Request for Research Funding for FY 2021-2022			
Requesting Office	State Traffic Engineering and Operations Office	**Priority**	4 of 15
Proposed Title	Assessing Safety and Mobility Benefits of Autonomous Ride Sharing Services Among Older Adults in Florida		
Justification	This research aims to use a multidisciplinary team, industry, and community-based perspective among experts in transportation access, policy, and technology— as well as communities of older adults who are potential end users of automated ride sharing services. The overarching objective is to identify the user perspective about automated ride sharing services (AV ride sharing services) during the COVID pandemic, and to solicit responses pertaining to adoption and acceptance practices thereof. We will invite, from older adults (50+ years of age), feedback on factors that impact their successful acceptance, adoption, and user practices on autonomous ride sharing services. This is important because (1) we do not have a quantifiable data to understand the older adult perspective to engaging in AV ride sharing services—especially during the COVID pandemic, (2) the industry partners may not provide the optimum design features in the automated vehicles to safely, comfortably and conveniently accommodate older adults, (3) policy makers do not have data driven information pertaining to older adults' perceptions in various geographic areas in Florida—which may make deployment decisions for widespread use of automated ride sharing services challenging, and (4) educational materials—a critical step towards acceptance and adoption practices—are currently lacking for those 50+. Therefore, to overcome these limitations, we will solicit older adults' responses before and after being exposed to AV ride sharing services, and use their feedback to inform industry provider(s), policy makers, and the Florida Department of Transportation's (FDOT) Safe Mobility for Life Program and Coalition (SMFL) with their responses.		
Impact	The responses obtained from older adults have a direct impact on informing: (1) researchers and advocates of older adults on the older adults' perspectives to engaging in AV ride sharing services <u>during and potentially</u> after the COVID pandemic; (2) industry partners on the design features that may inhibit or enhance the safety, comfort and convenience of older adults; (3) policy makers in Florida with empirical data for their decision-making pertaining to widespread deployment of automated ride sharing services in five different geographic areas; and (4) the SMFL with targeted information to develop and provide educational materials for further dissemination. Overall, and collectively, we believe that this research project will identify barriers and challenges for older adults pertaining to adopting and accepting AV ride sharing services—and identify opportunities to overcome those as relevant for the older drivers and their advocates, industry, policy makers and the SMFL.		
Affected Offices	State Traffic Engineering and Operations, State Transit Office, District Traffic Operations and District Multimodal Offices		
Existing Work	The FDOT commissioned a study on general perception of AVs by older adults in 2015. The study showed that even though the older adults are less likely to trust AVs, over half of the respondents were interested in AVs. The University of Florida (UF) has also embarked upon developing a survey on the perceptions of older adults, necessary for understanding their adoption practices of AV technologies. These foundational work, combined with new approaches (systematic and evidence based literature review, evaluating other current AV technology user surveys for item cross-checking, focus group methodologies), have been utilized to develop refine, and establish psychometrics of a user perception survey targeted at older adults. Items for this survey (Mason et al., 2020) have been developed from recent literature on older adults and their adoption practices towards technology, as well as user surveys, the Technology Acceptance Measurement Scale, the Technology Readiness Index 2.0, and the Life Space Questionnaire (which captures when, where, how far, how, and why older adults venture from their primary dwelling). We also include items from the FDOT and		

FSU survey, and other national surveys of relevance. On the basis of the literature, theoretical frameworks, existing surveys, and guided by measurement theory, we are in the process of validating the survey to capture older adult perceptions on acceptance and adoption practices of AV ridesharing services.

