

Program Progress Performance Report for University Transportation Centers

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Tier I University Transportation Centers Center for Accessibility and Safety for an Aging Population (ASAP)

Program Director:

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1. Accomplishments

1.1 Major Goals and Objectives of the Center

1.1.1 Research

With motivation from Florida's large number of senior residents, the reported relatively high involvement of seniors in traffic crashes nationwide and their special needs for transportation, the theme of the Center is to promote safe and accessible transportation for the aging population. The center focuses on four interdisciplinary areas: Accessibility and community connectivity among older adults; human factors affecting the older population, especially regarding acceptance of emerging technologies; geometric design research, especially regarding elder crash mitigation; and health, wellness and safety of seniors as it relates to multimodal transportation and emergency operations.

1.1.2 Education and outreach

The Center faculty are committed to education and workforce development at all levels, including activities such as the following: Research assistantships; Annual graduate student research colloquia; Seed grants for student pilot projects; Dissertation fellowships; Monthly brown bag lunch and seminar series; Expanding existing NSTI summer program at Florida A&M University (FAMU) and developing NSTI program at Florida State University (FSU), to serve a larger student population over longer time frame; Conducting an annual K-12 Transportation Day; and developing online educational activities and games for inclusion on the Center website.

1.1.3 Collaboration and diversity

The Center is a collaborative effort among Florida State University (FSU), Florida A&M University (FAMU), and the University of North Florida (UNF), with FSU serving as the lead institution. The selection of these two collaborative institutions (FAMU and UNF) is special because of the uniqueness of the two institutions, with FAMU being an HBCU institution. The Center also collaborates with other public section organizations as well as with other Universities. There are both External and Internal Advisory Boards with members appointed from private industry, government agencies, e.g., federal, state, county, city, etc., and academic institutions. Our Center is uniquely equipped to address the challenges of broadening participation and attracting minorities to the transportation field. The Center is committed to increasing the number of students in STEM (science, technology, engineering, and mathematics) fields in general and the transportation field in particular.

1.2 Accomplishment under Major Goals and Objectives

1.2.1 Research

The Center has conducted two cycles of research proposal funding. The first cycle projects were scheduled for nine-month durations with the projects scheduled to start in January 2014 and end September 2014. The second cycle projects started January 2015 and they are scheduled for an average of 18-month durations. The Center's research projects have been multi-disciplinary in nature, thus involving principal investigators across colleges and universities in the consortium. Overall, nine research projects were selected under the first cycle funding and ten projects were funded under the second cycle. With the Center's focus on safety and accessibility as it affects the aging population, each project was assessed in terms of the MAP-21 (Pub. L. 112-141 Sec. 52003) requirements as follows:

- Section 52003 (b) (2) IMPROVING HIGHWAY SAFETY: Outcomes include: Safety assessments and decision-making tools, Innovative operational improvements and designs of roadway and roadside features, Safety measures for vulnerable road users, including bicyclists and pedestrians, and Human factors studies and measures.
- Section 52003 (b) (4) STRENGTHENING TRANSPORTATION PLANNING AND ENVIRONMENTAL DECISIONMAKING: Outcomes include: Creation of models and tools for evaluating transportation measures and transportation system designs, including the costs and benefits; and Transportation and economic development planning in rural areas and small communities.

The funded projects are summarized in the following sections with some details are provided on each project, followed by two tables indicating for each funding cycle, how the projects relate to the MAP-21 requirements. The specific accomplishments in terms of publications, conference presentations, etc. are listed later on in other sections (2.0 Products) of this report.

Funding Cycle 1 Research Projects

ASAP2013-001: Student Pilot Project -- Impact of Red Light Running Camera Flashes on Younger and Older Driver Brake Response Times (FSU Dept. of Psychology), (Project Duration: 1/6/2014 to 5/6/2014 with no cost extension to 12/23/2014)

Recent empirical evidence suggests that the flashes associated with red light running cameras (RLRC) distract younger drivers, pulling attention away from relevant roadway information and delaying visual processing. Considering the perceptual and attentional declines that occur with age, older drivers may be especially susceptible to the distracting effects of RLRC flashes, particularly in situations in which the RLRC flash is highly salient (a bright flash at night). The current study examined age and situational differences in RLRC flash capture. Two experiments utilized both covert (inhibition of return) and overt (eye movement) indices of attention in order to explore potential age differences in the distracting effects of RLRC flashes. Salience of the flash was manipulated by varying its luminance and contrast with respect to the background of the driving scene (either day or night scenes). Results suggest that simulated RLRC flashes capture observers' attention, but, surprisingly, no age differences in attention capture were found with either covert or overt markers of attention. Findings inform future work that will examine how the distracting effects of RLRC flashes influence driving behavior.

ASAP2013-002: Protecting Vulnerable Road-Users: Ensuring the Safety of Bicyclist Infrastructure for an Aging Population (FSU Dept. of Psychology; FSU Dept. of Urban and Regional Planning), (Project Duration: 1/6/2014 to 12/23/2014 with no cost extension to 5/21/2015)

Bicycling is a popular outdoor activity for people of all ages and is associated with significant health benefits. However, bicycling is also one of the most dangerous modes of travel. When involved in a collision, a bicyclist's risk of injury or death is greater than seven times that of a motorist, and this risk increases with age: cyclists aged 65 and older face a risk three times that of cyclists in general. While past work examining the effectiveness of bicycle lanes frequently finds some safety benefits after bicycle lanes are installed, these studies do not consistently find an increase in the distance at which motorists pass bicycles, sometimes finding that motorists pass at closer distances after the installation of bicycle facilities. This study examined the influence of additional factors related to the distance at which motorists pass cyclists. First, we tested whether the presence of a cyclist lane boundary line affected the accuracy of drivers' estimates of the distance as they passed a stationary cyclist/bicycle. Second, we evaluated whether individual differences in spatial ability and processing speed among drivers predict the accuracy of passing distance estimates. Third, because participants completed parallel simulator and field versions of the passing distance task, we also compared the accuracy of passing distances in a simulated driving task to those observed in a field task for both younger and older adults, as well as examined the correspondence between individual drivers' performance in both types of task. Main findings include 1) younger and older drivers were inaccurate in their distance estimates, but overall tended to underestimate distances (e.g., when asked to pass at 3 feet, drivers passed at much greater distances), 2) cognitive measures did not strongly predict distance judgments, and 3) behavior inside and outside of the simulator were moderately correlated. From our results, it can safely be concluded that when motorists do not pass a cyclist with at least three feet of clearance, this is not due to drivers overestimating the distance between their vehicle and a cyclist.

ASAP2013-003: Needs Assessment for Multi-Modal Emergency Transportation Operations with a Focus on an Aging Population (FSU Dept. of Civil & Env. Engrg; FSU Dept. of Geography; FAMU: Dept. of Civil & Env. Engrg; UNF: School of Engrg.), (Project Duration: 1/6/2014 to 12/23/2014 with no cost extension to 2/28/2015)

In the aftermath of disasters, evacuating aging victims and maintaining an optimal flow of critical resources in order to serve their needs becomes problematic, especially for Gulf Coast states in the USA such as Florida, where more than 6.9 million (36.9%) of the overall population are over age 50. Recent

experience with Hurricane Katrina showed that fatalities are disproportionate among aging people who live independently and who are not willing or able to evacuate. From a transportation perspective, this problem becomes even more challenging when we consider roadway disruptions that can drastically affect the emergency transportation operations. Scanning the literature, there is no substantial prior work that has synthesized the requirements for a detailed multi-modal operational emergency needs assessment that could facilitate safe and accessible evacuation of aging people, and optimize the flow of critical resources into the affected disaster region to satisfy the needs of those who remain. This project describes the conceptual foundation and components necessary to create such a knowledge base with importance given to both ensuring the resiliency of the transportation infrastructure and meeting the needs of aging population. Following a thorough analysis of the aging population-focused emergency literature, these components are presented via an aging victim-focused and GIS-based case study application set in the District 3 region as identified by the Florida Department of Transportation.

