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Item 4 (d) of the provisional agenda

**Strategic questions of a horizontal policy nature:****Intelligent transport systems****Status of the implementation of the Road Map on Intelligent transport systems****Overview of activities promoting innovative transport technologies and Intelligent Transport Systems****Note by the secretariat***Summary*

This document provides an overview on activities promoting innovative technologies that impact on the implementation of the Road Map on Intelligent Transport Systems and Services (ITS), that was launched at the seventy-fourth session of the Inland Transport Committee.

The Committee is invited to encourage the actions for regulating automated vehicles. In 2014, vehicle automation became the central pinnacle of ITS and the telematics sector. The vehicle and its automation became the catalyst for speeding up the existing efforts at implementation of ITS. Fostering regulatory actions would ensure the benefits that ITS could provide in terms of road safety, environmental protection, energy efficiency and traffic management.

The Committee is invited to encourage activities promoting ITS activities linked to infrastructure and all transport modes and to consider ways to address ITS issues in an integrated approach.



## I. Background

1. Intelligent Transport Systems and Services (ITS) are defined as *any system or service that makes the movement of people or goods more efficient and economical, thus more "intelligent"*. They are a key element to take into account when addressing future mobility. ITS applications will help in achieving sustainable mobility by making transport more efficient, safer and greener. This will only happen if the relevant technical solutions and services are successfully embedded in appropriate policy frameworks and harmonized policies, to facilitate national and international interoperability.

2. In recognition of the importance of innovative technologies, addressing present and future challenges for transport and mobility, the policy segment of the seventy-sixth session of the Inland Transport Committee (ITC) was entitled "Innovations for a sustainable mobility". It gave valuable insights about the coming opportunities that can deliver innovations in the transport sector. It provided a stimulating impulse to the ITC subsidiary bodies working on innovation at various levels.

3. The following sections in this note aim at presenting activities and initiatives promoting innovative technologies to implement the UNECE Road Map on ITS. A summary of the 20 Actions contained in the Road Map can be found in Annex I. The overview of the Road Map Actions addressed in 2014 can be found in Annex II.

## II. UNECE activities in 2014

### A. Policy segment of ITC

*Documentation:* [ECE/TRANS/240](#) and [Corr.1](#), para. 10 and Annex I

4. Numerous innovative solutions for sustainable mobility and transport were presented at the policy segment of the seventy-sixth ITC session (25 February 2014, Geneva). Some of them already existed, others were about to be put into operation. They were seen as opportunities that could revolutionize the transport sector and address issues beyond those directly related to transport such as the energy transition.

5. Two speakers gave presentations about new trends in term of vehicle technologies and expressed two views on how to implement the technologies related to self-driving vehicles: a "traditional" approach, by increasing step by step the technology level (vehicles intelligence) and a "disruptive" approach, bringing in one step, vehicles innovative technologies in a very near future. Both presenters emphasised that this rapid technology step would bring safety benefits, as well as more efficient and greener vehicles. They also stated that these technologies would have a positive impact on ageing societies and ease the life of disabled persons.

6. It was stressed that the UNECE secretariat could play a significant role in sharing good practices, enabling the exchange of information to successfully accompany the development and implementation of ITS.

7. Following this impulse given by the policy segment and ITC in general, several activities and meetings inside and outside of UNECE were organized around the subjects of vehicle automation and vehicle connectivity.

*Road Map Action addressed: Action 2*



## **B. Symposium of the International Telecommunication Union on the Future Networked Car**

*Documentation:* <http://itu.int/en/fnc/2014/>

8. Following the policy segment, UNECE jointly organized with International Telecommunication Union (ITU), the 2014 Symposium on the Future Networked Car. The symposium took place during the Geneva Motor Show and thus addressed a large professional audience. The symposium concluded that to benefit from ITS, it is important to address issues including standards, cybersecurity, software reliability, information and education, legal frameworks and liability in a holistic manner with a wide range of actors. Actors from the automotive and Information and Communications Technology (ICT) sectors, regulatory, legal and standardization bodies were called on to collaborate on a road map that would facilitate the transition to a globally coordinated rollout up to 2020, as, by then, automated vehicles would be marketed.

