Pilot site South West

Cyril LAUQUIN (DIRCO)
& Eric MONCEYRON (Bordeaux Métropole)
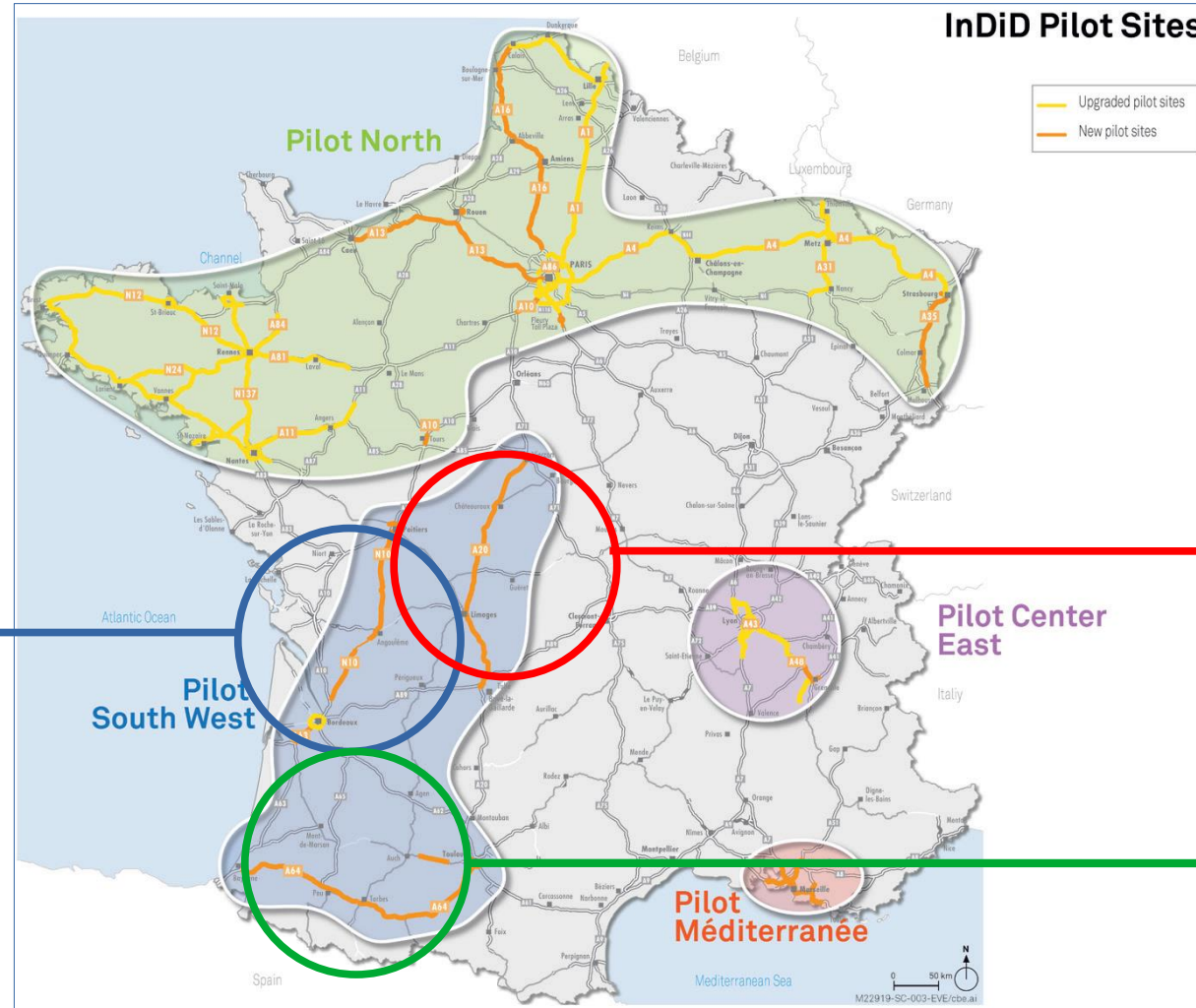
Pilot site South West
Presentation

DIRA (I.Duarte)
& Bordeaux Métropole
(E.Monceyron)

DIRCO
(C.Lauquin)

DIRSO (N.Le Bail)
& VINCI Autoroutes
(L.Bessou)

Pilot site South West
What are the DIR ?

- Manager of the unconcessioned national road network (11600 km)

  - National roads (9000 km)

  - Unconcessioned highways, without tolls (2600km)

- 11 DIR in France

- 3 DIR on the southwest quarter of the country :

- DIR Atlantique (DIR A - Bordeaux)

- DIR Sud Ouest (DIR SO – Toulouse)

- DIR Centre Ouest (DIR CO – Limoges)

Pilot site South West– DIRA

Scope & main issues
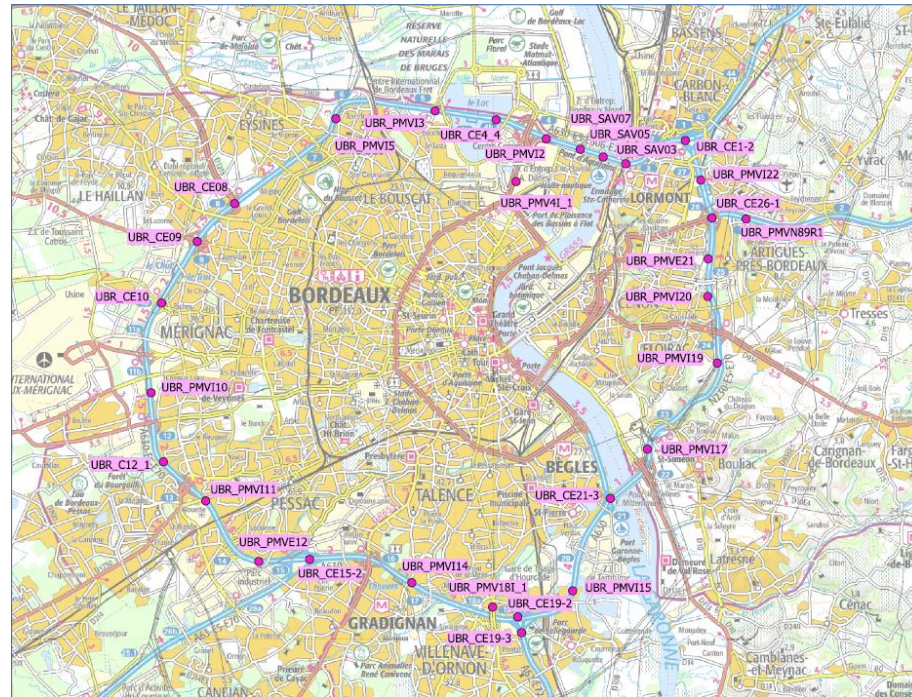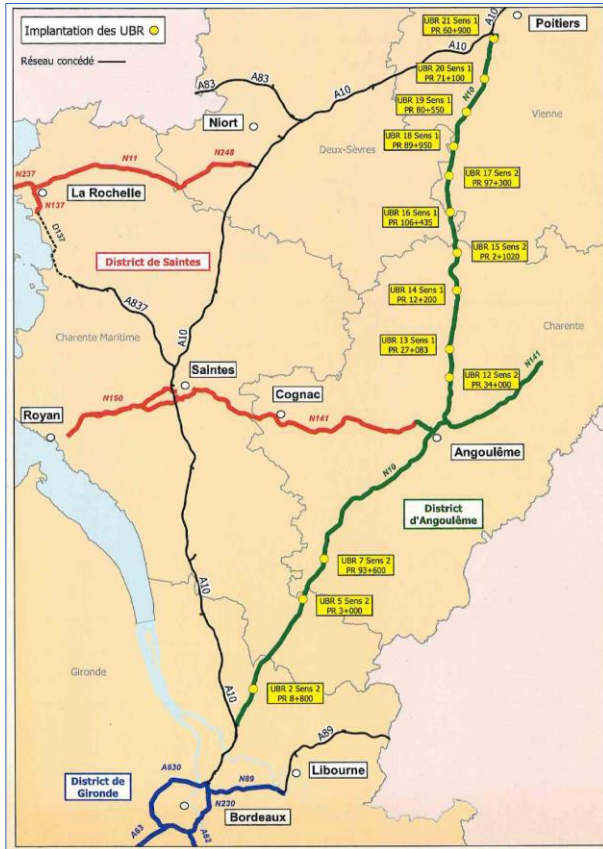

- Ring road of Bordeaux

- RN10 transit axis (Poitiers – Bordeaux) with high HGV traffic

- Central Europe Atlantique Road (RCEA) RN141

- Pyrénées Atlantiques service road

Pilot site South West – DIRSO

Scope & main issues

- Ring road of Toulouse

- Toulouse – Lourdes axis (A64)

- Toulouse – Rodez axis (A68-N88)

- Pyrénées service road

- Itinerary « Grand Gabarit » (Airbus A380)

Pilot site South West – DIRCO

Scope & main issues

- North-South Transit Axis (A20) including crossings of Limoges and Brive-la-Gaillarde cities (A20/A89)

- Central Europe Atlantique Road (RCEA) : RN145 – RN141 (connexion DIRA)

- Star service from Limoges connections

  - Poitiers – Nantes (RN147-RN149) (connection DIRO)

  - Périgueux – Agen (RN21) (ex connection DIRSO)

