The French strategy for the development of automated road mobility 2020-2022
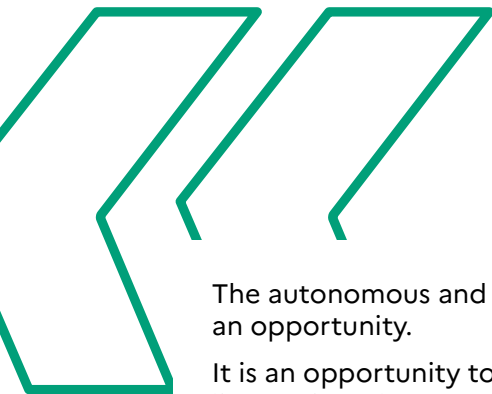
Jean-Baptiste Djebbari
Deputy Minister for Transportation

Agnès Pannier-Runacher
Deputy Minister for Industry

The autonomous and connected vehicle is an opportunity.

It is an opportunity to provide safer mobility services that are more suited to individual needs. It is an industrial opportunity, an opportunity to grow, to invent, to progress. It is an opportunity for Europe to conquer its own technological sovereignty, not having to depend tomorrow on those who invest heavily today.

Since May 2018, the national strategy for the development of autonomous vehicles aims to make these opportunities real; to accelerate the development of these technologies; to integrate them into the existing mobility services for passengers and goods in a safe way.

Thanks to the mobility orientation law of December 2019, France is one of the first European countries to adopt a legal and regulatory framework allowing the circulation of these vehicles by 2022. It is a great pride.

We must now move from pride to reality, from experimentation to implementation, from advent to deployment. With Anne-Marie Idrac, we decided to develop a second edition of the national strategy. It should make it possible to amplify the momentum in favor of automated road mobility services, and is structured around three main priorities:

→ **Establish partnerships** between sectors, industrial and service stakeholders, new technology companies and traditional stakeholders

→ **Entrench these new services in the territories,** because the success of their deployment depends on their integration into local mobility policies

→ **Act on a European scale,** because it is through Europe that we will move forward on vehicle regulation, on the interoperability of connectivity systems, and on support for research and innovation. France intends to be the driving force behind the construction of this European framework.

The national strategy for the development of automated road mobility 2020-2022 responds to these challenges. Like the one of 2018, its implementation will closely involve the ecosystem brought together within France véhicules Autonomes, which will expand into new sectors, particularly in the fields of road, logistics and communications. Its follow-up will be the subject of a permanent dialogue with civil society actors on societal, economic and environmental issues. Its implementation will closely involve local communities.

France has been able to innovate, to give this object a new framework and to get ahead. Let us give ourselves all the means to keep it and to accentuate it further.

Anne-Marie Idrac
former Minister,
High representative in charge of the
French strategy for the development
of autonomous vehicles

Since 2017, at the request of the President of the Republic and the Government, and in close interaction with our rich national ecosystem, I have had the honor of leading the French strategy for the development of autonomous vehicles.

My observation is that its founding principles turn out to be perfectly relevant with regard to technological and market developments, on at least five items:

• It combines the challenges of industrial innovations and those related to mobility services

• It chooses progressivity in order to safely cover all forms of automation

• It is focused on use cases, which makes it possible to define pragmatic and socially acceptable business models

• Its public / private governance promotes the articulation of decision-making processes

• It fits into European and international frameworks and plays a leading role there

The commitments of 2018 and 2019 have been fulfilled, both in terms of legislative and regulatory evolutions and in terms of support for experiments and innovations - as recalled below.

From now on, we must continue to develop our strengths and to go forward through the next steps:

• finalize the development of rules allowing vehicles without an operator on board in some secured and supervised use cases

• finance full-scale demonstrators

• better take into account the topics of physical and digital connectivity

• support evolutions in logistics services

• ensure even better the integration of our national strategy in the European context

I would like to congratulate and thank the administrations, local communities, industrial and service companies, research and support organizations commited in a strategy that is both proactive and pragmatic.

