Center for Teaching Old Models New Tricks (TOMNET)

A USDOT Tier 1 University Transportation Center

PROJECT PROPOSAL: 2017-2018

Title: Attitudes towards Emerging Mobility Options and Technologies – Phase 1: Data Collection

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Principal Investigator: Giovanni Circella, Senior Research Engineer, School of Civil and Environmental Engineering, Georgia Institute of Technology

Co-Principal Investigator: Patricia L. Mokhtarian, Susan G. and Christopher D. Pappas Professor, School of Civil and Environmental Engineering, Georgia Institute of Technology

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1. Introduction/Problem Statement

Emerging transportation technologies including electric and autonomous vehicles, and emerging mobility services such as ride-hailing and vehicle sharing are bringing about transformative changes in the transportation landscape. How will these emerging technologies and mobility services impact user's travel choices, activity-travel patterns, residential location, quality of life, land use, and the energy and environmental footprint? It is very important to understand and predict the behavioral impacts of these changes and plan future transportation systems with a view to improve mobility, accessibility, and environmental sustainability for all, regardless of location and socio-economic status.

Autonomous vehicles (AV) (also referred to as driverless cars or self-driving cars) are capable of navigating without human input using an array of technologies such as radar, lidar, GPS, Odometry, and computer vision. Most industry experts suggest that autonomous vehicles will be on the road within a few years (1). The Secretary of Transportation in the US stated at the 2015 Frankfurt Auto show that he expects driverless cars to be in use all over the world by 2025 (2). Google plans to have its driverless cars on the market no later than 2018 (3). The Institute of Electrical and Electronics Engineers (IEEE) is predicting that up to 75% of all vehicles will be autonomous by 2040 (4).

Electric vehicles are also witnessing dramatic improvements in range that could contribute to enhanced interest in these vehicles. There are over two dozen all-electric and plug-in hybrid electric vehicles in the market and several additional models are likely to be introduced in the next few years (5). Recent entries in this market, including those from Tesla and GM, are promising dramatic improvements in range that should reduce range anxiety and greatly increase the appeal of these vehicles despite limited charging infrastructure. Virtual ride hailing companies such as Uber and Lyft are beginning to change the transportation landscape in significant ways as they provide door-to-door mobility-on-demand through the use of mobile apps. In general, information technology is making ride share and transit travel options more convenient using location-aware services and real-time data analytics.

With the emergence of new transportation technologies and services, it is critical that transportation forecasting models be enhanced to account for market dynamics that will result from the increasing penetration of disruptive forces in the transportation domain. To enhance transportation forecasting models, people's attitudes towards and perceptions of these technologies and services need to be measured and understood. Armed with such an understanding, it will be possible to specify and develop behavioral models that account for attitudes and perceptions, adoption cycles, and adaptation patterns. It is envisioned that such models will help decision-makers better plan transportation infrastructure systems and design marketing and policy strategies that maximize the benefits of these disruptive technologies. Attitudes and

perceptions are likely to vary by socioeconomic characteristics, existing travel patterns and mobility experiences, and land use and built environment attributes.
Researchers at the University of South Florida (USF), in partnership with the AAA foundation, conducted a survey to study consumer perceptions of AVs, interest in advanced safety and automation features in future vehicle purchases, and potential impacts of AVs on travel patterns and mobility choices. This project will build significantly on the USF study to obtain attitudinal and behavioral data from a sample of respondents in the Atlanta metropolitan region of Georgia.

This project will collect survey data from a sample of approximately 1000 residents in the Atlanta metro area to understand how the market may perceive, adopt, and adapt to transformative transportation technologies. During the one-year duration of the project, the research team will review relevant behavioral studies, design the survey instrument and sampling plan, conduct a survey pre-test, perform actual data collection, compile and clean data, and produce the required reports and documentations. Thus, the focus of this phase-I effort is to collect a rich dataset of users' attributes and mobility choices, together with attitudes, perceptions and stated preferences towards new mobility options and technologies. The sampling plan will be designed with a view to obtain data from a stratified sample such that comparisons can be made across socio-economic market segments defined by age, gender, employment status, income, vehicle ownership, household structure and composition, and residential location. Through a coordinated set of projects, similar data will also be collected in Tampa and Phoenix, thus delivering a harmonized set of data sets from multiple locations that would afford the ability to perform comparisons and test spatial transferability of behavioral models (that will be developed in phase-2 of the effort, envisioned to be undertaken in year 2).

