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Intelligent Transport Systems and other technological applications for Rail Transport

Draft UNECE Road Map for promoting ITS – 20 global actions 2012 – 2020

Note by the secretariat

At its seventy-second session, the Inland Transport Committee (ITC) was informed that the development of an ITS Road Map was progressing. The Committee supported the need for deploying ITS work in all transport modes and invited its subsidiary bodies to contribute to elaborating the Road Map by incorporating ITS into their programme activities (ECE/TRANS/208, para.97). For this purpose the secretariat has prepared the draft UNECE Road Map for promoting ITS that identifies 20 global actions to be undertaken to deploy ITS. These 20 actions reflect the input received from governments, businesses and academia through the UNECE public consultation on ITS (March – July 2011).

ITS and information technologies have been dealt with by several Working Parties to enhance inter-modal coordination. An ITS focal point was nominated during the 2008 reorganization of the Transport Division. This ITS related work has been assisted by a Junior Professional Officer / Associate Expert staff member funded by the German government. The ITS strategy package has been supported by the Italian government.

The secretariat believes that the proposed actions in the Road Map could mostly be implemented without programme budget implications, i.e. within the current meeting time allocated to ITC and its Working Parties and within staff resources currently allocated to the UNECE Transport Division. Working Parties are invited to check that this assumption is correct as far as their own current and future ITS activities are concerned.

Actions 18–19, however, would require additional resources (regular or extra-budgetary). Any expansion or acceleration of legislative work, in particular work related to the interactions between WP.29 and WP.1, would warrant additional resources.

The draft Road Map, reproduced below, is distributed to all relevant Working Parties, in particular the World Forum for Harmonization of Vehicle Regulations (WP.29), the Working Party on the Transport of Dangerous Goods (WP.15), Working Party on Inland Water Transport (SC.3), Working Party on Intermodal Transport and Logistics (WP.24), Working Party on Rail Transport (SC.2), the Working Party on Road Traffic Safety (WP.1), the Working Party on Road Transport (SC.1) and the Working Party on Transport Trends and Economics (WP.5) for consideration and comments before final submission to the ITC for adoption.

The reasons for the UNECE Road Map on Intelligent Transport Systems (ITS)

1. Intelligent Transport Systems are increasingly considered as a part of the solution to current and future transport challenges. They are becoming widely accepted as an instrument towards achieving efficient, safe and overall sustainable mobility while at the same time contributing to a better quality of life. Already in 2003, the UNECE Inland Transport Committee (ITC) identified the use of telematics and Intelligent Transport Systems (vehicles, infrastructure) as an issue that could become a major challenge for the future, or possibly change direction of its work. This conclusion led to the organization of a Round Table on Intelligent Transport Systems under the auspices of the World Forum for Harmonization of Vehicle Regulations in 2004, another building block in developing the UNECE strategy on development of legislative and practical implementation of ITS.
2. Figure 1 – shows in a simplified way the interactions between ITS applications and the real world. It also shows a wide range of applications of ITS to solutions and benefits for different aspects of transport services (safety, efficiency, traffic management). It also illustrates that ITS is a technology that brings around transport policy solutions (efficiency, traffic management etc.). However, it is also more than technology since it calls for new institutions, new ways for mobility and transport services. In addition, as an industrial product it is part and target of international trade; and at the same time – when harmonised – it is the means for smooth logistics and supply chain management.
3. ITS is often seen as the new mode of transport or at least the modal integrator that can improve traditional transport performance and can strengthen its position in sustainable development.
4. Notwithstanding its benefits, the use of various ITS solutions still continues to face different obstacles. It was felt that to overcome these barriers the formulation of a common strategy for the future implementation of ITS solutions was the necessary next step.

