AVENUE

Autonomous Vehicles to Evolve to a New Urban Experience

D2.10

First report on regulatory requirements and compliance plan

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Executive Summary

WP2 aims to define in detail the use cases of each demonstrator, the scenarios for each implementation phase, and the value added services required for the success of the demonstrators. A human-centred design approach for the design of the use cases will be followed. The required data to be collected for the impact analysis will also be defined. Existing knowhow and best practices will be surveyed, assessed and analysed. The work of tasks of WP2 is iterative, and as the provided demonstrators and services become more sophisticated, new iterations of the work of the different tasks will be contacted."

AVENUE will identify and map regulatory and legislative requirements and procedures (concerning actual and under development policies), as well as barriers/ obstacles for the full deployment of AVENUE demonstrations and vision. Similarly to previous tasks, the identification will focus on the city demonstrators (in depth – exhaustive analysis) and up to 10 additional cities (non-exhaustive analysis). From the latter, an in-depth analysis will be performed for those to be selected as replicators. Based on the results of the analysis a plan for regulatory compliance will be elaborated per demonstrator and replicator city. This task contributes to deliverable D2.4.

In order to identify and map regulatory and legislative requirements and procedures (concerning actual and under development policies), we have collected data, for the French situation, on the three following aspects at national, regional and local levels:

- policy decision making organization, i.e., competencies
- laws and legal documents in the field of urban planning, transportation and mobility
- Reports, white books and national programs

After this first step, we have interviewed actors and stakeholders of Navly projects to investigate the issues they encountered and/or still face and how they overcame any problems, and to identify potential bottle necks, expectations in terms of regulation evolutions or stakeholders contribution. The interview guide is presented in annex, so as the list of interviewees.

The current document presents the outcome of our investigations.

1 Legal context in France

1.1 Mobility and transport framework

1.1.1 Territorial competencies

The law Maptam (modernisation de l'action publique territoriale et d'affirmation des métropoles) has brought many changes in the skills/competences of the different levels of communities in the areas of environment, energy and transport. It also introduces new responsibilities for organizing mobility, among others.

1.1.2 Organizing authority for mobility

Due to the adoption of the law of modernization of territorial public action and affirmation of metropolises (MAPTAM- modernisation de l'action publique territoriale et d'affirmation des métropoles) on the 27th of January 2014, the former urban transport organizing authority (AOTU - autorité organisatrice des transports urbains) has become the organizing authority for mobility. (AOM - autorité organisatrice de la mobilité) (art.52).

Its territorial jurisdiction corresponds to the perimeter of the intercommunality which exercises mobility competence. Some communities exercise this competence compulsorily - metropolitan areas, urban communities and agglomeration communities -. According to the wishes of their members, the communities of communes can choose not to acquire this competence or exercise it in whole or in part.

It is related to the implementation of « sustainable mobility » and « territory development ». The modalities of the joint action of the communities and their groupings for the exercise of these competences are debated by the territorial conference of the public action (CTAP- conférence territoriale de l'action publique), under the aegis of the president of the regional council (art.4). CTAPs can be organized into specialized thematic commissions involving all relevant stakeholders. For example, the thematic commission of a CTAP in charge of transport "are able to associate all the authorities organizing transport to its work, even if they are not members of the CTAP".

According to the last adopted laws, the mobility competence exercised by the AOM includes:

- Compulsory missions
  - The organization of regular urban and non-urban public transport services;
  - The development of non-motorized travel modes and shared uses of motorized vehicles;
  - Urban travel mater plans - mandatory only for AOMs with more than 100,000 inhabitants;
  - The development of public and private decision support tools that have an impact on mobility practices - mandatory only for AOMs with more than 100,000 inhabitants;
  - The establishment of a “mobility account” showing the different mobility practices in the agglomeration and in its urban area, the costs for the user and the community - mandatory only for AOMs with more than 100,000 inhabitants;
  - The setup of an information service for users - mandatory only for AOMs with more than 100,000 inhabitants;
  - The establishment of a mobility advice service.

- Optional missions
  - On-demand transport setup ;
  - Reducing urban congestion and pollution by setting up public goods and urban logistics service;
  - The organization of the car-sharing activity
  - Incentives and actions plans for car sharing ;
  - Bike-rental public service implementation

Note on car-sharing: the article L. 1231-14 has been introduced into the Transport Code to define the car-sharing activity as "the pooling of a vehicle or a fleet of motorized transport vehicles for the benefit of subscribers or users, authorized by the entity or the vehicle manager ". The mobility authorities are given the task of issuing the "car-sharing" label by defining award criteria that are consistent with their mobility policy. In the absence of a private offer, they will be able to create a public car-sharing service or make dematerialized platforms available to the public, facilitating the meeting of carpooling offers and requests.

Regarding large French urban areas, the text provides for the creation of 14 metropolises, 3 of which have a special status (Grand Paris, Lyon and Aix-Marseille-Provence). From January 1st 2015, the "regular" cities, namely the Lille, Strasbourg, Toulouse, Bordeaux, Nice, Nantes, Grenoble, Rennes and Rouen communities - and under certain conditions Montpellier and Brest - lead "a project of development and economic, ecological, educational, cultural and social development of

their territory in order to improve its cohesion and competitiveness and to contribute to a sustainable development and solidarity of the regional territory "(Article 43). To do this, the scope of the powers devolved to the metropolis, instead of the communal block, is particularly vast, particularly in terms of development of port or airport areas and the metropolitan area: Scot (*"schema de cohérence territoriale, PLU-plan local d'urbanisme"*, mobility, roads, signaling, passenger shelters, parks and parking areas, urban travel master plan, public spaces dedicated to all modes of urban travel, governance and development of stations etc. On this last point, it was important not to interfere with the dual role of organizing authority for regional express transport (*"TER"*) and leading regional intermodality.

With regard to the environment, the text also broadens the powers transferred by the municipalities through automatic divestiture: water and sanitation, management of aquatic environments, flood prevention, household and similar waste management, pollution control and pollution control. air, noise pollution, contribution to the energy transition - pending the draft law related to this, which will clarify competences on this subject -, support for actions to control energy demand, climate-energy plan territorial, concession of the public distribution of electricity and gas, management of heat networks, load infrastructures of electric or hybrid vehicles or management of beaches granted by the State.

In terms of community space development, the compulsory jurisdiction of urban communities for parking lots is extended to parking areas (section 71). The text also complements the competences devolved to urban communities, by adding a recognized competence to metropolises, entrusting them with "the contribution to the energy transition", the management of energy networks (heat, electricity and gas networks conceded) as well as the creation and maintenance of charging infrastructures for electric vehicles. It should be noted that for the exercise of the jurisdiction of the granting authority of the public electricity distribution, the urban community is substituted for the member communes composing it within the electricity Syndicat. Finally, the text specifies that urban communities are consulted "in the development, revision and modification of planning schemes and documents relating to planning, economic development and innovation, higher education and of research, transport and environment, the list of which is fixed by decree in Council of State ".

Department

The department was transport authority until January 1st 2017 for intercity transport and remained until September 1st 2017 for school transport. Considering the terms of the law on the new territorial organization of the Republic (NOTRe- nouvelle organisation territoriale de la République - August 7th 2015), the transport competence of the departments are carried out by the regions. The department is competent for the organization of these transports on its perimeter outside the territorial jurisdictions of the AOM.

Its main role is on the social level, for example, “contribution to the reduction of energy poverty”.

Regions

Region is the organizing authority for collective transport of regional interest. Its competences are both for road and rail transport.

The Region Rail competence has been given to regions in the frame of the law solidarity and urban renewal (SRU- solidarité et renouvellement urbain - december 13th 2000). Since january 1st 2002, the regions are therefore responsible for organizing and financing regional passenger rail services and road services as a substitute for them. In the respect of a coherent and unique rail system of which the State remains the guarantor and the SNCF the operator, the regions can fix the tariffs of the rail services in the respect of the principles of the national tariff system of the SNCF.

In addition to road transport as a substitute for rail services, the regions are the organizing authorities for interurban transport and inter-urban school transport - instead of departments.

With the adoption of the MAPTAM law, the legislator has made the region the leader in intermodality and complementarity between modes of transport. As such, the regional level is now responsible for coordinating its action AOMs’ and to define general rules on intermodality between public transport and mobility services within the framework of the regional planning, sustainable development and territorial equality plan (SRADDET – “*schéma régional d’aménagement, de développement durable et d’égalité des territoires*”).

The region and the department must establish projects of "territorial agreements of concerted exercise of a competence" in each of the fields for which they are designated leaders. It is only a faculty for the local block. These agreements provide for the delegation of possible powers, the creation of unified services and the terms of financial coordination and the duration of the agreement, which may not exceed six years.

