



Connected & Autonomous Car

A MAJOR CHALLENGE FOR AUTOMOTIVE INDUSTRY

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Groupe RENAULT Overview



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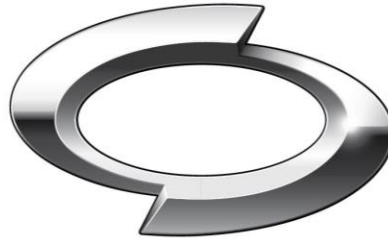
GROUPE RENAULT: KEY FIGURES



RENAULT



DACIA



Renault
Samsung
Motors



ALPINE



LADA



5 brands: 3.76 million vehicles sold in 2017



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GROUPE RENAULT: THE ALLIANCE



RENAULT NISSAN MITSUBISHI

1st LARGEST AUTOMOTIVE MANUFACTURER

10.6 MILLION OF VEHICLES SOLD IN 2017

€5.7 BILLION IN SYNERGIES IN 2017

WORLD LEADER IN ELECTRIC VEHICLE WITH MORE THAN **630 000** UNITS SOLD BY THE ALLIANCE



Autonomous Driving: more and more on stage

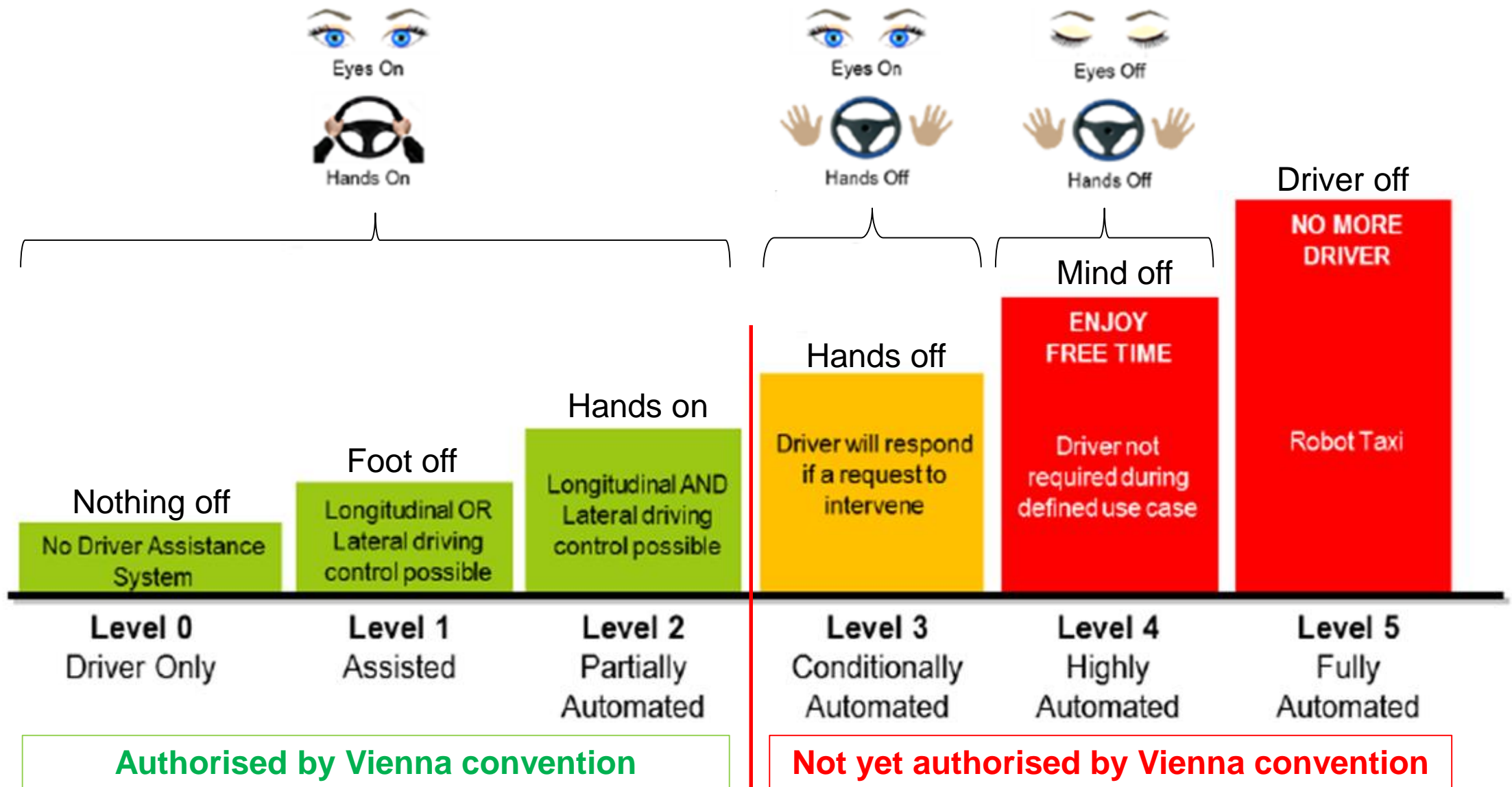


FOUR HIGH STAKES FOR MOBILITY

- ❖ 90% accidents due to human errors
- ❖ 78 minutes each day in car, in Ile de France
- ❖ 55% of French population without access to public transport
- ❖ 30% to 60% of delivery time for driving in urban city



TRUE AUTOMATION STARTS FROM LEVEL 3 (SAE)



Authorised by Vienna convention

Not yet authorised by Vienna convention

RENAULT VISION FOR AUTONOMOUS DRIVING (Passenger Car)