ASAP2013-004: Spatial Context Transportation Safety Analysis for the Aging Population: An Integrated 3-Dimensional Visualization and Human Factors Simulation Approach (FAMU & FSU: Dept. of Civil & Env. Engrg; FSU: Dept. of Psychology), (Project Duration: 1/6/2014 to 12/21/2014)

As the population ages in the United States and around the world, we will have more older drivers on the road than ever before, making understanding older driver crash risk and developing effective countermeasures of critical importance. This will serve the goal of protecting aging road users and helping older adults maintain their mobility and independence. Research reported here developed an approach to understanding older adult crash risk at specific intersections. First, crash records were examined for crashes within the Tallahassee Florida region to identify intersections associated with older adult crashes. Then, using 3D modeling software, this intersection was recreated to help identify potential reasons for this crash risk in terms of the intersection's spatial context. Then, this 3D model was converted to a driving simulator tile to further understand older driver risk in a driving simulator study, which identified potentially risky decisions by older drivers. We propose this process of identifying risky intersections, modeling them, and importing them into the driving simulator as a potentially promising methodology to better understand specific properties of intersections that pose risk to older drivers, the perceptual and cognitive changes related to this differential risk, and countermeasures to reduce older driver risk. The promise and challenges of this approach are discussed.

ASAP2013-005: Accessibility for an Aging Population: Measuring and Ensuring Access to Goods, Services, and Vital Needs (FSU: Dept. of Geography; Dept. of Urban and Regional Planning), (Project Duration: 1/6/2014 to 12/21/2014 with no cost extension to 4/30/2015)

From securing healthy food to obtaining medical care, as well as simply remaining socially connected to family and friends in their communities, transportation systems have a critical role to play in ensuring our aging population can safely and efficiently reach desired destinations. In this project our key objective is to develop approaches that can be used to assess aging populations' accessibility to essential goods and services. We conducted two literature reviews: one for research that focuses on the research trends in accessibility modeling and then another that focuses on travel behavior and accessibility needs of aging populations. In the latter case, we also analyzed household travel data from Florida travelers in an effort to fill in gaps we find in the existing literature. We then combined these two lines of research into a modeling framework that would allow for accessibility measures that are aimed at understanding aging populations. Application of the accessibility metrics allowed us to evaluate how well different modes of transportation equitably serve the needs of the aging population. We explored these issues using Leon County, FL as a case study. Using highly disaggregate spatial data containing the locations of populations and possible activities, we implemented accessibility models in a Geographic Information Systems (GIS) environment, accounting for the mode of transportation. Scenarios and activities analyzed are informed by the review of the broader literature as well as our own analysis of the 2009 National Household Travel Survey. We found that the potential accessibility of the aging population varies by activity type and differs with other age group cohorts. The oldest group (those 85+) tends to have higher levels of accessibility.

ASAP2014-006: Improving Cutaway Bus Safety for Aging Passengers (FSU: Dept. of Psychology; FAMU: Dept. of Civil & Env. Engrg.), (Project Duration: 1/6/2014 to 8/6/2014)

The main objective of this project was to improve safety of elderly passengers in paratransit buses in Florida and possibly, nationwide. Until now, crashworthiness of paratransit buses and safety of their passengers were assessed using the Federal Motor Vehicle Safety Standard (FMVSS) 220. This assessment was made based on quasi static roof tests of the buses. However, research studies revealed that such tests did not help at all in assessing crashworthiness of the buses during dynamic, rollover test. Instead, dynamic rollover tests, implemented in Europe (ECE R66) and worldwide (UN R66) were proven to have beneficial impact on improved passenger safety and they were adopted, in large part, into so called Florida Standard. This standard was used to assist a paratransit bus manufactured in constructing a prototype of a safer bus, which would meet the stringent dynamic, rollover standard at almost the same cost. A Champion bus was selected as a target for this study. This choice had the strongest impact on improved safety as Champion buses represent over 50% of over 300 paratransit buses acquired annually by the State of Florida. The new and crashworthy design of the bus was presented to Champion Bus Inc. Company and a new prototype was built. It was shipped for testing to Tallahassee, Florida. A rollover test was carried out in June 2014. While the new design of the frontal ring of the bus showed significant improvement, the back wall was weaker and failed the test.

ASAP2014-007: Assessment of the Psychosocial Behavior Associated to Elderly Drivers to Reduce Their Involvement in Crashes (FAMU: Dept. of Architecture; Dept. of Health Care Management; and Dept of Occupational Therapy), (Project Duration: 1/6/2014 to 12/21/2014 with no cost extension to 9/30/2015)

Older adults living in rural areas have less access to transportation than their urban counterparts. More rural dwelling older adults are dependent on their own private vehicles to have access to services and social events. Access to alternative transportation has been correlated to older adults voluntarily ceasing to drive. Prior to giving up driving, many older adults self-regulate their driving behaviors in response to changes associated with age, such as decreased mobility, cognition, and vision. Very little research has been done on comparison of self-regulatory behaviors between rural and urban older drivers and its impact on driver cessation. The objective of this research is to determine whether rural older adults are less likely to self regulate their driving behaviors, and as a result cease from driving when they are not fit to drive, compared to urban dwelling older adults. The study is also examining whether urban dwelling older adults are more likely to self-regulate their driving behaviors because they have more options for alternative transportation.

ASAP2013-008: Analyzing Crash Clusters Near Senior Destination Sites Using GIS (UNF: School of Engrg.; FAMU: Dept. of Civil & Env. Engrg; FSU: Dept. of Civil & Env. Engrg), (Project Duration: 1/6/2014 to 12/21/2014 with no cost extension to 4/30/2015)

Roadway accidents claim more than 30,000 lives each year in the United States, and they continue adversely affecting people's well-being. This problem becomes even more challenging when aging populations are considered due to their vulnerability to accidents. This is especially a major concern in Florida since the accident risk is increasing proportionally to the population growth of aging Floridians. This study investigates the spatial and temporal patterns of aging people-involved accidents using Geographical Information Systems (GIS)-based methods via a case study of three urban counties in Florida, selected based on their high aging-involved accident rates. A series of spatial analytic methods are utilized to explore accident patterns, including a network distance-based kernel density estimation method, which provides an unbiased distribution of the accidents over the local roadways. Results indicate that high risk locations for aging-involved accidents show different spatial and temporal patterns than those for other age groups. Investigating these distinct patterns at a high spatio-temporal scale can lead to better aging-focused transportation plans and policies.

ASAP2013-009: Safety Investigation of Elder Drivers and Pedestrians at Roundabouts (FSU: Dept. of Civil & Env. Engrg; and FSU Dept. of Geography), (Project Duration: 1/6/2014 to 12/21/2014 with no cost extension to 9/30/2015)

Modern roundabouts are being installed on state and local roads in the United States at an increasing rate. Roundabouts can be less expensive to construct and operate than signalized intersections, and their use reduces vehicle delay, while enhancing the aesthetic appeal of the surrounding community. However, while most guides suggest that roundabouts should improve older driver safety, the ability of older drivers and pedestrians to successfully navigate roundabouts has not been thoroughly investigated. A brief literature review has shown that, while researchers are beginning to explore the effects of roundabouts on crash rates and severity in the U.S., little research has looked at the effect of age on those measures. The proposed research aims to examine 1) the growth in modem roundabouts in the state of Florida, including the proximity of roundabouts to communities with high numbers of older adults, and 2) crash rates and severity of roundabout crashes involving older drivers and pedestrians. The study will generate important baseline knowledge on potential problem areas and form the basis for additional interdisciplinary research within the Center, including simulator studies to examine older drivers' and pedestrians' comfort with and level of success navigating roundabouts.

