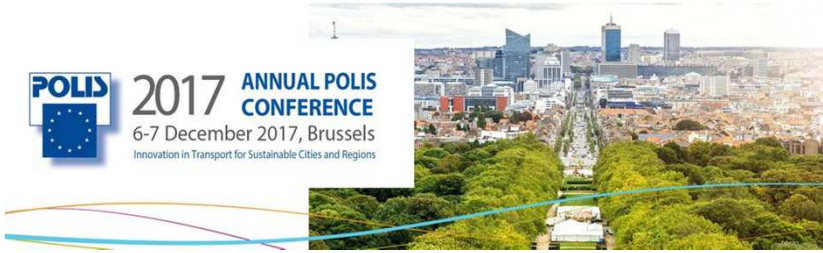
Automated shuttles : an opportunity for Toulouse public transport network ?

THE CHALLENGES AHEAD



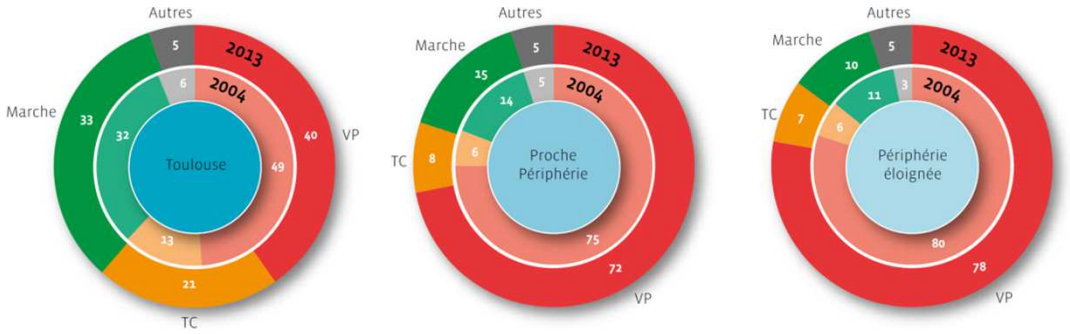
Continued demographic expansion

15 000 inhabitants/yr + **+ 7 000** jobs/yr =

+ 500 000

Additional daily travels by 2025

4 millions travels in 2013 which 16 % using public transport



TC : Transport en commun
VP : Voiture particulière

Parts modales par territoire de résidence (en %)

Saturation of structuring road networks and metro network

AN AMBITIOUS TRANSPORT POLICY : THE MOBILITY PROJECT 2020 2025 2030

Strategic decisions around 3 main challenges:

- **MOBILITY**: Organising the conditions for sustainablemobility in the perspective of sustained demographic growth.
- **ACCESSIBILITY**: Responding to the demand for mobility relating to demographic growth and economic dynamism.
- **ATTRACTIVENESS**: Improving access and maintaining the attractiveness of economic and employment areas.

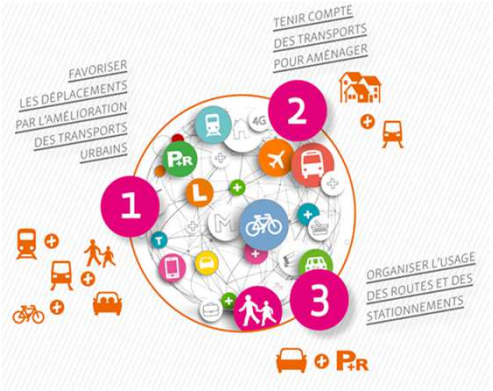
Through:

- Territorial meshing,
- Attractive travel times,
- Sufficient transport capacity (+ 250 000 travels / day)
- Efficient connections to road networks, rail network and the airport.