- Connection RN151-RN142 (Bourges) (connection DIRCE)
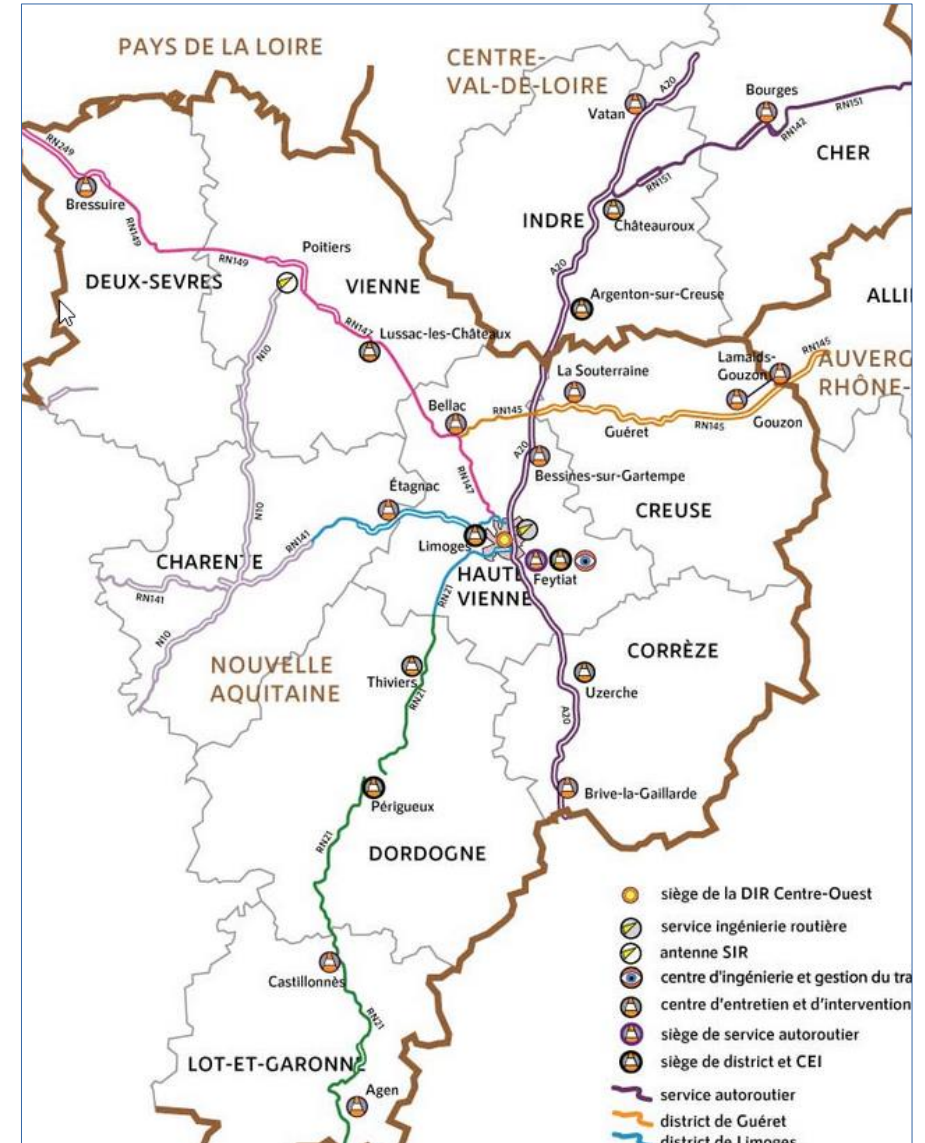
Why developping C-ITS ?
Deployment & production

- Long experience of C-ITS for the DIR A (SCOOP, C-ROADS projects, etc.) in Bordeaux

- INDID : desire to extend the C-ITS scope to the RN10 (high stakes axis, particularly HGV) and deployment of new use cases (F1: HGV parking spot availability) + continuity of exchange of information with Vinci on the A10 network (Estalot area)

- DIRCO & DIRSO : INIDID first experience on C-ITS

- DIRCO : experimenting with C-ITS on critical points on the network and developing new use cases, particularly on wrong-way driving detection (real problem on A20 and RN145)

Deployment ofs RSU on Pilot southwest in INDID

Breakdown per road operator
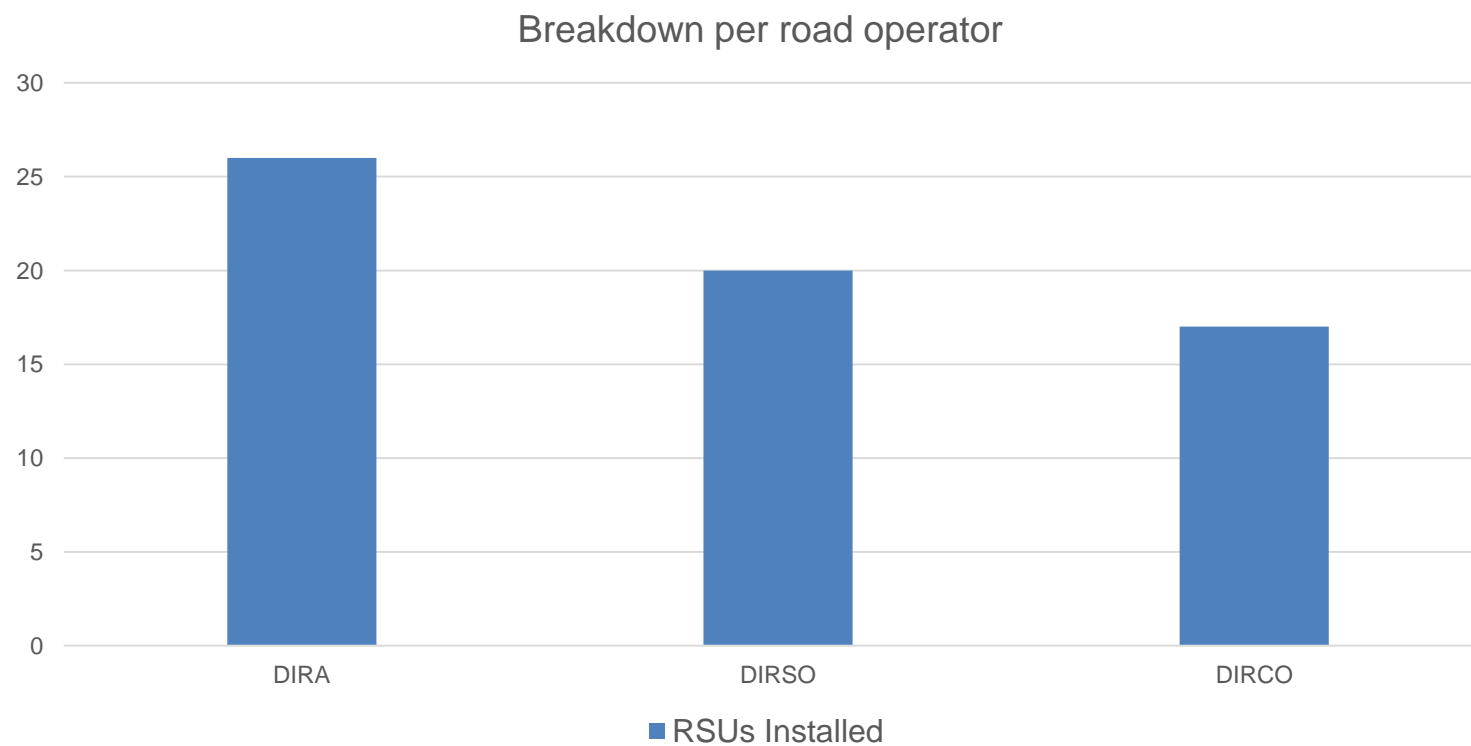
DIRA Deployment

Isabelle DUARTE

Pilot site South West – DIRA

Deployment & production

- 42 UBR au total + 7 UEVG

- PFRO v4.1.04 installée

- Cas d'usages spécifiques

  - C2 (information sur régulation dynamique des vitesses)

  - C3 (PMV embarqué)

