## Motivation for automated driving functions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Zero emission**       | Reduction of fuel consumption & CO₂ emission  
                        | Optimization of traffic flow                                                                |
| **Demographic change**  | Support unconfident drivers  
                        | Enhance mobility for elderly people                                                        |
| **Vision zero**         | Potential for more driver support by avoiding human driving errors                        |
// Potentials for automated driving

Drivers are supported in demanding or repetitive tasks. Travel comfort increases.

Vehicles dynamically adapt the level of automation according to the current situation.

Vehicles react more effectively to external threats.

Vehicles are resilient to different types of system and human failure.
Challenges and project objectives

Widespread application of automated driving to improve traffic safety, efficiency and comfort
// 29 partners

- VOLKSWAGEN
- BMW GROUP
- BMW Group Research and Technology
- DAIMLER
- CRF
- FORD
- PSA PEUGEOT CITROEN
- RENAULT
- BOSCH
- Continental
- DELPHI
- bast
- CTag Centro Tecnológico de Automoción de Galicia
- DLR Deutsches Zentrum für Luft- und Raumfahrt
- German Aerospace Center
- CHALMERS
- LUND UNIVERSITY
- TNO
- ika RWTH Aachen University
- UNIVERSITY OF TRENTO - Italy
- UNIVERSITY OF LEEDS
- WIVW
- UNIVERSITÀ WÜRZBURG
- alcor
- eict
Urban scenarios

Test and develop applications for medium speed manoeuvres in complex scenarios
Functions

- Level 0: No automation
- Level 1: Assisted
- Level 2: Partial automation
- Level 3: Conditional automation
- Level 4: High automation
- Level 5: Full automation

- City cruise
- Supervised city control
- City chauffeur
- Safe stop

October 2015 | ITS World Congress 2015, Bordeaux
// Challenge and motivation

- **Complex environment** with demanding driving scenarios, dense traffic, several types of road users and static obstacles

- Driving in urban areas is often:
  - **Demanding** from cognitive and emotional point of view
  - Boring and irritating, creating stress and even anxiety
  - Time and energy demanding
Traffic Jam Chauffeur // level 3

- Conditional automated driving in traffic jam up to 60 km/h
- On motorways and similar roads
- System can be activated, if traffic jam scenario exists: detection of slow driving vehicles in front
- Driver must deliberately activate the system, but does not have to monitor the system constantly
- Driver can at all times override or switch off the system
- Take over request if traffic jam scenario does not exist any longer
- Safety benefit via relief of the driver: no exhausting, manual driving during traffic jams
- Comfort benefit via relaxing and use of selected infotainment functionalities
Demonstrators

- Parking assistance, garage, special areas, multi-level garage, Stop & go
- City cruise, City chauffeur, Supervised city control
- Enter & exit highway, following lane, lane-change, filter-in, overtaking, danger spot intervention, Stop & go

Safe stop
Crucial aspect: Transitions of control between automation and driver

As long as there are no fully autonomous systems, systems always have to interact with humans at different times and to different degrees.

Goal: Safe and efficient transitions
//Timeline

- Scenarios for legal aspects
- Use cases
- System specifications
- Legal glossary
- Evaluation plan
- System architecture
- Midterm evaluation of HVI

- Demonstrators equipped
- Sensor fusion
- Demonstrators ready for evaluation
- HVI requirements
- Final results
- Definition of legal aspects
- Evaluation methodology
- Impact analysis

Jan 14
Jan 15
Jan 16
Jan 17
Jun 17
Thank you.

Luisa Andreone
Centro Ricerche FIAT

+39 011 90 83 071
luisa.andreone@crf.it