



Vehicle Technologies & Automation - Research on the “User Issue”

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and Automated Driving Systems

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A non-profit, Section 501(c)(3) organization founded in 1947 by American Automobile Association with voluntary fund contributions from AAA, CAA, and individuals

Mission Statement

"To identify traffic safety problems, foster research that seeks solutions, and disseminate information and educational materials."

AAA Foundation Focus Areas



EMERGING TECHNOLOGIES

Current Research

- Evaluation of IVIS/ADAS
- User experience of ADAS
- Assess safety benefits of technologies

2018 Topics

- User expectations & acceptance
- Technology impact on users
- User experiences

Internal & external research projects

Continue data collection to understand user expectations, acceptance, ...

BEYOND 2018

- Collaboration with others on C&AV deployments – data collection
- Collaboration to carry out relevant research

Mission Support

- Actively contribute to C&AV events

November 2017 Forum

Research findings on user acceptance & expectation of technology

IMPACT:
Improve design of vehicle technologies

Related research findings from other research entities

Evaluation of IVIS & ADAS (1 of 2)

Visual and Cognitive Demands of Using In-Vehicle Infotainment Systems

September 2017

CENTER FOR DRIVING SAFETY & TECHNOLOGY

SEPTEMBER 2017

VISUAL AND COGNITIVE DEMANDS OF USING IN-VEHICLE INFOTAINMENT SYSTEMS

INTRODUCTION

The features of vehicle-based infotainment technology have greatly expanded in recent years, opening up a new array of tasks accessible to motorists while driving. Many of these new functions are unrelated to driving. Examples include voice commands to send a text message, check social media or surf the web. Furthermore, many tasks distract motorists from driving by diverting their eyes and attention from the road and hands from the steering wheel. Yet, surprisingly, little is known about how these interactions may affect a driver's performance when the demands are high.

Given the potential safety concerns, as part of its Center for Driving Safety and Technology, the AAA Foundation for Traffic Safety commissioned the University of Utah to carry out research to address three important questions:

1. Which task is the most demanding to complete while driving: calling/dialing, sending a text message, tuning the radio or programming navigation?
2. What level of demand is associated with completing these tasks using voice commands, touchscreens or other interactive technologies (e.g., buttons, rotary dial, writing pad)?
3. How does demand from these interactions vary across the infotainment systems found in different vehicle makes and models?

KEY FINDINGS

With respect to different types of tasks (calling or dialing, text messaging, tuning the radio or programming navigation):

RESULTS	Implications
<ul style="list-style-type: none">• Overall, navigation was found to be the most demanding task.• Text messaging was associated with a significantly higher level of overall demand than tuning the radio and calling/dialing.	<p>Motorists should:</p> <ul style="list-style-type: none">• Program their navigation system before starting their drive.• Avoid texting while driving even when technology for this purpose is available. <p>Automakers and other industry leaders should:</p> <ul style="list-style-type: none">• Block the ability to program navigation and send text messages while driving.
<ul style="list-style-type: none">• All tasks were associated with higher levels of cognitive (manual) demand.	<p>Motorists should:</p> <ul style="list-style-type: none">• Remember that keeping their hands on the wheel, their eyes on the road and mind on the drive is not necessarily the same as focused driving.
<ul style="list-style-type: none">• The radio tuning and navigation tasks led to higher levels of visual (eyes off road) demand than the calling/dialing and text messaging tasks.• The text messaging and navigation tasks led to significantly longer task completion times than tuning the radio and calling/dialing tasks.	<p>Automakers and other industry leaders should:</p> <ul style="list-style-type: none">• Use enhanced system designs to reduce the visual demand and time required to complete the features accessible to motorists while driving.

Evaluation of IVIS & ADAS (2 of 2)

Next step ...

- Conduct detailed human factors evaluation of ADAS on selected vehicles
- Working with AAA Automotive and AAA Clubs to link ADAS performance & human factors evaluation

Thereafter ...

- Establish partnership with key stakeholders

User Experience of ADAS (1 of 2)

Survey of 1000+ owners of 2016-2017 vehicles with technologies such as

- Adaptive Cruise Control
- Forward Collision Warning
- Automatic Emergency Braking
- Lane Keeping Assist
- Blind Spot Monitoring

In-depth survey to gauge understanding, experiences, ...

In collaboration with University of Iowa

User Experience of ADAS (2 of 2)

Preliminary findings based on a small set of study data,

Confusion/uncertainty/misunderstanding

- Confuse deceleration from ACC with AEB
- ~20% not sure if they have AEB
- >10% not sure if they have Lane Keeping Assist and Rear Cross Traffic Alert

Adaptations

- >50% owners with Blind Spot Monitoring admit changing lanes without looking

➤ Research report in mid-2018

Assess Potential Safety Benefits of ADAS (1 of 2)

>1.4 million lane-departure crashes occur annually in U.S. with 364,000 injuries and 12,000+ deaths

- LDW and Lane Keeping Assist could prevent some

>2 million rear-end crashes occur annually in U.S. with 800,000 injuries and 2,000+ deaths

- FCW and AEB could prevent some

Assess Potential Safety Benefits of ADAS (2 of 2)

Literature review & crash data analysis

- Estimated effectiveness in preventing specific crash types
- Numbers of crashes/injuries/fatalities that could be prevented with FCW, AEB, LDW, Lane Keeping Assist, & Blind Spot Monitor

➤ Research findings in 2018



Forum on the Impact of Vehicle Technologies and Automation on Users

November 7-8, 2017
Salt Lake City, Utah

The Forum on the Impact of Vehicle Technologies & Automation on Users

Co-hosted by the AAA Foundation for Traffic Safety and The University of Utah

November 7-8, 2017

Rice-Eccles Stadium at University of Utah in Salt Lake City.

During this two-day forum, representatives and experts from the research community, government and industry will gather to discuss and identify research needs and direction on the impact of vehicle technologies and automation for drivers and other transportation users. Working together, forum attendees will:

- Develop a living document of research needs to share with other stakeholders to improve coordination and encourage collaboration.
- Identify organizations who may be willing to “adopt” and make future resource commitments in one or more research needs.

Registration is now closed. For late registration, please contact Amanda Neely at aneely@national.aaa.com.

Thank you to our co-sponsors



Research Needs from this Event will be posted –

<https://www.aaafoundation.org/>

2018 & Beyond

Connected & Automated
Vehicles Research on –

User expectations and
acceptance

Impact of Technologies

User experiences



Learn more about AAA Foundation ...
<https://www.aaafoundation.org/>

New website, December 2017!