EXPERT PANEL SUMMARY

The Wireless Revolution and the Transformation of Transport

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Background

Wireless technology is well established and is progressively being integrated into vehicles and infrastructure. The essence of the wireless revolution is the fitting of transmitter/receiver units to vehicles and widespread coverage of infrastructure to enable two-way traffic between a vehicle and its infrastructure or between a number of vehicles. It has the potential to impact on many aspects of transport, including road safety, congestion, freight operation and environment. However, a number of key challenges remain to be addressed to fully benefit from the technologies.

The Panel

- Moderator: John Horsley, AASHTO,
- Wolfgang Höfs, Directorate General for Information Society and Media, European Commission
- Takayuki Oba, Ministry of Land, Infrastructure, Transport and Tourism, Japan
- Eric Sampson, Newcastle University, UK
- T. Russell Shields, Ygomi LLC
- Carlo van de Weijer, TomTom International

Conclusions

Next generation of technologies

Wireless technologies for transport application already exist and include travel and communication applications through third and fourth generation cell phones; travel information systems, GPS navigation systems, on-board safety equipment such as lane departure systems or adaptive cruise control, and electronic tolling systems. By adopting wireless technology social networking has also changed radically and is already being used extensively for real time traffic information.

The “next generation” of technologies is being developed and involves the convergence of the advances in automotive engineering and IT on the one hand with the availability of high capacity wireless linking to and from moving cars. There is a wide range of societal and commercial benefits from introducing further fast and high capacity wireless technologies, with major potential gains in road safety, traffic and demand management and pollutant and greenhouse gas emissions reduction. Smarter driver support and assistance leads to safer traffic and fewer accidents. Better prediction and management of traffic flow leads to reduced congestion and more consistent journey times. Better management of traffic leads to reduced emissions and energy consumption. Wireless technologies will also lead automotive manufacturers and the ITS industry to provide a range of new products and services to the road users.

Barriers to innovation

The underpinning technology is there but full implementation requires removing a number of barriers and adopting a new way of co-operating between the different stakeholders from the public and private sectors. There has been much work on ‘wireless’ techniques but too little on the administrative, legal and institutional aspects.

Progress has been hampered by concerns about risk and liability of safety-related applications, and the lack of a common international approach to human factors issues such as driver distraction, driver overload and driver underload. The problems are familiar: technological innovation is ahead of legal and institutional change.

New management approaches

Turning the concept of a wireless-enabled vehicle into reality requires a new public private partnership. We need genuinely collaborative working between all the stakeholders, including automotive manufacturers, Intelligent Transport System (ITS) service providers, telecoms bodies, government agencies and the infrastructure owners and operators. The speakers expressed concern that much of the research and development in this area has been carried out by just one of the various trade sectors with little apparent cooperative working between them.

Getting the benefits means changing how we do things, sharing data and infrastructure, and accepting different regulatory models and traffic management approaches. As an example, private sector telecom and navigation companies collect a huge amount of real time data from their customers which can be used by government agencies for improving traffic information and management services and be more cost effective than traditional loop–inductor based technology. Both sectors will gain from this sort of cooperation.

Different attitudes to risk acceptance need to be sought. There has been a tendency to look for the “perfect solution” – with zero failure -- which has impeded key policy decisions by governments. The English classical scholar F.M. Cornford argued “never do anything for the first time. If you do and it succeeds you have set a precedent; if it does not work you have just shown why you should not do it”. But a realistic, and increasingly acceptable, approach is to assess the net societal benefits and to accept

some risks. Field operational tests and ex-post evaluations are needed. A first approach could be a series of experiments sponsored at Government level in order to underwrite the risks and liabilities and thus clear the way to real testing by groups comprising all classes of stakeholders of the behaviour of drivers and systems with these new products. The aviation world has adopted 'fly by wire' techniques that are transferrable to land transport from both the aspect of system design but more importantly from the aspect of system testing.

Incentives, regulation and international co-operation

There is a need to take a fresh look at the 1968 Vienna Convention Article 8 and its concept that "Every driver shall at all times be able to control his vehicle or animal". A solution might perhaps lie with aviation where it is accepted that the 'driver' is not 'in control' but 'in command'. There is duplication or triplication of safety-critical components and a "Black Box" recorder to log the pilot's commands and the aircraft's systems' responses.

Should the adoption of new technologies be regulated? In the field of safety it is clear in many countries that without adoption on a wide scale of some of the emerging new technologies further significant improvements to reduce the number of casualties will become more difficult. At the same time, a minimum penetration rate will be necessary to observe the positive impact of technologies, in terms of safety improvement, traffic flow management and efficiency.

It is likely that one or more of the EU, Japan or the United States will require mandatory fitment on new cars of a vehicle-infrastructure wireless link within 5 years. There is an urgent need to anticipate this with collaboration initiatives so that the undoubted benefits are achieved for all stakeholders at minimum cost and lower risk and with the highest end-user buy-in.

In most countries, the main political priority for the forthcoming decade is to reduce the GHG emissions, to which transport contributes around one fourth. This could be a strong argument to accelerate the take off of wireless technologies, which can contribute to reduce fuel consumption and greenhouse gas emissions, while also having positive effects on safety, congestion and efficiency.

International cooperation and standardisation in equipment for communication and data exchange system will help to generate economies of scale and ease deployment. The Session discussions supported involving a major international body such as the ITF / OECD, to encourage more collaboration and integration in this sector .