



AUTOC-ITS

Connecting Europe Facility

AUTOCITS

Regulation Study for Interoperability in the Adoption of Autonomous Driving in European Urban Nodes:

AUTOCITS PROJECT

AUTOCITS is an European Project coordinated by INDRA, co-financed by the European commission under the CEF programme, which aim is to contribute to the deployment of C-ITS in Europe by enhancing interoperability for autonomous vehicles as well as to boost the role of C-ITS as catalyst for the implementation of autonomous driving. Three pilots are implemented in three major European cities to do this: Paris, Madrid and Lisbon, located along the Atlantic Corridor. For more information visit and contact at www.autocits.eu

ABSTRACT: Report on international regulations and autonomous vehicles

This document is an executive summary of the analysis carried out in the first activity of the AUTOCITS project. ***Report on international regulations and autonomous vehicles*** of the AUTOCITS project, whose aim is to study the current regulations related to the authorization of autonomous vehicles circulation in free flow traffic. This study, focuses in the European case but also considering international regulations. Technical and legal requirements, standardization, certification processes, homologations and inputs and benefits from the current C-ITS are considered.

<http://autocits.eu/>

This document belongs to the AUTOCITS consortium.

1 Introduction

The market introduction of fully **autonomous vehicles** is estimated to be gradual in the next 30 years. This means that the vehicles will step by step increase their autonomous equipment, including safety systems, energy efficiency systems and comfort systems, culminating in the full self-driving car. During this gradual technology introduction, the Society of Automotive Engineers International (**SAE**)¹ has defined various levels of automation and for some time there has been need for standardization and regulation. The SAE definitions divide vehicles into levels based on “who does what, when”, from SAE Level 0 to SAE level 5. There is a distinction between Levels 0-2 and 3-5 based on whether the human operator or the automated system is primarily responsible for monitoring the driving environment. Throughout the term “highly automated vehicle” (HAV) represents SAE Levels 3-5 vehicles with automated systems that are responsible for monitoring the driving environment.

Levels 0 and 1 are considered the actual state-of-the-art, this is, the actual systems and services that are available in the vehicles in market. Level 2 corresponds to the next generation of technology that will be equipped in vehicles, assuming a higher level of automation. Vehicle with levels 3 or higher are expected to be in market from 2025². Those facts mean that the real introduction in the market of autonomous vehicles will be slow and gradual, with a long time of coexistence between autonomous (semi-autonomous) and manually driven ones, up to 2050, when all the vehicles in the road are expected to be autonomous³.

The AUTOCITS project focuses precisely on this point, the development of a study, an analysis and the proposals associated with the current **regulations on autonomous vehicles**, considering its implementation as a complement to the C-ITS, whose deployment will undoubtedly contribute to accelerate its commissioning.

1 https://www.sae.org/misc/pdfs/automated_driving.pdf

2 FAZ.NET. (2015). Selbstfahrende Autos: Amerika schaltet auf Autopilot. [online] Available at: <http://www.faz.net/aktuell/wirtschaft/unternehmen/verkehrsminister-foxx-selbstfahrende-autos-in-10-jahren-standard-13811022.html> [Accessed 3 May 2017].

3 IEEE Spectrum: Technology, Engineering, and Science News. (2014). Driverless Cars: Optional by 2024, Mandatory by 2044. [online] Available at: <http://spectrum.ieee.org/transportation/advanced-cars/driverless-cars-optional-by-2024-mandatory-by-2044> [Accessed 3 May 2017].

2 Comparative resume of the regulations

The following table is the summary of one of the main outputs of the analysis of the European and international regulatory framework carried out in AUTOCITS. It is important to highlight the relevance of the study, as in the literature several studies have been found in regard to technical issues and implementation of C-ITS and automated driving, but not under the normative and regulation point of view.

2.1 European Countries

Elements	Spain	Paris	Portugal	UK	Germany	Sweden	The Netherlands	Italy	Denmark
Linked to Vienna Convention	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Current Legislation	Code for Vehicles and Traffic Law and Code for Traffic Rules	Code for Vehicles and Traffic Law	Portuguese Road Code	The Highway Code, road safety and vehicle rules	German Highway Code	Code for Vehicles and Traffic Law	Reglement verkeersregels en verkeerstekens	Codice della Strada (Highway Code) and Regolamento di Attuazione del Codice della Strada	Code for Vehicles and Traffic Law
Testing Procedures	Yes. Autonomous driving is allowed, dedicated regulation in November 2015	Yes. Autonomous driving is allowed for testing purposes	Partially and temporary by closing of the road and under an agreement between road administrations and concessionaires	Yes. Autonomous driving is allowed for testing purposes. Code of practice for testing of automated vehicle technologies	Yes. A section of the A9 autobahn is to be set up for testing autonomous vehicles and connected vehicles	Yes. Autonomous driving is allowed for testing purposes	Yes. Autonomous driving is allowed for testing purposes	Generally are not allowed on public roads for safety reasons	Yes. Autonomous driving is allowed for testing purposes
Certification Procedures	Vehicle manufacturer shall provide a certification	Authorities shall provide a certification	No certification / procedures	No certification / procedures	No certification / procedures	Yes	Companies that wish to test self-driving vehicles must first demonstrate that the	-	Application for permission to test automated vehicles must be submitted to

