A co-operative effort

Are we getting close to true road services interoperability, ask **Jorge Alfonso** and **Prof. José Manuel Menéndez**

In the last few decades several initiatives have had a profound impact on the way road traffic and road safety are managed. Continuous development of data collection, processing and communications technologies have made available to users and traffic managers the mechanisms to increase their awareness of the traffic environment. This increased awareness of the traffic and its environment conditions is an effective tool towards improving traffic safety and efficiency, but only if the parties involved actively share their information.

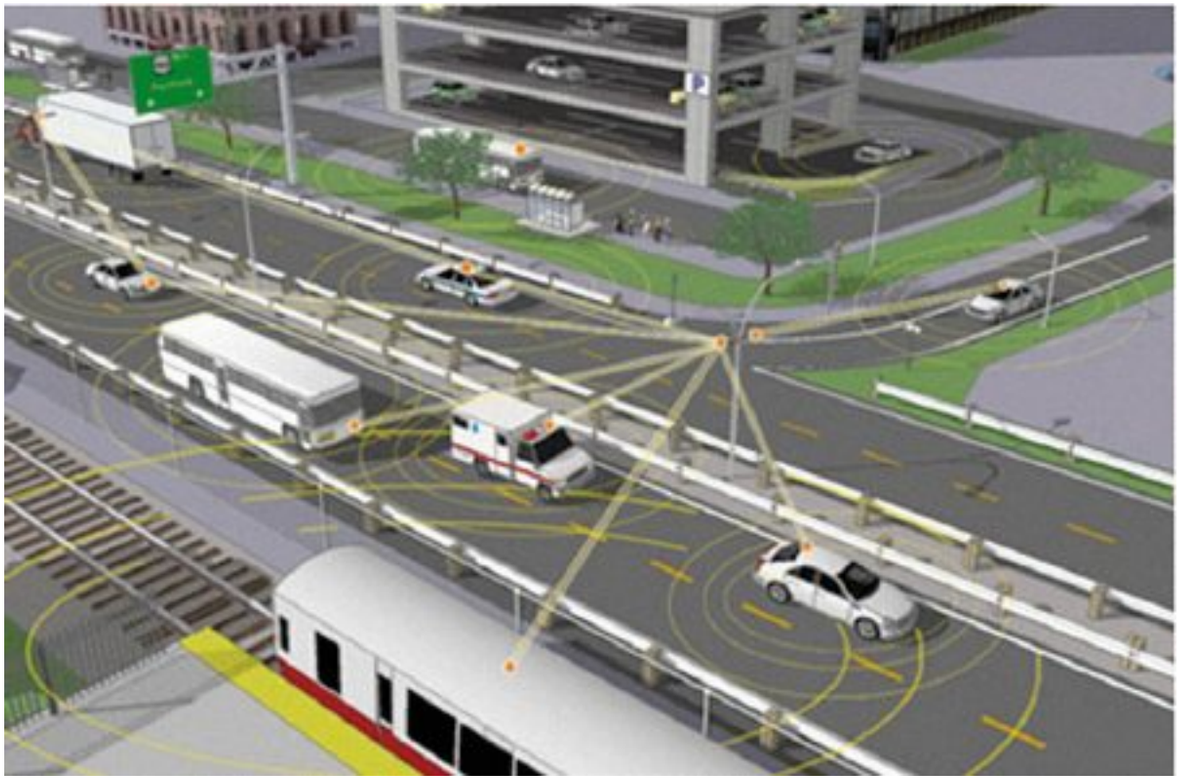
And that is precisely the biggest strength and at the same time the most important weakness of the Cooperative Intelligent Transport Systems (C-ITS) services and applications. On one hand, the promise of connecting seamlessly all the elements and devices that could have certain relevance in the field of road transport. On the other hand, the need for those same elements and devices to be prepared and willing to provide that information.

Let us see briefly some of the most important aspects influencing this vision or seamless sharing of road traffic information.

