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ASSESSING THE EFFECTIVENESS OF ADVANCED TRAVELER INFORMATION ON OLDER DRIVER TRAVEL BEHAVIOR AND MODE CHOICE

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16. Abstract

For the first time in American history, more than 50 percent of the United States populations is over the age of 50 years old. With this change comes a number of challenges relative to meeting the safety and mobility needs of the American driving and traveling population. While the implementation of Intelligent Transportation Systems (ITS) shows promise as one of many tools to address current and future transportation challenges, the effectiveness of these technologies is unclear with respect to the ever-increasing "elderly" population. This research paper focuses on the older driver/traveler needs in the specific area of Advanced Traveler Information Systems (ATIS).

For the research documented herein, special focus groups (hands-on with ATIS technologies) and surveys were conducted to assess the driver utilization and understanding of many recently implemented ATIS technologies in the San Antonio, Texas area. These focus groups and survey panels were developed for older drivers as well as younger drivers so as to identify and isolate special needs of older drivers relative to ATIS. Special surveys were also developed and distributed for the Lower Rio Grande Valley of South Texas. This region sees a dramatic increase in older individuals, primarily from the northern portion of the U.S., for approximately six (6) months of every year.

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ABSTRACT

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For the research documented herein, special focus groups (hands-on with ATIS technologies) and surveys were conducted to assess older driver utilization and understanding of many recently implemented ATIS technologies in the San Antonio, Texas area. These focus groups and survey panels were developed for older drivers as well as younger drivers so as to identify and isolate special needs of older drivers relative to ATIS. Special surveys were also developed and distributed for the Lower Rio Grande Valley of South Texas. This region sees a dramatic increase in older individuals, primarily from the northern portion of the U.S., for approximately six (6) months of every year.

KEY WORDS: older drivers; advanced traveler information systems; ATIS; intelligent transportation systems; ITS; survey; focus group

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EXECUTIVE SUMMARY

For the first time in American history, more than 50 percent of the Unite State (U.S.) population is over the age of 50 years old. The proportion of the U.S. population comprised of individuals over the age of 50 is only expected to increase as the baby boomers reach their golden years and average life expectancy in the United States increases. With these changes come a number of challenges relative to meeting the safety and mobility needs of the American driving and/or traveling population. Implementation if Intelligent Transportation Systems (ITS) and associated technologies show promise as one of many tools to address our current and future transportation challenges. The effectiveness and/or utilization of these technologies is, however, unclear with regard to older drivers.

Various characteristics of older drivers, such as degradation in visual and auditory perception, increase the time needed to make complicated decisions and inhibit the ability to obtain and/or interpret advanced traveler information. The general unfamiliarity (of older drivers) with advanced technologies (e.g., computers) could also influence the potential success of such technologies.

Critical real-time data relative to traffic conditions and conditions and multi-modal operations of our transportation system are becoming increasingly available. The acceptance and utilization of ATIS technologies and the information they convey, especially by older drivers, will be an important factor influencing their future success. The older driver population is a significant demographic group that cannot be ignored.

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Assessing the effectiveness (and optimization) of conveying this information to this significant and continually growing segment of our population is critical to maximizing potential for sustainable communities and educated mode and/or route choices.

RESEARCH OBJECTIVE

This research capitalized on recent ATIS technology implementation (e.g., kiosks and Internet web sites) in the San Antonio area associated with the Metropolitan Model Deployment Initiative (MMDI). Data were obtained through various means to assess the understanding and utilization of these technologies by "older" and "younger" members of our population. The primary objective of the study was to identify areas of need and/or improvement (for older drivers/travelers) which will facilitate a better design and ultimate utilization of ATIS technologies. For the purpose of this research, "older drivers" were defined as individuals over the age of 55 years.

DATA ACQUISITION

The study team conducted a number of data collection efforts to complete the project. These efforts included paper surveys, focus groups (with hands-on use of ATIS technologies), and on-line surveys. The focus groups and surveys were developed for older drivers as well as younger drivers so as to identify and isolate special needs of older drivers relative to ATIS.

TABLE OF CONTENTS

Page

LIST OF FIGURES.....x

LIST OF TABLES.....xi

I. INTRODUCTION.....1

Research Objectives.....2

II. LITERATURE REVIEW.....3

III. DATA ACQUISITION.....5

Surveys.....5

Focus Groups.....7

IV. RESULTS.....9

V. CONCULSIONS.....23

REFERENCES.....25

APPENXIX A – PAPER SURVEYS.....27

APPENXIX B – ON-LINE SURVEYS.....37

LIST OF FIGURES

Page

Figure 1. Age Distribution of Focus Group Participants.....18

Figure 2. Ease of Use for Web-Site Application.....18

Figure 3. Ease of Finding Information with In-Vehicle Navigation Unit.....19

Figure 4. Frequency of Use if IVN Unit Were Available.....19

Figure 5. Amount Participants Were Willing to Pay for IVN Unit.....20

Figure 6. Ease of finding Information with KIOSK.....20

Figure 7. Indicated Frequency of Use if KIOSK were Available.....21

LIST OF TABLES

Page

Table 1. Age and Gender Data.....9

Table 2. Education Data.....10

Table 3. Income Data.....10

Table 4. Modal Data.....11

Table 5. Rural vs. Urban Driving Data.....11

Table 6. Mileage Driven Data.....12

Table 7. Familiarity with Technology.....13

Table 8. Access to Technology.....14

Table 9. Current Use of Technology.....14

Table 10. Benefits of ATIS.....15

Table 11. Importance of Various Advanced Traveler Information.....15

Table 12. Response to Advanced Traveler Information.....16

Table 13. Reasons Preventing ATIS Access.....16

I. INTRODUCTION

For the first time in American history, more than 50 percent of the Unite State (U.S.) population is over the age of 50 years old. The proportion of the U.S. population comprised of individuals over the age of 50 is only expected to increase as the baby boomers reach their golden years and average life expectancy in the United States increases. With these changes come a number of challenges relative to meeting the safety and mobility needs of the American driving and/or traveling population. Implementation if Intelligent Transportation Systems (ITS) and associated technologies show promise as one of many tools to address our current and future transportation challenges. The effectiveness and/or utilization of these technologies is, however, unclear with regard to older drivers.

Various characteristics of older drivers, such as degradation in visual and auditory perception, increase the time needed to make complicated decisions and inhibit the ability to obtain and/or interpret advanced traveler information. The general unfamiliarity (of older drivers) with advanced technologies (e.g., computers) could also influence the potential success of such technologies.

Critical real-time data relative to traffic conditions and conditions and multi-modal operations of our transportation system are becoming increasingly available. The acceptance and utilization of ATIS technologies and the information they convey, especially by older drivers, will be an important factor influencing their future success.

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The older driver population is a significant demographic group that cannot be ignored. Assessing the effectiveness (and optimization) of conveying this information to this significant and continually growing segment of our population is critical to maximizing potential for sustainable communities and educated mode and/or route choices.

