CEDR

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National Road Authorities' roles in ITS

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This report is: **FOR DECISION**

Executive summary

This report outlines the main achievements and conclusions of task group 14 (Roles and responsibilities of NRAs in ITS) during CEDR's Strategic Plan 2 (SP2) 2009–2013.

The group has reached all of its objectives, including having a CEDR representative in the ITS Advisory Group for the EC, steering the work of key iMobility working groups as co-chairs, and establishing close cooperation with the major European ITS deployment action EasyWay. Furthermore, the group cooperated with the Traveller Information Services Association (TISA), achieving tangible results, and initiated the large-scale deployment of cooperative systems in the Amsterdam Group together with the other road authorities/operators and vehicle manufacturers.

Intelligent Transport Systems (ITS) have continued to develop very quickly such that CEDR has had to be dynamic in adapting its work plan to respond quickly to new demands. Key changes related to the EU adoption of the ITS Directive in 2010, the expansion of the safety-oriented eSafety Forum into the iMobility Forum for safe, smart, and clean road mobility, and the forceful entry of big multi-national private companies into the ITS domain. All of this requires a speedy yet considered response from NRAs.

This report provides CEDR and NRAs with a strategic assessment and recommendations in the following areas:

- EU ITS Action Plan and EC ITS Directive
- EasyWay and follow-up project(s)
- iMobility
- priority services and data quality
- cooperative systems
- research guidance

In essence, the recommendations underscore the need for NRAs to be proactive in relation to key developments such as the ITS Directive, iMobility, and connected vehicles. At different levels, NRAs need to establish and maintain a structure of communication and cooperation with the EC and important stakeholders and projects driving the research, development, and deployment of ITS. The issue of optimum data and information quality is a topic of specific importance for NRAs.

In addition, CEDR identifies a number of important ITS deployment issues such as standardisation, open data, and market developments, which will require CEDR and NRA attention in the near future.

The experience of the task group clearly shows that when it comes to activities within dynamic and turbulent domains—such as ITS today—CEDR would benefit from a dynamic and flexible task organisation to ensure that each urgent issue is tackled by the best experts.

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Introduction

ITS (Intelligent Transport Systems and Services) is the integration of information and communication technology into transport infrastructure, vehicles, and users. By sharing vital information, ITS allows people to get more from transport networks with increased safety and less impact on the environment (source: www.ertico.com).

Six major developments

The European Commission has developed an ITS Action Plan and Directive that will be implemented in the next few years. Furthermore, the EU launched the EasyWay project as a follow up to the Euro-regional projects. The eSafety Forum continued under the name iMobility. The concepts developed in these three EU initiatives will have an impact on the NRAs. This task group worked on defining the interests and roles of the European NRAs with regard to these three initiatives. To do so, CEDR monitored the on-going development of these initiatives.

Since this CEDR task group started its work in 2009, ITS has continued to develop very quickly such that CEDR has had to be dynamic in adapting its work plan to respond quickly to new demands.

As a mid-term report, the task group presented the CEDR ITS Positioning Paper that was approved by the CEDR GB in 2011. Based on this strategic paper, the task group defined three other important items requiring CEDR and NRA attention and, consequently, discussions within the task. For this reason, CEDR will also present an overview of cooperative systems, priority services and data quality, and research guidance.

The goal of this report is to provide an overview of all these developments and to define the role and tasks of NRAs and of CEDR in contributing to a better integrated transport system. Information in this report is aimed at helping NRAs to develop their own strategies. The focus is on strategic elements and the impact of ITS on NRAs.

The following chapters (Chapters 1–6) will provide the following elements for each of these developments:

A. a short description,
B. the strategic importance of the subject for NRAs,
C. its impact on NRAs,
D. possible ways forward, and
E. recommendations for CEDR/NRAs.

Levels of ITS adoption

The use and implementation of ITS is progressing at different rates across Europe. The current level of adoption of ITS (i.e. development, implementation, and deployment) varies from country to country and from region to region in Europe.

An important goal for CEDR is to provide information and recommendations for NRAs that will allow them to develop their own ITS strategies. The strategies and 'possible ways forward', however, depend on the level of ITS adoption.

To facilitate understanding, task group 14 introduced three different levels of adoption (Levels I, II, and III). These are used in each chapter outlining 'Possible ways forward'. This report will not classify individual countries for the final report; it is up to each country to determine its position for itself, including the status of regions within its country. The idea of the 'product life cycle' description from a generally accepted marketing theory was used to describe the different levels of ITS adoption, as Figure 1 shows:

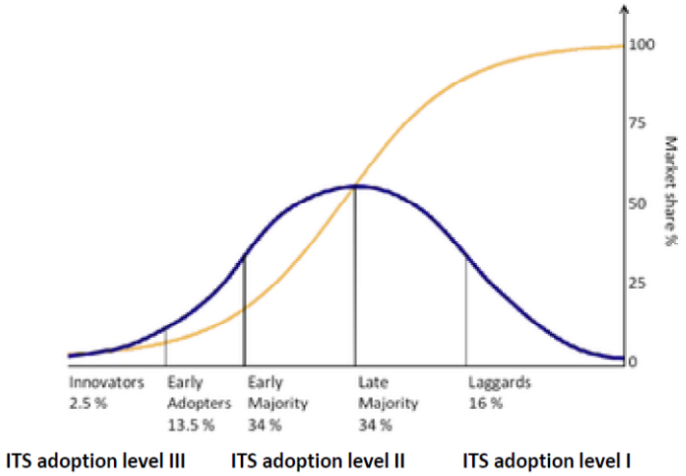


Figure 1: Product life cycle

- ITS adoption level I:
  - followers (late majority/laggards)
  - monitoring of ITS developments, deployment of reactive and proven services
  - limited, unsystematic involvement in ITS research
  - focus on physical infrastructure over ITS
  - no risks taken
- ITS Adoption level II:
  - majority (early/late majority)
  - active deployment of proven and mature ITS services
  - risk averse
- ITS Adoption level III:
  - leaders (early adopters/innovators)
  - make full use of state-of-the-art ITS, for multiple policy goals
  - willing to take some risk
  - dedicated and implemented ITS strategy
  - active and leading participation in ITS development and deployment of (new) services

Chapter 7 reviews some important additional deployment issues in the world of ITS. Chapter 8 lists achievements and conclusions. Finally, a list of all recommendations can be found in Chapter 9.

Links between task group 14 and other task groups within CEDR

For Strategic Plan 2, CEDR set up three technical domains (TDs). According to the plan, TD Operation was tasked with focusing on the NRAs' role in managing and operating the road network and developing and providing a service to road users and others who may be affected by the operation of road networks.

TD Operation had seven task groups, four of which are part of the Project Group ITS:

- Comparison of congestion policies of NRAs (Task 11)
- Traffic management to reduce congestion (Task 12)
- Incident and emergency management (Task 13)
- NRAs' roles in ITS, EasyWay, eSafety (Task 14)

Task 14 Background Report

A background report will be published in the spring of 2013. It will provide a detailed description of all of the task group's major activities, including the achievements, conclusions, and recommendations on which this final report is based. The background report could act as a transfer document for future CEDR activities including the current state of affairs in ITS.

1 The EU ITS Action Plan and EC ITS Directive

A. Short description

The European Commission took a major step towards the accelerated deployment and use of ITS in road transport (and interfaces to other transport modes) by adopting an ITS Action Plan (on 16 December 2008) containing 24 actions in six different areas. In addition, the ITS Directive (2010/40/EU) provides a legislative framework for enhancing coordination and for ensuring interoperable deployment. The directive specifies four priority areas (in line with the ITS Action Plan) and lists six priority actions. In accordance with the Lisbon Treaty, this directive gives the European Commission the mandate to define within the next seven years specifications (i.e. functional, technical, organisational, or service provisions) to address the compatibility, interoperability, and continuity of ITS solutions across Europe.

These specifications will be adopted as delegated acts and will be binding. The adoption of specifications is not automatically calling for deployment of the related service but, according to the terms of the directive, the Commission 'shall within 12 months following the adoption of the necessary specifications and where appropriate present a proposal for mandatory deployment of the action'. That, however, needs to be decided in co-decision with Council and European Parliament (the comitology procedure).

The circular information flow between the European Commission and the member states (including Ministries of Transport and NRAs) established under the framework of the ITS Directive is illustrated in Figure 2 below. In summary, it consists of various channels for bottom-up coordination from member states to EU level (i.e. reporting, consensus-building via high-level institutions and input provided to related surveys). On this basis, the European Commission is enabled to draft viable specifications, starting with those for the priority actions of the ITS Directive.