Note on parking regulation: Decriminalization of pay parking on streets allows the municipal council or the deliberative body of the intercommunal body or the “syndicat mixte” with urban transport competencies to set a parking fee and the price of the post-parking fee to replace the fine (sections 63 and 64). It is a measure that would allow communities to better manage traffic flows and, consequently, sustainable mobility policies. The provisions introduced affirm the domanial nature of the parking fee that motorists must pay, either by immediate payment or later via the payment of a post-parking fee. In this case, the package will be capped at the maximum amount of the parking fee due for a day. Modulations of the parking fee are provided based on the duration of parking, the area occupied by the vehicle, its impact on air pollution, as well as specific pricing for certain categories of users, including residents. The product of the post-parking packages is allocated "to operations to improve public transport or environmentally friendly and traffic". If the community that established the levy has jurisdiction over streets, part of this revenue may also be used to finance road operations. Note, in the case of the metropolis of Lyon, the municipalities return the proceeds of post-parking packages to the metropolis, after deduction of the costs related to the implementation of these packages.

1.1.3 Planning documents

The law (art. 6) establishes a regional scheme of intermodality, intended to promote coordination between transport authorities with regard to the provision of services, user information, pricing and ticketing. Developed by the region, in consultation with the departments and the authorities organizing the mobility, the draft scheme must be approved by the regional prefect, before being approved by the regional council after favorable advice from the general councils of departments "representing at least half of the regional population and the deliberative bodies of the majority of the authorities organizing urban mobility representing at least half of the population of the urban

transport perimeters of the region ". Urban Travel Plans (UDP) should be compatible with the regional scheme of intermodality.

1.1.4 Lyon metropole

The metropolitan poles system - created by the Local Government Reform Act of December 16th 2010 and currently 16 in number - is considerably enlarged (MAPTAM - Article 77). The text gives them in particular a general competence, replacing the limitative list of competences, since their actions are now intended to "promote a model of planning, sustainable development and territorial solidarity". The departments and regions concerned can join.

Note on parking policy: the president of Lyon Metropole exercise the traffic police on all the roads of public domain (art.26). On the other hand, the parking police reports to mayors. However, a consultation with the president of the metropolitan council by the mayor is planned prior to the enactment of a parking regulatory act.

The MAPTAM law thus gives the new Métropole de Lyon a unique status in France. It results from the merger of the current skills of Grand Lyon and Rhône Departement in the territory of the metropolis. The Urban Community and the Rhône Department disappeared on January 1st 2015 in this area. A new Rhone Department has been created in the remaining territory.

The territory of the metropolis is that of the former Urban Community of Lyon (59 municipalities). The capital of the metropolis is set in Lyon.

The creation of a single territorial unit in place of the former Communauté urbaine and the Département du Rhône constitutes a major institutional advance enabled by the high degree of intermunicipal integration of this territory. With a clause of general competence, the Métropole de Lyon regulates all matters of metropolitan interest by deliberation.

Lyon Métropole Urban Travel Plan

It sets the direction of the metropolis medium and long-term travel policy on jurisdiction of the mobility authority (SYTRAL).

The transit network development projects or action ideas are described even those that will remain to be studied more precisely before their implementation.

The Transport Code provides that the UTP aims to ensure

- the sustainable balance between the need for mobility and access, on the one hand, and the protection of the environment and health, on the other hand, strengthening social and urban cohesion, improving the safety of all trips, the decrease in car traffic,
- the development of public transport and the means of transport that consume the least energy and are the least polluting,
- the improvement of the use of the main road network in the agglomeration,
- the organization of parking on roads and in public parking lots,
- the organization of the conditions of supply of the agglomeration necessary for the commercial and artisanal activities,
- the improvement of the transport of the personnel of the companies and the public authorities,
- the organization of integrated pricing and ticketing for all trips,
- the design of charging infrastructures to promote the use of electric vehicles or plug-in hybrids.

As part of its "Smart Metropolis" strategy, the Lyon Metropole's president has set the goal of inventing the city of tomorrow to improve people's daily lives: mobility is a priority of this strategy. To build relevant alternatives and facilitate urban travel on its territory, the Lyon Metropole associates public and private partners, in order to:

- improve the performance of public transport
- Smooth and reduce car traffic
- promote modal shift (from individual transport to public transport)
- contribute to changing behaviour
- offer users new services.

In this context, the Métropole de Lyon is involved in the development, coordination and experimentation of innovative projects such as NAVLYA 50/50 joint venture Navya and Keolis, Optimod or Opticities.

1.2 Experiment status for Autonomous vehicle

1.2.1 International regulation on road traffic and vehicles

Two major elements of the regulatory framework for automated vehicles are at the international level, including the United Nations (Economic Commission for Europe - UNECE): road traffic rules and the technical regulation of vehicles. The International Traffic Conventions of Geneva (1949) and Vienna (1968) form the basis of traffic laws in most countries of the world. Among other things, they deal with the role of the driver, his tasks and all traffic rules. "Ever more eager to facilitate international road traffic and to increase road safety, the Contracting Parties are striving to adopt increasingly uniform rules". This is the raison d'être of the 1968 Vienna Convention, of which the WP 1 or World Forum on Road Safety of the United Nations, is competent to adapt it periodically, according to the needs, as the technological evolution for example, and more generally, according to road safety requirements. In fact, aside the harmonization of rules, the facilitation of cross-border mobility and the recognition of the obvious needs of the global automotive market, the priority of these Conventions remains road safety and its constant improvement. The technological evolution, first of all the driving assistants, then the more and more advanced automation of certain driving tasks, required the evolution of this international text. An amendment to deal with driver assistance or assistance devices entered into force on 23 March 2016. This amendment deals with equipment and / or technical devices on board vehicles, which are already approved and international agreements on the technical regulation of vehicles which are also UNECE legal instruments.

Technical vehicle regulations are also developed at the international level by UNECE (WP29). It covers, at this stage, 140 regulations in force, some of which deal with the automation of vehicle functions. In practice, it is currently Regulation 79 on the management of vehicles, which addresses the main issues of automation. The technical regulation of vehicles applicable in Europe is taken from the regulations elaborated within the framework of the UNECE, which are of compulsory application in European homologation.

European action on the development of automated and connected vehicles is particularly important, in the field of vehicle type-approval, to ensure that road and functional safety

requirements are uniformly applied in Europe; as well as in the field of data access and exchange, to ensure the interoperability of services and interfaces, ensuring security and privacy.

1.2.2 Authorization to carry out experiments on vehicles equipped with driving delegation functions

In France, the applicant must, (vehicle covered by type approval or not), file an application for authorization. The file must contain, in particular, a technical description of the experimental vehicle, the request for experimentation and the opinions of the infrastructure manager, the competent authority for the traffic police, and the transport authority when the vehicle is intended for public transport of passengers. The authorization document clearly indicates on which sections the vehicle can be driven in automatic mode and which automated driving functions can be activated. For this purpose, the vehicle must be equipped with a device that records when the vehicle has driven in automatic mode. Holders of experiment authorizations must regularly submit reports to the relevant ministries on the experiments carried out. In France, the validity of road test authorizations is limited to a maximum of two years, with the option of renewal. In France, Germany and Luxembourg, vehicle tests with driving delegation functions are carried out with a driver on board who must be ready to take control of the vehicle at any time. With Bill 2018-211, the driver can be outside the vehicle. The delegated driving systems must be designed in such a way that the driver can deactivate or disable them at any time.

1.2.3 Experiments Legal status

The legislative and regulatory framework for the experiments, resulting from the 2015 Energy Transition Law, was updated in March 2018.

Order n°2016-1057 the 3rd of August 2016 to carry out experiments on vehicles equipped with driving delegation functions on public ways.

This order is made of four articles. The circulation for experimental purposes of a vehicle with partial or total delegation of driving on a lane open to public traffic is subject to the issue of an authorization to ensure the safety of the conduct of the experiment. The authorization is granted by the Minister in charge of transport after the opinion of the Minister of the Interior, if necessary

after the opinion of the road manager, the competent authority for the police and the organizing authority of the transport concerned. The conditions are detailed into the following decree.

Decree n°2018-211 March 28th 2018 authorization to carry out experiments on vehicles equipped with driving delegation functions on public ways

The purpose of this decree is the determination of the conditions of issue and the conditions for the implementation of the authorization for driving for experimental purposes of vehicles with driving delegation. This is made of 20 articles that can be summarized as follow.

The vehicles concerned by the authorization can circulate on lanes open to public traffic under cover of a provisional title of specific circulation which is added to the number of those currently envisaged by the article R. 322-3 of traffic regulation.