- 3 levers for action -

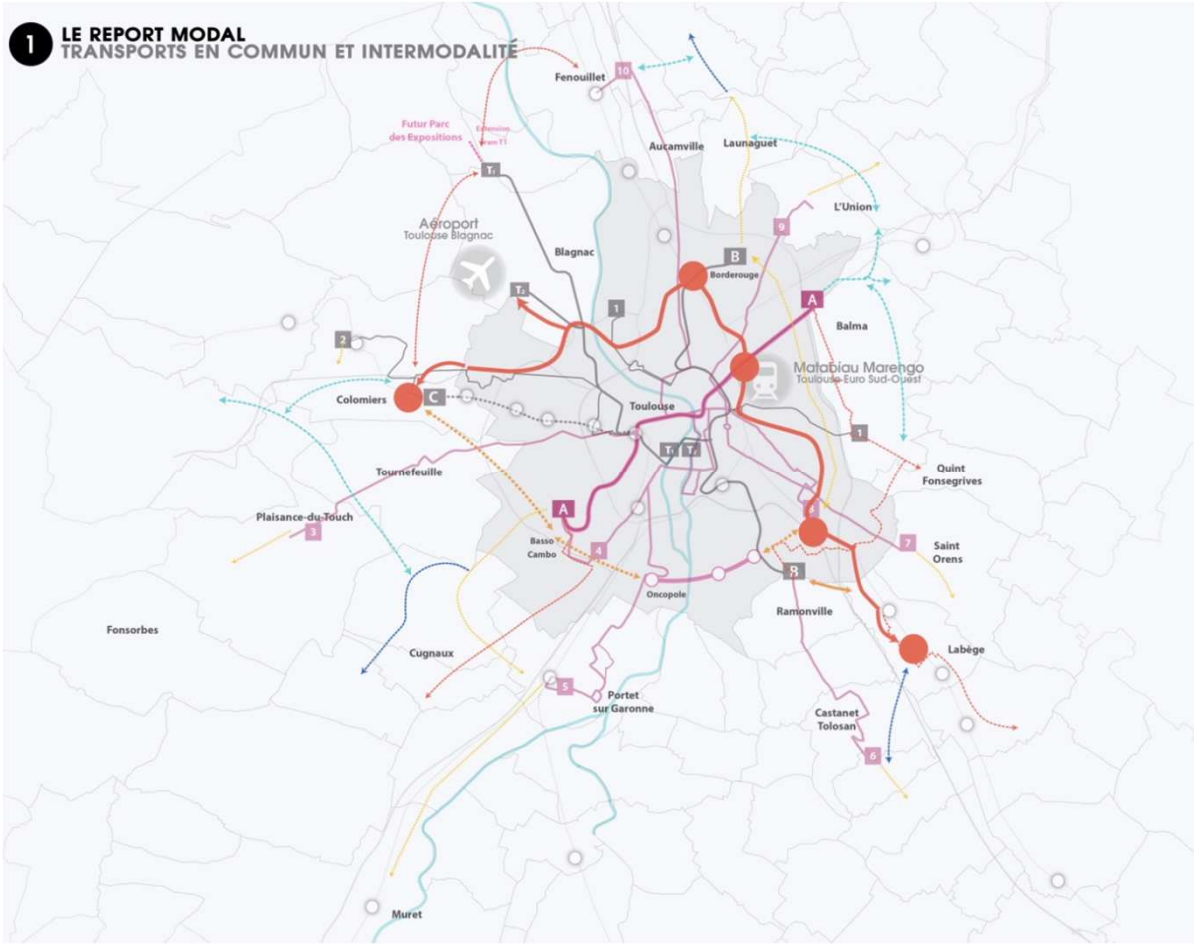
1. MODAL SHIFT
Or how to co-ordinate rail travel, the metro system, the tramway, buses, walking, cycling and car-sharing

2. COHERENCE BETWEEN URBANISME AND MOBILITY
Or how to develop the city and public transport



3. ROAD NETWORKS ORGANISATION
Or how better to develop and organise highways and parking

THE DEVELOPMENT OF A FAR-REACHING STRUCTURING NETWORK



2016

2020

2025

2030

Réseau structurant en 2016

- Réseau transport en commun structurant existant (Métro, Tram, Ligne C, Linéo 1 et 2)
- Réseau ferroviaire et gares
- Réseau viaire

Horizon 2020

- **Doublement de la capacité de la Ligne A**
- **Réseau Linéo 2020**
- **Téléphérique Urbain Sud**
- Extension du Tramway

