Briefing

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Automated vehicles in the EU

SUMMARY

Automated vehicle technologies allow the transfer of driving functions from a human driver to a computer. Automation, and in particular digitalisation, of driving will change road transport in a way which is viewed as a revolution in the field of mobility. As human error is the main reason for road traffic accidents, driving which is automatically controlled by a computer is expected to make future road transport safer and more secure. It has also the potential to be more environmentally friendly, efficient and accessible.

Worldwide, automobile manufacturers and technology firms are working on driving system innovation. Agreement by all stakeholders on the desired deployment of the new technologies will provide developers with the certainty they need for investments. For an effective communication between the technological and political spheres, categorisation and terminology are being developed which define different levels of vehicle automation.

Motor vehicles are highly complex systems which need advanced technical and legal standards in terms of road safety requirements. The technical requirements as well as international traffic rules are agreed at United Nations level and are currently in the process of being assessed with a view to the increasing automation of vehicles. The European Union and its Member States participate in international working groups which are revising the regulations as prerequisites for the deployment of automated vehicles. Furthermore the European Union is funding research on automated road transport as a priority in the Horizon 2020 Transport Research programme. Some key elements of the discussions on political and technical aspects are the questions of how data protection and cyber security can be secured and liability issues can be solved.

In this briefing:

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Glossary

Automated vehicle: a motor vehicle (car, truck or bus) which has technology available to assist the driver so that elements of the driving task can be transferred to a computer system.

Autonomous vehicle: a fully automated vehicle equipped with the technologies capable to perform all driving functions without any human intervention.

Connected vehicle: a motor vehicle equipped with devices to communicate with other vehicles or the infrastructure via the internet.

Cooperative – Intelligent Transport Systems (C-ITS): systems consisting of vehicles accompanied by a communication and sensor infrastructure with which the vehicles – fitted with appropriate on-board devices – are capable of communication between themselves and with the infrastructure.

Potential and challenges of automated vehicles

Potential

Around the world, industry and research groups are working on technologies which are transferring driving tasks from human drivers to a computer. Some of the new technologies are taking over certain parts of the driving function; some are intended to fully replace the human driver. Recently media reported the successful test driving of vehicles, even buses, without a human driver.

Public authorities in many countries have presented action plans in support of the development and introduction of automated vehicles. It is estimated that the market introduction of automated and connected vehicles will deliver a huge growth impact on this global, trade-oriented market.

Today's car already has the computing power of several personal computers, processing billions of bytes of data with the software algorithms that control vehicle operations. While these digital technologies are intended to optimise the operational functions of a vehicle, the new developments with connected vehicles focus on the ability of a vehicle to connect with the outside world with a view to improve the driving function even further and enhancing the on-board services for driver and passengers.

Transferring more and more of the driving task to a computer system means eliminating the human factor which is at the root of many road accidents. According to the European Commission, automated driving will increase road safety significantly, as human error is involved in more than 90% of all traffic accidents on Europe's roads; in which more than 40 000 people are killed and 1.5 million injured every year.

Being an important part of the Internet of Things (IoT), intelligent transport systems and connected vehicles will not only increase road safety, but can also help reduce congestion and raise fuel efficiency. For instance, vehicle-to-vehicle connectivity will allow the permanent exchange of information on the position of all vehicles in proximity on the road and help with warnings to avoid crashes. Connectivity makes 'platooning' possible, i.e., a coupling of several vehicles within minimal distance of each other, so that they automatically and simultaneously accelerate or brake. Modern vehicles equipped with sensors and on-board parking cameras could determine the location and size of an empty parking spot just by driving past. This information could be distributed via the internet, allowing the creation of a real-time overview of city parking spaces and thereby better traffic management in cities.

Challenges

The potential impact of the deployment of automated vehicles raises many questions.[1] The answers are still under discussion, having ethical, legal, financial, economic and technical dimensions. While most of the scientific discussion has to date dealt with the development of the technology, the focus recently is shifting towards topics such as user acceptance and legal issues. Policy makers, in particular, face challenges in designing the appropriate legal and regulatory framework so that new technologies are used properly and for the benefit of society.

