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Supporting Statement

Older adults comprise an increasing proportion of the driving population. While most of these drivers manage driving tasks safely, some find it increasingly difficult to navigate to unfamiliar destinations. Electronic navigation systems (ENSs) may provide a means to safely maintain an older adult's ability to drive to unfamiliar destinations; however, these systems might also add to driver workload by causing a distraction, thereby increasing risk. This study will explore the extent to which GPS-based navigation systems support or impair older adults' performance when driving to an unfamiliar destination as compared to navigation using traditional methods. A professional driving rehabilitation specialist will rate participants' driving performance as they drive to (1) a familiar destination, (2a) an unfamiliar destination using a map and/or turn-by-turn instructions, and (2b) using an ENS. Researchers will analyze driving performance scores to document strengths and weaknesses associated with electronic and paper directions. Researchers will then develop training based on errors participants made while using the navigation system and assess the benefits of providing training in using an ENS to older adults. The findings will provide older drivers, as well as professionals who work with older drivers with valuable and currently unavailable information about the safety and mobility implications of older drivers using ENSs. Training methods developed through this study provide a means of maximizing the benefits of the systems while minimizing the extent to which they distract the driver.

A. Justification

The National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation (USDOT) is seeking approval from the Office of Management and Budget (OMB) to conduct a qualifying questionnaire of prospective volunteer participants and conduct a study entitled *Older Drivers and Navigation Devices* described above.

A.1. Explain the circumstances that make the collection of information necessary. Identify any Legal or administrative requirements that necessitate the collection. Attach a copy of the appropriate section of each statute and regulation mandating or authorizing the collection of information.

a. Circumstances making the collection necessary

NHTSA was established to reduce the number of deaths, injuries, and economic losses resulting from motor vehicle crashes on the Nation's highways. As part of this statutory mandate, NHTSA is authorized to conduct research as a foundation for the development of motor vehicle standards and traffic safety programs.

A 2008 estimate by the Federal Highway Administration reveals that there are more than 208 million licensed drivers in the United States, of whom about 15% are 65 years of age or older.¹ The proportion of drivers 65 and older is anticipated to grow to

¹ <http://www.fhwa.dot.gov/policyinformation/statistics/2008/dl22.cfm>

more than one in five over the next 20 to 30 years as the population ages and as the current cohort of drivers continues driving longer than previous generations. This growth in the number of older drivers fuels concern that functional declines associated with normal aging or disease will lead to increased occurrence of crashes and resultant injuries and deaths. At the same time, modern society, especially in the United States, is heavily dependent on automobile travel, so that the inability to drive poses its own risks to health and quality of life. In this context, a consensus has developed that mobility preservation, *when safely possible*, is important both to the affected individuals and to the greater population.

A number of electronic devices have been advanced as means to safely prolong older adults' driving careers. These include ENSs, such as the widespread portable and built-in Global Positioning System (GPS) navigation units, which could aid older drivers through freeing cognitive resources otherwise needed for wayfinding. It is possible, however, that these systems may increase driver workload because they select a route that is different than the driver expects or by causing a distraction. This study will explore the extent to which GPS-based navigation systems support or impair older adults' driving performance and provide a potential for increased mobility.

The purpose of Segment 1 of the study is to document differences in older adults' driving performance while they drive to familiar destinations, unfamiliar destinations using paper directions, and unfamiliar destinations using an ENS. The project will also explore the effects of familiarity using an ENS on driving performance (half of the participants will be regular ENS users, the remainder will not). Segment 2 of the study will evaluate an ENS training protocol designed to address errors participants made in entering destinations into or following directions from the ENS observed during Segment 1. Following training, participants will enter destination information into an ENS and then drive to the destination following ENS instructions. Performance measures will be compared to those of a control group who will not receive such training.