Horizon 2025

- Périmètre d'étude de **Toulouse Aerospace Express**
- Desserte aéroport
- Connexion TAE / Réseau ferroviaire
- Ceinture Sud
- Interconnexion Ligne B – 3ème ligne de métro
- Principe de Linéo à l'étude
- Offre Optimo à l'étude

Horizon 2030

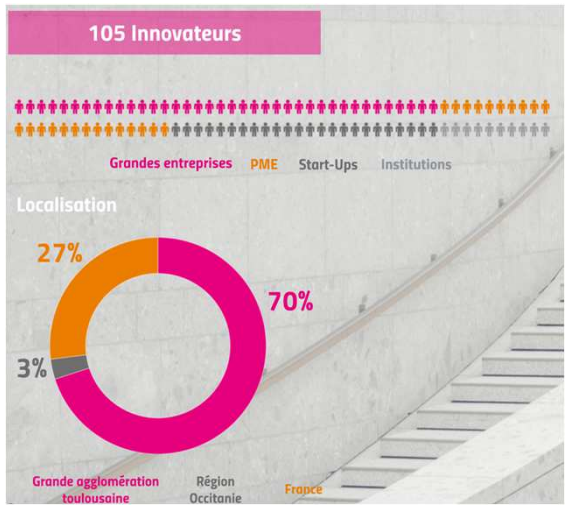
- Offre Optimo à l'étude
- Axes TC inscrits au SCoT

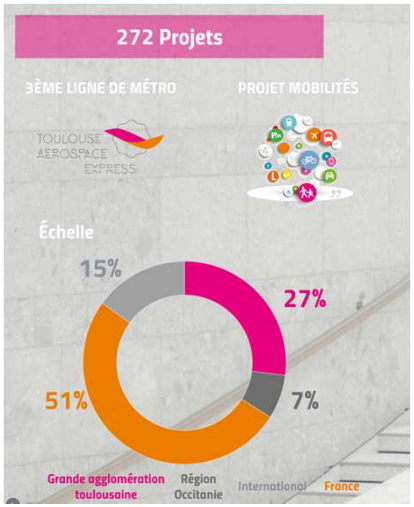
AN INNOVATION STRATEGY FOCUSED ON USERS

Towards more partnerships with the private sector serving the Mobility Project

- **Call for Interest on Innovation (23 mars – 28 avril 2017)** : as a first federative action to improve the user experience

  - 4G coverage in the entire metro network, multimodal mobile application integrating accessible routings,
  - **Driverless public transport shuttles on demonstration sites**
  - Electronic ticketing, multimodal fares, distance ticket selling,
  - Carsharing, carpooling, bikesharing, motor bikes sharing, car hire between individuals, etc.
  - Multimodal, multiservice and connected interchanges,
  - Evolving and connected public spaces, development of smart dwellings in relation to mobility,
  - Integration/management of highway and parking data,
  - …





A STUDY ON THE OPPORTUNITY OF AUTOMATED SHUTTLES

Ongoing study launched by Tisséo Collectivités analysing the opportunity of driverless public transport shuttles as a complement to the existing transport offer

- **Anticipate the mobility of tomorrow** and organise the future mobility chain.
- **Study the benefits of automated shuttes for public transport** :
  - Serving less dense areas
  - Irrigating along structuring axes (last mile shuttles): minibus lines to route passengers to train, metro, own-site bus, etc.
  - Serving Park and Rides
  - Offering wider opening hours and frequency
  - Keeping costs under control
  - Reucing air pollution
- **and the technical, financial and legal conditions** of an automated shuttles service, as a complement to other transport modes.

TOULOUSE L'OPEN MÉTROPOLE
Stratégie Smart City 2015-2020

A STUDY ON THE OPPORTUNITY OF AUTOMATED SHUTTLES

- **Accompagnying its members smart city initiatives** (Toulouse Metropolis), acting towards the development of automated and connected vehicles.
- The **order of 3 August 2016** allows the circulation of vehicles with **driving permission** on public roads, only in the context of an **experiment** and subject to obtaining a **compulsory authorization**.
- For regulatory reasons related to safety, the circulation of the shuttles **in total autonomy is not authorized** currently. An authorized person must be in the vehicle.

