

Heavy vehicle driver acceptance of safety applications in a trial of CITS

Vanessa Vecovski^a, John Wall^a, David Elliott^b, Robert McPhedran^b, Paul Tyler^c

^aNSW Centre for Road Safety, Transport for NSW; ^bIpsos Social Research Institute; ^cData 61

Abstract

The Cooperative Intelligent Transport Initiative is the first large-scale permanent deployment of Cooperative Intelligent Transport Systems (CITS) in Australia, and the only one in the world to focus on heavy vehicles. Sixty heavy vehicles and three traffic signals have been fitted with CITS. Participating drivers receive visual and auditory safety messages on an in-vehicle display. Messages include collision avoidance warnings and alerts when exceeding the heavy vehicle speed limit or approaching red traffic signals. In February 2016, qualitative research will be conducted to explore attitudes of participating heavy vehicle drivers towards the technology including acceptability, usability, benefits and concerns.

Background

Cooperative Intelligent Transport Systems (CITS) use Dedicated Short Range Communications (DSRC) to transmit information between vehicles and between vehicles and infrastructure. CITS increases the quality and reliability of information available to drivers about their immediate environment, other vehicles and road users by providing information that may not be directly visible. For example, it can alert drivers of a potential collision, weather or congestion. Anticipated benefits include improved road safety, increased network capacity, reduced congestion and lower vehicle operating costs. The technology is sometimes referred to as connected vehicles.

Transport for NSW has established Australia's first CITS testbed in the Illawarra region of NSW, known as the Cooperative Intelligent Transport Initiative (CITI). This is the world's first CITS testbed dedicated to heavy vehicles. It includes:

- 58 heavy vehicles equipped with CITS, including in-vehicle display of safety alerts
- 3 traffic signals equipped with CITS, broadcasting signal phase information to equipped vehicles
- 1 portable roadside unit broadcasting speed limit information to equipped vehicles
- 2 portable roadside units receiving and collecting data from equipped vehicles.

The CITS technology installed in the 60 heavy vehicles allows them to communicate with other equipped vehicles and with CITS-equipped infrastructure. Each heavy vehicle is fitted with a DSRC Radio and DSRC antennas, GPS and a 7-inch in-vehicle audiovisual display. Drivers receive the following messages: forward collision warning, intersection collision warning, heavy braking ahead alert, red signal phase alert and truck speed limit information. Over time, more alerts will be added.

Method

The 60 heavy vehicles and 150 drivers participating in the initiative are from three transport companies operating in the Illawarra. The vehicles operate 24 hours a day, 7 days a week. A comprehensive driver induction package was delivered to all drivers prior to the installation of the CITI device. Installation began in February 2015 and was completed in September 2015.

Transport for NSW has commissioned Ipsos Social Research Institute to undertake qualitative research to explore attitudes of participating drivers towards the CITI device including acceptability, usability, benefits and concerns. The research includes in-depth interviews with the fleet managers from each company and group discussions with heavy vehicle drivers. Key areas of

exploration include past and current driving behaviour; driver understanding of the device and technology; feedback on device usage; and perceived impact on attitudes and behaviours.

Results

The results of the research are not available at the time of writing. They will be provided in the full submission.

Potential implications

The results of the research may influence changes to the design of the Human Machine Interface (HMI), including the frequency of alerts, visual display and audible sounds. The research may also inform the types of safety applications introduced in the next phase of the initiative.

The emergence of increased automation and driver assistance systems raises questions about the changing role of the driver. This research will add to our understanding on the potential impacts on driver behaviour and safety of providing visual and auditory warnings on an in-vehicle display.