- Mise en production de la chaîne Coopits

Pilot site South West – DIRA
Deployment & production

Co-financed by the Connecting Europe
Facility of the European Union
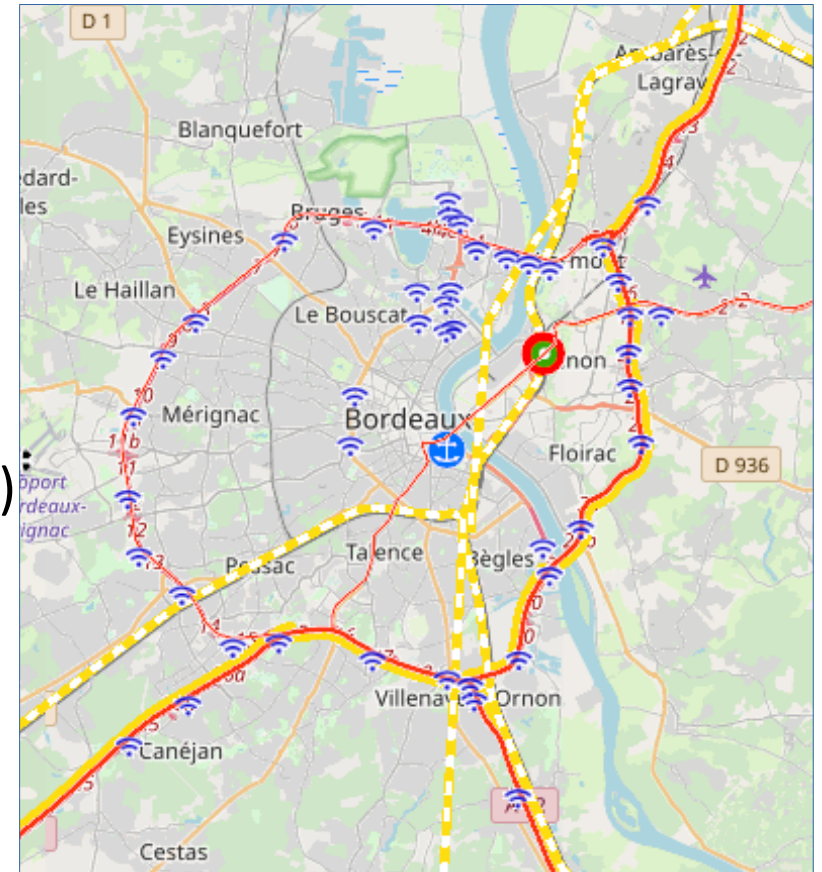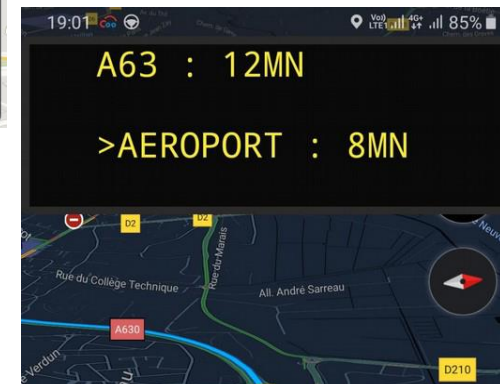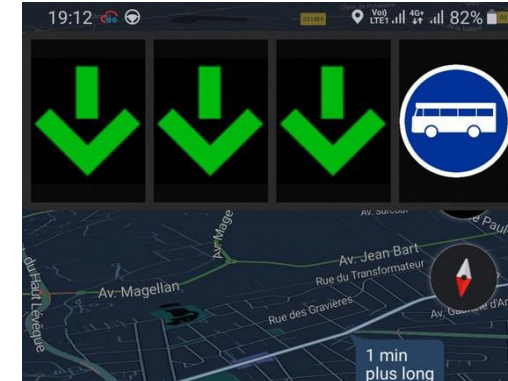
Pilot site South West – DIRA
Tested Use Case - POC : E2 (rerouting)
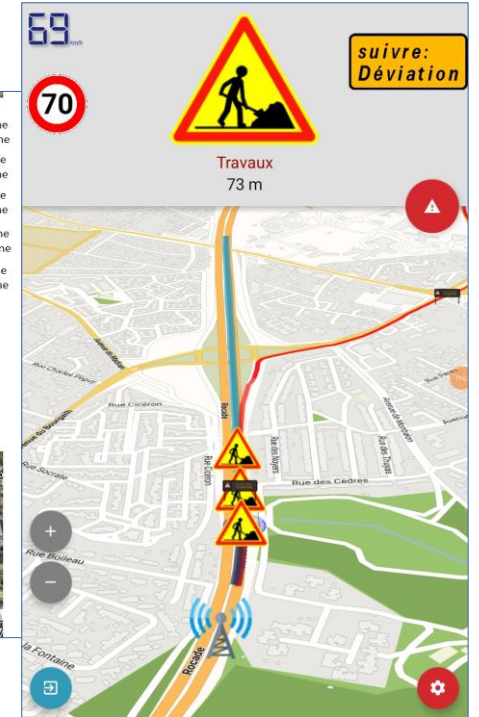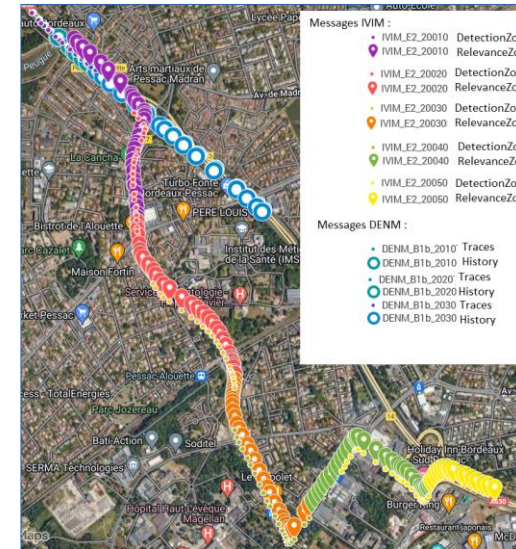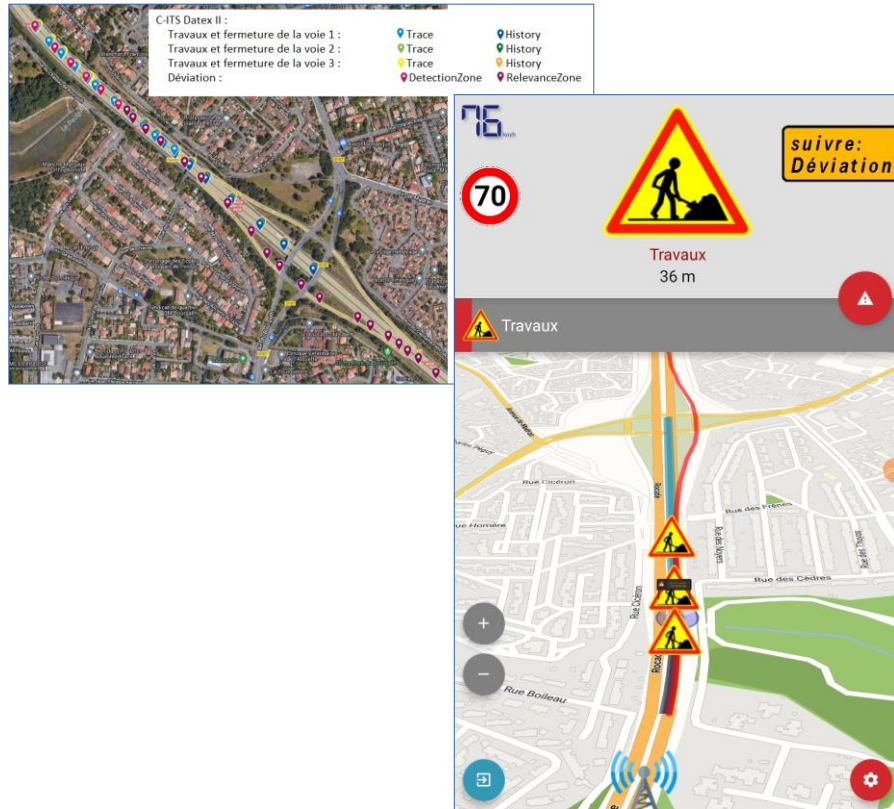
- Mise en œuvre de 2 scénarios :
  - Déviation courte
  - Déviation longue
- Suivi continu de la trace de la déviation

Pilot site South West – DIRA
Used technologies & suppliers

- RSU supplier : NEOGLS
- (InstallerAXIMUM)
- OBU supplier : NEOGLS
- Technology : V2X
- SAGT : Tipi

