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Draft revision of the ECE Road Map on Intelligent Transport Systems

Transmitted by the Secretariat[[1]](#footnote-1)

The text below was prepared by the secretariat of the Informal Working Group on Intelligent Transport Systems (ITS), under the World Forum for Harmonization of Vehicle Regulations. Following Decision 18 of the Inland Transport Committee (ITC) at its eighty-second session in February 2020 and considering the importance of ITS in light of global mega trends, technological developments, and the ongoing transformation of ITC and its Working Parties, the secretariat has initiated activities, in close cooperation with relevant Working Parties and subsidiary bodies, to prepare a revision of the UNECE Roadmap on ITS. The secretariat consulted the Co-Chairs of the IWG on ITS, on the basis of the existing 2012-2020 Roadmap and sought guidance on necessary amendments to the existing roadmap. The secretariat is launching consultations of the Working Parties and subsidiary bodies and is proposing to use the following online collaboration tool to collect input : <https://docs.google.com/document/d/1-tIgg7XLAaax0t-WuiMrdU8WFxH3eOO6/edit>

**Note:** This version reflects the amendments introduced into the draft document on the Google Docs platform up to 14 October 2020.

**I. Draft ECE Road Map on Intelligent Transport Systems – Overview [Revision for the decade 2020 – 2030]**

**Table 1**  
**Summary**

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| *No.* | *Action title* |
| **1** | Reaching a common definition for ITS |
| **2** | Harmonizing policies |
| **3** | Forging International cooperation |
| **4** | Facilitating interoperability via ITS Reference Architectures |
| **5** | Ensuring data security |
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| 6 | Promoting vehicle to infrastructure communication |
| 7 | **V**ehicle-to-vehicle communication |
| 8 | **Improve**road safety |
| 9 | Addressing the liability concerns |
| **10** | Harmonizing Variable Message Signs |
| **11** | **Enabling safer**Transport of Dangerous Goods |
| **12** | Integrating with Rail Transport |
| **13** | Integrating with Inland Water Transport |
| **14** | Enhancing the modal integrator’s role of ITS |
| **15** | Developing cost-benefit assessment methodologies |
| **16** | **Improving the environmental sustainability of transport** |
| **17** | Promoting analytical work amongst contracting parties |
| **18** | Contributing to capacity-building, education and awareness-raising, with special attention to emerging economies |
| **19** | Organizing the United Nations annual round table on ITS |
| **20** | Wheeled vehicle automation and emerging technologies. |

1. **Revised actions (insertions are marked in bold)**

**Action 1 - Reaching a common definition for ITS**

1. Inland transport systems to which information and communication technologies have been applied to improve mobility are generically referred to as “Intelligent Transport Systems” (ITS). ITS systems are comprised of Information and Communications Technology (ICT) and ITS-unique applications, technologies, and communications.

2. However, the scope and nature of the framework for the collecting, processing, communicating and distributing information needed to create ITS have been envisioned in a variety of ways due to differing economic and development priorities of interested Governments and institutions Accordingly, this may lead to confusion across borders. To improve the prospect for collaboration and coordination across borders, the development and agreement upon a harmonized definition is highly desirable.

3. As a global partner, the UNECE endeavours to facilitate the dialogue about ITS deployment, and, to that end, seeks to contribute to the search for a common definition that can be used by all stakeholders.

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**Action 2 - Harmonising policies**

4. The lack of harmonized policies for ITS deployment at the global level could hamper the implementation of available approaches. Implementation should proceed now, with the caveat that the chosen approaches should not unnecessarily hinder or complicate the future transition to utilize more advanced ICT..

5. 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. Within such a framework, ITS infrastructure and services could be more effectively planned, 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 passengersglobally .

**Action 3- Forging International cooperation**

6. **The status and implementation of the UNECE ITS Road Map until 2020** showed that Governments and stakeholders support the work of UNECE in this field, especially its regulatory work, **as ITS can provide benefits in terms of safety, environmental protection, energy efficiency and traffic management, and support the advancement towards numerous goals and targets within the UN Sustainable Development Agenda (SDGs) and the Decade of Action.** In addition, **UNECE**s bridging function as the platform for international cooperation in transport, with non-EU countries, is an added value. International cooperation is considered essential for a successful change towards meeting future needs for mobility. UNECE is encouraged to continue working in close cooperation with Governments, international organizations and other relevant stakeholders.

