



Rémy DANGLA

Delivering Autonomous Mobility

# Autonomous vehicles in the future of mobility





# EasyMile in a nutshell



Founded in **June 2014**



Current headcount  
**190 employees**



Headquartered in **Toulouse** (France), with offices in **Denver** (USA), **Berlin** (Germany), **Singapore**, and **Adelaide** (Australia)



Privately funded by **founders**, with **Alstom**, **Continental** and **Bpifrance** as strategic investors

**ALSTOM**

**Continental**

**bpi**france



# Our vision : Autonomy is the future of mobility



## Improved safety



## More mobility

- Affordable solution for 1st and last mile to complete public transport network



## Better use of public space

- Less traffic jam and new way to share public space by reducing number of private cars
- Less space dedicated to parking lot



# Mobility needs have exploded in urban areas

1985

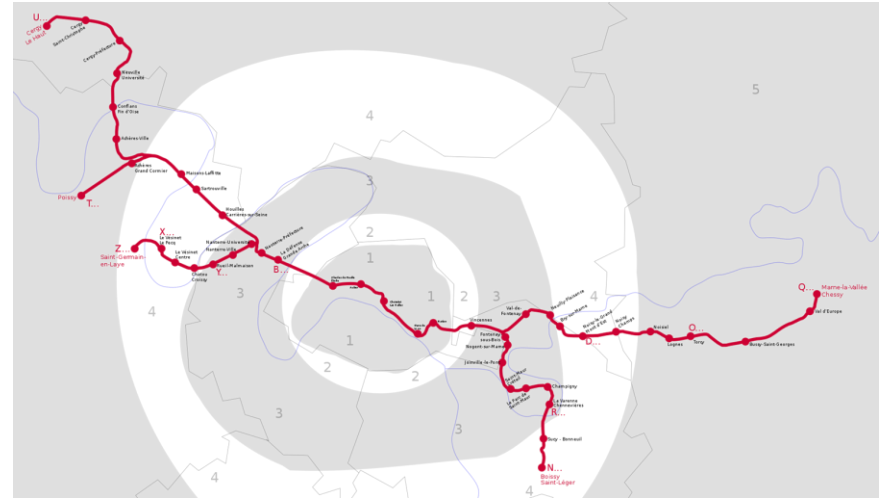
9 cities > 10 Million inhabitants

2001

19 cities

2017

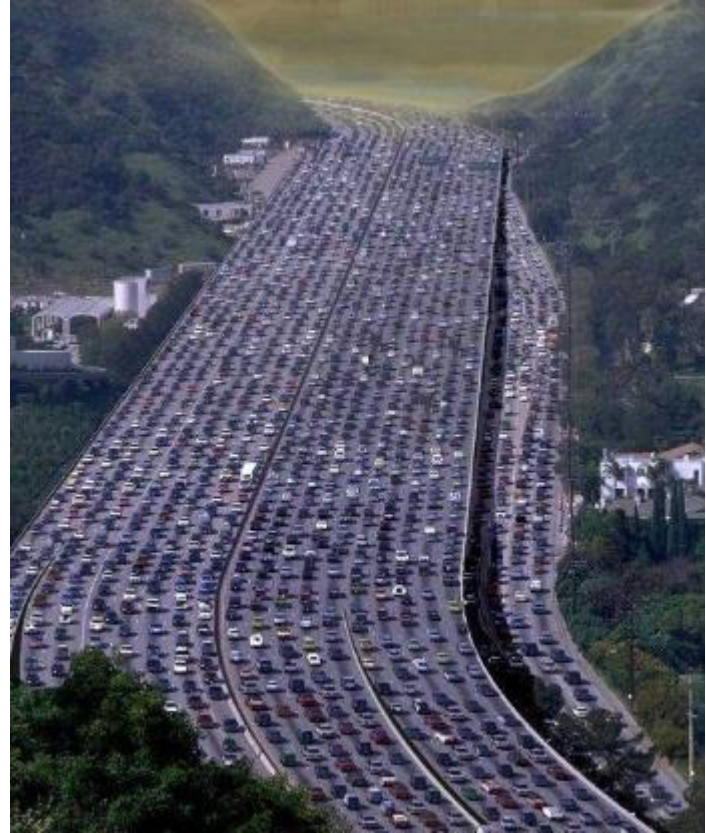
40 cities



- Commuting is growing: 45 km/ day - 9 times more than 50 years ago

# Public transport vs private cars

- Mass transportation is a solution to restrain the flow. Example: Paris RER A has a 50 000 pphpd capacity
- Considering 1.2 passengers per car, a 2x18 lines road would be required to reach this capacity
- Cars, autonomous or not cannot be the answer...



