Driver distraction from in-vehicle telematics devices: The public opinion.

Christina M. Rudin-Brown, Ph.D.
Ergonomics and Crash Avoidance Division
Road Safety and Motor Vehicle Regulation Directorate
Transport Canada

Presented at the 2005 International Conference on Distracted Driving,
Toronto, October 2-5.

Abstract:

"In-vehicle telematics" refers to devices incorporating wireless communications technologies to provide information services, vehicle automation and other functions to drivers. Transport Canada is concerned that in-vehicle telematics devices are a threat to road safety because they can increase driver distraction and cause an increase in distraction-related crashes. This concern is based on a substantial and mounting body of evidence indicating that using these devices impairs driving performance.

In the spring/summer of 2003, Transport Canada engaged the general public in consultations that explored the issue and the potential response/role of the federal government. Public awareness and education campaigns regarding distracted driving were strongly supported, as was the initiation of a non-regulatory, co-operative approach between Transport Canada and industry to limit driver distraction caused by in-vehicle telematics.

Transport Canada is currently negotiating an agreement known as a memorandum of understanding (MOU) with automotive manufacturers, which would deal with the safety of in-vehicle telematics devices. The two main elements of this agreement would be commitments by industry to a) incorporate a safety design and development process, and b) adhere to industry-developed performance guidelines, in telematics' device design and development. The MOU would address safety concerns, be adaptive to continued technological advancement, and not burden the industry unnecessarily.

This document summarizes a presentation that was made during the panel entitled "Legislation, regulation and enforcement for dealing with distracted driving" at the 2005 International Conference on Distracted Driving. For more information, please refer to the document "Strategies for Reducing Driver Distraction from In-Vehicle Telematics Devices: Report on Industry and Public Consulations" (www.tc.gc.ca/roadsafety/tp/tp14409/menu.htm).

Introduction:

New electronic devices, known as "telematics," are becoming more common in vehicles. Through a combination of computing, communications and sensor technologies, telematics offer drivers many new functions. While these technologies may assist drivers and increase productivity, they may also distract them and increase the risk of collision. Transport Canada (TC) is concerned that some telematics devices may be a threat to road safety, and that current efforts by industry may not adequately limit their potential to distract drivers.

While cellular phones are currently the most common type of telematics device used in vehicles, other telematics technologies and applications are entering the automotive market. In-vehicle telematics is a general class of device that features information- and computer-based technologies. Within the category of in-vehicle telematics, a distinction is made between technologies intended to increase driver productivity or support information and entertainment demands (infotainment systems) and technologies intended to support the driver in the performance of the driving task (driver assistance systems). While infotainment systems include navigation systems and a variety of telecommunications devices and services that deliver information and entertainment to drivers (e.g., email, Internet access, and location-based information such as gas stations, restaurants, traffic and weather), driver assistance systems include collision warning, adaptive cruise control, lane departure warning, lane change aides, and parking aides. The distinction between infotainment and assistance systems is becoming increasingly blurred, as telematics functions grow more and more interrelated. While distraction is often cited as a criticism of infotainment systems, the potential for distraction from driver assistance systems is no less important. However, it remains an issue whether these two types of systems should be subject to the same government initiatives intended to limit driver distraction.

In 2003, concurrently with industry consultations, TC used a 'deliberative democracy' methodology to explore public opinion regarding driver distraction from telematics devices and possible solutions. Deliberative democracy, also referred to as deliberative polling, involves recruiting a representative sample of the general public, surveying them to determine their initial views, then bringing them together at a single location. Participants receive balanced information about an issue, question experts, and engage in group discussions before they are polled again. In this way, government obtains the views of well-informed members of the public on a given issue. Using this approach, citizens dialogue not only with government but also amongst themselves and with subject matter experts to arrive at a recommendation on how the government should proceed.

Sixty Canadians chosen from an initial survey sample of over 1500 participated in in-depth focus groups, allowing TC to better understand the public perception regarding in-vehicle telematics, and what the public sees as the most effective type(s) of potential government intervention.

The public consultations used linked quantitative and qualitative research methods to investigate public views of in-vehicle telematics devices and road safety. Specifically, the objectives were to ascertain the public's general views on road safety and driver distraction, and to provide policy guidance to TC's Road Safety Directorate based on the representative and considered views of the general public.