AUTONOMOUS DRIVE

SAFETY
BENEFIT



STRESS-FREE
BENEFIT



FREE TIME
BENEFIT



MANUAL DRIVE

DRIVING PLEASURE



RENAULT SYMBIOZ DEMO CAR: TOMORROW'S CAR IN ACTION

AUTONOMOUS, ELECTRIC AND CONNECTED

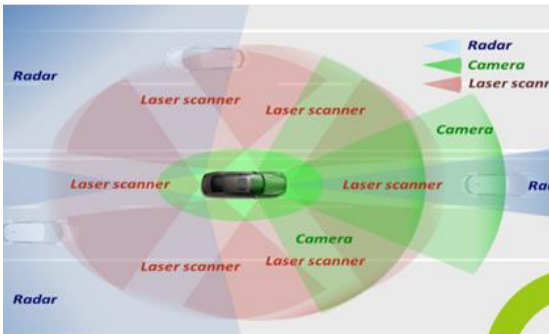
<https://youtu.be/caMvuQRXggc>

GROUPE RENAULT

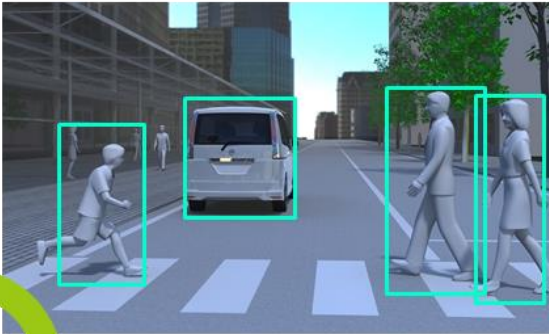
THE NECESSARY TECHNOLOGY FOR AD

Core technologies

SENSING



COGNITION



ACTUATION



DECISION



Redundancy



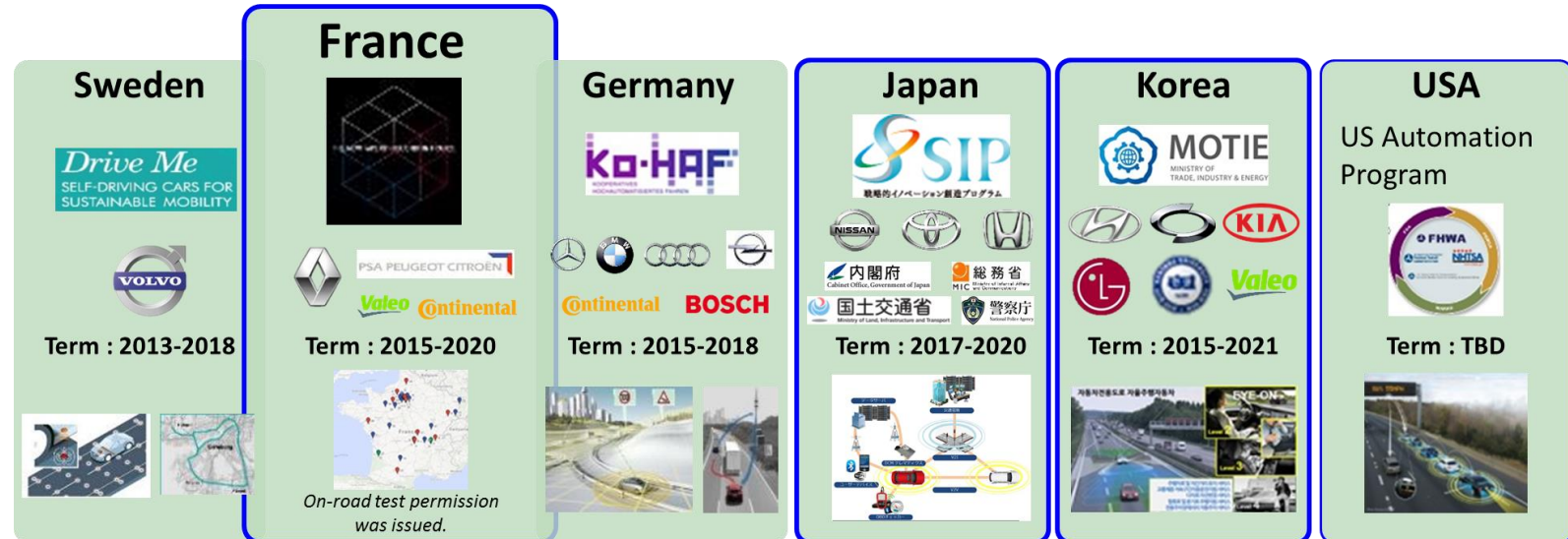
SUCCESS CONDITIONS : SOCIAL ACCEPTANCE

Social acceptance

Experimentation

- Regulations
- Product Liability
- Infrastructure
- Insurance
- Consumer awareness
- Driver Education

