipment to use during the measurement campaigns: software-defined radio units will be purchased from National Instruments, whereas antennas will be manufactured and /or constructed, (2) A high-resolution algorithm known as

Extended Kalman Filter (EKF) is being tested. It will later be used for the parameterization of the geometry-based stochastic channel model from the collected measurement results, and (3) The IEEE 802.11p simulator is being implemented, first in SIMULINK then in MATLAB. We expect to complete all the tasks of these work packages within the next quarterly reporting period.

**USC 14-04 Analysis and Prediction of Spatiotemporal Impact of Traffic Incidents for Better Mobility and Safety in Transportation Systems (Cyrus Shahabi, USC) (Project start/end dates: 1/1/2015 - 12/31/2015)**

The main objective of our research is to forecast how and when travel-time delays - caused by road accidents - occur on the transportation network in both time and space. Towards this end, we will develop machine learning techniques to predict and quantify the impact (i.e., backlog and clearance-time) of road accidents on the up-stream traffic direction and in the surrounding network of the accident locations. The research will use the real-world traffic sensor and accident datasets that we have been collecting and archiving in the last past three years in ADMS database. We completed the following tasks towards enabling the main framework of our research: (1) literature review on traffic incident impact prediction on road networks, (2) creation and population of road network topology data structures, (3) directional map matching of accidents to LA Road Networks, (4) detection and correction (or removal) of inaccurate sensor readings and accident records, and (5) spatial and temporal aggregation of sensor data.

**Year 2 Open Solicitation Research Program**

Per the research plan in the Tier 1 UTC proposal, all research projects for year two will be selected via a competitive process. We issued the Year 2 RFP in December 2014 with proposals due February 2015. The RFP included a general solicitation for projects within Center themes, as well as a list of specific projects (also within the themes) solicited by Caltrans. The RFP is at <http://www.metrans.org/research-projects/metrans-utc>. All tenure track and research faculty at USC and CSULB were eligible to submit proposals. The RFP process described in the Tier 1 proposal was followed and fifteen complete proposals were received. The METRANS Executive Committee will meet in May 2015 to select projects for funding. Because relatively few of the proposals addressed the Caltrans topics, a second Year 2 RFP was issued in March 2015. This RFP also included a solicitation for Year 2 projects under the National Center for Sustainable Transportation. All proposals for this second RFP are due by April 27, 2015.

**1.1.3 Dissemination**

Research reports are published to the METRANS website and presented at METRANS research seminars, open to the public. Preliminary results are often presented at conferences and published in journals.

*The following paper is under preparation for a journal submission.*

E. Lovisari, G. Como, A. Rantzer and K. Savla, "Stability Analysis and Control Synthesis for Dynamical Transportation Networks". Available at <http://arxiv.org/abs/1410.5956>

*During this reporting period, the following were presented:*

G. Giuliano, "The Freight Landscape: Los Angeles Case Study" preliminary results were presented at the Transport Research Arena (TRA), Paris, April 2014, and the Pan-American Advanced Studies Institute on Sustainable Urban Freight Systems (PASI-SUFS), Bogota, Colombia, August 2014.

G. Giuliano et al., "Using proxies to describe the metropolitan freight landscape," paper presented at the Western Regional Science Meetings, Tucson, February, 2015, also presented at the VREF Conference on Urban Freight, Gothenburg, Sweden, March 2015

H. Zou and M. M. Dessouky, "An Intelligent Look-ahead Framework for the Dynamic Vehicle Routing Problem," 2014 National Meeting of INFORMS, San Francisco, CA

*The following research was presented by METRANS affiliated graduate students:*

Y. Hou, “Traffic Congestion, Polycentricity and Intra-urban, Firm Location Choices: A Study of the Los Angeles Metropolitan Area,” at the Association of Collegiate Schools of Planning annual conference, Oct. 30 – Nov. 2, 2014.

L. Fan “Discovering Causality in Traffic for Accident Impact Prediction.” Annual Transportation Research Forum, 2015, Atlanta, GA

*The following papers were recently submitted for conference submission.*

Q. Ba, K. Savla and G. Como, “Distributed Optimization for Traffic Flow over Networks”, *IEEE Conference on Decision and Control*, Osaka, Japan, 2015. Under review

P. Ioannou, “Evaluation of Impact of Traffic Light Control with Truck Priority”, *IEEE Intelligent Transportation Systems Conference*, Sept. 2015. Under review

G. Nilsson, P. Hosseini, G. Como and K. Savla, “Entropy-like Lyapunov Functions for the Stability Analysis of Adaptive Traffic Signal Controls”, *IEEE Conference on Decision and Control*, Osaka, Japan, 2015. Under review

R. Wang, O. Renaudin, R.M. Bernas and A.F. Molisch, “Efficiency improvement for path detection and tracking algorithm in a time-varying channel” *IEEE Int’l Vehicular Technology Conf. (VTC) Fall 2015*.

#### **1.1.4 Plans for Next Reporting Period**

Plans for the next reporting period are to: 1) complete the Year 1 launch projects; 2) select and begin the Year 2 projects; and 3) continue dissemination of research results via our website, other publications, papers, conference presentations, and via our METRANS seminar series.

*Year 2 Open Solicitation Research:* All research projects to be awarded from Year 2 funding will be selected via peer review. We have issued two RFPs as described in Section 1.1.2 above. RFPs are discussed with Caltrans, and specific topics of interest to Caltrans that fall within the themes of the UTC are part of the RFPs. As with Year 1, a meeting with Caltrans will finalize project selection, after which the task order process will be conducted. Because of the length of this process, we plan to start Year 2 projects in the summer of 2015.