For vehicles used for the public transport of persons or goods, the decree makes adaptations of Articles R. 3113-10 and R. 3211-12 of the Transport Code. These adaptations make it possible to simplify the registration in carriers' registers (of persons or goods) of companies wishing to experiment with a transport service consisting solely of vehicles with driving delegation. For this, it requires a formal agreement from the AOM (Sytral here) to become a public transport service. This entails in particular a transfer of responsibilities towards the operator (and no longer towards the persons coming on board the vehicle as "guinea pigs")

The authorization is a prerequisite for the circulation for the purpose of experimenting with a driving delegation vehicle. These experiments relate to one or more of the following cases:

- technical tests and development;
- performance evaluations in the situation of the use for which the vehicle with driving permission is intended;
- public demonstrations, especially during eventual events.

Vehicles subject to driving license testing operate under a special registration certificate "WW DPTC".

The authorization may be accompanied by conditions to ensure safety during the experiment.

The sections on which the vehicle is authorized to operate in driving delegation as well as the driving delegation functions that can be activated on these sections are specified in the authorization.

The authorization may relate to a vehicle engaged in the performance of a service for the transport of persons or goods. In the case of an experiment of a vehicle intended for the public transport of persons or for the transport of goods, this transport is carried out on the route defined in the authorization. Any experimentation of a vehicle with a driving delegation intended for the public transport of persons entails a trial period without the execution of this transport.

The vehicles with driving delegation circulating within the framework of an authorization of experimentation are equipped with a recording device making it possible to identify the phases of delegation of pipe.

The applicant guarantees that his financial and technical capacities are adapted to the purpose of the experiment. The authorization specifies the start date and the duration during which the experiment is authorized. The maximum duration of the authorization is two years and may be extended by renewal of the authorization depending on the evaluation of the experiment.

Order April 17th 2018 authorization to carry out experiments on vehicles equipped with driving delegation functions on public ways

The purpose of this decree is to determine the composition of the application file for experimental purposes of a delegated driving vehicle and the contents of the register created to list the authorizations granted. The application file content is presented in annex.

Draft Law "PACTE" - Business Growth and Transformation

The Order No. 2016-1057 of August 3, 2016 is amended as follows: "Art. 1 st. - The circulation on the public road for experimental purposes of vehicles with partial or total delegation of driving is subject to the issue of an authorization to ensure the safety of the conduct of the experiment. The issuing of the authorization is subject to the condition that the driver delegation system can be deactivated or deactivated by the driver at any time. In the absence of a driver on board, the

applicant shall provide evidence to show that a driver outside the vehicle will be ready at any time to take control of the vehicle and will be able to do so ";

2 ° It is inserted, after article 1, an article 1-1 thus written:

"Art. 1-1. - The circulation for experimental purposes of vehicles with partial or total delegation of driving may only be authorized on public transport lanes for vehicles used to carry out or set up a public passenger transport service. »;

3 ° It is inserted, after article 2, two articles 2-1 and 2-2 thus written:

"Art. 2-1. - The provisions of the first paragraph of Article L. 121-1 of the traffic regulation are not applicable to the driver during periods when the driving delegation system, which he activated in accordance with its conditions of use, is in operation and informs him to be in a position to observe the traffic conditions and to execute without delay any maneuver in his place and place.

"These provisions are applicable again as soon as the driver delegation system asks the driver to regain control of the vehicle. The same applies when the driver has ignored the obvious circumstance that the conditions of use of the driving delegation system, defined for the experiment, were not or no longer met.

"Art. 2-2. - If the driving of the vehicle, whose driving delegation system has been activated and operates under the conditions provided for in the first paragraph of section 2-1, contravenes rules the non-compliance of which constitutes a contravention, the holder of the authorization is financially responsible for the payment of the fines. If this conduct caused an accident resulting in personal injury, this holder is criminally responsible for the unintentional tort of life or integrity of the person under the Articles 221-6-1, 222-19-1 and 222-20-1 of the Penal Code when it is established a fault within the meaning of Article 121-3 of this Code in the implementation of the system of delegation of conduct. "

1.3 The current barriers and expected evolution

1.3.1 Development of use cases and evolution of driving rules

The traffic conditions on the public roads of the vehicles concerned must guarantee a level of road safety at least equivalent to comparable vehicles without driving authorization systems. This will necessitate adaptations to the rules of the road and the definition of a liability regime specifying the respective tasks and responsibilities of the driver, the automated system, possibly including supervision, infrastructure managers or operators and vehicle and equipment manufacturers. Adaptations will have to be consistent with the evolution of international conventions on driving.

Liability

In the field of civil liability, Law No 85-677 of 5 July 1985 on improving the situation of victims of road traffic accidents and speeding up compensation procedures, known as the Badinter Law, establishes fault-free liability system allowing a certain and rapid compensation of the victims (bodily injury or material damage). The driver is not defined; it is the owner of the vehicle who is presumed guardian. This exclusive liability regime is coupled with an insurance plan, based on an insurance obligation covering this civil liability (Articles L. 211-1 et seq. Of the Insurance Code). This national system, particularly protective, guarantees the victims to be compensated by the insurer of the vehicle involved (except in the case of inexcusable or intentional fault), who can subsequently bring an action against the author of the damage. Existing legislation ensures, in all circumstances, the creditworthiness of the person who caused the damage.

This dual regime seems to be applicable to automated vehicles, even without any driver on board. The absence of driver or control by a driver is thus indifferent, both for the application of the liability regime and for the obligation of civil liability insurance. Compensation for victims would remain based on the notion of involvement of the automated vehicle, regardless of the existence of a driver or his fault. After compensation, a case-by-case examination would establish all the responsibilities (manufacturer, equipment supplier, software supplier, other vehicles, infrastructures, etc.). This would include resolving the issue of a possible defect or possible failure of the product, ie the automated system, and therefore the responsibility of the manufacturer, the

designer of the equipment, or from the software vendor or any other person involved in this automation.

With regard to the criminal liability of the driver and as the functions of automation of driving tasks develop in the vehicles, it is important to distinguish between two situations:

- cases where the driver must always remain in control of the vehicle using certain automated driving functions, and must be able to regain control at any time, no reform appears necessary;
- Cases (future for fully automated vehicles) where the driver can not monitor the road in any way.

The civil liability regime resulting from the "Badinter" Law and the insurance framework based on an insurance obligation covering this liability seem to be able to handle, without modification to this effect, automation cases, including total automation. Established in the interests of the victims and guaranteeing them certain and rapid compensation, the current legislation does not constitute a barrier on the development of automated vehicles.

In terms of criminal responsibility, it is necessary to consider:

- If it is necessary to provide, by way of derogation from existing laws or regulations, specific rules in the traffic regulation Code for vehicles capable of driving without drivers (providing for the non-applicability of any article of the traffic regulation).
- How to deal with highly automated systems in which may appear long periods of time during which the "driver" will rely on the system, and which will raise the question of responsibility, especially in terms of recovery, to reconcile the fact that the driver is in any case responsible criminally while he trusts the system almost all the time.

French government proposition

With a view to enabling the deployment of highly automated vehicles by 2020 to 2022, the liability regime will be adapted according to changes in the respective roles of the driver and the automated system for the corresponding use cases. These adaptations will be proposed, along with the corresponding changes in the traffic regulation Code, within the framework of the working group led by the Ministry of the Interior, including the Ministries of Justice, Transport and Industry. In the immediate future, in order to allow the development of experiments that derogate from the provisions of the traffic Code, the Mobility Orientation Law will propose a framework of

responsibility adapted to the specificity of the experiments, and in particular to the commitment of the person in charge of the experiment, holder of the authorization, to ensure its safety. Judicial magistrates, judicial experts and judicial police officers will be made aware of the liability issues that will be generated by the development and introduction of autonomous vehicles.

Driving licence

The conditions for the issue of driving licenses fall within the competence of the European Union and, more specifically, the provisions contained in Directive 2006/126 / EC of the Council and the European Parliament of 20 December 2006 on driving licenses. It is the European Commission, in particular DG MOVE, its Road Safety Unit, which must work on the issue.

“This is a key point in our discussions with Xavier Delage at the Ministry. Currently, Navya shuttle operators must hold a D (+ FCO / FIMO) license. On the Autonom Cabs however, less than 9 passengers, so normally a license B will be sufficient. We (with the other operators RATP and TD) asked that the shuttle operators could hold only a license B. We await their returns.” Clément Aubourg,Keolis

Evolution of vehicle technical regulation and homologation

In the context of the work on the evolution of the technical regulation of vehicles within the UNECE in Geneva, it is currently Regulation 79 (see box below) relating only to vehicle steering equipment which deals with the main issues of automation. Until 2017, this regulation allowed the automatic control of the steering control by the vehicle only up to 10 km / h. This requirement was sufficient to certify automatic parking systems, but did not allow the homologation of the projects of the manufacturers aiming to direct the vehicle automatically on fast lanes or in situations of corks, and eventually in all situations.