Pilot site South West – DIRA
Elements of success and encountered difficulties

- **Elements of success:**

  - DIRA long-time involved in the field of C-ITS

  - DIRs network

  - C-ITS data reliabilty

- **Difficulties :**

  - Mobilizable human ressources

  - Update of first generation equipments

DIRCO Deployment

Cyril LAUQUIN

Pilot site South West – Center West
Localisation
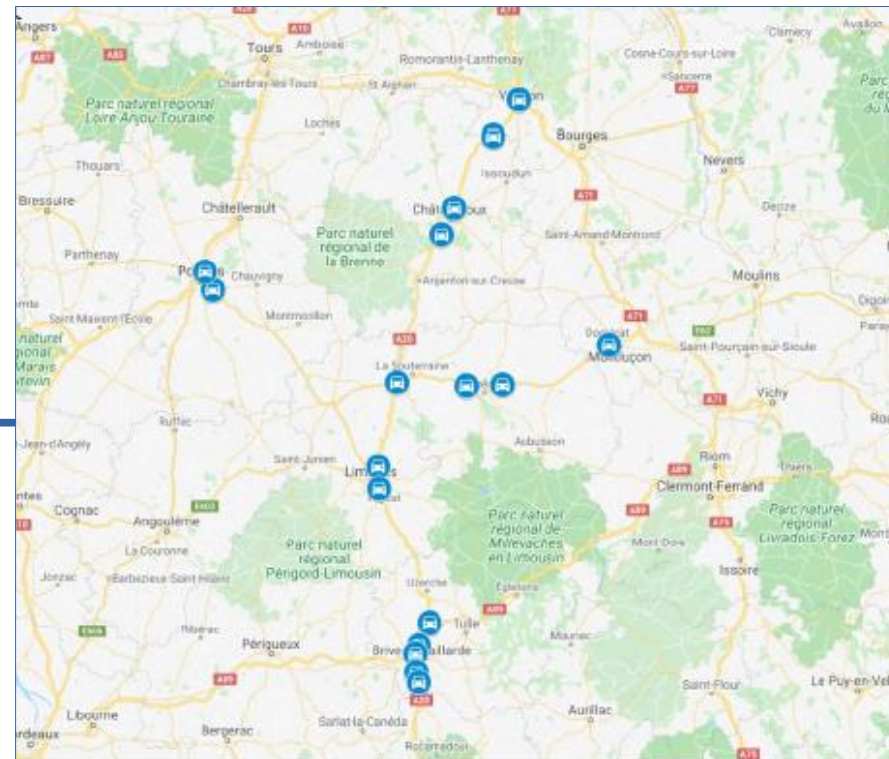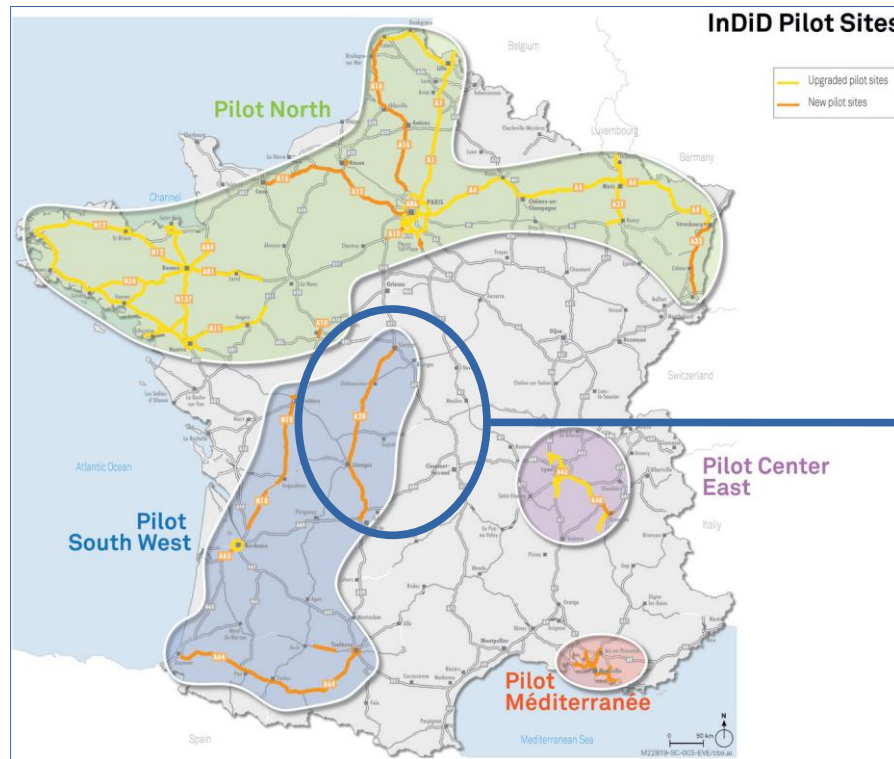
- 17 RSU

- 5 OBU

- 1 new UC (A5)

Pilot site South West – Center West
Developped Use Case : A5 (automatic wrong-way driving detection)

Co-financed by the Connecting Europe Facility of the European Union
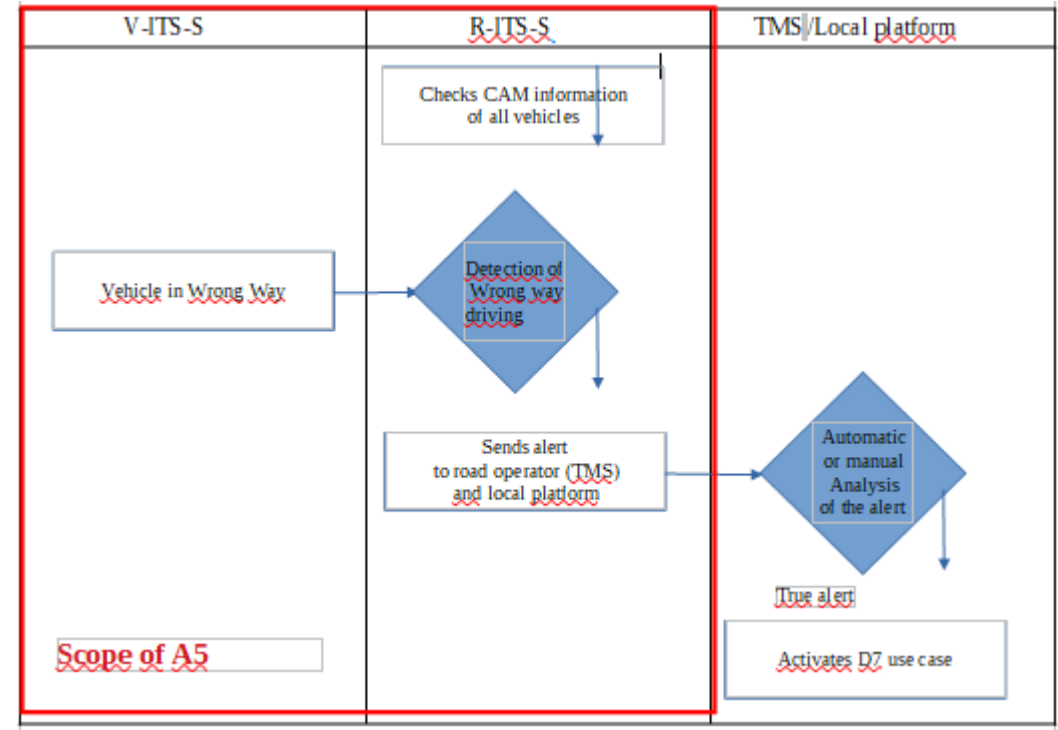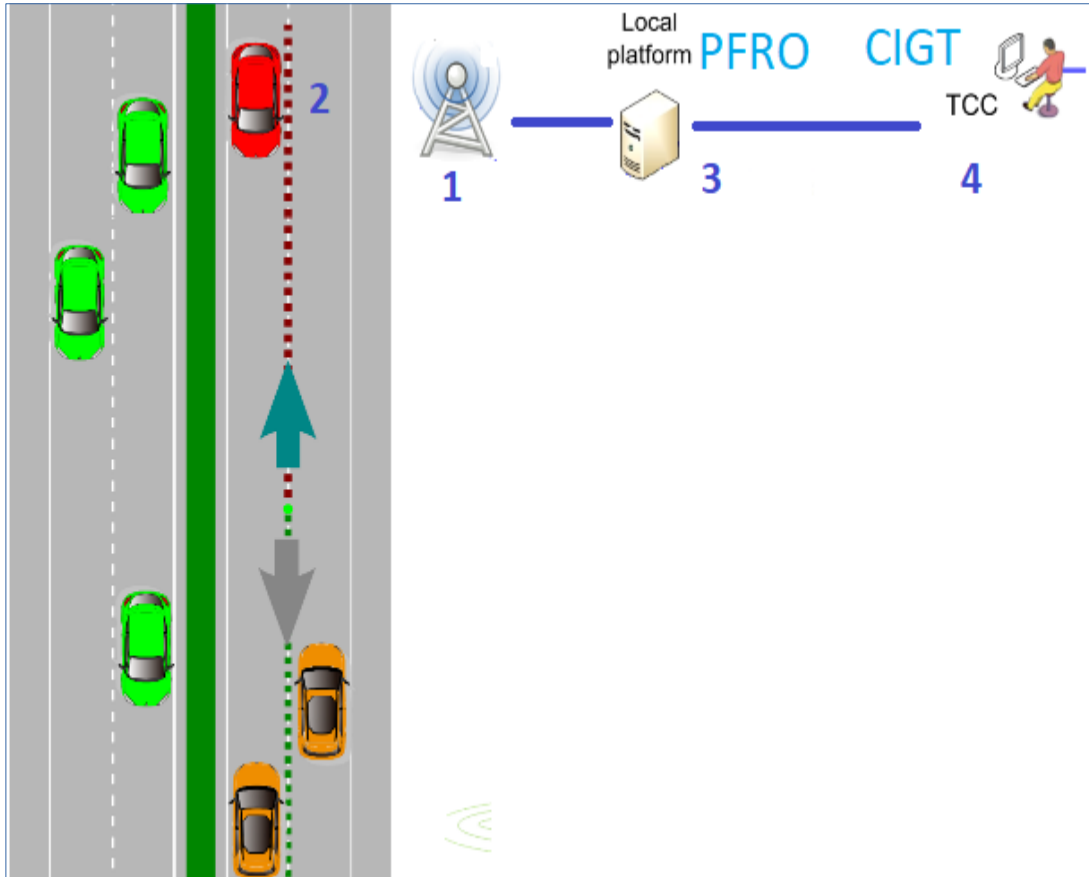
Pilot site South West – Center West
Used technologies & suppliers

- RSU supplier : NEOGLS

- (Installer AXIMUM)

- OBU supplier : NEOGLS

- Technology : V2X

- SAGT : Tipi

Pilot site South West – Center West
Deployments and production

- 17 RSU deployed and connected

- 5 OBU installed in operating vehicles

- A5 UC developped and locally experimented

- PFRO installed

- Tests in progress

- PRISM on-board handrail deployed
and upcoming tests for the interfaced handrail

Pilot site South West – Center West
Elements of success and encountered difficulties

- ## Elements of success :

  - Contract completed while DIRCO is "recent" involved in C-ITS

  - Increase in technical skills of our teams on the C-ITS subject (starting from 0)

  - Growing awareness among our agents, our partners and the authorities of the possibilities offered by C-ITS (particularly on security)

- ## Difficulties :

  - C-ITS field complex to understand (technical knowledge, specific markets to set up, etc.)