## **1.2 EDUCATION AND WORKFORCE DEVELOPMENT**

METRANS’ education goal is to foster education and training to contribute to the development of the transportation workforce. Traditional discipline-based education and training is not sufficient for current and future workforce demands; our approach is multi-disciplinary, multimodal, and incorporates both passenger and freight. Under this grant we are developing a series of education activities, from K-12 to PhD. These programs build on the education and training programs available at both universities.

### **1.2.1 New and Continuing Activities Associated with Degree Programs**

*Graduate Research Assistantships:* We reserved Year 2 funds for graduate research assistantships to support dissertation research not tied to a specific research grant and to attract new PhD students. We were able to support our PhD students on other grants, and recruit new students for 2014-15 without offering separate assistantships. These funds were therefore shifted into the research project funds.

*New Graduate Courses:* We completed the first session of two new courses during the reporting period.

*PPD 599, Seaport Policy and Management,* was introduced at USC fall 2014. As noted in PPR2, the course is taught by Dr. Geraldine Knatz, former CEO of the Port of Los Angeles. The purpose of this course is to provide an introduction to the vital role that seaports play in accommodating world trade.

*CE 584, Intelligent Transportation Systems (ITS)*, was also introduced at USC fall 2014. As noted in PPR2, this course is taught by Professional Engineer Dr. Shahed Rowshan, and presents the fundamental concepts of ITS to students with interest in both transportation engineering and planning.

*New Undergraduate Minor and Coursework under Development:* The CSULB Department of Civil Engineering and Construction Engineering Management (CECEM) and the Center for International Trade and Transportation (CITT), continue to develop an undergraduate minor degree in transportation in the College of Engineering. As noted in PPR2, this minor degree allows students to become familiar with major components of transportation. Specifically, the degree will include the following modules in the economic impacts of transportation, policy and finance; traffic studies, design, and control; elements of transit operations, safety and security; highway design, operation, materials, and maintenance; port operations, systems and logistics; elements of railroad operations; and environmental impacts of transportation and environmental justice.

The modules on economic impacts of transportation, policy, and finance and environmental impacts of transportation and environmental justice are under development and will be tested with high school and engineering students in summer 2015 which will allow for feedback and lay the ground work for development of the rest of the modules in the academic year 2015-2016. During the same academic year, the minor degree will be proposed through the academic review process at CSULB. Other classes will be developed with the goal of offering the degree officially starting in the fall 2016 semester.

*Degree Related Internships:* Internships are part of the Masters of Planning and of Public Policy at USC. Internships have been required for completion of the Masters of Arts in Global Logistics (MAGL) degree program at CSULB, a program which has been transitioned to a new Master's of Science in Supply Chain Management (MS-SCM) offered by the College of Business Administration. The first cohort will begin in the fall of 2015. The MS program is an evening and weekend program targeted at working professionals. As a result, an internship will no longer be required for degree completion, but CSULB will continue to facilitate internships for students seeking additional work-based experience. At both campuses, METRANS helps to facilitate student placement in transportation related internships.

### **1.2.3 Facilitating Connections between Students and Employers**

*Professional Development:* METRANS partnered again with WTS-LA to promote student participation in the WTS-LA resume book and to facilitate and sponsor membership and attendance at WTS events. METRANS Assistant Director Victoria Deguzman serves on both the Resume Book and the WTS Mentor Committee and conducts outreach for WTS throughout the greater Los Angeles region. She is also mentoring two graduate level transportation students as part of the USC Price Mentor Program and one early-career professional as part of the WTS-LA Mentor Program.

During the reporting period, METRANS provided application and financial assistance to three USC undergraduate students who were selected to attend the CTF Annual Education Symposium in Santa Cruz, CA, a highly selective, two day symposium designed to provide professional development and real world transportation problem solving experience to high performing college juniors studying a transportation related field. During the conference, mentored by experienced transportation professionals from throughout the state, students compete to provide comprehensive and creative solutions to pressing transportation issues. Of the three attendees, one was a member of a minority group and one was both female and a member of a minority group.

METRANS also offers career services to students interested in a transportation related degree such as application, resume, and cover letter assistance, facilitates connections with students and industry, and

hosts on-campus opportunities for professional photographs, in addition to the mentor program and internship/employment assistance described below.

*METRANS Mentor Program:* This program guides graduate students who plan to pursue a professional, nonacademic career in transportation to make informed career decisions and to develop into well-rounded professionals. Mentors broaden the students' educational experience through personal interaction, an opportunity often missing in formal education. The METRANS mentor program is in its fourth year. Twenty one new matches were made during this reporting period. Of them, six were graduate level students in policy, twelve were graduate levels students in engineering, two were undergraduate students in policy, and one was an undergraduate student in engineering. Fifteen are members of minority groups, eight are female, five are both female and a member of a minority group, and one is both female and a member of an underrepresented group.

*METRANS Lunch with a Practitioner Series:* We launched a new series, Lunch with a Practitioner, and held three lunch time events. Designed to facilitate career planning and provide both guidance from and connections with practice, these events are a chance for current transportation students to meet and learn from active transportation practitioners. Speakers were: Steven Mateer, Transportation Planning Manager, Los Angeles County Metropolitan Transportation Authority; Monica Born, Vice President, Parsons Brinckerhoff; and Sandipan Bhattacharjee, Principal, Translutions.