Research Objectives

This report presents results found from a research project recently conducted by the Texas Transportation Institute in the South Texas region. The research capitalized on recent ATIS technology implementation (e.g., kiosks and Internet web sites) in the San Antonio area associated with the Metropolitan Model Deployment Initiative (MMDI). Data were obtained through various means to assess the understanding and utilization of these technologies by "older" and "younger" members of our population. The primary objective of the study was to identify areas of need and/or improvement (for older drivers/travelers) which will facilitate a better design and ultimate utilization of ATIS technologies.

II. LITERATURE REVIEW

The literature review of over 30 documents which was conducted as part of this research revealed numerous characteristics of older drivers regarding physical challenges which make driving more difficult as we age (e.g., decreasing visual acuity and reaction/response time). The data clearly indicate that drivers over the age of 65 years old (in addition to drivers under the age of 24, but for different reasons) represent the portion of our driving population with the greatest driving risk (1).

Review of the literature indicated a varied definition of "older drivers" relative to age, with the definitions most frequently used being either > 55 or >65 years of age (2, 3, 4). For the purpose of this research, "older drivers" were defined as individuals over the age of 55 years.

III. DATA ACQUISITION

The study team conducted a number of data collection efforts to complete the project. These efforts included paper surveys, focus groups (with hands-on use of ATIS technologies), and on-line surveys. The focus groups and surveys were developed for older drivers as well as younger drivers so as to identify and isolate special needs of older drivers relative to ATIS. The following sections provide more detail on the specific data collection efforts undertaken during the course of the project.

Surveys

Paper Survey. A questionnaire was prepared to assess the use and appeal of ATIS by older drivers. The target audience was older drivers in the Lower Rio Grande Valley of South Texas. For approximately six (6) months of every year, a large number of elderly individuals migrate to this region, most of whom come from the far northern portion of the U.S. The presence of these part-time, mostly elderly residents in this region of the state provided several unique opportunities to gauge ATIS understanding and utilization on a multi-regional and multi-variable basis.

The survey contained three sections of questions. The first section addressed personal mobility, including the type of transportation they use and the frequency of use of that particular mode. Travel behavior and location of that travel (rural vs. urban) was also determined for both Texas and their home state. The second section of the survey asked questions regarding the respondent's accessibility to traveler information – both in

Texas and in their home state. Questions addressed the technology by which they access traveler information, what particular information they consider important, the usefulness of the various technologies, their likelihood to alter travel behavior, and any barriers to obtaining traveler information. The final section of the survey included classification information, which provided demographic variables that had the potential for influencing responses.

This survey was distributed among five winter residential communities in McAllen, Pharr and San Benito, Texas and left with several Chambers of Commerce in the region to be distributed by their staff. The Oasis Group (a group of elderly individuals) in San Antonio, Texas also distributed approximately 50 surveys amongst its members. A total of 498 completed (by "older drivers") surveys were collected during the course of the study. Two versions of the survey were developed – one designed for the "Winter Texan" group and one for all others filling out the survey. The difference between the two surveys is the breakdown of applicable questions into habits while in Texas versus a Winter Texan's home state. Both versions are included in Appendix A.

On-Line Survey. An on-line version of the paper survey was prepared and administered for completion by employees of USAA (a large local employer of approximately 15,000 employees in San Antonio) and is included in Appendix B. The target audience for this survey were "younger drivers" to serve for control data/comparative purposes. Responses were sent electronically to the study team for analysis. A total of 137 respondents completed these on-line surveys.

Focus Groups

The study team conducted two focus group sessions with a total of 34 participants. The target audience for the focus groups was both older and younger drivers. The intent of the focus groups was to provide participants the opportunity for hands-on use of three types of technologies that might be used to obtain traveler information. The technologies were a desk-top computer web site application, an in-vehicle navigation unit, and an information kiosk. With each technology, participants were asked to complete a series of activities in which they were to obtain traveler information related to a specific trip they were taking. Participants then answered a series of questions about each technology, including the relative ease of use, their anticipated frequency of use, and demographic information. The participants then took part in a general discussion that focused on the technologies as well as the type of traveler information they would find useful on such applications.

IV. RESULTS

Located in Tables 1-6 are basic demographic and driving characteristic data. The age groups represented in the surveys are reasonably well distributed with 54 percent of the "older drivers" being between the ages of 55 and 64 years old. Approximately six percent (eight) of the USAA respondents were over the ages of 55 years – these individuals were placed in the "older driver" data set. The USAA (i.e., "younger driver") respondents were predominately women (61%), while the older driver group was closer to an even gender distribution (45% female, 55 % male).

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Table 1. Age and Gender Data

What is your age and gender?	
USAA – Responses (Percentage, %)	
Male	54 (39%)
Female	83 (61%)
Under 30	10 (8%)
31 – 40	50 (39%)
41 – 55	59 (46%)
55 – 65	8 (6%)
Older Drivers – Responses (Percentage, %)	
Male	249 (55%)
Female	201 (45%)
41 – 54	2 (---)
55 – 64	93 (21%)
65-74	242 (54%)
75 and Over	115 (25%)

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Table 2. Education Data

Highest level of education?	
USAA – Responses (Percentage, %)	
Less than high school	0 (---)
High School or equivalent	4 (3%)
Some college or Technical training	37 (27%)
College degree	65 (47%)
Graduate degree	31 (23%)
Older Drivers – Responses (Percentage, %)	
Less than high school	17 (4%)
High School or equivalent	152 (34%)
Some college or Technical training	173 (38%)
College degree	71 (16%)
Graduate degree	37 (8%)

Table 3. Income Data

Annual Income?	
USAA – Responses (Percentage, %)	
Less than $10,000	1 (1%)
$10,000 - $29,999	3 (2%)
$30,000 - $49,999	37 (30%)
$50,000 - $74,999	46 (37%)
$75,000 - $100,000	24 (20%)
Over $100,000	12 (10%)
Older Drivers – Responses (Percentage, %)	
Less than $10,000	9 (3%)
$10,000 - $29,999	104 (30%)
$30,000 - $49,999	131 (38%)
$50,000 - $74,999	70 (21%)
$75,000 - $100,000	22 (6%)
Over $100,000	10 (3%)

Table 4. Modal Data

Classify your use of the following modes of transportation			
USAA – Number of Responses (Percentage, %)			
	Daily	Weekly	Rarely
Automobile	113 (80%)	7 (5%)	5 (4%)
Pickup	28 (20%)	11 (8%)	55 (39%)
Motorcycle	0	3 (2%)	70 (50%)
Motor Home	0	0	72 (51%)
Bus Service	0	0	73 (52%)
Older Drivers – Number of Responses (Percentage, %)			
	Daily	Weekly	Rarely
Automobile	146 (29%)	18 (4%)	5 (1%)
Pickup	47 (9%)	11 (2%)	6 (1%)
Motorcycle	2 (---)	2 (---)	4 (1%)
Motor Home	12 (2%)	16 (3%)	12 (2%)
Bus Service	7 (1%)	3 (---)	5 (1%)
Light Rail	3 (---)	2 (---)	1 (---)
Heavy Rail	2 (---)	1 (---)	1 (---)
Other	6 (1%)	3 (---)	5 (1%)