The work undertaken in UNECE WP29 leads to a sequential approach to the increasingly high degrees of automation, classified into 5 categories:

A: manoeuvres <10km / h, including remote controlled parking (example park assist)

B: keeping in the lane

B 1: assistance, the driver must keep his hands on the steering wheel (example: lane keeping assist)

B 2: delegation, the driver can let go of the steering wheel (example: lane guidance)

C: lane change (initiated by the driver): the driver decides to change lanes, and asks the system to do so

D: lane change (validated by the driver): the system proposes to change lanes, the driver valid

and the system operates

E: B2 + automatic lane change: delegation of maintenance in the lane and totally automatic lane change.

In addition to the management regulation R79, it is important to include the evolution of international technical regulations in a new framework that makes it possible to move from a "module" approach (eg lateral-direction, braking-acceleration, field of vision) to a "system" approach and to take into account in particular:

- the need to distinguish the different types of use cases in the approach, including automation levels and areas of use or traffic conditions;
- the need to take into account the learning nature of these systems;
- the need to progressively extend technical regulations to the challenges of vehicle connectivity.

In terms of approval, based on the 'horizontal rule' approach, each type of vehicle with a set of automated features may be approved by a receiving authority, on the basis of a service report, which will have carried out all the necessary verifications adapted to all the embedded functionalities (documentary verification, simulation tests, physical tests, conformity assessment open and systemic). The process of issuing the European homologation of the vehicle will be done according to the principles established by European directives or framework regulations, for all non-automated aspects of the vehicle (seat belts, lighting, glazing, ...), by incorporating the certification dedicated to the automated features above.

Finally, the existing national framework, in particular the third book ("The Vehicle") of the Traffic Code and its implementing decrees, will have to be reviewed in order to ensure the adequacy between the new technical prescriptions published in Geneva and made compulsory by Brussels, and those already present in the traffic Code, whether in terms of the technical provisions of the vehicles, their receipt and homologation, their registration and their technical inspection, and should be adapted accordingly.

1.3.2 Automated public transport framework

The dynamics of innovation in the automated public transport sector suggest that it is necessary to anticipate the transition from an experimental logic to the development of services. It is likely that, in an incremental logic and learning, shuttle use cases first develop on relatively secure circulating environments (as has been observed until then in research and experimentation projects), to gradually move from "almost-dedicated sites" to less secure routes (mixed flows and crossroads, change of lanes for avoidance), to possibly go towards non-fixed routes. The services identified in the framework of the NFI (Nouvelle France Industrielle) suggest that the "size" of the vehicle, as it is currently known (about 12 people), will have to diversify as well as the nature of the routes (dedicated sites / open sites), to cover a wider spectrum, ranging from autonomous shared vehicles for the most atomized applications, to capacity buses. The automation levels targeted are higher than what is targeted for the particular vehicle, targeting now levels 4 and 5.

The regulatory work on automation carried out at UNECE does not address the challenges of developing automated public transport, which appears fast in relatively secure areas of employment.

The dynamic development of automated public transport leads French decision-makers to consider two strategic orientations at the national level to support the market

The development of a regulatory framework laying down the safety requirements of the "shuttle" type vehicle (9 to 16 seats, including at least 4 seats), as well as the traffic conditions of these vehicles when they are automated (this category of vehicle is different from categories M2 or M3 intended for the transport of persons and subject to international regulation and European homologation).

The development of a reference system for evaluating the safety of shuttle routes, when these routes are fixed, based on an analysis of the critical situations of automated shuttle traffic in urban areas and on experiments. These two elements will make it possible to set up a system of homologation of the vehicles concerned, and a system of validation of the routes and conditions of circulation of the vehicles.

1.4 On-going programs

1.4.1 France-Germany-Luxemburg project

France initiated cooperation with Germany in 2016, extended to Luxembourg in 2017 which resulted in the identification of a transboundary site. The content of the expectations of the public authorities has been defined. On this basis, a call for expressions of interest was launched on 11 May 2018 following the meeting of the French and German ministers. The following text is directly taken from the document “Franco-German-Luxemburgish cooperation on automated and connected driving Concept for the Cross-border Digital Test Bed”, co-signed by Bundesministeriumfür Verkehr und digitiale Infrastruktur, Ministère de la transition écologique et solidaire et le gouvernement du Grand-Duché du Luxembourg on the 8th of May 2018.

“On September 29th, 2016, the Governments of Germany and France launched the "Franco-German Initiative on Electric and Digital Mobility". The objective of the initiative is to enhance cooperation between the two countries in order to progress innovations in the spheres of electric mobility and automated and connected driving. By launching this initiative, the two countries are affirming their joint commitment to a sustainable European transport policy that is fit for the future. In the field of automated and connected driving, the Franco-German initiative provides for cooperation on the following points:

- Assessment of challenges of the use of automated and connected vehicles, with a focus on safety and traffic management impacts, as well as interactions with the infrastructure and other vehicles or road users;
- Assessment of medium-term impacts of automated and connected driving on mobility and the environment;
- Identification of the need for joint experimental or pilot projects;
- Exchange of experiences regarding driving skills and training needs.

In connection with these points an agreement was reached on the establishment of a cross-border "Franco-German Digital Test Bed" for automated and connected driving on 8 February 2017. The test bed serves to promote the deployment and trialling of technologies for automated and connected driving in cross-border operations and in real life conditions. The interaction between motorway, rural and urban traffic is to be future-proofed across national borders. In particular, the following objectives should be emphasized:

The test bed is to provide a technologically neutral offer to industry and academia for testing innovative technologies.

A joint exchange of experience based on experiments results of industry and academia especially regarding juridical and technical issues encountered during the cross-border testing of automated and connected driving technologies is to be established.

On this basis the impacts and potentialities of the technologies regarding concrete use-cases are analysed and assessed.

The lessons learned will be submitted jointly to European and international institutions for discussion.

On 14 September 2017, Luxembourg joined the cooperation, and additional objectives were added to the trilateral cooperation:

- Support the development of innovating and tailored mobility services, for example towards rural zones;
- Aim at developing a joint large scale pilot project in the cross-border regions;
- Pay a particular attention to acceptability and ethical issues;
- Support common and proactive initiatives in European and international institutions."

Thematic Key areas

1) Continuous compatibility of automated driving perception functions
2) Link between automation and connection, including Intelligent Transport Systems (ITS) and cross-border mobility services
3) Impact and effects of automated and connected driving
4) Data access and use

1.4.2 National autonomous vehicle development strategy

On May 14, 2018, the French State adopted the National autonomous Vehicle Development Strategy.

The 10 priority actions defined aim to "build the framework, by 2020 to 2022, to allow the circulation of private cars, public transport vehicles and highly automated goods in France. the traffic code, the rules of responsibility or the training can be adapted ",as quoted into the report from former minister Anne-Marie IDRAC.

Experiments will also take place in Île-de-France from 2019, said the president of the Île-de-France region, Valérie Pécresse. These will take place on the A1, A6, A4 and A10 on emergency stop strips transformed into connected and dedicated traffic lanes. These infrastructures will be financed by the region with 100 million euros. In the prospect, "an automated service to the sites of the Olympic Games in 2024, to compensate for some delays in the railway," hopes the elected. These autonomous buses or collective taxis - the project has not yet been precisely stopped - will serve the Charles de Gaulle airport, Orly or Marne-la-Vallée.

At the national level, category 3 autonomous vehicles (the driver may give up complete control of the vehicle but must be able to take it back in a given time) may be authorized in 2020, those in category 4 (full autonomous driving on certain portions route) in 2022, according to the schedule presented by Anne-Marie Idrac, commissioned by the government to establish this strategic plan. Level 5, where the vehicle can drive alone in all circumstances and make critical decisions, is not up to date. The Pact Law, as mentioned before, whose entry into force is expected in 2019, will include a component on the experimentation of autonomous vehicles without an attentive driver, said the Minister of Transport Elisabeth Borne, which will make possible the experiment in Ile-de-France. The law of orientation of the mobilities aims at creating a perennial legal framework by 2022. Since the end of 2014, 54 registration authorizations for autonomous vehicle trials have been issued in France, including 26 for private cars.

