EU-wide, 70% of road fatalities in urban areas involve vulnerable road users.

There is increased safety risk across age groups (children, adults, older adults), types of impairment (e.g., sensory, developmental, cognitive, physical impairments), and among users of mobility devices. Most user studies in the field of automotive safety are conducted with predominantly young male and technologically educated participants.

∞ AWARE2ALL

Safety systems and human-machine interfaces oriented to diverse population towards future scenarios with increasing share of highly automated vehicles.

This project will effectively address the changes in road safety derived from the introduction of Autonomous Vehicles

Putting special focus on underrepresented populations (female, elderly, sensorial or physical disabilities, cultural minorities, low digital abilities) to ensure that results provide safety to any (type of) occupant and HRU[1].

The **main objective** of AWARE2ALL is to address the new safety challenges posed by the introduction of HAVs[2] in mixed road traffic, through the development of inclusive and innovative safety (passive and active) and HMI[3] (internal and external) systems that will consider the variety of population and will objectively demonstrate relevant improvements in mixed traffic safety.

Definition and prioritisation of relevant Use Cases to demonstrate and validate the project achievements.

Objective 1

Develop one virtual prototype of passive safety (D1), addressing the variety of possible occupant postures and orientations and taking a large diversity of occupants into account.

Objective 2

Develop two active safety physical prototypes (D2, D3) to ensure that the vehicle is able to anticipate hazardous situations and act proactively.

Objective 3

Development of a hybrid (virtual and physical) prototype (D3) of iHMI[4] that will adapt, dynamically, the required bi-directional interaction with the driver/occupants.

Objective 4

Extension of the current ODD[5] definition by including occupant/driver state definition.

Objective 5

Develop an eHMI[6] physical prototype (D4) for effective communication and interaction with diverse HRU[1].

Objective 6

Develop innovative testing methods and tools for performance assessment of AWARE2ALL safety and HMI[3] solutions.

Objective 7

HRU[1]: *Human Road Users.* **HAV[2]:** *Highly Automated Vehicle.* **HMI[3]:** *Human Machine Interfaces.* **iHMI[4]:** *Internal Human Machine Interfaces.* **ODD[5]:** *Operational Design Domain.* **eHMI[6]:** *External Human Machine Interfaces.* **OMS[7]:** *Occupancy Monitoring Systems.*

EXPECTED RESULTS

DEMO1 Passive Safety virtual prototype

This demo will include the 3D simulation model of the new vehicle interior configuration with seats, belt systems and airbag systems for crash simulation in LSDyna or PAMcrash.

DEMO2 Active safety – no driver available (shuttle) physical prototype

This demo will showcase an automated L4 shuttle, on a PIX-Robobus platform, deploying strategies for fallback and emergency situations on system components/sensors failure including fail-operational functionalities.

DEMO3 iHMI[4], OMS[7] and Active safety – driver available hybrid prototype

This demonstrator is based a passenger car platform installed in a driving simulator with environment visualization based on openStreet maps and vehicle dynamics simulation including active safety features.

DEMO4 eHMI[6] physical prototype

This demonstrator will utilize a Seat Cupra to showcase the integration of out-of-vehicle perception and HRU safety mechanisms. The demonstrator will incorporate a Surround View System (SVS) with a multimodal communication interface with eHMI, along with AI-driven HRU diversity detection, attention recognition, and intention prediction mechanisms.

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