Legal framework for road safety

Regulation of automated vehicles faces challenges to establish rules for technologies not yet applied. In particular, appropriate safety requirements have to be agreed. Traffic rules and the regulatory framework need to be adapted. In addition, it has to be decided how the safety of automated vehicles should be tested and by whom. The further development of vehicle automation will demand an adaption of driving education and licensing.

Infrastructure and technical standards

Automated and connected vehicles need special features in infrastructure. What needs to be done at the infrastructure level has yet to be clarified. An important prerequisite for intelligent transport systems will be an agreement on what communication is needed between vehicles (V2V), between vehicles and infrastructure (V2I) and vehicles to anyone else. Technical standardisation is necessary for international compatibility and interoperability.

Data processing

The new technologies raise questions as to how data privacy and cyber security will be addressed. The highly or fully automated vehicle will process data and make decisions: this raises ethical issues which have to be solved in a societal dialogue. The programmed algorithms will make decisions in conflicting situations, such as a choice between two unavoidable crash scenarios. How will the decision be taken? What 'best driving behaviour' should be reflected by the system?

Liability issues

In case of malfunction of an automated vehicle, who is liable when such malfunctions result in an accident: the manufacturer, the owner or the driver has to be clarified.

Levels of automation

A prerequisite for feasible political solutions and regulations for automated vehicles is the agreement on terminology and categories of the different forms of automation. Currently, different ways of categorising the levels of automation exist in parallel, but many organisations follow the classification set by the International Society of Automotive Engineers (SAE). In a 2014 report (SAE international standard J3016) SAE identified six levels of driving automation with a view 'to simplify communication and facilitate collaboration within technical and political domains'.

The **levels of automation** (see Figure 1) identify how the aspects of the dynamic driving task are divided between the human and the machine according to the various **driving modes**, each with their particular characteristic (e.g. motorway merging, high speed cruising, low speed traffic jam).

Figure 1 – Levels of driving automation

	SAE Level	Name	Steering, acceleration, deceleration	Monitoring driving environment	Fallback performance of dynamic driving task	System capability (driving modes)
Human monitors environment	0	**No automation** the full-time performance by the human driver of all aspects of the dynamic driving task, even when enhanced by warning or intervention systems	👤	👤	👤	n/a
Human monitors environment	1	**Driver assistance** the driving mode-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task.	👤 🚗	👤	👤	Some driving modes
Human monitors environment	2	**Partial automation** the driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	🚗	👤	👤	Some driving modes
Car monitors environment	3	**Conditional automation** the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene	🚗	🚗	👤	Some driving modes
Car monitors environment	4	**High automation** the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene	🚗	🚗	🚗	Some driving modes
Car monitors environment	5	**Full automation** the full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver	🚗	🚗	🚗	All driving modes

Source: Automated and Autonomous Driving, OECD/ITF, 2015 (adapted from SAE Standard J3016, SAE International 2014).

In its report on automated and autonomous driving, the OECD International Transport Forum[2] adapted the SAE taxonomy as it captures the emerging descriptive consensus most systematically. According to this consensus, the **dynamic driving task** includes different aspects which might be automated. It consists of operational aspects like steering, braking, and accelerating, as well as monitoring the vehicle and the roadway. It also includes tactical or decision aspects such as responding to events, determining when to change lanes, turning, or using signals.

Examples for the different levels of automation

Each level of automation is matched by different automation systems for road vehicles. The European Road Transport Research Advisory Council (ERTRAC) has drafted an Automated Driving Roadmap providing definitions of the different automation systems and the expected date of their possible deployment (see textbox for examples).

