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## **Response to Draft Principles for a National approach to Co-operative Intelligent Transport Systems (C-ITS) in Australia**

### **iMOVE Australia**

iMOVE Australia operates the iMOVE Co-operative Research Centre (iMOVE CRC) which is Australia's leading facilitator of innovation in the transport sector. It assists its industry and government partners to develop, adapt and adopt emerging technologies that will improve the movement of people and goods in Australia.

Since its formation in 2017, iMOVE has been strongly engaged with the conduct of projects to develop and trial numerous aspects of Co-operative Intelligent Transport Systems (C-ITS). C-ITS projects that iMOVE has directly supported include:

- 1-002 Cooperative Intelligent Transport Systems (C-ITS) Pilot - Field Operational Test (FOT) and Evaluation
- 1-005 Cooperative Intelligent Transport Systems (C-ITS) Pilot - Security Credential Management System (SCMS) Evaluation and Research
- 1-006 Cooperative Perception
- 1-012 Safely introducing Connected and Automated Vehicles into integrated transport networks
- 1-013 Connected, Autonomous, Electric and Shared Vehicle Industry Ecosystem Mapping Project
- 1-017 Putting the Connectivity in C-ITS - Investigating pathways to accelerate the uptake of road safety and efficiency technologies
- 1-049 Evaluating 5G productivity uses in transport
- 1-060 Integrated connected data for safer more efficient traffic management operations
- 1-063 Development and Demonstration of Cooperative Intelligent Transport Systems (C-ITS) on NSW Roads
- 3-015 Promoting Community Readiness and Uptake of Connected and Automated Vehicles
- 3-016 Light Insight Trial (LiT)
- 3-025 Fully Integrated and Strategic Approach to Parking Management for Smart, Connected Brisbane Framework (Brisbane City Council)
- 5-004 Interactions between Autonomous vehicles and pedestrians
- 5-009 Signal control optimisation with connected and autonomous vehicles considering vulnerable road users



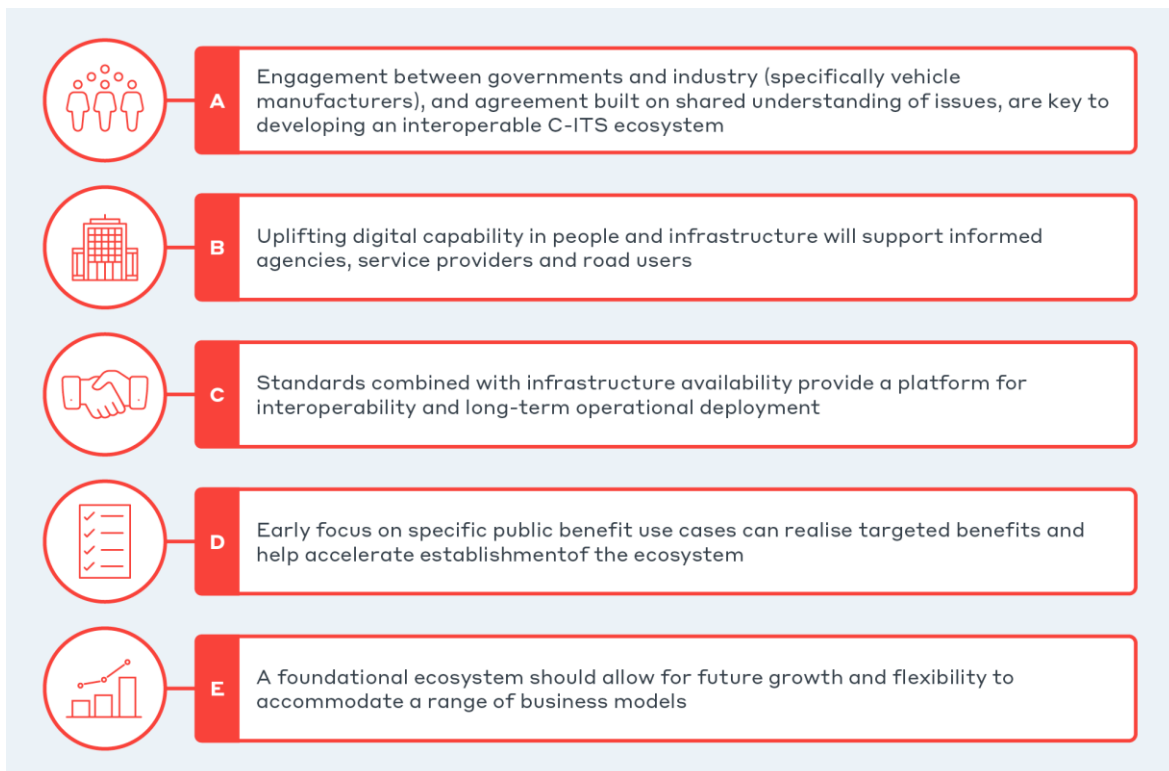
iMOVE appreciates the opportunity from the Department of Infrastructure, Transport, Regional Development and Communications and the Arts (DITRDCA), to comment on the proposed Principles for a National Approach to C-ITS.