2. Project Objectives

The overall goal of this project is to collect a rich set of data that includes information about people's travel behavior and their attitudes towards and perceptions of advanced transportation technologies and mobility options with a view to inform the development of robust behavioral models of technology adoption capable of reflecting impacts of these disruptive forces on traveler behavior and values.

The objectives of this project include the development of a harmonized survey instrument, survey design and administration protocol, and sampling plan that other jurisdictions can adopt to conduct similar surveys in their areas. There is significant interest in understanding how people may adopt and respond to the introduction of transformative transportation technologies, but there is considerable uncertainty in how best to design a survey and set of questions that elicit the information needed to develop well-specified behavioral models. This project will provide a data collection protocol and methodology that can be widely adopted.

3. Proposed Methodology and Data

This project will commence with a review of previous studies on attitudes towards and behavioral impacts of autonomous transportation technologies and innovative mobility services. A comprehensive review of previous studies will help identify data needs and behavioral dimensions of interest. The review will help identify data gaps that need to be addressed; gaps may take the form of data content and/or sample groups. The plan is to use the previous University of South Florida study design and survey instrument and other survey tools developed by TOMNET researchers in previous projects as a starting point, and then enhance the survey and data collection protocol based on a review of the literature and behavioral questions of specific interest to the TOMNET team.

The survey instrument may take the form of an online or paper-based mail-out/mail-back survey. The survey design decisions will be made as part of the project tasks. Working in close partnership with the Atlanta Regional Commission, the project team will identify the best methodology to recruit a sample of households for potential participation in the planned "autonomous vehicle and smart mobility options" survey proposed in this study. The survey will collect a host of information from respondents. Attitudinal questions and statements will be included in the survey with respondents expected to provide ratings on a

likert scale. Some open-ended questions will also be included to obtain qualitative information that can help clarify the quantitative data collected in the survey.

Overview of Survey Content

1. General Information
    - Socioeconomic and vehicle attributes
    - Usual travel patterns
    - Residential, work, and school locations
2. Attitudes towards and perceptions of transformative technologies
    - Electric vehicles
    - Automated vehicles
        - Adoption patterns – ownership vs sharing
3. Awareness and use of shared mobility services
    - Current use of ride hailing services, online ride sharing
    - Propensity to use shared mobility services
    - Impacts of shared mobility services on other components of travel behavior
4. Behavioral impacts of transformative technologies on mobility patterns and choices
    - Stated preference questions/scenarios
    - Stated adaptation questions
    - Open-ended qualitative questions
    - Distinguish between short- and long-run impacts

The exact content and set of questions will be designed as part of the project tasks.

4. Work Plan (Project Tasks)

The following tasks will be undertaken in this project.

Task 1 - *Review of behavioral studies about adoption of and adaptation to transformative transportation technologies*: The project will commence with a comprehensive review of the literature on studies that aimed to provide insights on the behavioral impacts of new transportation services and technologies. The design of the survey within this project will be informed by this literature review, and the project team will seek to ensure that the proposed survey addresses gaps found in the literature.

Task 2 - *Design of survey and sampling plan*: In this task, the project team will first identify the research questions of interest and behavioral and attitudinal variables that are needed to address the research questions and inform behavioral model specifications. The survey instrument and sampling plan will be designed so that the data needs are met. Findings from the literature review and information from the USF autonomous vehicle survey and other previous surveys developed by the research team in California and Georgia will be used to help guide the survey design and sampling plan. It is envisioned that a respondent sample size of 1,000 will be targeted. The survey design and sampling plan will be harmonized across projects being undertaken in multiple jurisdictions to ensure that the data and findings can be compared across metropolitan regions.