CURRENT C-ITS STANDARDIZATION AND DEPLOYMENT SITUATION OVERVIEW

There are four major pillars that contribute to the solutions in the field of Cooperative ITS interoperability: the public authorities and institutions, the standardization bodies, car manufacturers and finally different initiatives, projects and platforms. With the 2009 M/453 Mandate on the standardization of Cooperative ITS in the European Community, the European authorities addressed the need of a common standardization effort by CEN, CENELEC, ISO and ETSI, which has had its most significant result in the publication in 2014 of the so-called Release 1 for C-ITS procurement. The Release 1 is a list of standards aiming to provide a foundation for the practical implementation of the Day 1 C-ITS and include specifications from the overall communications architecture (the ITS Station Reference communications architecture), to different radio access such as IEEE 802.11p, through IPv6 networking, to ITS Station management processes, to selected applications data structures.

However, even with the publication of the Release 1 list, the current standardization situation is not as straightforward as



The ability to share transport information is both the greatest strength and most important weakness of C-ITS

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it looks for C-ITS applications and systems. Experience with deployment-focused European projects has shown that there are different ways of implementing the reference architecture and that there is no guarantee that different efforts will be fully interoperable without providing further implementation details.

What is in a fact is that the Cooperative ITS architecture is considered a closed effort by now, even if the reference standard ISO 21217 has been revised as recently as 2014. The discussion now revolves around other issues, in circles like the Platform for the Deployment of C-ITS in the EU, started by the European Commission last year. Considering aspects like Business Models, there is a clear intention to push the C-ITS applications in European roads.

ROAD TRAFFIC C-ITS APPLICATIONS AND FUTURE INTERNET

But there are undoubtedly other developments that will have an impact on the way Cooperative ITS services are designed and deployed. With the emergence of mobile-based applications that rely on the relatively unstructured contributions from users, it is becoming more and more necessary to revise the way in which services are deployed to road traffic users.

This emergence of new data collection and processing paradigm hints at the denominated Future Internet initiative, a EU-backed effort to promote the development of Internet-based technologies in support of smart infrastructures and business processes. Now in its Phase 3, the current objectives is to focus on the development and implementation of specific use case services and applications in different interest areas: transport and logistics, social connected TC, smart energy or e-Health. From an information exchange point of view, the Future Internet vision is based on the provision of services over a pool of distributed and loosely controlled resources, data and users. Internet of Things (IoT), Cloud technologies, Web UI, Big Data analysis… are some of the key aspects of the Future Internet approaches, ultimately with the goal of providing the services and applications with the maximum amount of meaningful collected, stored or processed data.

So naturally the question arises of whether it is possible to revise Cooperative services in general, or at least a type of Cooperative services in particular in the light of these emerging technological paradigms. Road services fall roughly into four different categories: safety critical, traffic efficiency management, infotainment and electronic payment-related services. Developments of Cooperative ITS have been mostly aimed at the first type, the safety critical services, with the corresponding design and specification decisions on the communications and processing performance of their deployment.

Accuracy, data integrity, quasi-real-time behavior have been some of the requirements considered to specify the main building blocks of the Cooperative ITS architecture. This has resulted in a very strictly controlled and secured framework of data exchanges and processing. Integrating the C-ITS framework with the Future Internet approach requires a thorough assessment of the management and operating requirements of C-ITS and the development of certain elements into the Future Internet architecture that will ensure the fulfilment of those requirements.

WHO MANAGES THE INFORMATION?

Finally, the revision of the current paradigms of Cooperative ITS services must go beyond the technical details. In the Future Internet scheme of things, the key aspects are related to the distribution and ubiquity of data, services and processing resources. Given the experience with Cooperative ITS field test projects, both those in which the current road operators were involved and those in which car manufacturers, cars being arguably the major volume data producers in road environments, it is clear that management of user information (position, service usage, etc.) is not a trivial subject. It could become indeed one of the discussion issues when designing the next generation of cooperative road services, and push topics about access to data, security and control.

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