

## Connected vehicle solutions for safer roadworks

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### Abstract

One of the major anticipated benefits from Connected and Automated Vehicles (CAVs) is improved road safety. Limited access motorways ought to provide a simpler environment for adoption of these vehicles. Despite operating at high speed, there should be fewer complications from factors such as traffic lights, pedestrians, cyclists and oncoming traffic. It will be important to ensure that these vehicles will not only be able to safely drive in typical motorway conditions, but will also be able to handle atypical situations such as incidents and roadworks.

To ensure the safety of the 10,000 people currently working on Transurban projects to build new roads and more lanes across the country, as well as their continued safety in a future road environment with CAVs, Transurban is conducting a series of trials and developments focused on work zone safety, together with key partners.

### Background

In the long-term, we hope that detailed, real-time data about atypical scenarios such as work zones and incidents could give CAVs enough situational awareness to allow them to safely navigate through these locations, perhaps more safely than human drivers would.

It will be some time before vehicles with these capabilities are driving on our roads in significant numbers. In the meantime, road workers close to live traffic are vulnerable to errant vehicles. Transurban and our partners are exploring solutions that could improve today's safety issues using existing technologies.

### Robo-cones and wearables trial

Transurban identified Telstra as a partner with a strong interest and capability in connected vehicle communications, and jointly conducted a proof of concept to test the technical viability of various work zone safety solutions.

Ultimately, our aim is to provide more detailed work zone information to CAVs and given that today's vehicles are driven by people, we considered if and how we could notify drivers who were about to stray into work zones. We quickly concluded this would have limited value, with most work zone incursions or near misses emanating from drivers who appear to be distracted/impaired or even intentionally entering a work zone.

Instead, we conducted a Proof of Concept (POC) to test technologies that could reduce the need for workers to operate close to live traffic and detect if workers were in danger from approaching vehicles and then alert those workers..

The POC confirmed the feasibility of some elements of a work zone safety solution, including

- robotic traffic cones that could be deployed remotely from a safe location, reducing workers' exposure to live traffic
- sensors on traffic cones to detect vehicles entering (or about to enter) a static work zone
- wearable devices to alert workers through sound, light and vibration
- smart rumble strips

Other elements were also explored but considered premature, or required further testing, such as

- definition of a work zone perimeter, and positioning of workers to confirm if they were within the correct zone
- automatic detection of (likely) errant vehicles approaching the work zone from further up the road

Following this POC, selected elements considered most relevant for management of roadworks and incidents on Transurban motorways were developed further and are now undergoing on-road tests and trials. These will be taking place periodically from July to November 2019, with interim results to be shared at the conference.

### **Automated TMA development**

A different form of worker exposure to errant vehicles in roadworks comes from drivers of truck mounted attenuators (TMAs) that provide a collision buffer between the workers and traffic approaching from behind. Although the TMAs are designed to absorb a crash and to protect workers if a vehicle fails to move out of the roadworks lane(s), the TMA driver is still at risk.

To reduce these risks, Transurban is working with the Virginia Department of Transportation (VDOT), Virginia Tech Transportation Institute (VTTI), and DBi Services to develop a TMA that can operate autonomously, removing the need for a driver to sit within the vehicle. Development and testing of the technology will take place over the coming year at VTTI's Blacksburg, Virginia campus, with trials to take place on their Virginia Smart Road closed test-bed research facility.

### **Conclusion**

This presentation will focus on the process undertaken from ideation, concept development, proof of concept testing, pilots and trials, and our associated learnings.

### **About Transurban**

Transurban builds and operates roads in Australia, the USA and Canada. Our vision is to strengthen communities through transport and our road safety strategic framework is underpinned by the safe system approach. Transurban reports on its road safety KPIs, including the rate of injury crashes, and commissions independent research and analysis to inform our operations provide a safe environment for people using our network.