Note: Percentages calculated based upon total responses = 141 for USAA; 498 for Older Drivers

Table 5. Rural vs. Urban Driving Data

In what type of region or area is most of your mileage driven or traveled?		
USAA – Responses (Percentage, %)		
Rural		20 (15%)
Urban		115 (85%)
Older Drivers – Responses (Percentage, %)		
Texas	Rural	107 (25%)
	Urban	326 (75%)
Home State	Rural	192 (53%)
	Urban	171 (47%)

Total Responses = 135 for USAA; 433 for Older Drivers

Table 6. Mileage Driven Data

How many total miles do you drive or travel each year?	
USAA – Responses (Percentage, %)	
Less than 1,000	0 (---)
1,001 – 5,000	10 (7%)
5,001 – 10,000	32 (24%)
Over 10,000	93 (69%)
Older Drivers – Responses (Percentage, %)	
Less than 1,000	13 (3%)
1,001 – 5,000	75 (16%)
5,000 – 10,000	126 (26%)
Over 10.000	266 (55%)

Total Responses = 137 for USAA; 498 For Older Drivers

As could be expected, the "older drivers" exhibit a considerably lower level of education (62% with at least some college in comparison to 97% for the "younger driver" sample) and income (30% with over $50,000 annual income compared to 67% for the "younger drivers"). The "older driver" group drives less on a daily basis, tends to do more rural driving, and drives slightly less overall miles per year than the "younger driver" subjects.

The results included in Tables 7-13 deal more directly with ATIS and technologies in general. The extremely high familiarity of the "younger drivers" with e-mail and the Internet is likely biased by the administration of the USAA survey via e-mail, and thus, by itself, not a very meaningful observation. Differences between the two group's familiarity with all technologies for which participants were queried are, however, consistently significant; with "older drivers" significantly less familiar with

technology. The access the "older driver" respondents have to technology (as well as their current usage habits) is in line with their familiarity levels – low in comparison to the "younger driver" sample. With respect to how they will utilize ATIS data, "older drivers" seem less likely to act upon advanced information obtained via the Internet/e-mail, while both groups exhibit a high level of trust (or perhaps current reliance) in radio and television as sources and fairly low levels of motivation to take action based upon data obtained via kiosks or pagers.

Table 7. Familiarity with Technology

With which of the following technologies are you familiar?	
USAA – Responses (Percentage, %)	
Internet/world-wide web	136 (100%)
E-mail	136 (100%)
Highway Advisory Radio	18 (13%)
Kiosk	66 (48%)
Pager	102 (74%)
Older Drivers – Response (Percentage, %)	
Internet/world-wide web	117 (23%)
E-mail	152 (31%)
Highway Advisory Radio	87 (17%)
Kiosk	23 (5%)
Pager	64 (13%)

Table 8. Access to Technology

To which of the following do you have convenient access?	
USAA -- Responses (Percentage, %)	
Internet/WWW	133 (97%)
HAR	7 (5%)
Kiosk	24 (8%)
Pager	69 (50%)
E-Mail	132 (96%)
Fax Machine	74 (54%)
Computer	25 (18%)
Older Drivers – Responses (Percentage, %)	
Internet/WWW	90 (18%)
HAR	24 (5%)
Kiosk	8 (2%)
Pager	16 (3%)
E-Mail	126 (25%)
Fax Machine	66 (13%)
Computer	126 (25%)

Total Responses = 137 for USAA; 498 For Older Drivers

Table 9. Current Use of Technology

Which method do you currently use to obtain information about travel conditions, construction , incidents, etc.?	
USAA – Responses (Percentage, %)	
Internet	44 (32%)
HAR	4 (3%)
Kiosk	2 (1%)
Pager	0 (---)
E-Mail	9 (7%)
Television	94 (69%)
Radio	129 (94%)
Fax Machine	0 (---)
Computer	20 (15%)
Older Drivers – Responses (Percentage, %)	
Internet	34 (7%)
HAR	25 (5%)
Kiosk	2 (1%)
Pager	4 (1%)
E-Mail	21 (4%)
Television	374 (75%)
Radio	343 (69%)
Fax Machine	4 (1%)
Computer	34 (7%)

Percentages calculated based upon total responses = 137 for USAA; 498 for Older Drivers

Table 10. Benefits of ATIS

Please rate the following descriptions of advanced notification of traffic conditions.			
	Strongly disagree	Agree	Strongly agree
USAA – Responses (Percentage, %)			
Decreases stress I know what to expect	11 (8%)	62 (45%)	64 (47%)
Allows me to adjust my schedule	12 (9%)	61 (45%)	62 (46%)
Saves time because I can alter my route	4 (3%)	41 (31%)	89 (66%)
Older Drivers – Responses (Percentage, %)			
Decreases stress I know what to expect	13 (3%)	166 (44%)	203 (53%)
Allows me to adjust my schedule	15 (4%)	139 (35%)	245 (61%)
Saves time I can alter my route	8 (3%)	126 (42%)	164 (55%)

Table 11. Importance of Various Advanced Traveler Information

When traveling, how important are the following items to you?					
	1 (Not very important)	2	3 (Important)	4	5 (Very important)
USAA – Responses (Percentage, %)					
Weather	3 (2%)	9 (7%)	25 (18%)	35 (26%)	64 (47%)
Traffic Congestion	2 (2%)	3 (2%)	7 (5%)	48 (35%)	77 (56%)
Incidents/Accidents	3 (2%)	4 (3%)	15 (11%)	38 (28%)	77 (56%)
Lane Closures	3 (2%)	4 (3%)	12 (9%)	45 (33%)	73 (53%)
Construction	0 (---)	9 (7%)	27 (20%)	56 (41%)	45 (33%)
Transit Schedules	85 (64%)	30 (23%)	9 (7%)	5 (4%)	4 (3%)
Older Drivers – Responses (Percentage, %)					
Weather	21 (5%)	22 (5%)	78 (18%)	58 (13%)	256 (59%)
Traffic Congestion	12 (3%)	42 (11%)	83 (21%)	83 (21%)	177 (45%)
Incidents/Accidents	19 (5%)	41 (12%)	78 (22/%)	72 (20%)	143 (41%)
Lane Closures	26 (7%)	35 (10%)	88 (24%)	84 (23%)	130 (36%)
Construction	14 (4%)	30 (8%)	92 (24%)	111 (29%)	132 (36%)
Transit Schedules	125 (60%)	22 (10%)	23 (11%)	14 (7%)	24 (12%)

Table 12. Response to Advanced Traveler Information

If you had access to accurate travel information, what would be your typical response upon hearing of a major delay on your planned route?	
USAA – Responses (Percentage, %)	
Change travel mode	2 (2%)
Change departure time	15 (11%)
Change route	116 (86%)
Cancel trip	1 (1%)
Make no changes	1 (1%)
Older Drivers – Responses (Percentage, %)*	
Change travel mode	42 (8%)
Change departure time	237 (48%)
Change route	362 (73%)
Cancel trip	34 (7%)
Make no changes	19 (4%)