*METRANS Internship and Employment Database:* Internships provide professional experience and often lead to jobs. All transportation students are encouraged to secure internships. To assist, METRANS collects and disseminates information regarding transportation internship opportunities. Our efforts are designed for both undergraduate and graduate students pursuing a transportation related career. During the reporting period, 27 USC students were successfully placed in transportation related internships, and five of these students secured employment as a result. Internship providers include Los Angeles County Metropolitan Transportation Authority (LA Metro), the Los Angeles Department of Transportation, the Port of Los Angeles, the Port of Long Beach, the Los Angeles County Bicycle Coalition, Southern California Association of Governments, the South Coast Air Quality Management District, and Foothill Transit. In addition to internships, METRANS collects and disseminates information regarding transportation *employment* opportunities both to students of transportation and transportation professionals. These comprehensive databases are available for review in the METRANS offices, are periodically shared with students at events and by email, and special announcements are made via posting, email and social media when opportunities become available.

*CITT Job and Internship Post:* To facilitate placements the Center for International Trade and Transportation (CITT, a partner organization to METRANS at CSULB) has also established a job and internship post, at the CITT Manifest website: <http://www.ccpe.csulb.edu/TheManifest/calendar.aspx>

#### **1.2.4 Non-degree Programs**

*Metropolitan Transportation Management Certificate (MTMC):* Curriculum development on the CSULB MTMC has continued. Classes will be launched in the Fall of 2015. It is targeted at transportation and city planners, elected officials and their staff, planning commissioners, and others engaged in transportation planning within metropolitan regions and address multi-modal transportation corridor project development and management by improving participants' understanding of (including solutions to) conflicts between passenger and freight mobility in urban and suburban environments. The course will cover multi-modal transportation planning fundamentals, and examine the increasingly complex urban and suburban planning environments.

*Certificate in Transportation Systems:* The graduate level Certificate in Transportation Systems continues. This is an interdisciplinary program administered by the Dept. of Civil Engineering at USC, and open to interested graduate students campus wide. It combines transportation engineering with transportation policy, planning and project management. During the reporting period, 46 students were enrolled, and four graduated at the winter term (an unusual time to complete; 30 plan to graduate this spring).

### 1.2.5 Research Seminars

*METRANS Transportation Research Seminar Series:* This seminar series serves as a forum for faculty, guest presenters, and advanced graduate students to present their research. The seminars take place during both the fall and spring semesters and are open to the public. They help to increase the visibility of transportation research and are, whenever possible, a collaborative effort of METRANS and invited cosponsors such as student, academic, and professional groups. Many of the seminars are recorded and made available through social media. Seminars are well attended, with an average attendance of well over 60. Table 3 lists seminars held during this reporting period.

DATE	SPEAKER(s)	TITLE
10/1/2014	PhD Students: Sandip Chakrabarti, Mohja Rhoads , Xize Wang	The Demand for Reliable Transit Service; Work& Space-Time Constraints on Activities; Are Angelenos Driving Less to Work? A Cohort-Tracking Demographic Analysis.
10/17/2014	PhD Students: Andy Hong, Yuting Hou, Eun Jin Shin	Effects of new light rail transit on phys. Activity; Traffic congestion, poly-centricity and intra-metropolitan firm location choices- LA region; Exploring causal effects of living in an ethnic enclave on immigrants' commuting mode choices.
11/5/2014	Evelyn Blumenberg, Professor and Chair, Department of Urban Planning, UCLA	Travel Behavior of Millennials
11/19/2014	Seiji Steimetz, Assoc. Professor/ Assoc. Chair, CSULB Dept. Econ.	Incentives to Reduce Air Pollution by Reducing Ship Speeds: Evidence from the Port of Long Beach Green Flag Program
1/21/2015	Rui Wang, Assistant Prof. UCLA Luskin School of Public Policy	Restricting Driving for Better Traffic and Clearer Skies: Did It Work in Beijing? <sup>a</sup>
2/4/2015	Lisa Schweitzer, Assoc. Professor USC Price School of Public Policy	Public Transit Service and Stigma on Social Media: A Case of Study Twitter <sup>b</sup>
2/9/2015	Peter Gordon, USC Price Professor	Occupational Variations in Propensities to Work at Home
2/25/2015	Peter Gordon, USC Price Professor	Economic Development, Cities and Networks
3/10/2015	Seleta Reynolds, Gen Mgr, LADOT	Great Streets of Los Angeles <sup>d</sup>
3/25/2015	Geraldine Knatz, Former Exec. Dir, Port of LA, USC Professor	Seaport Mergers: Why Not Los Angeles and Long Beach? <sup>e</sup>
3/26/2015	Sandip Chakrabarti, USC PhD Candidate, Urban Planning,	Development and Application of a “Big Data” Archive: The ADMS Project <sup>f</sup>

<sup>a</sup> Jointly sponsored by Sol Global, <sup>b</sup> Jointly sponsored by IPPAM, <sup>c</sup> Jointly sponsored by ASPD, <sup>d</sup> Jointly sponsored by Urban Growth, <sup>e</sup> Jointly sponsored by VREF & WLPPD, <sup>f</sup> Jointly sponsored by Sol Price School (Dean’s Merit Scholar Event)

### 1.2.6 Educational Enrichment

METRANS provides promotional, administrative, and financial support to transportation related student and professional groups at USC, CSULB, and in the community to assist them with strategic planning, event planning and execution, membership recruitment and retention, awards, scholarships, and their day

to day operations.. These groups include the McNair/Gateway Scholars program, WTS LA, WTS OC, USC Student Chapter of the Institute for Transportation Engineers (ITE), USC Student Chapter of the American Planning Association (APA), Sol Global (graduate level students of planning policy), Women Leading Policy, Planning, and Development (WLPPD), Young Professionals in Transportation (YPT), and the Graduate Policy and Administration Community (GPAC). METRANS also provides opportunities for students to experience transportation outside the classroom, such as field trips, resource and guest speaker referrals and opportunities for publication on our various media.