Project No.	MAP-21 Section 52003 (b) (2) Improving Highway			MAP-21 Section 52003 (b) (4)			
	Safety				Strengthening Transportation		
	,				Planning and Environmental		
				Decision-making			
	Safety	Innovative	Safety	Human	Creation of	Transportation	
	assessments	operational	measures	factors	models and	and economic	
	and decision-	improvements	for	studies	tools for	development	OTHER
	making tools	and designs of	vulnerable	and	evaluating	planning in	
		roadway and	road users,	measures	transportation	rural areas and	
		roadside	including		measures and	small	
		features	bicyclists		transportation	communities	
			and		system		
			pedestrians		designs		
ASAD2012-001	N			J			
A3AF 2013-001	•			V			
ASAP2013-002	v			V			
ASAP2013-003	v				v		v ¹
							•
ASAP2013-004	v	v	v	V	v		
ASAP2013-005				v	v	v	v ²
46402012.000			-/		-1		
ASAP2013-006	V		V	v	v		
ASAP2013-007	v			V			
ASAP2013-008	v		٧		v		
ASAP2013-009	v		٧		v		
¹ Emergency tra	nsportation on	erations	I	1	1		

Table 1. Funding cycle 1 research projects and relation to MAP-21 requirements

² Assessments of accessibility needs and decision making tools

Funding Cycle 2 Research Projects

ASAP2014-001: Student Pilot Project: Improving Data Validity in a Driving Simulator: Effects of Guided Practice in Older Adults on Simulator Handling Skills and Incidence of Simulator Sickness (FSU: Dept. of Psychology), (Project Duration: 1/6/2015 to 8/7/2015 with no cost extension to 2/28/2016)

Although driving simulators are increasingly used in research because they allow precise investigation of critical issues which would otherwise be unsafe or impractical, simulator studies can be costly due to high levels of data loss. These losses accrue when participants lack the skill to handle a simulator as if it were a real car or become sick and must discontinue participation. Older participants often suffer significant data losses, and it can be difficult to recruit more in a timely fashion. During one such study, skill deficits in simulator handling were observed and a guided practice scenario developed to correct the issue. Resulting data were significantly more consistent and suggestive of increased skill. The current research proposes: to extend these findings among older adults to handling the simulator on curving roads and during turns at intersections; to determine whether an automated practice scenario can provide similar benefits; and explore whether the benefits of guided practice extend to reducing incidence of simulator sickness. Preventing data loss from data validity and simulator sickness issues would be of great benefit to researchers working in partnership with the ASAP Center and using simulators.

ASAP2014-002: Understanding Contributing Factors to Wrong-way Crashes and Evaluating the Effectiveness of Countermeasures in Reducing Wrong-way Crash Risk of Older Drivers (FSU: Dept. of Psychology; and UNF: School of Engrg.), (Project Duration: 2/28/2015 to 8/5/2016)

The majority of Wrong-way Crashes (WWCs) involve a driver using an exit ramp to enter a highway. As highlighted by a number of WWCs in Florida this year, these crashes are severe and often fatal. WWCs frequently involve drivers impaired by drugs and/or alcohol, but there is also evidence that age-related perceptual and cognitive declines put older drivers at greater risk for this type of crash. The current proposal aims to use crash analysis, in addition to a human factors approach, to understand the factors related to WWCs in older drivers, and to evaluate the effectiveness of new and existing countermeasures to prevent WWCs. Proposed studies will complement a Florida Department of Transportation (FDOT) funded simulator study on effective WWC countermeasures and recent FDOT initiated efforts to understand WWC crashes in Florida. The aim of the existing FDOT project is largely focused on examining the impact of traditional wrong-way countermeasures (pavement markings, signs) on younger and older drivers within the driving simulator. However, ASAP funding will allow for the exploration of relatively new and novel WWC countermeasures, such as the benefit of flashing wrong-way signs, new sign messages, novel roadway geometries, and the combination of different countermeasures. These studies will aide in our understanding of the best practices to reduce wrong-way entries, with the ultimate goal of reducing WWCs for drivers of all ages.

ASAP2014-003: Travel Time and Roadway Capacity Reliability for an Aging Population: The Development of a Model Integrating Roadway Traffic with Aging Adults' Driving Behavior (FSU: Dept. of Civil & Env. Engrg; Dept. of Geography; FAMU: Dept. of Civil & Env. Engrg; and UNF: School of Engrg.), (Project Duration: 1/6/2015 to 8/5/2016)

The highly developed and heavily used American roadway infrastructure plays a pivotal role in ensuring mobility, safety, reliability, and accessibility for the public. Technology, in the form of efficient and reliable decision-support systems, offers a valuable tool to improve the day-to-day and emergency operations and management of our existing transportation network and facilities, ensuring the most efficient utilization of surface transportation systems and offering sufficient travel time and network capacity reliability for the users. Meeting these transportation needs is especially important, and challenging, to vulnerable populations requiring more travel time and facing greater health and safety concerns – including aging adults. Given the aging of the population, technologies, including decision-support systems, are needed that are sensitive both to the transportation needs and behaviors of aging drivers and the reliability of the available transportation network in areas more heavily populated by aging adults. Such decision support systems would play a vital role in ensuring increased efficiency, reliability, and connectivity of the nation's highway transportation system, which is currently evolving in response to population aging. These challenges include not only daily traffic operations but also hazard

relief response. Central to meeting these challenges are new aging-focused methodologies that will provide agencies with complete, practical, and efficient transportation management and operations procedures. The first step in obtaining such novel methodologies is to extensively evaluate two datasets: existing travel time/traffic data and aging driving patterns. The second step is to integrate them, in order to generate a comprehensive reliability-based model that jointly considers aging adults' travel behavior and traffic on roadway networks. The proposed project will derive this mathematical model through the creation of travel time and network capacity reliability measures based on this integrated database. In order to increase the utility of the model, it will be tested using real-world data from Florida, the state with the highest percentage of aging adults. Analyses also will examine, using scenarios built in GIS-based transportation network models, selected regions of Florida with particular traffic patterns and age profiles.

ASAP2014-004: Scenario-based Evaluation of Multi-Model Emergency Transportation Operations Towards Better Decision Making in Aging-Focused Humanitarian Logistics (FSU: Dept. of Civil & Env. Engrg; and FSU: Dept. of Geography), (Project Duration: 1/6/2015 to 8/5/2015 with no cost extension to 12/31/2015)

In a recent study funded by the Center, the PIs successfully developed a comprehensive knowledge base and a detailed multi-modal operational emergency needs assessment that could facilitate safe and accessible evacuation of aging people, and optimize the flow of critical resources into affected disaster regions to satisfy the needs of those who remain. The results of this unique research project, with an application to District 3 as identified by Florida Department of Transportation, indicate that there is no substantial prior work that has synthesized and evaluated these issues. From a transportation planning perspective, this problem becomes even more challenging when we consider implementing these ideas in the context of emergency management/operations plans. Thus, to ensure and promote the long-term usage of this knowledge base by state/federal agencies and other organizations, it is important to conduct a scenario-based implementation study that will address the following major goals: (a) to extend our previously developed methodology to other Districts of Florida, (b) to create and evaluate new aging-focused emergency evacuation scenarios and case studies using GIS-based transportation network models such as CUBE, and (c) to leverage these tools and findings to inform emergency plans. This project will provide new knowledge for decision support and emergency assistance focusing on the safety, accessibility, speed and reliability issues that are critical for the survival of aging victims in the aftermath of disasters.