* Taken as a percentage of 498 possible maximum responses

Table 13. Reasons Preventing ATIS Access

If you feel you don't have access to advanced travel information, what do you believe is preventing this access?	
USAA – Responses (Percentage, %)	
Cost	18 (22%)
Awareness	46 (57%)
Not available in area	12 (15%)
Don't understand technology	5 (6%)
Older Drivers – Responses (Percentage, %)	
Cost	79 (27%)
Awareness	93 (32%)
Not available in area	52 (18%)
Don't understand technology	64 (22%)

Both groups agreed that advanced traveler information was useful in that it: 1) decreases stress, since they know what to expect; 2) allows them flexibility to adjust their schedule; and 3) saves them time, because they could alter their route (Table 10). The "older drivers" placed a greater importance on weather information than did the "younger drivers" and a lesser degree of importance on traffic congestion, accidents, lane closures,

and construction (the typical sources of delay in typical daily urban commuting). Both groups placed the least importance on transit information, but the overall importance "older drivers" placed on this information was higher than that of the "younger drivers."

With regard to how they would specifically respond to learning of a major incident on their route (in advance), "older drivers" appear more likely to change their mode of transport (although still only 8 percent of those responding), to change their departure time (48% compared to 11% for the "younger drivers"), and to cancel their trip altogether. When asked to define their reason for not having access to advanced traveler information, "older drivers" cited cost (27%) and a lack of understanding of technology (22%) more often than "younger drivers." The "older" group also cited lack of awareness as the most significant reason (32%). Lack of awareness was also the most typical response from "younger drivers" and was surprisingly high at 57 percent.

The results of the focus group sessions are summarized in Figures 1 through 7. Ten (10) of the focus group participants were "older drivers" from a San Antonio American Association of Retired Persons (AARP) Chapter, while 24 participants were "younger drivers" from USAA. In general, the USAA group had an easier time using the web-site application for attaining advanced traveler information, but both groups seemed to find it relatively easy to use.