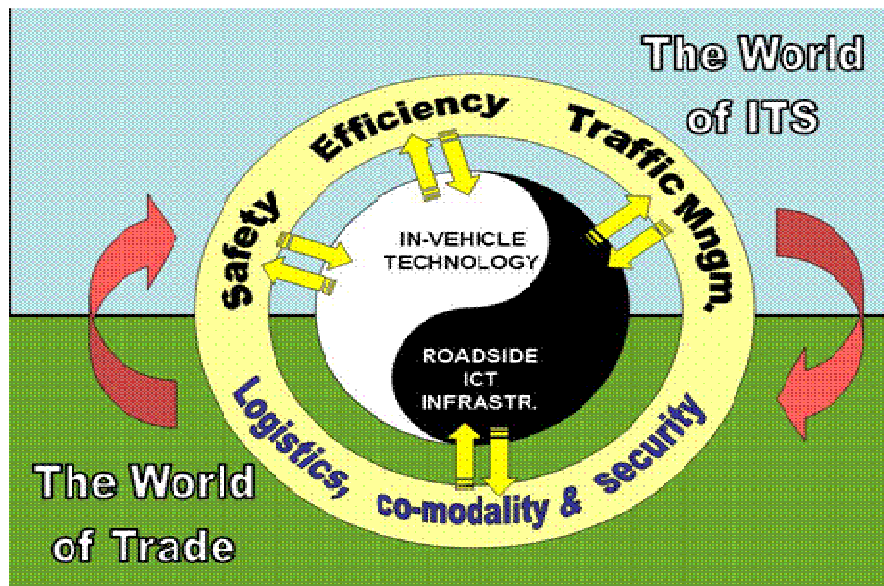


Figure 1 – Process of evolution of ITS – the integration with other transport services

5. The main objective of the United Nations Economic Commission for Europe (UNECE) is to promote economic integration. It brings together 56 countries, members of the European Union (EU), as well as non-EU Western and Eastern European countries, and member countries in South-East Europe, Central and Western Asia and North America. The Inland Transport Committee was created in 1946 to facilitate the international movement of persons and goods by inland transport modes and improve safety, environmental protection, energy efficiency and security in the transport sector to levels that contribute effectively to sustainable development. Furthermore, the UNECE administers the UN inland transport and vehicle agreements that have a global outreach. **In achieving its mission, the ITC and the UNECE secretariat launched a strategic review on how Intelligent Transport Systems can contribute to this goal and how UNECE can promote the use of ITS solutions.** The review package consists of:

- a background paper that has the primary objective to share information (including best practices) and raise awareness about the values ITS solutions can deliver;
- a strategic note that attempts to identify the main gaps in and impediments to the broader use and faster dissemination of ITS applications irrespective which organizations, institutions or bodies can or will fill the gap; and
- this Road Map that outlines the areas and lists the activities UNECE can embark upon either as a continuation of on-going tasks or as new initiatives.

6. The draft strategic note was subject to a public consultation and the comments received from Governments, businesses and academia, are now incorporated in the final note, as well as in this Road Map.

20 global actions to promote the use of ITS

Action 1 Reaching common definition for ITS

7. Applying information technologies in inland transport is generically named “Intelligent Transport Systems” (ITS). However, the ITS framework which provides the ability to gather, organize, analyze, use and share information about transportation systems have different boundaries. Differing economic and development priorities of Governments and institutions drive ITS deployment in different directions. Accordingly, this leads to a lack of understanding, thus a commonly agreed upon definition of ITS is warranted.

8. A myriad of variations exists and different definitions are used. As a global partner, UNECE endeavours to facilitate the dialogue about ITS deployment, which should lead to a common definition that is used by all stakeholders. This definition should be designed in a holistic way.

Action 2 Harmonising policies

9. The lack of harmonized policies for ITS deployment at global, and in particular at the Pan-European level hampers the implementation of already existing solutions. In this context, the UNECE offers an advantageous platform through its intergovernmental structures (such as the World Forum for Harmonization of Vehicle Regulations and other Working Parties) to lead and collaborate in shaping key ITS strategies, such as harmonization and deployment.

10. Within such a framework, ITS infrastructure and services could be more effectively planned and, coordinated, and efficiently implemented both in terms of technical regulations and legal instruments. When developed through harmonized national policies, a common ITS deployment strategy would be more effective in offering a reliable, safe and seamless journey both for freight and passengers at a global level.

