INTELLIGENT TRANSPORT systems

>>> THE FRENCH EXPERTISE <<<

COLLECTION EXPERTISE FRANÇAISE

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MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE

MINISTÈRE CHARGÉ DES TRANSPORTS

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DEVELOPING new technologies

A SECTOR OF EXCELLENCE IN FRANCE, intelligent transport systems and services (ITS) concern over one thousand companies. For most of them, this accounts for a small share of their business activities but there is however the potential for rapid growth if they quickly manage to group to meet the needs of the markets.

Innovative and competitive, these systems combine a vast range of technologies, from telematics to cooperative systems (vehicles, infrastructure) and include ticketing and traffic management. They use IT and telecommunication systems to improve transport safety, efficiency and management while respecting the environment. Road is particularly concerned as well as its interfaces with the intelligent mobility solutions applied in all other transport modes: rail, waterway, maritime and air transport.

In organising transportation on a day-to-day basis, ITS help improve service quality and increase user comfort and safety, facilitating coordination in managing traffic and rationalising network use. They can also encourage the shift towards transport modes that can save time, cost and energy. These systems take part in providing services in digital cities to encourage economic development and address the challenges in operating major cities and the growth of metropolitan areas.

ITS development requires greater cooperation between public mobility and transport policymakers (on international, national and local levels) and private stakeholders (from the large international groups to small specialised companies) while involving research and training organisations. France is a major player in this field thanks to a fabric of qualified and renowned companies. New strategic challenges are emerging: ITS offer significant development opportunities around vehicle-to-vehicle and vehicle-to-infrastructure communication, as well as new mobility services.

Since 2016 the French initiative Mobility 3.0 aims to build a collective strategic management framework combining all the stakeholders, in order to manage and deploy, in France and worldwide, new mobility solutions meeting users expectations, contributing to road safety objectives, and ensuring better conditions of traffic, environmental protection and fight against climate change.

THIS DOCUMENT ILLUSTRATES

the main areas in which ITS can be applied, using examples of services or technologies developed by French companies.

FRENCH ITS PLAYERS

1 THE PUBLIC CLIENTS

The State and local authorities define mobility strategies and support ITS development programmes by relying on:

- **places for consultation and promotion** that facilitate the emergence of a shared culture, such as Atec-ITS France (the association for the development of Transportation, Environment and Traffic Techniques) and Idrrim (the Institute for roads, streets and mobility infrastructure).
- **their scientific and technical network** with Cerema (centre for research and expertise on risks, the environment, mobility and territory planning) Ifsttar (the French institute of science and technologies for transportation, territory planning and networks) and Inria (the national institute for IT and automation research).

2 THE REGULATORS

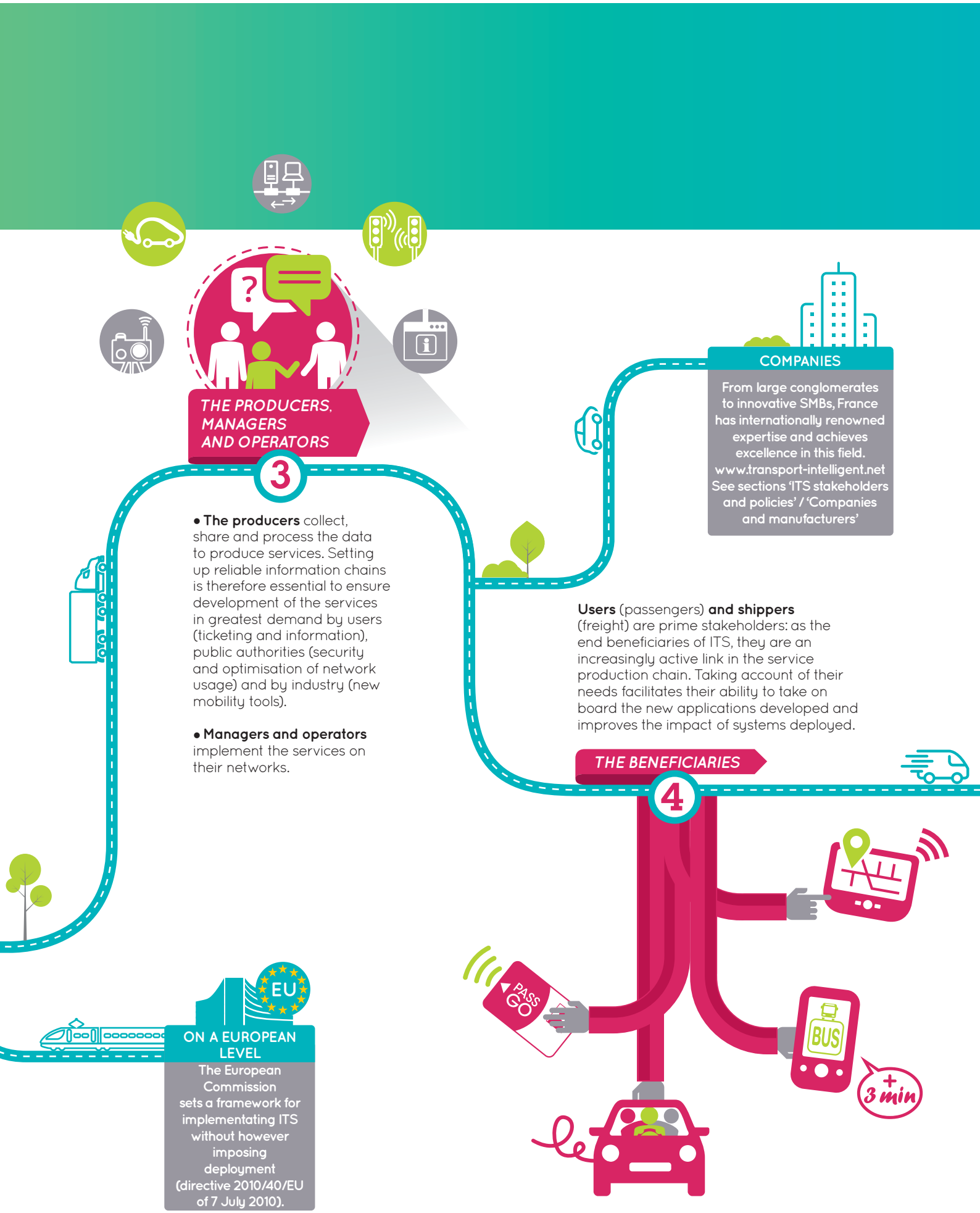
The public authorities define the regulatory frameworks that apply to intelligent mobility solutions. They develop and promote ITS standards to ensure reliable, affordable and interoperable mobility services (help in the design of interoperable transportation systems in France – ACTIF). They ensure funding (BPI – Public investment bank, Ademe – French environment and energy management agency). They offer facilities to support innovation and experimentation.