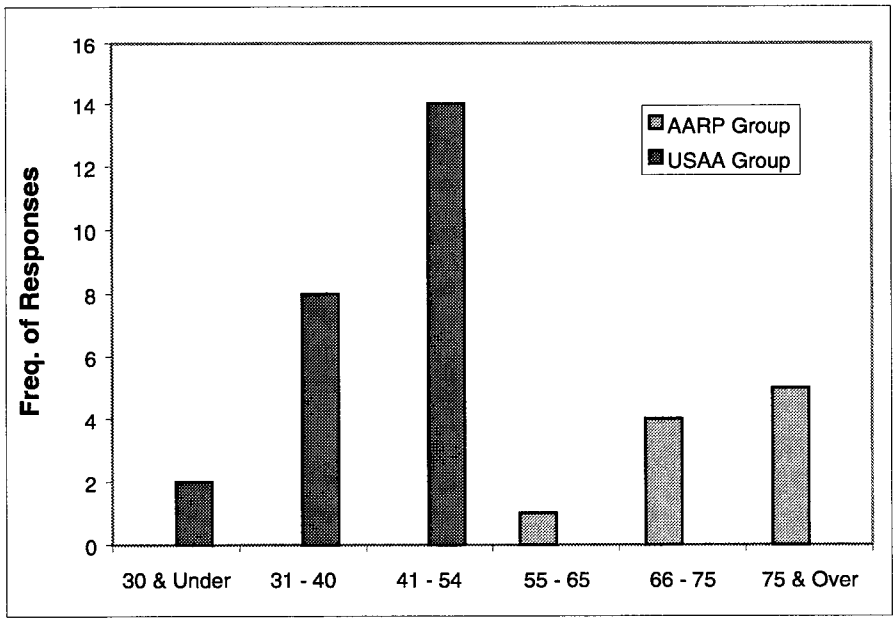

Figure 1. Age Distribution of Focus Group Participants

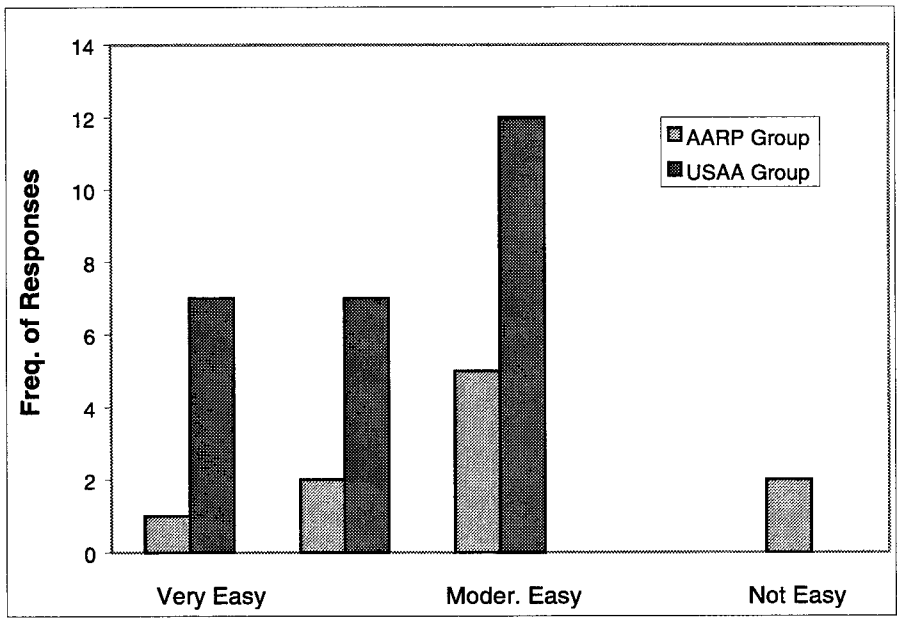

Figure 2. Ease of Use for Web-Site Application

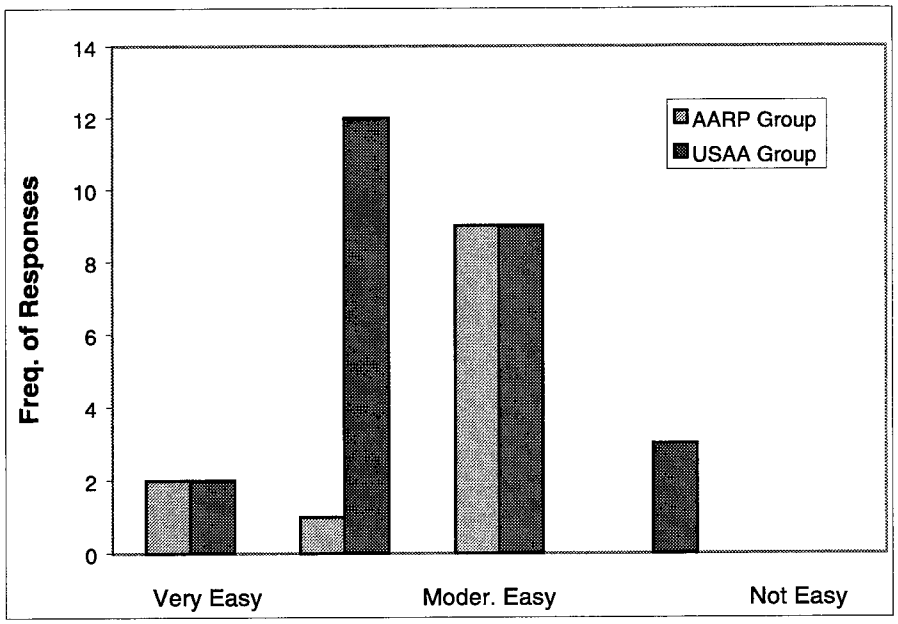

Figure 3. Ease of Finding Information with In-Vehicle Navigation Unit

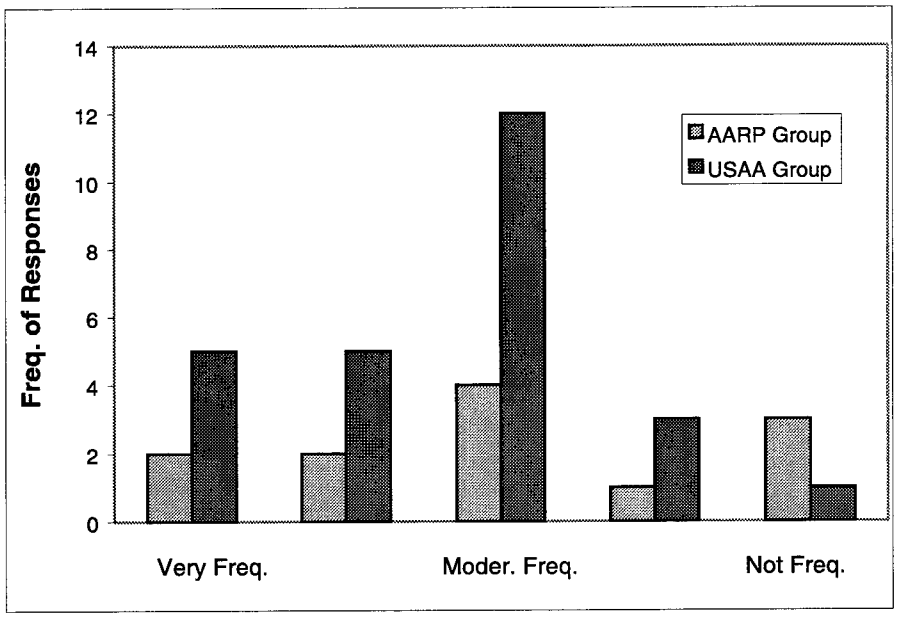

Figure 4. Frequency of Use if IVN Unit Were Available

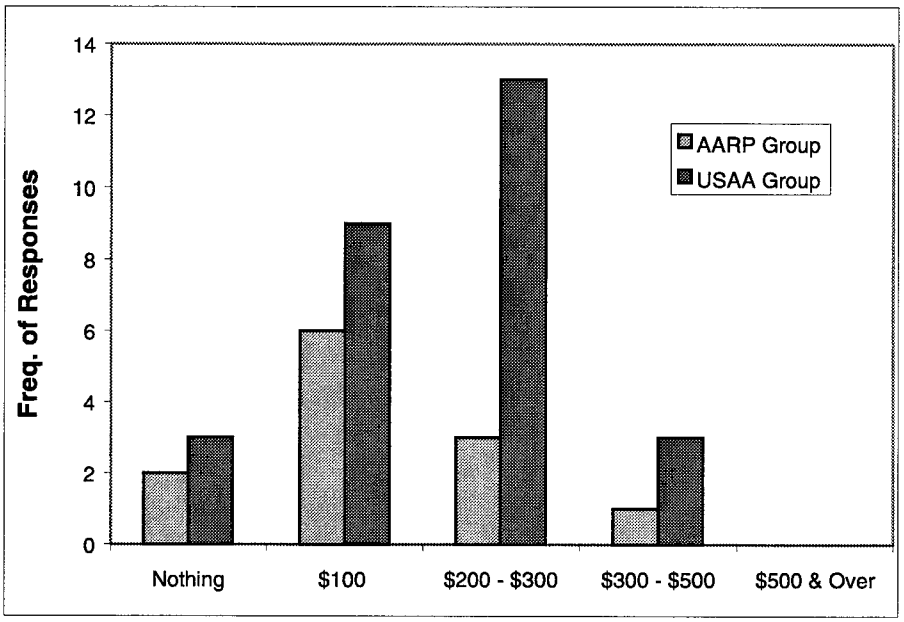

Figure 5. Amount Participants Were Willing to Pay for IVN Unit

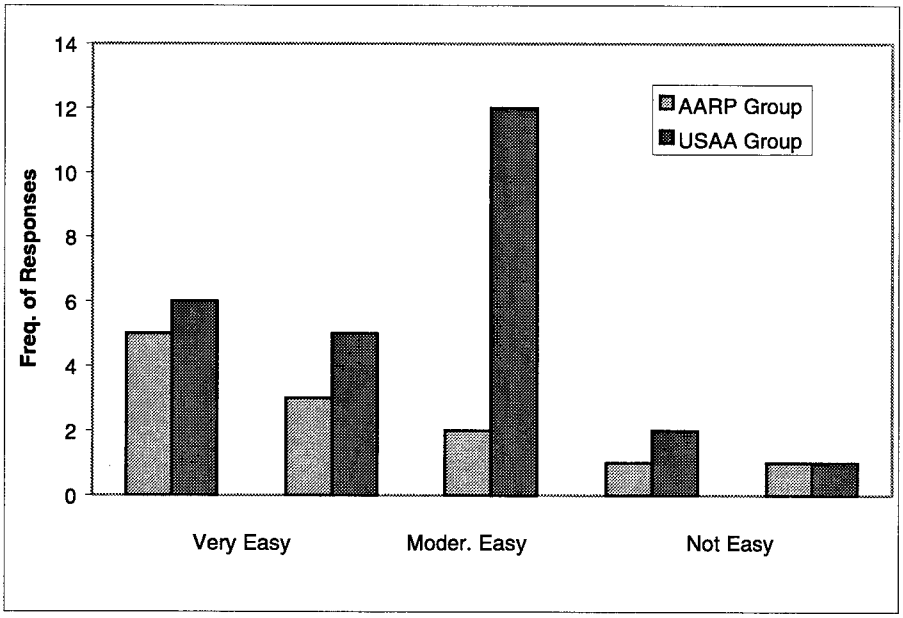

Figure 6. Ease of finding Information with KIOSK

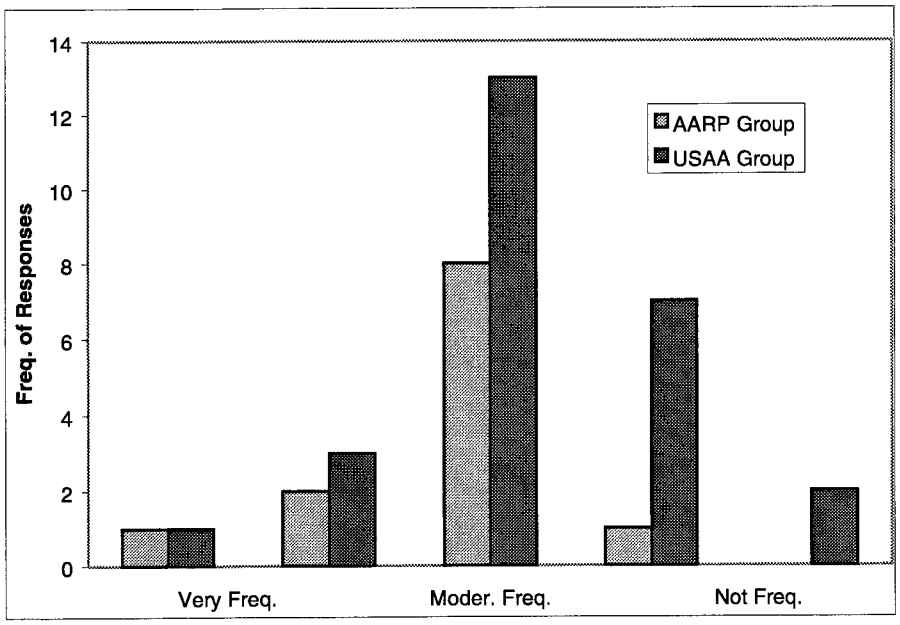

Figure 7. Indicated Frequency of Use if KIOSK were Available

These same results were observed regarding the use of the in-vehicle navigation (IVN) unit. Both groups indicated that, if available to them, they would use the IVN unit with moderate frequency. The "younger driver" group indicated a willingness to pay more for an IVN unit than the "older drivers", with the mode response for the latter group being $100 as opposed to $200-300 for the former.

The AARP group had a more favorable view of the kiosk as a means of attaining advanced traveler information than did the USAA group, with both groups finding it relatively easy to use. Both groups cited the ability to print out route information as their favorite features and the speed of the kiosk in illustrating information as their chief

complaint. The "older drivers" frequently responded with requests for larger print for all three technology applications as means for future improvement/features.

V. CONCLUSIONS

The vast majority of the results obtained in this research were consistent with what was to be expected. As an example, "older drivers" frequently cited challenges with legible font size during the focus group sessions. The results of the focus group sessions (as well as physical observations during these sessions) did, however, suggest that "older drivers" appreciate and would use ATIS-type technologies if they are aware of them and these technologies were readily accessible.

Additional specific results worth reflecting upon were the tendency of "modal option" information being made available for "older drivers" as well as the lack of awareness of ATIS technologies. The lack of awareness amongst the "younger drivers" was alarmingly high. The data regarding awareness from both age groups suggests that public education and awareness regarding the availability and use of ATIS and associated technologies is a clear area of need.

The data gathered in this study also further support the need for focused attention on the needs of "older drivers" as it relates to current and future ATIS developments and deployments. It is clear that "older drivers" have special needs. They are typically much less familiar with new technologies and are less likely to utilize them. If ignored, these needs will likely have a detrimental impact on U.S. society as the "baby-boomers" create a larger "elderly" driving and traveling population than this nation has ever seen. Sensible and properly planned development and deployment of ATIS, as well strategic public