Level 0
Park Distance Control (already deployed): The system assists the driver to manoeuvre into tight spaces by communicating distance from obstacles by means of acoustic or optical signals.
Level 1
Park Assist (already deployed): The system automatically steers the car into parallel and bay parking spaces, and also out of parallel parking spaces. The system assists the driver by automatically carrying out the optimum steering movements in order to reverse-park on the ideal line. The measurement of the parking space, the allocation of the starting position and the steering movements are automatically undertaken – all the driver has to do is operate the accelerator and the brake. This means that the driver retains control of the car at all times.

Level 2
Traffic Jam Assist (possible deployment 2015/2016): The function controls the vehicle longitudinally to follow the traffic flow in low speeds (lower than 30 km/h). The system can be seen as an extension of the Adaptive Cruise Control with Stop&Go functionality, i.e. no lane change support.
Level 3
Traffic Jam Chauffeur (possible deployment 2017-2018): Conditional Automated Driving up to 60 km/h on motorways or similar roads. The system can be activated in a traffic jam scenario. It detects a slow-driving vehicle in front and then handles the vehicle both longitudinally and laterally. Later versions of this functionality might include lane change functionality.
Level 4
Highway Pilot (possible deployment 2020-2024): Automated driving up to 130 km/h on motorways or motorway-like roads from entrance to exit, on all lanes, including overtaking movements. The driver must deliberately activate the system, but does not have to monitor it constantly. The driver can override or switch off the system at all times. There is no request from the system to the driver to take over when the system is in its normal operation area on the motorway. Depending on the deployment of vehicle-to-vehicle communication and cooperative systems, ad-hoc convoys could also be created.
Level 5
The **fully automated vehicle** should be able to handle all driving from point A to point B, without any input from the passenger. According to ERTRAC only a rough estimation for possible deployment can be given: 2026-2030.

Automated technologies and their deployment

The automation technologies in vehicles are based on sensors and on connectivity. Sensor-based systems use a combination of advanced sensors, such as GPS, stereo cameras or long and short range radar, in combination with actuators (devices which transform an input signal, mainly an electrical signal, into motion), control units and integrating software.

Cooperative-intelligent transport systems use wireless telecommunication and information technologies to exchange information instantaneously and in two-way direction from vehicle to vehicle (V2V), from vehicle to infrastructure (V2I), or from vehicle to any other object (V2X).

The deployment of vehicle automation

In the United States (in several states, as well as in cross-continent test-driving), technology firms such as Google or Apple are testing fully-automated vehicles in pilot projects. In the EU, deploying vehicles without a human driver is an option only for restricted and well-defined areas. Several Member States already allow or have announced the adoption of legal acts to make the testing of automated vehicles legal, e.g. on an approved test route or in an urban environment, where the vehicle, the infrastructure and the environment are controlled.

The approach to developing vehicles which are fully-automated and might be deployed only in well-defined areas is described as 'everything somewhere'. In contrast, traditional car manufacturers are gradually improving the automated driving systems in conventional vehicles following an approach which is known as 'something everywhere'.

CityMobil2 is a multi-stakeholder project, co-funded by the EU (FP7), 2012-2016, setting up a pilot platform for automated road transport systems, which will be implemented in several urban environments across Europe. All participating local authorities recognise the potential of vehicle automation as part of their public transport systems.

Regulatory and legal framework for automated vehicles

Road traffic is a highly regulated area as it bears huge risks for all traffic users in public spaces. The automation of vehicles changes the driving risks in many regards and therefore requires an assessment of all traffic and vehicle related regulation.

Different national jurisdictions can hinder the development and deployment of new technologies for systems or vehicles. European mobility requires a harmonised approach towards these new technologies, while fragmented regulatory approaches would hinder implementation and jeopardise European competitiveness.