I trust the Government to support these dynamics as they serve its objectives of promoting technologies as well as a more efficient mobility.
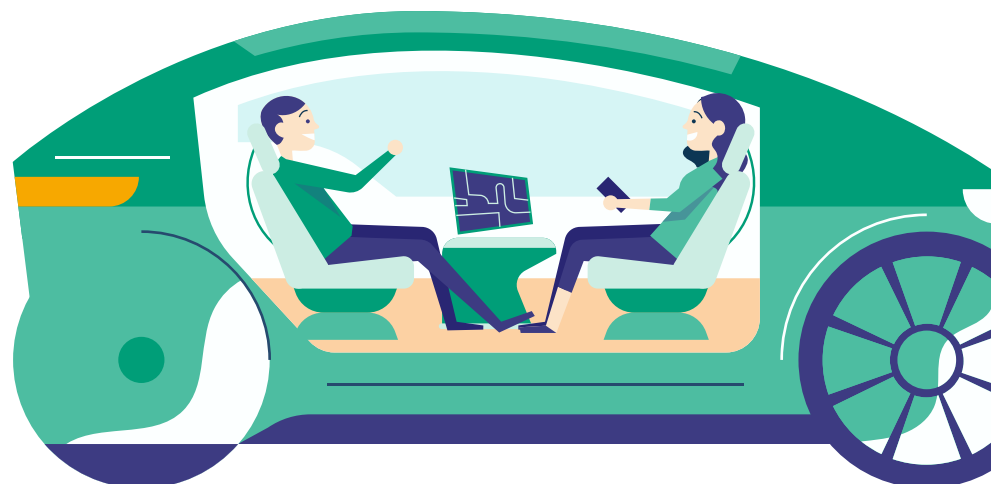
France considers the development of automated vehicles as a double opportunity, technological and societal :

- For a mobility better suited to demand, cleaner and more inclusive.

- For the promotion of our assets in the major sectors (automobile, transport services, road, digital) which are at the forefront of innovation at the global level.

After several years of experiments since 2015, France has committed to a global and coherent strategy for the development of automated vehicles since the end of 2017 - with the appointment of a High representative and the implementation of a collaborative working method between public authorities and private actors, led by "*France Véhicules Autonomes*".

This working method seeks to adhere to concrete **use cases,** made possible by the state of technology, respecting security requirements and meeting user needs.

The strategic document released in May 2018 set four objectives :

→ Establish the legislative and regulatory framework allowing the circulation of automated vehicles in France by 2022, taking into account the maturation of the various use cases at that time.

→ Support innovation, mainly through experimentation.

→ Prepare the security validation framework at the national, European and international scales.

→ Assess the acceptability issues and the economic outlook for deployment more precisely.

National experimentation program EVRA

2 projects, 16 experimentations, 3 years, 120 M€ including 42 M€ of subsidies.

→ SAM (« *Sécurité et Acceptabilité de la conduite et de la Mobilité autonome* ») = experiments of roll-out on dual carriageways, parking valet, on-demand transport in urban areas, regular transport complementary to existing networks, establishment service from a remote car park, use of a railway right-of-way , autonomous delivery vehicles)

→ ENA (« *Expérimentations de Navettes Autonomes* ») = experiments of autonomous shuttle services complementary to the urban transport network and rural service.

The actions carried out are in line with these objectives :

1. → The scope of the experiments has been extended to use cases with the operator outside the vehicle, with specifications regarding the liability regime and the safety requirements.

2. → The experiments develop within a framework to pool the lessons learned, specifically with regard to the safety evaluation and the acceptability. More than 120 authorizations to experiment have been granted since 2015 and a coordinated program (EVRA) was launched in 2019.

3. → The legislative framework resulting from the Mobility Orientation Law (24 December 2019) will allow the circulation of automated vehicles beyond the experiments, thanks to an adapted liability regime, by setting the safety requirements. This framework :

  → Will cover high levels of automation, for which the systems are able to handle all driving situations in their operational domain without any driver intervention or when the operator is located outside the vehicle.

  → Will cover the transportation of passengers and the transportation of goods.