*Field Trips and Site Visits:* Students toured the Los Angeles Metro Blue and Exposition Light Rail Line Tour (with APA-USC student chapter), the CH2M Hill Los Angeles location, (with APA-USC student chapter), Foothill Transit offices and operations, Los Angeles Department of City Planning Department (with APA-USC student chapter), and the Anaheim Regional Transportation Intermodal Center (ARTIC) Field Trip (jointly sponsored by Parsons Brinkerhoff).

*Student of the Year:* METRANS selected Vy Phan-Hoang (MPL, Price; Certificate in Transportation Systems, Viterbi; 2015), the METRANS Student of the Year. The Student of the Year honors outstanding students from each University Transportation Center around the country. METRANS sponsored Vy to attend the TRB Annual Conference to receive the award. Vy is a first generation college student, is female, minority, and a member of an underrepresented group.

### **1.2.7 Attracting New Entrants to Transportation**

*Virtual Transportation Academy:* METRANS is developing high school courses as part of a Virtual Transportation Academy (VTA). The goal is to provide opportunities for high school students to get college level credit for what could lead to an undergraduate minor degree in transportation in CSULB's College of Engineering. The program starts with a module-based introductory class offered online which facilitates access for qualified senior high school students. Other classes will have both online and hybrid options. Several modules are under development.

*USC Price Research Fairs:* We regularly present information regarding transportation education, research, careers, employment and internships opportunities, and transportation related resources at research fairs held for students admitted to and considering enrolling at the USC Price School. During this reporting period, METRANS faculty, staff and students participated in the Price School Admitted Students Research Fair and the Price School Merit Scholars Research Fair.

*Career Fairs and Career Nights:* We also host and participate in events designed to match students with potential careers and employers. During this reporting period, METRANS staff and students held the Young Professionals in Transportation Career Night (jointly with Young Professionals in Transportation and APA-USC) and participated in the Price School Career Fair.

### **1.2.8 Dissemination**

Dissemination of education and workforce development is accomplished through student research assistantships, degree and non-degree courses and certificate programs, information and assistance regarding internships, employment opportunities, and professional development, METRANS seminar and educational series, the METRANS website, student research opportunities, support and outreach to student groups, research fair presentations, and student engagement in the mentor program and internships. We also use the METRANS Facebook page, LinkedIn account and Twitter account to disseminate information on events and on educational opportunities, and we provide regular updates on seminars, workshops, and conferences, and new job and internship postings and publications featuring METRANS-related work. We continue to use our podcast series to highlight education programs of the Center.

During the reporting period, an average of 1 post a day was made to the Facebook page. We also repurpose the information for other social media outlets. A total of 324 Tweets went out via Twitter during the period. This includes transportation articles, job information as well as information on events of interest to our followers. Between the start of the period and its completion, the number of METRANS Twitter followers increased from 102 to 173. The METRANS LinkedIn page has 94 members, and much of the information on METRANS related programs is shared via the CSULB CITT LinkedIn site, which has been active for a longer period of time and currently has 1,066 members.

### **1.2.9 Plans for Next Reporting Period**

Plans for the next reporting period include to 1) continue our professional development, student recruitment and support, and educational enrichment programs; 2) launch the Metropolitan Transportation Management Certificate, Fall 2015, 3) continue the seminar series; 4) continue the Lunch with a Practitioner series, 4) participate in the WTS LA and WTS OC Career Day events, and 5) complete tests of the first two modules with faculty and students as part of the Virtual Transportation Academy.

## **1.3 TECHNOLOGY TRANSFER**

The goal of the METRANS UTC technology transfer program is to broaden our reach and effectively disseminate research results.

### **1.3.1 Continuation of Signature Events**

*Annual State of the Trade and Transportation Industry Town Hall Meeting:* The Town Hall Meeting is a practitioner-oriented educational forum that explores transportation and trade issues. Participants include the goods movement industry, longshore union, research community, and elected officials and their constituencies. A video introduces the topic and sets the context for the discussion. Speaker presentations are followed by open Q&A. The 2014 Town Hall, *Global Trends, Local Impacts, Big Decisions*, was held on October 15, 2014 at CSULB and addressed the impact of trends such as e-commerce, 3-D manufacturing, rising energy costs, and emerging markets on regional and national competitiveness. The newly appointed Port of Long Beach Chief Executive Jon Slangerup was a featured speaker. Over 300 attended the event. Fourteen transportation student volunteers supported the conference. Town Hall was also shared on social media. The full, two hour program received 154 viewings, and the documentary received 171 viewings. The documentary has also aired on local Beach TV, which has the potential to reach up to 500,000 people in the area surrounding the CSULB campus. The 2014 Town Hall documentary is available on the Beach TV Affiliate Broadcast Download page, making it available to other educational cable TV stations throughout California.