*Road Map Actions addressed: Actions 2, 3, 4, 5, 8, 9 and 17.*

## **C. Annual Round table on Intelligent Transport Systems and Services (ITS)**

*Documentation:* [www.unece.org/index.php?id=36646#/](http://www.unece.org/index.php?id=36646#/)

9. The annual UNECE round table on ITS, jointly organized with the government of Belgium (17 to 18 November 2014, Brussels) was entitled Towards a New Transportation Culture: Technology Innovations for Safe, Efficient and Sustainable Mobility. This annual flagship workshop, as one of the UNECE Road Map actions for promoting ITS, addressed global actions ranging from harmonizing policies to improving road safety and ensuring data security. The Conference brought together ITS experts to discuss how innovations based on information and communication can help to create a driving and transportation culture that contributes to safe, efficient and sustainable mobility. The ITS workshop concluded that the main opportunities are in improving road safety and managing mobility. The Conference identified several priority areas for progress: the development of autonomous cars and automated vehicles, safety in intersections and level crossings, intelligent road charges and smart e-tolling as well as traffic management and variable message signs (VMS).

*Road Map Actions addressed: Actions 1, 2, 3, 4, 5, 7, 8, 9, 11, 13, 15, 16, 17, 18, 19 and 20.*

## **D. Working Parties of the Inland Transport Committee**

### **(a) UNECE special session on "Transport and Air Pollution"**

*Documentation:* [ECE/EB.AIR/WG.5/112](http://www.unece.org/transport/working-groups/5/112/), Annex II

10. A special session of the Working Group on Strategies and Review, a body under the UNECE Convention on Long-range Transboundary Air Pollution had been jointly organized with the UNECE Transport Division on 3 July 2014 and dedicated to the theme Transport and Air Pollution. Many innovations for sustainable transport in the field of emission reduction were presented. The Working Group noted the positive impact expected from intelligent innovations and exchanged experiences on policies, strategies and measures taken to reduce air pollution (including the reduction of Greenhouse Gas emissions) in the sectors of inland transport.

*Road Map Actions addressed: Action 17.*

**(b) Working Party on Inland Water Transport (SC.3)**

*Documentation:* ECE/TRANS/SC.3/197

11. The Working Party on Inland Water Transport continued its work on ITS applications in Electronic Ship Reporting and towards the harmonization of pan-European River Information Services (RIS).

*Road Map Actions addressed: Action 14.*

**(c) The Working Party on the Transport of Dangerous Goods (WP.15)**

12. The joint meeting of the Carriage of Dangerous Goods by Rail (RID) Committee of experts and WP.15, through its informal working group on telematics, continued its work on ITS applications aimed inter alia at improving the speed and efficiency of emergency responses involving dangerous goods in transport.

*Road Map Actions addressed: Action 12.*

**(d) Working Party on Road Traffic Safety (WP.1)**

*Documentation:* [ECE/TRANS/WP.1/145](#) and [Corr.1](#) (paras. 21 and 22)

13. The Working Party on Road Traffic Safety concluded a part of its deliberation on amendments to the 1968 Vienna Convention. These were necessary (i) to ensure that safety rules do not hamper the dissemination and use of new technologies that aim at improving road safety and (ii) to remove any potential inconsistencies between the Convention and the 1958 and 1998 Agreements in Vehicle Regulations.