Action 3 Forging International cooperation

11. The evaluation and assessment of results obtained from the UNECE public consultation on ITS clearly showed that Governments and stakeholders support the work of UNECE in this field, especially its regulatory work. In addition, its bridging function as the platform for international cooperation in transport, in particular with non-EU countries is seen as an added value.

12. International cooperation is considered essential for a successful change towards future needs for mobility. UNECE is encouraged to continue working in close cooperation with the European Union, International Organizations and other relevant stakeholders.

Action 4 Facilitating interoperability and the ITS architecture

13. Innovative technologies in various transport fields are rapidly developing and made available. Given that the design and industrial development cycle of innovative technologies is shorter than the policy cycle, national regulatory authorities often lag behind, but this is particularly evident at the international level. This leads to technical fragmentation and eventual interoperability issues within and across the countries. Therefore, efforts to speed up development and implementation of regulations and agreements on technical and technological compatibility are warranted.

14. Some countries, like Japan and the United States of America have opted for an ITS architecture to avoid the problem of lack of interoperability and compatibility, and at the same time to ensure the necessary freedom for innovations and entrepreneurial initiatives. The ITS architecture offers a technology neutral map of services incorporating current systems into future strategies. With a properly developed and implemented architecture, Governments and stakeholders can identify both the services required by users and the sources of data for those services. Such architecture can also describe how to optimize, coordinate, structure and share data sources and information services for the common benefit of the users.

15. Additionally, through the sharing of data, services and information, the overall cost and the cost of providing each component of the system are reduced. The ability for the private sector to operate effectively is enhanced because already available data from existing systems could be shared at a lower cost.

16. The European Union (EU) has launched major initiatives to overcome the slow and fragmented uptake and deployment of ITS in road transport. The European Commission's ITS Action Plan and — in the form of the ITS Directive — dedicated EU legislation on ITS together constitute a concerted policy framework to boost ITS across Europe. With these two complementary elements in place, the EU Roadmap is now clearly set and the tools are available to bring ITS deployment into a new era where integrated, interoperable systems and seamless transport services become the norm for Europe's road transport system. EU Directive 2010/40 of the European Parliament and of the Council on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport was adopted in 2010 and entered into force later that year. The deadline for transposition by member States was set to February 2012.

17. This development is an encouraging step towards the systematic and comprehensive implementation of ITS in the EU member countries. However, the full effect and the benefits of the ITS implementation could only be achieved and multiplied if a complementary strategy is developed for all other non-EU UNECE member countries at the pan-European level. It is with this objective that the UNECE Road Map and Strategy for promoting ITS is being developed to harmonize and ensure full coverage and implementation of the commonly adopted strategy throughout its 56 member countries.

Action 5 Ensuring data security

18. Security and privacy concerns could become potential barriers to ITS deployment. Data losses and the danger of identity theft could reduce the potential performance and benefits of ITS. ITS have to be implemented by way of viable business cases that require consistent standards and regulations on liability and highest levels of security for personal data. Future UNECE ITS legislation will ensure protection of privacy and data security.

Action 6 Scaling up the work on ITS in all Working Parties of the UNECE Inland Transport Committee (ITC)

19. In the transport sector the area of work Intelligent Transport Systems needs strengthening. The Transport Division’s responsibility will be improving access to high-quality information on available ITS and their meaningful integration into the work of the intergovernmental bodies, e.g. through best practices. All Inland Transport Committee (ITC) Working Parties are encouraged to incorporate ITS related topics into their agendas.

20. All UNECE Working Parties should continue:

- (a) to align their work with sustainable mobility principles that include safe, efficient, environmentally friendly and affordable transport services, and
- (b) to determine how relevant ITS solutions could assist in bringing this about.