ASAP2014-005: An Investigation of Innovative Approaches to Transportation Service Provision for Aging Populations Residing in Areas Lacking Fixed-Route Public Transportation Service (FSU: Dept. of Urban and Regional Planning), (Project Duration: 3/20/2015 to 12/31/2015)

Many older Americans wish to remain in their current homes and communities as they age, and access to safe, reliable, and convenient transportation is critical for enabling them to do so. The availability of transportation options is particularly important to older Americans who for reasons of disability, income, or choice are not able to drive themselves. While older Americans living in metropolitan areas that provide fixed-route transit have access to public transportation to help them meet their mobility needs, nearly one out of five older adults live outside metropolitan areas and lack easy access to such transportation services. Many communities rely on paratransit services to help meet this critical transportation need; however, such services have serious limitations related to the high cost associated with providing these services, the need for users to schedule rides in advance of their actual travel, and service quality and reliability issues. In several states, individuals and organizations have begun to experiment with innovative transportation services that seek to address the limitations of the paratransit model in communities that lack fixed-route transit services. These services range from publicly funded, quasi-formal service networks to volunteer-led organizations that rely on private donations and informal operating approaches. Other informal approaches include volunteer-led transportation linkages that operate using personal vehicles, on-call scheduling, and existing social networks lo provide rides to older adults who need one. However, these services are understudied. There is a need for more information about the types of services that are provided, and there is a need

for assessment about the effectiveness of their organizational, structures and service delivery strategies for providing critical mobility services for the older population, the sustainability of their funding models, and the applicability of such approaches for other communities. This study seeks to provide best practices guidance through a multiple case study national investigation of innovative transportation services in communities that lack traditional fixed-route transit.

ASAP2014-006: Transit-Oriented Development for Aging Adults: An Evaluation of Recent Trends, Best Practices, and Future Prospects (FSU: Dept. of Geography; and FSU Dept. of Urban and Regional Planning), (Project Duration: 5/1/2015 to 12/31/2016)

The availability of transportation options is particularly important to older Americans who are not able to drive themselves. While older Americans living in metropolitan areas that provide transit have access to public transportation to help them meet their mobility needs, nearly one out of five older adults live outside metropolitan areas. While there is some public transportation available in rural and small communities, there is a need for more information about the types of services that are provided, and there is a need for assessment about the effectiveness of their organizational structures and service delivery strategies for providing critical mobility services for the older population, the sustainability of their funding models, and the applicability of such approaches for other communities. Through the research we will address the following three questions: (1) what types of transportation services exist in rural and small communities?; (2) how are these transportation services organized, financed, and delivered by the entities that provide the services?; and (3) how are these transportation services for planners and other interested professionals in the United States.

ASAP2014-007: Biomechanics of Older Drivers to Mitigate Injury in Automobile Accidents, (FSU: Dept. of Civil & Env. Engrg; and FAMU: Dept. of Civil & Env. Engrg.), (Project Duration: 1/5/2015 to 8/5/2016)

This study is evaluating both vehicle crashworthiness and occupant protection, with focus on aging occupants. Finite Element (FE) dummy models are being developed for aging driver/passenger (occupants) in automobiles, based on the population-average dummy models by LS-Dyna computer software. For selected cases, aging occupants using the Total Human Model for Safety (THUMS) will be also studied. These models will incorporate the frailty aspects of the aging person and other attributes. After developing the FE dummy models for aging occupants, FE analyses will be conducted simulating vehicle accidents. The types of vehicle accidents are vehicle-to-vehicle collisions and vehicle collision with roadway objects such as bridge columns. The biomechanical responses from the model will include estimates of incidence and severity of injuries to head and thoracic parts of the body. There would be focus on Injury Mechanisms, Biomechanical Response, and Human Tolerance (specifically for the aging human). The study will develop survivability envelopes for vehicle impacts for aging occupants, and compare them with those for younger occupants. The study will enable biomechanics-based recommendations to minimize the severity of injury, should accidents occur. It will compare different roadside conditions and will study to see if design improvements can alleviate injuries. Roadside designs may include geometric factors such as the side slope, and other pertinent roadway features.

ASAP2014-008: An Investigation of Pedestrian Signals to Reduce Intersection Crashes and Red Light Violations for Elderly Drivers, (FAMU: Dept. of Architecture; UNF: School of Engrg; and FSU: Dept. of Civil & Env. Engrg.), (Project Duration: 1/5/2015 to 8/5/2016)

Signalized intersections are designed to reduce the number of traffic conflicts by separating conflicting movements at an intersection. However, signalized intersections are known to have high likelihood of crash occurrences compared to other sections of the roadway. Decisions made by the drivers who are in dilemma zone are sometimes aided by upstream warning signals. Pedestrian signals have the potential of serving as warning signals as pedestrian green time coincides with the green time for corresponding traffic movement. For the elderly drivers, the decision making process is crucial since their perception reaction is longer than the average perception reaction time experienced by younger drivers. This study wishes to investigate the potential of utilizing pedestrian signals as warning signals and their impacts on driver's perception reaction time, specifically the elderly. This study will analyze intersections in Florida

with different types of pedestrian signals and evaluate their effectiveness as it pertains to movement of traffic to assist with the reduction of crashes especially elderly crashes and red light violations. Additionally, the study will utilize questionnaire survey to gain insight of how drivers utilize pedestrian signals as warning signals.

ASAP2014-009: Micro-Analysis of Collisions in Crash Clusters: Creating Crash Patterns and Conducting a Driver Simulation Study, (UNF: School of Engrg.; FAMU: Dept. of Architecture; FSU: Dept. of Psychology; FSU: Dept. of Civil & Env. Engrg; and FAMU: Dept. of Civil & Env. Engrg.), (Project Duration: 1/5/2015 to 8/5/2016)

One of the studies that were conducted in the first phase of funding by the Center was titled "Analyzing Crash Clusters Near Senior Destination Sites Using a GIS Approach". Using the GIS shapefiles for the elderly crashes, the study identified high crash clusters for 10 counties in Florida, most of which were listed as priority counties by the Safe Mobility for Life Coalition. This proposed study is the second phase which is intended to use the results of phase 1 in conducting an in-depth crash study in a crash by crash basis (microanalysis) in order to develop elderly crash patterns, create possible countermeasures, and examine the effectiveness of those countermeasures by using a driving simulator approach. The findings of this study will assist state and local safety officials in their strategic planning efforts for developing appropriate intervention and prevention programs for various roadway conditions in order to improve safety and enhance mobility for aging road users.

ASAP2014-010: Spatial-Context Intersections Safety Analysis for the Aging Population: An Integrated 3-Dimensional Visualization and Human Factors Simulation Approach, (FAMU: Dept. of Civil & Env. Engrg; and FSU: Dept. of Civil & Env. Engrg.), (Project Duration: 1/5/2015 to 8/5/2016)

To combat the potential for elderly drivers to be involved in collisions of all natures, the Federal Highway Administration (FHWA) developed the 2014 Handbook for Designing Roadways for the Aging Population. This handbook's chapter, which focuses on intersections, highlights sixteen Proven Practices and eight Promising Practices that can lead to the reduction in elderly traffic collisions. This research plans to directly investigate one of the Promising Practices (20 – High Visibility Crosswalks) and one of the Proven Practices (9 – Right-Turn Traffic Control for Signalized Intersections) and semi-directly one Proven Practice (8 – Left-Turn Traffic Control for Signalized Intersections). Through the utilization of Geographic Information Systems (GIS), 3D modeling, and the usage of the UTC's driving simulator, the study will determine regions where elderly drivers are involved in dangerous collisions, develop driving simulations where elderly and younger drivers will be expected to maneuver, and analyze the differences in behaviors between the elderly and younger drivers. From this data, conclusions will be developed as to how elderly drivers handle the cognitively-demanding scenarios, how the elderly drivers differed from the other age groups, and about the validity of the FHWA's belief that high visibility crosswalks can reduce elderly collisions with pedestrians. Additionally, this research strives to investigate the usage of a Flashing Turn Signal Head with Pedestrian Indication (FPI) to assist in reducing the number and level of collisions involving pedestrians and vehicles attempting to turn right. The expected outcome of the project will be specific planning and geometric design recommendations, as well as specific guidelines for education, licensing, and training for the ageing resulting from the spatialcontext human factors analysis to improve the safety of the aging population.