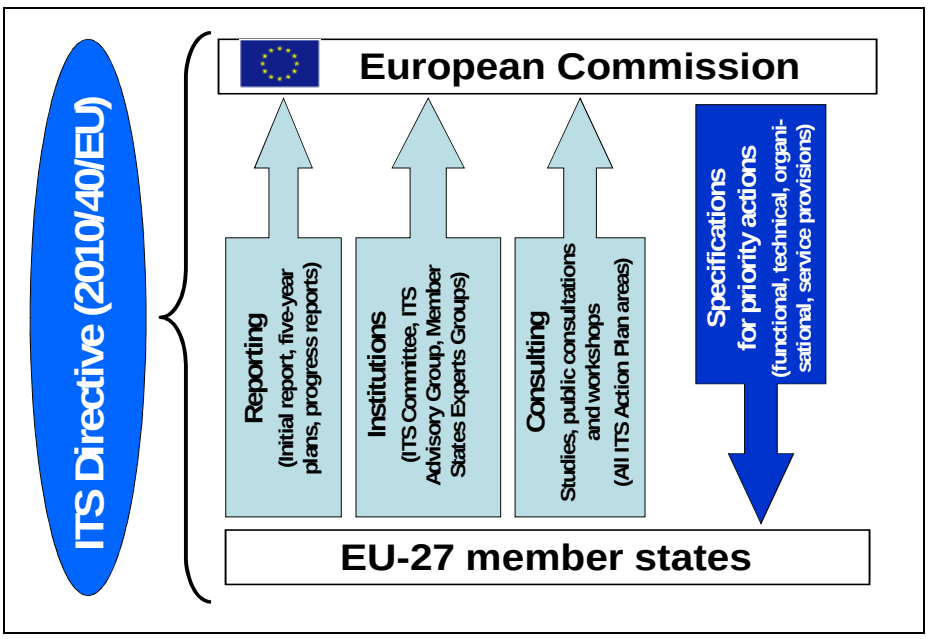


Figure 2: The information flow between the European Commission and the member states

The adoption of specifications as delegated acts will have a great impact on national ITS policies. To influence the content of the ITS specifications, a pro-active approach on the part of the stakeholders is necessary. Because the GB has a representative in the EU ITS Advisory Group, CEDR has a voice in this important, high-level support group to the EC.

B. Strategic importance for NRAs

The challenges faced by CEDR members are clearly linked to the ITS Directive, especially in terms of:

- the optimisation of the use of existing infrastructure, making transport more efficient, the improvement of mobility in urban and inter-urban transport, the increase in infrastructure throughput, and the reduction of congestion;
- the improvement of traffic and transport safety and security
- the full integration of the vehicle into the transport system (= cooperative mobility)

Current developments in Brussels are of strategic importance for NRAs. Once specifications have been adopted, NRAs have to comply when implementing new ITS services. It is highly likely that the specifications will define a minimum set of requirements to be respected. Even if additional national initiatives will remain possible, they might require harmonisation at a later stage. Because of the mechanism of the Lisbon Treaty, influencing the decisions of the EC should be done upfront. Also, it may be necessary to change national guidelines/standards or to renew current systems before the end of the life cycle.

For most NRAs, however, the development push that will come from the ITS Action Plan, the ITS Directive, and the adoption of related specifications is a strategic advantage, especially for countries that are in an early phase of ITS deployment. A Europe-wide, interoperable approach creates the potential for cheaper components and services (incentives, avoiding vendor lock-in), while European harmonisation should lead to better understanding and higher road user satisfaction.

CEDR and the EC share common visions on the deployment of ITS throughout Europe. The main goals of the EC (as described in the White Paper for Transport) are fully in line with CEDR's priorities (as described in CEDR's ITS Positioning Paper of 2011). However, at recent meetings, EC representatives stressed the added value of CEDR acting as the voice of European NRAs acting in concert.

C. Impact on NRAs

The impact of on-going developments in the European ITS arena for CEDR and its member states was analysed by the task group. The main conclusion is that NRAs face many challenges in the coming years: mobility continues to grow, public budgets are decreasing, the end-user is becoming more demanding, and the potential role of private service providers on the roads is gradually increasing. The importance of coordinated traffic management is increasing, and managing the network will depend more and more on using ITS as a tool.

The core business of NRAs, network operation, will remain the same. However, there is a clear shift in focus towards network-wide traffic management, a more efficient use of existing infrastructure and an increasing focus on maintenance and operation. The application of ITS will enable NRAs to achieve set goals.

Although the impact of the specifications adopted under the ITS Directive will vary from country to country, the main risks and opportunities will be similar for all:

Risks:

- For some services, the upgrade or deployment of new ITS infrastructure and facilities is required.
- Investment risk: (deployment of new) nationally developed services might be subject to European harmonisation (at a later stage).
- In the coming years, more staff and budget will be required for ITS; in the longer term, successful ITS implementation will result in an overall reduction of costs at NRA level for operation and maintenance of the network.

Opportunities:

- Harmonisation and standardisation will lead to economies of scale and risk reduction for ITS projects (financially, planning, technically).
- European co-funding for ITS is expected to accelerate and in many cases kick-start deployment.
- New Europe-wide binding requirements for service provision by public authorities (e.g. incident management/eCall) will lead to easier coordination and will facilitate cooperation.

However, although member states have an official relationship with the EC, the NRAs are not always well connected, either from a national perspective or in terms of enjoying formal cooperation with EC services and bodies.

D. Possible ways forward

All possible ways forward serve the main goal of maximising NRA weight/influence on European developments.

Possible ways forward	Level of ITS adoption I	Level of ITS adoption II	Level of ITS adoption III
CEDR is active in consultation and workshops relating to the ITS Directive and the ITS Action Plan (including ITS Advisory Group) and in proposing further priority actions on behalf of (clusters of) members (a unanimous opinion is not necessary; several views are possible)	✓	✓	✓
Individual NRAs are active in consultation and workshops relating to the ITS Directive and the ITS Action Plan and in proposing further priority actions to be tackled.	–	✓	✓
The creation of an effective framework for structured EC–CEDR cooperation	–	✓	✓

E. Recommendations for CEDR/NRAs

In the field of the ITS Action Plan and the ITS Directive, the main goal for CEDR and its members is to maximise NRA weight/influence on European developments. In order to reach this goal, the task group recommends that:

- ITS 1: CEDR and NRAs should be proactive on EU specifications.
  - Where possible, CEDR and NRAs should join strategic and technical working groups, participate in questionnaires and workshops, and prepare common views on main topics.

- ITS 2: CEDR should organise a three-level cooperation with the EC.
  - Cooperation should be established at Governing Board, Executive Board, and task group levels.

- ITS 3: NRAs should establish a structure for the consistent and active exchange of information concerning the ITS Action Plan and Directive.
  - On matters relating to the ITA Action Plan/Directive between national representatives (from NRAs and ministries) dealing with the EC
  - Avoiding gaps and overlaps between national representatives in EC consultations, CEDR ITS, EasyWay, iMobility, CEN/ETSI

2 EasyWay and follow-up project(s)

A. Short description

The EasyWay project is a pan-European deployment project supported by DG MOVE via the TEN-T programme. It involves most European road authorities and private motorway operators and focuses on harmonised traffic management and deployment of ITS on the trans-European road network. The European Commission has a long tradition of supporting the coordinated roll-out of ITS, first via the Euro-regional projects and, since 2007, via the integrated project EasyWay. An important focus of the current EasyWay 2 project has been the development of deployment guidelines for the core ITS services of road authorities/operators. These guidelines enhance harmonisation from the user's perspective and are expected to contribute to the reaching of the goals outlined in the ITS Action Plan.

The main goal of EasyWay is to reduce congestion, increase road safety, and reduce CO_2 emissions through the deployment of harmonised ITS services for the European traveller and haulier. As the aim is to guarantee European cohesion and coordination in the deployment of ITS, considerable efforts have to be made to establish a common framework for this deployment. The EasyWay 'ITS roadmap' seeks to provide a common vision of the possibilities for the deployment of ITS through a coordinated and concerted roll-out of the so-called 'Core European ITS Services' in Europe.

To facilitate the consolidation of best practices and to enhance the transfer of knowledge, EasyWay contains 'Expert and Study Groups'. One Expert and Study Group within EasyWay (ESG 5) is devoted to DATEX II, a multi-part standard for the centre-to-centre exchange of dynamic traffic information. The mature parts of DATEX II are already standardised at European level (CEN TS 16157), whereas the pre-standardisation workload on additional topics is currently borne by EasyWay.

As the EasyWay partnership includes national road authorities (NRAs) from 25 European countries and most motorway companies operating in these countries, it should come as no surprise that the plans and objectives have a lot in common with those of CEDR and its members. To fully synchronise intentions and actions, CEDR and EasyWay cooperate under the flag of a memorandum of understanding (MoU), starting from and building on their unique positions: CEDR as a high-level strategic forum of European NRAs and EasyWay as a major European ITS deployment project.

EasyWay faces several challenges:

- to reach common goals while fulfilling national requirements;
- to govern a massive project involving >150 partners;
- to achieve member state commitment to goals and guidelines and their implementation;
- to involve all relevant stakeholders in the EasyWay ITS Services.

EasyWay 2 will end in 2013. The question is how and in what way the work and the cooperation between Community-funded projects and NRAs can continue in 2013 and beyond.

B. Strategic importance for NRAs

NRAs have a major interest in the (technical) work of the EasyWay working groups, since the Deployment Guidelines for ITS Services developed by EasyWay should set the scene for ITS deployment in Europe. Where EasyWay is a platform for developing and maintaining the (technical) expertise in ITS, NRAs hold the key to deployment.

