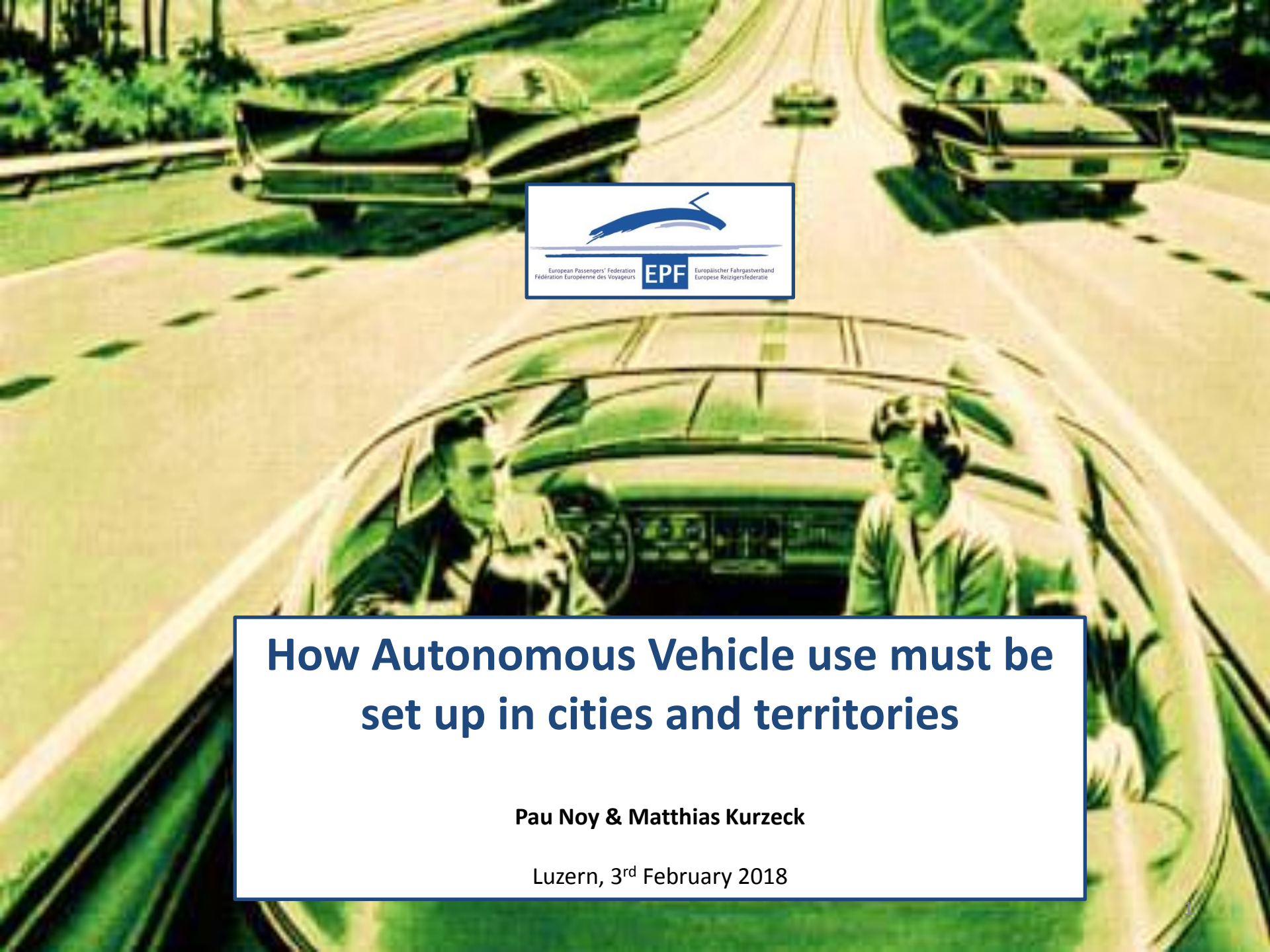

How Autonomous Vehicle use must be set up in cities and territories

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Luzern, 3rd February 2018

The automation of mobility is invented since many years

Not yet in bicycles

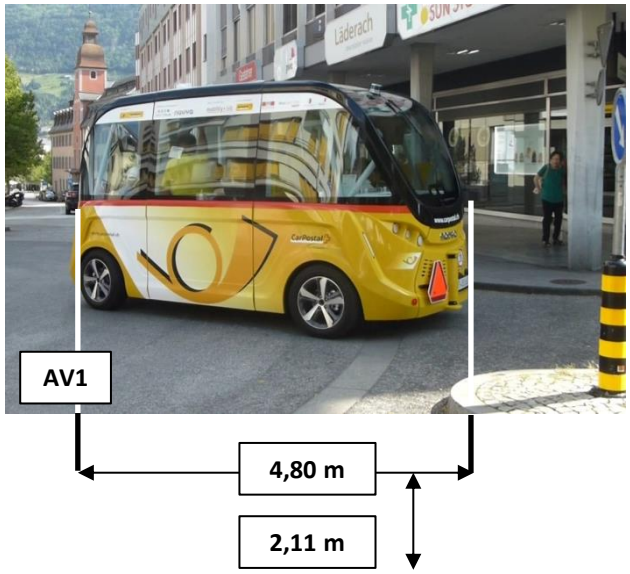
The automotive industry is willing to extend its new product

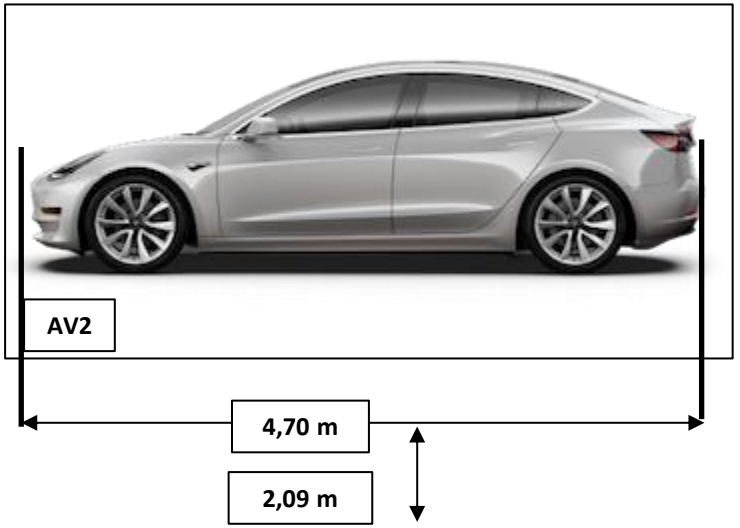
Promise: AV is going to solve all problems that cars put to cities

Uber's vehicles is useful to analyze results of a massive AV use

- *Since AV and Uber cars work in a similar way, without a single driver*
- *With the difference that running AVs will be cheaper they save driver*
- *The results are catastrophic: + transit / - public transport use*

Which is the difference between AV1 and AV2 ?





- *Its purpose ¡¡*
- *Because their measurements are the same*

Advantages of AVs

1. Theoretically **zero road accidents;** very low rate on road incidents
(but detection of pedestrian and cyclist may be assured in 100% of cases).

2. **Lower energy consumption** and less pollution (like any e-car)

3. **Increase** of transport services supply through **sharing cars/vehicles**

4. **Decrease of needed cars**

5. Universal access to those **people that do not have a driving license** *(50% of adult people in Spain, probably over 40% in the whole Europe)*

Threats provided by AVs

1. The risks of **increasing traffic** and replacement of Public Transport by Avs
2. In the most favorable case **any negative impact on the employment** in mobility services.
3. But this "threat" could be overcome by providing **new services on board** … advising on the use mobility services (Mobility-as-a-Service).