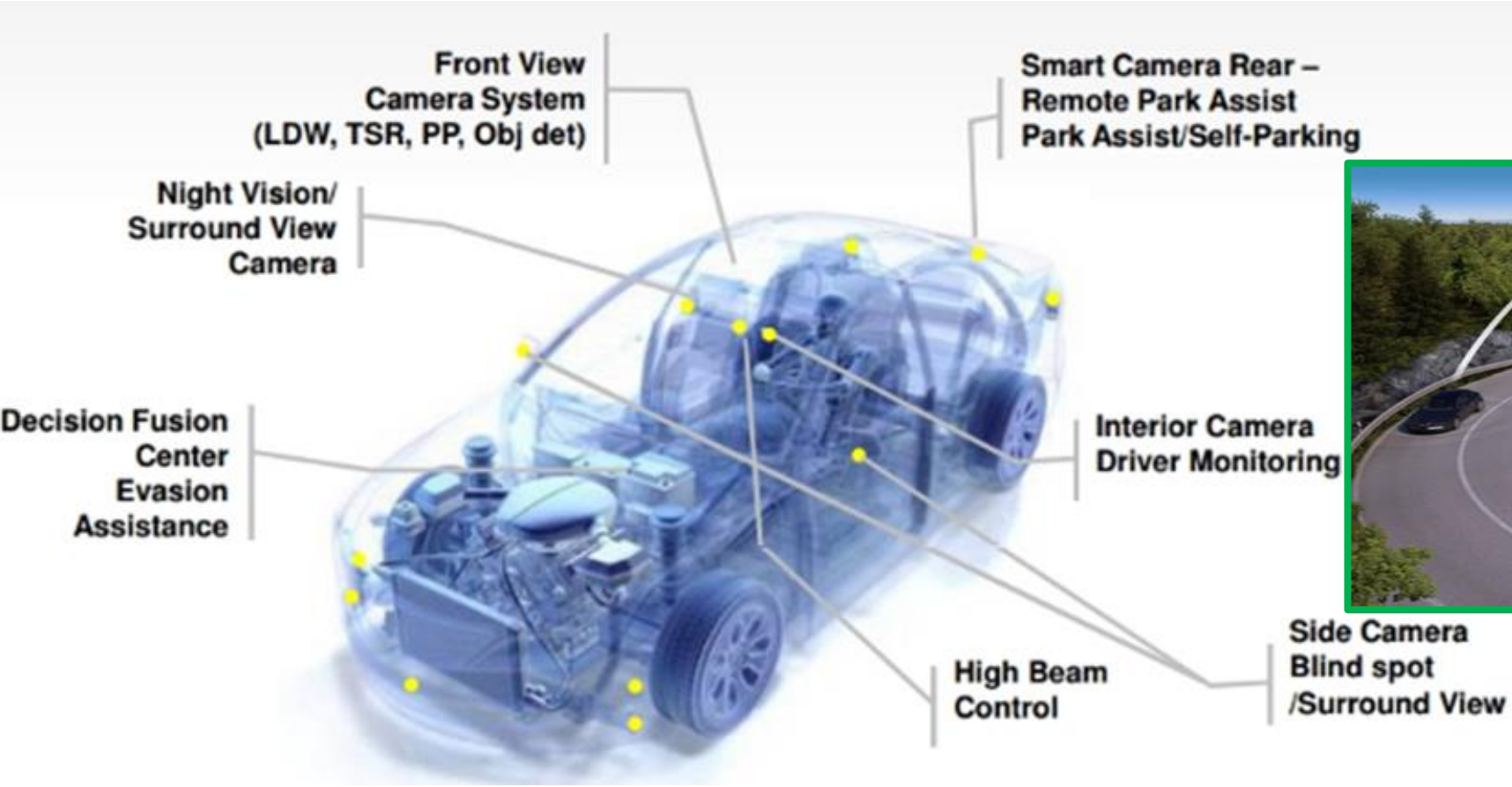
- Proof by FOT on certified roads





THE MAJOR STAKE IS SAFETY

SYSTEM OF SYSTEM & LOCALIZATION



Connectivity: V2V, V2I, HDmap...