**Action 4 - Facilitating interoperability via ITS Reference Architecture**

7. Innovative technologies in various transport fields are rapidly developing. Given that the design and industrial development cycle of innovative technologies is often shorter than the policy cycle, national regulatory authorities may lag behind. This is particularly evident at the international level and could leads to technical fragmentation and eventual interoperability issues within and across the countries. Therefore, efforts to develop and implement guidelines, regulations and agreements on technical and technological compatibility and neutrality, based on data and science, are warranted.

8. Suitable ITS reference architectures can provide a means to identify and describe ITS services, identifying interfaces throughout overall ITS system-of-systems that can support interoperability between and within the ITS infrastructure and among vehicles and other mobile participants in the transportation system along with appropriate ICT and ITS technical standards to facilitate interoperability and cybersecurity. Reference architectures can support identification of interfaces for interoperability while supporting needed regional and local customization of the ITS system. For example, the US Department of Transportation makes available the Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT, [www.arc-it.org](http://www.arc-it.org/)) identifying 140+ ITS services along with companion software toolsets for use by any interested ITS implementers to develop their own regional and project ITS architectures to support needed services and desired levels of interoperability. Currently, international services and ICT/ITS standards are represented in ARC-IT Version 9, based on contributions via international collaborations with Australia, Canada, Europe, and Japan.

9. The **updated** UNECE Road Map for ITS seeks to harmonize and ensure coverage and implementation of the commonly adopted strategy throughout its 56 member countries.

**Action 5 - Ensuring data security**

10. 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 should be implemented by way of viable business cases that require consistent data driven guidelines, standards and regulations on liability and highest levels of security for personal data..

**Action 6 - Promoting vehicle to infrastructure communication**

11. The World Forum for Harmonization of Vehicle Regulations (WP.29) is promotingtechnological innovations in vehicles through guidelines, voluntary standards and, when needed, regulations that are applicable on worldwide scale.

12. Cooperative Driving Automation technologies include infrastructure and vehicle related intelligent transport devices that are active and ‘cooperate’ to perform a common service. Consequently, in cooperative systems, communication could be vehicle-to-vehicle or vehicle-to-infrastructure, or both.

13. Given that Advanced Driver Assistance Systems (ADAS) technologies are important advances in vehicle safety the cost beneficial 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.

14. The development of provisions for ADAS - such as **Automatically Commanded Steering Functions (ACSF)** 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 standalone **UN** Regulations under the 1958 Agreement. According to an impact assessment made by the European Commission, the mandatingof these systems has the potential toprevent the loss of around 5,000 lives and avoid 35,000 serious injuries a year across the EU27.

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

(a) raising awareness on the safety issues and missed opportunities with non-communicating infrastructure;

(b) infrastructure standards to promote vehicle to infrastructure and vehicle to vehicle communication (AGR, Convention on Road Signs and Signals).

**Action 7 - Vehicle - to – vehicle communication**

16. 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.

17. Cooperative systems are expected to make use of state - of - the - art communication facilities allowing the driver access to all road and traffic information. Close cooperation amongUNECE, the International Telecommunication Union (ITU), the International Organization for Standardization (ISO) **and potentially other standard developing organizations** is essential and willbe further broadened on matters of frequencies and international standards.

18. The competent UNECE body that will interact with Governments and global players, dealing with cooperative systems in information technologies has yet to be identified.

**Action 8 - Improving road safety**

19. UNECE is actively involved **in promoting solutions that can lead to improved national, regional and global road safety through implementing a continuous stream of tailored** road safety activities to educate, raise awareness, to induce action and to create dynamic and effective responses to road safety **challenges**.

20. Those actions are performed primarily by – but not limited to – **the secretariat of the UN Road Safety Trust Fund, the secretariat of the UN Secretary General Special Envoy for Road Safety, the Global Forum for 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.