4. Regarding the employment in the automotive industry, as a result of a decline of car demand, **the real threat** in this sector are **robots**, not new sustainable mobility services.
   (It would be not surprising if in the next 20 years most employment in the automotive disappeared despite the new more sustainable mobility schemes were not introduced.)
5. And in the future we will probably have to face the **super-threat of robots building robots producing** as a result a massive destruction of employment and other consequences.
   (But it is a threat for the whole mankind, not a specific problem in the transport industry).

Drawbacks of AVs

Like other vehicle equipped with tires, AV may have disadvantages

1. **Noise**. If Av is an electric vehicle (supposed to be so), it is silent up to 30 km/h, but at higher speed they are heard as normal vehicles, since dominates the sound from the tires.
2. **Pollution MP**. High percentage of pollution comes from (MP-10 and MP-2.5) coming off due to the abrasion of rubber wheels, roads and breaks.
   (not the dioxide of nitrogen)
3. **Congestion**. AVs do not avoid congestion, depending on how they are managed. Problem of private automotive is its very low rate of occupancy of the vehicles, 1.2 persons/vehicle, compared with the 50 persons/vehicle in bus-systems or the 150-600 of rail-systems
   (rush-hour figures, during the whole in average they are a third)).
4. **Available surface to circulate**. A cars need a surface of 100 m2 to circulate without congestion, and in cities.
5. **Extra traffic** due to go and come back trips (Go trip: carrying passengers, come back trip coming back to its base.