*International Urban Freight Conference:* The purpose of I-NUF is to provide a forum for sharing emerging, multi-disciplinary research on all aspects of freight in metropolitan areas. The 6<sup>th</sup> METRANS I-NUF is scheduled for October 21-23, 2015 and will be at The Westin Long Beach. During the reporting period, we circulated a call for abstracts, identified keynote speakers, and coordinated special activities including site visits and special sessions with partners including the TRB Urban Freight Committee, Intermodal Freight Transport Committee, Young Members Council and Freight Committee of the American Society of Civil Engineers (ASCE).

### **1.3.2 New Outreach Events**

METRANS held its second Industry Outlook event on December 4 at USC featuring speaker Patrick Burgoyne, CEO of NYK Ports LLC. Burgoyne discussed the port congestion, trade patterns and strategies and potential solutions to these issues. Solutions include better liner/terminal operational coordination, nationwide rationalization of terminal capacity to maximize land usage, market selection (developing ports to meet specific needs), creative uses of automation to improve operations and create skilled jobs, infrastructure investments, and continued dialogue among labor, government, public and

private businesses. The event was attended by more than 80 people. The talk can be accessed at <https://www.youtube.com/watch?v=1wdSVm2x6Zg&feature=youtu.be&list=PLFF4D4389AC445594>.

Our next Industry Outlook event will be held at USC in May 2015. Titled “The Future Transportation Professional,” it will feature a panel discussion of representatives from both industry and academia.

*Transportation Optimization Workshop:* In partnership with the Epstein Department of Industrial and Systems Engineering, METRANS is holding a statewide workshop on optimization methods and applications in May 2015. The goal of the workshop is to bring together transportation optimization scholars from throughout California and promote research collaborations.

*Working and Living in a Port City Series:* The Working and Living in a Port series is designed to introduce local decision makers and community residents to what happens at a maritime port, its position in the global supply chain, and the career pathways available in international trade and transportation. The three-part series is offered twice a year and is taught by industry professionals and a transportation careers advisor. It is supported by industry sponsorships and offered free of charge. During the reporting period, CITT conducted outreach for the next set of workshops which will be held in the spring of 2016.

### 1.3.3 Media and Communications

*Scholarly Venues:* METRANS is committed to conducting research that both contributes to knowledge and addresses transportation problems. We expect researchers to publish in scholarly journals, and require them to present at scholarly conferences. As part of I-NUF 2015, we are soliciting papers for submission to two special journal issues, one in urban planning and one in logistics.

*The Manifest: An Industry Event Calendar:* The Manifest began as a CITT-sponsored industry event wiki-calendar for trade and transportation related activities. It is now an industry-sponsored portal where companies can share information with the broader community on events, internships, and employment opportunities and where CITT and METRANS can reach an industry-focused audience via social media. For example, podcasts can be accessed via the Manifest. METRANS provides administrative support for the Manifest. See more at <http://www.ccpe.csulb.edu/TheManifest/calendar.aspx>.

*Research Briefs:* A “Research Brief” that provides a short summary of research results suitable for a non-technical audience is part of the METRANS Tier 1 research requirements. The Research Briefs will be widely circulated through both traditional and social media. During the reporting period, two research briefs were produced, “Train Scheduling and Routing under Dynamic Headway Control” (Dessouky) and “Adaptive Truck Priority Signal System” (Ioannou).

*METRANS News:* METRANS News is a tri-annual newsletter that features the research, education and outreach activities of METRANS. Effective Summer 2014, METRANS News is published in both print and online. Issues were published in Summer 2014, Fall 2014, and Spring 2015. Over 500 newsletters are mailed to university transportation centers and faculty throughout the U.S., to federal, state, and local public agencies, and to the transportation industry. Additionally, another 1,500 recipients are emailed the link for each issue that is posted on the METRANS website. It is also posted on the TRB e-newsletter. The newsletter is also distributed at conferences, events, and meetings.

*METRANS Website:* The METRANS UTC is part of the METRANS Transportation Center website. New content continues to be added, and news articles and opportunities are generated and posted on a weekly basis. The Tier 1 UTC may be accessed at [www.metrans.org/metrans-utc](http://www.metrans.org/metrans-utc). We are also now active on Facebook, Twitter, and LinkedIn.

*METRANSInfo*: METRANSInfo is a queryable database under development. It will include definitions, basic information on urban transportation systems and data (e.g., how many truck trips are generated by retail, how many passengers are carried on rail). A research assistant has been hired to coordinate development. In order not to duplicate the approaches of other websites or databases, METRANSInfo will be more narrowly focused on the METRANS theme of passenger-freight interactions and conflicts. METRANSInfo will be integrated into the new website.

*ContainerCasts*: ContainerCasts are webcasts focused on topics of interest to the international trade community and feature discussions based on Tom O'Brien's *Long Beach Business Journal* articles. Three ContainerCasts were issued during the reporting period, Creating a Border Environment, Inland Connections, and Big Ship Ready. All ContainerCast episodes are available at [www.ccpe.csulb.edu/citt](http://www.ccpe.csulb.edu/citt).

*YouTube*: METRANS Seminars are available on YouTube. The full METRANS Playlist URL is [http://www.youtube.com/results?search\\_query=mtrans+transportation+center](http://www.youtube.com/results?search_query=mtrans+transportation+center).

*Trade and Transportation Perspective*: O'Brien writes the Trade and Transportation Perspective monthly column for the *Long Beach Business Journal*, highlighting important issues in goods movement and international trade and featuring CITT activities and research findings. Five articles were produced during this reporting period and can be found at <http://www.ccpe.csulb.edu/CITT/IndustryArticles.aspx>.