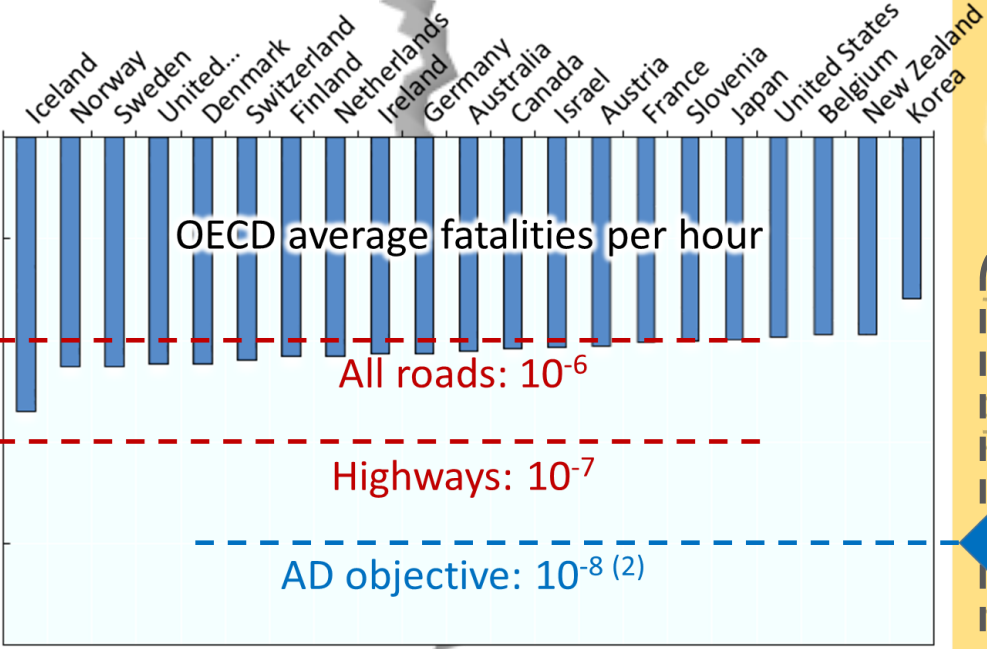
AD IS A MAJOR DISRUPTION

ADAS

(L1, L2, L3)



Driver reliability proof



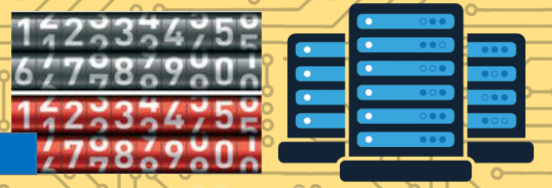
- (1) Emerging German L3 "standard"
- (2) Tentative consensus among European OEM

AD