Being the bridge between technical expertise and policy-making/decisions on investments, CEDR could anchor the results of EasyWay in NRAs, for example by matching deployment guidelines and concerted NRA investment programmes.

The continuation of the technical work and the EC's financial support for ITS deployment in 2013 and beyond is of extreme importance.

C. Impact on NRAs

The main issue has been the national consultation and validation of the EasyWay deployment guidelines. These guidelines contain the service requirements for 15 European ITS services. It is likely that the service requirements will play a role in the drafting of specifications under the ITS Directive. The current phase of the EasyWay project ends in 2013, but it is likely that a common programme for the deployment of specific ITS services will continue after this. It is also likely that such a programme will have a strong service orientation, focussing on the pan-European deployment of a selected set of ITS priority services. Therefore, it is also essential to maintain good cooperation between EasyWay and CEDR in the future.

This will entail several risks and opportunities for CEDR members:

Risks:

- For some services, new ITS infrastructure and facilities will have to be deployed.
- For some services, it may be necessary to upgrade current ITS infrastructure and facilities.
- It will require effort on the part of NRAs to participate in EasyWay expert groups.
- NRAs might withdraw their support for EasyWay if requirements are considered too tough (representation of all NRAs in all groups is not possible).
- Only a limited commitment to the deployment of DATEX II on a European scale

Opportunities:

- It fulfils an NRA need: cooperation on technical development, deployment in cross-border regions between NRAs and with European Commission.
- European co-funding, which is likely to be available, would accelerate deployment.
- Harmonisation and commonly agreed minimum requirements will reduce the risks of ITS deployment (financial, planning, technical).

- CEDR can provide support for DATEX II development and maintenance, which is scalable in involvement (organising the commitment to deploy DATEX II, funding/co-funding of common interest areas, providing the organisational home for DATEX II)

D. Possible ways forward

The goal is to maximise NRA weight/influence on European developments

Possible ways forward	Level of ITS adoption I	Level of ITS adoption II	Level of ITS adoption III
CEDR encourages all NRAs to participate in EasyWay.	✓	✓	✓
CEDR encourages all NRAs to adopt the EasyWay Deployment Guidelines for all ITS deployment.	✓	✓	✓
NRAs should adopt and utilise DATEX II.	(✓)	✓	✓
CEDR develops a plan B, in case EasyWay 3 (EW3) is not launched (create a framework for EC–CEDR cooperation)	–	✓	✓

E. Recommendations for CEDR/NRAs

The main goal for CEDR and its members is to maximise NRA weight/influence on European developments, preferably by remaining involved in post-EasyWay 2 projects, co-funded by the EC. In order to achieve this goal, the task group recommends that:

- EW 1: NRAs should actively participate in EasyWay and follow-up projects.
  - NRA experts should actively participate in EasyWay's technical expert groups (competence-building, exchange of best, good, and bad practices).
- EW 2: CEDR should support EasyWay towards EC as the NRAs' deployment programme
  - To safeguard strong cooperation between NRA experts and the EC
- EW 3: CEDR should liaise with EasyWay and follow-up projects.
  - In order to avoid duplicated efforts and to anchor the results of EasyWay in NRAs and their daily operations.

3 iMobility

A. Short description

The iMobility Forum (previously known as eSafety) deals with intelligent vehicles and infrastructure. It is a multi-stakeholder forum that has set itself the goal of accelerating the deployment of safe, smart, and clean road mobility—mainly in vehicles but also on the roadside. The cooperation in iMobility is quite unique since there is a close cooperation between industry and public parties in the various working groups. CEDR has actively participated in the Steering Group of the iMobility Forum and some members co-chair working groups. Several NRAs are involved in the iMobility Platform; only a few of them are actively participating in working groups. Figure 3 gives an overview of the organisation of the iMobility forum and the working groups.

Figure 3: The iMobility organisation chart

The iMobility partners are working on strategic ITS deployment issues. A very clear example is the 'chicken and egg' problem with respect to deployment (the role of industry, authorities, operators, and service providers).

Work in the iMobility Forum is not only strategic for the industry and the public parties, it also plays a role in the strategic view of the EC (DG CONNECT, earlier known as DG INFSO). Their main goals (safe, smart, and clean mobility) rest on three pillars: a) policy, b) research, development, and innovation, and c) deployment. In the eyes of the EC, the iMobility Forum is part of the deployment pillar.

B. Strategic importance for NRAs

With the current speed of technical developments, NRAs are promoting the development of systems and services that serve their own best interests. Of course innovation is an important way towards the future, but it is also of strategic importance for optimising NRAs' investments and safeguarding the core-business of NRAs: network operation.
Of course, each NRA elaborates on individual subjects in its national context, but the iMobility Forum is the platform where NRAs can have a major impact on European development and the deployment of ICT (Information and Communication Technologies) for mobility applications provided by the industry. Several NRA-relevant ITS services are primarily on the agenda of the iMobility Forum (e.g. eCall, speed alert, nomadic device services, etc.). It is also a unique opportunity to discuss developments with the industry. CEDR could be more proactive in collaborating with other umbrella organisations in iMobility. Active CEDR participation provides extra weight to NRA views within the iMobility Platform.

C. Impact on NRAs

A lot has happened since the CEDR group started its work in 2009. The NRAs have made progress with regard to ITS deployment; the iMobility Forum has widened its sphere from safety to clean, safe, and smart road mobility; and the cooperative systems relying on vehicle-to-vehicle and vehicle-to-infrastructure communications are getting close to large-scale deployment, to list some of the most noteworthy developments.
The on-going work in the field of intelligent vehicles and infrastructure will bring several risks and opportunities for CEDR members:

Risks:

- Proactive NRA participation in the working groups of iMobility requires staff, expertise, and funding.
- Industry is setting the agenda. This might be a risk for NRAs because industry initiatives might be counter-productive in terms of NRA goals (e.g.: dynamic route guidance).

Opportunities:

- Strong NRA participation in iMobility results in strong NRA weight/influence on European developments in iMobility.
- For NRAs in countries without an automotive industry, the iMobility Forum provides a platform for dialogue.

D. Possible ways forward

The goal is to maximise NRA weight/influence on iMobility and to strengthen the position and interest of NRAs in intelligent vehicles and infrastructure.

Possible ways forward	Level of ITS adoption I	Level of ITS adoption II	Level of ITS adoption III
More NRAs and more active participation of NRAs in working groups (and thus more cooperation with industry)	–	✓	✓
Active participation of CEDR in the iMobility Steering Group	–	–	✓

E. Recommendations for CEDR/NRAs

The main goal for CEDR and its members is to maximise NRA weight/influence on European developments. In order to achieve these goals, the task group recommends that:

- IM 1: NRAs should actively participate in the relevant iMobility working groups.
  - In order to increase NRA influence on the development of intelligent vehicles and infrastructure; CEDR representatives should ensure that an NRA applies to co-chair WGs of specific importance for NRAs when such groups are initiated.
- IM 2: All NRAs should consider participating in one or more iMobility working groups.
  - In order to give weight to the NRA voice in iMobility
- IM 3: CEDR should actively participate in the iMobility Steering Group.
  - Continuing the work of the last couple of years, underlining the importance of the developments in iMobility to NRAs

4 Priority services and data quality

A. Short description

Travel information and ITS systems play an increasing role in NRAs' mobility and traffic management responsibilities and tasks. Information influences driver and traveller behaviour, and its quality is particularly important for road safety and fluidity objectives.

Considering the growing importance of ITS services for mobility and traffic management, NRAs should express their views on priority deployment and other policy priorities at national level and beyond in order to facilitate harmonised and seamless services throughout Europe.

The focus on services has obviously resulted in a suggestion to enter into a task-driven cooperation with TISA, the Traveller Information Services Association. TISA itself has 100+ members from private and public institutions, including service and content providers, the automotive industry, the product industry, broadcasters, and public authorities. It creates and maintains global open traffic and traveller information specifications, standards, and policies for increasing the safety and efficiency of travel for all. It has links with several bodies, including standardisation bodies (ISO–TC204: WG 10 TMC and TPEG Standards) and EasyWay (Joint Task Force on 'DATEX II to TPEG' interoperability).

B. Strategic importance for NRAs

NRAs have various roles to play in terms of the provision of ITS services:

- they can provide travel information directly to their users; the end-users' image of NRAs is increasingly based on the availability and quality of information;
- they manage traffic flows that are influenced by various information services;
- they provide (raw) data to information service providers;
- they are, de facto, included in the 'travel information value chain', in which roles and responsibilities may have to be defined (through architectures);

Considering these roles and the variety and dynamics of market forces in providing ITS services, there is a clear need for NRAs to identify priority services that need special attention, either for priority deployment or for broader policy actions, among other things, quality management, setting architectures, or prioritising research, experimentation, and evaluation needs. In this context, national ITS policy and/or strategy could be a proper basis for the expression of NRA priorities, taking into account private initiatives, user needs, NRA goals, cost-efficiency, and (EC) legislation. This expression of national priorities could also help identify common priorities and issues with a view to enhancing harmonised and seamless services throughout Europe.