#### **1.3.4 Dissemination**

Dissemination of research results are achieved through the events, media, and communication channels described in sections 1.3.1 through 1.3.3.

#### **1.3.5 Plans for Next Reporting Period**

Plans for the next reporting period include the following: 1) publish completed METRANS research reports and briefs to the METRANS website; 2) continue planning for INUF 2015; 3) publish METRANS News and METRANS website news; 4) enhance and expand the website; 5) continue social media programs and grow our subscriber database for LinkedIn and the followers of Twitter; 6) hold the third annual Industry Outlook, "The Future Transportation Professional;" 7) offer the seminar series on Working and Living in a Port City; 8) deliver a new course for high school teachers in conjunction with the Port of Long Beach; (9) hold the new Transportation Optimization Workshop in May 2015.

## **2. Products**

### **2.1 PUBLICATIONS**

No refereed publications from the Tier 1 research program have been generated because no project is sufficiently far along to have publishable results. Some papers have been accepted for conference presentations and others been submitted for publication. These are listed in Section 1.1.3.

### **2.2 WEBSITES**

The website may be accessed at <http://www.metrans.org>. It is described in section 1.3.3.

### **2.3 TECHNOLOGIES**

Nothing to report

### **2.4 INVENTIONS**

Nothing to report

## 2.5 EDUCATIONAL PRODUCTS

We completed the first session of two new courses during the reporting period.

## 2.6 OTHER PRODUCTS

The following other products have resulted from this grant: 1) freight landscape database created under project 1-1b and jointly with MetroFreight; 2) podcasts of METRANS seminars; 3) the internship opportunities database; 4) the employment opportunities database; 5) O'Brien Long Beach Business Journal column publications and related podcasts (during the reporting period, two articles appeared in the Journal and were posted online, both pertaining to the recent congestion at ports in Southern California); 6) podcast of Industry Outlook; 7) spring, summer and fall issues of METRANS news (during the reporting period, we completed the spring 2015 issue) expansion of the Monitoring the Ports database (an average of 10 news items were added to this publicly accessible goods movement related timeline each week during the reporting period).

# 3. Participants and Collaborating Organizations

In this section we describe participant and collaborating organizations associated with the METRANS UTC. Participants are those organizations that directly contribute to the work of the Center through financial or other support, or that participate directly in the research. Organizations that participate in Center activities, provide advisement, or generally support the center are collaborating organizations.

## 3.1 PARTICIPANTS

METRANS is a partnership between the USC and CSULB. At USC, the Price School of Public Policy and the Viterbi School of Engineering are the main partners. At CSULB, participants are CITT, the School of Engineering, the Department of Economics, and the School of Business. METRANS is a multi-disciplinary research center, and researchers routinely collaborate across department and school boundaries.

Caltrans is the major funding partner, providing the entire required match for the Center. Additional financial support is provided by members of the METRANS Associates, and by individual corporate contributions to scholarships and education programs. Participant roles are summarized in Table 3.

## 3.2 COLLABORATING ORGANIZATIONS

METRANS has extensive relationships with other universities, public agencies, and private industry. The METRANS UTC has access to these relationships.

### 3.2.1 Advisory Organizations

*METRANS Advisory Board:* The Advisory Board meets annually, and provides overall policy guidance for the Center. It suggests research priorities, identifies funding opportunities, assists in student job placements, and participates in outreach activities. Members are leaders from sponsor agencies, other agencies, and private industry. They serve as liaisons to their agencies and industries, and also contribute funding support. Members are appointed by the Director with the advice of the Executive Committee. Gold level METRANS Associates are members of the Board; others are appointed to represent the broad constituency of stakeholders. A list of members is available at <http://www.metrans.org/advisory-board>.

We are currently updating and expanding the Advisory Board to better reflect our broader activities. During this reporting period, we added three new members: Jake Racker, Sr. Director, Network Strategy and Engineering, Kroger Company; Seleta Reynolds, General Manager, LADOT; and Jon Slangerup, Chief Executive, Port of Long Beach. We plan to add three to six additional members to provide more representation from private sector transport industries and public sector leadership. The Advisory Board

met in February to discuss research, outreach, and education priorities and potential match funding opportunities and new candidates for the board.

<b>Table 3: METRANS UTC Partners and Contributions</b>		
<b>Name</b>	<b>Location</b>	<b>Contribution</b>
Price School of Public Policy	USC	Home of the Center, participating faculty, education programs, students; financial contribution for administration; indirect cost share; offices and labs
Viterbi School of Engineering	USC	Participating faculty, education programs, students; indirect cost and tuition cost share, METRANS labs
CITT	CSULB	Home of CSULB METRANS, participating faculty, training and professional education programs, students; METRANS offices
College of Engineering	CSULB	Participating faculty, education programs, students
Department of Economics	CSULB	Participating faculty, education programs, students
Caltrans	Sacramento, CA	Match fund sponsor, financial contribution of full required match, data sharing, other research funding
Port of Los Angeles	Los Angeles	METRANS Associate, financial contribution, internships, student scholarships
Port of Long Beach	Long Beach	METRANS Associate, financial contribution, internships, student scholarships
Majestic Realty	Industry, CA	METRANS Associate, financial contribution
SCAG	Los Angeles	METRANS Associate, financial contribution, internships, data sharing
Metro	Los Angeles	METRANS Associate, financial contribution, internships, research funding
ILWU	Los Angeles	METRANS Associate, financial contribution
APM Terminals	Long Beach	METRANS Associate, financial contribution