International governance

The **United Nations Economic Commission for Europe** (UNECE) is one of five UN regional commissions, administered by the UN Economic and Social Council. The UNECE is the forum where in total 56 countries of western, central and eastern Europe, central Asia and North America come together to promote economic cooperation. The UNECE **Inland Transport Committee** (ITC) is a platform for international cooperation to facilitate the international movement of persons and goods by inland transport modes. The platform's work is reflected in more than 50 international agreements and conventions providing an international legal framework and the technical regulations for the development of international road, rail, inland water and intermodal transport, as well as dangerous good transport and vehicle construction. The ITC has two permanent subsidiary bodies whose work is relevant for the introduction of automated driving:

The **Working Party on Road Traffic Safety** (WP.1) is a permanent intergovernmental body responsible for administering the international road-traffic related conventions including the 1968 Convention on Road Traffic and the 1968 Convention on Road Signs and Signals.

The **World Forum for Harmonization of Vehicle Regulations** (WP.29) is a permanent intergovernmental body, responsible for the harmonisation of technical vehicle requirements. WP.29 prepares the work of the ITC to develop and adopt harmonised vehicle regulations.

Regulation of road traffic

The **Vienna Convention on Road Traffic of 1968** ('Vienna Convention of 1968') is an international treaty designed to facilitate international road traffic and to increase road safety by establishing standard traffic rules among the contracting parties. The convention has been ratified by 73 countries to date. All EU Member States are signatories of the Vienna Convention – only the UK and Spain have not ratified it. The USA is not one of its signatories, but is a signatory of the 1949 Geneva Convention on Road Traffic, which imposes somewhat less 'extensive obligations' regarding the driver,[3] making it is easier to allow autonomous vehicles.

One of the fundamental principles of the Vienna Convention is the concept, as laid down in Article 8, that a driver is always fully in control and responsible for the behaviour of a vehicle in traffic.

Article 8
(1): Every moving vehicle or combination of vehicles shall have a driver ...
(5): Every driver shall at all times be able to control his vehicle ...

In March 2014, WP.1 approved an amendment to the Vienna Convention of 1968 saying that 'systems which influence the way vehicles are driven', as well as other systems which can be overridden or switched off by the driver, are deemed to be in accordance with Article 8.

The amended convention (the formal steps for the amendment to come into force will probably be completed in 2016), still demands that every vehicle must have a driver. However, in the future it will be in accordance with the Convention that highly automated systems will have a driver who may take the hands off the wheel, but must be ready at all times to take over the driving functions, and who can override the system and switch it on and off.

A further amendment process is therefore necessary to permit driverless vehicles. Systems with high or full automation are mostly still incompatible with the Vienna Convention, even with the 2014 amendment, because a driver may not be required in these systems, depending on the use case.

Technical requirements of motor vehicles and type-approval in the EU

The main objective of the WP.29 for the regulations on the approval of vehicles is to ensure that new vehicles (including components and separate technical units) on the market provide a high level of safety and environmental protection. International harmonisation of vehicle regulations is an important factor for the automotive industry as it is a highly trade-dependent sector.

Technical requirements for vehicles are internationally harmonised in the framework of the two following UNECE Agreements:

The **1958 Agreement** provides the framework for establishing international UN Regulations with uniform performance-oriented test provisions and administrative procedures for granting type approvals, for the conformity of production and for the mutual recognition of the type approvals granted. The 1958 Agreement currently has 54 contracting parties and 135 annexed UN Regulations.

The **1998 Agreement** concerns the establishing of global technical regulations for the construction of new vehicles, including performance requirements. Its purpose is to further enhance the process of international harmonisation through the development of global technical regulations (GTR). The 1998 Agreement has 35 Contracting Parties and 16 UN GTRs, established in the UN Global Registry (March 2015).

The 1998 Agreement applies in parallel to the 1958 agreement. The main difference is that the 1998 Agreement – known as the Parallel Agreement – does not provide for the mutual recognition of approvals, thereby allowing countries unable to assume the obligations of mutual recognition to play a concrete part in the harmonisation of global technical regulations.