  → Will allow the circulation of public or shared transport of passengers on predefined routes in terms of regulations, from 2022. It will rely on reference documents for safety demonstration, the first ones being already underway.

4. → France has also worked to ensure that international and European regulations are prepared to quickly host various use cases of automation, with a systemic vision of safety (vehicles, infrastructure, connectivity, supervision) and by articulating the validation tools (audit, simulations, tests). The international driving regulation (Vienna Convention) has been adapted to allow the circulation of highly automated vehicles from 2022, subject to compliance with technical regulations.

Vision and strategic orientations 2020
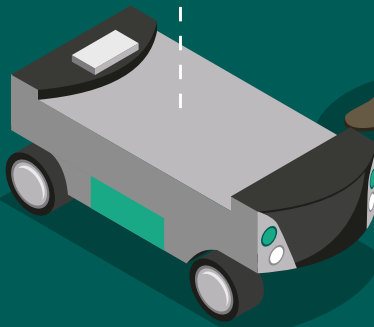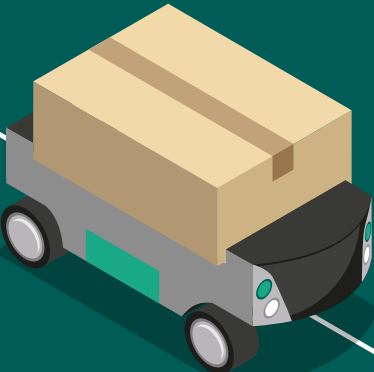
The vision of the 2020 strategy is *to make France the preferred place in Europe for the deployment of automated road mobility services, between 2022 and 2025 depending on the use cases:*

- in traffic environments adapted to the safety requirements,

- by responding to the needs of the territories for various forms of mobility (private, shared, public transport; passengers and freight).

This vision takes into account a reassessment of the use cases, their accessible operational domains and the steps necessary for their deployment:

- We are witnessing the reaffirmation of the potential of mobility services (public, shared) for passenger transportation, in adapted traffic environments.

- The coordinated and supervised operation of automated vehicles deserves growing interest and could attract new stakeholders

- Another major development concerns the automated transport of goods and logistics, for which the design of use cases has greatly accelerated, due to the expected efficiency gains, and for urban logistics the lessons of the crisis of the Covid.

- About private vehicles, the gradual transition from driving assistance to automation is of great importance in terms of the safety of behaviors. The prospects for automated parking management services have been confirmed.

Orientations for the use cases
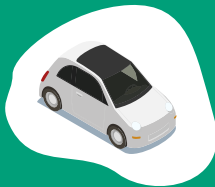
AUTOMOTIVE

→ Deployment of driving assistance systems

→ Preparation for the « level 3 »

→ Autonomous, electric and shared mobility services in restricted operational domains (experiments and service pilots between 2022 and 2025 to define the scale-up)
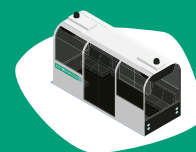

TRANSPORT

→ Deployment of autonomous, electric and shared mobility services in a controlled environment from 2022 without an operator on board to meet the needs of the territories

→ Development of supervision services ensuring the efficiency of services

LOGISTIC

→ Solutions for the transportation of goods in closed sites and automated transport solutions for the last kilometer delivery in city centers remotely supervised between 2022 and 2024

MIXED

→ Carpools and automated transport cooperating with the infrastructure

The three conditions to be met for scaling up services are:

1.

The integration of all the components of the system and the service (in particular the link with the infrastructure, connectivity, supervision, operation and integration into the service packages of the organizing authorities).

2.

The operation and the strengthening of synergies between the stakeholders in the industrial and service sectors.

3.

The appropriation by the territories of the potential of automated mobility.

The 5 main collective challenges are now:

1. → **The development of safe driving without an operator on board,** which concerns both the design, the operation, the safety, the acceptability and the economic profitability of automation. The **remote supervision and intervention** refunctions represent a top-level issue for public action regarding the support to R&D and demonstrators as well as for the safety evaluation and demonstration.