Standardisation organisations such as AFNOR's BNTRA (bureau for the standardisation of transport and road design)

Assistance organisations, such as Inter Mutuelles Assistance (IMA France), which contribute to implementing intelligent transport (emergency calls).

Independent administrative authorities, such as the CNIL (national personal data privacy commission)

Training bodies, with the Institut Mines Télécom or Ponts Formation Conseil



THE PRODUCERS, MANAGERS AND OPERATORS

3

• **The producers** collect, share and process the data to produce services. Setting up reliable information chains is therefore essential to ensure development of the services in greatest demand by users (ticketing and information), public authorities (security and optimisation of network usage) and by industry (new mobility tools).

• **Managers and operators** implement the services on their networks.

COMPANIES

From large conglomerates to innovative SMBs, France has internationally renowned expertise and achieves excellence in this field.
www.transport-intelligent.net
See sections 'ITS stakeholders and policies' / 'Companies and manufacturers'

Users (passengers) **and shippers** (freight) are prime stakeholders: as the end beneficiaries of ITS, they are an increasingly active link in the service production chain. Taking account of their needs facilitates their ability to take on board the new applications developed and improves the impact of systems deployed.

THE BENEFICIARIES

4

ON A EUROPEAN LEVEL

The European Commission sets a framework for implementating ITS without however imposing deployment (directive 2010/40/EU of 7 July 2010).

1. Optimising
THE USE OF TRANSPORT INFRASTRUCTURE

EXAMPLES OF FIELDS OF APPLICATION

Development of intermodality

Prevention of traffic congestion

Better road sharing

Traveller involvement

ITS HELP LIMIT the construction of new infrastructure by optimising the use and performance of existing transport systems:

› **they enable global management** of travel and increasingly fine management of traffic flows;
› **they support the development** of new mobility services such as carpooling;
› **they back up** more conventional modes (services for users who provide occupancy information on forthcoming trains);
› **they open up new possibilities** to optimise supply chains, both in economic terms and through their environmental integration.

LYONS

Optimod'Lyons

In response to a call for urban mobility projects from Agency for Environment and Energy Management (ADEME), as part as part of the "Investing for the future" programme, the main goal of the Optimod'Lyons project is to encourage cooperation and synergies between private and public stakeholders in order to test and develop innovative services for sustainable urban mobility.

This research and development project, initiated and driven by the city of Lyons, has brought together eight companies (Renault Trucks, IBM, Orange, Cityway, Phoenix ISI, Parkeon, Autoroutes Trafic, Geoloc Systems), a number of research bodies (CNRS - National Scientific Research Centre, Transport Economics Laboratory, IT laboratory for image information systems), Cerema and the municipality of Lyons.

Scheme

A data warehouse was set up to enable the development of practical mobility services. On a single platform, its hosts 30 real time databases on real-time flows: road traffic, urban and departmental public transport, regional trains, bicycle sharing, air transport and car parking. This accounts for some 20 million entries per day, available to project partners with one single licence.

Management

The provision of comprehensive, reliable and consolidated mobility data has already enabled the development of two innovative services:

- Onlymoov.com (Lyons metropolitan area): this website features all mobility offers for the metropolitan area and proposes a real-time multimodal route calculator;
- Optymod'Lyons (Cityway) : the first real-time multimodal urban geolocation system for smartphones. Once the best route has been calculated, this app tracks your progress and issues alerts in case of difficulties ahead. It also includes one-hour traffic forecasts.

*Urban logistics. **Optimod'Lyons is also**:*

- ***a navigator for urban freight enabling drivers to choose the best delivery route taking account of real-time traffic and occurences;***
- ***a tool to optimise delivery rounds for intelligent deliveries. Time and kilometres savings are substantial and easy to quantify.***

THE +

- Most data are made available on an open platform, using exclusively free, standard-compliant tools to ensure interoperability and communication with other platforms.
- Travel time reliability is unprecedently great, based on historic data, real-time data and one-hour traffic predictions.
- Multimodal routes are computed in real time.

ÎLE-DE-FRANCE

The Gerfaut II system

For global transit management purposes, the Seine-Saint-Denis department Council is currently overhauling its Gerfaut system (dated 1990) used to control traffic light crossroads. The goal is to limit nuisances caused by traffic congestion and improve travel comfort. Priority is given to developing intermodality and efficient management of mass meetings like at Le Bourget and the Stade de France.

Scheme

The Gerfaut II system regulates over 600 traffic light crossroads. Priority in crossing is extended to all collective transit systems, tramways (T1, T4, T5 and T8) and to the future Rapid Transit Buses on their reserved lane on the former RN3 as well as Mobilien bus lines. A network of traffic sensors, traffic cameras and weather stations ensure permanent monitoring of travel conditions. Dynamic information panels are deployed, aimed at road and collective transport users.