The objective is to get elements of strategic thinking about the opportunity and sustainability of an autonomous shuttle service, while taking advantage of the experience feedback from the territories.

A LOCAL PLAYER

- A local economic actor has answered Tisséo Collectivités Call for Interest : the **start-up EasyMile**
- Created in 2014 and settled in Toulouse, EasyMile offers a **100% electric driverless shuttle « EZ10 »**
- Each one can transport **up to 12 individuals** (11 passengers and the operator) - or maximum 9 individuals if the operator does not hold the public transport permit (8 passengers and the operator)
- To circulate in an optimum way, this autonomous shuttle requires **5 meters of width of road** per sense of circulation (shuttle of 2 meters of width + 1.5 meters of security on both sides)
- The shuttle uses **GPS, laser and camera guidance technologies**
- Its maximum possible speed is **25 km/h**
- Easymile currently has more than **40 shuttles in service** around the world - in Asia, Europe and the United States.

ONGOING EXPERIMENTS IN TOULOUSE

In France

2011

- **La Rochelle** (Transdev)
  Driverless automated minibus, *a premiere in France*

2015-2016

- **Lyon** – Confluence (Keolis)
- **Civaux** nuclear power station (Transdev)

2017

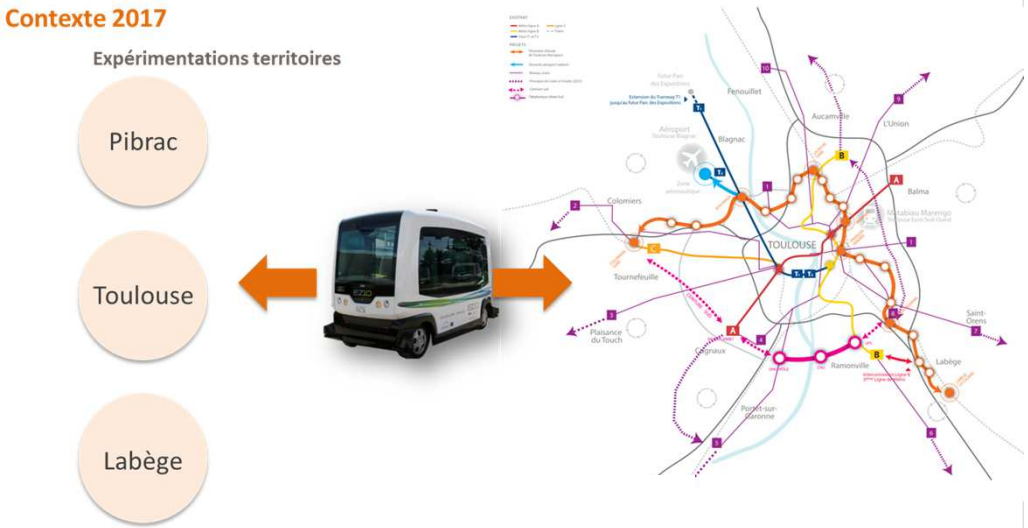
- **Paris**
  La Défense (Keolis)
  From Gare d'Austerlitz to Gare de Lyon train stations (RATP)
- **Rouen** (Transdev, Renault)
  On demand autonomous electric cars « Zoe »,
  a *premiere in Europe*

From the circulation in own-site or in pedestrian zones towards the entry in the traffic ...

The example of the Greater Paris metropolis:

- Rungis = electric autonomous minibuses, intersections to cross
- Vincennes (RATP) = In real traffic / From Metro Château de Vincennes to Parc Floral

In the Greater Toulouse



ONGOING EXPERIMENTS IN TOULOUSE (1)

PIBRAC (city close to Toulouse)

8 000 inhabitants/ 15 km from Toulouse/ Suburban area/ Lots of inhabitants working on the airport area (10 km from Airbus)

- Experiment conducted by Toulouse Metropolis (Smart City)
- 3 months experiment (14 June to 5 September 2017)
- Location: city center (Esplanade Sainte Germaine)
- 3 stops (Théâtre, Basilique, Église Sainte Germaine)
- Lengh of course : 340 meters
- Average speed : 6,3 km/h
- 1 145,7 km travelled
- 3 210 cumulated travellers on board , representing 38 individuals / day (90 on peak hours)