## 1 Principles

*Are principles for a national approach to C-ITS in Australia necessary? And if so, are the draft principles, as articulated, sufficient to inform investment by industry in C-ITS?*

iMOVE strongly supports the establishment of principles to guide the design and implementation of C-ITS in Australia. C-ITS deployment in Australia requires co-operation from numerous governments and organisations, all of whom are independent of one another. To secure co-ordinated actions from this group requires 'buy-in' from all parties, and this typically requires them to appreciate and accept the rationale for a concerted national effort.

iMOVE endorses the five principles that have been articulated by the Department and are illustrated in the figure below:





iMOVE proposes that those five principles could benefit from the addition of an opening contextual statement to provide linkage back to other, foundational government objectives. For example:

Co-operative Intelligent Transport Systems (C-ITS) encompass a suite of technologies, the collective purpose of which is to improve the flow of information to human and automated decision makers in our road network (including drivers and network managers). C-ITS is being deployed to advance the delivery of multiple government objectives including:

- Reducing the number of road accidents
- Reducing the number of fatalities on the road network
- Reducing the emission of greenhouse gases from road transport activity
- Smoothing the flow of traffic
- Maximising the available capacity and network productivity from existing infrastructure
- Safely facilitating the passage of emergency and public transport vehicles
- Contributing an evidence base to support further investments in infrastructure (for risk reduction or capacity expansion)
- Effective management of emergencies and crises

iMOVE observes that there are aspects of C-ITS deployment that may warrant the expression of some additional principles.

Our suggestions for additional principles are:

#### Trust and Reliability

Decision makers (drivers and network managers) and the community generally will only benefit from the deployment of C-ITS if the information it provides is trustworthy and reliable. Therefore,

*The Australian C-ITS system will adopt and comply nationally with agreed performance standards in relation to:*

*Timeliness of information availability (ie message latency is 'fit for purpose', new data is made available in a timely manner)*

*Accuracy of information shared (data is curated and cleansed to minimise noise and false alerts)*

*System reliability (system uptime, readiness, accessibility, redundancy)*

*User expectations are managed (boundaries of service availability are known and shared)*

*Information flows are protected from interference (cybersecure)*

*We note that existing standards for C-ITS message delivery already incorporate aspects of reliability performance.*



### Governance of system and data

The number and diversity of stakeholders in the deployment and use of Australia's C-ITS system will be very large. To derive the full benefit from these technologies requires all stakeholders to have confidence that the system operates with fairness, and appropriate transparency. At the same time the system and its users must comply with the Privacy Act and must be protected from corrupt, inappropriate and malevolent use of data and information. Therefore:

*The national government will take the lead in establishing a cross-sectional working group the purpose of which is to define which aspects of the C-ITS system are 'national' in scope, and to establish the governance framework (which could involve either a new or existing entity) by which those 'national aspects' will be overseen.*

*Some aspects that may be judged to be 'national' in scope are:*

- *Establishment of the matrix of governance and responsibility across the set of relevant stakeholders.*
- *Maintenance and updating of the Australian C-ITS standards (albeit that these standards will be derived from international standards)*
- *Articulation and assertion of the Australian C-ITS standards (including system performance standards, and cyber security standards)*
- *Procurement of those aspects of the C-ITS system that are deemed to be 'national' in scope (eg national database of hazard information for 'long range' driver alerts, national security credential management system)*
- *Establishing clarity as to what data is personal and private (and subject to the Privacy Act), what data is proprietary to commercial interests, and what data is public.*
- *Establishing appropriate data architectures and data access regimes for the different data types at the participating organisations*

*All parties with responsibility for system delivery will conform to the governance framework that is established.*

## **2 iMOVE future involvement in C-ITS**

*Over the next 5 years, to what extent does your organisation anticipate moving into a C-ITS role or increasing its involvement in C-ITS?*



iMOVE has a unique set of capabilities in the ITS space:

- It specialises in the formation and execution of multiparty co-operative projects.
- It has undertaken numerous projects in the ITS space.
- It has a good understanding of the complexities of the ITS situation in Australia and overseas.
- iMOVE enjoys close working relationships with most of the key stakeholders in the Australian ITS ecosystem, including the Department of Infrastructure and the State Departments of Transport, but is not beholden to any one of them.
- Through the iMOVE Co-operative Research Centre, it can contribute resources to further research into ITS and ITS deployment.

In pursuit of its objective *to advance the development and adoption of technologies that improve Australia's transport systems*, iMOVE aspires to continue its involvement in C-ITS. It anticipates:

- Undertaking additional applied research projects
- Undertaking trials of novel technology configurations
- Sharing the learnings from past ITS projects (including the TMR Ipswich trial)
- Facilitating capability development and training at participating organisations
- Assisting to define the structure of the hybrid comms system (long range + short range)
- Assisting to trial and refine the deployment plan for whichever technologies are ultimately selected.
- Assisting the jurisdictions to each develop their capabilities to participate in the national ITS system.

iMOVE also observes that the corporate structure that underpins iMOVE (independently funded, politically neutral, not-for-profit, company-limited by guarantee) could be relevant for the body that becomes responsible for oversighting the national C-ITS system. iMOVE is willing to contribute its multistakeholder governance experience to the formation of the national C-ITS system. It is also willing to act as 'interim host' for the national system if that is required.