  - Small project team and difficult to build up

  - Environmental reluctance ("Waze already does it, right?"))

  - No standard plan for project implementation: need for a "tailor-made" plan for each site

DIRSO Deployment

Nicolas LEBAIL

Pilot site South West – DIR SO
Localisation

VSA Toulouse

- 20 RSU

- 10 OBU

A64
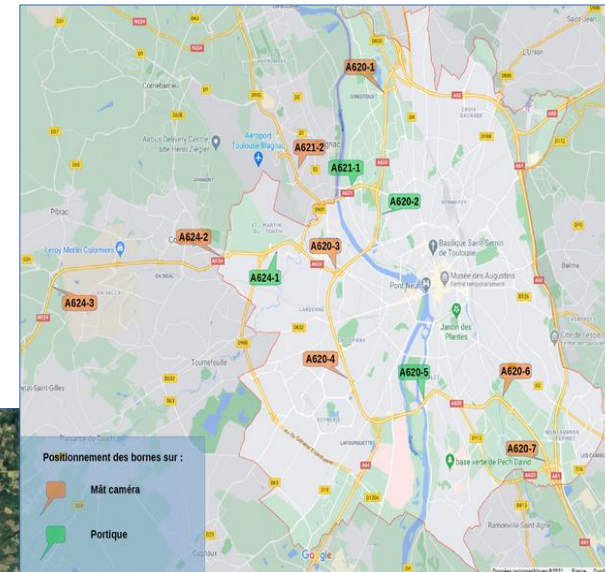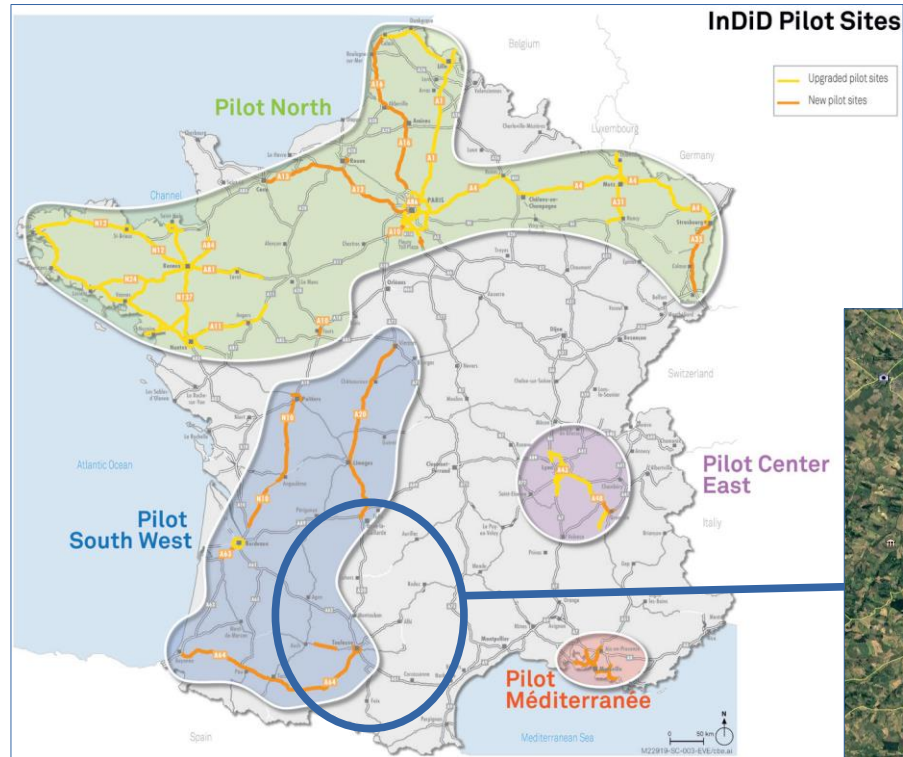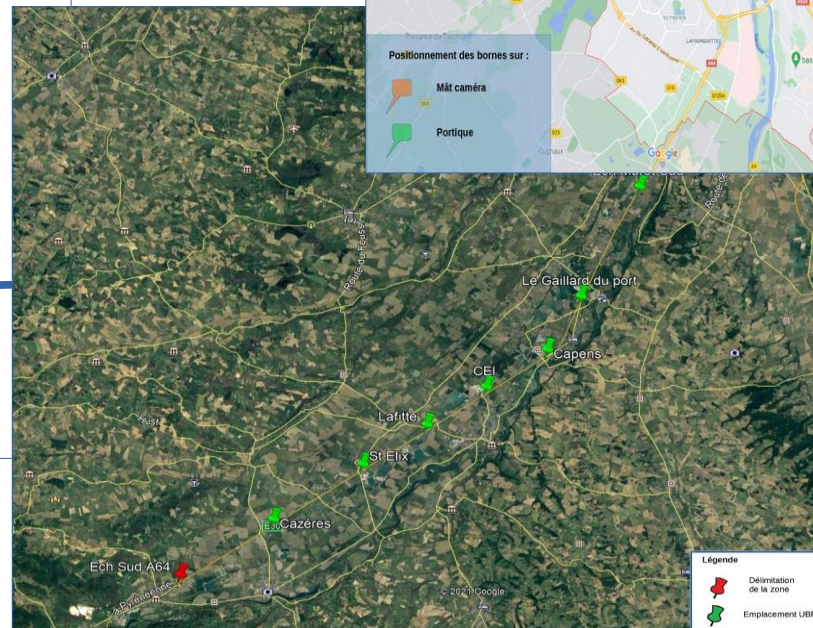
Pilot site South West – DIRSO
Used technologies / supplier

- RSU supplier : LACROIX City

- (Installer INEO)

Pilot site South West – DIRSO
Used technologies / supplier

- OBU supplier : LACROIX City
- Installer : LACROIX City
- Technology : V2X
- SAGT : SAGACITE

Antenne multi-bandes GPS/3G/5G

Toit

Habitacle

Tablette

Wi-Fi

Cellule

UEVG

Antenne WIFI
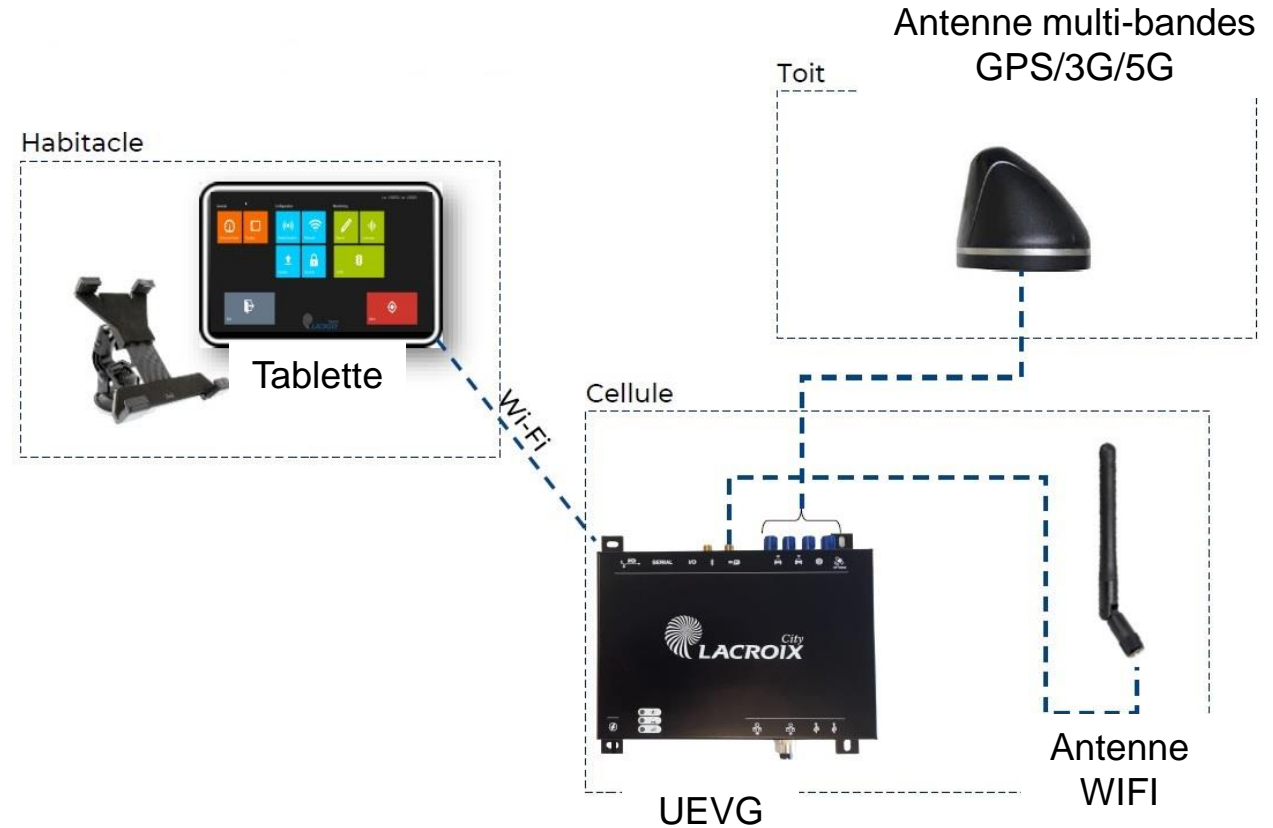
Pilot site South West – DIR SO
Deployment and production

- 20 RSU deployed and connected

- 10 OBU installed in operating vehicles

- SCOOP-PRISM on-board interfaced handrail deployed

- PFRO installed (including RGS certificates)

- Tests in progress

Pilot site South West – DIR SO
Elements of success and encountered difficulties

- ## Elements of success :

  - Contract completed despite technical difficulties (including the deployment of a new SDAGT), economic difficulties (strong impacts of road transfers linked to the 3DS law) and the renewal of the project teamt

  - Increase in technical skills of our teams on the C-ITS subject (starting from 0)

  - Collective awareness of the possibilities offered by C-ITS (particularly on security)

- ## Difficultés :

  - C-ITS field complex to understand (technical knowledge, specific markets to set up, etc.)