C. Call for Projects - Investments of the Future - Experimentation of the Autonomous Road Vehicle

The EVRA (expérimentation véhicule routier autonome) call aims to support experimental projects for the use of autonomous vehicles, marketable by 2022, in the field of individual, shared or collective mobility, freight and logistics. These projects will contribute to the development of methodologies for validation of safety and to the improvement of knowledge on uses and acceptability. It is managed by ADEME (French energy and environment national agency). It was launched on June 8th 2018 and will be closed one November 29th. On May 14, 2018, the State adopted the National autonomous Vehicle Development Strategy. This call aims to select one or more projects that register and participate in Priority Action 5 of this strategy, entitled "Structuring a National Program of experimentation ". It follows the “call for interest” opened on February 23, 2018, which was intended to allow actors to gather around common projects. Projects that meet this call involve several “call for interest” winners, working in particular on the development of automated vehicles or on the development of mobility or transport services for goods using these vehicles

The choice of public authorities is to select a limited number of projects, of sufficient critical size, having the best governance between the project partners, but also with the other projects and the public authorities, in order to exploit as much as possible the synergies between the cases of use and the pooling of skills necessary for experimentation.

The projects deal with one or more of the application areas defined as part of the “*Nouvelle France Industrielle*” stand-alone vehicle roadmap:

- Particular vehicle ;
- Collective and shared transport system;
- Freight transport system.
- Only consortium projects labeled in the call for interest are eligible.

1.4.3 French Mobility program: prototypes to launch projects

French Mobility is a community open to all mobility stakeholders: transport companies, start-ups, local authorities, incubators, investment funds, training organizations, associations. In a process of co-construction, the community members are called upon to participate in the creation of an

environment conducive to the development of new mobility, for persons and goods, by proposing concrete and operational solutions that meet the needs of project leaders.

The French Mobility initiative is an operational complement to the Mobility Orientation Law, which aims to modernize the legislative framework for mobility, and is anchored in the Government's actions for innovation. It participates in the promotion of French innovation carried by numerous institutional players and relies on existing approaches (French Tech, France experimentation Investment plan for the future ...) for the benefit of its members.

The French Mobility action plan, announced at the European Mobility Fair 2018, includes 7 main measures over two years (French Mobility Facilitator within the Ministry of Transport; French Mobility collaborative platform; Appropriation of the innovative purchase; Creation of an innovation and mobility culture; Orient funding in support of innovation in mobility; Engineering support for low density territories; Highlighting French Mobility as THE unifying brand of mobility innovation). Six multidisciplinary groups (State, local authorities, companies, start-ups, associations, etc.) are already working on prototypes for its implementation.

These prototypes include ways to improve and develop solutions that meet everyone's needs.

The group "financing of innovation and public procurement" aims to remove the financial and legal obstacles to the setting up of experiments and innovative solutions by the public authorities. Short and medium-term actions are proposed to facilitate the path of the innovative candidate, reconciling innovation and public order and, in the longer term, encouraging the financing of experiments and large-scale deployment.

The purpose of the "Deployment" working group is to allow the transition from successful experimentation to a generalized and sustainable service, in a priority area: the link between the peripheries and the agglomerations. To accelerate large-scale deployment and integrate innovations with existing solutions, the prototype plans to integrate the deployment of innovative solutions by making it possible, as of 2019 and for a period of 3 years, to amend the 400 service delegation contracts.

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2 Legal context in Switzerland

2.1 Mobility and transport framework

2.1.1 Framework

In Switzerland, control and direction of transport at the federal level is the responsibility of the Federal Department of the Environment, Transport, Energy and Communication through four different offices, namely the Federal Office for Civil Aviation (FOCA), responsible for aeronautical policy and surveillance of Swiss civil aviation, the Federal Office of Roads (FEDRO), responsible for road infrastructure and individual traffic for national roads and main roads , the Federal Office of Transport (FOT), responsible for public transport (railways, cable transport, buses or boats) and rail freight traffic and the Federal Office for Spatial Development (ARE), responsible for strategies and the coordination of the decisive projects of territorial organization, transport coordination and sustainable development.

By virtue of the principle of subsidiarity of the federalism in force in the country, the cantons exercise, in the field of transport as in all the others, all the rights which are not delegated to the Confederation. Over time, delegated rights became increasingly important, centralizing power within the Confederation. For example, in the field of road traffic, the ownership of motorways passed from the cantonal hands to the federal hands in 2007, while the national roads did the same from 1 January 2008 as part of the project reform of the financial equalization and division of labor between the Confederation and the cantons (RPT project)

Public transport in Switzerland is spread over several modes of transport: alongside trains, trams and buses, there are boats and cableways that are also under the competence of the OFT. On this page and its derived pages, you will find the information by mode of transport, as well as the information on the offers of freight traffic carried by these modes of transport, including road freight traffic, whose legal framework conditions also apply. of the competence of the OFT.

OFT and the cantons jointly order the bus and tram offers (as well as the rail offer) in regional traffic, while local traffic is controlled and financed by the cantons and cities.

As the approval authority, the OFT also plays an important role in national and international bus line traffic. The OFT grants the necessary authorizations or licenses to companies engaged in the road transport of passengers. He is responsible for the technical approval of buses and trams and he also approves the extensions and transformations of the trolleybus infrastructure.

The same rules apply to trams and railways in various fields. These include the admission of drivers of motor vehicles as well as authorizations to use the rail network and operate vehicles

The local traffic includes the lines which serve for the capillary service of localities. It is excluded from federal benefits. In accordance with art. 3 OITRV, the local traffic includes lines serving the localities, ie when the stops are, as a general rule, less than 1.5 km from the nearest junction with the public transport network. and that the distance between stops is short.

Art. 28, para. 2, LTV, states that local traffic offers are excluded from federal benefits.

Legal basis : Federal Law on Road Transport Companies : (LEnTR) 20 march 2009 (januaryr 2016). This Act governs the business license for the carriage of passengers and goods by road.

The right to transport passengers regularly and in a professional capacity, granted under art. 6 to 8 of the law of 20 March 2009 on the transport of passengers is reserved.

2.1.2 Agglomeration Traffic Program and Urbanization

Through the Program for Agglomeration Trafficking (PTA), the Confederation contributes to the financing of transport projects in towns and cities. Federal contributions go to agglomerations whose agglomeration projects effectively coordinate the development of transport and that of urbanization. Agglomeration projects are therefore an important pillar of the Confederation's agglomeration policy and sustainable spatial development of Switzerland.

Transport systems and urban development are closely linked: new transport offers boost urban growth and, conversely, urban development generates additional traffic and therefore increased demand for infrastructure. Through the PTA, the Confederation encourages coherent planning of transport and urbanization in agglomerations and thus promotes, beyond the communal, cantonal

and national boundaries, urban development within the built environment and an extension of the supply of transport where the need is really felt.

The PTA enables cities and agglomerations to meet the major challenges posed by increasing traffic and urbanization. Thanks to a clear planning framework and PTA co-financing, the projects carried out have the best effects in the long term. More than 80% of the agglomerations have been able, with the support of the PTA, to increase the efficiency of their transport networks over the past ten years. The PTA has thus proved to be one of the most successful instruments of Swiss transport policy. Its long-term financing was ensured by the "yes" of the people and the cantons to the creation of the fund for national roads and agglomeration traffic during the February 2017 vote.

Already at the end of 2006, the Confederation co-financed particularly urgent transport projects in agglomerations using the PTA. Since 2007, agglomerations have been submitting agglomeration projects every four years, which are examined and, where appropriate, co-financed. The first and second generation projects are already in the implementation phase, while the third generation projects will start in 2019

2.1.3 COMO/KOMO

In the field of transport, DETEC is committed to sustainable development. The latter also includes the development of new ideas for promising forms and mobility offers.

With the Service Center for Innovative and Sustainable Mobility, the Confederation contributed to this development from 2006 to 2015. In 2016, the Coordination Office for Sustainable Mobility (COMO/KOMO) took over the tasks of the Service Center.: The SwissEnergy program was initiated by the Federal Council with the aim of promoting energy efficiency and renewable energies.

To this end, it raises awareness in Switzerland about energy issues, encourages innovative projects and supports training as well as continuing education for professionals. The program is thus making a significant contribution to allowing new products to enter the market, gain a foothold and gain visibility. Renewable energy or efficient use of energy: SwitzerlandEnergie advises and informs interested parties.

2.2 Long-term strategy for autonomous mobility

2.2.1 Trains without mechanic

“The Confederation is open to new technologies. We consider that automation is part of the general technical development. But it's the ETFs and the industry that are leadership position in this area. We support pilot projects. As a supervisory authority, we focus on security. We were contacted by different parties, but there is no concrete plan nowadays. There is a lot of discussion about it, but I'm not sure about that lead to important projects. The basic service in Switzerland is provided by transport services ordered and financed jointly by the Confederation and the cantons. This principle remains the backbone of public transport throughout the national territory even if the entrepreneurial incentives are reinforced, the control processes optimized and the offer complemented here and there by autonomous vehicles”. M. Füglistaler, Director of the Office

2.2.2 On-going programs

National Program

Coordination Office for Sustainable Mobility COMO, Project name: Mobility combined with autonomous vehicles

Objectives: Development and management of supply models for autonomous shuttle buses; digital and physical integration into an existing mobility ecosystem

Measures: Offer design, pilot operation, user survey, development of autonomous vehicle use possibilities as an extension of the existing mobility ecosystem,

Degree examination: technological maturity, profitability audit, energy and environmental balance • Deployment plan vs autonomous vehicles

Expected results • Concept of offer for autonomous vehicles in agglomeration • Management of the organization for different types of application • Evaluation of the technology • Analysis customer acceptance • Environmental analysis • Induction charge management concept (optimized time); energy balance brief description

The pilot project is to develop an offer concept for stand-alone shuttles as first-to-last-mile solution providers in train stations and to be tested in a multi-phase pilot company (running at request, coordinated with the TP schedule, connection to car sharing).