							tests will be conducted in a safe manner		the Transport, Construction and Housing Ministry
Laws to be modified	Code for Vehicles and Traffic Law and Code for Traffic Rules	Code for Vehicles and Traffic Law and Code for Traffic Rules	-	The Highway Code, road safety and vehicle rules	Federal Government, Draft Act to Amend the Road Traffic Act	-	-	Codice della Strada (Highway Code) and Regolamento di Attuazione del Codice della Strada	-
Initial Modifications for SAE3-5	Regulation on assisted parking of motor vehicles	Fully autonomous systems have been profoundly discussed (Working groups) in context of road safety applications	-	Liability Initiatives	Law in the Cabinet: Automated driving on the way	-	-	-	-

2.2 USA - Federal States

Elements	California	Nevada	Michigan	Utah	Florida	Tennessee
Linked to Vienna Convention	No	No	No	NO	NO	NO
Current Legislation						
Testing Procedures	Yes	Yes	Yes	Yes	Yes	Yes
Certification Procedures	Obtain an instrument of insurance, surety bond, or proof of self-insurance in an	A driver's license endorsement for the operation of an autonomous vehicle on the highways of that	-	The Department of Public Safety, shall study, prepare a report, and make recommendations	-	Certification program for manufacturers of autonomous vehicles before such vehicles may be tested,

	amount of five million dollars and submit a detailed description of the testing program to the department	State		regarding the best practices for regulation of autonomous vehicle technology on Utah highways		operated, or sold
Laws to be modified	-	-	-	-	-	-
Initial Modifications for SAE3-5	-	-	-	-	-	-

2.3 International countries

Elements	Singapore	South korea	China	Japan	Australia
Linked to Vienna Convention	No	No	No ⁴	No	No
Current Legislation	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, ROAD TRAFFIC ACT)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, The Enforcement Rule of the Motor Vehicle Management Act)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, Road Traffic Safety Law of the People's Republic of China)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, Japanese traffic rules and regulations)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, Motor Vehicles Act, Road Traffic Act)
Testing Procedures	Yes, for example the Trials for Autonomous Vehicles are obtained	Designated by MOLIT	Yes (N/A)	guidelines released by the National Police	Yes (Department for Planning, Transport and Infrastructure - National

⁴ https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XI-B-19&chapter=11&Temp=mtdsg3&lang=en#5

	after a Road Traffic (Exemption) Order and they must have liability insurance and specify "relevant period", "specified area" and "specified vehicle".			Agency ⁵	Transport Commission)
Certification Procedures	Follows the ROAD TRAFFIC ACT	Designated by MOLIT	Yes (N/A)	guidelines released by the National Police Agency	Yes (Department for Planning, Transport and Infrastructure - National Transport Commission)
Laws to be modified	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, ROAD TRAFFIC ACT)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, The Enforcement Rule of the Motor Vehicle Management Act)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, Road Traffic Safety Law of the People's Republic of China)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, Japanese traffic rules and regulations)	Code for Vehicles and Traffic Law and Code for Traffic Rules (for example, Motor Vehicles Act, Road Traffic Act)
Initial Modifications for SAE3-5	Road Traffic Bill No.5/2017 published on 10 January 2017	Ministry of Land, Infrastructure and Transport initiatives	Government plans to expand the number of testing programs for autonomous vehicles to 100 by late 2017	guidelines released by the National Police Agency	National Transport Commission published on November of 2016 a discussion paper about National guidelines for automated vehicle trials

⁵ <https://www.npa.go.jp/koutsuu/kikaku/gaideline.pdf> (in Japanese language)

2.4 Conclusions

Market trends expect vehicles with levels 3 or higher to be in market for 2025, therefore regulations must be updated contemplating the legal and technical aspects currently not covered by the regulation framework. It is clear, that in the EU context, the members' states are at **very different levels** regarding the regulations for AVs. In particular, the short-term emphasis is enabling deployment of AVs under testing and Pilot scales. Thus, legislations and regulations for full-autonomous circulation of AVs in public roads are still under progress.

Analyzing thoroughly the current legislations of the European countries, it has been drawn that the countries that are not linked to the Vienna convention are the **more flexible and advanced** in terms of allowed testing, as they present less legislative obstacles and restrictions for this purpose. But regardless of the Vienna Convention's ratifications, although Spain and UK are non-ratified members, some member states have made the amendments and/or exceptions necessary to allow testing and deployment, under specific conditions, of AVs in real-world traffic scenarios. This indicates that the interest of the countries in this direction is becoming more and more evident.

Now the current framework of Automated Driving has been set for the European countries, AUTOCITS will keep monitoring the strategy of the European Commission (C-ITS Platform) and initiatives such as C-ROADS, GEAR 2030... In a second phase of the project, the member states will be helped to **development the specific laws required** to foster the deployment of the autonomous vehicles in the European roads.

This, and future results, will be included in the project website and in future documents that will be sent to the International Cooperation Group, so from AUTOCITS we encourage you to **keep linked** to the project activities.