The European Union is a contracting party to the 1958 and the 1998 Agreement. As of 31 December 2014, the European Union has acceded to 118 Regulations under the 1958 agreement and has voted in favour of all 16 GTRs under the 1998 agreement. The Commission publishes an annual working paper on major regulatory developments and activities in WP.29. In its latest progress report[4] on the 2014 activities, the Commission notes its expectation that in the coming years the regulatory framework for automated vehicles will be progressively placed as a priority topic on the WP.29 agenda.

Example: UN-Regulation 79 – steering equipment

An automatically commanded steering function is allowed only up to 10 km/h (e.g. parking manoeuvres). Above 10 km/h, only the 'corrective steering function' is allowed and no level of steering automation is compatible with the current requirements of UN-Regulation 79. An amendment would be necessary as a prerequisite to automated driving functions.[5]

Implementation of type-approval of vehicles in the European Union

Under the European vehicle type approval system, manufacturers can obtain approval for a new vehicle type in one EU Member State if it meets the EU technical requirements. The manufacturer can then market it EU-wide with no need for further approval tests or checks in other Member States. The approval is granted by a national authority in charge of type-approval. The completion of the type-approval examination results in issuance of a Certificate of Conformity, which is a statement by the manufacturer that the vehicle conforms to the relevant legal requirements as stipulated by EU legislation.

The common legal framework for the approval of motor vehicles and their trailers is provided by Framework Directive 2007/46/EC. Within the EU, mass-produced cars may only be used on public roads if they are type-approved in compliance with the administrative procedures and technical requirements established by the Directive.

For the purpose of EU-type approval, Annex IV of the Framework Directive lists the technical requirements laid down in EU directives and in UNECE regulations. In the case that UNECE requirements co-existed with EU legislation, a manufacturer could choose which one to apply as they were deemed equivalent. The General Safety Regulation (Regulation (EC) 661/2009) amended the Framework Directive, replacing 50 EU directives by UNECE regulations on a mandatory basis. Compliance with the UNECE regulations is now compulsory for type approval submissions since 1 November 2012 and for all vehicles entering into service since 1 November 2014.

As for the simplification and internationalisation of the regulatory environment, the EU vehicle type-approval system refers, where appropriate, to UNECE Regulations. The European Commission negotiates new UN Regulations and UN GTRs in the name of all 28 Member States.

The European Commission informs the European Parliament, via the comitology procedure, about the regulatory work undertaken in the UNECE. New UN Regulations or UN GTRs will receive a favourable vote of the EU if – after the consent of the European Parliament – the Council of the EU approves the draft by a qualified majority.

AdaptIVe

AdaptIVe is a 42-month EU-funded project which will address the major challenges of automated driving. The project results are due in June 2017; the definition of legal aspects will be presented in December 2016.

The targets of the project are to demonstrate the feasibility of automated driving, provide guidelines for cooperative controls and define and validate new methodologies for safety evaluation. Furthermore, it will assess the impact on road transport and evaluate the legal framework with regards to implementing barriers.

Roadworthiness Tests

EU law ensures that all vehicles and trailers are inspected at regular intervals. It provides a basis for checking that vehicles throughout the EU are in a roadworthy condition and meet the same safety standards as when they were first registered.

In 2014 the EU adopted a roadworthiness package consisting of three directives which cover periodic roadworthiness tests, technical roadside inspections for commercial vehicles and registration documents.

The new directives – with implementation dates starting from 2017 to 2023 – will improve the quality of vehicle testing and the control of cargo securing. The package will also render electronic safety components (like ABS or Electronic Stability Control) subject to mandatory testing.

At UNECE level, the 1997 Vienna agreement concerning periodical technical inspections of wheeled vehicles entered into force in 2001. It has 12 signatories, including six EU Member States.

At EU and international level the rules for periodic technical inspections, or at least the technical standards on the basis of which these inspections take place, may need to be adapted for higher levels of automation. As new technologies are evolving, road safety and the performance of the vehicle depend more and more on the correct functioning of these technologies.

