

Domain

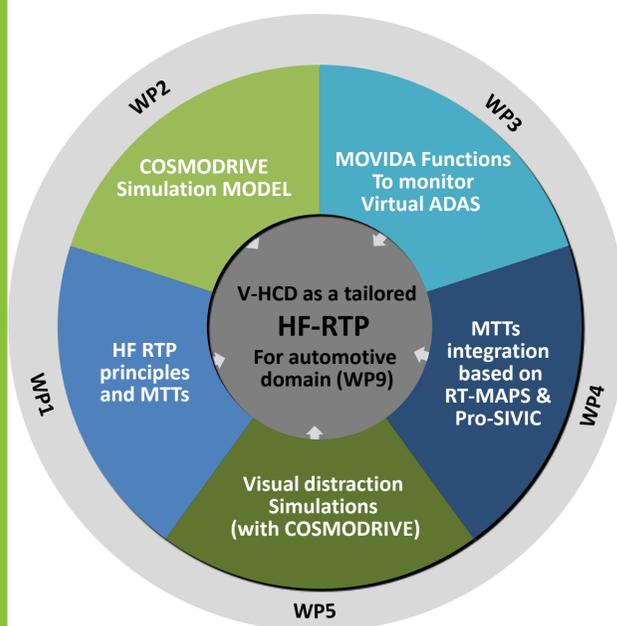


Motivation

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 in the design process.

Applied MTTs



Current State: 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 simulators, sensors and actuators, or HMI, and can integrate data processing algorithms, also with capacities for synchronized recording and playback of any kind of streams.

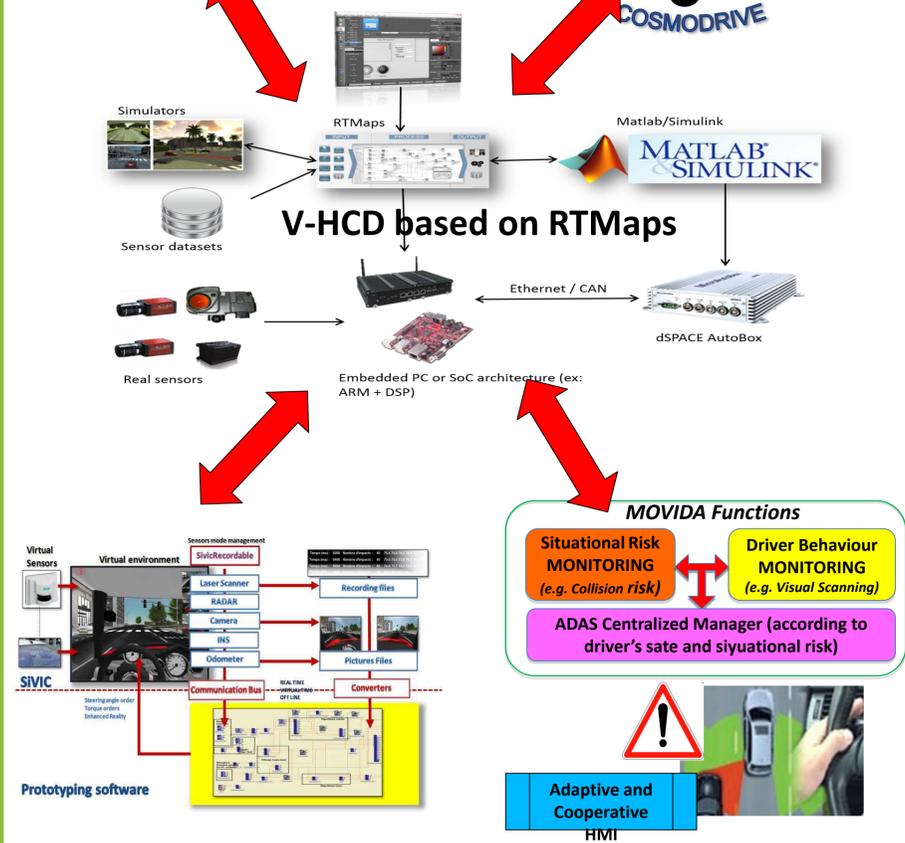
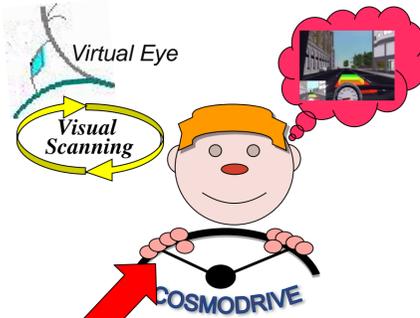
VIRTUAL SENSORS, CAR & ROAD ENVIRONMENT:

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 ADAS:

Based on Pro-SIVIC[®] Research and RTMaps, a set of ADAS are virtually simulated, like Collision Mitigation/Avoidance, Lane Keeping Assistant, & Lane Change Assistant.

VIRTUAL AdCoS (VIRTUAL SENSORS + VIRTUAL ADAS + MOVIDA):

Based on **MOVIDA** (MOnitoring of Visual Distraction & risks Assessment) algorithms, in charge to centrally manage ADAS and to interact with the car Driver in an Adaptive and Cooperative way.

Results

This V-HCD platform may be 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 are used to assess driving performances and potential risks due to visual distraction in case of unassisted driving.

Through these simulations, it is possible to identify critical driving scenarios and to provide ergonomics specifications of real human driver needs, as a set of Use Cases (stored in RTMaps as a "reference database") to be, at last, supported by the final MOVIDA-AdCoS.

During the virtual design process of the AdCoS, this reference database associated with visual distraction simulations based on COSMODRIVE, may be used to progressively increase the AdCoS efficiency in accordance with the different Use Cases or critical scenarios previously identified. These simulations also allow the designer to assess the potential effectiveness of MOVIDA, before developing a prototype, and then testing its real effectiveness among real human drivers, through full scale tests with end-users implemented on driving simulator.

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,

Consortium



Acknowledgments

This research has been performed with support from the EU ARTEMIS JU project HoliDes (<http://www.holides.eu>) Any contents herein are from the authors and do not necessarily reflect the views of ARTEMIS JU.