*The Center for International Trade and Transportation (CITT):* The CITT is dedicated to delivering education programs, innovative research, and community outreach in the area of goods movement. CITT is the Long Beach home for the: METRANS Tier One Center. The CITT Executive Director, Thomas O'Brien, serves as a METRANS Associate Director. The CITT has several noteworthy educational programs which directly related to the Tier One Center. For example, the CITT is developing *Secondary Education Instructors Course*, a one week short course for teachers at Long Beach Unified School District to be offered in June 2015. The course is sponsored by the Port of Long Beach and will provide instruction to high school teachers on how to incorporate maritime and trade related issues into the high school curriculum. It will be taught by university instructors, industry professionals and pedagogical experts. Course participants will be matched with an industry mentor as part of the process and leave the class with a completed lesson plan. CITT is also developing *Principles of Supply Chain Management*, a 36-hour (two-week) class on Principles of Supply Chain Management that will be offered in partnership with Long Beach City College as part of a Trade Adjustment Act grant from the Dept. of Labor. The class is targeted at potential entry-level supply chain employees who have lost their jobs as a result of economic restructuring. The class will help prepare them for a certification recognized by the Council of Supply Chain Management Professionals.

*CITT Policy and Steering Committee:* The CITT Policy and Steering Committee (PSC) consists of representatives from modal transportation sectors, units of government, organized labor, and other individuals in international trade and transportation as well as from academia. The PSC helps direct the outreach activities of CITT, including those sponsored by METRANS. The PSC also serves as the advisory body on the development of the structure and content of the Town Hall Meeting.

METRANS has extensive informal relationships with industry and government. SCAG provides regional planning and transportation modeling data. LA Metro funds a major research project to develop a data archive from real-time transportation system monitoring data and develop applications for planning and system management. Several trade organizations offer scholarships and other assistance, including the Los Angeles Transportation Club (LATC), Harbor Transportation Club (HTC), Harbor Association for Industry and Commerce (HAIC) and Council of Supply Chain Management Professionals. The HAIC and LATC have endowed scholarship funds for GLS students.

### 3.2.2 Relationships with Other Universities

*Council of University Transportation Centers:* METRANS is a long-time member of the Council of University Transportation Centers. The center director (Giuliano) is a past president and executive committee member. O'Brien is serving on the executive committee. O'Brien also serves as METRANS lead for the CUTC workforce development efforts.

*MetroFreight (MF) Center of Excellence:* METRANS is the home of the Volvo Research & Educational Foundations (VREF) Center of Excellence on urban freight. MetroFreight seeks to improve the sustainability of goods movement in metropolitan areas around the world. The consortium includes the University Transportation Research Center (Region 2 UTC) in New York, the Institute of Science and Technology for Transport (IFSTTAR) in Paris, and the Korean Transport Institute (KOTI) based in Seoul. Nineteen Year 2 research projects have been launched, which include two for which LA serves as lead: Integrating Management of Truck and Rail Systems in LA, Dessouky (PI); and, Modeling for Local Impact Analysis, Ioannou (PI). Two additional projects are led by the UTC New York with Giuliano on the team: Conceptualizing and Testing the Freight Landscape, and Spatial Dynamics of Warehousing and Distribution. The Year 3 research program has begun with 8 new and 16 continuing projects.

The MetroFreight team meets monthly via conference call and in person as opportunities arise. During this reporting period METRANS faculty and VREF partners met and participated in the VREF Transforming Access and Mobility in Cities Workshop, New York (October 2014); UTC Spotlight Conference, the Role of Freight Transportation in Economic Competitiveness, Washington DC, (December 2014); TRB Annual Conference, Washington, DC (January 2015); VREF Conference on Urban Freight, Gothenburg, Sweden (March 2015); ITS America Symposium: Advancing an Intelligent Freight Network, Long Beach, CA (March 2015).

A new graduate urban freight course, *Urban Freight and City Logistics*, taught by Alison Conway, CCNY, is being tested online at USC under the direction of Giuliano. O'Brien continues to develop *Urban Freight Best Practices* course with MF partners.

*National Center for Sustainable Transportation (NCST):* METRANS is a partner in the NCST consortium, led by UC Davis, and including UC Riverside, Georgia Tech, and University of Vermont. METRANS' role is sustainable freight transport, which links well with MetroFreight. All five launch projects have been started: Reducing Truck Emissions and Improving Truck Fuel Economy via ITS Technologies, Petros Ioannou (PI), Routing Strategies for Efficient Deployment of Alternative Fuel Vehicles for Freight Delivery, Maged Dessouky (PI), Impacts of Legislative Mandates on Transportation Workforce Capacity, Thomas O'Brien (PI), Spatial Dynamics of the Logistics Industry and Implications for Freight Flows, Genevieve Giuliano (PI), and Urban Spatial Structure and GHG Emissions, Marlon Boarnet (PI). A second year open solicitation for NCST projects was included in our second Year 2 RFP.

*Southwest Transportation Workforce Center:* METRANS is now home to the Southwest Transportation Workforce Center (SWTWC), one of five regional centers that form the National Network for the Transportation Workforce. Each is dedicated to providing a more strategic and efficient approach to

transportation workforce development. The Federal Highway Administration (FHWA) funded the launch of the five centers to build strategic partnerships and engage regional and national stakeholders to advance the goal to develop a skilled and career-ready transportation workforce. O'Brien serves as Director of SWTWC, which is based in the METRANS CSULB offices. SWTWC includes the following partner institutions: USC Sol Price School of Public Policy, Texas A & M University Transportation Institute (TTI), ICF International, and the National Occupational Competency Testing Institute. SWTWC facilitates results-driven partnerships with State Departments of Transportation, State Departments of Education, industry, and other stakeholders throughout transportation, education, labor, and workforce communities.