The cooperation with TISA is of strategic importance for CEDR in terms of achieving a common understanding of value chains and associated message standards in the field of traffic information, as indicated in Figure 4. This figure shows the traffic information value chain including an overview of the various communication techniques and channels. A schematic overview of all kinds of different stakeholders with whom CEDR and NRAs are dealing is included in the next chapter.

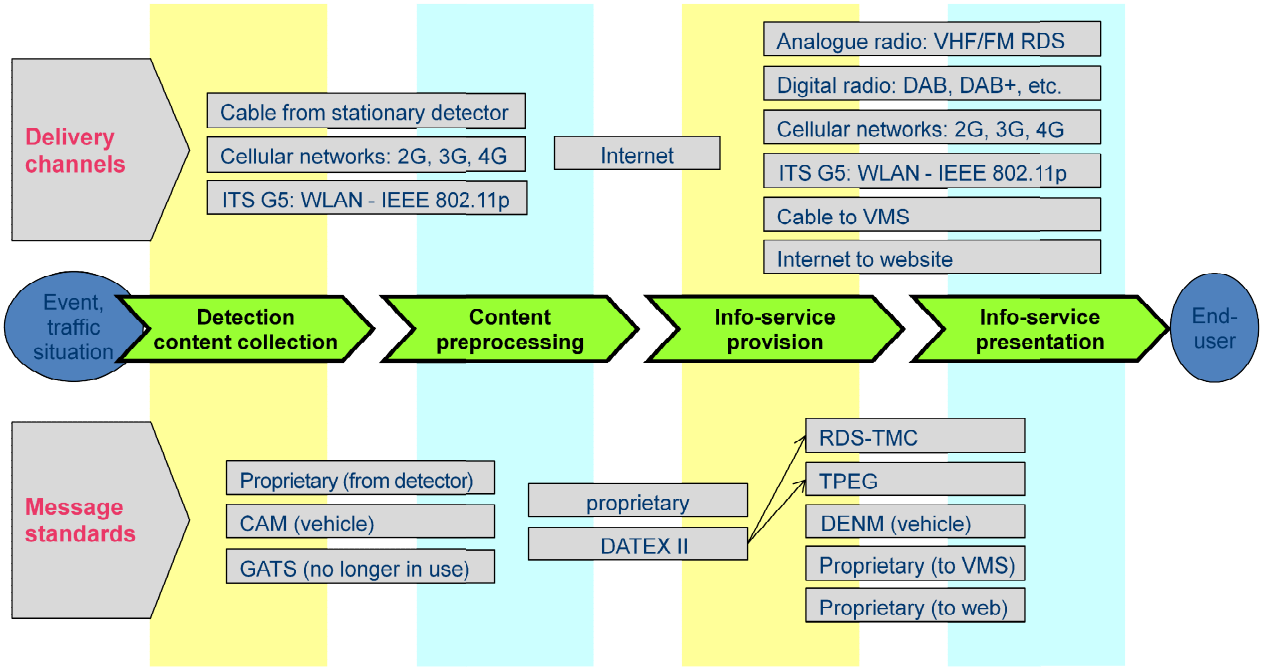


Figure 4: The Traffic Information Services value chain

- This stylised value chain illustrates the basic steps in the 'production' of traffic information services. It also illustrates the available delivery channels and the associated message standards for delivering content or information at each step along the value chain.
- For safety-related information that is free of charge to users (priority action C of the ITS Directive) in particular, CEDR has concluded, in cooperation with TISA, that users should be addressed via multiple channels. Spoken radio still has the highest coverage, but other channels (e.g. TMC, TPEG, Apps, DAB) are either becoming increasingly available or are emerging. Even though the value chains look similar, the value chain integration (end-to-end coverage by one actor or extensive content/information sharing) and the public sector involvement represent the main discriminating factors in information provision in the member states.
- The figure suggests that convergence of broadcast-centric, mobile communication-centric and vehicle-centric information provision is becoming an important issue since they all—when seen from the users' perspective—deal with the very same subject: traffic information.
- Figure 4 also reveals that there is a need to ensure consistent information over the various channels, a task to which NRAs must pay attention.

C. Impact on NRAs

The current focus on ITS priority services is well justified by NRA interests and the implementation timetable for the ITS Directive (see Chapter 1).

Quality is an increasing concern for all players in the information value chain. On an increasingly competitive market, end-users' quality expectations are of growing importance. In this context, NRAs have a particular role to play in designing 'desirable' levels of quality (including levels of service). There are two main reasons for this: firstly, from the end-users' point of view, driver and traveller behaviour contributes to safe and efficient traffic and mobility management; secondly, from the operators' point of view, the quality of data is associated with investment, maintenance, and personnel costs.

The roles and responsibilities of different stakeholders may have to be clearly defined for some services for quality, liability, and security reasons. Roles and responsibilities might also need to be clearly defined for collaboration with other transport and (lower-level) road authorities and other stakeholders for the efficiency of mobility and traffic management. NRAs have a particular role to play in the elaboration of so called 'architectures' (or 'value chains') that seek to clarify roles and responsibilities.

Finally, the on-going elaboration of EC specifications, which will become mandatory, needs a common expression of views from NRAs, both on the quality and level of service issues and from the value chain or architecture point of view.

This on-going work should be completed by CEDR and the NRAs, but will bring several risks and opportunities for CEDR members:

Risks:

- Network operation (a core NRA task) will change: NRAs need to consider their role and responsibilities with regard to data management, priority services in their home market.
- Exchanging data and information might generate liability issues for NRAs. NRAs are happy to have a good image with end-users, but end-users expect reliable services and data.
- Data and service quality requires investment (staff and funding).

Opportunities:

- EC service specifications will become mandatory.
- A common view on a European value chain involving all stakeholders is needed to provide the basis for deployment.
- A more comprehensive overview of the road situation on the whole network is necessary, i.e. collaboration with (lower-level) road authorities and other stakeholders.

D. Possible ways forward

The goal for NRAs is to safeguard the availability and accessibility of traffic data and information that are necessary for the core NRA tasks.

Possible ways forward	Level of ITS adoption I	Level of ITS adoption II	Level of ITS adoption III
CEDR and NRAs extend cooperation with relevant umbrella organisations (e.g. TISA), whenever those organisations address quality and architectures issues.	✓	✓	✓
NRAs determine their strategic and legal position on priority services on their home market.	✓	✓	✓
CEDR and NRAs develop a common view on a European value chain.	–	✓	✓
NRAs continue their search for optimum data quality with CEDR's support.	–	✓	✓

E. Recommendations for CEDR/NRAs

The main goal for CEDR and its members is to maximise NRA weight/influence on relevant European developments relating to the availability and accessibility of traffic data and information. In order to achieve this goal, the task group recommends that:

- PD 1: NRAs should determine their strategic and legal position on priority services on their home market.
  - NRAs should produce their own strategic positioning paper on priority information services based on common structure; CEDR should draw up an overview/conduct a benchmark in SP3.
- PD 2: NRAs should, with the support of CEDR, identify optimum information and data quality for core services.
  - Identify core priority services for which quality issues are prominent
  - Elaborate methodology for quality assessment and management
- PD 3: NRAs should, with the support of CEDR, further explore the need for value chains or architectures.
  - Identify services for which architectures or value chains have to be developed, either for informative or prescriptive purposes
  - Among those services, identify services for which a common EU approach is desirable
  - Exchange information and practices on architectures and value chains
- PD 4: CEDR and NRAs should extend cooperation with other umbrella organisations (TISA, Amsterdam Group, and others, e.g. follow-up to EasyWay)
  - On quality issues and architectures, on a case-by-case approach; concrete examples have to be chosen, based on common priority services

5 Cooperative systems

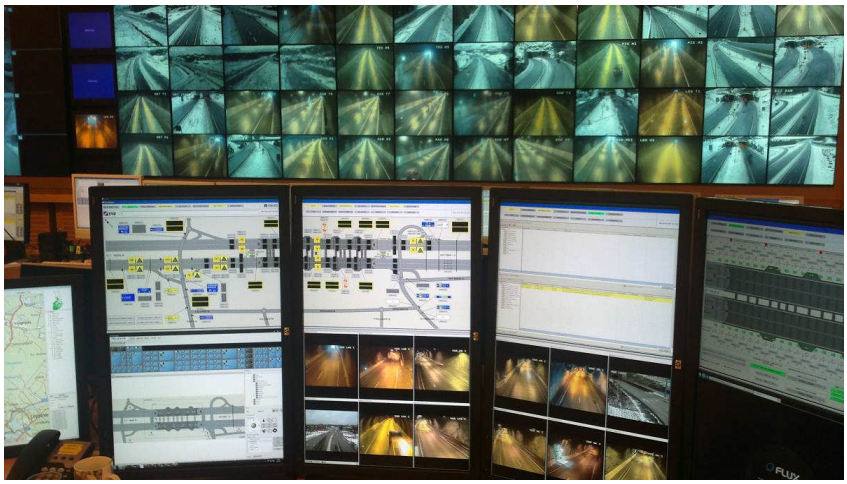
A. Short description

Cooperative systems (CoSy) tend to demand the active participation and simultaneous investments of a number of different stakeholders. Cooperative systems rely on both communication between vehicles (vehicle-to-vehicle) and communication between vehicles and the infrastructure (vehicle-to-infrastructure). They have the potential to greatly improve the safety, efficiency, and sustainability of the road transport system. The cost-benefit assessments carried out in EasyWay indicate that these systems are clearly socio-economically profitable. It should also be noted that the deployment of cooperative systems is high on the European Commission's agenda, and is included in the EU ITS Action Plan.