2. → **Improvement of connectivity functions,** in order to help the on-board system in its perception of the environment, allow remote supervision and interventions, support the development of services and the operation of cooperative vehicle fleets. The deployment of connectivity, mainly related to infrastructure, raises issues that go beyond the question of the automation of land vehicles. At this stage, the strategic choice for the development of automated vehicles remains to seek complementarities between C-ITS technologies and mobile technologies, depending on the quality requirements of connectivity both for safety and for the quality of services.

3. → **The safety validation,** which must remain at the heart of public action, by articulating the national, European and international scales. The framework resulting from the Mobility Orientation Law (LOM) and the first work at the UN has

laid down the principles. It is now necessary to accelerate nationally the production of reference documents for safety, in priority for public and shared transport on predefined routes or zones. The technical validation doctrine relating to supervision, connectivity and the use of scenarios for validation is a priority. We will work on the targeted safety levels for each use case and take into account their acceptability.

4. → **Acceptability,** which must remain a topic of listening, vigilance and permanent interactions with stakeholders in the ecosystem and, more broadly, with civil society. The issue of security is likely to remain central in perceptions, but the willingness to pay for new services is expected to be increasingly important and will be increasingly monitored in consequence.

5. → **Data management,** which becomes central for the design, validation, learning and operation of automated mobility systems and services. The regulatory framework resulting from the Mobility Orientation Law mainly concerns the use of learning data and validation data and the use of data by public authorities ; its implementation will closely involve stakeholders, especially local authorities, and will have to ensure coherence with the European and international framework.

The priority actions to strengthen concern :

→ **Support for innovation,** which will be intensified and expanded to consider the evolution of use cases, the growing importance of connectivity and of the contribution of the infrastructure, and the need to deepen business models. This mainly involves supporting the services scale-up, which requires taking into account phases of progressivity (reduced speed, restricted environments) and the development of new bricks, including augmented perception, supervision and connectivity.

To meet this public support need (estimated at 300 million Euros over the duration of the program "Investing for the future" - 2021-2025), the tools should make it possible to address research or prototype projects, experiments, services pilots, impact assessments and involvements in the assets creation operations mainly linked to data and its use.

→ **The European approach,** which will be mobilized even more, through its various levers: mobilization of the Horizon Europe research and innovation program, continuation of pilot deployment projects (making it possible to hasten the convergence between automation and connectivity), implementation of the vehicle safety certification framework, standardization of connectivity. In order to achieve this, a mission will be entrusted to a parliamentarian in coordination with the High Representative for the Development of Automated Vehicles.

→ **Accompany the local stakeholders,** which will involve local authorities more closely in pre-regulatory and normative technical work and will facilitate the exchange of experiences and the provision of technical doctrine and economic evaluation of new services.

→ **The exposure of the strategy,** at national and international levels. The joint actions by the public authorities and "France Véhicules Autonomes" will improve it.

Legislative and regulatory framework

→ Finalize the legislative and regulatory framework for the operation of automated vehicles resulting from article 31 of the Mobility Orientation Law, for vehicles with a driver on board and for those (including without a driver on board) used as part of an organized transport of passengers on a predefined route or zone on the other hand (Q1 2022)

→ Finalize the legislative and regulatory framework relating to data of automation systems, from Article 32 of the Mobility Orientation Law (Q4 2021)

→ Define the regulatory needs for automated freight and logistics use cases (Q2 2021)

→ Develop the relevant regulatory framework for the use of automated freight and logistics (Q4 2022)

→ Participate in European work about the development of the driving license directive

Technical doctrine and reference documents for safety

→ Produce reference documents for safety demonstration for organized transport of passengers on a predefined route or area (in particular: application of the globally-at-least-as-safe approach to systems, including supervision; characterization of routes and traffic hazards; reference driving scenarios for validation; characterization of supervision functions; reference safety levels) (Q2 2022)

→ In application of the framework for the circulation of automated urban logistics use cases, define and produce the first reference documents for safety demonstration (Q4 2022)

→ Develop a French doctrine for the use of critical scenarios for validation (Q1 2022)

→ Establish the priority needs of connectivity for automation use cases, in priority for public or shared autonomous transport supervised with a remote operator, then the needs in terms of informational content, quality and security, then the needs for deployment on the various networks and the associated economic models (2021 and 2022)