*Road Map Actions addressed: Action 10.*

**(e) The Working Party on Brakes and Running Gear (GRRF)**

*Documentation:* Informal document [GRRF-76-43](#), [video](#)

14. At its seventy-sixth session in February 2014, GRRF received a presentation on connected vehicles and a promising application of this technology, namely "Platooning" (GRRF-76-43). Electronic and connected road-trains or platoons present a significant opportunity to both improve traffic efficiency and to improve the energy efficiency and the safety of vehicles within the platoon. At this stage, several programmes were ongoing, i.e. the [SARTRE Project](#) or the [Companion project](#). GRRF was of the opinion that this type of technology had a significant potential impact on Fuel Economy and Road Safety, but that the impact was currently reduced by national and international traffic rules such as that the driver must be in control of the vehicle and the mandatory safety distances between vehicles on the road (derived of the interpretation of Article 13 of the 1968 Vienna Convention).

*Documentation:* Informal documents [GRRF-78-31](#) and [WP.29-164-27](#)

15. At its seventy-eighth session in September 2014, GRRF received a presentation ([GRRF-78-31](#)) from the European Association of Automotive Suppliers on existing and future technologies: valet parking and highway autopilot. It was followed by a discussion on a proposal to remove provisions of a Regulation that would de facto result in authorizing self-steering vehicles. The recent discussions with WP.1 concerning the Vienna Convention were considered directly relevant to the deployment of this type of technology. It appeared that a strategic direction was necessary to support policy considerations and the follow-up regulatory work. GRRF decided to postpone the decision on the proposal, awaiting guidance from policymakers ([WP.29-164-27](#)).

*Road Map Actions addressed: Actions 2, 3, 4, 5, 8, 9 and 17.*

**(f) The Working Party on General Safety (GRSG)**

16. In 2013, GRSG began work on Accident Emergency Call Systems (AECS) or the so-called e-Call systems. Many experts considered that regulating the use of positioning and telecommunication systems for the purpose of vehicle safety was a significant step forward and would bring an advanced knowhow to regulators. The utility when working on the connectivity of vehicles should not be underrated. Many conferences in 2014 on the connectivity of vehicles and vehicle automation showed the interest of standardization bodies in regulation, as well as on the existing delay in standardizing and harmonizing telecommunications for vehicle connectivity. This situation was considered unsatisfactory as the regulator cannot rely on well-established and globally harmonized standards. The Chair of the Informal Working Group on AECS has taken on the challenge of this activity in an ambitious timeline to deliver what would be the first regulation on vehicle connectivity.

*Road Map Actions addressed: Actions 3, 4, 5, 7 and 9.*

**(g) The World Forum for Harmonization of Vehicle Regulations (WP.29)**

*Documentation:* [ECE/TRANS/WP.29/1110](#), para. 16  
[ECE/TRANS/WP.29/1112](#), para. 21

17. At its June 2014 session, WP.29 noted a rapid technological evolution reflected in several presentations at several motor shows on concept models, including advanced vehicle automation. WP.29 recalled that WP.1 had agreed, at its April 2014 session, to amend the 1968 Vienna Convention. Taking into account the significance of these developments, WP.29 decided to refocus some actions. At its November 2014 session, WP.29 received a status report on the related activities. WP.29 endorsed a road map for actions addressing the challenges linked to vehicle automation by redefining the terms of reference of its "ITS informal working group" which will become the "Informal Working Group on Automated Driving".

**III. Conclusion drawn from the activities in 2014 and next steps****A. Connected vehicles**

18. Under the auspices of UNECE, many activities were launched to promote innovative technologies and implement the ITS Road Map endorsed at the seventy-fourth session of ITC. The deployment of ITS faced many stumbling blocks slowing down its implementation across all transport modes, one of them being the fragmentation. In 2014, the developments on automated and connected vehicles crystalized significant results of various ITS activities.

19. In the past, drivers obtained information on traffic congestion, accidents and hazard from radio information (Traffic Message Channel (TMC) or news bulletin). ITS introduced VMS. With the current state of the art technology, portable positioning systems and smartphones (using e.g. Googlemaps, INRIX, Tele Atlas and NAVTEQ providing traffic information based on the information collected by the smartphones and other sensors) brought immediate and better information. In a near future, connected cars equipped with Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) features will allow a more systematic use of information and interactions. They will allow a more sophisticated and active traffic management, addressing issues such as road safety, energy efficiency and pollutant emissions. In addition these technologies could extend the possibilities related to modal shift and optimize intermodal transport solutions.