NHTSA proposes an experimental study to document differences in driving performance as participants drive to familiar locations, unfamiliar locations using an ENS device and unfamiliar locations using traditional paper maps and step-by-step directions. In addition to the recruiting and classification information, data collected through Segment 1 of the study will include participants' scores on:

1. A clinical measure of functional skills to 1) ensure that the participant is safe to drive before they begin the on-road segment of the study, and 2) to support analyses of the effects of functional skills on ability to use an ENS system;
2. Driving performance while driving to a familiar location, an unfamiliar location while using an ENS and an unfamiliar location while using paper maps with turn-by-turn directions.
3. Performance entering an unfamiliar destination into the ENS;

Segment 2 of the study will develop and evaluate a training protocol based on errors noted during Segment 1; data collection will focus on driver performance in entering an unfamiliar destination into an ENS, and following ENS directions to that destination for two sets of

drivers: 1) those trained in ENS use, and 2) a group of similar age who did not received training.

NHTSA is requesting clearance to collect voluntary information from potential participants to determine their eligibility to participate in this study, as well as the other measures described above.

b. Statute authorizing the collection of information

Title 23, United States Code, Chapter 4, Section 403 gives the Secretary authorization to use funds appropriated to carry out this section to conduct research and development activities, including demonstration projects and the collection and analysis of highway and motor vehicle safety data and related information needed to carry out this section, with respect to all aspects of highway and traffic safety systems and conditions relating to - vehicle, highway, driver, passenger, motorcyclist, bicyclist, and pedestrian characteristics; accident causation and investigations; and human behavioral factors and their effect on highway and traffic safety, including distracted driving. [See 23 U.S.C. 403(b)(1)(A)(i), 23 U.S.C. 403(b)(1)(A)(ii), 23 U.S.C. 403(b)(1)(B)(iii)].

A.2. Indicate how, by whom, and for what purpose the information is to be used. Except for a new collection, indicate the actual use the agency has made of the information received from the current collection.

This is a new collection of information. Respondent compliance is voluntary.

Dunlap and Associates will conduct this study under an Indefinite Delivery Indefinite Quantity (IDIQ) contract with NHTSA. A questionnaire will be used for recruitment to ensure that potential participants meet study inclusion criteria, and to assign each participant to the appropriate study group (familiar/unfamiliar with ENS use).

NHTSA intends to recruit participants from a number of venues in the Greenville, NC metropolitan area. The East Carolina University and Medical School offer sources of potential participants. Both have email listservs available to this project from which “blast” emails are routinely sent that can be used to recruit interested parties. The emails will briefly describe the purpose of the study, detail compensation, and express that extended family members and friends of the person receiving the email within the desired age groupings are invited to participate. Flyers will be posted throughout the University System advertising the study to staff members or others (e.g., patients) who may qualify. Researchers also have contacts at various religious and social organizations in the area from which participants will be recruited.

All recruitment efforts will instruct potential participants to contact the research team by email or by phone for more information about study participation. A researcher will contact potential participants at the telephone number they provide in their initial response to the recruiting materials, or meet with them if that is more convenient, to

allow potential participants to complete the **Older Drivers and Navigation Systems** qualifying questionnaire. This questionnaire will be used to prescreen each potential participant based on the eligibility criteria listed below. Candidate participants will be asked about their age, driver license status, general health, access to a car to use in the study, and their driving exposure.

Basic Qualification Criteria

- 60-79 years old;
- Sex as per quota (approximately equal numbers per group);
- Valid NC license with no restrictions other than corrective lenses;
- Access to a licensed, insured passenger vehicle (car, SUV, pickup);
- Driving at least three trips per week

Definition of Unfamiliar Group

- Does not list ENS as the preferred navigation method (Q10) **and**
- Checks first or second box regarding experience with ENS (Q8) **and**
- Checks “none” on Q9 regarding type of navigation system used most often

Definition of Experienced Group

- Not qualified for Unfamiliar group **and**
- Checks fourth or fifth box on Q8 regarding using an ENS device while driving **and**
- Lists ENS as navigation device used most often (Q9)

Responses to the **Older Drivers and Navigation Systems** questionnaire will be used to identify eligible participants and assign them to the proper group for this study. Candidates who are selected for the study will be scheduled for study visits to complete the functional evaluation and study drives as described above. Those who do not meet eligibility requirements listed above would be excluded because they may introduce too much variability into the data and mask effects of independent variables which are the principal focus of the study. Those who meet eligibility requirements and agree to participate in the study will complete study activities as described above.