Task 3 - *Survey pretest and revision*: Prior to undertaking the full-fledged data collection effort, the project team will conduct a small scale pretest using a convenience sample of university employees and students. Participants in the survey pretest will be given the opportunity to offer feedback about the survey and identify areas for improvement. The pretest data, collected from about 50-100 respondents, will be analyzed in detail with a view to enhance the design of the survey and ensure that there is no ambiguity in survey questions.

Task 4 - *Survey administration and data collection*: In this task, the full-fledged data collection will take place. The survey will be administered in accordance with the survey design plan developed in Task 2. An

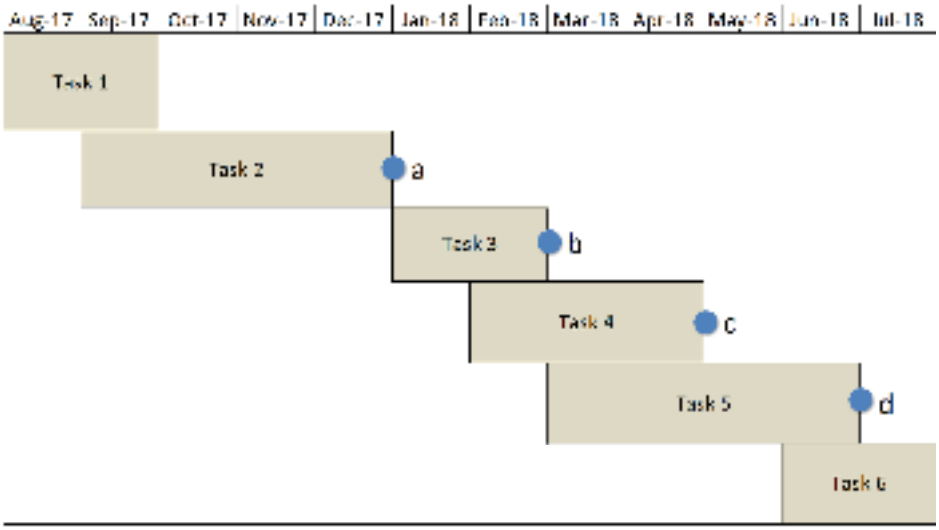
address database will be purchased from a vendor to mail surveys and postcards; households will be able to complete the survey online or by mailing back a paper version of the survey. If the survey design calls for an incentive, then a token of appreciation will be included in the package.

Task 5 - ***Data compilation and documentation***: Upon completion of the data collection effort, the project team will compile the electronic databases and thoroughly document the data. A number of data validity checks will be performed so that the final data sets assembled in this project are clean and free of obvious logic errors. For the final cleaned data set, multi-dimensional raking procedures will be used to weight the sample households so that the weighted sample is representative of the general population. Data documentation, including a detailed data dictionary and description of the data collection methodology, will be prepared to support permanent data archival according to established data documentation standards.

Task 6 - ***Submission of final deliverables***: The final deliverables of the project will include a comprehensive report documenting the literature review, survey design and sampling plan, data collection details, and data documentation. The project will also result in the delivery of a fully documented and weighted data set that can be used to study attitudes towards and behavioral impacts of autonomous vehicles and emerging mobility services. The final datasets will be saved and archived in CSV format to facilitate ease of use in any software platform.

5. Project Schedule

The project schedule is shown in the figure below.



Milestones:

a: Initial survey instrument and sampling plan is ready

b: Survey pre-test is conducted and final survey instrument and sampling plan is ready

c: Data collection is completed

d: Final dataset is ready

As per the schedule, the literature review will be undertaken in August and September of 2017, the first two months of the project. The design of the survey and sampling plan will commence in September 2017. It is anticipated that this task will take four months. The survey pretest and revision will take place in January and February 2018, facilitating a full-fledged data collection effort in March, April and May 2018. By collecting data in Spring 2018, it will be possible to ensure that respondents are providing information in the context of their regular daily activity-travel patterns when schools are in session. The data compilation and documentation effort will take place between March and June 2018. Final deliverables will be prepared and submitted in July 2018.

