# Connected Cooperative Intelligent Transport Systems

## ITS Australia Position Paper

October 2023

# Executive Summary

Over the past 15+ years, steady progress has been made across the globe to develop standards and demonstrate the benefits of connected vehicle technologies. Connected vehicle technologies are broadly understood to be the next wave of interventions that will substantially improve safety and efficiency outcomes for road transport. In Australia there has been some good progress with a number of pilots and trials and policy actions.

ITS Australia supports the advancement of connected and cooperative ITS technology and see the appropriate deployment of the technology as a pathway to provide safer, more efficient and more sustainable transport.

As confirmed through pilot projects, C-ITS offers proven and substantial benefits to today's drivers and the community as a whole. Two key trends in ITS pervade most parts of modern life with the expectation of being connected and receiving information in near real time.

Not only that it is possible but that users really value the information and make different decisions when they trust the information. So this discussion on C-ITS isn't about will it happen it should be about how do we collectively make it happen as soon as we can to realise the benefits.

There is currently large investment in the development and delivery of major transport infrastructure and ITS Australia there is an imperative to ensure both the design and construction of these major roads, rail networks, and light rail systems, and other transport developments be built for the future.

ITS Australia strongly endorse the following activities to ensure a nationally harmonised approach to the application of these vial technologies:

1. Nationally consistent C-ITS environment with the aim of supporting a seamless experience for road users across Australia
2. Ensuring the full benefit of C-ITS can be utilised by enabling vehicles to vehicle communication as well as including devices used by connected infrastructure and vulnerable road users
3. Collaborating across government, industry, academia and the community
4. Leveraging international experience and maximising customer choice
5. Focusing on improving road safety, transport productivity, sustainability and reducing emissions
6. Guaranteeing data sharing arrangements are secure and ensure the privacy of all users

# Pathways and benefits of a connected and cooperative mobility future

This integrated development of digital engineering is necessary from the early planning and design stages through to construction and implementation of effective asset management systems. Intelligent Transport Systems need to be built into all stages of transport infrastructure delivery to ensure we build for the networks of tomorrow. This includes the physical and digital infrastructure, to enable emerging and future technologies for safety, security, connectivity and multi-modality.

The potential for these new and emerging data sources to contribute to existing network control practices, particularly signalised intersections, present opportunities to improve traffic movement and reduce congestion. Traffic signal control management could be more effectively optimised utilising traffic probe features transmitted from modern vehicles in real time.  Such use of data is also critical to an on-going drive to improve safety in and around intersections – not only for personal vehicles but also for vulnerable road users, public transport service vehicles and freight vehicles.

Probe data that is generated by monitoring the position of individual vehicles provides an opportunity to collect, analyse, and model real-time user-centric data.

There are two main areas of focus: improving safety -- reducing the road toll 'towards zero' and improving efficiency in the transport network. These are achieved across use cases of varying difficulty across four domains of traffic management: incident management, intersection management, network and freeway management, and micromobility management. In addition, emerging data was also identified to have the potential to support longer-term transport infrastructure planning applications.

Numerous existing and emerging datasets and technology could support improving transport network operations management. This includes probe data as well as other infrastructure-based technology solutions such as camera-based video analytics. There is a desire for data sources to not only capture probe data for motorised vehicles, but also include information on other modes including micromobility, active transport, and pedestrians. Integrating new data has the potential to support use cases such as:

- Congestion performance measurement
- Historical pattern database development
- Supporting heavy vehicle movements
- Demand management and congestion charging
- Speed compliance enforcement
- Machine learning operations
- Vehicle priority and pre-emption system
- Improved coordinated corridors

There are numerous datasets that could be integrated with existing systems to support improvements in transport operations management. However, stakeholders have identified challenges around this integration:

- Privacy and security management is critical to ensure trust and reliability of data.
- The existing traffic control system needs to be developed to accept the new data.
- Complex algorithms and analysis is not yet proven on large scale.
- Prediction and simulation models do not always reflect real-world scenarios.
- Deployment of use cases is constrained by existing telecommunications infrastructure.
- Some use cases will be constrained by cost, with particular concern around economic pricing models used by data providers to deliver data in a useable format.
- Agreement across agencies and across jurisdictions is required.
- There are inherent biases within alternative data sources.
- Some datasets are constrained in their ability to provide high accuracy information on location and speed.
- Datasets come at different levels of granularity.

These cutting-edge digital communication technologies will allow cars to interpret their surroundings and alert drivers to potential hazards intelligently. In 2020 ITS Australia with research partners University of Melbourne and key government agencies published a report Investigating pathways to deliver road safety and network efficiency benefits through connected technologies which revealed that these technologies can reduce vehicle crashes by up to 78 per cent, dramatically reducing road trauma and the death toll.

With the recent AAA December 2022 report benchmarking the performance of the national road safety strategy showing road deaths increased by 9.3% in Q3 2022 these connected technologies are increasingly necessary to improve safety outcomes on Australian roads and supporting government goals.

It is essential to progress rapidly due to the clear safety, efficiency, sustainability and accessibility benefits that align with government objectives. Harmonisation requires national leadership and active collaboration across borders and with industry, academia and the wider community a recommended course of action building on the principles would be establishing frameworks and working groups around key areas.

Reflecting on the successful C-Roads model and aligned to the European principles these collaborative working groups could include:

- Organisational and business models
- Technical aspects
- Security, equity and privacy
- Cross-border evaluation

Building base level infrastructure and certainty around a national strategic direction will allow the sector to develop and market products and platforms that can be supported in an acceptable product lifecycle. The C-IT Principles recently drafted by the Australian Government are a positive first step in building this confidence. Commitment to ongoing engagement across the sector and support of existing consultation processes such as NTC's Vehicle Data Working Group is key this includes the importance of public facing engagement to raise awareness and interest for potential C-ITS applications to build trust and drive demand

ITS Australia commits to continue working with government at all levels, industry and the Australian community to deliver an evidence based and collaborative pathway to building an ecosystem for these vital technologies.

There are important elements that require national architecture and development to enable "no regrets" investment as part of the current physical infrastructure projects and building some of the "digital components" that are platform agnostic. These include, but are not limited to:

- Suitable communications
- Highly accurate mapping
- Highly accurate positioning capability
- Security by design
- Capability for handling large volumes of data with capacity to share in real time
- Digital twin for virtual asset management
- Edge devices

ITS Australia is a membership based peak body representing Australian industry, government and research organisations in promoting Intelligent Transport Systems initiatives. We are a peak body that serves the interests of our members in Australia and globally. We represent the Australian ITS sector within Australia and Australian ITS interests internationally.

As such we recognise the importance of these technologies and work with our members and the wider community to ensure safe and responsible development and deployment of these potentially life-changing transport innovations.

With more than 1,200 people dying and over 30,000 people being seriously injured each year on Australia's roads, the only long-term goal we can have is for zero fatal and serious injuries. To that end, we believe connected and cooperative Intelligent Transport Systems are some of the key safety initiatives to achieving that ambitious goal. C-ITS could address some of the key priorities by improving safety for road users, heavy vehicles, regional road users and vulnerable road users.

The safety of our citizens is paramount and driver assistance technologies are clearly saving lives on our roads now. Emerging and future technologies will in our view provide enhanced in-vehicle safety, however the deployment of these technologies needs government consideration and oversight. Industry is keen to work with government to best deliver these life-saving technologies, and ITS Australia is well placed to facilitate these discussions.