18 European countries are currently in the stage of large-scale deployment of C-ITS services and the related infrastructure undertaken under the umbrella of the C-Roads Platform. By doing so, we are as well following the deployment activities outside of Europe with great interest. Therefore, we take the freedom to answer the open consultation on the Australian Draft Principles for National Approach to Cooperative Intelligent Transport Systems.

C-ITS is already today in a deployment stage across Europe. The European C-Roads Platform members are deploying C-ITS services by using a hybrid communication mix, where C-ITS services are made available via several communication channels including in a first step ITS-G5 short range and cellular long-range. Several C-Roads Platform members are rolling out C-ITS based on ITS-G5, others are following a cellular long-range strategy. In future, in all European C-Roads Platform member countries C-ITS services using the hybrid communication mix will be available; additional communication channels might be added. In total 18 European countries and more than 50 cities are committed to this approach.

In parallel, the automotive sector has started deploying C-ITS services using as well ITS-G5/cellular long-range technology. All European C-ITS deployments are the result of close cooperation between OEMs (covered by the work in the Car-2-Car Communication Consortium – C2C CC) and road operators/road authorities (represented by the C-Roads Platform).

The technology choices by the C-Roads Platform members are based on rigorous requirements, rather than selecting a single technology. The goal is an interoperable and backward compatible C-ITS environment that allows any technology into the market that allows all vehicles to communicate amongst each other and with infrastructure. So far, ITS-G5 is seen as the only commercially available short-range technology supplemented by long-range communication technologies fulfilling these criteria, whilst we are closely following the efforts of other short-range communication technologies to meet the requirements.

Please find our point of view to your five questions regarding C-ITS principles.

1. **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?**

Guiding principles form the basis for cooperative ITS (C-ITS) service deployment. Hereby technology always shall be seen as enabler, but deployment decisions should be done on a use-case basis. In Europe, before discussing technology use-cases have been identified and piloted by using available communication technologies. Based on these learnings deployment decisions have been made.

Such Guiding Principles are as well necessary to ensure a C-ITS contribution to the policy goals, which are road safety, efficiency and limitation of the environmental impact. Of course, sustainability by ensuring the contribution to future developments, e.g. in the area of automated driving, needs to be envisaged as well. When it comes to technology decisions, C-Roads has formulated following basic principles:

- Interoperability is a must: It is unacceptable that people would die on European roads because vehicles cannot "speak" to each other or implemented roadside units due to non-interoperable communication systems (e.g. non-interoperability of ITS-G5 and LTE-V2X).
- Furthermore, C-Roads Member States are committed to the "backwards compatibility" criteria in the technological evolution: New C-ITS equipment beyond Day-1 needs to support and safeguard already deployed C-ITS services.

- Communication technologies used need to ensure <u>non-inference with existing systems</u>. This is especially for European electronic tolling systems that sometimes work in the 5.8 GHz frequency band a crucial element.
- Road authorities should <u>not be forced</u> to equip the roadside with two or more competing technologies (ITS-G5, LTE-V2X, or potential future technologies) serving the same use cases or providing the same content to road users.
- And road authorities need to have the choice how to provide connectivity via a <u>hybrid communication</u> approach, including all suitable communication networks to vehicles also in the future.

2. 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?

C-Roads is the infrastructure and authority driven organisation for C-ITS deployment across Europe. The "harmonized C-ITS specifications" are public available and are forming the basis for all infrastructure based deployments within 18 European Member States. These "harmonized C-ITS specifications" are covering Day 1 C-ITS safety services as well as Day 1.5 C-ITS services.

CAR 2 CAR Communication Consortium (C2C-CC) is one of the driving organizations for C-ITS deployment. Its C-ITS Basic System Profile (BSP) is the bases for European interoperability and backward compatibility. The BSP is openly available for realization of Day 1 C-ITS safety services and is based on ETSI and ISO/CEN standards. It is operational and C2C-CC has an operational process to maintain the quality and to resolve issues when found in the field.

C2C-CC as well as C-Roads are currently working on extending the BSP as well as "harmonized C-ITS specifications" to support Day 2 and beyond services for future deployment.

3. How might C-ITS impact other vehicle connectivity systems in Australia, including vehicle/original equipment manufacturer (OEM) connectivity, vehicle/cloud connectivity, heavy vehicle telematics systems, mapping systems, etc?

We believe that the future will be in the hybrid communication mix – using all available technologies for infrastructure to vehicle connection. However, more important than the connectivity is the willingness to cooperate based on clear defined use-cases, to be prepared to exchange data between public and private stakeholders to make European roads safer and more sustainable.

The hybrid communication mix is hereby using short range communication and long range communication, which complement each other and have both their unique role in C-ITS. While short-range communication is a direct and fast communication technology to be used especially in hot spots, long-range communication technologies enable the informed traveler all across the European road network. We cannot expect that the whole road network will be equipped with short range technologies, insofar both communication channels need to complement each other. This hybrid communication approach is applied in the harmonised communication profile of C-Roads, which is public available.

4. 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?

A central security Private Key Infrastructure (PKI) for Australia would be necessary and run by a neutral party to avoid a conflict of interest and facilitate cooperation between automotive OEM and road operators. As example the European PKI could be used as reference.

In addition, governance structure need to be established to enable a closer cooperation between OEMs and road authorities. Only a mutual understanding will at the end lead to successful deployments. In Europe this governance structure is given by C-Roads and the C2C CC. Here cooperation meetings are taking place on a biweekly basis, which means strong commitments of all involved parties.

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

As you know, European Transport Ministries representing Member States all across Europe are members of the C-Roads Platform. In addition, Transport Ministries outside Europe are invited to become partner in the C-Roads Platform. Currently Austroads is one of the C-Roads platform partners enabling participation of Australian authorities in C-Roads Platform activities.

In the C-Roads Platform a huge variety of C-ITS use cases are elaborated with referenced standards and detailed specifications and triggering conditions to ensure interoperability and backward compatibility today and in the future for vehicle-to-infrastructure communication. For the vehicle-to-vehicle communication, a participation in C2C CC can be envisaged (where as well first European Road Operators are members). Joining C2C-CC or C-Roads as a member not only provides the advantage of introducing Australian needs to the discussion and hence to the specifications, but also provides access to a large network of long time C-ITS experts of many different stakeholder groups.