Method and Results:

The public consultations consisted of three components: a public opinion telephone survey, focus group discussions, and a follow-up survey. The following sections describe each phase in more detail, including the most significant findings from each.

1) Public Opinion Telephone Survey. The first phase of the public consultations comprised a short public opinion survey that looked at attitudes towards telematics and road safety. In early May 2003, EKOS Research Associates (Ottawa, ON) conducted a telephone survey of a random sample of 1504 Canadians aged 16 years and older. The data from the survey was statistically weighted by age, gender, and region to ensure that findings were representative of the Canadian population aged 16 and over.

The purpose of this initial survey was to assist TC in the development of potential policy responses to the telematics issue. It also served as a baseline measure for data collected during the next two phases of public consultations (qualitative and post-session survey results from the deliberative democracy sessions). In addition to demographic variables, twelve questions addressed respondents' opinions regarding a variety of road safety issues.

Results. Most respondents (73%) drove on a daily basis, with others driving occasionally (14%), rarely (5%), or never (9%). When asked to rate the severity of various potential threats to traffic safety, 'drivers using cell phones' ranked third (with 53% of respondents rating it as a serious problem) after drunk driving (77%) and speeding (58%). The problem of 'drivers being distracted' ranked fifth (48%) after driver fatigue (50%). On the other hand, while 40% of respondents felt that the problem of drunk driving had improved over the past five years, only 3% thought that driver distraction had improved (63% felt that it had gotten worse *vs.* 22% for drunk driving).

Fifty per cent of respondents reported not being at all familiar with in-vehicle telematics devices, while 9% reported being 'very familiar'. This was a similar ratio to how frequently respondents used a cellular phone while driving, with 49% reporting 'never' and 6% reporting 'during most trips'. Not surprisingly, 83% of respondents agreed with the statement "collisions are the result of drivers not paying enough attention to the road"; 64% thought telematics would make vehicles more dangerous, while only 13% thought they would make vehicles safer. Forty-two per cent felt that it was the drivers themselves who could do the most to reduce the potential dangers associated with telematics devices, followed by the vehicle manufacturers (32%) and government (23%).

With respect to legislative requirements concerning telematics devices, 49% of respondents believed that telematics devices are currently tested to ensure that they are not too distracting for the average driver. Seventy-four per cent thought that the use of handheld cell phones while driving should be banned, while fewer

(47%) agreed with a ban on hands free models. Finally, 35% of respondents thought that imposing tighter restrictions on the types of devices that can be installed in vehicles would be the most effective means of combating driving dangers associated with using telematics devices while driving. Thirty-four per cent thought that laws banning drivers from using certain electronic devices would be most effective. Only 7% thought that allowing industry to develop its own code of conduct regarding telematics devices would be the most effective option.

2) Focus Group Discussions. The qualitative component of the public consultations comprised three deliberative focus group sessions held in Toronto, Montreal, and Calgary in August 2003. A total of 60 people, who had completed the initial telephone survey, participated (20 in each session). The groups' composition matched the larger survey population with respect to gender, age, and beliefs concerning the impact of telematics and their potential impact on road safety.

A ten-page background document that presented the issues to be discussed was provided to participants in advance of the sessions. The document was an abridged version of the Discussion Document that had been published in the Canada Gazette. It contained factual information regarding the issue of driver distraction from in-vehicle telematics, and outlined the regulatory and non-regulatory initiatives that could be used to address the issue.

Two bilingual moderators facilitated the sessions using open-ended questions to generate discussion of the key issues. A TC resource person, with expertise in automotive ergonomics, answered participants' questions. Sessions lasted approximately 3.5 to 4 hours. An overview of the session agenda is presented in Table 1.

Table 1: Session Agenda

ACTIVITY	DURATION
1. *Introduction*	15 min
2. *Preliminary discussion* – Initial views of participants	15 min
3. *Review and discussion of first half of the background document* – Review of the driver distraction issue, telematics, and development of questions	40 min
4. *Question session with resource person*	15 min
5. *Dinner break* – Participants encouraged to continue discussions	20 min
6. *Review and discussion of second half of the background document* – Participants review proposed options, weigh the pros and cons, and develop questions	70 min
7. *Question session with resource person*	15 min
8. *Discussion and selection of recommended options* – Participants decide on a preferred course of action and provide rationale	40 min
9. *Post-discussion survey and wrap-up*	10 min

Sessions were based on alternating plenary and working group segments. The plenary sessions, for which all 20 participants were gathered together, were used to introduce the project, review the agenda and, later, to allow participants to question the resource person. At the conclusion of the focus groups, participants completed a questionnaire that replicated the initial telephone survey and evaluated the consultation process.