The implementation of cooperative systems will provide communication and real-time information sharing between a) vehicles and b) vehicles, end-users, and the infrastructure. This will enable the exchange of information that will help enhance road safety, traffic efficiency, and sustainable travel beyond the scope of stand-alone systems. The implementation of cooperative systems will bring innovative services to road users and will support road authorities and road operators in their roles as traffic managers and network operators.

However, the widespread and effective implementation and deployment of cooperative systems requires coordination and cooperation between relevant private and public parties.
The recommendations for NRAs made by the Intelligent Infrastructure Working Group, which was co-chaired by CEDR, were endorsed by the EB in 2010. NRAs recognised that close cooperation between the different stakeholders would encourage an early roll-out of cooperative systems in Europe. The first steps towards this cooperation have been made in the so-called Amsterdam Group. The signed Letter of Intent (between three European road authority umbrella organisations—CEDR, POLIS, and ASECAP—and the European automotive industry in the Car-2-Car Communication Consortium) encourages NRAs to make the next steps together with stakeholders in the development of first cooperative applications.

Figure 5 shows that current cooperation within the Amsterdam Group is just a first step. In addition to the automotive industry, many other stakeholders play an important role and have links with road authorities.



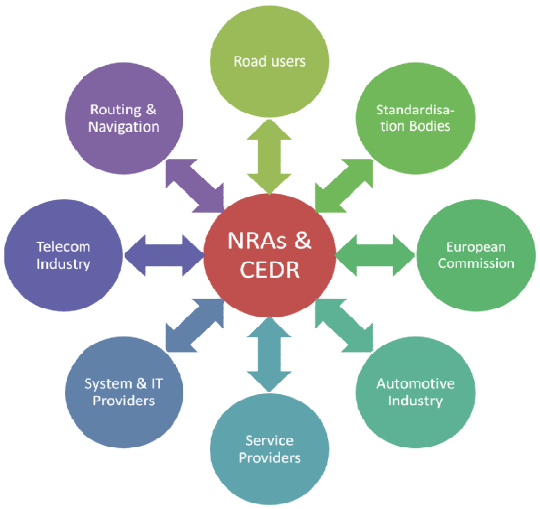


Figure 5: The stakeholders in cooperative systems

B. Strategic importance for NRAs

Cooperative systems will have an influence on the behaviour of the road users and can change investments in ITS applications. Consequently, in order to safeguard the role of the NRAs as 'main traffic managers', cooperation with the private sector will become more important in the future. This holds not only in Europe, but also in the US, Japan, and elsewhere.

In a deployment scenario examined by the EasyWay Cooperative Systems Task Force, the investment by road authorities required for the Trans-European Road Network was approximately €12 million per year for all of the EU-27. Although this is substantial, it represents a modest share compared with the total investment required (€8 billion), which will mostly be provided by the automotive industry, telecom operators, and their customers. In contrast to these figures, NRAs are still regarded as a major player, a fact that is illustrated by the cooperation under the umbrella of the Amsterdam Group.

Cooperative systems deployment also means that in order to improve the reliability of ITS Services, it is necessary to enhance the consistency between dynamic roadside and in-vehicle messages as well as traffic management strategies on national, regional, and local networks.

Cooperative systems will support the further development of multimodal traffic and travel information services.

For NRAs, it is of strategic importance that the implementation of cooperative systems does not conflict and should co-exist with existing infrastructure at a legal, operational, and technical level. Before systems are deployed, the regulatory position of NRAs should be carefully considered in order to optimise service levels and minimise risks.

As already stated in Chapter 4 (Priority services and data quality), the availability and use of different communication channels is an important prerequisite for the delivery of reliable cooperative services. This means that a strategic cooperation not only with the automotive industry (using the short-range communication protocol ITS G5, the current focus of the Amsterdam Group) but also with the telecom industry is necessary (using long-range communication channels). This is illustrated in Figure 6.

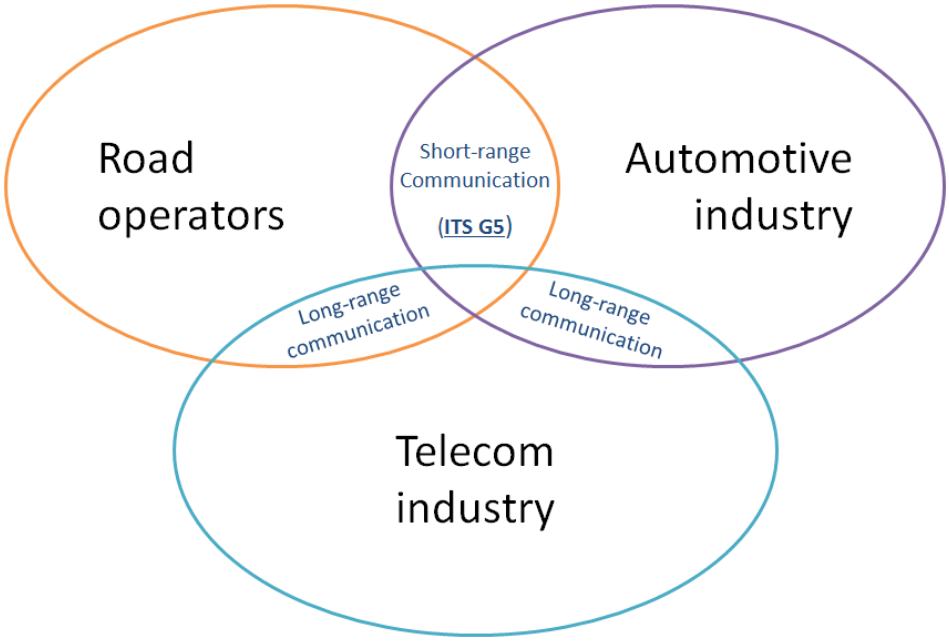


Figure 6: Short-range (ITS G5) and long-range communication channels and the different partners involved

C. Impact on NRAs

The development of cooperative systems should help NRAs to combine these strategic interests

1. Proper road network operation and improved utilisation of the current network
2. Value for money and economies of scale
3. Continuity: future-proof choice

Many different stakeholders are active in this field. This will bring several risks and opportunities for CEDR members:

Risks:

- Traffic management: cooperative systems will lead to modified end-user behaviour. This will affect network operation.
- An increased need for consistency between dynamic roadside and in-vehicle messages: messages need to be synchronised; this is important for user satisfaction.
- The implementation of cooperative systems may conflict with existing systems (such as electronic tolling) and new infrastructure at a legal, operational, and technical level.
- Industry-driven standards for cooperative systems may affect interoperability, including traffic management, which is a core business of NRAs.

Opportunities:

- The successful deployment of cooperative systems would improve innovative and cost-effective network management.
- An increase in service-level requirements is needed for roadside communication systems, especially in the case of time-critical services.
- Extended cooperation is required between national and local road authorities and between authorities and industry.

D. Possible ways forward

The goal for NRAs is to be and to stay a major European stakeholder in the development of cooperative systems.

Possible ways forward	Level of ITS adoption I	Level of ITS adoption II	Level of ITS adoption III
NRAs closely monitor developments in the connected vehicle and road user field in order to react quickly when necessary.	✓	✓	✓
CEDR encourages NRAs to continue with pilots, FOTs, day-one applications and deployment, etc. also in EasyWay Cooperative Systems Taskforce	–	✓	✓
Individual NRAs commit to the deployment of first cooperative applications including signing the Amsterdam group Memorandum of Understanding.	–	(✓)	✓
NRAs take the lead on new infrastructure-related road traffic cooperative system applications.	–	–	✓
NRAs participate in the new road traffic cooperative systems standardisation activities.	–	–	✓

E. Recommendations for CEDR/NRAs

The main goal for CEDR and its members as a major important stakeholder is to lead the development and deployment of cooperative systems. The task group recommends that:

- CoSy 1: CEDR and NRAs should accelerate the deployment of cooperative systems together with strategic partners.
  - Continue co-chairing Amsterdam Group
  - Extend cooperation to other key stakeholders (e.g. telecom industry, routing and navigation industry)
  - NRAs should continue with cooperative systems developments in the EasyWay Taskforce but also in pilots like Field Operational Tests (FOT).
  - Individual NRAs should sign MoUs and start deployment of day-one applications.
  - NRAs should be more active in standardisation work to establish NRA impact on industry-controlled bodies.
- CoSy 2: NRAs should closely monitor developments in the connected vehicle and road user field in order to react quickly when necessary.
  - Cooperative systems as an important issue in SP3
  - Stay informed in a world where the industry is evolving rapidly
- CoSy 3: NRAs should develop strategies for upgrading roadside units to cooperative units.
  - To ensure that investments are being made in systems or technologies, which will be the widely accepted solutions in the long run
  - To harmonise European developments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6 Research guidance

A. Short description

In order to ensure an up-to-date insight into ITS in Europe in different fields (and especially in the field of priority services), applied (trans-)national research is and will be needed. The goal here is to assess the challenges faced by NRAs in embracing new ITS techniques and services and to analyse the potential impact of emerging technologies on drivers, their behaviour, and consequential needs for traffic management in order to get the most out of the road network. Research focuses on short-term deployment (with a horizon of approx. five years) but also covers long-term development to a sufficient degree.