21. Figure 2 – indicates the core values of UNECE one can build on in promoting the use of ITS (convening power, legal instruments, harmonisation activities etc). It also positions UNECE as one among the key stakeholders with whom close cooperation is envisaged to avoid duplication and to leverage the activities and results of the players, governments, governmental bodies, industries and academia. In fact, UNECE can become a gateway or an institutional world forum for ITS.

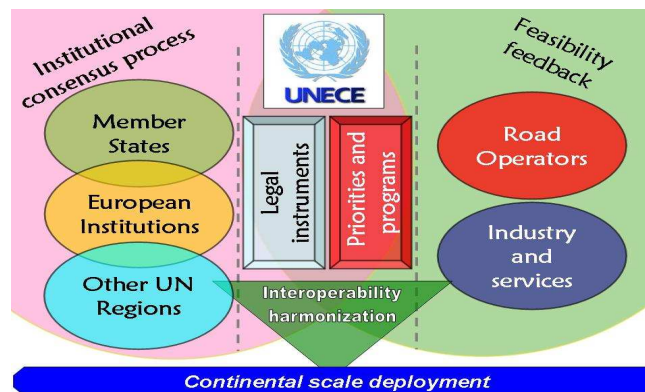


Figure 2 – UNECE as an Institutional World Forum for ITS

Action 7 Promoting vehicle to infrastructure communication

22. The World Forum for Harmonization of Vehicle Regulations (WP.29) is introducing technological innovations in vehicles by regulations that are applicable on worldwide scale.

23. As a basic innovation, cooperative systems bring infrastructure and vehicle related intelligent transport devices that are active and ‘cooperate’ in order to perform a common service. Consequently, in cooperative systems, communication could be vehicle-to-vehicle or vehicle-to-infrastructure.

24. Advanced Driver Assistance Systems (ADAS) technologies are important advances in vehicle safety and the optimization of their potential benefits is crucial. In 2002 WP.29 established an ITS Informal Group to consider the necessity for a regulatory framework on ADAS, which are becoming more common in vehicles.

25. The development of provisions for ADAS — such as Lane Departure Warning Systems (LDWS) and Advanced Emergency Braking Systems (AEBS), the actions of which are restricted to emergency situations — are expected to bring about draft regulatory text proposals that will take the form of new stand-alone UNECE Regulations under the 1958 Agreement. According to an impact assessment made by the European Commission, the mandatory measures of these systems can prevent the loss of around 5,000 lives and avoid 35,000 serious injuries a year across the EU27.

26. Additionally, the World Forum invited the UNECE Road Safety Forum (Working Party on Road Traffic Safety – WP.1) and the Working Party on Road Transport (SC.1) to devote special attention to and accelerate their work on:

- raising awareness on the safety issues and missed opportunities with non-communicating infrastructure;
- infrastructure standards to promote vehicle to infrastructure and vehicle to vehicle communication (AGR, Convention on Road Signs and Signals).

Action 8 Promoting vehicle to vehicle communication

27. Vehicle to vehicle (V2V) communication can be defined as the cooperative exchange of data between vehicles through wireless technology, with the objective of improving road safety, mobility, efficiency and improving the use of road capacity

28. Cooperative systems are expected to make use of state-of-the-art communication facilities to allow the driver access to all road and traffic information.

29. Imagine using one single device on board of your vehicle into which you may plug-in and synchronise your mobile phone, iPad or laptop and access all relevant information via one application. Close cooperation between UNECE, the International Telecommunication Union (ITU) and the International Standard Organization (ISO) is essential and will be further broadened on frequencies and international standards.

30. The competent UNECE body where actions are requested by Governments and global players, has yet to be identified regarding cooperative systems in the domain of information technologies.

Action 9 Fighting the road safety crisis

31. UNECE is actively involved in the regional and global implementation of the UN General Assembly Resolution 64/255 Improving global Road Safety and has ambitious

plans for a series of road safety activities to educate, raise awareness, to induce action and to create dynamic and effective responses to the road safety crisis. Those actions will be performed primarily by — but not limited to — the Road Safety Forum (Working Party on Road Traffic Safety – WP.1) and the World Forum for Harmonization of Vehicle Regulations (WP.29), including promoting accession to and, where necessary, more effective worldwide implementation of UNECE legal instruments.