6. Relevance to the Center Theme/Mission

This research project involves the collection of attitudinal data to better understand how people perceive and value autonomous vehicles, mobility-as-a-service options, and other disruptive and transformative transportation technologies. Transportation planning agencies are increasingly seeking to forecast travel demand and mobility patterns/choices under alternative future states; however, they are limited in their ability to do so due to a severe paucity of data and behavioral insights on how individuals may adopt and adapt to various disruptive transportation services and technologies. Many studies to date have not gathered data about attitudinal variables, which are likely to play a very important role in shaping behavioral response to alternative technologies and services. This project directly addresses the theme of the center by collecting attitudinal data together with behavioral and socio-economic information. The resulting data set can be used to develop new behavioral forecasting models that explicitly account for attitudes, perceptions, and values. Therefore, the attitudinal data collection effort contemplated in this project directly addresses the mission of TOMNET, namely, to advance data and methods to explicitly reflect the role of attitudes, perceptions, values, and preferences in activity-travel behavior and mobility choice models.

7. Anticipated Outcomes and Deliverables

The proposed project will result in the development of a rich dataset incorporating information about people's socioeconomic attributes, current travel behavior, attitudes toward and perception of new mobility choices and advanced technologies in transportation, and expected impact of advanced mobility options on traveler behavior and values. It is envisioned that parallel harmonized data collection efforts will take place in at least two other metropolitan areas, namely, Phoenix and Tampa. The project will result in the delivery of harmonized data sets that can be pooled or analyzed separately in subsequent phases (years) of the overall research enterprise. The project will also result in the publication of a final report and the preparation of presentations that document the entire study including the literature review, survey design plan, sampling plan, data collection methodology, and sample descriptive statistics. The data sets and documentation will be made available to all members of the TOMNET team to facilitate collaborative data analysis and modeling efforts. It is anticipated that the survey design and sampling plan developed in this research effort can be used by any jurisdiction in the country interested in collecting similar data within its metropolitan region or context.

8. Research Team and Management Plan

The research team is led by Dr. Giovanni Circella, who will serve as the Principal Investigator for the project at Georgia Tech. Professor Patricia Mokhtarian will serve as the Co-principal investigator for the project and will assist in each and every project task. The project will support one highly qualified PhD student, and a few undergraduate research assistants (who will assist with survey administration and data entry).

Giovanni Circella is a Senior Research Engineer in the School of Civil and Environmental Engineering of the Georgia Institute of Technology. His research interests include travel behavior, transportation planning, travel demand modeling, land use modeling, travel survey methods, transportation sustainability, shared mobility and transportation technology, energy consumption, and policy analysis. He is an expert in the

collection and analysis of behavioral data and the estimation of discrete choice models and other quantitative methodologies. His recent research has focused on the impact of personal attitudes and preferences on travel choices, the relationships between land use and travel behavior, the impact of shared mobility and on-demand ride services (e.g. Uber/Lyft) on travel behavior and auto ownership, the energy consumption associated with various land use patterns, the impact of information and communication technology (ICT) on transportation, and the mobility patterns of specific segments of the population (e.g. "millennials") and in various regions of the U.S., Europe, South America and the emerging economies of the Middle East/Gulf Countries. He is a panel member for the National Cooperative Highway Research Program (NCHRP) projects 20-102, 20-102(01) and 20-102(09) on the Impacts of Connected and Automated Vehicles on State and Local Transportation Agencies. In addition to his contribution to scientific and professional organizations, he regularly cooperates with metropolitan planning organizations (MPOs), other agencies and non-profit organizations in the U.S. and Europe. He is the elected representative of the research faculty in Civil and Environmental Engineering in the Faculty Senate of Georgia Tech. **Patricia Mokhtarian** will serve as the Co-principal Investigator for this project. She is an internationally-known travel behavior scholar, who has specialized in measuring and modeling attitudes and incorporating them into models of travel-related behaviors.

Giovanni Circella will be the primary point of contact for all aspects related to this research and will manage all aspects of the project. He will work closely with a graduate student and a few undergraduate students to accomplish the project tasks. He will also coordinate efforts with other research groups conducting the same survey in other US metropolitan areas to ensure consistency in the survey data and products. Patricia Mokhtarian will assist on various project tasks and provide significant input on the design of the survey and sampling plan.

