

Autonomous driving challenges for enforcement in built-up areas



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Divisão de Trânsito e Segurança Rodoviária
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POLÍCIA
SEGURANÇA PÚBLICA

Summary

PSP – Road Safety

Autonomous driving

Future challenges



Road Safety

Polícia de Segurança Pública - PSP

- In metropolitan areas of Lisbon and Oporto;
- In the district capitals and main cities;
- In the Autonomous Regions of Madeira and the Azores;
- 5.200.000 population;
- Floating population in urban centers \pm 2.000.000 people per day.



Road Users

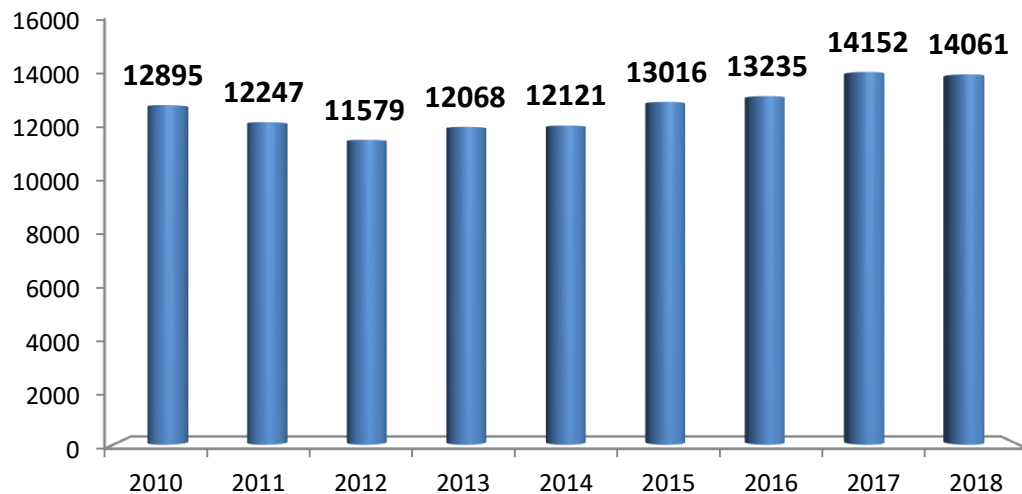
Different forms of human mobility:

- ✓ Walking;
- ✓ Using vehicles
 - ✓ Bikes
 - ✓ Cars, trucks, etc.;
 - ✓ Motorcycles, scooters, etc.;
 - ✓ Others...