(L3+⁽¹⁾, L4, L5)



System reliability proof



AD SIMULATION IS KEY



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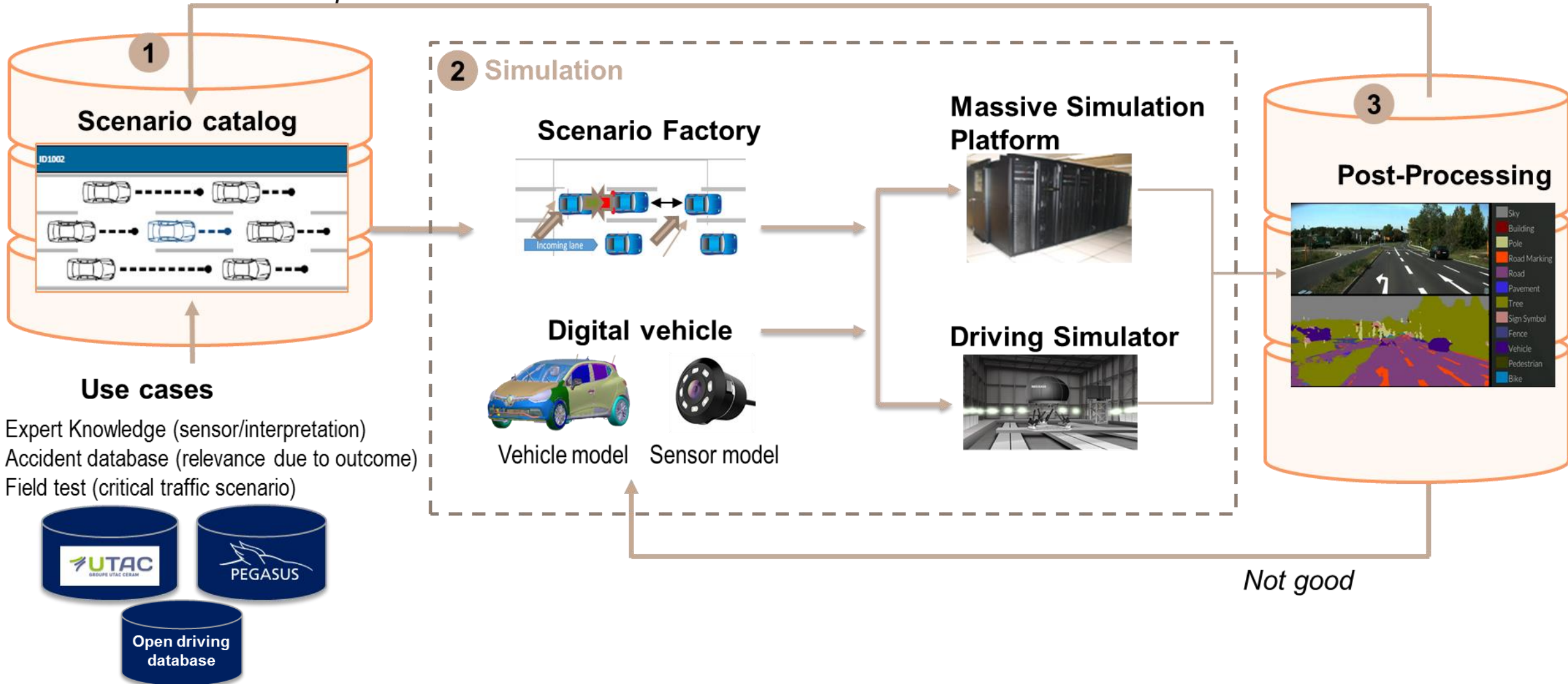
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AD / ADAS SIMULATION CHAIN