# Current public transport system issues

- Despite...
  - A great promotion
  - Environmental benefits
  - Low cost for users
- ... there are still lots of traffic jams
- Some areas suffer a lack of service

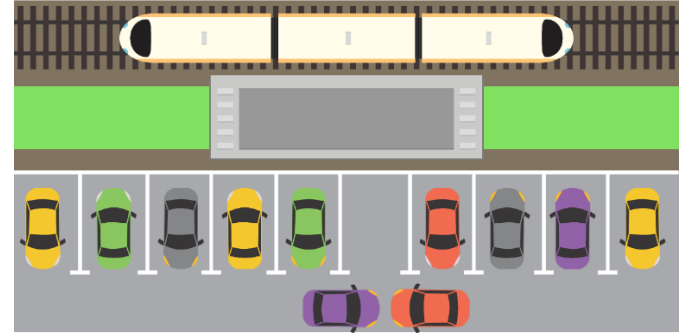


# Limits of current solutions

Increase mass transportation use



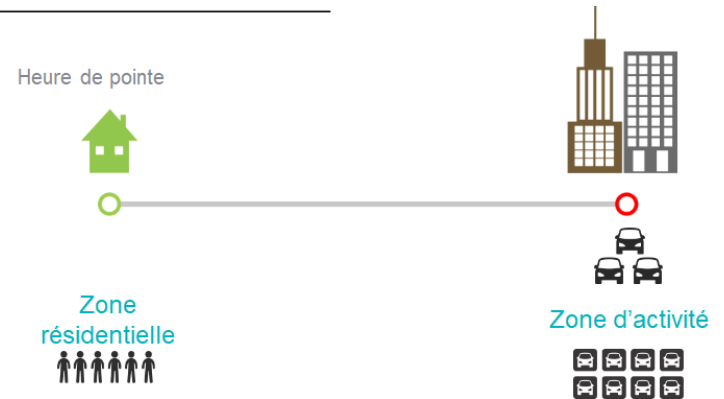
Parking lots are full and there is no space to extend it



Increase car sharing solutions



Bad distribution of transports and issues of parking space





# Autonomous shuttles as a complement of current mass transportation

Autonomous vehicles cannot be the solution to replace current public transport system.

Shared autonomous vehicles can greatly improve the door to door ride, even more on low demand areas



# Challenge 1: being at least as safe as a human driver

What a human  
bus driver  
achieves

Fatality rate	$4 * 10^{-8}/\text{hour}$
Severe injuries	$4 * 10^{-7}/\text{hour}$
Injuries	$4 * 10^{-6}/\text{hour}$

Assuming a 10km/h commercial speed, this represents one fatality per 250 millions km travelled

→ Very high

→ Can not be demonstrated through statistics

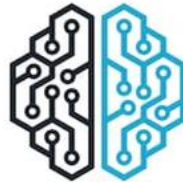
# Challenge 2: make autonomous driving vehicles certifiable to gain large public acceptance



No existing standard tailored to autonomous vehicles



Nearly infinite number of corner cases



“Black box” effect of machine learning, vs. need of formal proof



**Each autonomous driving player has adopted a specific strategy / technology mix to address this challenge**

# Challenge 3: being cost competitive vs. a human driven vehicle



+



+



Cost of the vehicle

Cost of the sensors

Cost of the embedded systems



+



+



Cost of the autonomous driving software

Cost of deployment and support

Supervision and/or safety operator



**Leverage volumes to spread R&D costs and decrease production unit costs**

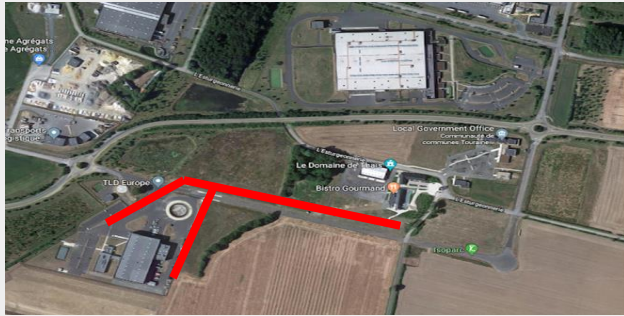
**Benefit from decreasing price of technology**

**Withdraw the safety operator**

# Since November 2018, EZ10 is 100% autonomous on an industrial site in France

## Description of the site

- Nearly 1km road with limited intersection with other vehicles
- Linking Workshop - Restaurant
- Daily operation at lunch time



- Supervised by an operator trained by EasyMile
- 50% of TLD employees use it daily



# Thank you !



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#EasyMile