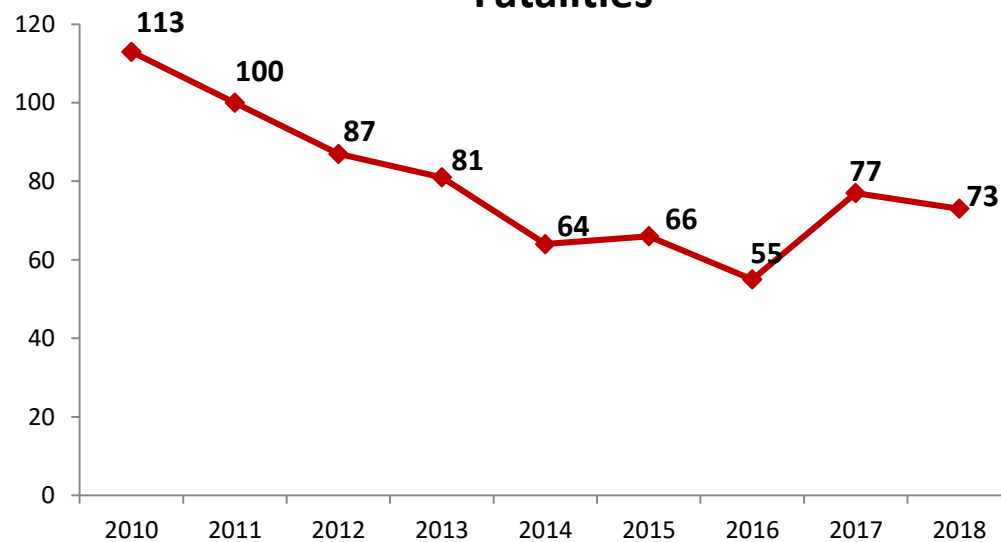


PSP – Road Safety

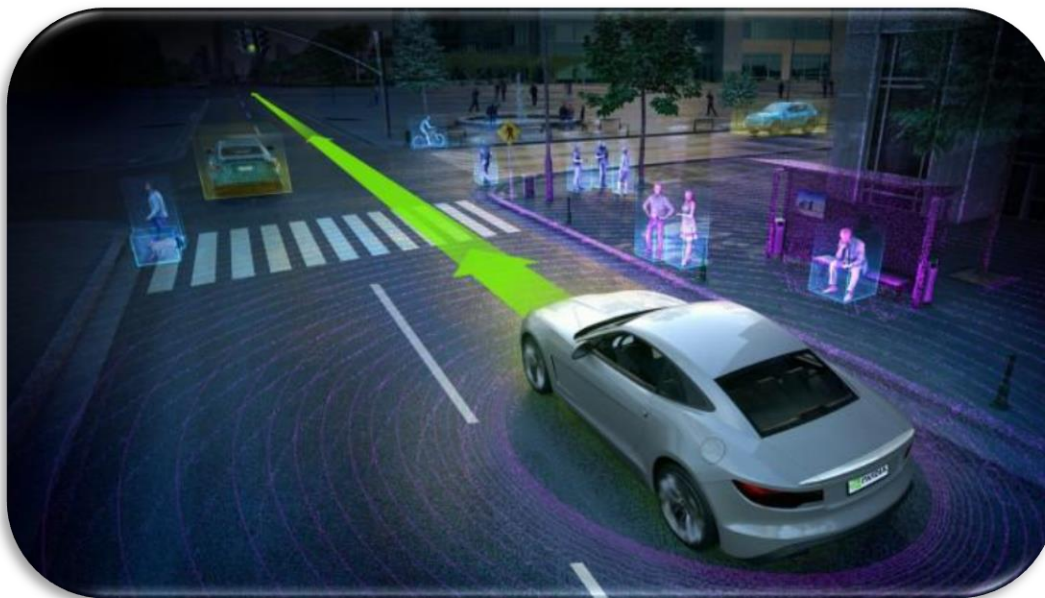
Accidents with victims



Fatalities



Autonomous driving



Main causes of road accidents



Autonomous driving

Expectations

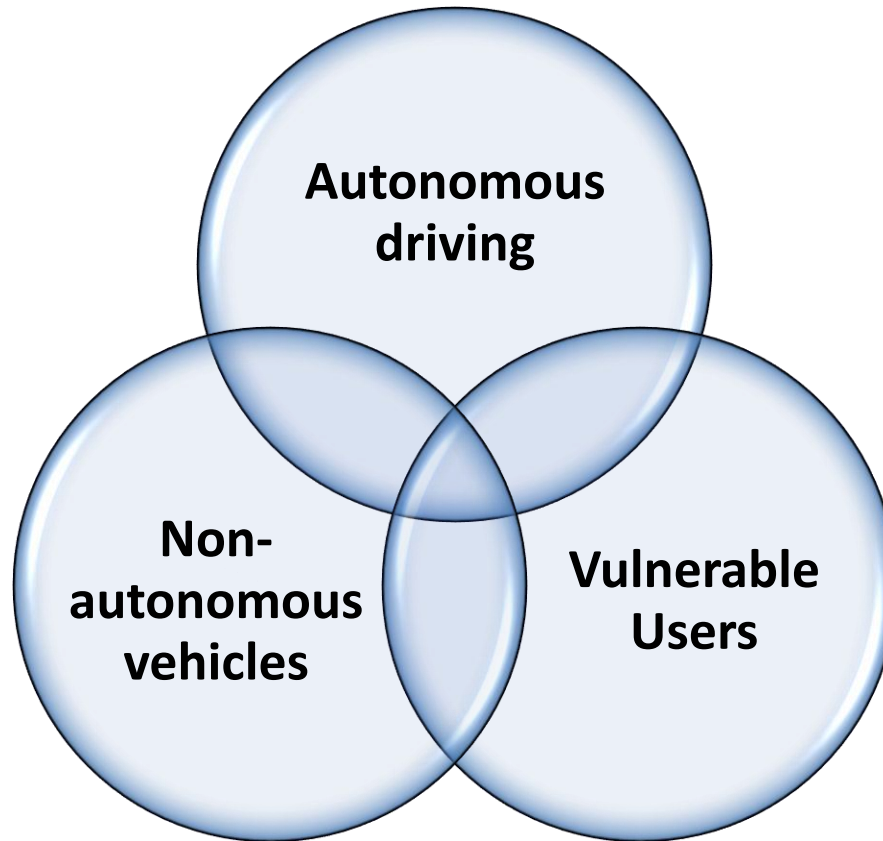
Autonomous driving (full) - Reduction of road injuries