21. **Technologies are essential tools in the design and management of national road safety systems, and key enablers of progress across the five pillars of a national road safety system – safe users, vehicles, infrastructure, post-crash response and the overarching road safety management pillar. ITS linked technologies have a documented track record of improving road safety, such as the impact that driving assistance systems embodied in UN Vehicle Regulations have had in reducing road traffic casualty rates since their introduction.**

**Action 9 - Addressing the liability concerns (unchanged)**

22. 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. Technologies such as navigation systems, cruise control and systems optimizing the braking of vehicles are already widely used and have contributed to fewer accidents and better fuel consumption.

23. 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.

24. 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.

25. WP.29 already closely cooperates on this matter and will present a solution in the near future, particularly in the case of ADAS systems. 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 overridedriver’s decisions.

**Action 10 - Harmonizing Variable Message Signs**

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

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

(a) road markings;

(b) posted signs;

(c) electronic signs.

28. 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.).

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

(a) traffic lights;

(b) traffic signals;

(c) VMS.

30. Uniformityis 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;

(b) consider the main issues, the main pictograms, creating proposals, etc.

(c) all work undertaken by parties of the 1968 Convention will ensure compatibility of the measures with the 1949 Geneva Convention

**Action 11 - Enabling safer Transport of Dangerous Goods**

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

**Action 12 - Integrating with Rail Transport-Clarify purpose**

32. 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.

33. 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 13 - Integrating with Inland Water Transport (unchanged)**

34. 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. The UNECE Working Party on Inland Water Transport (SC.3) will carry out this work.

**Action 14 - Enhancing the modal integrator’s role of ITS (unchanged)**

35. 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. 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 15 Developing cost-benefit assessment methodologies (unchanged)**

36. 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 greatinterest to Governments and policy-makers.

37. 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. All Governments and policy-makers are encouraged to share related data and methodologies, to include open source code and documentation, to accelerate shared learning on cost-benefit assessment methodologies and outcomes.

**Action 16 - Improving the long-term environmental sustainability of transport**

38. The potential contribution of ITS to reduced pollution and congestion is crucial. In January 2011 the UNECE Sustainable Transport Division launched the United Nations Development Account funded project on climate change and transport. The goal was to develop and implement a monitoring and assessment tool for CO2 emissions in inland transport to facilitate climate change mitigation.

39. **As the outcome of this project, the ForFITS (For Future Inland Transport Systems) tool is primarily focused on CO2 emissions from inland transport, including road, rail and inland waterways, and predicts future emissions based on current patterns. The** tool is freely available to all United Nations Member States. It provides a robust framework for analysing different scenarios of sustainable transport, proposing transport-policy strategies, among them the further development of ITS.

**Action 17 - Promoting analytical work amongst Contracting Parties**

40. 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.

41. The success rate of ITS implementation is closely related to the availability of data driven ICT infrastructure. **Action 18 - Contributing to capacity building, education and awareness raising, with special attention to emerging economies**

**(a) Assisting Governments**

42. 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. Consideringof this mandate, the Sustainable Transport Division 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)).

43. The growth of road transport continues to be significant, especially in emerging economies. 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 can exceed the capacity of existing infrastructures and radditional improvements in modern transport managementmay be needed. These are all areas where ITS could offer practicable solutions.

44. Education and awareness-raising is the key to innovation in transport. There is a need to ensure guidelines and regulations are based on science and data drive. In addition, there is a need to inform the public how the future mobility maylook like to foster this new culture, keep the public abreast of what is going on, to plant understanding and gain acceptance and support.

**(b) Leapfrogging**

45. 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. 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 19 - Organising the United Nations Annual Round Table on Intelligent Transport Systems**

46. 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.

47. 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.

48. The UNECE Sustainable Transport Division will provide the platform for exchange of views and record of discussions to inform Governments as they develop their own national policies and programs.

**Action 20 – Wheeled vehicle automation and emerging technologies**

**49. (Forthcoming)**

1. Based on :Informal document WP.5 (2020) No. 10; Informal document GRVA-07-14, 7th GRVA, 21-25 September 2020, Agenda item 12(c); Informal document GRSG-119-34, 119th GRVA, 6-9 October 2020, Agenda item 16; Also mentioned at the WP.1 session (September 2020) and presented at the SC.3 session (October 2020) [↑](#footnote-ref-1)