Autonomous shuttle in ZUG

At the push of a button, order the bus and get off wherever you want? This is the vision of a pilot project in the city of Zug, which was presented today. From the summer of 2017, two automated shuttle buses will drive through the city center. The project, supported by the Sustainable Mobility Coordination Unit (KOMO) * under the Energy Switzerland program, integrates self-driving buses into an existing transport and mobility system. Compared to previous projects, such as "SmartShuttle" in Sion, the shuttle buses operate in regular urban traffic and ensure connection to trains at the station. Zug wants to reduce long-term traffic in the city center.

The two self-propelled electric shuttle buses transport up to eight passengers free of charge from the station to the Zug technology cluster. In the second phase of the project, passengers can board at any location within the project area. Various applications are tested. For example, as part of a car sharing offer or in the network of existing public transport. The complexity in terms of route guidance and supply is continuously increasing.

Participants include the SBB, Mobility Carsharing, Zugerland Verkehrsbetriebe, the city of Zug and the Zug Technology Cluster. The project partners contribute their specific and broad know-how in order to find innovative solutions together.

The project has a long-term and sustainable perspective. Self-driving vehicles have the potential to radically change the mobility system and bring great potential for a more efficient and cost-effective overall transport system. Automated driving involves both opportunities and risks, as a recent Federal Council report shows. Therefore, the project will be analyzed in order to avoid possible negative effects on energy consumption or the environment.

* KOMO is supported by the six federal offices ARE, ASTRA, FOEN, BAG, BAV and BFE. KOMO serves as a central point of contact and coordination for innovative mobility projects as well as a

knowledge platform. There are two submission deadlines for projects each year: April 30 and October 31.

2.2.3 Diversity of the activities in the field of AV

In terms of clarifying key aspects of automated driving, Switzerland relies heavily on international developments in this area. It is therefore necessary to monitor them closely and take timely measures to make use of the new opportunities that will result.

The Confederation has already undertaken to fulfil many of the tasks involved.

Generate knowledge and make it available

Research: As part of the research on roads, FEDRO has launched a research program on automated driving. Through this program, the Confederation intends to fill the gaps in the knowledge of this field and allow research organizations to seize this theme oriented towards the future.

The inaugural project, which has already started, aims to define the scope and modalities of the entire program. The Confederation also kicked off an EPFZ research project on the analysis of the effects of automated vehicles on the Swiss transport system and on the other hand on acceptance of new potential offers.

The knowledge gained from this research is immediately integrated into the Confederation's activities in the field of "smart mobility".

Finally, the Federal Institute of Metrology (METAS), which has extensive experience in measuring data and data security, is currently strengthening its skills in the field of automated vehicles and data security.

- Cooperation within international organizations: FEDRO has long been represented in the specialized technical bodies of the EU, where it participates in the development of international guidelines and standards for automated driving. Switzerland also maintains regular international contacts in the field of traffic law.

These examples of cooperation ensure the rapid integration of international developments in the corresponding activities in Switzerland.

- Exchange knowledge and make it available: the Confederation commits itself - alongside specialized associations, universities and cantonal bodies
- in its-ch, the Swiss telematics transport platform. its-ch promotes the launch in Switzerland of products and services related to transport telematics, as well as the networking of relevant stakeholders from scientific circles, industry and administration. Intelligent mobility is one of the priorities around which its-ch organizes regular events

Networking, Specialized Conferences and issues status reports.

FEDRO has also launched, in collaboration with the TCS Mobility Academy, a web platform dedicated to automated driving. The purpose of this platform is to gather national and international knowledge in this field and to make it available to interested circles.

By encouraging the creation and operation of knowledge exchange platforms and organizing specialized events, governments support sector stakeholders in carrying out their tasks and facilitate networking.

2.2.4 Planning conditions and technical conditions

• Planning and design conditions: As part of the development of its mobility model, DETEC is currently defining, among other things, the principles that will determine the importance of new technological opportunities in Switzerland related to mobility. as well as the principles that will govern its management. Mobility models and infrastructure programs will then be reviewed in the light of this model and, if necessary, adapted.

• "Digital Switzerland" strategy action plan: various elements of the "Digital Switzerland" strategy are being developed - led by the Federal Office of Communications (OFCOM) - as part of the action plan based on this strategy. The action plan includes an overview of the data policy of the Confederation, the creation of a national data infrastructure, and an IT-based intermodal and

interconnected traffic management (including (c) for automated driving) and to examine issues of cybersecurity and data security.

Without these elements, it will not be possible to develop automated driving.

In addition to the action plan measures are the activities of the industry, which is currently developing and standardizing Next Generation Communication Technology (5G).

This could play an important role in the interconnection of automated vehicles.

• Technical conditions: FEDRO has for several years been responsible for the "Swiss System Architecture" project, which aims to harmonize and standardize equipment for the operation and safety of national roads on a technical level. One of the permanent tasks resulting from this project is to continually modernize the equipment in place to bring it into line with the latest state of the art. This work is a prerequisite for the connection of automated vehicles with the infrastructure in Switzerland.

Moreover, as soon as the technical standards of communication between vehicles and infrastructure are sufficiently stable at the international level, it will be necessary to define and apply the measures that may be necessary to comply with them in our country.

Finally, it will also be necessary to define the tasks of the public authorities in connection with the implementation and operation of the data systems that will be required to automate the traffic.

These tasks can range from simple provision of data to active participation in the design, implementation and operation of these digital infrastructures.

3) Create legal bases

• Road Traffic Legislation: The legal framework for automated driving and the use of other opportunities in the digital world in the field of mobility will need to be created. The first step is to make possible the development of predictable automated driving in the short and medium term in Switzerland, as well as its harmonization with international developments.

FEDRO has already developed a model governing the changes to the traffic rules and the conditions for admission of vehicles and drivers to be carried out.

The adaptations of the relevant legal bases are being prepared. They aim to make legally possible technological developments necessary to achieve, in Switzerland, level 4 of automated driving.

• Other legislation: the need to legislate in areas other than road traffic, such as data protection, cybersecurity, data system operation or government influence on traffic, must still be determined.

The necessary legislative work will have to be coordinated with the activities foreseen in the "Digital Switzerland" strategy action plan.

In addition, depending on the positions that society and the political world will take on the effects of the technological developments needed to automate mobility, various other regulatory measures will have to be adopted. These measures will have to be identified, then addressed to the competent services so that they specify the contents and, finally, subject to the process of political decision.

2.2.5 Other activities

In addition, the Confederation provides services in the areas below.

• Allow and monitor pilot tests: The Confederation is actively working to make pilot tests possible in relation to automated vehicles. DETEC has already issued the first test approvals and more will follow.

The lessons learned from the pilot tests are gradually integrated into the work of the Confederation.

• Coordinate and steer the works in progress: in early 2016, FEDRO set up a small group called "Intelligent Mobility". This interdisciplinary working group is responsible for developing ideas for applying intelligent mobility, coordinating activities in this field and implementing the adopted subprogrammes.

One of these subprogrammes is the creation and operation of a data platform, on which FEDRO will make all traffic data available to interested users.

• Ensure the smooth flow of traffic on national roads: FEDRO has been working hard for several years to ensure the smooth flow of traffic on national roads. These include, in particular, the

continuous improvement of the provision of real-time information on the state of the traffic, the installation on national roads of equipment suitable for influencing the traffic, the realization of installations making it possible to put the band emergency stop temporarily at the disposal of general traffic, or the implementation of extension projects as part of the bottleneck elimination program.

• Implement the mobility pricing model: FEDRO and the Federal Office of Transport (FOT) are currently working to implement the report on mobility pricing adopted by the Federal Council. The goal is to deepen the conceptual reflections it contains and accumulate experience in the application of this instrument. In the medium and long term, mobility pricing could help to counteract the undesirable developments that automated driving might present.