- ✓ Compliance with vertical and traffic light signaling;
- ✓ Compliance with speed limits;
- ✓ Compliance with safety distance;
- ✓ Effective use of safety devices;
- ✓ Driver becomes a passenger:
 - Elimination of distracted and fatigued driving;
 - Elimination of dangerous maneuvers;
 - Elimination of the influence of alcohol and drugs on driving abilities.



Autonomous driving: built-up areas

Coexistence of different forms of mobility



Roads reserved to
automobiles and motorcycles

Urban
streets



Autonomous driving: built-up areas

Roads reserved to automobiles and motorcycles

Integration of Autonomous driving is more easy:

- ✓ Without road crossings;
- ✓ Entrances and exits of the road defined;
- ✓ Obstructions on the road can be signaled faster.



Autonomous driving: built-up areas

Urban streets

Integration of autonomous driving is more difficult:

- ✓ Roads shared with different forms/types of mobility (autonomous/not autonomous);
- ✓ Multiple road crossings;
- ✓ Multiple road entrances and exits (garages and parking areas);
- ✓ Higher probability of unpredictable obstructions.



Future Challenges



Future Challenges

Road
circulation

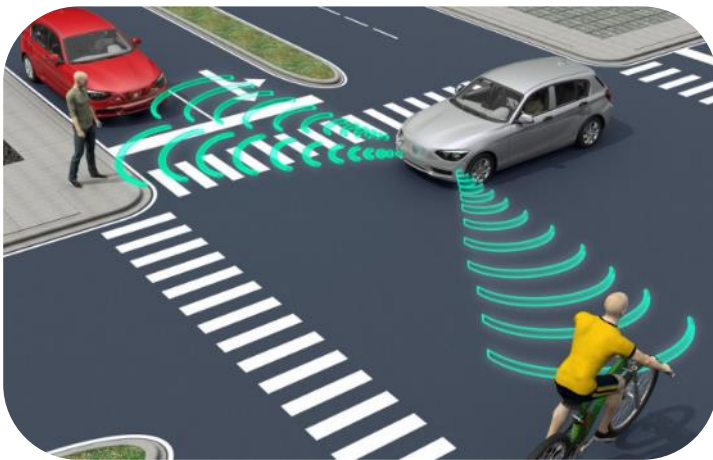
Road
accidents

New
crimes

Future Challenges - Road circulation

Coexistence of Autonomous driving and other users

- Principle: **Avoid collisions/running over.**
- **Reaction of the others users of the road** (drivers and pedestrians).
 - Increased disregard of lane-crossing and priority of vehicles rules!?



Future Challenges - Road circulation

Road Stop operation

- **Orders of the Traffic Control Agents.**

- The Autonomous Vehicles will be able to identify the Traffic Regulatory Agents!?

And follow the different orders / indications!?

- **Autonomous driving violates traffic regulations.** (ex: violation of traffic light signals)

- The police must stop the vehicle!? How!?

Or the main service may be able to identify the fault and call the vehicle!?



Future Challenges – Road Accidents

Road Accidents with Autonomous vehicles

- **Data collection about the road accident.**
 - What data is collected and saved by autonomous vehicles!?
- **Accidents with autonomous vehicles.**
 - Whose responsibility is it!?



Future Challenges – New crimes

Cybercrime and the Autonomous Vehicles

- **Control of autonomous vehicles by third parties. How to avoid and investigate?!?**
- Theft of autonomous vehicles.
- Terrorist attacks.
- Trafficking in arms, drugs, human beings or other offences...



OBRIGADO PELA VOSSA ATENÇÃO.
Thank you



Pedro J. Maia Pereira
Comissário