Action 10 Addressing the liability concerns

32. The 1968 Convention on Road Traffic states that “*Every driver of a vehicle shall in all circumstances have his vehicle under control....*” How are ITS solutions linked to the issue of liability? Devices that assist the driver to drive safely already exist. UNECE has played a crucial role in that development. Some of these technologies (e.g. navigation systems, cruise control and systems used to optimize the braking of vehicles) are already widely used and have contributed to fewer accidents and better fuel consumption.

33. Other vehicle-based systems are at various stages of development and will be incorporated into UNECE Vehicle Regulations later. ITS devices are also widely applied in traffic management and control through, for example, variable message signs, speed cameras, electronic vehicle detection and toll charging systems, and vehicle positioning and tracking.

34. The current critical debate concerns devices that act on behalf of the driver, or even override the driver’s decisions. While driver assistance systems contribute to intelligent and efficient mobility as well as to efficient and safe roads, they also introduce new challenges. For example, in a system failure and accident situation: who is legally liable? In some European countries, for example, the law in this respect clearly states that the liability of driving remains exclusively with the driver.

35. WP.1 and WP.29 already closely cooperate on this matter and will present a solution in the near future, particularly in the case of ADAS systems.

36. To bridge the gap, an agreement over the following overarching principle is emerging: ITS assisted driving is in harmony with the current legal instruments, while most of the governments are not ready to accept ITS that replace driver’s decisions.

Action 11 Harmonizing Variable Message Signs

37. The Working Party on Road Traffic Safety (WP.1) established an ad hoc group of experts on Variable Message Signs (VMS). Its wider mandate is to analyze new technological developments that increase road safety and to draw up proposals for including these developments in the relevant United Nations legal instruments.

38. The VMS expert group proposes that WP.1 considers restructuring the 1968 Convention on Road Traffic according to the following groupings:

- Road markings
- Posted signs
- Electronic signs

39. The idea behind this proposal is that *we need controlled change in order to keep cohesion* of road displays, whatever the signing domain, particularly between posted and electronic signs (shapes, design principles, contents). As it turned out in the case of VMS and their heterogeneous use through different European administrations, there is the real

danger today that competing industries driven by marketing interests could take road signing for promotion purposes of particular brands (more fashionable, aesthetics, etc.).

40. Electronic signing, in principle, concerns the following devices:

- Traffic lights
- Traffic signals
- VMS

41. Consensus is sought for all types of road signs as a new platform for current and future work. At a later stage, an implementation programme will be warranted. This means: (a) Reform following a step by step approach, and (b) Consider the main issues, the main pictograms, creating proposals, etc.

Action 12 Making Transport of Dangerous Goods less dangerous

42. The Working Party on the Transport of Dangerous Goods (WP.15) will continue to further consider how ITS applications such as telematics could be used to improve safety, security and facilitate the transport of dangerous goods by using monitoring and tracking systems linking consignors, transport operators, emergency responders, enforcement and control authorities and regulators.

Action 13 Integrating with Rail Transport

43. Interoperability is a key for improving rail infrastructure and thus the efficiency of railway operations. This would ensure that the railway sector could contribute to sustainable transport in a competitive environment with a level playing field for all modes.

44. The revised Master Plans of the UNECE TEM (Trans-European North-South Motorway) and TER (Trans-European Railway) Projects published in autumn 2011, devote a whole chapter to both road and rail ITS, summarizing the present status of implementation as well as their expected future development. It also presents the experience gained by the individual member countries of TEM and TER Projects in these fields. It is expected that work in this field will continue.