The ERA-NET ROAD II programme (co-funded by the 7th Framework Programme of the EC) was an example of a platform for international cooperation and collaboration in research areas of common interest. CEDR played a role in the guidance for the five mobility projects of this programme (Figure 7) in particular.

- COBRA: Cooperative Benefits for Road Authorities
- SEAMLESS: Seamless Traffic Data Dissemination across Urban and Inter-urban Networks
- QUATRA: Software and Services for the Quality Management of Traffic Data
- RAIDER: Realizing Advanced Incident Detection on European Roads
- STEP: Short-term Prediction

Figure 7: The ERA-NET Road II Mobility projects

Another example is the Forever Open Road (FOR) programme of the Forum of European Highway Research Laboratories (FEHRL). This programme facilitates 21st-century mobility needs and works towards a next generation of advanced and affordable road maintenance and construction. It will enable road operators to broadly adopt innovation while overcoming increasing constraints on capacity, transfer, reliability, and integration. The Forever Open Road programme consists of three key elements: the adaptable road (allowing for flexible responses to demand changes and capacity constraints), the automated road (fully integrating roadside intelligence into user and vehicle applications, traffic management, and road operation itself), and the climate resilient road (ensuring adequate service levels of the road network under extreme weather conditions).

A multi-modal approach to research and innovation is required. The EC White Paper on Transport COM(2011)244 states: 'This will also concern the deployment of smart mobility systems developed through EU-funded research, such as … intelligent transport systems (ITS), and interoperable interconnected solutions for the next generation of multimodal transport management and information systems (…). It will also require an investment plan for new navigation, traffic monitoring and communication services.' To meet these objectives, transport modes should also collaborate at research level. As implementers of research results, NRAs and CEDR should take the lead in developing multi-modal research and innovation programmes with a clear role for ITS.

A proactive input from CEDR would help NRAs to set new strategic research agendas.

B. Strategic importance for NRAs

ITS research assesses the challenges faced by NRAs in embracing new techniques and influencing emerging developments to get the most out of the existing road network. It will also provide a better insight into a rapidly developing market by assessing (new) stakeholders in the ITS arena. Important questions about the roles and responsibilities of both public and private players have yet to be answered. NRAs should use ITS research not only for the development of traffic management, but also on new developments such as:

- the effect of social networks on ITS services
- the effect of rapidly changing forms of communication on the role of NRAs (both technical and social)
- the effect of the wide availability of information flows on the mobility of goods and people
- legal implications (such as NRA liability)
- a comprehensive evaluation of the effects of ITS

C. Impact on NRAs

The results of research meet NRAs' information needs and enable informed decision-making. Setting a joint, transnational, multimodal research agenda will bring more useful results; the road towards implementation of ITS research is shortened.
This on-going work should be continued, but will bring more opportunities than risks to CEDR members:

Risks:

- Pooled funding research programmes require NRA resources (staff and budget)

Opportunities:

- Better insight into a rapidly developing market and improved business cases
- Evidence-based policy: informed decision-making on investments
- Input for deployment strategy (strategic planning)

D. Possible ways forward

Possible ways forward	Level of ITS adoption I	Level of ITS adoption II	Level of ITS adoption III
CEDR/NRAs look for funding (possible co-funding by EC).	✓	✓	✓
NRAs strengthen the R&D links to deployment to ensure quick implementation of results.	✓	✓	✓
CEDR/NRAs identify research needs, set the research agenda, and provide guidance to research projects.	-	✓	✓
CEDR and the NRAs to start/continue pooled funding research programmes with room for innovation.	-	(✓)	✓

E. Recommendations for CEDR/NRAs

The main goal for CEDR and its members is to maximise NRA weight/influence on European developments. In order to achieve this goal, the task group recommends that:

- RG 1: NRAs should initiate the programme management of pooled-funding multi-modal ITS research with room for innovation.
  - Identify multimodal ITS research needs
  - Bundle resources (staff and budgets): economies of scale
  - Look for possible co-funding from the EC, should participate as well
- RG 2: NRAs should strengthen national R&D links to deployment to ensure quick implementation of research results.
  - Bringing research and deployment closer together
- RG 3: CEDR should include ITS on the TRA (Transport Research Arena) agenda.
  - ITS as an important research item for CEDR and the NRAs

7 Other important ITS developments

CEDR has focused on current main developments in the world of ITS as described in the previous six chapters. However, intelligent transport systems represent an increasingly prominent example of converging markets. Traditionally, NRAs developed tailor-made ITS systems and services themselves; nowadays, all hardware—often including complete services—can be purchased almost off-the-shelf. Converging markets are usually characterised by a fast innovation pace, high uncertainty, incomplete standardisation, fast market growth, and intense cross-industry competition. The traditional and obvious value chain of traffic information services is changing into a complex value web with existing and new market players.

Of course, these developments also have an impact on NRAs. For this reason, the task group discussed several of these developments. Since the developments in this field are evolving very rapidly, this chapter will discuss some important ITS developments that will impact on NRAs and therefore need to be monitored in future CEDR activities.

A. Standardisation bodies (CEN/ETSI)

The standardisation bodies CEN (the European Committee for Standardisation) and ETSI (the European Telecommunications Standards Institute) are the main providers of European standards and technical specifications. With one common standard in all European countries, a service can reach a far wider market with much lower development and testing costs.

For NRAs, for example, these standards become important if they decide to deploy cooperative ITS systems. The European Commission has asked the standardisation organisations to develop new common standards for vehicle-to-vehicle and vehicle-to-infrastructure communication to guarantee interoperability. This is formulated in the European Commission's mandate M453.

Both CEN and ETSI have technical committees and working groups dedicated to creating standards for cooperative systems. CEDR members could improve the quality and the tempo of the standardisation process by giving jointly organised and agreed input, from the road operator's perspective (for example by providing functional specifications for cooperative services). They could also play a role in determining the priority of these services, e.g. with so-called 'agreed day-one uses cases' as selected within the Amsterdam group (see Chapter 5).

B. Market developments

Global giants in the ICT industry such as Google, Apple, Nokia, and Vodafone, are rapidly entering the field of transport, having identified huge markets in transport by providing services and products to travellers and hauliers. Some of their services and products relate directly to transport, such as the automated driving advocated by Google, which shows that a global industry giant can make things happen now that would otherwise have been expected to take at least 20–40 years if driven by the public sector. It is not yet clear how the role of mobile telecom operators will develop in the field of transport. They might act as service providers, as data suppliers, or in some other role.

Another example is the development of augmented reality, e.g. Google Project Glass. A trend towards new ways of visualising information and data—both for the public and for the operators in traffic management centres—is noticeable. This is likely to influence changes in driver behaviour and have a consequential impact on the operational needs of the road network.

Transport and travelling have become a growing market for private companies that are operating in what was previously the exclusive domain of NRAs. The US-based company INRIX is rapidly becoming one of Europe's major suppliers of road data and traffic information.

The enormous growth in the use of routing and navigation systems has a major impact on traffic management. The parameters and dynamics of these systems do not always match the traffic management goals of road authorities and might lead to 'unwanted routing': more traffic on roads where authorities do not want more traffic.

There are multiple aspects to this complicated issue: technical improvements, dedicated cooperation between public and private stakeholders, and the behaviour of the end-user. NRAs should keep working together with industry and experts to solve this, to be aware of, or even to influence (some of) the advised routes of the navigation systems and route planners.

These developments indicate that in the future, NRAs might have to deal with stakeholders other than their traditional industry partners. Major (global) IT companies, graphic designers, and multimedia experts might become new industry partners for NRAs. This will also mean that NRAs will need more and specialised (IT) experts (databases, graphics, multimedia, human factors) on their own staff.

Recommendations for CEDR/NRAs

- ADD 1: NRAs should continuously track developments with ITS potential and be pro-active where these developments influence core NRA business.
  - Assess the impact for NRAs and alert CEDR/NRAs to crucial developments
  - Get involved in the developments, see them as opportunities; these are developments CEDR and NRAs cannot ignore
- ADD 2: NRAs should act as professional, pro-active business partners to important (future) market players.
  - Role for CEDR: NRAs should join forces to deal with major technology giants.

C. Open platforms and open data

Reliable, available, and usable data and information are of the utmost importance for many (new) ITS Services. As a result of the development of open data and open platforms, public data is becoming increasingly accessible. The trend is likely to continue and gather speed. This is strongly supported by the European Commission and by most European governments, based on the EC Directive on the re-use of public sector information and the INSPIRE Directive, which establishes an infrastructure for spatial information in Europe.