9. Technology Transfer Plan

The project team believes in executing an effective technology transfer plan by disseminating project information and results widely to the professional community. During the one-year duration of this particular project, each milestone will be disseminated using one of the TOMNET communication mechanisms (e.g., website, webinar, seminar, teleconference). Project team members will prepare articles about the survey and data set for publication in refereed journals and conference proceedings. Project team members will participate in conferences and deliver presentations about this work and the outcomes of the effort. The project will also result in the preparation of data and survey products that can be shared with the broader professional community so that other jurisdictions can mimic the study without any difficult. The project team will conduct webinars and seminars and post all interim reports and technical memoranda online at the TOMNET website.

10.Workforce Development and Outreach Plan

The project incorporates a strong workforce development and outreach plan. The project will employ a full time PhD graduate student as a graduate student researcher. The doctoral student will be involved in all aspects of the project including survey design, sampling plan, data collection, and data analysis. Undergraduate students will also be recruited to participate in the research endeavor; they will be expected to help with data entry, data checks, and data documentation. Finally, the project will also welcome high school students who may be interested in serving as volunteer researchers under the TOMNET Scholar Initiative. Findings from the project will be integrated in graduate level courses taught at various institutions in the consortium so that the research and workforce development activities of the center are seamlessly blended together.

11.References

John D. Stoll, The Wall Street Journal (2016, May 10). Retrieved on 2017, June 6 from: https://www.wsj.com/articles/gm-executive-credits-silicon-valley-for-accelerating-development-of-self-driving-cars-1462910491

Jan Hauser, Wirtschaft (2015, Oct 19). Retrieved on 2017, June 6 from: http://www.faz.net/aktuell/wirtschaft/unternehmen/verkehrsminister-foxx-selbstfahrende-autos-in-10-jahren-standard-13811022.html

Driverless car market watch. Retrieved on 2017, June 6 from: http://www.driverless-future.com/?page_id=384

IEEE 2012 news. Retrieved on 2017, June 6 from: http://www.ieee.org/about/news/2012/5september_2_2012.html

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12.Qualifications of Investigators

GIOVANNI CIRCELLA
Senior Research Engineer, Civil and Environmental Engineering
Georgia Institute of Technology, Atlanta, GA 30332-0355 Email: gcircella@gatech.edu

Education

Ph.D., Infrastructure Engineering and Transportation Planning, Politecnico di Bari, Jul 2008.
M.Sc., Agricultural and Resource Economics, University of California, Davis, Sep 2009.
M.Sc. + B. Sc. (Italian Laurea, summa cum laude), Civil Engineering (Transportation), Politecnico di Bari, Apr 2004.

Employment and Professional Experience (last 25 years)

Senior Research Engineer, School of Civil and Environmental Engineering, Georgia Institute of Technology, Nov 2016 – present (75% appointment).
Assistant Professional Researcher, Institute of Transportation Studies, University of California, Davis, Oct 2015 – present (25% appointment).
Research Engineer, School of Civil and Environmental Engineering, Georgia Institute of Technology, Nov 2013 – Nov 2016 (75% appointment).
Post-Doc Researcher, Institute of Transportation Studies, UC Davis, Oct 2009 – Sep 2015.

Fields of Interest and Expertise

(1) Personal attitudes and travel behavior analysis; (2) Discrete choice modeling; (3) Travel survey methods and data collection; (4) Transportation planning; (5) Transportation demand modeling and forecasting; (6) Statistical analysis of transportation data; (7) Sustainability and energy; (8) Shared mobility; (9) Information communication technologies and transportation

