

Contribution ID: 384

Type: **Presentazione orale**

Assessing Driver Acceptance of Advanced Vehicle Technologies Through Driving Simulators

Wednesday 2 September 2026 12:45 (15 minutes)

User acceptance by human drivers in a driving simulator is a critical prerequisite for the reliable assessment of innovative automotive technologies. User acceptance is addressed within a human-in-the-loop framework in which the subsystem behaviour, simulator fidelity, and driver response are treated as correlated quantities. DriSMi dynamic driving simulator at Politecnico di Milano was conceived not only for the virtual testing of vehicle components and ADAS prior to physical prototyping, but also for the experimental characterization of driver behaviour, ergonomics, and safety under controlled yet realistic traffic scenarios.

Within this perspective, user acceptance is interpreted in a multicriteria framework defined by perceived safety, controllability, workload, and trust in the simulated vehicle response, rather than as a purely subjective judgement. Experimental studies conducted within DriSMi on L4 vehicles take-over scenarios show that the interaction between drivers and vehicle functions can be evaluated through the combined analysis of behavioural, subjective, and psychophysiological measures. The simulator infrastructure itself supports this approach through active control interfaces and dedicated systems for monitoring driver's hand forces, gaze, and physiological reactions, thereby enabling a rigorous assessment of how human drivers perceive and accept advanced vehicle subsystems. To increase the active safety of road vehicles to reduce fatalities, the global stability of the motion of road vehicles with a human or a non-human driver must be studied. The typical nonlinear behaviors of vehicle-and-driver subject to disturbances like evasive steering maneuvers, wind gust, pot-hole excitation and so on can be studied.

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Session Classification: Automotive

Track Classification: Automotive