ONGOING EXPERIMENTS IN TOULOUSE (1)

PIBRAC/ First results and lessons learnt

SURVEY/ SHUTTLE USERS

- ❑ 200 respondents (retired persons represent 44,5% of the sample)
- ❑ Average rating : 4.3/5

Stengths

- ❑ Information on board, security
  - 97.5% of respondents found the shuttle comfortable and the driving pleasant
  - 78.5% of users felt safe aboard the shuttle
  - 90.5% of people would have board even if there was no operator
  - People who had concerns before testing the shuttle all say they are reassured by the shuttle's behavior (comfort, driving, speed)
- ❑ Quite vehicle, smooth driving

Improvements needed

- ❑ Slowness, no time gained

ONGOING EXPERIMENTS IN TOULOUSE (1)

PIBRAC/ First results and lessons learnt

- Inhabitants have taken over the automated shuttle,
- More than 90% of them assure that they will use it again
- For 97% of people, the shuttle is a good way to make last mile trips.
- Consciousness of users that the automated shuttle have to connect important locations of the city and to connect to existing transport networks.

SURVEY/ LOCAL POPULATION

- 32% of the population was not favorable to the experiment, considering the path not adapted to their needs: course too short, shuttle too slow, shuttle not serving useful places.
- Most desired route: train station - high school - shopping center.

ONGOING EXPERIMENTS IN TOULOUSE (2)

TOULOUSE CITY CENTER - Allées Jules Guesde

Connection with Metro/Tram Tisséo

- Experiment conducted by Toulouse Metropolis (Smart City)
- 6 months experiment (6 December 2017 to 31 May 2018)
- From « Palais de justice » Metro/Tram station to Grand-Rond public garden (3 stops)
- Lengh of course : 850 meters
- Pedestrian zone
- Average speed expected : 13-14 km/h (7-8km/h taking into consideration the duration of the intermediary stop)
- 2nd generation of shuttle EZ10 : slightly larger, better inside ergonomy, air conditionning/heating added, new monitoring system
- Operator : Transdev
  - ✓ **Phase 1 : operator on board**
  - ✓ **Phase 2 : no operator on board, but operator following the shuttle from outside**
  - ✓ **Phase 3 : no operator on board**

THE POSSIBLE FUTURE EXPERIMENT LOCATIONS

Considered future sites where experimenting the automated shuttle (ongoing validation):

- **Internal own-site service** in major sites like Airbus headquarters, Toulouse Cancer Health Foundation (Oncopole),...
- **Serving sites welcoming major events** like Cité de l'Espace, Toulouse Aerospace new district,...
- **Last mile service** to companies (Thalès, Labège), hospital (Capio), business areas (Basso Cambo, ZAC Gabardie de Balma,..), etc.
- **Connecting public transport connections** in less well served areas : Labège Enova, Quai de Tounis, rue Bayard,...

TOWARDS MOBILITY AS A SERVICE

Automated shuttles

Towards a MaaS in Toulouse ? Challenges ?

Give meaning to the mobility strategy	**Mobility Project 2020.2025.2030, focus on user experence**	**Anticipate driverless shuttles in PT** (ongoing study)
Consolidate public-public and public-private partnerships	**Community of innovators (CFI)**	**Call for proposals** (EU,...)
Concentrate on challenging locations and topics	**Actions following CFI**	**Targeted dedicated sites** (ongoing validation)

Tisséo position / Innovation - Mobility actors

Fundamental principles: user experience, optimisation of network operation, eco-responsible approach,...

Business model to sharpen: cooperation tools, conventions,…

Governance model to refine : around the Mobility Project, interactions and complementarities with the other organizing authorities

Perimeter of organizing authorities regarding new mobilities,

Towards a local land mobility chain in Toulouse

THANK YOU FOR YOUR ATTENTION

tisséo COLLECTIVITÉS

Syndicat Mixte des Transports en Commun
de l'Agglomération Toulousaine