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VMU CONTRIBUTION FOR THE COCKPIT SYNTHESIS AND VEHICLE FEATURE HMI

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COCKPIT SYNTHESIS

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CURRENT GENERATION COCKPIT

Last new cars from PSA – 308, DS4 and C5-X launch the new Infotainment platform

That gives an overview of the need for infotainment system in future

The platform manages four screen

The digital instrument cluster requires quick boot and safety mechanism.

Driving information need to be available as soon the traction is ready (few second
There are ASIL requirements on some of warning and graphical feedback.

Instrument Cluster

Head Up display

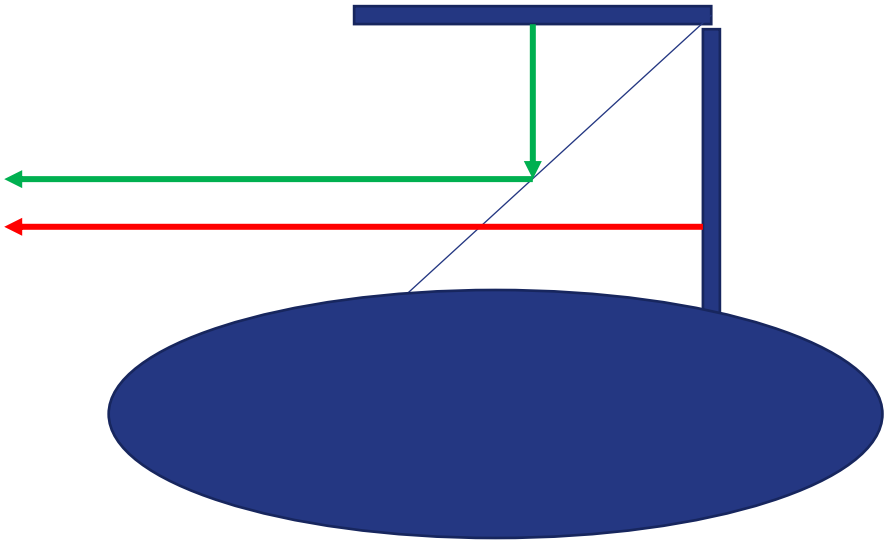
Same information have different graphical feedback in parallel to be applied in the IC and HUD

DS Smart Touch (link)
- Short cut access and characters recognition

high response time to display the track of the finger

The platform manages four screen (the 3D cluster counts for two)

3D INSTRUMENT CLUSTER : TWO DISPLAYS WITH SEMI REFLECTIVE GLASS



The two displays must be fully synchronized

MODULARITY

The same box shall be capable to manage different display setup

Double screen instrument cluster + CID
Instrument cluster + HUD + CID

The same box shall be capable to manage different skins according brand expectation

USER DEMAND FOR CUSTOMIZATION

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VEHICLE FEATURE HMI

Regulatory framework - GSRV2

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GSR STAND FOR GENERAL SAFETY REGULATION

Revision N°2 of the GSR (Version 1 : 2009) to enhanced the road safety by imposing on all new vehicles safety technologies and design features

2018 starting point
The Commission's proposal provides that all road vehicles are to be fitted with **intelligent speed assistance**, **reversing detection and reversing camera**, **driver distraction and drowsiness recognition**, and **tyre pressure monitoring systems**. It obliges cars and vans to have **lane keeping assistance** and **advanced emergency braking systems** for pedestrians and cyclists.

2019 adopted text (link)
For cars, vans, trucks and buses: **warning of driver drowsiness and distraction** (e.g. smartphone use while driving), **intelligent speed assistance, reversing safety** with camera or sensors, and data recorder in case of an accident ('black box')
For cars and vans: **lane-keeping assistance, advanced emergency braking**, and crash-test improved safety belts

The new safety features will become mandatory from 2022

2019 ADOPTED TEXT

- Advanced emergency braking (cars, vans)
- Alcohol interlock installation facilitation (cars, vans, trucks, buses)
- Drowsiness and attention detection (cars, vans, trucks, buses)
- Distraction recognition / prevention (cars, vans, trucks, buses)
- Event (accident) data recorder (cars, vans, trucks, buses)
- Emergency stop signal (cars, vans, trucks, buses)
- Full-width frontal occupant protection crash test - (cars and vans)
- Head impact zone enlargement for pedestrians and cyclists -
- Intelligent speed assistance (cars, vans, trucks, buses)
- Lane keeping assist (cars, vans)
- Pole side impact occupant protection (cars, vans)
- Reversing camera or detection system (cars, vans, trucks, buses)
- Tyre pressure monitoring system (vans, trucks, buses)
- Vulnerable road user detection and warning on front and side of vehicle (trucks
- Vulnerable road user improved direct vision from driver's position (trucks)