Results. Participants expressed general concern regarding other drivers' inability and/or unwillingness to drive safely. Distracted driving was identified as a major and growing threat to road safety. The use of handheld cellular phones while driving was believed to account for a large part of the current distraction problem, and participants thought that the introduction of telematics devices would likely exacerbate the situation.

Most participants were not familiar with telematics devices and relied on the background document and discussion to form their views. Many were surprised that emerging telematics technology could soon allow drivers and passengers to access e-mail, the Internet and a range of other office functions. Based on this understanding, participants concluded that telematics devices were not inherently dangerous. Instead, they saw risks to road safety resulting from how drivers would use (or misuse) the more distracting devices. And, while they saw the proliferation of in-vehicle telematics devices as being "inevitable", they did not want to prevent Canadian drivers from having access to them. Instead, participants focused on finding workable approaches that would limit telematics-related distraction.

It was clear that participants had a good understanding of the relationship between telematics device design, functionality, and potential to distract. For example, many suggested that certain telematics devices, such as location-based services and navigation systems, could be voice-activated to reduce the potential for distraction. They also agreed that the most distracting devices should not be operable in a moving vehicle.

Participants' understanding of the research evidence outlined in the background document appeared to be limited. Drawing more on common sense, they suggested that future safety-related telematics research be conducted by organizations that "are as objective as possible". While government was thought to be more credible than industry, a "neutral third party" (such as a university) was put forth as being most likely to generate credible results. Many participants thought the best option would be a consortium of stakeholders; "That way everyone could keep an eye on everyone else."

Preferred policy options. Participants' initial understanding of the issues suggested that they overestimated the ease with which the federal government could pass and implement regulation; however, they appeared to grasp the main differences among the potential policy options, and what each entailed. The most

difficult policy concept for participants to understand was the "Safety Design Process" (aka 'human factors design process'). Many participants also seemed to find it difficult to consider the design of telematics with levels of federal government involvement in an integrated manner, as indicated by their tendency to describe recommended courses of action without referring to the terminology and concepts outlined in the background document.

Participants' views evolved during the consultations. Generally, they were less likely after the discussions to see the issues in terms of absolute black and white, and more apt to understand that a combination of approaches would be most suitable. Also, it became apparent that adoption of regulation was much more complex and time consuming than participants had initially imagined. Moreover, it appeared that some participants had originally underestimated the level of cooperation and consultation that exists between the federal government and industry. Finally, participants gained a much better understanding of the MOU and Advisory approaches to federal government involvement.

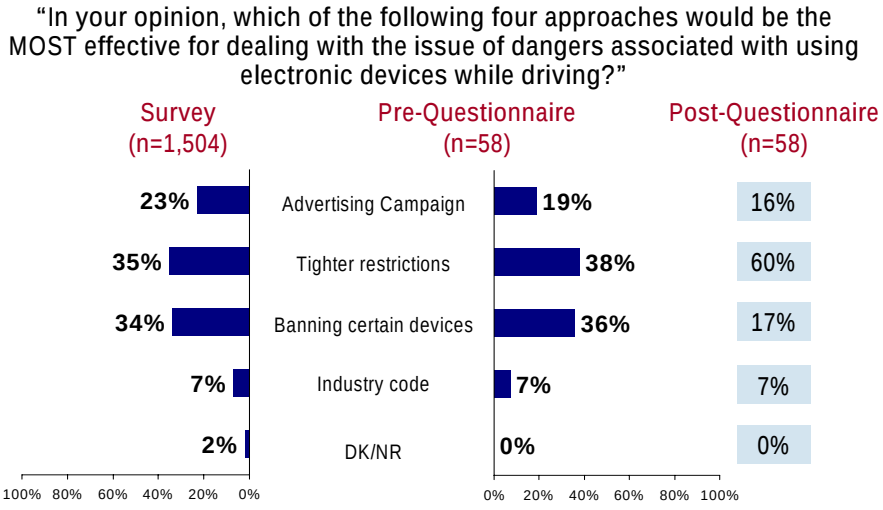
Based on the scientific evidence presented in the background document and their own anecdotal reports of drivers being distracted while using cell phones, participants felt that Canadian drivers could not be relied on to use telematics devices responsibly. Similarly, a purely voluntary, industry-developed approach to telematics safety management was thought to be inadequate. On the other hand, a regulatory approach was felt to be premature, possibly heavy-handed, and likely to be fraught with complications. Participants remained adamant, however, that public safety should in no way be compromised; telematics devices that are found to pose a risk to public safety should either be redesigned to reduce the risk they pose or be made inoperable in a moving car.