General regulatory environment

The regulatory environment relating to cybersecurity, data privacy, and liability issues is of particular importance in the development of automated vehicles.

Cybersecurity and data privacy

Today's connected vehicles are already equipped with extensive IT communication capabilities. In-vehicle networks for information and entertainment co-exist with automotive control networks. The different networks have different degrees of relevance for the safe functioning of the vehicle and for cybersecurity risks and data protection issues.

Automated vehicles are extended vehicles, meaning that they have external software and hardware extensions as some of their features. These extensions are developed, implemented and managed by the vehicle manufacturer. The connection between the in-vehicle system and the manufacturer's central server has to be secure, so that all data transfers are protected from unauthorised disclosure and manipulation.

Uncontrolled, unrestricted **access to vehicle data** in the on-board network by third parties directly and indirectly jeopardises the safety of the vehicle, occupants and other road users. Media report increasingly on cybersecurity problems related to cars, for instance covering the successful attempt of hacking into a vehicle and controlling its basic driving functions via the entertainment and navigation software.

In July 2015, the Alliance of Automobile Manufacturers formed a voluntary information-sharing and analysis centre (Auto ISAC) for the industry, to target the threat of hackers. The European Automobile Manufacturers Association (ACEA) has agreed on principles of data protection in relation to connected vehicles and services.

The debate on **data privacy** regarding connected automated vehicles is evolving in parallel with the new technologies. In general, digital services will be available in vehicles, as they are anywhere else. The 'connected car' has the capability to generate, store and transmit users' personal data, such as their route to work, time of driving, favourite music, appointments or favourite restaurants. These data have a significant potential for other uses. As third parties can access and use sensitive driver and driving data, legislation seems necessary to protect personal privacy of consumers in connected vehicles.

A study commissioned by the European Commission in 2012 assessed potential measures for guaranteeing data protection and data privacy in intelligent transport systems. In 2014 the Article 29 Data Protection Working Party, an independent European advisory body on data protection and privacy, published an opinion on recent developments on the Internet of Things (IoT) (Opinion 8/2014). As is pointed out therein, its principles and recommendations may also apply to issues like smart transportation or 'machine to machine' developments, even if these developments of the IoT are not in the strict scope of the opinion.

The current data protection framework dates back to 1995. The new General Data Protection Regulation proposed in 2012 by the Commission and informally agreed by Council and European Parliament in December 2015, will establish a single set of rules on data protection, also with regard to digital technologies, valid across the EU.

Liability issues

Traffic accidents have very large costs in economic terms, in particular regarding human lives or health, or regarding damage to an object. Liability law answers the question of who is responsible and who has to bear the costs of an accident.

In the European Union product liability is strongly harmonised by the Directive on liability for defective products (Council Directive 85/374/EEC). A producer is liable for any damage caused by a defect in his product; a product is defective when it does not provide the safety which the consumer is entitled to expect.

However, there is currently no framework in place harmonising the rules on liability for damages caused by accidents in which motor vehicles are involved – the regulation of liability of the holder of a vehicle or of the driver differ between the Member States.

Most liability regimes in the EU use a concept of causality for determining and allocating liability. From a certain level of vehicle automation on, it might be difficult to establish the exact cause of an accident and to prove if it is due to a defect with the automated vehicle or the behaviour of the driver. The new possible causes created by automation might interfere with the very objective of liability regimes to apportion risks, therefore an adaptation of liability law to the new technologies and a European harmonisation of the regimes concerning the liability of owners and/or drivers of automated vehicles seem necessary.

Ongoing work in the EU

International context

In September 2015, the Transport Ministers of the G7 States and the European Commissioner for Transport agreed on a declaration on automated and connected driving. They underlined the need to take appropriate steps to establish a harmonised regulatory framework, enabling safe deployment of these technologies across national borders. Sustained cooperation between the G7 States and the European Commissioner for Transport is deemed to be required in following areas:

- coordinating research, promoting international standardisation within an international regulatory framework,
- evolving technical regulations and
- ensuring data protection and cyber security.

