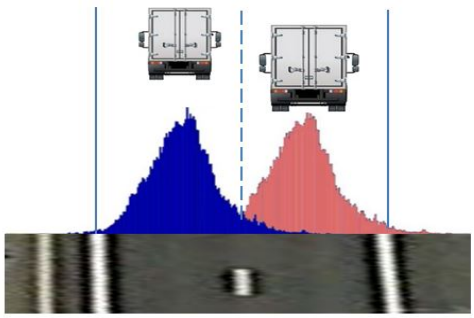
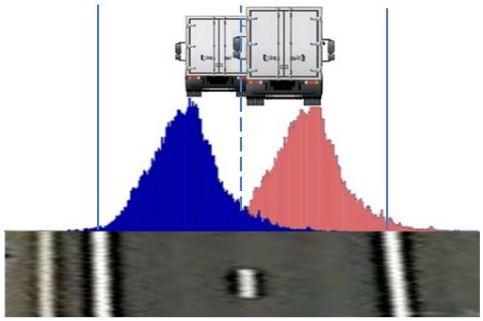
Cooperative Intelligent Transport Initiative
Limitations - Position accuracy

False alerts reported by drivers

Participating heavy vehicle drivers found a large number of false positives for the forward collision alert. A forward collision alert is issued to warn a driver about an imminent nose-to-tail collision. The alert is only seen by the driver in the rear vehicle. Drivers reported seeing this alert in cases where there was no vehicle directly in front of them.

Analyses of position accuracy

After investigating the data from the trial, researchers determined that drivers were experiencing false forward collision alerts due to imprecise GPS positioning. The C-ITS system uses GPS to determine a vehicle's position. Two separate, independent, scientific analyses were undertaken on samples of data taken from the trucks participating in CITI. They found that the GPS position calculated for the truck can be several metres inaccurate.

	
The blue and red lines on the histogram show a collection of all the GPS readings taken for two trucks travelling in adjacent lanes, on a particular point on a road. Most of those readings place the vehicles in the centre of their respective lanes. But some readings are well out to the left or right.	In this image, the GPS readings are 1-2 metres inaccurate. The trucks are travelling in adjacent lanes, but the C-ITS device analyses the GPS readings and incorrectly determines the trucks are on a collision path. The driver in the rear would receive a forward collision alert, even though the trucks are not going to collide.

Limitations of GPS

Typical GPS positions contain errors that may result from satellite position drift, signal blockages (trees, buildings, etc.), reflections (off buildings, rock faces, etc.), atmospheric conditions affecting the signal path, and other factors. The cumulative effect of these errors means GPS positions may be more than several metres from the true position.

Potential solutions

A potential solution to this dilemma may lie in improved accuracy of the GPS location. Methods available to improve GPS location accuracy often involve complex post-processing of the satellite signal.

Another method is to use a **Satellite Based Augmentation System (SBAS)**, which uses space-based and ground-based infrastructure to improve the accuracy, integrity and availability of basic satellite navigation and positioning system signals. SBAS have already been developed internationally including WAAS in the United States and EGNOS in Europe.

GeoScience Australia is running a two-year trial of SBAS in Australia and New Zealand commencing late 2017. Transport for NSW has submitted a proposal to GeoScience to participate in the SBAS trial. According to Geoscience Australia, SBAS may be able to provide GPS positioning that is accurate to within a few decimetres for everyday users and to within a few centimetres for high-end system users. With improved positioning, the number of false positive alerts given by the C-ITS system should reduce substantially, making it a more reliable and effective road safety device. The SBAS trial will help determine if improved position accuracy can be achieved.

The Geoscience Australia website has more information on satellite based augmentation systems.

Further information

Email: CITI.Support@transport.nsw.gov.au