A.3. Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical or other technological collection techniques or other information technology. Also describe any consideration of using information technology to reduce burden.

To collect this qualification and classification information, NHTSA will engage in a telephone call that a driver, who has responded to an invitation, has placed to a staff member on the research team. No automated, electronic, mechanical, or other technological collection techniques are planned to obtain this information. Telephone interview is the least burdensome method to contact participants in this case.

Functional data will be collected by a certified driver rehabilitation specialist using a validated, standard protocol. Driving performance will be assessed by a driving rehabilitation

specialist, and an electronic tracking device will concurrently collect objective data on the vehicle's actual route, speed, and heading.

A.4. Describe efforts to identify duplication. Show specifically why any similar information, already available cannot be used or modified for use for the purposes described in Item 2 above.

To qualify for this study drivers must engage in a specified amount of driving (trip frequency) and meet other study inclusion criteria. There is no source of this information other than direct inquiry to the participant. The single direct telephone or face-to-face conversation proposed in this application is not only an efficient means of acquiring the necessary qualifying information; it also permits the driver to ask any questions he/she may have about study participation. Similarly, there is no source of information about older drivers' ability to use ENS systems safely.

A.5. If the collection of information involves small businesses or other small entities, describe the methods used to minimize burden.

The information collection involves individuals, not small businesses.

A.6. Describe the consequence to Federal program or policy activities if the collection is not conducted or is conducted less frequently, as well as any technical or legal obstacles to reducing burden.

Little is known about how older drivers interact with ENSs and how ENSs may affect older driver performance and safety on the road. NHTSA has a responsibility to develop evidence regarding these widely available devices, and provide advice to the public, to driving rehabilitation specialists and other professionals who provide guidance to older adults regarding driving safety, and to device manufacturers regarding their potential safety impacts. Without the conduct of the proposed data collection effort, NHTSA will not be able to advise relevant parties as to the safety and effectiveness of such devices or develop appropriate guidance in their safe use. Qualification of study participants for inclusion in the study and proper group assignment is essential to the development of useful and reliable data for analysis. The findings will provide the public, including device manufacturers, driver rehabilitation specialists, and others who work with older adults in efforts to balance safety and mobility needs with valuable, and currently unavailable, information about the safety implications of older drivers using ENSs. Training methods developed through this study provide a means of maximizing the benefits of the systems while minimizing the extent to which they distract the driver.

A.7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with the guidelines set forth in 5 CFR 1320.6.

No special circumstances require the collection to be conducted in a manner inconsistent with the guidelines in 5 CFR 1320.6.

A.8. Provide a copy of the FEDERAL REGISTER document soliciting comments on extending the collection of information, a summary of all public comments responding to the notice, and a description of the agency's actions in response to the comments. Describe efforts to consult with persons outside the agency to obtain their views.

FEDERAL REGISTER NOTICE: A copy of the Federal Register Notice which notified the public of NHTSA's intent to conduct this information collection, and provided a 60-day comment period, was published on April 30, 2014 (Vol. 79, No. 83, Pages 24494-24495). No comments were entered into the NHTSA docket in response to the 60-day Federal Register Notice

A copy of a second Federal Register Notice (Vol. 79, No. 149 Pages 45231 - 45232), which announced that this information collection request will be forwarded to OMB, was published August 4, 2014.

A.9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.

No payment or gift will be provided to respondents for the qualification questionnaire portion of this study. A total of \$150 will be provided to qualified volunteer participants who are selected and complete the two study sessions. Participants will receive \$50 for the first session and \$100 for the second session, in which they complete driving tasks in their own vehicles. Previous experience has shown that this is the minimal amount necessary to recruit participants for a study such as this one.

A.10. Describe any assurance of confidentiality provided to respondents

The solicitation to participate in the study assures prospective participants that their information will be held in confidence. Participants in the study will be asked to execute an Informed Consent document that promises no individual results and no personal information will be published and no personal results will be shared with any licensing regulatory authority. All published results will provide only summary statistics that cannot be used to identify any individual or individual responses.

A.11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior or attitudes, religious beliefs, and other matters that are commonly considered private.