5 Recent Relevant Publications

1. Dong, Z., P. L. Mokhtarian, **G. Circella** and J. Allison (2015) "Estimation of Changes in Rail Ridership Through an Onboard Survey: Did Free Wi-Fi Make a Difference to Amtrak's Capitol Corridor Service?", Transportation, 42 (1), 123-142.
2. Guzman, L. A., D. De La Hoz and **G. Circella** (2015), "Evaluation of Synergies from Transportation Policy Packages Using a Social Welfare Maximization Approach: a Case Study for Madrid, Spain", Case Studies on Transport Policy, 3 (1), 99–110.
3. McFadden, A. J., **G. Circella**, B. Haydu and N. J. Linesch (2014) "Impact of Proposed Land Use and Transportation Investments on Future Travel Patterns in California", Transportation Research Record, Journal of the Transportation Research Board, 2430, 207-215.
4. **Circella G.**, P. L. Mokhtarian and L. K. Poff (2012) "A Conceptual Typology of Multitasking Behavior and Polychronicity Preferences", electronic International Journal of Time Use Research, 9 (1), 59-107.
5. Ye, L., P. L. Mokhtarian and **G. Circella** (2012) "Commuter Impacts and Behavior Changes during a Temporary Freeway Closure: The Fix I-5 Project in Sacramento, California", Transportation Planning and Technology, 35 (3), 341 – 371.

Graduate Student Supervision/Advising

Graduated: 1 MS; **Current Supervision**: 5 PhDs (including 2 women)

Honors and Awards

Keynote Speaker, Trailways 80th Annual Meeting and Conference, Fort Myers, FL, Feb 2016.
Fulbright Fellowship, University of California, Davis, 2006-2007.
Erasmus Scholarship, Universidad Politecnica de Valencia, Spain, 2013.
Research Award, City of Bari, Italy, for the Best Research Thesis, 2006.

PATRICIA L. MOKHTARIAN, PhD
Susan G and Christopher D Pappas Professor, School of Civil & Environmental Engineering
Georgia Institute of Technology, Atlanta, GA 30332-0355 Email: patmokh@gatech.edu

Education

PhD, Industrial Engineering/Management Sciences, Northwestern University, 1981
MS, Industrial Engineering/Management Sciences, Northwestern University, 1977
BA (summa cum laude), Mathematics, Florida State University, 1975

Employment and Professional Experience (last 25 years)

Susan G and Christopher D Pappas Professor (2016-present) / Professor (2013-2016), School of Civil & Environmental Engineering, Georgia Institute of Technology
Full (1999-2013)/Associate (1996-1999)/Assistant (1990-1996) Professor, Department of Civil & Environmental Engineering, University of California, Davis
Chair and Graduate Adviser (1997-2013), Interdisciplinary Graduate Group in Transportation Technology and Policy, University of California, Davis
Acting Director (1999-2000) / Associate Director for Education (2001-2013), Institute of Transportation Studies, University of California, Davis

Fields of Interest and Expertise

(1) Attitude measurement and survey design; (2) Statistical/econometric analysis of transportation data; (3) Impacts of information/communications technology on travel; (4) Attitudes toward travel; (5) Activities conducted while traveling; (6) Impacts of the built environment on travel behavior

5 Recent Relevant Publications (not already cited in the proposal)

Lee, Richard J., Ipek N. Sener, Patricia L. Mokhtarian, and Susan L. Handy (2017) Relationships between the online and in-store shopping frequency of Davis, California residents. *Transportation Research A* **100**, 40-52.

Garikapati, Venu M., Ram M. Pendyala, Eric A. Morris, Patricia L. Mokhtarian, and Noreen McDonald (2016) Activity patterns, time use, and travel of millennials: A generation in transition? *Transport Reviews* **36(5)**, 558-584.

Mokhtarian, Patricia L. and David van Herick (2016) Quantifying residential self-selection effects: A review of methods and findings from applications of propensity score and sample selection approaches. *Journal of Transport and Land Use* **9(1)**, 7-26.

Mishra, Gouri Shankar, Regina Ruby Lee Clewlow, Patricia L. Mokhtarian, and Keith F. Widaman (2015) The effect of carsharing on vehicle holdings and travel behavior: A propensity score and causal mediation analysis of the San Francisco Bay Area. *Research in Transportation Economics* (Special Issue on Sustainable Transportation) **52**, 46-55.

Mokhtarian, Patricia L., Francis Papon, Matthieu Goulard, and Marco Diana (2015) What makes travel pleasant and/or tiring? An investigation based on the French National Travel Survey. *Transportation* **42(6)**, 1103-1128.