Action 14 Integrating with Inland Water Transport

45. The UNECE "White Paper on Efficient and Sustainable Inland Water Transport in Europe" identifies River Information Systems (RIS) as one of the seven strategic areas of inland waterway transport developments. Under Policy Recommendation No. 3 the White paper calls on Governments, river navigation commissions, international organizations and the inland navigation industry to "promote the use of River Information Service and other information communication technologies (ICT)." It proposes a series of UNECE actions in this area, including supporting a pan-European dialogue on the implementation and further development of RIS and encouraging other uses of ICT for facilitating IWT operations and inspections of inland navigation vessels. This work will be carried out by the UNECE Working Party on Inland Water Transport (SC.3).

Action 15 Enhancing the modal integrator's role of ITS

46. The Working Party on Intermodal Transport and Logistics (WP.24) as well as the Working Party on Road Transport (SC.1) will take actions to simplify the rules and

requirements on international road and intermodal transport and the relevant administrative procedures and documentation.

47. Integration of different transport modes and their information systems will allow inclusion of electronic information on road freight traffic operations in the intermodal transport operations and supply chains, making logistics and security more integrated and automated, thus increasing the efficiency and security of administrative procedures.

Action 16 Developing Cost-benefit assessment methodologies

48. A lack of harmonized methodology for cost-benefit analysis of ITS hampers the deployment of the innovative solutions with greatest overall community benefits and may encourage the use of other less beneficial solutions adding further costs to customers. More information in this area is needed since it is commonly accepted that cost-benefit analyses have major effects on future sustainable transport planning. It is a tool of special interest to Governments and policy-makers. It is an area where UNECE and in particular WP.5 are also tasked to work more and to provide guidance, building on earlier achievements and technical assistance in investment assessment methodologies. Transport Canada and the United States Department of Transportation might be of assistance since they have advanced knowledge and experience in this area.

Action 17 Contributing to climate change mitigation

49. The potential contribution of ITS to reduced pollution and congestion is crucial. In January 2011 the UNECE Transport Division launched the United Nations Development Account funded project on climate change and transport. The goal is to develop and implement a monitoring and assessment tool for CO₂ emissions in inland transport to facilitate climate change mitigation. The tool will be freely available to all United Nations Member States. It will provide a robust framework for analysing different scenarios of sustainable transport, proposing transport-policy strategies, among them the further development of ITS. The project is designed to assist Governments to develop mitigation strategies.

Action 18 Launching analytical work

50. Every ITS service depends on the availability of an Information and Communication Technology (ICT) backbone and enabling systems that constitute the core of ICT infrastructure.

51. The success rate of ITS implementation is closely related to the availability of ICT infrastructure. The capability to deliver ITS services does not grow in a linear direction with the augmentation of available technology, but for most ITS services a minimum critical mass is needed in order to perform a wide number of tasks.

52. More research and analysis in this field should be carried out by UNECE — obviously through leveraging the benefits of inter-agency cooperation — to assist governments and to provide advice.

Action 19 Contributing to capacity building, education and awareness raising, with special attention to emerging economies

Assisting Governments

53. The major aim of the UNECE is to promote economic integration. To this end, it provides analysis, policy advice and assistance to Governments; it supports the United Nations global mandates in the economic field, in cooperation with other global players and key stakeholders. In light of this mandate, the Transport Division has the necessary experience and is prepared to assist Governments and stakeholders in the deployment of ITS. This could be done through capacity building workshops and in cooperation with the other regional commissions (the Economic and Social Commission for Asia and the Pacific (ESCAP), the Economic Commission for Latin America and the Caribbean (ECLAC), the Economic Commission for Africa (ECA) and the Economic and Social Commission for Western Asia (ESCWA)).

54. The growth of road transport continues to be significant, especially in emerging economies. Simultaneously with the economic and financial crisis, the growth has been accompanied by rapid urbanization that is expected to continue unabated in the future. The rising concentration of population in cities is accompanied by growing social problems such as worsening traffic congestion, increasing air pollution and an escalating number of road accidents. However, not only urban areas are affected by these developments. Road transport growth exceeds the capacity of existing infrastructures and reform requirements in modern transport management are needed. These are all areas where ITS offers practicable solutions.

55. Education and awareness-raising is the key to innovation in transport. There is a need to inform the public how the future mobility will look like in order to foster this new culture, to keep the public abreast of what is going on, to plant understanding and gain acceptance and support.