education/awareness campaigns (in light of these concerns) can serve as one of many valuable tools to meet our future transportation mobility needs.

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1. Aging Drivers Ahead: Design With Care. Perel, Michael. May 1998. ITS World, pp. 29-32.
2. In-Vehicle Navigation Devices: Effects on the Safety of Driver Performance. Walker, J.E., et al. 1990. Technical Report FHWA-RD-90-053. Washington, D.C.: US DOT
3. Older Drivers and ATIS Guidelines. Granda, Thomas M.; et al, Traffic Congestion and Traffic Safety, pp. 346-352, 1997.
4. IVHS and the Elderly Driving. Nsour, Salameh A., Traffic Congestion and Traffic Safety, pp. 333-339, 1995.

APPENDIX A

PAPER SURVEYS

Personal Mobility

1. Please check the following types of transportation that you own or have access to on either a daily, frequent (2-3 times per week), or infrequent (less than 1 time per week) access. If you own a particular type of transportation, please indicate how many you own.

	Own (Number)	Daily Access	Frequent Access	Infrequent Access
Automobile	☐ ( )	☐	☐	☐
Pickup	☐ ( )	☐	☐	☐
Motorcycle	☐ ( )	☐	☐	☐
Motor home	☐ ( )	☐	☐	☐
Bus service	☐	☐	☐	☐
Other _____	☐ ( )	☐	☐	☐

2. In what type of region or area is most of your mileage driven or traveled?
   - ☐ Rural
   - ☐ Urban

3. How many total miles do you drive or travel each year?
   - ☐ Less than 1,000
   - ☐ 1,001 - 5,000
   - ☐ 5,001 - 10,000
   - ☐ Over 10,000

Information Accessibility and Use

4. Which of the following terms do you have a working knowledge of? (Check all that apply)
   - ☐ Internet/World Wide Web
   - ☐ E-Mail
   - ☐ Highway Advisory Radio (HAR)
   - ☐ Kiosk
   - ☐ Pager

5. To which of these items do you have access? (Check all that apply)

Texas	Home State
☐ Internet/World Wide Web	☐ Internet/World Wide Web
☐ HAR	☐ HAR
☐ Kiosk	☐ Kiosk
☐ Pager	☐ Pager
☐ E-Mail	☐ E-Mail
☐ Fax Machine	☐ Fax Machine
☐ Computer	☐ Computer

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6. When traveling, how important are the following information items to you? Mark all that apply. Please rate the information item on a scale of 1-5, with 1 being not important and 5 being very important.

	Not Important		*Important*		*Very Important*
☐ Weather	1	2	3	4	5
☐ Traffic congestion	1	2	3	4	5
☐ Incidents / Accidents	1	2	3	4	5
☐ Lane closures	1	2	3	4	5
☐ Construction	1	2	3	4	5
☐ Transit schedules	1	2	3	4	5
☐ Other _____	1	2	3	4	5

7. Which of these items do you currently use to obtain information about travel news, such as construction, incidents, weather conditions, congestion, and transit schedules? (Check all that apply)

- ☐ Internet/World Wide Web
- ☐ HAR
- ☐ Kiosk
- ☐ Pager
- ☐ E-Mail
- ☐ Television
- ☐ Radio
- ☐ Fax Machine
- ☐ Computer

8. For those items indicated in question 7, how would you rate the usefulness of the information you receive? Please rate on a scale of 1-5, with 1 being not useful and 5 being very useful.