The questionnaire does not contain any questions of a sensitive nature or related to matters that are commonly considered private.

A.12. Provide estimates of the hour burden of the collection of information on the respondents.

Information collection will be conducted by telephone or in-person questionnaire of up to 320 respondents to achieve a selected sample of 160 drivers (assumes 50% will qualify and agree). The questionnaire is expected to last an average of 3.5 minutes, resulting in 18.7 burden hours (Table 1a).

Table 1a. Burden Hours: Screening Potential Participants (for Phases 1 and 2)

	Respondents *	Hours per participant	= Burden hours
Screening	320	.06	18.7

Phase 1. Each participant in Phase 1 will read and sign a consent form, complete a clinical functional evaluation, a series of driving tasks, and a destination entry task resulting in 310.8 burden hours (Table 1b).

Table 1b. Phase 1 Burden Hours

	Participants *	Hours per participant	= Burden hours
Consent	120	0.17	20.4
Functional Evaluation	120	0.75	90.0
Field drives, destination entry	120	1.50	180.0
Payment/dismiss	120	0.17	20.4
TOTAL	120	2.59	310.8

Phase 2. Each participant in Phase 2 will read and sign a consent form, complete an ENS training protocol and a series of driving and/or destination entry tasks resulting in 113.6 burden hours (Table 1c).

Table 1c. Phase 2 Burden Hours

	Participants *	Hours per participant	= Burden hours
Consent	40	0.17	6.8
Training	40	1.0	40
Field drives, destination entry	40	1.5	60
Payment/dismiss	40	0.17	6.8
TOTAL		2.84	113.6

This results in a total of **443.1** burden hours for screening, Phase 1, and Phase 2 data collection.

A.13. Provide an estimate of the total annual cost to the respondents or record keepers resulting from the collection of information.

Since respondents will contact researchers in response to emails and flyers seeking study participants, the questionnaire will not pose any actual cost to participants (i.e., they will participate during non-salaried hours). However, the time they spend responding to the questions can be looked at in terms of what it would have cost had participants spent a similar amount of time responding while on the job. Mean hourly wage provided by the Bureau of Labor Statistics for All Occupations (http://www.bls.gov/oes/current/oes_va.htm#00-0000) is \$23.82.

$$\$23.82/\text{hr.} * 443.1 \text{ burden hours} = \$10,554.64.$$

The questionnaire would be administered a single time, and within a single year. Thus the total annual cost to respondents would be a maximum of **\$10,554.64**.

A.14. Provide estimates of the annualized cost to the Federal Government.

The estimated annualized cost to the Federal government is \$78,380 (see table 2a through 2c).

Table 2a: Cost to the Government/Screening

Contractor activity	Cost
Screening	\$3,200

Table 2b: Cost to the Government/Phase I

Contractor activity	Cost
Consent	\$1,800
Functional Evaluation	\$14,220
Field Drives	\$37,920
Payment/Dismissal	\$1,200
TOTAL ESTIMATED COST TO GOVERNMENT	\$55,140

Table 2c: Cost to the Government/Phase II

Contractor activity	Cost
Consent	\$600
Training	\$6,400
Field Drives	\$12,640
Payment/Dismissal	\$400
TOTAL ESTIMATED COST TO GOVERNMENT	\$20,040

Screening cost to Government (\$3,200) + Phase 1 cost to Government (\$55,140) + Phase 2 cost to Government (\$20,040) results in a total cost to Government of **\$78,380**.

15. Explain the reasons for any program changes or adjustments in Items 13 or 14 of the OMB 83-I.

This is a new information collection. As such, it requires a program change to add the estimated 26.67 hours for the new information collection to existing burden.

A.16. For collection of information whose results will be published, outline plans for tabulation and publication.

Personal information will not be published. An exact publication date has not been established but would occur no sooner than Quarter 4 of Fiscal Year 2018.

A.17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that display would be inappropriate.

NHTSA will display the expiration date for OMB approval.

A.18. Explain each exception to the certification statement identified in Item 19, "Certification for Paperwork Reduction Act Submissions" of the OMB Form 83-I.

No exceptions to the certification are made.