20. The United States of America's Department of Transportation National Highway Traffic Safety Administration (NHTSA) has already released an Advanced Notice of Proposed Rulemaking on V2V communications technology and work continues on the next ruling step (a Notice of Proposed Rulemaking for 2016).

21. The full benefits of V2V and V2I, such as Intersection Motion Assist, Left Turn Assist and Red Light Violation Warning, will become noticeable once a sufficient market penetration rate is reached. (Note: the median age of passenger cars is statistically 11 years in the United States of America and 9 years in the European Union). Awaiting the critical mass for implementation, vehicle connectivity and the related technologies linked to the digitalization of modern societies will bring transitional applications and benefits to transport and traffic management.

22. Regulatory actions are needed at various levels to quantify their benefits and address cybersecurity concerns.

## **B. Automated vehicles**

23. The work done in the various subsidiary bodies of ITC demonstrated that ITS innovations in terms of automation were in the process of being developed and marketed. Automations were considered in the past as comfort systems and did not require action on the part of the authorities. In 2014, it appeared that automations were not isolated researches. They were based on emerging concepts linked to the evolution in digitalization and mature prerequisite technologies for automation such as positioning systems (GPS, ERA GLONASS, and GALILEO), High Definition Maps as well as environment sensing technologies and processing technologies ("intelligence"). It also appeared that they became subject to competition among nations.

24. Progress and promotion of these intelligent vehicle systems would require work on the definitions and classifications. The World Forum WP.29 had agreed to take on this work. Two approaches were presented by industry at the policy segment of the last ITC session, and policymakers may need to address partial automation and self-driving technologies. Uncertainties concern (i) the timing of market introduction of these innovations and (ii) the assessment of the security and safety of these relatively unknown and untested emerging technologies.

25. Policymakers will have to assess and address side effects of the deployment of these technologies, such as impacts (i) on the insurance system, (ii) on liability assessment in case of an accident, (iii) on traffic rules that might have to be adapted, (iv) on infrastructures in case the connectivity of vehicle would be considered to be a prerequisite for certain types of automation.

26. At its June 2014 session, the World Forum made a decision to organize and coordinate the needed work in the framework of its mandate. At its November 2014 session, several questions were raised by one of its subsidiary body: Should these technologies be treated together with conventional technologies or separately? Should regulations actively lead the technological development (a full set of performance based requirements) or flexibly complement it (only require minimum safety measure provisions)?

27. WP.29 decided to address these questions and bring some answers to its subsidiary bodies in 2015 to avoid blocking the regulatory development corresponding to these technologies.

### **C. Intelligent Transport Systems and Services across the transport modes and their infrastructures**

28. The year 2014 focused on the connectivity and automation of vehicles, along with the traditional activities ITS across all transport modes and their infrastructures. UNECE continued its efforts to promote them and implement the ITS roadmap, e.g. on the transport of dangerous good and VMS. The Steering Committee of the Trans-European North-South Motorway (TEM) project (10–11 April 2014, Warsaw) agreed to work on traffic management and the compatibility of ITS between TEM countries, bearing in mind the common architecture provided by the European Union's framework (FRAME) architecture.

29. In 2014, the fashionable subjects of vehicle automation, originally not linked to vehicle connectivity, reached a turning point. They became the central pinnacle of ITS. When addressing automation, many actors also promoted connectivity technologies. The connected vehicle became the catalyst for many ITS activities, including the promotion of traditional ITS across all transport modes and their infrastructures. So, the work on vehicle automation is an opportunity to speed-up the implementation of past and current actions on ITS.

*Road Map Actions addressed: Actions 2, 7, 13 and 15*

### **D. Next steps**

30. The Committee is invited to encourage the promotion of ITS activities linked to infrastructure and all transport modes and to consider ways to address ITS issues in an integrated approach.