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IMPACT ON VEHICLE FEATURE

Five new imposed regulatory features :

- **warning of driver drowsiness and distraction**
- **reversing safety** with camera or sensors
- lane-keeping assistance, → **2021/646 : emergency lane-keeping systems (ELKS)**
- **advanced emergency braking**
- **intelligent speed assistance,**

IMPACT ON USER EXPERIENCE

Four are already in the €NCAP protocols

- warning of driver drowsiness and distraction (DDAW)
- reversing safety with camera or sensors (UPA / Visio Park)
- emergency lane-keeping systems (ELKS)
- advanced emergency braking (AEBS)

With the same type of HMI requirements

Always on
Constant visual feedback when deactivated
Constant visual feedback when in failure
Visual and audible escalated warning

→ Using of the “guardian angel” HMI philosophy

MY CAR PROTECTS ME

Active safety functions:
ELKS - AEBS - DAA - UPA

My vehicle is equipped with functions ensuring my safety :
- I need to be informed when they intervene, when they are deactivated or when a failure occur in order to know if I'm definitively not supported

General consideration :

→ Active safety features are **guardian angels** that act only rarely and in case of danger, to make up for driver error.

ADAS HMI technical policy :

→ To achieve the safety benefit, the function must not change the behavior of the driver and he must not rely on the function.

Visual feedback referential :

- **Mastery / Sharp** → Show the correction/intervention
- **Protective / Hidden** → No permanent feedback
- **Prevention / Explicit** → Show when the function is OFF or in failure

MASTERY = SHARP

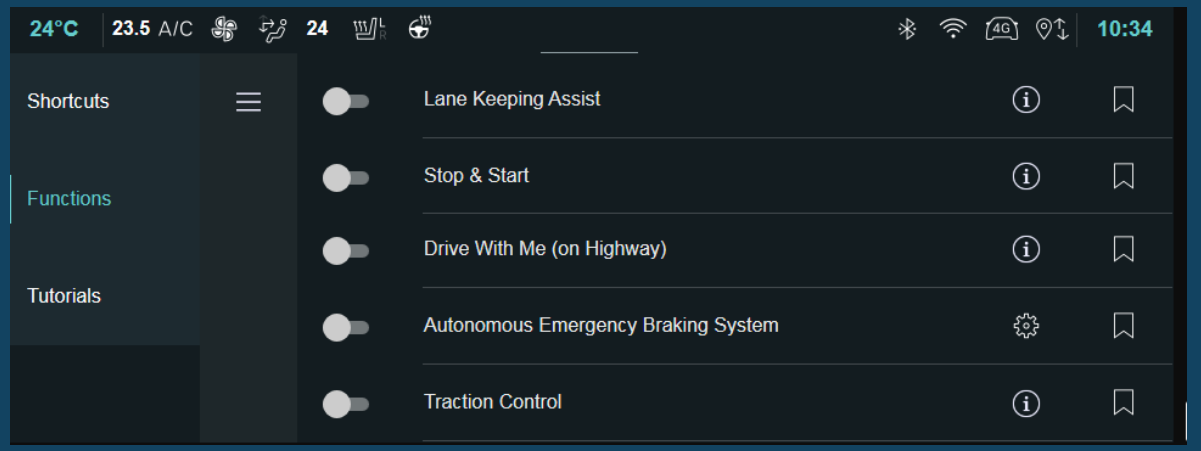
Active mode	Flashing

PROTECTIVE = HIDDEN

Standby mode	Off

PREVENTION = EXPLICIT : INFORM THE USER OF UNSAFE SITUATION

Failure mode	Static
OFF mode	Static



These HMI component becomes regulatory elements : Diagnostics and traceability constraints

INTELLIGENT SPEED ASSISTANT

The HMI is not a real issue.

Providing speed limit indication and overspeed warning is a classical execution

Same constraints than the previous element

The main point is to provide reliable speed limit information

- True positive distance ('TP_D'): the correct speed limit shall be determined for at least 90 % of the total distance
- Knowledge of the country to apply the implicit speed limit

THANK YOU FOR YOUR ATTENTION

QUESTIONS ARE WELCOME

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