	MAP-21 Section 52003 (b) (2) Improving Highway Safety				MAP-21 Section 52003 (b) (4) Strengthening Transportation Planning and Environmental Decision-making		
Project No.	Safety assessments and decision- making tools	Innovative operational improvements and designs of roadway and roadside features	Safety measures for vulnerable road users, including bicyclists and pedestrians	Human factors studies and measures	Creation of models and tools for evaluating transportation measures and transportation system designs	Transportation and economic development planning in rural areas and small communities	OTHER
ASAP2014-001	v						٧ ¹
ASAP2014-002		v	v	V			
ASAP2014-003	v			V	v		v²
ASAP2014-004	v				v		v ³
ASAP2014-005						v	$\sqrt{4}$
ASAP2014-006				V	v		
ASAP2014-007	v			V			
ASAP2014-008	v			V			
ASAP2014-009	v			V	v		
ASAP2014-010	v	v	v	V	v		

Table 2. Funding cycle 2 research projects and relation to MAP-21 requirements

¹ Improving methods for simulator studies used in research studies

² Data extraction, fusion and evaluation

³ Emergency transportation operations

⁴ Innovative transportation strategies that permit individuals to age in place

1.2.2 Education and outreach

- On October 24, 2014, the Center held its first Annual Transportation Day event at the FAMU-FSU College of Engineering. More than 100 community members, researchers, and K-12 students enjoyed presentations and demonstrations on the theme of Transportation for the K-12 and Elder Road User. There were two concurrent tracks -- Aging and Mobility; and Teens and Transportation. Attendees also had the opportunity to experiment with the Center's new Driving Simulator. Younger participants were able to attend special Teens and Transportation track held at the same time. After a walk through transportation themed displays and posters, the students enjoyed hands-on activities in the FAMU-FSU computer lab, including a bridge design and safety competition, and a traffic signal design game.
- On October 24, 2014, at the Annual Transportation Day, Doctoral Research Fellow Awards were presented to Ayberk Kocatepe, PhD candidate in Civil and Environmental Engineering, Cary Stothart, Fourth Year Graduate Student in Psychology, and Timothy Wright, PhD Candidate in Psychology.
- On February 4 and 5, 2015, the Center participated in the 4th Annual Florida Forum for Minority Institutions of Higher Education (MIHE): Partnering in Transportation. This event was held at

Florida A&M University, Tallahassee, Florida. The theme was "The Road Beyond: How MiHEs Can Support a Strong Transportation Future." The center was represented by John Sobanjo and Doreen Kobelo. Dr. Kobelo was one of the hostesses while Dr. Sobanjo made a formal presentation and was involved in a round table panel discussion.

On February 18, 2015, one of our UTC Consortium members, Florida A&M University (FAMU), hosted the U.S. Department of Transportation Secretary Anthony Foxx at a town hall meeting



held on the FAMU campus in Tallahassee, Florida. The Secretary's visit was the first stop on his four-day, five state bus tour, The GROW AMERICA Express, to highlight the importance of investing in America's infrastructure and to encourage Congress to act on a long-term transportation bill. He visited the SR 263 Capital Circle Southwest widening project with Tallahassee Mayor Andrew Gillum, and also met with students at FAMU.

From left: Florida Representative Alan Williams (D-District 8), .S. Representative Corrine Brown (D-District 5), U.S. Department of Transportation Secretary Anthony Foxx, FAMU President Elmira Mangum, and Tallahassee Mayor Andrew Gillum.

- The Center participated in the University Transportation Centers (UTC) Conference for the Southeastern Region on March 26-27, 2015, hosted by University of Alabama at Birmingham and Mississippi State University. The event was held in Birmingham, Alabama.
- On May 2, 2015, one of our ASAP Researchers, Dr. Lisa Spainhour participated in an outreach event at Lincoln High School in Tallahassee, Florida. The event was the third in a series of Super Science Saturdays, sponsored by the high school. In an effort to encourage more students to take science classes in high school and consider careers in science, engineering, and technology, Lincoln invites students from their feeder middle schools to learn about a science field, and compete against one another in a related event. Dr. Spainhour worked with Lincoln science teachers to teach the students about transportation engineering. Dr. Spainhour gave a presentation about bridge design and transportation safety, and then mentored the teams as they designed and built balsa bridges. Garit Poire and Scott Kell, both civil engineering students at FAMU-FSU College of Engineering, attended the event and mentored the student design teams. Students from Swift Creek and Montford Middle Schools participated in the event, and a team from Swift Creek took home the trophy for building the bridge with the highest strength-to-weight ratio.
- As part of an ongoing ASAP research project titled "Biomechanics Models for an Aging Driver," ASAP hosted a seminar at the FSU's Aero-Propulsion Mechatronics and Energy (AME) facility in the Conference Room 211 on May 26, 2015. The speaker was David Poulard, Ph.D., a Research Associate at the University of Virginia's Center for Applied Biomechanics. The seminar was successful and well attended by faculty and graduate students from the Departments of Mechanical Engineering, and Civil and Environmental Engineering at the FAMU-FSU College of Engineering.
- On July 7, 2015, the Center Director, John Sobanjo, visited StarMetro, the city-owned and operated public bus service for Tallahassee, Florida. This agency is responsible for special transportation needs for the aging and disabled citizens in the city. Dr. Sobanjo toured the StarMetro facilities and had discussions with the agency staff about potential areas of collaboration between the Center and the transportation agency.
- During Summer 2015, an ASAP Researcher, Dr. Ozguven and his graduate students Mehmet Baran Ulak and Hidayet Ozel sponsored two individual research projects (IRP) for the Young Scholars Program (YSP) at Florida State University. As a part of the program, two high school students were mentored for six weeks in order for them to learn ArcGIS Geographic Information

Systems (GIS) software. Geographic Information Systems (GIS)-based maps and visualizations were used to evaluate the accessibility of the hospitals with cancer facilities with respect to cancer populations, supported with several case studies using the spatial and population characteristics and the Florida roadway network.

- The Center conducted a week-long event during the fall 2015 semester, with the theme *Transportation for a Lifetime!*, starting Monday September 14, 2015. The event was hosted by the Center, together with FSU's Institute for Successful Longevity, and the Pepper Institute on Aging and Public Policy, as well as participation from FAMU, University of North Florida, other agencies and organizations outside FSU, including the K-12 and the elder community. Built around *The Annual Transportation Day*, which was done all day Friday September 18, the weeklong activities included a Director's Reception, Lectures, Career Fair, CarFit Training, Teens & Transportation. Workshop, Aging & Mobility Symposium, Poster displays, Booths & Demonstrations. The week ended with the ASAP Advisory Board Meeting on Saturday September 19. There were about 140 participants..
- The Director's Reception for the *Transportation for a Lifetime!* week was attended by local dignitaries including Leon County Commission Chair Mary Ann Lindley, who all talked about their initiatives in the transportation sector and learn about center activities in an informal setting.
- During the Transportation for a Lifetime! week, there was a lecture titled "Future of Transportation in Florida," by Melanie Weaver Carr, from FDOT's Office of Policy Planning. This event included a roundtable discussion on Florida's long-range transportation plan. The lecture was co-sponsored by FSU's Pepper Institute on Aging, and held at the Broad Auditorium in the Pepper Center Building on the FSU campus.
- ✤ As part of the *Transportation for a Lifetime!* week, 'Transportation Day' kicked off with a Teens and Transportation workshop for younger participants. Shakira Crandol, a Transportation



Planning Specialist with the Federal Highway Administration introduced the students to career opportunities in transportation. After a walkthrough of transportation-themed displays and posters, the students enjoyed hands-on games and activities in the FAMU-FSU College of Engineering Computer Lab, as they got to be Bridge Engineers and Traffic Engineers for a day. Concurrent activities for senior adults

during Transportation Day included a CarFit safety event, led by Fran Carlin Rogers, CarFit instructor from Orlando, and Dr. Debora Oliveira, ASAP affiliate and Interim Dean of the School of Allied Health Sciences at FAMU; demonstration of the ASAP driving simulator; and booths by the Safe Mobility for Life Coalition, HomeFit, and StarMetro transit, among others. More than 20 drivers were "fit" in their vehicles, and volunteers from the Thursday



training session completed their certification as CarFit Technicians. Doctoral Research Fellowships were awarded to five graduate students working under research grants funded by the Center. The awards were based on nominations by faculty, formal applications and a review process. On the Transportation Day, the following lectures were presented:

- Research and Innovation: Getting You Where You Want To Go, Transportation Day Keynote Speech by Darryl Dockstader, Manager of FDOT's Research Center
- Pedestrians are People, Too by Dean Perkins, FDOT's ADA Coordinator
- Guide to Assessing and Counseling Older Drivers, by Alice Pomidor, MD, FSU College of Medicine, Department of Geriatrics
- Aging-focused Accessibility Assessment of Multi-modal Facilities in Florida, by Eren Ozguven, PhD, FAMU- FSU College of Engineering, Department of Civil and Environmental Engineering

- Older Adult Transportation in Rural and Small Communities in the US, by James Wood, MRCP, FSU Department of Urban and Regional Planning
- Interventions to Reduce Crash Risk in Older Drivers, by Karlene Ball, PhD, University of Alabama at Birmingham, Department of Psychology
- Transportation Options that Contribute to a Better Quality of Life, by Trenda McPherson, FDOT Safety Office
- Maximizing Person-Environment Fit to Reduce the Crash Risk of Vulnerable Road Users, by Walter Boot, PhD, FSU Department of Psychology
- Sociological Implications of Older Adults' Transportation Patterns: An Examination Using the National Health and Aging Trends Study, by Anne Barrett, PhD, FSU Department of Sociology
- Preliminary Analysis of Elderly Crashes at Crash Clusters in Florida, by Michelle Angel, UNF Department of Civil Engineering
- On October 29, 2015, there was an event on "Creating a Thriving Intergenerational Community: Live, Work and Play Across Generations" sponsored by the City of Tallahassee at the Tallahassee Senior Center. This was part of the "Sustainability and You" Community Learning Series. Our ASAP Research Affiliate and FSU Urban and Regional Planning Professor Rebecca Miles was one of the four panelists at the event and also made a presentation.

1.2.3 Collaboration and diversity

There were collaborations with public agencies: Florida Department of Transportation (FDOT)'s Research Office; FDOT's Safe Mobility for Life Program; and FSU's Claude Pepper Institute for Aging. External and internal advisory boards were also established with memberships from the private industry, government agencies, e.g., federal, state, county, city, etc., and academic institutions.

Name	Title/Employer	Industry	Expertise
Karlene Ball	Prof. & Chair, Dept. of Psychology, Univ. of Alabama, Birmingham	Academic	Aging and Driving
Lynn Barr	Mobility Coordinator, Capital Region Transportation Planning Agency	MPO	Transportation Planning
Sara Czaja	Prof. Dept. of Psychiatry, Behavioral Sciences, and Industrial Engineering, Univ. of Miami, Florida	Academic	Aging
Heejo Ham	Director of Technical Support, Citilabs	Industry	Transportation Planning
Chester Henson	FDOT Roadway Design	State	Transportation Design
Gail M. Holley	Safe Mobility for Life Program and Research Manager, FDOT State Traffic Engineering and Operations	State	Transportation Safety
Bill Horrey	The Liberty Mutual Research Institute, Boston, MA	Industry	Transportation Safety/Human Factors
Sylvester A. Kalevela	Acting Dean/Prof., Transportation Engineering, Colorado State Univ.	Academic	Transportation
Ivan Maldonado	Director/GM, StarMetro, Tallahassee, FL	City	Transportation
Trenda McPherson	FDOT Pedestrian Safety	State	Transportation Safety
Eric Sawyer	Retired City Traffic Engineer, Tallahassee	City	Transportation Traffic
Victor B. Wiley	FDOT Transit Safety	State	Transportation Safety

External Advisory Board

Internal Advisory Board

Name	Title/Employer	Industry	Expertise
Simon Foo	Prof., FAMU-FSU College of	Academic	Electrical & Computer
	Engineering		Engineering
Michelle Rambo-	Assoc. Prof., FAMU-FSU College of	Academic	Civil & Environmental
Roddenberry	Engineering		Engineering
John Sobanjo	Prof., FAMU-FSU College of	Academic	Civil & Environmental
	Engineering		Engineering
Neil Charness	Prof., FSU Dept. of Psychology	Academic	Psychology
Mark Horner	Prof., FSU Dept. of Geography	Academic	Geography

2. Products

Publications, conference papers, and presentations

The following sections list the publications, conference papers, presentations, etc., resulting from the research funding at the Center.

The following papers have been accepted or in press for journal publication:

- [1] Gepner Bronislaw, Gleba Michal, Jung Sungmoon, and Wekezer Jerry, (2015). (*In press*), "Strain Rate Dependency in Paratransit Bus Rollover," *International Journal of Automotive Technology*.
- [2] Horner Mark W., Duncan Michael, Wood Brittany, Valdez-Torres Yazmin, and Stansbury Chris. (2015). "Do Aging Populations Have Differential Accessibility to Activities? Analyzing the Spatial Structure of Social, Professional, and Business Opportunities," *Travel Behavior and Society* 2(3), 182-191.
- [3] Horner Mark W., Schleith Daniel, and Widener Michael J. (2015). "An analysis of the commuting and jobs-housing patterns of older adult workers. The Professional Geographer, 67(4), 575-585.
- [4] Ozguven, E. E., and Ozbay, K., (2015). "An RFID-based Inventory Management Framework for Emergency Relief Operations," *Transportation Research Part C*, 57, 166-187.
- [5] Ozguven, E. E., and Ozbay, K. (2014). "Emergency Inventory Management for Disasters A Review," *Journal of Emergency Management*, 12(4), 269-286.
- [6] Ozguven, E. E., Horner. M., Kocatepe, A., Marcelin, J. M., Abdelrazig, Y., Sando, T., and Moses, R., (2015). (*Published ONLINE*). "Metadata-based Needs Assessment for Emergency Transportation Operations with a Focus on an Aging Population: A Case Study in Florida," *Transport Reviews, 30* pages.
- [7] Souders Dustin J., Gepner Bronislaw, Charness Neil, and Wekezer Jerry, (2015). (In press), "A User-Centered Literature Review of Safety and Human Factors Issues Involving Older Adults as Cutaway Bus Passengers," Transportation Research Record, National Academy Press. Washington, D.C., 2015.
- [8] Wright, T. J., Vitale, T., Boot, W. R., and Charness, N. (2015, October 19). The Impact of Red Light Running Camera Flashes on Younger and Older Drivers' Attention and Oculomotor Control. Psychology and Aging. Advance online publication. <u>http://dx.doi.org/10.1037/pag0000052</u>.
- [9] Wright, T. J., Boot, W. R., Charness, N., and Vitale, T., (2015). (*In press*), The Impact of Red Light Running Camera Flashes on Younger and Older Drivers' Attention and Oculomotor Control. *Psychology and Aging*.

The following papers have been submitted and are under review for journal publication:

- [1] Horner, M., Ozguven, E. E., Marcelin, J. M., and Kocatepe, A., "Placing Special Needs Hurricane Shelters for Serving the Aging Population: Development of a Methodology and a Case-study Application," Under review in *Disasters*.
- [2] Marcelin, J. M., Horner. M., Ozguven, E. E., and Kocatepe, A., "How do disaster relief needs compare between aging and the general population? A spatial network optimization analysis of

hurricane relief facility locations," Under review in International Journal of Disaster Risk Reduction.

- [3] Ozel, H., Ozguven. E. E., Kocatepe, A., and Horner, M., "Aging-focused Accessibility Assessment of Multi-modal Facilities: A GIS-based Case Study in the State of Florida," Under review in *Transportation Research Record*.
- [4] Wood, B., Horner M, and Duncan, M.," Aging Populations and Transit-Oriented Development: Socioeconomic, Demographic, and Neighborhood Trends from 2000 and 2010,". Under review in *Transportation Research Record*.
- [5] Vemulapalli, S., Ozguven, E. E., Sando, T., Horner, M., Abdelrazig, Y., and Moses, R., "GIS-based Spatial and Temporal Analysis of Aging-Involved Accidents: A Case Study of Three Counties in Florida," Under Review in *Applied Spatial Analysis and Policy*.