## Annex I

### The UNECE Road Map on Intelligent Transport Systems (ITS)

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<b>Action 1</b> Reaching a common definition for ITS	<b>Action 11</b> Harmonizing Variable Message Signs
<b>Action 2</b> Harmonising policies	<b>Action 12</b> Making Transport of Dangerous Goods less dangerous
<b>Action 3</b> Forging International cooperation	<b>Action 13</b> Integrating with Rail Transport
<b>Action 4</b> Facilitating interoperability and the ITS architecture	<b>Action 14</b> Integrating with Inland Water Transport
<b>Action 5</b> Ensuring data security	<b>Action 15</b> Enhancing the modal integrator's role of ITS
<b>Action 6</b> Scaling up the work on ITS in all Working Parties of the UNECE Inland Transport Committee (ITC)	<b>Action 16</b> Developing Cost-benefit assessment methodologies
<b>Action 7</b> Promoting vehicle to infrastructure communication	<b>Action 17</b> Contributing to climate change mitigation and adaption
<b>Action 8</b> Promoting vehicle-to-vehicle communication	<b>Action 18</b> Launching analytical work
<b>Action 9</b> Fighting the road safety crisis	<b>Action 19</b> Contributing to capacity-building, education and awareness raising, with special attention to emerging economies
<b>Action 10</b> Addressing the liability concerns	<b>Action 20</b> Organizing the United Nations Annual Round Table on Intelligent Transport Systems

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## Annex II

### Overview of the Road Map Actions addressed in 2014

<b>Action 1</b> ..... <input checked="" type="checkbox"/>	Reaching a common definition for ITS	<b>Action 11</b> ..... <input checked="" type="checkbox"/>	Harmonizing Variable Message Signs
<b>Action 2</b> ..... <input checked="" type="checkbox"/>	Harmonizing policies	<b>Action 12</b> ..... <input checked="" type="checkbox"/>	Making the Transport of Dangerous Goods less dangerous
<b>Action 3</b> ..... <input checked="" type="checkbox"/>	Forging International cooperation	<b>Action 13</b> ..... <input checked="" type="checkbox"/>	Integrating with Rail Transport
<b>Action 4</b> ..... <input checked="" type="checkbox"/>	Facilitating interoperability and the ITS architecture	<b>Action 14</b> ..... <input checked="" type="checkbox"/>	Integrating with Inland Water Transport
<b>Action 5</b> ..... <input checked="" type="checkbox"/>	Ensuring data security	<b>Action 15</b> ..... <input checked="" type="checkbox"/>	Enhancing the modal integrator's role of ITS
<b>Action 6</b> ..... <input checked="" type="checkbox"/>	Scaling up the work on ITS in all Working Parties of the UNECE Inland Transport Committee (ITC)	<b>Action 16</b> ..... <input checked="" type="checkbox"/>	Developing Cost-benefit assessment methodologies
<b>Action 7</b> ..... <input checked="" type="checkbox"/>	Promoting vehicle to infrastructure communication	<b>Action 17</b> ..... <input checked="" type="checkbox"/>	Contributing to climate change mitigation and adaption
<b>Action 8</b> ..... <input checked="" type="checkbox"/>	Promoting vehicle-to-vehicle communication	<b>Action 18</b> ..... <input checked="" type="checkbox"/>	Launching analytical work
<b>Action 9</b> ..... <input checked="" type="checkbox"/>	Fighting the road safety crisis	<b>Action 19</b> ..... <input checked="" type="checkbox"/>	Contributing to capacity-building, education and awareness raising, with special attention to emerging economies
<b>Action 10</b> ..... <input checked="" type="checkbox"/>	Addressing the liability concerns	<b>Action 20</b> ..... <input checked="" type="checkbox"/>	Organizing the United Nations Annual Round Table on Intelligent Transport Systems