Management

The Gerfaut II system is based on the Segur urban mobility monitoring software, developed by Thalès. This tool implements new traffic management strategies, with backup from the Claire expert system, developed by Ifsttar. Claire manages increases in demand in order to anticipate the risks of congestion and favour movements by collective transport vehicles. The entire system communicates by means of a powerful, dedicated and secured transmission network for a total of 400 km of optic fibre.

THE +

- **The system uses the Aimsun Online predictive simulator and data from FCD (floating car data) / FMD (floating mobile data) systems on travel times provided by Mediamobile and Flow. In complex situations these tools enable various operating strategies to be simulated in real time to ensure optimal decision-making.**
- **The Gerfaut II system will benefit from Claire-Siti services, a platform that integrates traffic data from all surface transport networks. In close collaboration with transport operators and neighbouring local authorities, it will help supply mobility information websites (including the Sytadin website providing information on the RN2 motorway),**
- **The optic fibre communication infrastructure, the cost of which accounts for a significant part of the project, is pooled with the high speed digital service provided to all secondary schools, data centres and public buildings in the department.**

Freight data exchanges: the NOSCIFeL example

NOSCIFeL is a collaborative project developed by eight partners. This innovative, modular freight transport management platform addresses primarily the needs of micro businesses and SMBs in the transport and logistics industry.

Its goals are:
- to facilitate access to applications in the form of customised subscriptions;
- to favour interoperability of information systems;
- to make companies more competitive.

The platform delivers such services as:
- making appointments between transporters, shippers and recipients;
- calculating greenhouse gas emissions;
- tracking goods;
- grouping/degrouping goods;
- safe digital archiving.

www.geolocsystems.com

PARIS

The Autolib' service

In December 2011, Paris and a number of towns around formed a mixed syndicate (joint association of local authorities) and launched Autolib', a self-service urban electric car rental system for one-off trips. This system aims to reduce the number of cars in circulation for a better car sharing and a better quality of life.

Scheme

Autolib' is present in Paris and in 96 other Ile-de-France municipalities with over 4,000 Bluecars available at nearly 1,100 stations. The Bluecar is an electric car with a range of 250 km which charges in 4 hours due to a new type of LMP (lithium-metal-polymer) battery. Each station has 4 to 6 parking places each with its own charging point and interactive terminal. Autolib' is governed by a public-private partnership contract between the mixed syndicate and the Bolloré industrial group.

Management

The service is only available by subscription. A subscriber who needs to use a car rents it from a station, drives to the destination and leaves it in any other station nearby to be recharged. If a user has a problem, he can contact the Autolib' operating centre based in Vaucresson (92) using an interface available in the car or at the station. 1,000 Autolib' "ambassadors" are on the ground to help users and carry out maintenance.

THE +

- **The service recorded 4,000 cars and 130,000 active subscribers in 2016, with 16,000 to 17,000 users per day.**
- **It offers the advantages of car travel without the disadvantages of owning a car (cost, parking difficulties) and enables users to give up their cars.**
- **This approach favours multimodality, helps decrease car traffic and hence reduces CO_2 emissions. By fitting out stations with charging points, the mixed syndicate promotes this more ecological mode of transport.**
- **Autolib' is also deployed in other French cities (Bordeaux, Lyons) and abroad (Indianapolis).**

ÎLE-DE-FRANCE

The Tranquilien application

This tool enables travellers to be aware in advance of the occupancy rate of trains on the Paris area regional train network (Transilien) and hence the level of comfort they can enjoy. The application was developed by Snips, a European start-up specialised in predictive models for intelligent cities and data geographic recontextualisation, with the support of SNCF Transilien.

Scheme

Once the departure and arrival stations are input, the user sees the next trains displayed with forecast occupancy rates in the form of a colour code (green, orange, red depending on the occupancy level). For example, if the indicator is red and the next train is green, the traveller may decide to put off their departure for a few minutes in order to be more comfortable. Customers can also look up occupancy of evening trains and leave work at the best time. Finally they can consult the application in the evening to select the ideal time to leave the next day.

Management

The predictions for the future occupancy of trains are based on historical data provided by SNCF Transilien and on real-time occupancy information from users. A contextual model is being developed by Snips. It will be integrated into a second version of the application to improve predictions. Models will use new data (weather, accessibility by other means of transport, social and demographic data from the towns served, etc.). Eventually, they will come from some fifty different sources, most in Open Data mode.

THE +

- **Involving passengers in the collection of information continuously improves the service and predicts the impact of new events on the network.**
- **The development of predictive models makes city management more efficient and less costly.**

*Rand Hindi, **French IT genius aged 29 and co-founder of the start-up Snips, received the Innovator of the year award for 2014 from the Massachusetts Institute of Technology (MIT) for the creation of the Tranquilien application with the SNCF.***

Modelling behaviour in urban environments: the SNIPS example

Snips is a start-up company specialised in predictive modelling of behaviour in urban environments. The goal is to improve the quality of life and help cities develop on a large scale.
The technology that came about from the research by the three founders, doctors in bio-computing, physics and mathematics, is used to model population flows and compare these with context information.
Snips implemented other projects in 2013:
• modelling parking place availability in the streets of Manhattan, in partnership with Parkeon;
• modelling the attendance in French post offices. The prediction was performed for both mail and postal bank;
• modelling the risk of crashes (cars and bicycles) in London and San Francisco, in partnership with American telecom operators, car manufacturers and the GSM Association.
The start-up company is in the expansion phase in the United States, in particular with partnerships with telecom operators in order to model population flows over entire territories.

www.snips.net

2. Improving ROAD SAFETY

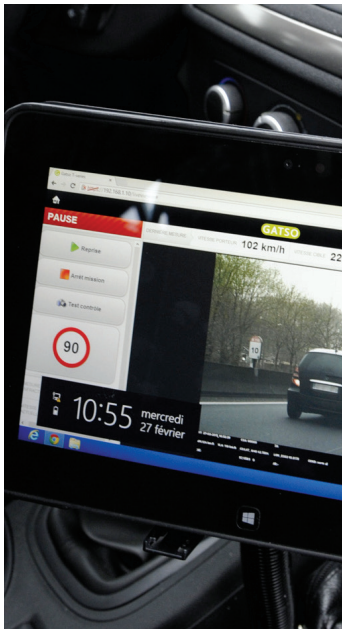
ITS HELP IMPROVE ROAD SAFETY through better understanding by users of the rules to be applied.