	Not Useful		*Useful*		*Very Useful*
☐ Internet/World Wide Web	1	2	3	4	5
☐ Highway Advisory Radio	1	2	3	4	5
☐ Kiosk	1	2	3	4	5
☐ Pager	1	2	3	4	5
☐ E-Mail	1	2	3	4	5
☐ Television	1	2	3	4	5
☐ Radio	1	2	3	4	5
☐ Fax Machine	1	2	3	4	5
☐ Computer	1	2	3	4	5

9. When you obtain advanced traveler information using one of the following technologies, how likely are you to alter your travel behavior (i.e., travel mode, travel route, departure time, destination, etc.) based on that information? Please rate on a scale of 1-5, with 1 being very unlikely and 5 being very likely. Base your response on your most usual behavior.

	Very Unlikely		*Likely*		*Very Likely*
☐ Internet/World Wide Web	1	2	3	4	5
☐ Highway Advisory Radio	1	2	3	4	5
☐ Kiosk	1	2	3	4	5
☐ Pager	1	2	3	4	5
☐ E-Mail	1	2	3	4	5
☐ Television	1	2	3	4	5
☐ Radio	1	2	3	4	5
☐ Fax Machine	1	2	3	4	5
☐ Computer	1	2	3	4	5

10. When you receive advanced notice of major traffic delays and/or incidents, which of the following best describes your reaction? Mark all that apply. Please rate on a scale of 1-5, with 1 being strongly disagree and 5 being strongly agree. Base your response on your must usual behavior.

	Strongly Disagree		*Agree*		*Strongly Agree*
☐ Makes my travel less stressful because I know what to expect.	1	2	3	4	5
☐ Allows me to notify others that I will be late.	1	2	3	4	5
☐ Saves me time by allowing me to choose a different route.	1	2	3	4	5
☐ Other _____	1	2	3	4	5

11. If you feel that you currently don't have access to travel information, such as accidents, travel delays, etc., what do you believe is keeping you from having this access?

☐ Cost
☐ Awareness
☐ Not offered in my area
☐ Don't understand technology
☐ Other _____

12. If you had access to ***accurate*** travel information, what would be your typical response upon hearing of a major delay on your planned route?

A. Change travel mode (i.e., take bus). ☐
B. Change departure time. ☐
C. Change travel route. ☐
D. Cancel trip. ☐
E. Make no change in plans. ☐
F. Other _____ ☐

For Classification Purposes

13. Are you: ☐ Male ☐ Female

14. What is your age? ☐ Under 40 ☐ 41-54 ☐ 55-64 ☐ 65-74 ☐ 75 and over

15. What is your highest level of education?
    ☐ Less than high school ☐ Some college or technical training ☐ Graduate degree
    ☐ High school or equivalent ☐ College degree

16. What is your annual income, before taxes, for your entire household?
    ☐ Under $10,000 ☐ $50,000 - $74,999
    ☐ $10,000 - $29,999 ☐ $75,000 - $100,000
    ☐ $30,000 - $49,999 ☐ Over $100,000

17. What state do you consider your home state or primary residence? _____

18. What is your employment status? ☐ Full-time ☐ Part-time ☐ Retired

19. Do you have any physical disabilities that prevent you from driving an automobile? ☐ Yes ☐ No

20. Are you married? ☐ Yes ☐ No

21. Please provide any additional comments and/or suggestions you would like to share with us.

_____

_____

_____

_____

_____

Thank you for your time and attention.

Personal Mobility

1. Please check the following types of transportation that you own or have access to on either a daily, frequent (2-3 times per week), or infrequent (less than 1 time per week) access. If you own a particular type of transportation, please indicate how many you own.

	Own (Number)	Daily Access	Frequent Access	Infrequent Access
Automobile	☐ ( )	☐	☐	☐
Pickup	☐ ( )	☐	☐	☐
Motorcycle	☐ ( )	☐	☐	☐
Motor home	☐ ( )	☐	☐	☐
Bus service	☐	☐	☐	☐
Other _____	☐ ( )	☐	☐	☐

2. In what type of region or area is most of your mileage driven or traveled?
   - ☐ Rural
   - ☐ Urban

3. How many total miles do you drive or travel on roadways each year?
   - ☐ Less than 1,000
   - ☐ 1,001 - 5,000
   - ☐ 5,001 - 10,000
   - ☐ Over 10,000

Information Accessibility and Use

4. Which of the following terms do you have a working knowledge of? (Check all that apply)
   - ☐ Internet/World Wide Web
   - ☐ E-Mail
   - ☐ Highway Advisory Radio (HAR)
   - ☐ Kiosk
   - ☐ Pager

5. To which of these items do you have convenient access? (Check all that apply)
   - ☐ Internet/World Wide Web
   - ☐ HAR
   - ☐ Kiosk
   - ☐ Pager
   - ☐ E-Mail
   - ☐ Fax Machine
   - ☐ Computer

6. When traveling, how important are the following information items to you? Please rate each information item on a scale of 1-5, with 1 being not important and 5 being very important.

	Not Important		*Important*		*Very Important*
Weather	1	2	3	4	5
Traffic congestion	1	2	3	4	5
Incidents / Accidents	1	2	3	4	5
Lane closures	1	2	3	4	5
Construction	1	2	3	4	5
Transit schedules	1	2	3	4	5
Other _____	1	2	3	4	5

7. Which of these items do you currently use to obtain information about travel news, such as construction, incidents, weather conditions, congestion, and transit schedules? (Check all that apply)

- ☐ Internet/World Wide Web
- ☐ HAR (Highway advisory radio)
- ☐ Kiosk
- ☐ Pager
- ☐ E-Mail
- ☐ Television
- ☐ Radio
- ☐ Fax Machine
- ☐ Computer

8. For those items you indicated you use in question 7, how would you rate the usefulness of the information you receive? Please rate on a scale of 1-5, with 1 being not useful and 5 being very useful.

	Not Useful		*Useful*		*Very Useful*
Internet/World Wide Web	1	2	3	4	5
Highway Advisory Radio	1	2	3	4	5
Kiosk	1	2	3	4	5
Pager	1	2	3	4	5
E-Mail	1	2	3	4	5
Television	1	2	3	4	5
Radio	1	2	3	4	5
Fax Machine	1	2	3	4	5
Computer	1	2	3	4	5

9. When you obtain advanced traveler information using one of the following technologies, how likely are you to alter your travel behavior (i.e., travel mode, travel route, departure time, destination, etc.) based on that information? Please rate on a scale of 1-5, with 1 being very unlikely and 5 being very likely. Base your response on your most usual behavior.

	Very Unlikely		*Likely*		*Very Likely*
Internet/World Wide Web	1	2	3	4	5
Highway Advisory Radio	1	2	3	4	5
Kiosk	1	2	3	4	5
Pager	1	2	3	4	5
E-Mail	1	2	3	4	5
Television	1	2	3	4	5
Radio	1	2	3	4	5
Fax Machine	1	2	3	4	5
Computer	1	2	3	4	5

10. Please rate each of the following descriptions of reactions to advanced notice of major traffic delays and/or incidents as they apply to you. Please rate on a scale of 1-5, with 1 being strongly disagree and 5 being strongly agree. Base your response on your must frequent behavior.