The requirement for open access to public data that is free of charge also applies to data owned by NRAs. Some NRAs are centralising traffic data in national traffic data warehouses. A new trend is already emerging, namely that these data warehouses might also include public transport data and will become centralised multi-modal traffic data warehouses. The quantity and quality of traffic data will increase and feed information services (both public and private).

The exact outcome of these developments for NRAs is still uncertain. There will be several opportunities, such as the possibility of data mining, merging, and the harmonisation of all kinds of transport-related databases that will improve and simplify operational traffic management and multimodal services. There will be challenges as well, such as the liability of authorities in relation to the quality of traffic data. The performance of the network operated by NRAs will be monitored by third parties based on easy access to open data.

Recommendation for CEDR/NRAs

- ADD 3: NRAs should optimise the impact of open platforms and open data on core NRA tasks.
  - CEDR and the NRAs need to determine and anticipate the opportunities and risks involved, and take action in close liaison with the EC when and where such action is relevant.
  - CEDR and the NRAs should get involved in developments, view them as opportunities; these developments cannot be ignored.

D. Policy issues: liability

The open data policies, steps toward automation of vehicles and road traffic, increasing reliance on traffic-related ITS services, and other developments increase the risk of liability-related issues (such as court cases). CEDR should encourage the NRAs to elaborate on the related risks and to develop measures to reduce and mitigate these risks.

When taking steps towards automated driving, for example, attention should be paid to compliance with regulatory law and liability issues (product liability, road traffic liability):

- Driver assistance and partial automation are already possible today. Going beyond this—i.e. levels of high or full automation—would definitely require a new approach to the legal framework for road traffic. Otherwise, drivers would breach their legal obligations.

- In order to control product liability risks, vehicle manufacturers have to prevent the reasonably foreseeable misuse of systems. User instructions are decisive here. When damages occur during highly and fully automated driving mode, this would in principle lead to additional manufacturer's liability. Road traffic liabilities are not fully harmonised within the EU. However, because the driver's liability (at least according to German law) is restricted to situations where the driver is clearly at fault as a result of his/her own actions, this liability would be no longer applicable in modes of high and full automation.

One potential measure to reduce and mitigate risks when providing services and deploying ITS systems and infrastructure might be to develop and utilise European codes of practice. However, there are a lot of on-going activities concerning the consideration of liability issues in relation to the ITS Action Plan and the iMobility Forum. For this reason, it is not yet possible to draw any final conclusions on the way forward.

Recommendation for CEDR/NRAs

- ADD 4: NRAs should assess the results of the on-going ITS Action Plan/iMobility activities when deciding on the next steps in addressing potential legal issues.

8 Achievements and conclusions

Task group 14 (Roles and responsibilities of NRAs in ITS) has reached all of its objectives. The task group worked on its activities between 2009 and 2013. Its mission was to 'obtain an overview of the ITS developments and define the role and tasks of NRAs and of CEDR to cope with these initiatives and so contribute to a better integrated transport system' (source: Terms of Reference of task 14).

The task group started with three topics: the European ITS Directive, EasyWay, and eSafety. This work plan was extended to include three more: priority services and data quality, cooperative systems, and research guidance. CEDR could easily have added twice the amount of topics.

The group succeeded in prioritising the six major developments and in presenting a strategic assessment and recommendations. Essentially, these recommendations underscore the need for NRAs to be proactive in relation to key developments such as the ITS Directive, iMobility, and connected vehicles. NRAs need to establish and maintain a structure for communication and cooperation with the EC and important stakeholders and projects at different levels.

ITS will continue to be a very important item on the agenda of the European Commission, with clear goals in the EC ITS Action Plan. Since the EC priority actions are very diverse, urgent ITS issues need to be addressed by CEDR. This task group was a real team of experts. However, future work in this areas is likely to be even more specific and will require different expertise for each item. For future ITS-related tasks, CEDR should facilitate a dynamic task organisation and interlink task groups working on relevant ITS issues. The need for this is illustrated by the fact that in the summer of 2012, CEDR and the NRAs only had eight days to react to draft specifications from the EC.

This chapter summarises CEDR's achievements on the major ITS issues and briefly outlines the ways forward.

1. ITS Action Plan and Directive

The task group drafted a CEDR ITS Positioning Paper (which was approved by the GB in 2011). This paper has proven helpful to NRAs when developing their own strategies. The application of Mrs Lena Erixon for a seat in the European ITS Advisory Group was strongly supported by CEDR and resulted in membership of this group. CEDR continuously exchanged information about national ITS initiatives, thereby creating an international discussion forum for such initiatives. This had proven added value. CEDR discussed possible ways of harmonising the transposition of the EC ITS Directive into the national laws of the member states. Studies and communications on the ITS Action Plan were discussed, and some questionnaires from the European Commission were answered on behalf of cooperating European NRAs. The participation of the EC as an observer at meetings of the task group proved very beneficial for both organisations.

CEDR should continue to monitor the work of the EC on the specification of ITS services and should be pro-active in this process. In this fast-developing world, NRAs need to react quickly and dynamically to ITS-related study reports, consultations, and various draft specifications. A good relationship with the European Commission is essential if CEDR is to have an impact on the choice of future priority actions. By using a three-level approach (at strategic, tactical, and operational level), CEDR will become a pro-active and reliable partner.

An important step for the next few years is the implementation of EC ITS specifications in national policies and activities.

2. EasyWay

EasyWay and CEDR signed a Memorandum of Understanding in Rome in 2010, mainly to cooperate on the development of deployment guidelines. The task group produced a CEDR reaction to the EasyWay Deployment Guidelines. In return, EasyWay knowledge has been used to shape CEDR views on ITS specifications from the European Commission.

NRA experts and practitioners responsible for the adoption and implementation of ITS at national level need good links to European developments. It is therefore necessary to bridge the gap between the strategic level and the tactical/technical experts of NRAs. This depends on the future of EasyWay beyond 2012. However, the task group recommends establishing formal contact between the CEDR EB and the possible EasyWay 3 Steering Committee. EasyWay results—such as the deployment guidelines—need to be adopted at national level; via CEDR, the NRAs can share a joint approach in adopting these results. The discussion about a possible role for CEDR as the host for DATEX needs to be finalised.

3. iMobility (eSafety)

CEDR is represented in the iMobility/eSafety Forum Steering Group, and CEDR members have been active in working groups, co-chairing the working groups on intelligent infrastructure, implementation roadmaps, and clean and efficient mobility. In this way, CEDR is steering developments in domains that are important for NRAs. CEDR members also participated in the work of many other working groups.

CEDR members should stay active in the iMobility working groups. The main reason for doing so is that iMobility is an ideal platform that allows NRAs to establish links to industry partners. In this way, NRAs can influence priorities in research, innovation, and investment. For this reason, the task group recommends that CEDR also remains active in the iMobility Forum Steering Group.

4. Priority services and data quality

Since the future of information services will be a co-production between public and private parties, CEDR has launched cooperation with TISA, the Traveller Information Services Association. The work resulted in the definition of the traffic information value chain. Extensive work was done on traffic data quality, including a comprehensive survey that gave a useful insight into the state of the art in Europe.

CEDR and the NRAs need to stay closely connected to the EC specification process, specifically for topics where priority services and data are relevant. In the coming years, the EC ITS specifications become mandatory and will be implemented. The EC specification process will have an impact on national regulations. This is why CEDR has to alert the NRAs to important developments. The work on data quality needs to be continued as well, because it is likely to become much more important in the coming years, also due to quality requirements included in the EC specifications.

5. Cooperative systems

The main recommendations of the Intelligent Infrastructure Working Group to NRAs were to initiate a European platform for the development and deployment of the first cooperative services. This was strongly supported by CEDR: CEDR initiated and co-chairs the Amsterdam Group, a cooperation of three European umbrella organisations of road authorities/operators and of the joint European automotive industry.

The Letter of Intent for cooperation within the Amsterdam Group has been signed by all partners. With this, CEDR established a link to the car industry. The members of the Amsterdam Group are now defining functional descriptions of the first applications of cooperative systems and services.

CEDR and the NRAs should continue their collaboration with stakeholders on cooperative systems. Not only at a technical level for all feasible communication alternatives, but also at strategic level, defining business cases and policy issues. It is also recommended that CEDR and the NRAs look at the deployment of cooperative systems at regional/local road level, by extending cooperation with the relevant stakeholders (e.g. POLIS).

6. Research guidance

CEDR identified the most (ITS)-relevant projects within ERANET. CEDR established an information exchange by inviting research project leaders to task group meetings and providing support by keeping them informed about relevant projects.

CEDR should maintain its links with relevant research programmes, especially those with a focus on multimodality. This could be established by organising interaction and inviting research project leaders to CEDR meetings. CEDR and NRAs should try to have an impact on the content of research calls (e.g. from ERANET or the EC). ITS-related tasks should act as a feeder for CEDR research-related tasks by adding a horizon: identifying the most important ITS research questions.

7. Other important ITS developments

Intelligent transport systems represent a prominent example of converging markets. Traditionally, NRAs developed tailor-made ITS systems and services themselves; nowadays, all hardware and software—often including complete services—can be purchased almost off-the-shelf.