The following papers are under preparation for journal publication:

- [1] Fung, Kakit, Jung, Sungmoon, Sobanjo, John, and Wekezer, Jerry. "The effects of aging driving posture on the injury criteria," Under preparation for International *Journal of Vehicle Safety* (*IJVS*).
- [2] Kocatepe, A., Ozguven, E. E., Horner, M., Marcelin. J. M., and Moses, R., "Aging-Focused Evacuation Transportation Analysis towards Better Decision Making in Emergency Traffic Management," Under preparation for *Disasters Prevention and Management*.
- [3] Kocatepe, A., Ozguven, E. E., Moses, R., Vanli, O. A., Barrett, A., Ozel, H., Omidvar, A., Gumber, C., "A Statistical Analysis of Speed Patterns on Inter-urban Parallel Highways: A Case Study in the Southeast Florida," Under preparation for ASCE Journal of Transportation Engineering.
- [4] Lwambagaza, L.J., and Sando, T. "Microsimulation Modeling of Elderly Driver Behavior on Merging Ramps", Under preparation for *Advances in Transportation Studies: An International Journal*.
- [5] Mitchum, A., Boot, W.R., & Charness, N. Evaluating passing distance judgments of younger and older drivers in the field and in a simulator: Do drivers know what 3 feet is? Planning to submit to *Accident Analysis & Prevention*.
- [6] Omidvar, A., Vanli, O. A., Ozguven, E. E., Kocatepe, A., Ozel, H., Moses, R., Barrett, A., Gumber, C., and Sando, T., "The Effect of Traffic Patterns on Frequency of Aging-involved Highway Accidents in Florida," Under preparation for Accident Analysis & Prevention.
- [7] Ulak, M. B., Ozguven, E. E., and Spainhour, L., "Investigation of Aging-involved Crashes: A GISbased Case Study in the Northwest Florida," Under preparation for Journal of Transport Geography.

The following papers were presented or scheduled for conferences, meetings, workshops, etc.:

- [1] Abdelrazig, Y., Doczy, R., Boot, W., Ozguven, E. E., and Moses, R., (2016). "Spatial Context Roadway Safety Analysis for the Aging Population: A Hybrid 3-Dimensional Visualization and Human Factors Simulation Approach", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [2] Boot, W. R. (2014). Promoting accessibility and safety for an aging population through technology. Plenary presentation in Wendy A. Rogers (Chair), Transportation and Cognitive Aging. Symposium conducted at the meeting of Cognitive Aging Conference, Atlanta, GA.
- [3] Charness, N., Mitchum, A., Boot, W. R., Stothart, C., & Lupton, H. (2015). Human factors in parking lot crash risk for older pedestrians. Poster at the Transportation Research Board's 94th Annual Meeting, Washington, DC, USA, January 11-15.
- [4] Dyer, B., Callegari, N., Ulak, M. B., Ozel, H., and Ozguven, E. E., (2016). "Evaluating Transportation Accessibility to Healthcare among Cancer Populations in Florida", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [5] Gepner Bronislaw, Siervogel Jeff, and Wekezer Jerry, (2014). "Crashworthiness Evaluation of Paratransit Buses", Southeastern Annual Conference of University Transportation Centers. Atlanta, GA, March 2014

- [6] Giroux, R., Vanli, A., and Ozguven, E. E., (2014). "Spatio-Temporal Monitoring for Highway Safety", Presented at the INFORMS Annual Meeting, INFORMS, San Francisco, USA, November.
- [7] Giroux, R., Vanli, A., and Ozguven, E. E., (2014). "Spatio-Temporal Monitoring for Highway Safety", Presented at the INFORMS Annual Meeting, INFORMS, San Francisco, USA, November.
- [8] Gleba Michal, Siervogel Jeff, Wekezer Jerry, and Jung Sungmoon, (2015). "Testing Program for Crashworthiness Assessment of Cutaway Buses", SEM 2015 Annual Conference and Exposition on Experimental and Applied Mechanics, Costa Mesa, CA, June 8-11.
- [9] Gumber, C., Barrett, A., Ozguven, E. E., Moses, R., Vanli, A., Kocatepe, A., Ozel, H., Omidvar, A., and Sando, T., (2016). "Explaining Gender Differences in Self-regulated Driving: What Roles Do Health Limitations and Transportation Alternatives Play?", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [10]Horner Mark W., Duncan Michael D., Wood Brittany S., Valdez-Torres Yazmin, and Stansbury Chris, (2015). A Comparative Analysis of Accessibility Outcomes for Aging Populations: Evidence from a Medium Sized City, Paper presented at the 2015 UTC Conference for the Southeast Region, Birmingham, Alabama, March 2015.
- [11]Horner, M., Ozguven, E. E., Marcelin, J. M., and Kocatepe, A., (2015). "Spatial Network Optimization Modeling for Special Needs Hurricane Shelter Placement Serving the Aging Population", Presented at the Transportation Research Board's 94th Annual Meeting., Washington D.C., January.
- [12]Kocatepe, A., Lores, J., Ozguven, E. E., and Yazici, M. A., (2016). "Measuring the Reach and Influence of DOT Twitter Accounts: A Case Study for Florida and New York", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [13]Kocatepe, A., Lores, J., Ozguven, E. E., and Yazici, A., (2015). "The Reach and Influence of DOT Twitter Accounts: A Case Study in Florida", Presented at the 18th IEEE International Conference on Intelligent Transportation Systems, September.
- [14]Kocatepe, A., Ozguven, E. E., and Lores, J., (2015). "Exploring the Social Network-based Feasibility of Cloud Services for Travel Time Reliability with a Focus on Aging People", Presented at the 27th European Conference on Operational Research, University of Strathclyde, Glasgow, UK, July.
- [15]Kocatepe, A., Ozguven, E. E., and Moses, R., (2014). "Evaluation of Multi-Modal Evacuation Operations in the Aftermath of a Disaster", Presented at 11th International Congress on Advances in Civil Engineering- ACE 2014, Istanbul Technical University, Istanbul, Turkey, October.
- [16]Kocatepe, A., Ozguven, E. E., and Vanli, A., (2014). "A Capacity and Travel Time Reliability Analysis on Transportation Networks for Emergency Operations," Presented at the INFORMS Annual Meeting, INFORMS, San Francisco, USA, November.
- [17]Marcelin, J. M., Horner, M., Ozguven, E. E., and Kocatepe, A., (2016). "How Do Disaster Relief Needs Compare between Aging and the General Population? A Spatial Network Optimization Analysis of Hurricane Relief Facility Locations", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [18]Omidvar, A., Vanli, A., Ozguven, E. E., Moses, R., Barrett, A., Kocatepe, A., Ozel, H., Gumber, C., and Sando, T., (2016). "Effects of Traffic Patterns on the Frequency of Aging Driver-involved Highway Crashes: A Case Study on the Interstate-95 in Florida", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [19]Omidvar, A., Ozguven, E. E., Vanli, A., and Moses, R., (2015). "Understanding the Factors Affecting Frequency and Severity of Aging-involved Accidents in Florida", Presented at the 2015 Road Safety & Simulation International Conference, Southeastern Transportation Center, Orlando, Florida, October.
- [20]Ozguven, E. E., (2016). "Assessing the Emergency Transportation-focused Impacts of Aging Populations' Recovery Needs," Invited Presentation at the Workshop: Mobility and Accessibility for Recovery After a Disaster: Social and Economic Resilience for Disadvantaged and Dislocated

Populations, Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.