• Ensure financing: the current financing of road traffic is essentially based on the mineral oil tax. However, if only because of the (partial) electrification of the fleet that is on the horizon, this funding is expected to find a new base in the relatively near future. In addition, since advances in automation are likely to accelerate this electrification, the need for action could be even more pressing. The levy on electric vehicles provided for in the draft fund for national roads and agglomeration traffic (FORTA) is a first step towards a new form of financing. However, because it is independent of the kilometres, this fee can only be a transitional solution. It is also uncertain whether the gradual automation of road traffic will require investment and, if so, how important it will be. If this is true, the corresponding financial resources should be available in due course.

3 Legal context in Denmark

3.1 Mobility and transport framework

More and better public transport is an essential element of a greener transport system in Denmark. Public transport should be an attractive everyday alternative to the car. Accessibility and flexibility are central issues in order to make public transport more attractive.

Public funds have been invested in projects on public transport solutions. Among these are projects that improve the accessibility of train stations and projects that integrate the use of mobile phones in planning and purchasing public transport services.

Public funds are also invested in public transport solutions for the larger cities such as Aarhus and Odense, e.g. light rails that will make public transport even more attractive. With the planned congestion charging zone in Copenhagen, more funds will be available for improving public transport, as the revenues from the congestion zone will be invested in improving and expanding the public transport sector.

The public transport system needs to be expanded and become more efficient, in order to better connect cities and provinces across Denmark. More terminals, more passenger stops and increased utilisation of IT are just some of the actions, which contribute to a more efficient and environmentally friendly public transport system Given the central role played by large-scale public investments, it would be easy to assume that Greater Copenhagen's sustainable transportation regime was made possible by a central state that was both strong and electorally dominated by the left.

The reality, however, is more complicated. Periodic state weakness has been crucial in producing not just positive change but also minimizing negative change in sustainable transportation in Greater Copenhagen. Most notably, the region's transit-oriented development model, the so-called Finger Plan, was developed and championed by non-state actors and became a reality, in the absence of state legislation, as a result of the influence of non-state actors. Private actors also played an important role in influencing the content of Denmark's national roads policy. This helped

contribute to a comparative underinvestment in the motorway system in the capital region, which in turn later facilitated the expansion of non-car-based modes of transportation.

3.2 Mobility program

This ITS Action Plan outlines the themes and focus areas that Copenhagen will be working with within Intelligent Transport Systems (ITS) up to and including 2016. These initiatives aim to ensure that the municipality meets the service goals set out in the Traffic Management Plan, which was approved by the Technical and Environmental Committee on 22 September, 2014. In addition, the initiative will further the municipality's overall objectives as set out in section 1.2.

In the period 2013-2014, the administration implemented a number of pilot projects as well as a public private innovation partnership (PPI) for ITS. In these, the administration, in collaboration with universities and private companies, has developed and tested new ITS solutions for the benefit of citizens and users. Lessons learned from these projects, as well as user feedback, have been decisive for the choice of themes and focus areas in this action plan.

As part of the "CPH 2025 Climate Plan - A green, smart and carbon neutral city", Copenhagen has set an ambitious goal to become carbon neutral by 2025. The ITS programme is one action in the Climate Plan and is expected to contribute to a reduction in CO2 emissions of 25,000 tons per year by 2025. In 2010, transport contributed with 380,000 tonnes CO2. This goal requires investments in ITS continuing until 2025.

So, the purpose of the ITS programme is to support the goals within green mobility and improve flow, enabling road users to reach their destination more easily, through smarter and greener traffic management for all modes of traffic. Persuading people to go by bike instead of taking their car is one of the most effective methods for reducing CO2 emissions. So, amongst many other things, the ITS programme deals with how to make cycling and public transport more efficient and attractive.

3.2.1 The Danish Infrastructure Commission

The Danish Infrastructure Commission was appointed in November 2006 following a government decision. The terms of reference for the work of the commission state that "the overall objective is for Denmark to maintain and develop its position as one of the countries in the world with the best transport systems, despite the fact that growing traffic volumes are increasing the requirements in the long term". On this background, the commission has been given the following main tasks:

- To analyse and assess the key challenges and development potential for the infrastructure and national traffic investments until 2030.
- To identify and assess the strategic options and priorities and to put forward suggestions to strengthen the basis for the national investment decisions in the transport area. Furthermore, the commission was given the task of analysing and assessing proposals for strategies for handling a number of selected issues. These include the issue of cost-effective organisation and management of construction projects, the handling of preservation, climate and environmental concerns, the opportunity for better utilisation of the infrastructure by means of modern IT, and the significance of the long-term physical planning.

3.2.2 The Ministry of Transport, Building, and Housing

The main responsibility of the Ministry of Transport, Building, and Housing lies within the following areas: Transport: roads, vehicles, railways, rapid transit systems (e.g. the Copenhagen metro), fixed links, harbours, ferry operations, aviation, airports and postal services. Building: national office buildings, building regulation, and regulation of the construction sector. Housing: social housing, housing regulation, and urban renewal. https://www.trm.dk/en

A new PT initiative from the Government, publish on 20th September 2018

The Danish government has just published a suggestion on how to develop better conditions for passengers and private solutions in public transport. The initiative are put forward in a bill later this year.

Some of the main points are: Digitalization in the field of transport has enabled digital mobility services to make it easier to access the entire journey. The trip could be planned, booked and paid in one single app.

With the new initiative, public transport offers are therefore required to share transport data with the private sector. At the same time, private operators must be able to resell tickets for public transport. This allows new markets to arise in the area of mobility.

Rejseplanen (journey planner) and Rejsekortet (electronic ticket system) must work more actively with the private sector, which must be linked to a larger extent on the Travel Plan (rejseplanen) across the country. And then the features of the two products must be assembled into one mobility service under one company with one joint board that will future-proof and strengthen the travel plan and travel card's offer to the travelers.

3.2.3 The Danish Road Directorate (vejdirektoratet)

The Road Directorate is responsible for the state road network, consisting of highways, a number of mainland roads and many of the country's bridges - a total of approximately 3,800 km of road. The state road network is only approx. five percent of the total public road network of almost 75,000 km, but almost half of all traffic in Denmark is being settled on state roads. To ensure a comprehensive and well-planned infrastructure, the Road Directorate collaborates with a large number of authorities and the road sector and municipalities.

The Road Directorate's work consists primarily of three elements:

- Planning
- Construction and operation
- Traffic development and management

3.2.4 Danish road safety agency (Færdselsstyrelsen)

The Danish Transport Agency is part of the Ministry of Transport, Building and Housing, the Ministry of Transport, Building and Housing. The Danish Transport Agency regulates and supervises within the traffic area.

The Agency consists of approx. 70 employees, divided into 9 professional teams. The Agency is responsible for regulation and supervision in the field of traffic, including contributing to the drafting of regulations and guidelines, the administration of traffic laws and the handling of general questions about the individual areas of responsibility.

The Agency is working closely with the Danish National Police, Police, Road Directorate and Transport Organizations.

The Danish road safety agency, recives the application for a test with autonomous vehicles:

An application for tests with autonomous motor vehicles is sent to the Road Directorate. Upon receipt, the Road Directorate examines whether the required documents are attached. Then the application material is forwarded to the authorities to process the application.

Task force for AVs

Experiments with AVs require handling of several authorities. There is therefore, a Task Force set up to make the application procedure so smooth and consistent as possible for the applicant.

The task force consists of four permanent members:

- The Danish Transport Agency
- The Danish national Police
- Director of Public Prosecution
- The Road Directorate

In addition to the permanent members, other relevant authorities may, for example, Ministry of Justice, municipalities or the Ministry of Transport, Building and Housing, will be involved in the processing of the application. The involvement of other relevant authorities depends on the scope,

nature, geography, etc. Then Task Force members begin processing the application based on their subject areas.

The examination of the application will be based on the assessor's assessment of the trial.

As a matter of principle, the professional handling process will consist of investigating all relevant safety issues have been uncovered. Likewise, the test's impact and requirements are investigated the traffic and other physical conditions.

The processing of the application is in dialogue with the applicant.

3.2.5 Autonomous vehicles

Act amending the Road Traffic Act: https://www.retsinformation.dk/Forms/R0710.aspx?id=191638

L 120 Proposal for a Law amending the Road Traffic Act:

The purpose of the bill is to allow tests on autonomous motor vehicles in Denmark when this can be done soundly according to road safety.

Under specific traffic conditions (eg. on a fully stripped motorway or at low speed in a track system) autonomous vehicles will be able to drive traffic-safely without a driver actively contributing.

The Ministry of Transport, Building and Housing, in 2015, received from two municipalities requests to use autonomous vehicles to streamline the production of municipal services. However, existing legislation requires a driver's physical presence in such cases. However, with the bill, it is proposed that a variety of tests for autonomous vehicles may be authorized.