Standardisation bodies are working towards a minimal set of standards to guarantee interoperability. NRAs need to stay involved in this process in order to influence it.

Major industry partners such as Google, Apple, Nokia, INRIX, and others are rapidly entering the field of transport. They will invoke changes in driver behaviour and, consequently, affect the operational needs of the road network.

As a result of the development of open data policies, public data is becoming increasingly accessible.

All these developments are likely to result in an increased risk of liability-related issues for NRAs. NRAs should consider mitigating these risks by utilising codes of practice.

For a detailed description of the activities carried out by the team, a background report describing all major activities will be published in the spring of 2013. This report could act as a transfer document for future CEDR activities, including the current state of affairs in ITS.

9 Prioritisation of the recommendations

A. Recommendations for NRAs

The report contains a total of 23 recommendations for both CEDR and CEDR members. Seventeen of these recommendations are addressed to NRAs. These recommendations are prioritised below using the concept of the 'level of ITS adoption' (I: followers, II: majority, III: leaders). Recommendations for all NRAs are the most important. This report does not classify individual countries or regions for the final report; it is up to each country or region within a country to determine its own position. The prioritisation for an individual NRA naturally depends on the policy focus and priorities in its country.

Recommendations for NRAs	Level of ITS adoption		
	I	II	III
ITS 1: CEDR and NRAs should be proactive on EU specifications.	✓	✓	✓
EW 1: NRAs should actively participate in EasyWay and follow-up projects.	✓	✓	✓
PD 1: NRAs should determine their strategic and legal position on priority services on their home market.	✓	✓	✓
ADD 2: NRAs should act as professional, pro-active business partners to important (future) market players.	✓	✓	✓
IM 2: All NRAs should consider participating in one or more iMobility working groups.	✓	✓	✓
CoSy 2: NRAs should closely monitor developments in the connected vehicle and road user field in order to react quickly when necessary.	✓	✓	✓
RG 2: NRAs should strengthen national R&D links to deployment to ensure quick implementation of research results.	✓	✓	✓
ITS 3: NRAs should establish a structure for the consistent and active exchange of information concerning the ITS Action Plan and Directive		✓	✓
ADD 1: NRAs should continuously track developments with ITS potential and be pro-active where these developments influence core NRA business.		✓	✓
ADD 4: NRAs should assess the results of the on-going ITS action Plan/iMobility activities when deciding on the next steps in addressing potential legal issues.		✓	✓
PD 2: NRAs should, with the support of CEDR, identify optimum information and data quality for core services.		✓	✓
IM 1: NRAs should actively participate in the relevant iMobility working groups.		✓	✓
ADD 3: NRAs should optimise the impact of open platforms and open data on core NRA tasks.		✓	✓
CoSy 1: CEDR and NRAs should accelerate the deployment of cooperative systems together with strategic partners.		✓	✓
PD 3: NRAs should, with the support of CEDR, further explore the need for value chains or architectures.		✓	✓
PD 4: CEDR and NRAs should extend cooperation with other umbrella organisations.		✓	✓
RG 1: NRAs should initiate the programme management of pooled-funding multi-modal ITS research with room for innovation.		(✓)	✓
CoSy 3: NRAs should develop strategies for upgrading roadside units to cooperative units.			✓

B. Recommendations for CEDR

Prioritisation of the recommendations for CEDR

Ten recommendations are addressed to CEDR as an organisation. In order to prioritise all these recommendations, the following aspects were identified:

a. The first actions that CEDR would need to take as a result of the recommendation (WHAT?).
b. The person/entity within CEDR who would be responsible for these actions (WHO?).
c. The timetable for the action suggested by the recommendation (WHEN?)

Recommendations were prioritised as follows:

- URGENT= action should be taken in the first half of 2013
- HIGH = action should be taken in 2013
- MEDIUM = action should be taken at a later stage

Follow-up of the recommendations for CEDR

A detailed description of the actions needed can be found in the table below.
Since urgent actions need to be launched in the first half of 2013, the members of CEDR task group 14 will initiate them.

The 5 most urgent actions (i.e. the actions that have to start in the first half of 2013) are:

- ITS 1: CEDR and NRAs should be proactive on EU specifications.
- ITS 2: CEDR should organise a three-level cooperation with the EC.

- EW 2: CEDR should support EasyWay towards EC as the NRAs' deployment programme
- PD 2: NRAs should, with the support of CEDR, identify optimum information and data quality for core services.
- CoSy 1: CEDR and NRAs should accelerate the deployment of cooperative systems together with strategic partners.

Actions that are considered to be 'high' or 'medium' priority should be put on the agenda of the first meeting of task group N7 (Utilising ITS for NRAs) at the start of CEDR's Strategic Plan 3. The ITS task referred to in the table below means Task T14 in actions until 2013 and Task N7 in the actions from 2013 onwards.

Recommendations for CEDR	What?	Who?	When?
ITS 1: CEDR and NRAs should be proactive on EU specifications.	Prepare common views a. Separate but coordinated reactions b. Brief the CEDR member in the ITS Advisory Group (see also ITS 2)	ITS task chair and thematic domain	URGENT Because of the EC's schedule
ITS 2: CEDR should organise a three-level cooperation with EC.	a. Set up a meeting at strategic level between CEDR and the EC b. Re-establish the EC's observer role in CEDR's ITS task group c. Send a CEDR expert as an observer to EC Expert Group meetings on priority actions of the ITS Directive.	a. ITS task chair b. CEDR's representative at the strategic meeting c. CEDR's representative at the strategic meeting	URGENT Because of the EC's schedule, these actions need to be initiated before start of SP3.
EW 2: CEDR to support EasyWay towards EC as the NRAs' deployment programme	a. T14 message for the preparation of the EasyWay successor programme: make sure that NRAs have coordinated approach b. In the strategic meeting with the EC (see ITS 2), the importance of coordinated NRA proposals for the follow-up of EasyWay (TEN-T) should be emphasised	a. The ITS task chair contacts the EasyWay successor programme b. The ITS task chair puts this on the agenda of the meeting with EC	URGENT Because of the timeline of the TEN-T call
PD 2: NRAs should, with the support of CEDR, identify optimum information and data quality for core services.	a. CEDR T14 1. Action C of the ITS Directive: NRAs work together on quality levels 2. Action B of the ITS Directive: NRAs work together on quality levels 3. Cooperative services (day-one applications) b. CEDR should support an information exchange platform between NRAs and CEDR members	a1 ITS task a2 ITS task a3 ITS task members who are also in the Amsterdam Group b SP3 / ITS task	a1 URGENT a2 URGENT a3 URGENT Because of the EC's schedule b HIGH as many NRAs are focusing on this topic
CoSy 1: CEDR and NRAs should accelerate the deployment of cooperative systems together with strategic partners.	a. Continue support for and co-chairing of Amsterdam Group (as a forum) b. Extend cooperation and information exchange to other key stakeholders (at least co-chair these initiatives) c. Continue cooperation with EasyWay CoSy Task Force or follow-up projects and with the European FOTs d. CEDR should consider assuming a leading role of information exchanger if there is NO follow-up to EasyWay.	a. Member of ITS task b. N7 c. CEDR EB members at the level of the Steering Committee; N7 members at project level d. N7 proposal to CEDR EB/GB	a. URGENT b. HIGH c. HIGH Because of the importance of cooperative systems for several NRAs d. MEDIUM

Recommendations for CEDR	What?	Who?	When?
RG 3: CEDR should include ITS on the TRA (Transport Research Arena) agenda.	a. Improve the inclusion of ITS on the research agenda b. Motivate CEDR ITS experts to be present at TRA and/or contribute to papers c. More NRA experts in review role for TRA papers	a. CEDR secretariat b. N7 experts to participate in TRA c. N7 experts	HIGH Because of timetable for TRA (April 2014)
EW 3: CEDR should liaise with EasyWay and follow-up projects.	CEDR members (= individual NRAs) should improve information/ knowledge exchange between EasyWay and CEDR representatives. The goal is to avoid double or parallel work on the same topics.	ITS experts from NRAs: representatives who are in both EasyWay (or follow-up) and CEDR ITS task	HIGH Should be established in 2013 because the follow-up to EasyWay will start in 2013
IM 3: CEDR should actively participate in the iMobility Steering Group.	T14 chair / N7 chair should also be a member of the iMobility Steering Committee.	CEDR ITS Task Group Coordinator	HIGH should be established in 2013 because N7 starts in 2013 and liaison should be established from the start
PD 4: CEDR and NRAs should extend cooperation with other umbrella organisations.	Identify a contact person for information exchange and collaboration activities with umbrella organisations such as: a. TISA b. Amsterdam Group (as a forum) c. Connected Vehicle d. POLIS e. FEHRL R&D network (at strategic level)	CEDR ITS Task members, persons to be defined	HIGH – MEDIUM (within SP3) The need for cooperation with umbrella organisations will arise in 2013
PD 3: NRAs should, with the support of CEDR, further explore the need for value chains or architectures.	CEDR should support NRAs in their need for value chains/architectures by identifying services for which this is relevant and that are of common interest. Purpose: ITS Directive	N7	MEDIUM On-going topic during SP3

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