They can also change behaviour by automating controls. Others applications are being developed, such as automatic incident detection (AID) or on-board systems (speed limiters, alarms, etc.).

EXAMPLES OF FIELDS OF APPLICATION

- **Fighting excessive speeds**
- **Controlling truck loads**

The new speed cameras



In 2003, France went to an automated system for preventing and controlling traffic offences, aimed at:

- improving road safety by encouraging in-depth changes in behaviour at the wheel and by reducing road delinquency;
- provoking a lasting change in driver behaviour by shortening the time between the offence and the sanction;
- reducing the workload of police forces enabling them to focus more on other forms of delinquency.

Scheme

2013 was marked by a further diversification in systems deployed. After speed cameras, red light cameras, level crossing cameras and truck distinguishing cameras, three new types of devices were deployed.

- **The new-generation mobile speed camera**

Also called MFD (mobile field device), it is carried on board an unmarked car driven by police officers in uniform. Its mission is to photograph all vehicles over the speed limit, without a flash and while keeping on the move.

- **The average-speed camera** (also called section camera)

The camera measures the average speed of a vehicle over a road section. At each check point (section entrance and exit), a video camera takes a snapshot of each vehicle and records its number plate (automatic reader) and time of passage. The place of the offence is the exit check point. A processing unit calculates, from this point and on the basis of this information for each vehicle, the average speed of the car over the section.

- **The worksite speed camera**

This is a semi-fixed speed camera. It is used to check speeds on worksite areas where speed limits are rarely complied with. This device is movable so to follow the progress of a worksite or be used in different working areas. The battery can operate for one week without recharging.

Management

- **The new-generation mobile speed camera**

Unmarked cars drive over some roads selected by the police under the authority of the prefects. All types of network are concerned (motorways, national and departmental roads and city roads) but especially those road sections where speeding leads to accidents. On August 1st 2015, 260 vehicles were deployed all over France.

- **The average-speed camera**

It is used for dangerous road or motorway sections (bends, downhills, etc.) or where a crash would have serious additional consequences (bridges, tunnels, viaducts, etc.). On august 1st 2015, 100 average-speed cameras were in operation.

- **The worksite speed camera**

The experimentation phase on the national road network, including the conceded motorway network, ended in 2012. The findings were conclusive and the deployement began in 2015.

THE +

All these camera systems help in the fight against speeding, a major cause of road deaths (32% of fatal crashes in 2016, i.e. close to 1,000 fatalities).

ALL ACROSS FRANCE

Truck load control

Trucks account for around 1.8% of traffic on the national road network. On average, 15% of these trucks are overloaded. Apart from the increased security risks (13% of fatal crashes are due to overloading), this also causes unfair competition between road hauliers and other forms of transport (20% overloading saves the haulier 26 k€/truck/year), and causes premature deterioration of roads and structures: a 30% axleload excess multiplies road impacts by 2 to 9 times depending on the paving technology.

Scheme

In 2004 the Transport ministry launched a programme of overload pre-selection stations. The first stations (also called HS-WIM-E, for "high speed weigh-in-motion equipment") were deployed in 2007. At present, the network has 29 stations spread over the French conceded and. non-conceded road networks. They mainly use piezoelectric sensors. Other technologies were also deployed abroad.

Management

The truck weigh-in-motion equipment is in addition to the 80 static weighing stations and the 170 vehicle silhouette recognition stations. The HS-WIM-E system is aimed at preselecting overweighted trucks. The vehicles identified are then subject to a second weight check and fined if an axleload or total load violation is counter-checked. The reference equipment, certified and implemented in legal weighing operations, comprises weighbridges, static axle-weighers or low speed weigh-in-motion equipment (LS-WIM-E).

THE +

Overload pre-selection systems are efficient means of identifying road transport vehicles to be checked, while optimising the human resources required for this mission. The rate of detection of overloaded trucks has thus increased from 25% to 96%.

Equipment for safety applications: The STERELA example

Sterela is a Toulouse-based company specialised in the design and development of innovative electronic systems for such sectors as defence (leading supplier to the French army), weather forecasting (leading supplier to Météo France for its automatic data collection stations), air transport (airport security) and road transport (intelligent transport systems and intelligent cities).

Sterela and its subsidiaries (Survision, Noval, AFSRR, Bluematrix) now have 160 staff for turnover of around €26M of which 20% comes from abroad. The company devotes 20% of its revenue to research and development. It is one of the 3,000 companies who have the BPIFrance excellence label.

Among the most significant innovations are:

- the Air cobot robotic platform;
- mobile pop-up target systems;
- the Pacome weather station, chosen by Météo France then Eumetnet (European consortium of 26 countries for the supply of weather stations on board ships);
- the fixed and mobile Lapi system (automatic number plate reading) that operates on all motorways in France, in 600 police, and customs vehicles;
- the Witty smart parking system or the Wim dynamic in motion vehicle weighing system.

All these systems can be operated by a single platform called Webtrafic.

Sterela Survision is a member of the Moveo competitiveness cluster as well as the ITS/Smart city Cluster. The company and all its subsidiaries are based in the Toulouse, Paris and Lyons regions. They are developing their export activities in South America, Africa, Russia and Europe.

www.sterela.fr

3. Improving SERVICE QUALITY

ITS IMPROVE service quality, because they provide direct assistance to customers. Trips are in effect greatly facilitated due to:

- **real-time information** (maps, timetables, routes, prices) and contactless ticketing;
- **geolocation systems;**
- **associated guiding systems.**

EXAMPLES OF FIELDS OF APPLICATION

Real-time information

Contactless ticketing

PICARDY

Integrated multimodal information

To address the travel needs of the different living areas within the Oise department, 14 transport organisation authorities (TOA) came together to set up SMTCO, the Oise mixed public transport syndicate. This structure coordinates the various transport offers and favours intermodal transport.