What is an AV

AV may run:

1. *As an **electric vehicle** (but also as thermic one). No matter with the traction.*

2. *As a **private car** for individual purposes.*

3. *As a public car for collective purposes, let's say a **Taxi.***

4. *As a **Bus** on different formats with a diverse capacity depending on the chassis*
   - *Car chassis provides space from 1 to 15 people*
   - *Midi bus chassis up to 40 people*
   - *Standard bus chassis up to 60 people.*

5. ***Mixed use***

Principle of an AV

*1. An AV is not a car, it is **just a vehicle**.*

*2. Main difference between a car and a bus (AV format) is the **internal arrangement of the space devoted to passengers**.*

*3. AV does not cause troubles in rural areas but **they can produce intense headaches and troubles to Mayors and neighbours**.*

*4. **Traction system is no matter***

*5. **Electrical traction provides many more advantages** than thermal engines.*

- *Zero NOx emissions and lower MP emissions*
- *Low CO2 emissions and zero CO2 emissions if 100% renewable energy.*
- *Silent (up to 30 km/h)*
- *Reduction of energy consumption,*
  - ✓ *With 1 passenger: Same level of consumption of a bus (thermal engine)*
  - ✓ *With 4 passengers: Same level of consumption of a metro/tram/train.*

The role of AVs

1. ***Mobility of cities must be organized*** *based on*

- ***Public transport*** *network which forms the basis of trips in cities, including taxis*
- *Travelling on* ***foot***
- ***Cycling*** *is the third pillar.*

(Foot and cycling are natural sustainable transport systems since they do not spend energy nor emit pollution)

- ***Sharing mobility (****Car-pool and car-sharing) complementing such means of transport*

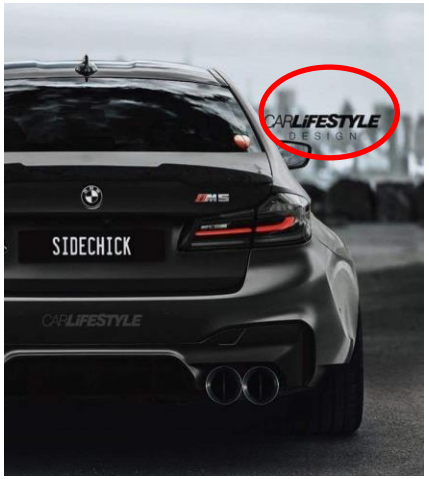
*2****. AV must play an important role*** *helping sustainable means to fulfil their transportation goals.*

3. ***AV provides a unique opportunity to get a city without private cars*** *or with a very important reduction of private cars.*

Replacing vehicles by AVs

- ***Private Car*** *--> Autonomous Taxi or bus on demand*
- ***Taxi*** *--> Autonomous Taxi*
- ***Bus*** *--> Autonomous Bus or Car*
- ***Car-Sharing*** *--> Public Autonomous Car/ Taxi*
- ***Rent-a-car*** *--> Autonomous car / Autonomous Taxi*

Freedom and lifestyle are values devalued when selling AVs



- ***With AVS, cars become just machines,*** *essentially computers .*
- *Neither* ***Freedom*** *nor* ***Lifestyle*** *wills be features of these vehicles. It is not sexy to buy them, nor to use them.*
- *Is sexy to use a given computer ?*

Mayors should control the AVs before that AVs control the city

A city based on a collective AVs fleet

A city based on a collective AV fleet, which do not distinguish cars of little buses or taxis…

… and on the traditional high capacity of PT schemes: metro, trams and bus-lines….

*….. **would just need the 10% of the current automotive fleet**.*

Its results

- ***Saving 90% of global mobility budget***
- ***Zero road accidents** and just some from time to time incidents*
- *A figure near to **Zero pollution***
- ***Doubling the public space** devoted to citizen needs*
- *More **silent** and comfortable cities*
- ***Set free 10% of the surface** of the city, today devoted to parking spaces*
- *The possibility **to increase the employment** (and well paid and stables).*