The literature also indicates that survey results alone are not adequate to understand the adoption and acceptance practices of older adults pertaining to AV ride sharing services. For example, in a study conducted by Classen et al. (2020) —an interim analysis (N= 69) compared older drivers' perceptions before and after a drive in an automated simulator and automated shuttle. Findings indicated that exposure to this automated vehicle technology positively affected older adults' perceptions, especially pertaining to trust, safety and intention to use. Specifically, in this study, older drivers' trust and perceived safety increased after being exposed to a driving simulator running in the SAE Level 4 mode of automation, or an automated shuttle (also running in SAE Level 4 mode of automation) — compared to the baseline condition which was basically exposing them to the survey only. Moreover, older drivers' perceptions of perceived usefulness and cost of automated vehicle technology also changed in a positive direction after being exposed to both the autonomous simulator and the autonomous shuttle. However, their perceptions did not change after their first automated vehicle technology exposure, regardless of whether it was the automated simulator or automated shuttle. Limitations of this study included that participants were mainly recruited from one geographic area in FL and lacked educational, socio-economic and cultural diversity. However, this study also indicated that exposing older adults to an automated simulator, or an automated shuttle, may promote their acceptance and adoption of autonomous vehicle technologies.

Keywords Used In Existing Work Search (Cannot leave blank)	Focus groups, survey, older adults, autonomous ride sharing services, mobility as a service, COVID-19		
Related Contracts (Give contract numbers)	BDV31-977-128 (UF) - Develop, Refine, and Validate a Survey to Assess Adult's Perspectives of Autonomous Ride-Sharing Services		
Funding Request	$250,000.00 ($40,000 of these funds to Beep as a subcontract)	**Anticipated Duration**	18 months
Project Manager	Gail M. Holley	**Contracting Method**	Direct contract with the University of Florida, Dr. Sherrilene Classen, PI
Urgency	1		Safe mobility of older adults, and expanded community mobility options, such as understanding the determinants leading to utilizing autonomous ride sharing services in Florida, will be greatly enhanced through the findings of this consumer centric research, conducted in five geographically diverse areas in Florida.
Implementability	1		We have developed a survey to assess perceptions of older adults pertaining to AV ride-sharing services developed in Phase 1 of a research study (BDV31-977-128 (UF). We expect to complete that study in the early part of 2021—and produce a survey tool with sound psychometric properties that can be deployed widely in different geographic areas in Florida. In this proposed study we will utilize the survey that we have developed in Phase 1, as well as focus groups to determine the responses of older adults' pre and post deployment rides in an AV ride sharing service—and during the COVID period. We have the commitment of the Research Director (Carla Vandenweerd) of the Villages to provide us with ready access to this population. We also have the commitment of the Beep CEO

		(Mark Reid) to utilize ride sharing vehicles in his fleet to assess older adults in five areas (Villages, Lake Nona, Tampa, St. Pete, Port St. Lucie) in Florida, as discussed in Project Benefits below.

Project Benefits (Succinct, complete explanation):

Older adults (≥65 years) account for 20% of the US population, and almost 25% of the Florida population— are over-represented in multiple-vehicle crashes, and accompanying injuries and deaths related to the crashes. Continued community mobility is a powerful facilitator of autonomy, independence, life satisfaction, and role execution. Autonomous Ride Sharing Services may hold safety benefits for older drivers, if they adopt this rapidly emerging technology—but personal (i.e., hesitation, mistrust, safety concerns) and social determinants (e.g., effects of the COVID-19 pandemic) may challenge their acceptance and adoption practices, while hindering widespread deployment of these technologies, and delaying safety benefits. Specifically, we must better understand the human centric needs to acceptance and adoption of AV ride sharing service. Such needs include participant perceptions to allowing technology to make the "driving decisions", understanding their mental models to shape their intentions to use the technology, and identifying factors that may cause confusion and/or ambiguity related to the use of such technology. Without understanding trust, safety, comfort and convenience, related to AV ride sharing service, we will delay and potentially confound the benefits that lifelong mobility—now in the realm of AV technology— may bring to older adults who can no longer drive, who do not want to continue to drive, or who should not continue to drive. Previously when older drivers resorted to driving cessation, evidence from the literature suggest that such behaviors were linked to decreased out of home activities, social isolation, greatly reduced mobility in a shrinking life space, early nursing home admissions, and even premature death. Although driving is a privilege, mobility is a human right—and as such we have a moral and ethical responsibility to ensure that alternative mobility options exist for older adults, through the lifespan, to keep them engaged in their communities and participating in society. With our previous work in this area (Mason et al., 2020; Classen et al 2020), our previous projects with FDOT (Find-a-Ride, and BDV31-977-128 (UF), and via using a multidisciplinary team, the SMFL, industry partners (Beep, https://www.go-beep.com/), and a new collaboration in the Villages—we are uniquely positioned to examine the benefits, risks and challenges associated with accepting and adopting autonomous ride sharing services— as an addition to the menu of possible community mobility options for older adults.