→ Continue and increase French participation in European and international working groups for the quality of HD mapping; establish, with a medium-term certification objective, the specific quality criteria (precision, completeness) of HD mapping in response to the needs by use cases, as part of a progressive evaluation of experiments, depending on the operational domains and levels of automation. Identify the public and regulatory data necessary for the development of global and uniform automation solutions (speed limits, road restrictions, road regulations) and the State for the sovereign exercise of public policy missions (safety, organization of mobility, police power). Propose an associated governance in accordance with national data regulations and within the framework of a European and international consensus (2021 and 2022).

→ Amplify the action and the role of the «State - industrial stakeholders» cybersecurity working group by integrating the entire ecosystem (shuttle manufacturers, public authorities for mobility, etc.).

→ Establish synergies between the various research projects relating to the cybersecurity of connected and automated mobility - in particular those relating to the programs "Investing for the future" (PIA) and / or which benefit from monitoring by the national research agency (ANR) - and the future cyber campus under the leadership of the ANSSI which is due to open in Q2 2021

→ Put forward a French doctrine on the future European certification scheme in terms of cyber-security of systems of systems which will make it possible to develop a framework for assessing the level of security, drawing on the expertise of France, which will be suitable for complex systems such as an automated vehicle (2022)

→ Define the content of information for customers of automated driving systems in consultation between the public authorities and the sales and rental professionals.

→ Define modules of theoretical initial and practical training courses in automated driving, as well as continuing training modules.

→ Conduct a study on the impact of the development of automated vehicles and the regulatory framework on state services, particularly at decentralized and territorial levels (2022)

Support for research and innovation

→ Design, in conjunction with the regions, a large-scale multi-year support program for automated and connected road mobility systems and services (2021), which will concern in particular :

  → pilots of mobility services in restricted traffic environments

  → experiments and pilots of freight and automated logistic services in a secure area

  → the connectivity equipment of sites or pilot courses for experimentation with automation cases

  → systems and software for the supervision, operation and cooperation of automated vehicles

  → data platforms for security, traffic management and infrastructure knowledge;

  → the basics of driving scenarios

  → the safety of human-machine interfaces
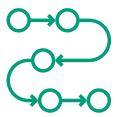
Animation, support, communication, governance

→ Bring together, on a quarterly basis, the main representatives of the sectors and ecosystems concerned, under the leadership of the high representative of the strategy for development, to identify any need to adjust priorities and time-tables (from Q1 2021)

→ Conduct a reflection on the opportunities for sovereign partnerships (French and / or European) on key building blocks of systems, including connectivity, operating systems, scenario bases, simulation tools) (Q4 2021) (*)

→ Establish an inventory of supply and demand for software engineering training adapted to the needs of automated systems (Q4 2021)

→ Establish an inventory of supply and demand for skills and training in supervision and operation of automated vehicle fleets (Q4 2021)

→ Continue to facilitate and monitor issues of individual and social acceptability (2021-2022)

→ Develop a shared methodological document, fed by the experimentation programs, on the impact assessment, particularly environmental and so-cial, of automated mobility projects (Q1 2022)

→ Establish a methodological guide for the economic evaluation of automated mobility services (Q1 2022)

→ Establish a methodological guide on the connectivity deployment needs for automation functions on the different types of road networks (Q4 2021)

→ Promote automated mobility projects on the www.francemobilites.fr platform (2021-2022)

→ Strengthen the French presence in European frameworks and projects (*)

→ Promote the productions of the national eco-system on automated vehicles (regulatory framework, experiments, research programs, innovation trends) on a dedicated website (Q3 2021)

→ Establish, in conjunction with the Organizing Committee, a visibility program for the offer of the national ecosystem for the 2024 Olympic Games (Q4 2022)

(*) : these two actions will be carried out within the framework of the mission entrusted by the Minister for Transport to a Member of Parliament, in coordination with the High Representative for the development of automated vehicles.

GOUVERNEMENT

Liberté
Égalité
Fraternité