  - Small project team not dedicated to C-ITS

  - Definition of appropriate use cases to take into consideration

What next for DIR ?

Pilot site South West
The consequences envisaged for the DIR

- Capitalize on the experience acquired on the INDID project and support DIR agents on the use of C-ITS

- Massive deployment of OBU and scaling up through the European SCALE project (equipment of most of our vehicles)

- → Make C-ITS a strong tool for improving the safety of our agents

MINISTÈRE
DE LA TRANSITION
ÉCOLOGIQUE
Liberté
Égalité
Fraternité

BORDEAUX
MÉTROPOLE

Bordeaux Métropole

Éric MONCEYRON

Bordeaux metropolis – Key figures

- ## Demographic dynamism
  - Metropolis 819,604 inhabitants$_{2022}$ (+1,2% /year – 1417 /km²) including the city of Bordeaux 260,858 inh. (5286 /km²)
  - Urban area 994,920 inhabitants$_{2022}$ (+1,4% /year)
  - Increasing commuting

- ## Key hub on the Atlantic Arc,

- ## The beltway, also part of local transport system
  - up to 135,000 veh./day, commuting at rush hour,
  - 15% HGVs,

- ## Congestion unabated
  - Index TomTom: 30

- ## Adaptation to climate change
  and reduce emissions

Legend:
- < 2 min
- 2 – 4 min
- 4 – 6 min
- 6 – 8 min
- 8 min et plus

2017   2021

Variability of circulation time (urban area) - Agence d'urbanisme Bordeaux Aquitaine

Mobility and public transportation

1995-2000 — the choice of a tramway to break away from the car as the mean transport mode

1 2000-2010 — The great success of the tramway and the redevelopment of the urban core

2 2010-2016 — The challenges of traffic saturation and metropolitan accessibility

3 2016-2020 — the start of a multimodal strategy

1995-2000 - 1995 marked the decision to invest in trams as the backbone of public transport to combat car use. In 2000, this led to the construction of a tram network with 3 lines

2000-2010 - the tram network is taking shape and ridership is exceeding expectations - for the first time, the modal share of the car is declining in favour of public transport and soft modes of transport.

2010-2016 - Faced with suburbanisation and the persistent challenges of saturation of public transport and major roads, Bordeaux Métropole is concentrating on extending the tramway network.

2016-2020 - Bordeaux Métropole continues to improve its infrastructure, while at the same time beginning to diversify its approach to mobility, with initiatives designed to encourage modal diversification.

Confidential source pwc

☞ **Public transport – AOM**

- Positive tram effect
- 171 M trips/year$_{2022}$
- A multimodal chain
- A new mobility roadmap[2020-2030]:

Main axis of mobility roadmap 2020–2030

1- Decongesting the metropolitan area
☞ decrease traffic -10 %

2- Making the Right Bank/Left Bank connections more fluid

3- Offering attractive alternatives to the links between the interior and exterior of the metropolis.
☞ P+R, metropolitan RER, express buses and coaches, HGV traffic regulation …

4- Decarbonising mobility
☞ Promote active modes & electric mobility
☞ LEZ (2025)

5- Fostering a new governance

☞ The need for more agile, more sober solutions, adapted to the specificities of the territory

Projet urbain

Ecocity EPA Euratlantique

charte des mobilités

ITS WC Bordeaux

1973 1985 1995 2003 2015

BORDEAUX 2015

Southwest Pilot Site – Bordeaux
Location (Bordeaux Metropolis)
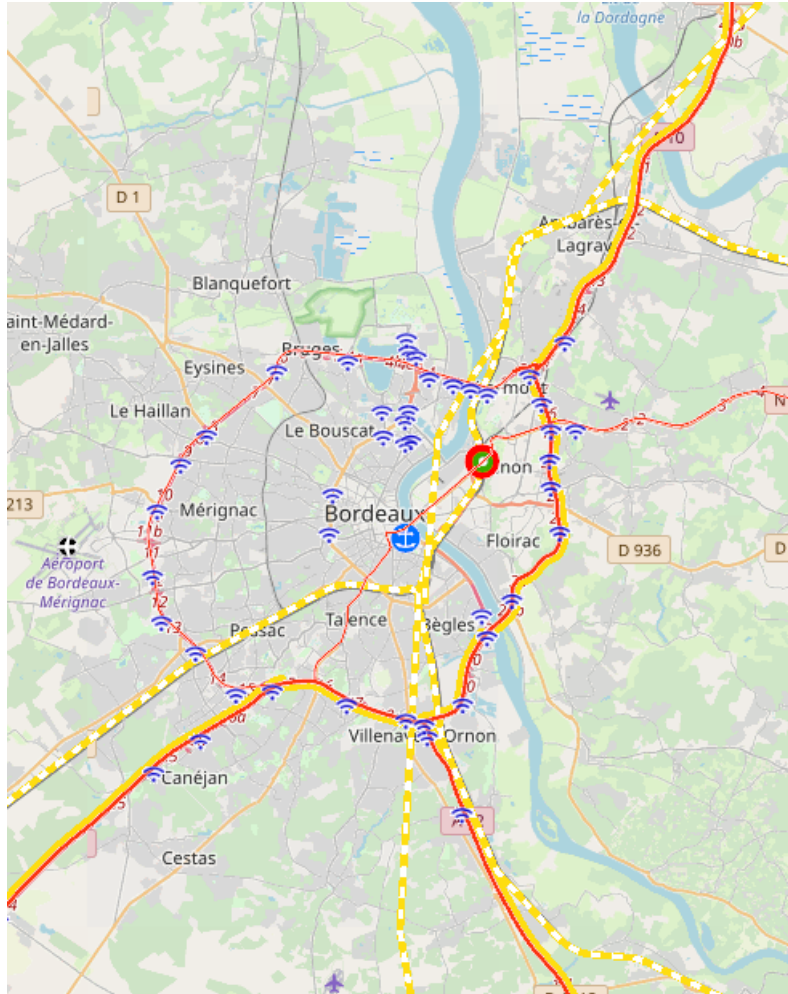
- A C-ITS scaling-up deployment site,
- with public/private collaboration, to strengthen the engagement of stakeholders involved in C-ITS/TMS chain, from implementation to operations,

- And now with public procurements,
- Based on local and national technological foundation,
- An App for large scale and quick deployment 'On-board Traffic CC',
- ETSI messages and profiles – PKI L0, pre-L1 (IP),
- Hybrid communication (long and short range).
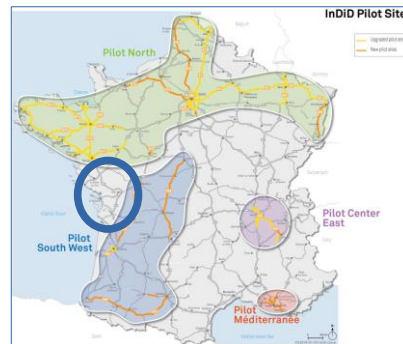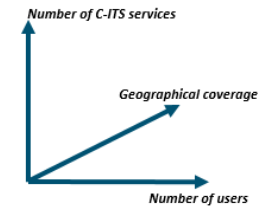
Bordeaux Pilot Site (urban node)	
C-ITS communication infrastructure	Long range + 10 ITS G5 test RSUs Short range on beltway: 39 RSUs
Pilot site coverage	530 signalised intersections + 53 tram light intersections (R24) > 2300 traffic lights
	65 off-street parkings (33,383 spaces) 26 P+R (7,317 spaces) 67 carpooling areas (690 spaces)
	24 VMS
	~ 30 C-ITS use cases on urban area

Southwest pilot – Bordeaux
An App for a large scale and quick deployment = 'On-board Traffic CC'

Green Light Optimal Speed Advisory (GLOSA)

Signal Violation/ Intersection Safety

Road Hazard Warning

Road Works Warning

Park and Ride Information

Emergency Vehicle Approaching

C-THE DIFFERENCE APP (Urban)

Nombre de services C-ITS

Périmètre géographique

Nombre d'utilisateurs

C-The Difference App (urban)

CoopITS (interurban + urban)

Website: https://coopits.développement-durable.gouv.fr/

Coopits

Associated projects:

Projet SCOOP · C-ROADS FRANCE · InterCor · InDiD · The Difference
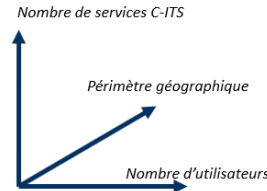
➢ **The 5 pillars of the C-ITS App:**