- [21]Ozguven, E. E., Vanli, A., Barrett, A., Moses, R., Gumber, C., Kocatepe, A., Ozel, H., Omidvar, A., and Sando, T., (2015). "Travel Time and Roadway Capacity Reliability for an Aging Population: The Development of a Model Integrating Roadway Traffic with Aging Adults' Driving Behavior", Accepted for Presentation at the Gerontological Society of America's 68th Annual Scientific Meeting, Orlando, FL, USA, November, 18-22.
- [22]Ozguven, E. E., Horner, M., Kocatepe, A., Marcelin, J. M., Abdelrazig, Y., Sando, T., and Moses, R., (2015). "Metadata-based Needs Assessment for Emergency Transportation Operations with a Focus on an Aging Population: A Case Study in Florida", Presented at the Transportation Research Board's 94th Annual Meeting., Washington D.C., January.
- [23]Ozguven, E. E., Ozbay, K., Iyer, S., Whytlaw, R., and Carnegie, J., (2015). "Multimodal Logical Architecture for Emergency Transportation Toward Better Decision Making in Humanitarian Logistics" Presented at the Transportation Research Board's 94th Annual Meeting., Washington D.C., January.
- [24]Ozel, H., Ozguven, E. E., Kocatepe, A., and Horner, M., (2016). "An Aging Population-focused Accessibility Assessment of Multi-modal Facilities in Florida", Accepted for Presentation at the Transportation Research Board's 95th Annual Meeting, Washington, DC, USA, January 10-14.
- [25]Ozel, H., Ozguven, E. E., Kocatepe, A., and Ulak, M. B., (2015). "Aging-focused Accessibility Assessment of Multi-modal Facilities towards Better Decision Making in Emergency Transportation Logistics", Presented at the 27th European Conference on Operational Research, University of Strathclyde, Glasgow, UK, July.
- [26]Souders Dustin J., Gepner Bronislaw, Charness Neil and Wekezer Jerry. (2015). "A User-Centered Literature Review of Safety and Human Factors Issues Involving Older Adults as Cutaway Bus Passengers", Paper # 15-2273 presented and published in conference proceedings at 94-th Transportation Research Board Annual Meeting. Washington, D.C., January.
- [27]Souders, D.J. & Charness, N. (2015). "Travel Safety and Technology Adoption by Elderly Populations" lectern presentation at the Mid-Year Meeting for TRB's Committee on Safe Mobility of Older Persons, Woods Hole, MA.
- [28]Ulak, M. B., Ozguven, E. E., and Kocatepe, A., (2015). "GIS-based Identification and Evaluation of Significant Factors for Aging-Involved Crashes", Presented at the 2015 Road Safety & Simulation International Conference, Southeastern Transportation Center, Orlando, Florida, October.
- [29]Wekezer_Jerzy, Gleba M. Michal, Siervogel, (2015). Jeff "Development of a Crashworthiness Standard for Assessment of Cutaway Buses", (2015). CMM 2015, 21st International Conference on Computer Methods in Mechanics, Gdansk, Poland, September 8-11.
- [30]Wood, J., Brown, J., Bond, M., & Suguri, V. (2015). Older Adult Transportation in Rural and Small Communities in the United States: The Results of an Agency Survey. Presented at 55th Annual Conference of the Association of Collegiate Schools of Planning, Association of Collegiate Schools of Planning, Houston, Texas, October.
- [31]Wright, T. J., Boot, W. R., Charness, N., & Vitale, T. (2015). Red light running camera flashes capture younger and older drivers' covert and overt attention. Presented at The 7th The Eye, The Brain and The Auto World Research Congress Poster Session, Detroit, MI, Sept. 9-11.
- [32]Wright, T. J., Boot, W. R., Charness, N., & Vitale, T. (2015). The effects of red light running camera flashes on older and younger driver's covert and overt attention. Presented at The 15th Annual Meeting of the Vision Sciences Society, St. Petersburg, FL.
- [33]Wright, T. J., Boot, W. R., Charness, N., & Vitale, T. (2015). Red light running camera flashes capture younger and older drivers' attention. Presented at The Florida State University Department of Psychology Graduate Research Day, Tallahassee, FL.
- [34]Wright, T. J., Boot, W. R., Charness, N., & Vitale, T. (2014). The impact of red light running camera flashes on younger and older driver attention and oculomotor control. Presented at The 67th Annual Meeting of the Gerontological Association of America, Washington, D.C.

Website(s) or other Internet site(s)

Hosted on a computer server at FSU, a website has been developed and maintained to provide information about the Center (<u>http://www.utc.fsu.edu/</u>). A Facebook page is being maintained (<u>https://www.facebook.com/The-Center-for-Accessibility-and-Safety-for-an-Aging-Population-1444922912427725/</u>). A twitter account was also established (<u>http://twitter.com/UTC_FSU</u>).

Technologies or techniques

Nothing to report.

Inventions, patent applications, and/or licenses

Nothing to report.

Other products

Nothing to report.

3. Participants & collaborating organizations

- Our UTC is a member of the Council of University Transportation Centers (CUTC).
- There are collaborations with public agencies: Florida Department of Transportation (FDOT)'s Research Office; FDOT's Safe Mobility for Life Program; and FSU's Claude Pepper Institute for Aging. Also, through their membership in the external and internal advisory boards, the agency or organization (employer) of the various members were involved in the Center's activities. Some of our partners served as speakers at seminars and conferences.
- Three support research projects were funded by the Florida Department of Transportation (Research Office) and used for cost sharing at our Center including those listed as follows.
 - Mike Duncan, PI: Enhanced Mobility for Aging Population Using Automated Vehicles, BDV30 977-11 (June 2014).
 - Walter Boot, PI: Driving Simulator Studies of the Effectiveness of Countermeasures to Prevent Wrong Way Crashes, BDV30 977-10 (June 2014).
 - Walter Boot, PI: Aging Road User Studies of Intersection Safety: Lab and Simulator Based Studies of Crosswalk Markings and Flashing Yellow Arrow Comprehension - Phase 2, BDV30 977-04 (Dec 2013).
- The following Center's affiliated faculty and graduate students have the listed award, services, and are on the listed national, regional and local committees:

Walter Boot: Associate Editor, Journal of Experimental Psychology: Applied, 2014–present; Springer Early Career Achievement Award in Research on Adult Development and Aging, American Psychological Association (2014).

Walter Boot, Neil Charness, Sara Czaja, Joseph Sharit, Wendy Rogers, and Arthur D. Fisk: Jack A. Kraft Innovator Award, Human Factors and Ergonomics Society (2013).

Jeffrey Brown: Member, Transportation History Committee, Transportation Research Board (TRB);

Member, Light Rail Transit Committees, Transportation Research Board (TRB).

Mark Horner: Chair, ADD20 Social and Economic Factors of Transportation, Standing Committee, Transportation Research Board (TRB); Member, ABJ60, Geographic Information Sciences and Applications, Standing Committee, Transportation Research Board (TRB). U.S. Co-Editor, Transportation (Springer).

Eren Ozguven: Member, Time, Speed and Reliability (TTSR) Subcommittee, Transportation

Research Board (TRB).

John Sobanjo: Member, Editorial Board, ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, American Society of Civil Engineers (ASCE) / American Society of Mechanical Engineers (ASME), 2014 – Present; Associate Editor, ASCE Journal of Bridge Engineering, American Society of Civil Engineers (ASCE), 2014 - Present.

Thobias Sando: Member (Topic expert), Fatigue Committee of the Florida Transit Safety Network.

Lina Lwambagaza: Outstanding Graduate Student Poster Award at the Florida Academy of Sciences Conference 2015, for the presentation titled "Pattern Analysis for Wrong Way Crashes of Older Drivers on Freeway Interchanges: Literature Review"

Timothy Wright: University Transportation Center Student of the Year (2015).

4. Impact

There is not much to report at this time on the impact. It is anticipated that the next report will present some results in terms of the impacts.

5. Changes/Problems

Nothing to report.

6. Special reporting requirements

Nothing to report.