Scheme

The Sismo integrated mobility services system in Oise aims at facilitating travel over the entire Oise territory by means of a single ticket system and a real time and multimodal (buses, coaches, trains, bicycles, carpooling, etc.) traveller information system. It can also be used to book tickets, on-demand transport or a taxi.

Management

The system is based on the single transport offer data repository: each TOA supplies the system with its offer and this is complemented by the information provided by the sensors on board the 700 vehicles. Users therefore can benefit from real-time information available from 170 information terminals, in every vehicle, on the web (www.oise-mobilite.fr, a mobile app, access by QR code to all 5,000 stops) and by phone (information centre for collective transport and booking of on-demand transport services). The development and operation of the Sismo were the subject of a public-private partnership contract with the companies VIX-ERG and Cityway for the period 2010-2022.

Travel Information Services: the CITIWAY example

Cityway has been a renowned player in the field of new information technologies as applied to mobility for over 10 years now. By developing software applications and proposing its services to local authorities and transport operators, Cityway brings its expertise in terms of customised multimodal solutions to make travel easier for passengers. Solutions based on the internet, mobile phones, call centres, on board buses and coaches and in bus stations are deployed on behalf of its customers and made available to the general public. Cityway operates the multimodal information services for SMTCO, the Alsace, Rhône-Alpes and PACA regions, but also the Finistère, Alpes-Maritimes, Bouches-du-Rhône, Savoie, Isère or Gironde departments, not to mention the Grand Lyons and Pays d'Aix urban community. Cityway has 150 employees, is headquartered in Aix-en-Provence and has offices in Paris, Bordeaux, Nice, Strasbourg, Lyons, Dijon and Beauvais. Turnover was €14 M in 2015, half of which came from local authorities. While most of its revenue is currently achieved in France, Cityway's goal is to grow internationally based on high innovation value products such as the multimodal real-time and predictive route calculator (Optimod'Lyons project) and on its skills in developing applications for smartphones to inform passengers.

www.cityway.fr

THE +

- This integrated system facilitates travel for users due to the combination of the various modes of transport, the integration of the department's networks and real time information.
- The single repository enables both information and ticketing systems to be integrated. Customers are informed online about a trip and can buy the corresponding ticket.
- This system enables TOAs to avail of data and tools to analyse occupancy or the consistency between supply and demand.

Sismo won the Innovation Trophy at the European Public Transport show in June 2010 and the Innovation Award at the International PUITP Congress in Dubai in April 2011. More recently, it received the label for innovative territories at the Interconnected Forum in Lyons on 3 December 2013.

GRENOBLE

Contactless ticketing

The collective transport network in Grenoble, the TAG network, comprises 5 tram lines, 46 bus lines and covers 49 communes. It provides 86 million trips per year for a total of 16 million vehicles.kilometres. Contactless ticketing came to Grenoble in 2005. This tool has always been used to optimise the service to customers and facilitate transport for them.

Scheme

AN INTERMODAL APPROACH

Depending on their needs, customers can benefit from combined fares and a single ticket to travel on several networks in the Rhône-Alpes region: for example, for trips using the regional train network + the Grenoble urban network + the Lyons urban network or trips combining the Isère departmental network + the Grenoble urban network. These tickets are loaded onto one single support that can be used on the various networks: the TAG network card or the OùRA ! regional card!

USB STICK

To diversify distribution channels and in particular to enable users to purchase and load their tickets from a PC connected to the web, contactless USB sticks are offered to customers of the TAG network. Users use their USB stick like a conventional contactless smart card (on boarding, during controls, at vending machines, etc.). The stick's USB port offers an additional feature: on connecting to the TAG online store, users can purchase and instantly reload their tickets into their support.

Management

The intermodal approach comes within the scope of the regional ticketing interoperability charter. This document, signed to date by over 20 TOAs, sets the framework and goals to be achieved for the signatory transport networks in the Rhône-Alpes region. In particular the ticketing charter specifies the choice of a single transport support: the OùRA ! contactless card.

The decision to diversify supports, and in particular the TAG USB stick, has been applied at the level of the Greater Grenoble area. The transport organisation authority in this area is SMTC, the mixed public transport syndicate. Operation of the TAG collective transport network has been entrusted through a public service delegation to Sémitag, a public-private partnership and partner of the Transdev group.

THE +

- These two examples are part of the global policy to improve the offer and service provided to users with the aim of making public transport more attractive. The goal is to make use of public transport easier and to develop a global mobility offer, the diversity of which can address each travel need.

4. Reducing INEQUALITIES

EXAMPLES OF FIELDS OF APPLICATION

Analysis and decision support tools

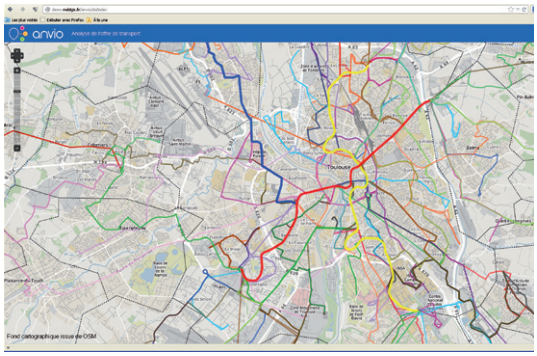
Travel assistance

ITS ARE A REAL OPPORTUNITY for information services aimed at people with reduced mobility (PRM).

Applications help reduce the difficulty involved in travelling and avoid blockage situations by making available information on PRM-accessible collective transport lines (rolling stock and stops and stations) and the characteristics of the road (low pavements). More generally, ITS help reduce inequality by acting to make the least well served territories more accessible to disabled people.