	Strongly Disagree		*Agree*		*Strongly Agree*
Makes my travel less stressful because I know what to expect.	1	2	3	4	5
Allows me to notify others that I will be late.	1	2	3	4	5
Saves me time by allowing me to choose a different route.	1	2	3	4	5
Other _____	1	2	3	4	5

11. If you feel that you currently don't have access to travel information, such as accidents, travel delays, etc., what do you believe is keeping you from having this access?

- ☐ Cost
- ☐ Awareness
- ☐ Not offered in my area
- ☐ Don't understand technology
- ☐ Other _____

12. If you had access to ***accurate*** travel information, what would be your typical response upon hearing of a major delay on your planned route (pick the <u>one</u> that best applies to you)?

A. Change travel mode (i.e., take bus). ☐
B. Change departure time. ☐
C. Change travel route. ☐
D. Cancel trip. ☐
E. Make no change in plans. ☐
F. Other _____ ☐

For Classification Purposes

13. Are you: ☐ Male ☐ Female

14. What is your age? ☐ Under 55 ☐ 55-64 ☐ 65-75 ☐ over 75

15. What is your highest level of education?
    ☐ Less than high school ☐ Some college or technical training ☐ Graduate degree
    ☐ High school or equivalent ☐ College degree

16. What is your annual income, before taxes, for your entire household?
    ☐ Under $10,000 ☐ $50,000 - $74,999
    ☐ $10,000 - $29,999 ☐ $75,000 - $100,000
    ☐ $30,000 - $49,999 ☐ Over $100,000

17. What is your employment status? ☐ Full-time ☐ Part-time ☐ Retired

18. Do you have any physical disabilities that prevent you from driving an automobile? ☐ Yes ☐ No

19. Are you married? ☐ Yes ☐ No

20. Please provide any additional comments and/or suggestions you would like to share with us.

_____

_____

_____

_____

_____

Thank you for your time and attention.

APPENDIX B

ON-LINE SURVEY

Web Survey

Advanced Traveler Information System Survey

1. Classify your use of the following modes of transportation.

	Daily	Weekly	Rarely	Never
Automobile.	○	○	○	○
Pickup.	○	○	○	○
Motorcycle.	○	○	○	○
Motor Home.	○	○	○	○
Bus Service.	○	○	○	○

2. In what type of region or area is most of your mileage driven or traveled?

- ○ **Rural.**
- ○ **Urban.**

3. How many total miles do you drive or travel each year?

- ○ **Less than 1000.**
- ○ **1,001 - 5,000.**
- ○ **5,001 - 10,000.**
- ○ **Over 10,000.**

Information Accessibility and Use.

4. With which of the following are you familiar? (Check all that Apply).

- ☐ **Internet/World wide web.**
- ☐ **E-Mail.**
- ☐ **Highway Advisory Radio (HAR).**
- ☐ **Kiosk.**
- ☐ **Pager.**

5. To which of these do you have convenient access? (Check all that apply)

- ☐ **Internet/WorldWide Web.**
- ☐ **HAR.**
- ☐ **Kiosk.**
- ☐ **Pager.**
- ☐ **E-Mail.**
- ☐ **Fax Machine.**
- ☐ **Computer.**

6. When traveling how important are the following information items to you? Please rate each item on a scale of 1-5, with 1 being not important and 5 being very important.

	1	2	3	4	5
Weather.	○	○	○	○	○
Traffic congestion.	○	○	○	○	○
Incidents / Accidents.	○	○	○	○	○
Lane closures.	○	○	○	○	○
Construction.	○	○	○	○	○
Transit Schedules.	○	○	○	○	○
Other.	○	○	○	○	○

6a.

Describe other. [ ]

7. Which method do you currently use to obtain information about travel conditions, such as construction, incidents, weather etc? (check all that apply).

- ☐ **Internet.**
- ☐ **HAR.**
- ☐ **Kiosk.**
- ☐ **Pager.**
- ☐ **E-Mail.**
- ☐ **Television.**
- ☐ **Radio.**
- ☐ **Fax .**
- ☐ **Computer.**

8. please classify the usefulness of the above on a scale of one 1-5?

	Not useful	Useful	Very useful	Extremely useful
Internet.	○	○	○	○
HAR.	○	○	○	○
Kiosk.	○	○	○	○
Pager.	○	○	○	○
E-Mail.	○	○	○	○
Television.	○	○	○	○
Radio.	○	○	○	○
Fax .	○	○	○	○
Computer.	○	○	○	○

9. When you obtain travel information from one of these sources, how likely are you to act on the information you receive?

	Very unlikely	Unlikely	likely	Very likely	Extremely likely
Internet.	○	○	○	○	○
HAR.	○	○	○	○	○
Kiosk.	○	○	○	○	○
Pager.	○	○	○	○	○
E-Mail.	○	○	○	○	○
Television.	○	○	○	○	○
Radio.	○	○	○	○	○
Fax .	○	○	○	○	○
Computer.	○	○	○	○	○

10. Please rate the following descriptions of advanced notification of traffic conditions.

	Strongly Disagree	Disagree	Agree	Strongly agree
Decreases stress I know what to expect.	○	○	○	○
Allows me to adjust my schedule.	○	○	○	○
Saves time I can alter my route.	○	○	○	○
Other.	○	○	○	○

10a.

Describe other. [ ]

11. If you feel you don't have access to advanced travel information, what do you believe is preventing this access?

- ☐ **Cost.**
- ☐ **Awareness.**
- ☐ **Not available in my geographic area.**
- ☐ **Don't understand the technology.**
- ☐ **Other.**

11a. Other.

Describe other. [ ]

12. If you had access to accurate travel information, what would be your typical response upon hearing of a major delay on your planned route?

- ○ **Change travel mode (i.e., take a bus).**
- ○ **Change departure time.**
- ○ **Change route.**
- ○ **Cancel trip.**
- ○ **Make no change in plans.**
- ○ **Other.**

12a.

Describe other. [ ]

For Classification Purposes.

13. Are you?

○ **Male.** ○ **Female.**

14. What is your age?

○ **Under 30.** ○ **31-40.** ○ **41-55.**
○ **Over 55.**

15. Highest level of education?

- ○ **Less than high school.**
- ○ **High School or equivalent.**
- ○ **Some college or technical training.**
- ○ **College degree.**
- ○ **Graduate degree.**

16. Annual income?

- ○ **Less than $10,000**
- ○ **$10,000 - $29,999**
- ○ **$30,000 - $49,999**
- ○ **$50,000 - $74,999**
- ○ **$75,000 - $100,000**
- ○ **Over $100,000**

17. Employment status?

- ○ **Full time.**
- ○ **Part time.**

18. Do you have any physical disabilities that prevent you from driving an automobile?

- ○ **Yes.**
- ○ **No.**

19. Are you married?

- ○ **Yes.**
- ○ **No.**

20. Please provide any additional comments and or suggestions.

Thank you for taking the time to complete this survey. Select Submit Survey now to send your responses to us.

Submit Survey | Clear All Answers

This questionnaire was created by Perseus SurveySolutions for the Web.