Graduate Student Supervision/Advising

Graduated: 10 PhDs (including 2 women), 23 MSs (6); **Current Supervision**: 4 PhDs (1)

Recent Honors and Awards

Invited speaker, endowed or distinguished/eminent lecture series, 5 occasions (2013-2016)
Invited keynote speaker at 5 international conferences (2014-2017)
Sustained Research Award, School of Civil and Environ. Engineering, Georgia Tech (2015)

1. Budget Including Non-Federal Matching Funds

Institution: Georgia Institute of Technology

Project Title: Attitudes towards Emerging Mobility Options and Technologies – Phase 1: Data Collection

Principal Investigator: Dr. Giovanni Circella, Senior Research Engineer

Budget Period: 8/1/2017 to 7/31/2018

CATEGORY	Budgeted Amount from Federal Share	Budgeted Amount from Matching Funds	Explanatory Notes; Identify Source of Matching Funds
Faculty Salaries	$16,800	$11,000	GT: Dr. Circella = $11,000 from GDOT project
Other Staff Salaries			
Student Salaries (includes data entry costs)	$24,000	$24,000	Student working on GDOT project
Fringe Benefits	$5,966	$4,296	Faculty: 28.8% of salaries Grad student: 4.7% of salaries
Total Salaries & Benefits	$46,766	$39,296	
Student Tuition Remission	$17,868	$17,868	Full calendar year tuition
Operating Services and Supplies (data storage)	$500		
Domestic Travel	$1,000		
Other Direct Costs (specify): Survey Related Costs (address database, URL, printing and mailing)	$30,000		
Other Direct Costs (specify)			
Total Direct Costs	$96,134	$57,164	
F&A (Indirect) Costs: 57.8% of MTDC (excludes tuition)	$45,238	$13,683	
TOTAL COSTS	$141,372	$70,847	Total Project Cost: $212,219

Grant Deliverables and Reporting Requirements for UTC Grants (November 2016)
Exhibit F

UTC Project Information	
Project Title	Attitudes towards Emerging Mobility Options and Technologies – Phase 1: Data Collection
University	Georgia Institute of Technology
Principal Investigator	Giovanni Circella
PI Contact Information	Address: 790 Atlantic Drive, SEB Room 329 Atlanta, GA, 30332-0355 Email: gcircella@gatech.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	US Department of Transportation (Federal UTC): $141,372 Georgia Department of Transportation (Cost Share): $70,847
Total Project Cost	$212,219
Agency ID or Contract Number	
Start and End Dates	8/1/2017 - 07/31/2018
Brief Description of Research Project	Emerging transportation technologies including electric and autonomous vehicles, and emerging mobility services such as ride-hailing and vehicle sharing are bringing about transformative changes in the transportation landscape. With the emergence of new transportation technologies and services, it is critical that transportation forecasting models be enhanced to account for behavioral dynamics that will result from the increasing penetration of disruptive forces in the transportation marketplace. To enhance transportation forecasting models, people's attitudes towards and perceptions of emerging technologies and services need to be measured and understood. Armed with such an understanding, it will be possible to specify and develop behavioral models that account for attitudes and perceptions, adoption cycles, and adaptation patterns. It is envisioned that such models will help decision-makers better plan transportation infrastructure systems and design marketing and policy strategies that maximize the benefits of these disruptive technologies. This project aims to collect survey data from a sample of 1000 residents in the Atlanta metro area to understand how the market perceives, adopts, and adapts to transformative transportation technologies. During the one-year duration of the project, the research team will review relevant behavioral studies, design the survey instrument and sampling plan, conduct a survey pre-test, perform full-fledged data collection through the administration of a comprehensive attitudinal and behavioral survey, compile and clean data, and produce

	reports and documentation. Thus, the focus of this phase-I effort is to collect a rich dataset of users' attributes and current mobility choices, together with attitudes, perceptions and stated preferences towards new mobility options and technologies. It is envisioned that this project will result in the development of a data collection protocol and methodology that can be widely adopted in any jurisdiction interested in replicating the study.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	TBD
Impacts/Benefits of Implementation (actual, not anticipated)	TBD
Web Links • Reports • Project Website	TBD