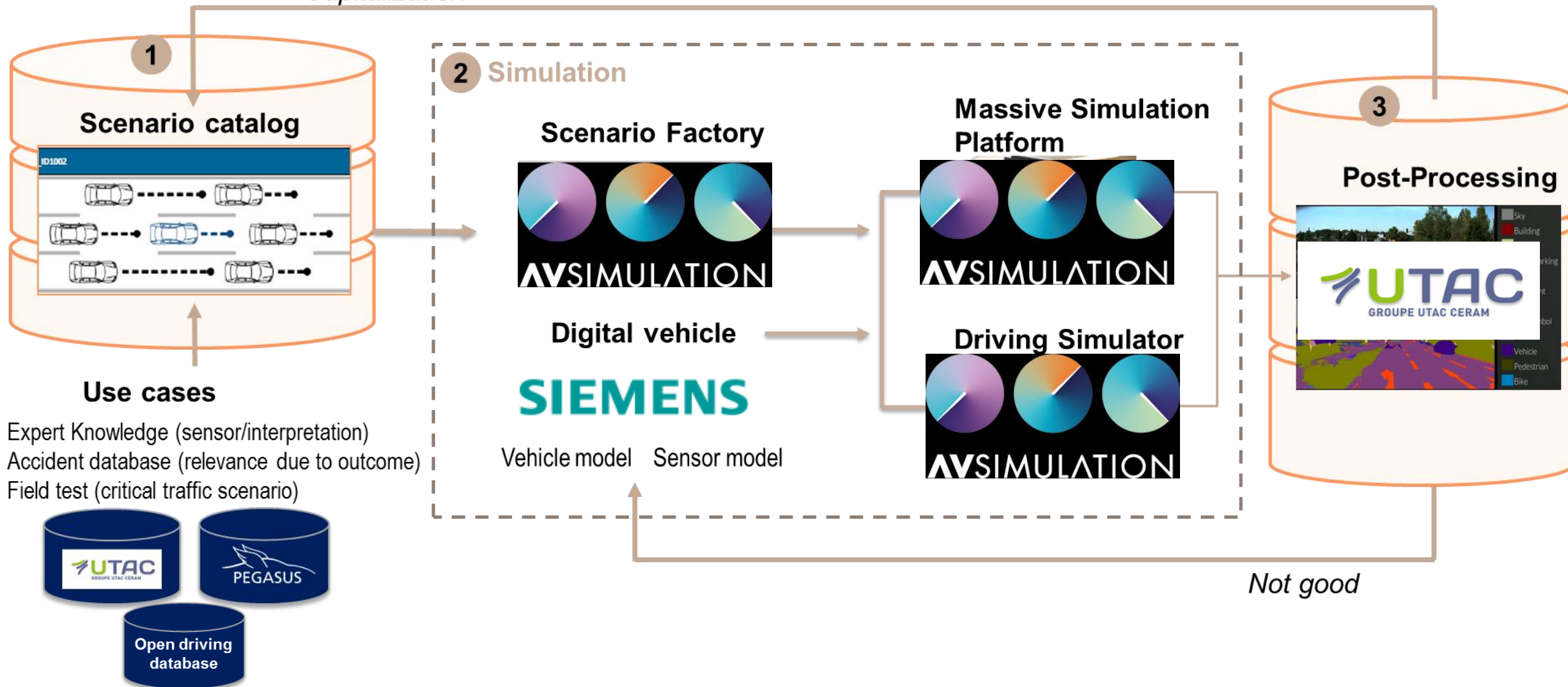
Capitalization