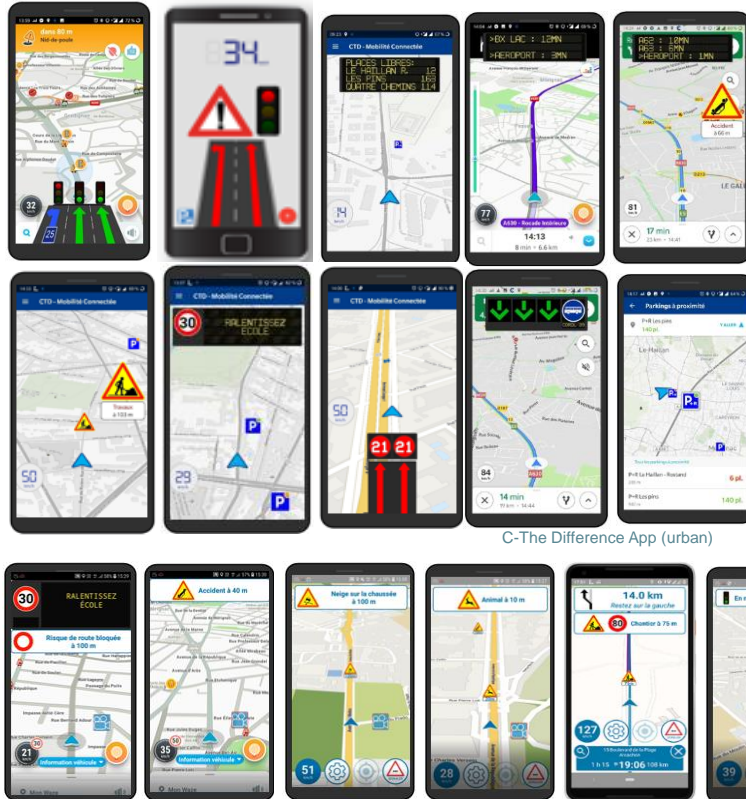|	
Reliable, for more road safety	Expert data from infrastructure managers, such as traffic lights to enable driving to be adapted, variable message signs, road works warning, , alerts about animals or obstacles on the road, etc
Eco-driving and responsible transport	Designed by the Ministry of Ecological Transition, the app promotes eco-driving by avoiding waiting at traffic lights, and reserved lanes for carpooling or public transport. And by informing about the availability of park-and-ride facilities and other public off-street parks.
Overlay	The App can be overlaid on a pre-installed GPS navigation (e.g. Waze) or run independently.
Official, secure and free	Coopits respects the privacy of the user: the information received by the road manager road manager is strictly anonymised. It does not disseminate advertising.
Public Policy support	A digital tool to better support sustainable mobility policies, the 2020-2030 master plan and the community's technical services.

Co-financed by the European Union
Connecting Europe Facility

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BORDEAUX MÉTROPOLE

Southwest pilot – Bordeaux
C-ITS expanding & TRL upscaling

Phase 1

Phase 2

Phase 3

POC EVP, EVA,
GLOSA (Compass 4D)
(Gertrude SAEM)
(NeoGLS)
(Bordeaux)

Scale-up, assess
GLOSA, P+R, IVS, TSP
IVLW, AEV
(Bordeaux-Helmond)
(NeoGLS)

Scale-up, assess
IVI VMS, continuity
reserved lanes,
(French Ministry)
(Bordeaux)

POC EVP, IVS, MTTA,
FI, SVW, MPA, UPA,
EBL, RHW, RWW, PVD
(Gertrude SAEM)
(NeoGLS)

Scale-up, assess
VRU, Flooded roads,
Multimodality
(French Ministry)
(Bordeaux)

2014   **2016**   **2018**   **2021**   **2024**

C-THE DIFFERENCE   C-ROADS   C-MOBILE   InDiD   DIT4TraM

CTW (City forum)

RETEX

| FOT | Small scale pilot | C-The Difference | Full scale permanent deployment |

Coopits

Number of C-ITS services

Geographical coverage

Number of users

Roadmap 1   Roadmap 2

Southwest pilot – Bordeaux
How can C-ITS services meet the challenges of urban mobility?

- **Phase #1:** Scale-up and proof of value
  - Selection of relevant C-ITS services, that could support our mobility policy and that are key enablers to enhance traffic efficiency, emission reduction performances, modal shift and accelerate the digital transformation, among the following:
    - **Signalized Intersection service:** GLOSA, **Traffic signal priority**,
    - **In-vehicle speed limits**,
    - Dynamic Lane Management –**reserved lane**,
    - **Traffic information** (DENM, IVI) & Smart routing,
    - **Park & Ride information**,
    - **Off street** and on street parking information.
  - Bringing together and ~~ing public private~~ stakeholders,

  - Recruiting and involving real end-users from start,
  - An App for large scale and quick deployment:
  'On-board Traffic CC'
  - Field Operational Tests (FOT) and assessment.
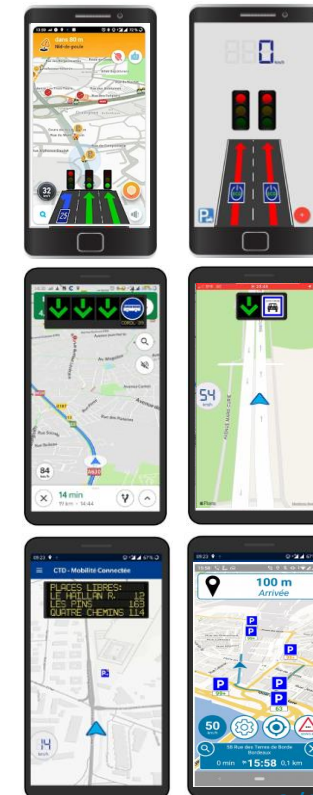
Southwest pilot – Bordeaux

Phase 2: Continuité des services entre voiries urbaines et rocade

- ○ National application   Coopits

- ○ Urban core:
  - ○ encouraging eco-driving and limiting vehicle emissions,
  - ○ and facilitating their parking,
  - ○ securing signalized intersection crossing,
  - ○ warning caution in the vicinity of schools,
  - ○ in vehicle-signs, (e.g., information on closure times of the lift bridge),
  - ○ and road works warnings.

- ○ Suburb and urban area:
  - ○ park and ride information,
  - ○ facilitating PT travel time (e.g., bus on emergency hard shoulder of beltway),
  - ○ improving traffic efficiency and safety,
  - ○ In-vehicle dynamic speed limit information - speed regulation zone,
  - ○ reporting accidents and road events.
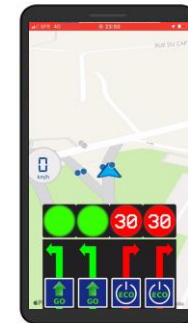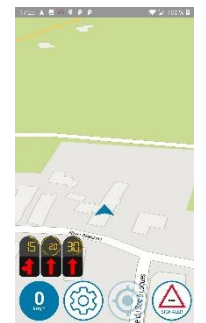
C-The Difference App   CoopITS App
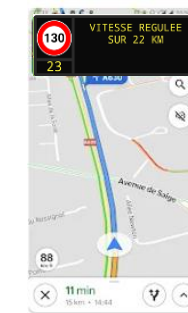
Southwest pilot – Bordeaux

Two events to move on to the next phase

- **City Twinning Workshop [2018]**
  - Foster knowledge sharing and C-ITS pilot best practices exchanges,
  - Targeted audience: representatives of city and region in charge of transport and mobility innovation, transport planning and traffic management (10 national road authorities and road operators, 25 European cities)
  - Exchange information with C-the difference pilot city representatives.

- **Seminar involving local public-private stakeholders [2021]**
  - Primary ambition of co-constructing the challenges and foundations of the new roadmap,
  - For "deploying a package of C-ITS services desirable for the user, supporting public policies, and supporting the regulation of public space as a complement to GPS navigator and digital giants",
  - Enlarge and involve professional experts the ITS community).

➤ **Roadmap 2022/2024**

InDiD – Infrastructure Digitale de Demain

Co-financed by the European Union
Connecting Europe Facility

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Liberté Égalité Fraternité

BORDEAUX MÉTROPOLE

C -THE DIFFERENCE

C-ROADS FRANCE
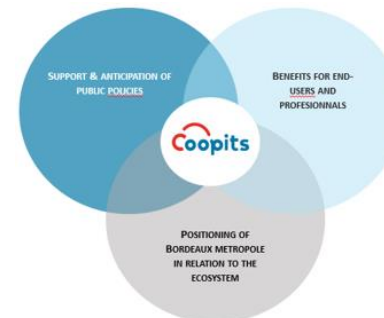
Southwest pilote – Bordeaux
Phase #3: level of maturity – roadmap 2022-2024

- C-ITS use cases are also an effective way of supporting objectives and our local mobility policy, at different scale :

  - Urban core:
    - Reinforcing the safety of Vulnerable Road Users (cyclists, pedestrian),
    - Prioritizing designated vehicle, and securing signalized intersection crossing,

  - Suburb and urban area:
    - Reinforcing modal transfer to the main public transportation,
    - Facilitating carpooling and PT travel time
    - Resilience for citizens in the face of various events (e.g., flooded roads)

- Assessment, considering previous results and revising initial assumptions.