ALL ACROSS FRANCE

The MobiAnalyst solution



The widely differing territories, user populations and practices must be taken into account when building a transport service capable of facing the challenges posed by mobility. For this, knowledge on the reality on the ground (networks, facilities...) is crucial, as well as availing of nominal transport services and tools that enable in-depth multimodal analyses. For this purpose, MobiGIS proposes its MobiAnalyst solution, a mobility mapping analysis tool to which a series of software components are added (network capture, analysis, sharing, etc.).

Scheme

The Mobianalyst solution integrates the Anvio solution which can take two forms:

- Anvio Web, a website that analyses nominal transport services in real time based on a multimodal approach. It also enables users to examine the particular characteristics of the stops and stations;
- Anvio Mobile, a mobile data capture application. The descriptive data of a stop or station can be directly input from the ground.

Management

The platform proposes a contributive working concept in order to:

- take stock of transport and road infrastructure;
- describe PRM-accessibility of significant points;
- carry out territorial diagnosis projects.

THE ✚

Anvio Web includes Chouette, the reference free software for standardised data interchange concerning collective transport services, supported by AFIMB, the French multimodal information and ticketing agency. Aimed at TOA, public transport operators and design offices, Chouette facilitates transport network modelling and data use. In particular Chouette enables data to be entered and exchanged that describe the nominal offer in terms of collective transport networks based on a standardised exchange profile.

Geographic information systems applied to transport: the MobiGIS example

Created in 2007, MobiGIS is a young innovative company, a software publisher and service provider specialised in geographic information systems in the field of transport and population mobility. MobiGIS provides the public and private sectors with innovative mapping software solutions to improve and plan passenger transport systems, propose new mobility services, make transport more cost-efficient and develop transport offers that provide efficient ecomobility for citizens.
MobiGIS currently employs fifteen people. Its head office is located in the Toulouse region, but it also has offices in Paris, Montreal (Canada) and Shanghai (China).
MobiGIS' strategy is to expand the company abroad, in particular in Canada and China, where the company has been involved in ambitious projects such as the Viajeo project, in partnership with Thales, a project aimed at mapping road traffic, bus positions and pollution levels in real time.

www.mobigis.fr

RENNES

The Handimap application

Launched in January 2011, Handimap.org is an application intended for PRM that offers several assistance features to make urban transport easier for these populations.

Scheme

Free of charge and advertising, this application calculates routes accessible to PRM by taking into account low pavements for example, and displaying various PRM-significant points (tactile areas indicating a pedestrian crossing, crossroads with sound assistance, PRM-accessible bus stops and sites, reserved parking, etc.). A disabled person in a wheelchair or a young mother with a baby in a pram is therefore sure to be able to take a route with accessible street crossings and intersections. The application uses the geolocation of the user and integrates it when calculating a route. The Handimap website is also available on mobile with a dedicated interface.

Management

Handimap came about in 2010 when Bertrand Gervais, an expert engineer in the geographic information field and Grégoire Morin, IT project manager, pooled their skills to submit the application to the Rennes Open Data contest organised by the Greater Rennes community. The application uses the Greater Rennes community's geographic data to provide a route calculator accessible to PRM. The website has a Google Maps type mapping system and can display the routes calculated as well as the accessibility of various PRM-significant points.

www.handimap.org

THE ⊕

- Handimap is available in several cities in France - Lorient, Rennes and Montpellier - as well as in La Rochelle and Nice with limited functionalities.
- Features were enhanced and it is now possible to directly view footpath accessibility using a colour code (PRM-accessible from both sides of the street, only on the even number side or odd number side or not PRM-accessible at all).
- The site has been made compliant with web disability standards.
- New features are being developed: instead of setting a PRM-accessibility level based only on Open Data, users will be able to supply information to the system directly.

Handimap.org won the Rennes Open Data contest in 2011 and has become one of the benchmark applications in terms of territory PRM-accessibility mapping.

5. Protecting THE ENVIRONMENT

ITS ENSURE EARLY ACTION on transport demand and on the behaviour of drivers during the trip.

Carpooling, by reducing the number of cars on the roads, helps reduce traffic congestion and pollution. Changes in driver attitudes directly help reduce fuel consumption and the risk of crash (ecological driving or eco-friendly driving).

EXAMPLES OF FIELDS OF APPLICATION

- Carpooling
- Ecological driving

ALL ACROSS FRANCE

Interoperability of carpooling websites

By reducing the number of cars in circulation, carpooling helps reduce traffic congestion and pollution. It is a relevant mobility solution in low population areas that are not well connected to public transport systems or when these systems are not operational. In practical terms, operators deploy a service that brings people together wishing to share their trip. This service is provided either for administrations, territorial authorities or employers (home-work trips), or aimed directly at travellers. To favour its development a critical threshold must be reached to make it really operational. That is why Feduco, the national carpooling federation is developing a new communication standard called RDEX (Ridesharing Data Exchange) to pool the databases of the various operators.

Scheme

This standard, the development of which was launched at the end of 2011, will be open to all players offering carpooling services, regardless of their nationality. Data sharing will enable:

- the number of ads to be increased;
- data to be exchanged between the various carpooling websites while complying with the data confidentiality provisions required by law. Each operator retains their own platform and communication protocol. When an internet user signs up to one of the network partner websites they get access to all ads available.

Management

This standard will bring carpooling services together and help reach the critical size. More central platforms will develop to enable the various local authorities to pool their efforts: for example, an authority may offer a carpooling service on its own website and refer users to the carpooling service operated on a regional level.

THE ⊕

› For users: non-competition between several websites means greater simplicity and efficiency. The chances of finding a passenger or a driver for a route are greatly increased.