### **3 C-ITS interaction other vehicle connectivity systems in Australia**

*How might C-ITS impact other vehicle connectivity systems in Australia, including vehicle/OEM connectivity, vehicle/cloud connectivity, heavy vehicle telematics systems, mapping systems, etc?*

If we accept that the purpose of C-ITS is to improve the flow of information and decision making by road users and managers, then we can view C-ITS as a system of systems. Some of the subsystems already exist and are operated (commercially) by third parties. Each of the existing systems was









established to improve the flow of particular types of information and facilitates particular types of decision. Therefore, when C-ITS is implemented, it would be preferable for it to operate in a way that is 'co-operative' with the existing systems. It will also be important for the C-ITS system to have a relatively open architecture that interfaces with third party systems and enables them to continue to innovate their products and services.

iMOVE contends that the range of ITS use cases, and the range of information flows to drivers and network managers, requires a diversity of message specifications. Some safety critical applications require low latency, high reliability, and high visibility to the decision maker, whilst others can be delivered with lower performance requirements. We recommend that the use cases be grouped according to their performance specifications. The following picture (taken from a presentation by the US DOT) illustrates the different performance specifications that accompany some groups of use cases.

**"WHEN" you need information drives "HOW" to get it**

When?	As Convenient	Pretty Soon	Soon	Now	Right Now!!
Timescale	Hours +	Minutes	5 - 60 secs.	0.5 - 5 secs.	< 0.5 secs.
How?	<ul style="list-style-type: none"> <li>Internet Protocol (IP) suitable</li> <li>"Apps.", many other options</li> <li>Opportunistically leverage available, uncongested spectrum</li> </ul>			"Either/Or"	Customized Low-Latency Protocol

ITS / V2X Communications U.S. Department of Transportation



On the expectation that implementation of each group of use cases will require some level of investment in public infrastructure, it will become incumbent on the federal government to lead the discussion to resolve which use cases are implemented across the nation and in what time frame.

For a particular group there may be multiple delivery technology options. If the technology options are fully independent, then it is likely that market forces will resolve the choice of technology. For the less demanding use cases it is likely that existing systems may already be contributing to the solution. They should be encouraged to continue and to progressively improve their systems.

However, if amongst the options one technology interferes with, or precludes the use of another (as is the case with C-V2X and DSRC), it will be incumbent on the federal government to define the implementation path that Australia will follow.

#### ***4 Structures required to support the development of an Australian C-ITS system***

*The draft Principles include a focus on cooperation across industry, government, the research sector, and the community: what structures would be necessary to support the development of an Australian C-ITS system?*

There is strong support for the contention that Australia's C-ITS system should be universal and homogeneous. It is accepted that the choice of functionality to be deployed will depend on local geographic circumstances, however the way the functionality operates, and the community's experience of that functionality should be the same wherever it is deployed.

In that sense, the development of a national C-ITS system requires the establishment of a national framework that sits on top of, and interacts with the relevant systems in all jurisdictions. Therefore, structures will be required for both governance and operation of this national system. Because those structures will have a material interaction with the corresponding jurisdictional systems, the jurisdictions will need to contribute to their design and governance.

The following list contains examples of structures that we expect will be required:

##### Operational structures

- A portal to access, interpret and explain the standards that Australia agrees to adopt
- A national data base of road hazard information
  - Able to be accessed by connected vehicles and vendors of relevant apps and navigation tools
  - Hosted in an Australian based 'cloud'





- Automated, timely, reliable uplift of relevant local and jurisdictional information to the cloud
- Good connectivity coverage over Australia's road network

#### Governance structures

- National, neutral, federally-funded, stakeholder-engaged, governance body to:
  - maintain and assert the agreed standards (including system performance standards),
  - 'Own' the database (but not the data)
  - Build and manage system security (possibly be holder of the public key for the SCMS)

### **5 Next steps/ path forward**

*After the Principles, what next steps do you think would be most productive?*

- 1 Establish a common understanding of:
  - i. the intended total scope of the Australian C-ITS system (once fully deployed)
  - ii. the various components that will make up the Australian C-ITS system.
- 2 Identify what parts can be implemented 'immediately' and what parts have to be deferred pending resolution of technological, financial, or policy impediments. Establish priorities.
- 3 On buy-in from the jurisdictions and other relevant stakeholders to the prioritised use cases, develop an **action and investment plan for the agreed activity**.
- 4 Establish and resource the system governance body/ structure. Resolve who (governance body/ jurisdictions/others) will be responsible for which actions on the action plan.
- 5 Make such choices as are required for the initial infrastructure deployment and encourage OEM's, and where relevant, Telco's, to follow.
- 6 Create an operational and funding plan (Commonwealth and jurisdictions) and secure the funding to implement the initial **action and investment plan**.
- 7 Start implementing and commissioning.

iMOVE Australia Ltd

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