Vehicle testing will be limited to specific vehicle types and specific road sections. https://www.ft.dk/samling/20161/lovforslag/l120/index.htm

The full is found here:

https://www.ft.dk/samling/20161/lovforslag/l120/20161_l120_som_vedtaget.htm

Traffic law: https://www.retsinformation.dk/Forms/r0710.aspx?id=185819

4 Conclusion and Synthesis tables

In order to identify and map regulatory and legislative requirements and procedures (concerning actual and under development policies), we collected data, for 3 countries and selected cities i.e. France and more specifically the Lyon Metropole, Switzerland and Denmark. The data collection targeted the following issues:

- Which are the policy decision making organizations, i.e., competencies
- On which laws and legal documents are based urban planning, transportation mapping and mobility policy
- Which reports, white books and national programs are published to describe regulation and public transport policy
- Which experiments are being (or have been) conducted with autonomous vehicles

The four questions have been considered for at 3 levels: national, regional and local levels.

The four following tables give a synthetic view of the legal context in the 3 analysed countries: France, Switzerland and Denmark.

4.1 TABLE 1 - Mobility and transport framework

		Denmark	France	Switzerland
1.1	Which organization has responsibilities to implement urban transport policy (like travel master plan)?		Metropolis / city	Department of Infrastructure
1.2	Which organization has responsibilities to implement regional transport policy (like inter-urban travel plan or rail development) ?	Rail is the state Busses are ordered by the municipalities (to be confirmed)	Department/Region	Department of Infrastructure
1.3	Which organization has responsibilities to implement national transport policy (like rail development or national mobility programs) ?	Ministry of Transport, Building and Housing	Ministry for the Ecological and Inclusive Transition	Federal Department of the Environment, Transport, Energy and Communications (DETEC)
1.4	Is there any national or local urban development planning or “clean air act” with mobility aspects?	Copenhagen 2025 Climate plan	Regional scheme of intermodality Urban Travel Plans 7 plans at different levels have to be compatibles	Very low scale Green Village initiatives and national Anti-pollution standards for vehicles.
1.5	What are the current regulatory documents in terms of mobility and parking within your city?	In general: the Road Traffic Act For parking specifically: FÆL §§ 28-31 https://www.retsinformation.dk/Forms/R0710.aspx?id=185819	The transit network development projects or action ideas are described in the Urban Transit Plan (UTP). The Transport Code provides that the UTP aims to ensure various sustainable mobility measures	Better availability of public transport and fewer parking spaces for normal vehicles.
1.6	Which entities are responsible for mobility and parking regulation within your city?	The Municipality of Copenhagen (Københavns Kommune) is responsible for publicly owned streets and parking areas.	Lyon Metropole Police department SYTRAL for applications	Department of Infrastructure

4.2 TABLE 2 - Experiment status for AV in the selected country

		Denmark	France	Switzerland
2.1	Which authorization(s) to carry out experiments on vehicles equipped with driving delegation functions are required (national level and/or local level)?	In July 2017 a new law was passed (unanimously vote from Parliament), which makes it possible to apply to conduct Trials/Project pilots with "Autonomous motorized vehicles". The law is called: L120 Motion on law on changing the Road Traffic Act - Authorization to form rules and give permission to conduct Trials/Project pilots with Autonomous motorized vehicles". In general we have to obtain two types of overall approvals on national level: **Vehicle approvals** and **Over all approval of each project.**	The authorization document clearly indicates on which sections the vehicle can be driven in automatic mode and which automated driving functions can be activated. For this purpose, the vehicle must be equipped with a device that records when the vehicle has driven in automatic mode. Holders of experiment authorizations must regularly submit reports to the relevant ministries on the experiments carried out. In France, the validity of road test authorizations is limited to a maximum of two years, with the option of renewal.	National (Federal) and local (Cantonal)
2.2	Who gives these authorizations? (National level and /or local level)	Transport, Building and Housing Committee Ministry of Transport, Building and Housing The Danish Road Directorate	Ministry of Transport	Federal Office of Transport Homologation of a Shuttle and only for a specific track
2.3	Is there a specific legal status for the experiment?	Each project ends up getting its own legal act, to ensure that the legal liability is ensured correctly.	The legislative and regulatory framework for the experiments, resulting from the 2015 Energy Transition Law, was updated in March 2018.	Shuttles have to comply with the same (technical) regulations as any other vehicle, they cannot load or unload passengers outside predefined bus stops Operator needs to be present in the Shuttle Max speed 25 km/h

4.3 TABLE 3 - Current barriers and expected evolution

		Denmark	France	Switzerland
3.2	Is there any on-going thinking to have evolutions on driving rules and the liability aspects (when accidents occur)?	The law L120 will be reviewed in 1 year (July 2020) - and will so far exist until 2023.	The civil liability regime resulting from the "Badinter" Law and the insurance framework based on an insurance obligation covering this liability seem to be able to handle, without modification to this effect, automation cases, including total automation. **Established in the interests of the victims and guaranteeing them certain and rapid compensation, the current legislation does not constitute a barrier on the development of automated vehicles**.	Authorities have no or very limited experience with autonomous driving and do not own a test environment. Hence, we more or less show them what is possible and which barriers we have to overtake, upon which they can prepare new rules. Swiss government is very open-minded for technological development
3.2	Is there any on-going thinking for driving license evolution (at the national level)?	No	The conditions for the issue of driving licenses fall within the competence of the European Union and, more specifically, the provisions contained in Directive 2006/126 / EC of the Council and the European Parliament of 20 December 2006 on driving licenses. It is the European Commission, in particular DG MOVE, its Road Safety Unit, which must work on the issue	The operators comply with the national standard driving license and are allowed to drive the shuttle on the open road (predefined and homologated track) after a specialized course from the constructor of the vehicle
3.3	What about the evolution of technical regulation and homologation of automated vehicles or what are the current procedures if they already exist?	Current situation for homologation of AV's: Danish Road Safety and Transport Agency approves each vehicle separately. Currently this means that AV are approved into an regular category called M2: large person car.	the existing national framework, in particular the third book ("The Vehicle") of the Traffic Code and its implementing decrees, will have to be reviewed in order to ensure the adequacy between the new technical prescriptions published in Geneva and made compulsory by Brussels, and those already present in the traffic Code, whether in terms of the technical provisions of the vehicles, their receipt and homologation, their registration and their technical inspection, and should be adapted accordingly	Homologation of a driverless vehicle used for public transport is the same as a normal bus used for the same service.
3.4	Is there already a specific automated public	The L120 law states that you do not have	**The dynamic development of automated public transport leads French decision-makers to**	No

	transport framework (in comparison with the regular public transport framework allowing companies to transport people on the behalf of public authorities)?	to a regular PTO to conduct project pilots with AV's where you are doing public transportation	**consider two strategic orientations at the national level to support the market:** The development of a regulatory framework laying down the safety requirements of the "shuttle" type vehicle (9 to 16 seats, including at least 4 seats), as well as the traffic conditions of these vehicles when they are automated. The development of a reference system for evaluating the safety of shuttle routes, when these routes are fixed, based on an analysis of the critical situations of automated shuttle traffic in urban areas and on experiments. These two elements will make it possible to set up a system of homologation of the vehicles concerned, and a system of validation of the routes and conditions of circulation of the vehicles	

4.4 TABLE 4 - On-going national programs on automated vehicles

		Denmark	France	Switzerland
4.1	Is there any on-going national program on automated vehicles or plans?	The new law is right now the program, you could say - it has dedicated resources in the different Authority teams dealing with the applications for pilot projects with AV's.	France-Germany-Luxemburg project On May 14, 2018, the French State adopted the National autonomous Vehicle Development Strategy. The 10 priority actions defined aim to "build the framework, by 2020 to 2022, to allow the circulation of private cars, public transport vehicles and highly automated goods in France. the traffic code, the rules of responsibility or the training can be adapted	Only private initiatives by Transport Operators and private companies
4.2	if yes, can you please give some details (objectives, resources, leadership, deadline, …) ?		The EVRA (expérimentation véhicule routier autonome) call aims to support experimental projects for the use of autonomous vehicles, marketable by 2022, in the field of individual, shared or collective mobility, freight and logistics. These projects will contribute to the development of methodologies for validation of safety and to the improvement of knowledge on uses and acceptability. It is managed by ADEME (French energy and environment national agency). It was launched on June8th 2018 and will be closed one November 29th.	Sion, Fribourg, Zug, Schaffhausen, Bern and Geneva. These are all low scale projects that deploy one line last mile services.
4.3	if no, can you please explain the barriers that hinder experimentations?			The technology is still in its infancy, not suited to replace a normal bus yet and very expensive. The Avenue project works with the "follow a virtual line" Shuttle technology, which is not very technologically advanced but less expensive and especially less complicated.