*Other Activities:* With university partners, METRANS submitted several major proposals during this reporting period. We continue to work with a consortium led by U Antwerp on port innovation research.

## 4. Impact

Impacts tend to be the result of a cumulative body of work, rather than specific projects or programs. The METRANS UTC is part of a larger effort of research, education and outreach. We provide a summary of impacts below.

### 4.1 DEVELOPMENT OF THE PRINCIPAL AND OTHER DISCIPLINES

METRANS is a multi-disciplinary research center that includes engineering, social sciences, urban planning and public policy. Our impact has been on developing interdisciplinary courses and degree programs. At USC, most graduate transportation courses are cross-listed between public policy and engineering. At CSULB, the masters level MS-SCM is an interdisciplinary degree. Employers recognize the value of our graduates' multidisciplinary training, which is reflected in very high placement rates of our graduates. Regarding fields of research, METRANS has contributed to development of routing and scheduling methods to improve rail and truck efficiency; development of simulation models for truck and passenger flows; and establishing urban freight as a field of research within urban planning and public policy.

### 4.2 DEVELOPMENT OF HUMAN RESOURCES

*Student Support:* At USC, METRANS UTC research funds 11 engineering and 6 urban planning graduate students. Four masters students (urban planning, public policy, civil engineering) and two urban planning undergraduates work on outreach activities. At CSULB, two masters students (computer science, education) and one undergraduate (business) work on METRANSInfo and social media.

We also provide financial and administrative support to allow students to participate in transportation related conferences and competitions, such as the CTF Annual Symposium, the Annual Town Hall meeting, I-NUF, ITS America, LA Business Council, SCAG, the Port of Long Beach, Foothill Transit, Young Professionals in Transportation, Parsons Brinkerhoff, Caltrans, and WTS activities.

*Support for Underrepresented Groups:* METRANS is committed to promoting diversity, in particular of underrepresented groups. Of the six student administrative assistants directly supported by METRANS funding, one is a member of an underrepresented group and four are both female and members of minority groups. Of the nine student and professional groups supported by METRANS, three are specifically devoted to women, and one is specifically devoted to underrepresented groups.

*Scholarship Opportunities:* METRANS regularly disseminates information regarding opportunities for scholarships to students at both universities as well as the general public via our website, social media, announcements at courses and events, and our email distribution list of over 3,000. Scholarships are generally awarded at the end of each academic year to facilitate the students' following year.

*Opportunities for Research:* Student support is an important component of research project selection. Fourteen faculty and 15 student researchers participate in these projects.

*New Educational Materials and Programs and Opportunities for Teaching:* During the reporting period, we developed and launched the pilot for one new transportation course and have begun testing modules of the undergraduate minor in transportation. There are several additional courses and programs under development, including the Virtual Academy, the Long Beach Unified School District Teacher Training Course, and transportation courses for the USC Executive Master of Leadership Development program. These programs alone will offer new teaching opportunities for more than ten instructors.

#### **4.3 RESOURCES AT UNIVERSITY AND PARTNER INSTITUTIONS**

We continue support of transportation student and professional organizations, and to improve our Goods Movement Database and the Manifest. New resources include the internship and employment databases. METRANS continues to develop the METRANS InfoShop. At USC, METRANS research activities will move to the new Price Research Center in May 2015. Research facilities include staff offices, high capacity computing, spatial analysis laboratory, secure data servers, and a variety of statistical software.

#### **4.4 TECHNOLOGY TRANSFER**

Technology transfer tends to occur after research results have been disseminated, and none of the research funded by this grant has been completed. Preliminary results have been presented.

#### **4.5 SOCIETY BEYOND SCIENCE AND TECHNOLOGY**

Our impact takes place through our faculty and researchers. Our faculty serve as editors and on boards of several scholarly journals, and are members of state or local committees and task forces, providing advice on transport policy and practice.

Giuliano is a member of the National Freight Advisory Committee and contributed to recommendations for a national freight strategic plan, as well as on specific policies, such as the proposed Designated Highway Primary Freight Network. Giuliano consulted on state legislation; California AB 2008 promotes dedicated loading space for new developments within transit villages. A member of the CUTC Workforce Dev. Committee, Nat'l Transportation Workforce Dev. Summit coordinating committee, O'Brien helps to raise the profile of transportation workforce development at the regional and national levels and brings together stakeholders from the public sector and private industry through the CUTC Workforce Development Committee and the Nat'l Transportation Workforce Development Committee. Boarnet is in regular communication with transportation policy makers. He presented the results of his research to two policy committees of the Southern California Association of Governments, and he has partnered to develop policy briefs that inform the implementation of California's greenhouse gas emission regulatory framework.

### **5. Changes**

There are no changes in the scope or objectives of this grant. We have encountered some schedule delays as a result of a lengthy process of contracting for match funding. The Caltrans contract was not fully executed until June 29, 2014. Since funds cannot be spent until a project task order is processed and approved by Caltrans, additional time is required. The first task orders were approved in August, and the projects began at the end of August. The remaining Year 1 projects have begun, and Year 2 projects will likely begin summer 2015. Education and outreach projects are on schedule.

### **6. Special Reporting Requirements**

No special reporting requirements. Nothing to report