European Union

Enabling intelligent transport systems and automated and connected vehicles is a horizontal task for transport policy and economic policy, in particular in the framework of the Digital Agenda for Europe. The automated and connected vehicle requires a **high-performance infrastructure**. The **Connecting Europe Facility** and the **Investment Plan for Europe** have as important targets to stimulate investment in broadband networks and transport infrastructure, which are necessary for effective C-ITS.

The ITS Directive (Directive 2010/40/EC) gave power to the Commission to adopt functional, technical, organisational and service provision specifications for the compatibility, interoperability and continuity of Intelligent Transport Systems throughout the European Union. Among the first priorities of the ITS action plan was the travel and traffic information systems and the eCall emergency system.

The European Commission is also promoting connectivity and interoperability by working on the international harmonisation of technical standards, in particular together with the European Standardisation Organisations and in cooperation within the US/EU Standardisation Harmonisation Working Group.

With initiatives such as the iMobility Forum and the C-ITS Platform, the European Commission brings together private and public stakeholders to coordinate the technical developments on European level and to ensure interoperability and coherent deployment of the systems.

In the 7th Framework Programme for Research and Technological Development, the European Commission initiated several research projects[6] examining the potential of automated vehicles and helping the development of strategies, technologies and integration of automated systems. In the framework of Horizon 2020, a dedicated call for automated road transport was launched, with a budget of over €100 million over two years.

European Parliament

As early as 2009, in its resolution on the Intelligent Transport Systems Action Plan, the Parliament underlined the importance of digital technologies for safer and more secure, cleaner and more efficient transport in the EU. The Parliament also stressed the need to involve all stakeholders in the development of the new systems and to protect personal privacy from the early stages of design of the ITS. These were also the main focus points of the Parliament when adopting the eCall emergency system in April 2015, and its resolution on multi-modal ticketing in July 2015.

In 2015, in its resolution on the implementation of the 2011 White Paper on Transport, the Parliament emphasised the positive impact of digitalisation on the efficiency and productivity of the transport sector. It also stressed the need for an enabling regulatory framework for pilot projects aimed at the deployment of intelligent automated transport in Europe.

Main references

Automated and autonomous driving - regulation under uncertainty, Corporate Partnership Board Report, OECD/International Transport Forum, 2015.

Automated Driving Roadmap, European Road Transport Research Advisory Council, ERTRAC Task Force 'Connectivity and Automated Driving', Version 5.0, July 2015.

Emerging Issues: The Internet of Things, OECD Digital Economy Outlook 2015, Chapter 6, 15 July 2015.

Endnotes

[1] At the United Nations level the World Forum for Vehicles Regulation (WP.29) is discussing the questions which have to be solved to develop the regulatory framework. In a note preparing ongoing work, the secretariat of WP.29 formulated a set of questions in June 2015.

[2] The International Transport Forum (ITF) at the OECD is an intergovernmental organisation with 57 member countries. It acts as a think tank for transport policy and organises the Annual Summit of Transport ministers. The ITF is administratively integrated with the OECD, yet politically autonomous.

[3] See: Automated Vehicles Are Probably Legal in the United States, Bryant Walker Smith, Texas A&M Law Journal, Volume 1, 2014.

[4] The European Commission published the progress report on the 2014 activities of the World Forum for Vehicle Regulations (UNECE WP.29) as Commission Staff Working Document SWD (2015) 138 final.

[5] See for example the position of an EU Member State: Strategie automatisiertes und vernetztes Fahren, Bundesministerium für Verkehr und digitale Infrastruktur, Berlin, September 2015.

[6] List of European projects in the area of Connectivity and Automated driving, see Annex to Automated Driving Roadmap, European Road Transport Research Advisory Council, ERTRAC Task Force 'Connectivity and Automated Driving', 21 July 2015; see also presentations at the ERTRAC info day (6 November 2015) on the Automated Road Transport Call.

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