Most participants thought that a cooperative approach between government and industry should, at least initially, be adopted. The preferred method was an MOU, which would include safety testing requirements and/or manufacturing criteria and limits to ensure that telematics devices would not pose a threat to public safety. Participants thought that government should closely monitor the industry's adherence to the MOU, and be ready to move to an Advisory if conditions of the MOU were not met. If an Advisory approach also proved unsatisfactory, then legislative action (a regulation) was recommended. In addition to enacting a regulatory or quasi-regulatory approach, participants supported the need for public awareness and education campaigns regarding driver distraction and in-vehicle telematics.

3) Post-discussion questionnaire. The results of the linked (pre- and post-discussion) survey elements are very consistent with the qualitative findings. Whereas the options of "banning certain devices" and "tightening restrictions" were both moderately appealing to participants (and Canadians in general, based on the national telephone survey) prior to their participation in the consultation (36 and 38 per cent, respectively) "banning certain devices" became a much less

attractive option after the focus groups, while “tightening restrictions” became more popular (17 versus 60 per cent; see Figure 1).

Figure 1. Most effective approaches.



Discussion of Ongoing Initiatives:

A number of projects have been initiated as a result of the consultative process. What follows is a summary description of each, including its current status.

1) MOU on Limiting Driver Distraction from In-Vehicle Telematics Devices. The External Advisory Committee on Smart Regulation was established to recommend areas where government can redesign its regulatory approach to be more effective, responsive, cost-efficient, transparent and accountable to Canadians (www.pco-bcp.gc.ca/smartreg-regint/en/index.html). One method suggested by the Committee to help accomplish these goals is to implement alternative regulatory instruments, such as MOUs. With support from both industry and the Canadian public, TC has decided to negotiate an MOU with industry that is intended to limit driver distraction from in-vehicle telematics devices.

In October 2004, a joint industry-government working group was created to develop the key elements of the MOU. To date, four drafts of the MOU have been put forth; however, progress has been slower than expected. The main point of discussion is the definition and introduction of a process-based safety management system for telematics device design and development. An agreement on the terms of the MOU was expected in autumn 2005, however, it now appears that discussions will extend beyond that date.

The MOU on Telematics has been identified by Treasury Board and Privy Council Office as one of Transport Canada's initiatives within the new Smart Regulation framework. This assignment has raised the profile of this initiative and gathered more support within government and industry. Compared to the alternative of regulation, the MOU approach provides for a timelier, more proactive reduction of risks, while preserving innovation and flexibility in product design. It is thus in the interest of all to foster and maintain the momentum required to make this initiative a success.

2) Distraction Awareness and Education. While awareness and education campaigns are reactive, rather than proactive, by nature, they are important tools that can mould public opinion and effect change. One has only to look at successful social marketing campaigns directed at issues such as drunk driving and seat belt use to appreciate their effectiveness (especially when combined with reliable enforcement).

TC is a member of the Canadian Council of Motor Transport Administrators (CCMTA), which, through a collective consultative process, makes decisions on administration and operational matters dealing with licensing, registration and control of Canadian motor vehicle transportation and highway safety. The CCMTA 'Strategy to Reduce Impaired Driving (STRID)' encourages all government jurisdictions "to develop and coordinate enforcement and awareness

programs". TC, with provincial jurisdictions and other groups such as the Canadian Automobile Association (CAA) through the CCMTA, hopes to develop a driver distraction awareness and education campaign. This work would be done within the STRID sub-group on distraction. TC is also providing input to an international conference on driver distraction that will be held in Toronto in October, 2005. This conference, organized by the Traffic Injury Research Foundation (TIRF) and CAA, will cover the problems of driver distraction in general and not just from telematics devices (www.distracteddriving.ca/).

