

Domain

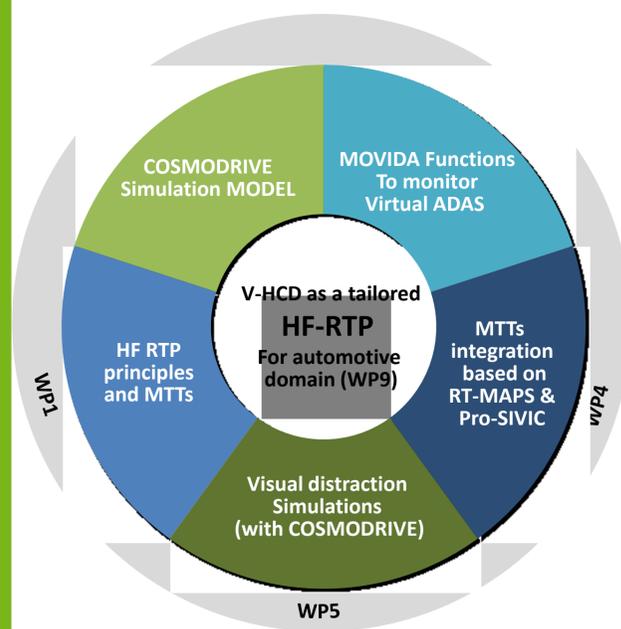


Motivation

This research aims to support the virtual design process of future Adaptive Cooperative Systems (AdCoS) for automotive domain, in charge to monitor risks due to visual distraction during lane change & overtaking manoeuvres. In this context, the challenging design issue in HoliDes is to develop Virtual Human Centred Design platform (V-HCD) to support the virtual design, development and test of AdCoS.

This V-HCD integrative platform integrates (1) a human driver model (using a "virtual eye" for road scene scanning) able to drive (2) a virtual car (3) equipped with a virtual AdCoS, for progressing in (4) a virtual road environment. By using a simulation model of the human driver, it is at last expected to better integrate end-users' needs during the design process.

Applied MTTs



The V-HCD Platform as a tailored HF-RTP

INTEGRATIVE V-HCD PLATFORM Based on RTMaps:

RTMaps is a software allowing to easily and efficiently interconnect the data streams of the different MTT, such as car sensors and actuators, or HMI, and may integrate data processing algorithms, also with capacities for synchronized recording and playback of any kind of streams.

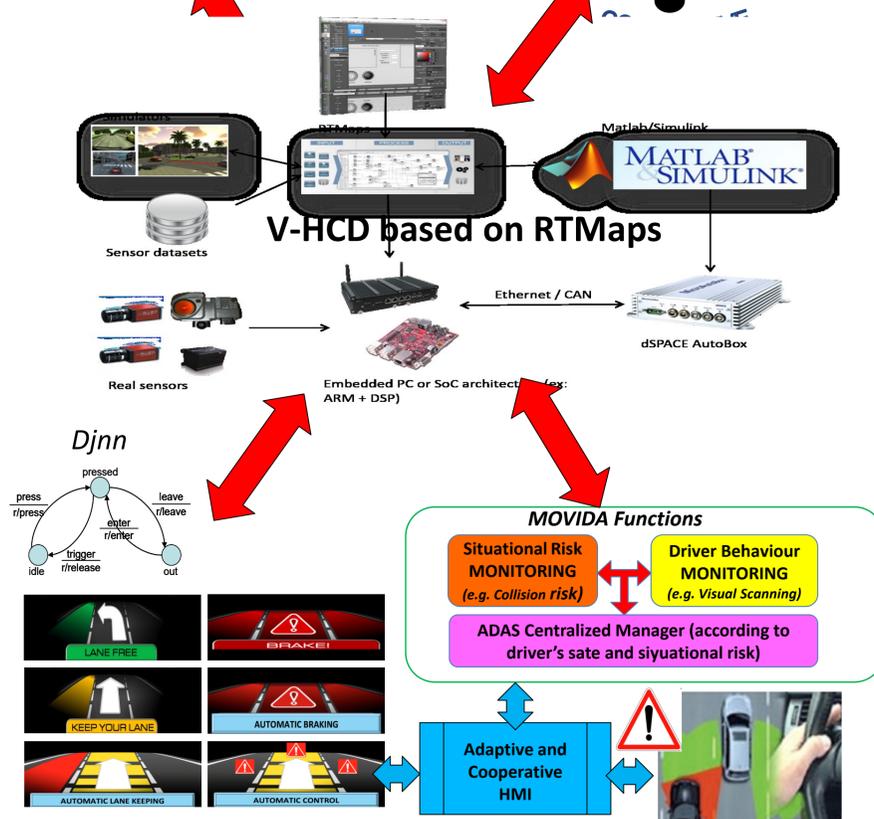
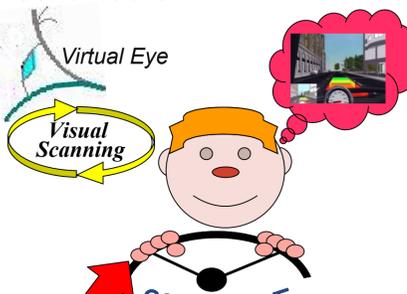
VIRTUAL SENSORS, ADAS, CAR & ROAD ENVIRONMENT:

Based on Pro-SIVIC®, a software platform able to simulate embedded Sensors, Equipments and Vehicles, in a virtual 3D Road Environment.



VIRTUAL DRIVER:

Based on COMODRIVE (COgnitive Simulation MODEL of the DRIVER), able to simulate human drivers visual strategies, cognitive processes, and driving behaviours.



VIRTUAL Adaptive & Cooperative HMI:

To interact with the Driver in an Adaptive and Cooperative way (Evaluated from COSMODRIVE-based simulations and Djnn Framework of ENAC)

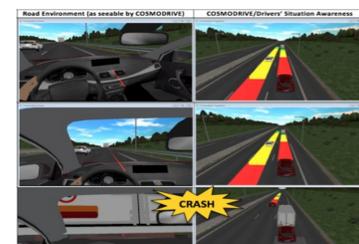
VIRTUAL AdCoS:

Based on MOVIDA algorithms (MONitoring of Visual Distraction and risks Assessment), in charge to centrally manage ADAS (Collision Avoidance systems and Lane Change Assistant)

Results

This V-HCD platform has been used to support the virtual design of MOVIDA-AdCoS at 2 main levels.

At the earliest stages of the design process, simulations based on COSMODRIVE were used to assess driving performances and potential crash risks due to visual distraction in case of an unassisted driving. Through these simulations, it was possible to identify critical driving scenarios and to provide ergonomics specifications based-on real human driver needs, as a set of "Use Cases of Reference" to be supported by the final MOVIDA-AdCoS.



Then, during the virtual design process of the MOVIDA-AdCoS, this "Use Cases of Reference" associated with visual distraction simulations based on COSMODRIVE, were implemented to evaluate AdCoS efficiency for the different critical scenarios previously identified. These simulations also allowed the designer to assess the effectiveness of the AdCoS, in accordance with end-users' needs.



Contact

Contacts: thierry.bellet@ifsttar.fr, dominique.gruyer@ifsttar.fr, jean-charles.bornard@ifsttar.fr, nicolas.dulac@intempora.com, philippe.desouza@civitec.com, mathias.ferraton@civitec.com, daniel.prun@enac.fr

Consortium



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