SUPPORT & ANTICIPATION OF PUBLIC POLICIES

BENEFITS FOR END-USERS AND PROFESIONNALS

Coopits

POSITIONING OF BORDEAUX METROPOLE IN RELATION TO THE ECOSYSTEM
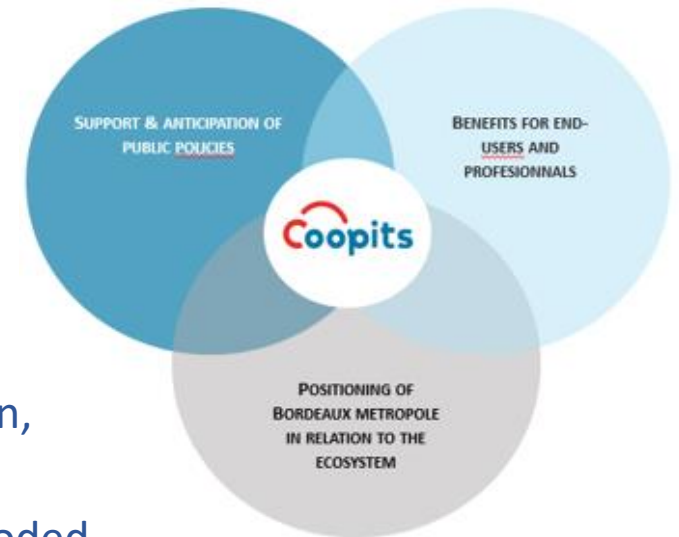
Southwest pilote – Bordeaux Métropole

Deployments + Operating
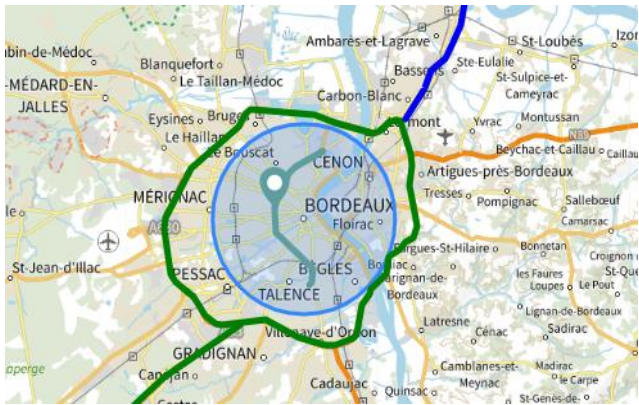
- Public contract (awarded after a call for tender) with the supplier NeoGLS, for development within the InDID project.

X	Service developed or improved in InDiD France, and deployed
X	Service developed in previous projects, maintained in InDiD
X	Service specified in InDiD France

* deployed and/or operated within the Coopits application chain

TLM <-> Module BI <-> Nfr-ITS-S <-> NAPSER <-> COOPITS

Urban Use Cases	Bordeaux road operator	
	Deployment stage	
A – Probe Vehicle Data (PVD)		
A1 – Traffic data collection	X	Operational*
A3 – PVD on manually declared events	X	Operational*
B – Road Works Warning (RWW)		
B1a - Alert neutralization of part of a lane, whole lane or several lanes	X	Operational*
B1b – Alert planned closure of a road or a carriageway (RWW enhanced)	X	Operational*
D – Hazardous Location Notifications (HLN)		
E – Traffic information and Smart Routing		
F – Parking, Park and Ride, Multimodality		
F1a – Information on parking lots location, availability and services in urban area (+ carpooling area information)	X	Operational*
G – Intersection (SI)		
G1a – GLOSA (Green Light Optimal Speed Advisory)	X	Operational*
G1b – TTG (Time To Green)	X	Operational*
G8 – Green time extension for pedestrians	X	Specified
H – Traffic management		
H4 – Dynamic lane management – reserved lane (I2V)	X	Operational*
H9 – Flooded roads	X	Deployed*
I-Vulnerable Users		

Southwest pilote – Bordeaux
Pedestrian crossing outside a signalized intersection - warning to vehicle

Detection zones:
In the middle of the carriageway, one zone per road side.

Reference position:
Pedestrian crossing center.

Relevance zone:
Pedestrian crossing perimeter.

ATTENTION PASSAGE PIETON DANGEREUX
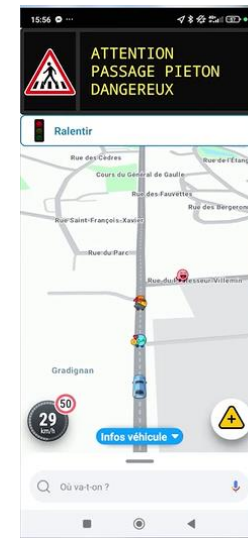
CITS use cases deployed - coverage (Bordeaux metropolitan area)

C-ITS deployed in the Bordeaux Metropolis - Geographical Coverage (October 2023)

- In-vehicle dynamic speed limit information - Safety zones around schools (City of Bordeaux) [IVS-TS] [IVS-FT]
- Carpooling area – location [POI]
- Off-street parking – availability of spaces and associated services [POI]
- Modal report at Park & Ride facility [POI + IVI]
- In-vehicle signage (Embedded VMS) [IVS-FT]
- In-vehicle urban signage (Embedded VMS) [IVS-FT]
- Urban roads on which alert of closure of a lane or of the road is potentially disseminated [RWW-LC] [RWW-RC]
- Road signs closed in the event of flooding [DENM]
- Roads closed in the event of flooding with rerouting [IVI]
- Reserved lane for carpooling (VR2+)
- Urban roads on which Signalized Intersection services are deployed [SI-GLOSA, SI-SPTI, SI-ISVW (POC 2018)]
- Traffic Light Priorization for bikes (POC 2023) [SI-TLP]
- Emergency Vehicle Priority (POC 2019) [SI-EVP]

- Beltway :

  In-vehicle signage (Embedded VMS) [IVS-FT] [IVS-TS]
  Alert closure of part of a lane, whole lane or several lanes [RWW-LC]
  Alert planned closure of a road or a carriageway
  Alert accident area [HLN-AZ]
  Traffic jam Ahead warning [HLN-TJA]
  Alert stationary vehicle / breakdown [HLN-SV]
  Information on parking lots location, availability and services [POI]
  Alert temporary slippery road [HLN-TSR]
  Alert animal/person on the road [HLN-APR]
  Alert obstacle on the road [HLN-OR]

C-THE DIFFERENCE

C-ROADS FRANCE

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Southwest pilot – Bordeaux
Key of success and points to watch (Bordeaux Métropole)

- **Key to success:**

  - Capitalising on previous projects and the national technological foundation, to enrich and strengthen the local C-ITS environment. To reach the production stage today.

  - A new approach to technological innovation, with the selection and design of use cases to support urban mobility policy.

  - A true scale-up, with use cases prioritised, developed and tested, to feed the catalogue of services.

  - Closer technical coordination between digital, mobility and risk prevention divisions, internal project control – RETEX.

- **Points to Watch:**

  - Local cross-functional governance to be strengthened.

  - Small project team.

  - Technical validation process for use cases between local and national levels.

  - Continue to evaluate new use cases.

  - Anchor the ability to provide local decision-makers with concrete ITS-C solutions to support mobility policy.

  - Minimum penetration rate to achieve benefits.

  - Data quality in line with the French transposition of the revised ITS Directive and its delegated regulations.

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Southwest pilot – Bordeaux
Follow-up action (Bordeaux Métropole)

- Integrating approaches to prepare for deadlines
  - Data: French transposition of the ITS Directive 2023/2661 adopted by the EC on 22 November 2024,
  - Connected services: ITS-C deployments in support of mobility policies,

- Scale-up
  - Capitalising on C-ITS services and putting them into production,
  - Strengthen the appeal of the final user application,

- The national C-ITS technology foundation and local platform (to be perpetuated in production mode)

- Development of road and digital network infrastructure connectivity
  - An essential lever to encourage the deployment of new C-ITS services,

- A 5-year roadmap as part of a new co-funded project.

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Prospects for developing new use cases

Main axes of the mobility roadmap 2020-2030

1- Decongesting the metropolitan area
☞ decrease traffic -10 %

2- Making the Right Bank/Left Bank connections more fluid

3- Offering attractive alternatives to the links between the interior and exterior of the metropolis.
☞ P+R, metropolitan RER, express coaches, HGV traffic regulation ...

4- Decarbonising mobility
☞ Promote active modes & electric mobility
☞ LEZ (2025)

5- Fostering a new governance

C-ITS Services packages

Phase 1

SI-GLOSA v1.0
EVA
[Trafic Environment]
4 1

SI-GLOSA v1.0
+ SI-ISVW
[Imminent Signal Violation Warning]
+ IVSL + VMS
[In Vehicle Speed Limit][Variable Message Signs]
[Road safety]
4 1

Phase 2

SI-GLOSA v1.0
+ SI-ISVW
+ IVSL + VMS
+ Parking
[shared-use lane]
[multimodality]
1 2 3 4

SI-GLOSA v1.1
+ SI-ISVW
+ IVSL
+ Parking v2.0
+ GLOSA pedestrian
+ priority at SI for bikes and carpoolers
+ Flooded roads
[VRU]
1 2 3 4

Phase 3

2028

+ LEZ
+ Multimodality
+ Priority at SI
[SI-TLP, bikes, SI-EVP]
+ GLOSA v2
+ Road safety
+ VRU
+ HLN on main urban roads
+ Help with road management in the event of crisis
1 2 3 4 5