3) Countermeasures for Other Distractions and Aftermarket Devices. Any awareness and/or education campaign directed at driver distraction from in-vehicle devices would also apply to other distractions, both in and outside of the vehicle. As recommended from the comments, TC would also encourage provincial governments to include a section on driver distraction in their driver training curricula, and in their driver's licensing manuals.

With respect to the MOU, TC would encourage all third party aftermarket equipment suppliers to voluntarily agree to follow its terms. If TC eventually moved to regulate telematics devices, aftermarket suppliers would not be required to meet the requirements, as this type of equipment falls under provincial jurisdiction. To preclude this possibility, TC, through its work with the CCMTA, hopes to introduce model legislation that provinces could implement regarding driver distraction caused by the use of in-vehicle aftermarket telematics devices.

4) Research on Distraction Countermeasures and Risks.

a) Evaluation of AAM Principles:

The Alliance of Automobile Manufacturers (AAM) has, since creating a working group in 2000, worked to develop principles intended to address the safety aspects of driver interactions with telematics systems. The "Statement of Principles, Criteria and Verification Procedures on Driver Interactions with Advanced In-Vehicle Information and Communication Systems" contains 24 principles, 18 of which specify information, measurement and/or performance criteria. The document was developed by consensus with industry stakeholders and continues to evolve. As of April 2002, AAM member companies have voluntarily agreed to abide by these guidelines in their design process. Although this initiative promises to improve the safety of these systems, there is some uncertainty as to the level of safety and effectiveness of the AAM procedures and criteria. Thus, there is a need to thoroughly evaluate the AAM's principles and to measure the compliance of current in-vehicle devices to these principles as a benchmark for change.

TC is evaluating four market-available original equipment navigation systems against the Statement of Principles. The purpose is to determine how current vehicles rate on the AAM principles and to collect benchmark data to evaluate

progress in the design of future telematics devices. The evaluation will also focus on the reliability and validity of principles themselves and their verification procedures and criteria.

Similarly, an MOU between TC and industry would require manufacturers to report annually which of their products fall within the scope of the MOU, and which products meet its requirements. Manufacturers would also be required to provide, on a case-by-case basis, clear evidence that their products are in compliance with the requirements of the MOU.

b) Assessing Driver Distraction:

To protect the safety of drivers and other road users, test methods are needed that can identify tasks and devices that place unsafe demands on drivers' attention. TC has an ongoing research program investigating methods for assessing the distraction potential of in-vehicle tasks and devices. The goal is to have standard meaningful, objective and reliable test procedures to identify unsafe levels of distraction.

TC has completed research associated with the European project HASTE (Human Machine Interface And the Safety of Traffic in Europe), the aim of which was to develop methodologies and guidelines for the assessment of in-vehicle information systems. This involved the cooperation of eight partners (7 European and 1 Canadian TC). The final experiments in this 3-year project have been completed and the project will be wrapping up in 2005 with only some final analyses, meetings and reports remaining.

Transport Canada has also been evaluating other test procedures to follow-on from the HASTE research. Two studies were completed in 2005; one using the Lane Change Test (LCT) and the second using the Occlusion Test. The LCT is a relatively simple and low cost standardized test scenario designed for measuring driver distraction. The Occlusion Test measures the amount of visual distraction created by an in-vehicle device. Both the LCT and Occlusion procedures were found to discriminate between different levels of task complexity. Among other studies, there is also a plan to apply the LCT to evaluate speech-user interfaces in vehicles.

TC's research supports the development of international standards (ISO) and harmonized research in the area of driver distraction. Canada currently chairs the International Harmonized Research Activities Working Group (IHRA) on Intelligent Transport Systems (ITS), which was established to coordinate, collaborate and exchange information on research aimed at optimizing the safety performance of ITS. The primary goal of this group is to develop test procedures to assess driver-vehicle interaction as a means for determining the safety potential of ITS. TC also participates in two ISO working groups (ISO TC 22/ SC 13/ WG 8; ISO TC 204/ WG 14), which develop standards relating to the ergonomic

aspects of transport information and control systems, and vehicle warning and control systems, respectively.