› For territories and local authorities: they save the costs of hosting an independent database, of developing software to match up offers and demands and of managing an independent carpooling website. Each territorial authority benefits from the structure proposed by the regional council and can focus their development resources on coordinating, communicating on and promoting carpooling.

Ecological driving assistance tools

Ecological driving is based on traffic anticipation (so to limit accelerations and decelerations), on striving to achieve constant speeds with a low engine regime and maintaining the vehicle in optimal condition (tyre pressure, etc.). Acquiring these good habits requires apprenticeship and ecological driving assistance. Smart on-board systems (EDAS - Ecological Driving Assistance System) are offered to drivers seeking to improve, maintain and develop their skills in this area.

Schemes

THE ECOGYZER, FROM NOMADIC SOLUTIONS

This is a simple and efficient ecological driving aid for private individuals. This small accessory is placed on the dashboard, without any connection to the calculator in the car and features a GPS and an accelerometer. Data processing is based on an algorithm that analyses trip related data: kilometres covered, speeds, accelerations, braking. Downloadable after the trip to a PC, the data are processed based on the engine features of the car then laid out in the form of indicators showing fuel consumption, CO_2 emissions or passenger comfort. They can also be sent in real time by Bluetooth to a PC, personal digital assistant or smartphone.

THE RANGE OF WIRMA PRODUCTS, FROM KERLINK

They feature retrieval and use of the data produced directly by the car (bus CAN) and those concerning the geolocation of the vehicle. They thus offer public transport professionals the material supports required for ecological driving (communicating calculator units, visual and tactile interfaces with the driver).

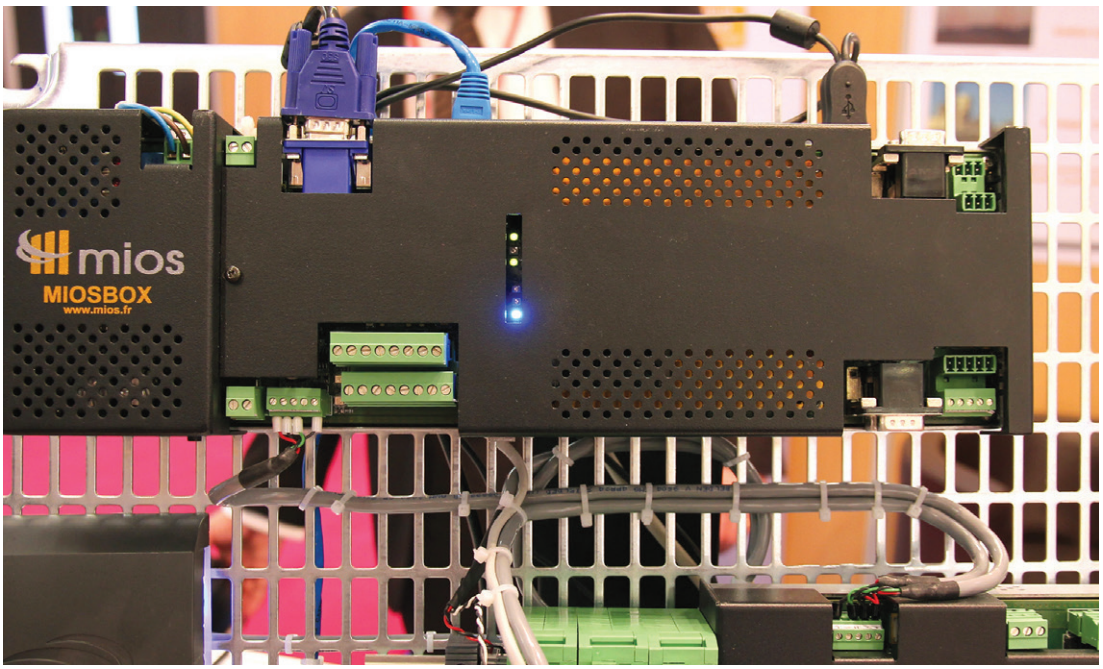
Management

- The EcoGyzer system is aimed more broadly at owners of trucks or public transport fleets who want to have their drivers adopt ecological driving habits as a back up to a one-off training course.
- Wirma equipments are installed in vehicles and can be implemented as part of a global solution (decentralised architecture) that facilitates deployment. Associated to the Wanesy platform, a product proposed by Kerlink, this equipment can be remotely supervised and maintained.

THE +

> EcoGyzer helps drivers get to know what their driving habits are. It offers advice on how to improve and keeps track of drivers' performances. Camera-based equipment is also offered to videorecord trips.

> The Wirma materials offer a wide range of services to complement ecological driving: help in running public transport systems, traffic light priority, traveller information, mobile router and Wi-Fi gateway. The versatility of these solutions enables the operator to plan progressive and smooth deployment.



Connected mobile solutions: the NOMADIC SOLUTIONS example

Nomadic solutions designs and distributes a range of connected mobile solutions to enable professionals to improve their profitability, optimise and rethink the mobility practices for people, vehicles and goods, while ensuring reliability, responsiveness and a significant ability to adapt to needs. The company has wide experience in nomadic computing and on-board electronics (close to 75,000 units sold to date).

Created in May 2003, Nomadic solutions designs its own products (ecomobility R&D) and sells a range of indoor and outdoor geolocation units (added value distribution).

Nomadic markets its offer, a combination of product design and trade, through a network of integrators and value added resellers (B2B2B and B2B2C). Nomadic is renowned for its ability to drive its network.

Due to the suitability and quality of its products, numerous partners have won large account tenders (GRDF, DDT7, Bolloré, ENEDIS, SNCF, etc.).

The company achieved € 1.22 million in turnover in 2015. Based in Melun, in the Paris region, the company has a staff of 5.

www.nomadicsolutions.biz

For FURTHER INFORMATION

The major issues of our society in terms of transport are diverse and need to be reconciled. The main issues are:

- digitalisation that deeply upsets organizations, business models, needs and demands;
- continuous improvement of road safety;
- environment and quality of life improvement through a better traffic management integrating objectives regarding air quality and greenhouse gas emissions reduction and through the development of ecopositive interactions between different modes;
- contribution to more efficient and more integrated goods transportation chains;
- supporting French economic stakeholders in field of intelligent mobility in France and worldwide;
- efficient implementation of European policies regarding ITS.