Specifically, this study will use five prominent areas in Florida: i.e., Lake Nona, Orange County (n=50), The Villages, Marion County (n=50); Tampa, Hillsborough County (n=50), St Petersburg, Pinellas County (n=50), Port St Lucie, St. Lucie County (n=50) to deploy (i) focus groups (1 per area pre-deployment of the autonomous ride sharing; 8 participants x 5 areas = 40), and one per area post-deployment of the autonomous ride sharing (8 members x 5 areas = 40), to examine the personal and social determinants of AV ride sharing acceptance practices in the COVID era; and (ii) pre- and post- Autonomous Ride Sharing exposure surveys, to quantify older drivers' perceptions, who were exposed to riding in an highly automated shuttle (SAE Level 4).

Anticipated results will (i) make clear the barriers, challenges, and opportunities—from an in-depth (personal) and (ii) broad (survey) perspective, (iii) lay the foundation for developing educational materials to be included in the Florida Guide to Safe Mobility for Life (http://safemobilityfl.com/Guide.htm), (iv) inform industry of user preferences (specifically design features that may enhance _safety_ such as the presence of a handrail or other ADA compliant strategies such as curbside level boarding; _comfort_ such as ample boarding and seating time; or _convenience_ such as an overhead monitor with visual displays of the route, and/or audio announcements related to upcoming drop-off points); and (v) shape decisions to inform policies and practices for deploying autonomous ride sharing services in the State of Florida (e.g., understanding older adults' acceptance and adoption practices of AV Ride Sharing services are critical for funding decisions to deploy such services in different geographic areas in Florida).

Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc…if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits

o Materials Enhancement		
o Materials Savings		
o Time Savings		
o Lives Saved/Injuries Prevented	Reduction of injuries and deaths as a result of traffic crashes.	Florida is the second in the nation in the number (3,341,250) of drivers 65 or older. Florida now leads the country in the number **(682) of traffic fatalities** involving at least one driver over 65, according to TRIP (2020), a national nonprofit transportation research group in Washington [1]. According to the FDOT these numbers (calculated from 2013-2017) translate to **37.8 crashes per 1,000 people aged 65 and older**— with the counties that we are targeting showing the following crash statistics: Orange (47.3 crashes per 1000 people > 65 yrs.), Hillsborough (32.9 crashes per 1000 people > 65 yrs.), Pinellas (31.2 crashes per 1000 people > 65 yrs.), St Lucie County (30.5 crashes per 100 people > 65 yrs.) and Marion (28.7 crashes per 100 people $\geq$ 65 yrs.). We expect that we will make significant advances in crash prevention and saving lives over the longer term[2]. [1] https://www.jacksonville.com/news/20180314/on-road-seniors-more-prone-to-traffic-fatalities-in-florida-new-study-says [2] https://www.mynews13.com/fl/orlando/news/2019/03/28/watchdog--fatal-crashes-among-elderly-drivers-in-florida-increasing
o Other (Explain)	Education materials for community outreach, industry knowledge, and enhancements of policy/ practices.	The study findings will illuminate the barriers, challenges, and opportunities for the use of AV Ride Sharing Services in the COVID-19 era. As such the participants' perspectives, will lay the foundation for development of educational materials by the FDOT's Safe Mobility for Life Program and Coalition, inform industry of user preferences and potential design features, and shape decisions that may affect policies and practices of deploying autonomous ride sharing services in Florida.

*Comments should explain and support urgency, financial benefit, and implementability scores