Leapfrogging

56. The UNECE platform could be used as a bridge to disseminate knowledge and best practices and become the umbrella for coordinated policy action in the field of Intelligent Transport Systems worldwide.

57. Developing countries can leapfrog far more rapidly to an ITS-enabled infrastructure and far less expensively than developed countries. The important role of UNECE in fostering the integration of landlocked regions (such as central Asia) would be reinforced, providing new opportunities to a broader range of emerging economies to become better integrated, promoting economies of scale and a greater ability to cooperate and exchange information.

Action 20 Organising the United Nations Annual Round Table on Intelligent Transport Systems

58. Under the aegis of the UNECE, all countries will have the opportunity for dialogue and develop cooperation on ITS issues through round table discussions convened annually.

59. The outcome of these round tables would provide guidance for and direct the work of the relevant UNECE bodies where actions would be initiated by Governments, other key stakeholders and global players, including the business community.

60. The UNECE Transport Division will provide the platform for exchange of views, provide analytical inputs, policy advice and assistance to Governments, and will ensure that the United Nations global mandate in this field of transport is maintained.

How will the Road Map and its actions be implemented?

61. The planned actions can be grouped as follows: (i) those of global nature (like common agreement on the definition) that encompass a whole range of areas of work and relevant institutions (like forging international cooperation); (ii) those that are direct or indirect continuation of on-going activities of Working Parties and of the UNECE secretariat (like vehicle to vehicle communication) and as such they can be manifested either in modification of legal instruments or through guidelines or recommendations for governments; (iii) those that help common thinking through theme related analytical work to push the envelop for the follow-up decision making; (iv) and finally those that serve knowledge sharing and capacity building. The annual round table on ITS issues will be dedicated to the most critical specific topic of the year so that the outcome of the round table contributes to a commonly acceptable solution.

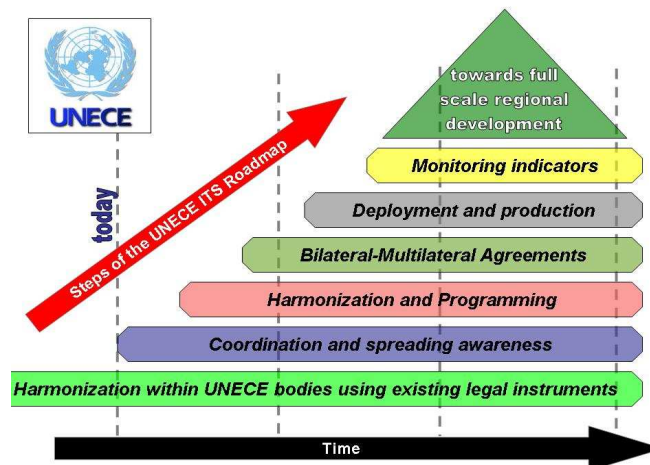


Figure 3 – Steps of the UNECE ITS Road Map

62. As illustrated in figure 3 the already on-going actions aim at harmonisation within the UNECE bodies using existing legal instruments. This will not only continue, but will be scaled up to all relevant topics and to all working parties. More inter-governmental and inter-agency coordination will be embarked on for efficient resource utilisation. As some of the actions bear fruits the effectiveness of harmonisation will be increased and the work programs of the Inland Transport Committee and its subsidiary bodies, the working parties, as well as the administrative committees of the different legal instruments will likely increase and /or sharpen their activities to promote the use of ITS. Further on, it is most probable, that modification of existing multilateral transport conventions, agreements and other legal instruments will be warranted. Today it is pre-mature to think about a UN legal instrument on ITS, though this cannot be excluded either. An important part of the implementation of the actions is to make sure that results are known to governments and to all other stakeholders. Finally, implementation and its impact will be regularly monitored and the secretariat will report to its governing bodies, first of all to the Inland Transport Committee. For implementation monitoring indicators will be developed and agreed on based on the adoption of this Road Map.