MOBILITY 3.0

The French initiative Mobility 3.0 aims to build a collective strategic management framework combining all the stakeholders: local and national public authorities, industrial and innovating solutions holders, infrastructure builders and operators, service providers, research institutes. The objective is to manage and deploy, in France and worldwide, new mobility solutions meeting users expectations, contributing to road safety objectives, and ensuring better conditions of traffic, environmental protection and fight against climate change.
The coordination of Mobility 3.0 initiative was entrusted by the end of 2016 by a joint decision from the ministries in charge of Industry, Transportation and Environment based on a 5-year mandate to ATEC ITS France. This association brings together stakeholders who operate in sustainable exploitation of land transportation systems, urban or interurban, for goods or passengers.

The Ministry for an Ecological and Solidary Transition brought its support to the preliminary studies of the initiative, and to a first deployment exercise of the initiative from December 2016 to June 2017.

The governance structures of the Mobility 3.0 Initiative are in place with a 28-member strategic committee aiming at guiding works, following the progress and the productions, and an executive committee, led by ATEC and which organises project and coordination structures and implements the work plan.

The second exercise of the Mobility 3.0 Initiative falls within the pursuit of this action plan:

- **coordination of the action through the hosting and the participation in the different governance entities of the initiative;**
- **driving of the 4 workstreams: preparing and developping the strategic frameworks; promoting the deployment of innovative solutions in the territories; promoting the French solutions across the world; preparing and creating an ad-hoc network;**
- **piloting together with the association TOPOS-Aquitaine the initiative ITS for Climate which includes a coordination component and a methodological component.**

THE INTELLIGENT TRANSPORT SYSTEMS FOR CLIMATE INITIATIVE (ITS4C)

This initiative seeks to mobilize actors of transport and mobility to promote the applications of ITS whose the effect will produce a positive impact on climate change. ITS4C was already an initiative set up in the context of the COP21. It continues in the context of the COP22 and beyond.

Generally, ITS4C aims to promote and encourage the use of ITS for cities in emerging countries, and showcase French expertise and solutions.

THE PLAYERS

This is not an exhaustive list but rather an initial overview of players in the sector.

Startup companies

SNIPS
www.snips.net

Drivy
www.drivy.com

Blablacar
www.blablacar.fr

Zenpark
www.zenpark.com

SMBs

Neavia Technologies
www.neavia.com

Citilog
www.citilog.fr

Magsys
www.magsys.net

Transway
www.transway.fr

STERELA
www.sterela.fr

Hikob
www.hikob.com

Comatis
www.comatis.com

Large companies

Thales
www.thalesgroup.com

AP2R
www.aprr.com

SANEF
www.sanef.com

VINCI Autoroutes
www.vinci-autoroutes.com

ADP
www.aeroportsdeparis.fr

SNCF
www.sncf.com

Renault
www.renault.com

PSA Peugeot Citroën
www.psa-peugeot-citroen.com

Consultants

MT3
www.mt3.fr

Tic&siT
www.tic-sit.fr

Grandear
www.grandear.eu

Suppliers

Aximum
www.aximum.fr

Lacroix
www.lacroix-signalisation.com

Continental
www.conti-online.com

Design offices

EGIS
www.egis.fr

Setec ITS
www.its.setec.fr

SYSTRA
www.systra.com

ARTELIA
www.arteliagroup.com

Ingerop
www.ingerop.fr

Ceryx Trafic System
www.ceryx-ts.net

Digital companies

MobiGIS
www.mobigis.fr

BMIA
www.bmia.fr

Carte blanche conseil
www.cbconseil.com

Clesmessy
fr.clemessy.com

Research and innovation

Advancity
www.advancity.eu

Mov'eo
www.pole-moveo.org

UTP
www.utp.fr

id4Car
www.id4car.org

Operators

SNCF
www.sncf.com

RATP
www.ratp.fr

Transdev
www.transdev.com

Keolis
www.keolis.com

State, local authorities and mobility organising authorities

Ministry for an Ecological and Solidary Transition
www.ecologique-solidaire.gouv.fr

AFIMB, French multimodal e-information and e-ticketing agency
www.ecologique-solidaire.gouv.fr
tab Transports - Logistique et transports intelligents

The website on intelligent transport system
www.transport-intelligent.net

Cerema, the centre for research and expertise on risks, the environment, mobility and territory planning
www.cerema.fr

Ifsttar, French institute of science and technologies for transportation, territory planning and networks
www.ifsttar.fr

Geoportal, developed by IGN, the national geographic institute
www.geoportail.gouv.fr

Partners

ASFA, French association of motorway companies
www.autoroutes.fr

ATEC ITS France
www.atec-itsfrance.net

SER, the industrial union for road equipments
www.ser-info.com

Business France
www.businessfrance.fr

Syntec ingénierie
www.syntec-ingenierie.fr

ATEC ITS FRANCE

For over 40 years, the association has fostered exchanges and experience sharing between mobility professionals (private companies, public stakeholders, academic research). Through its action, it promotes the development of new transport technologies, also called ITS (intelligent transport systems), that contribute to the emergence of intelligent cities. ATEC ITS France also represents all stakeholders concerned on international bodies devoted to the development of ITS.

Among the members of the association are the largest territorial authorities, State agencies, major education and research bodies, major engineering companies in the mobility industry, as well as numerous innovative SMBs and start-up companies.

www.atec-itsfrance.net

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through concrete examples throughout the country.

www.ecologique-solidaire.gouv.fr

For further information on the French global supply
of intelligent transport systems and services

www.transport-intelligent.net
www.atec-itsfrance.net