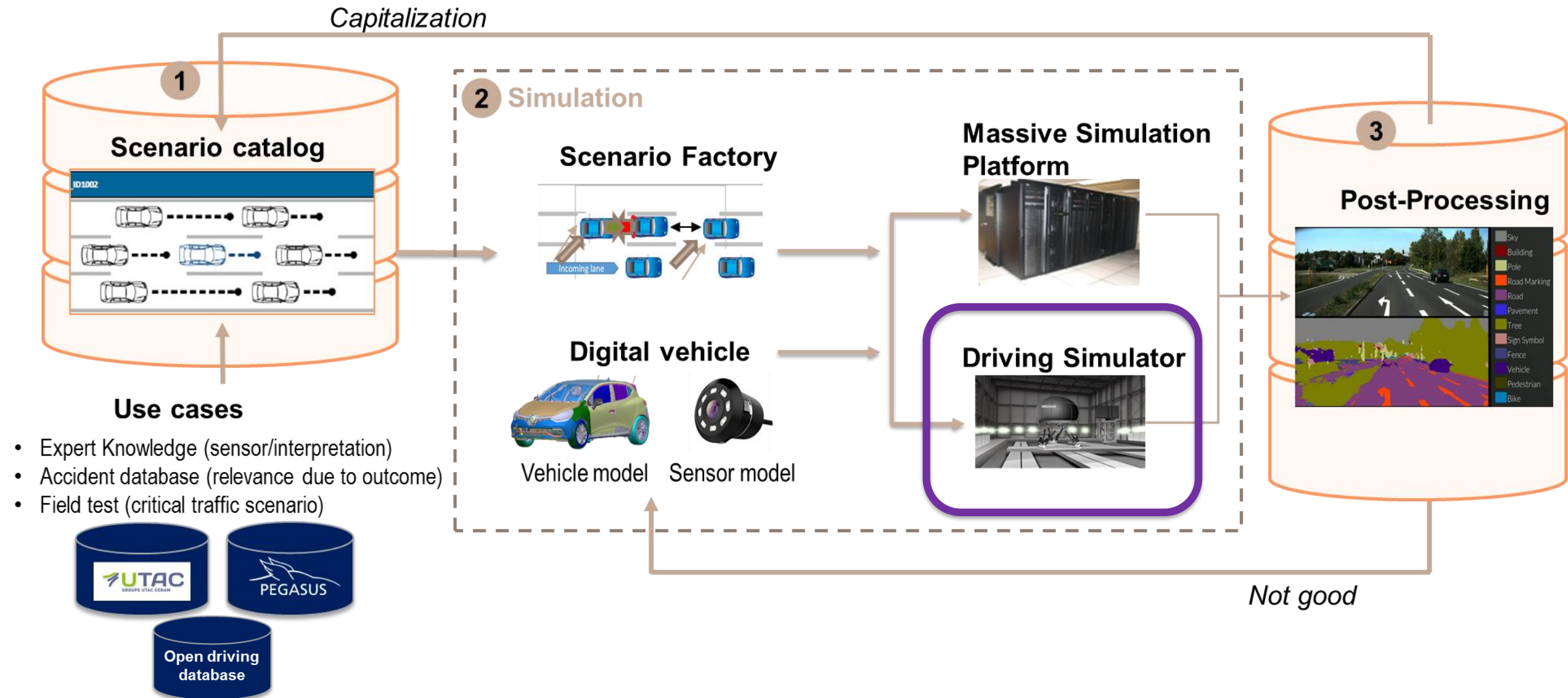
AD / ADAS SIMULATION CHAIN

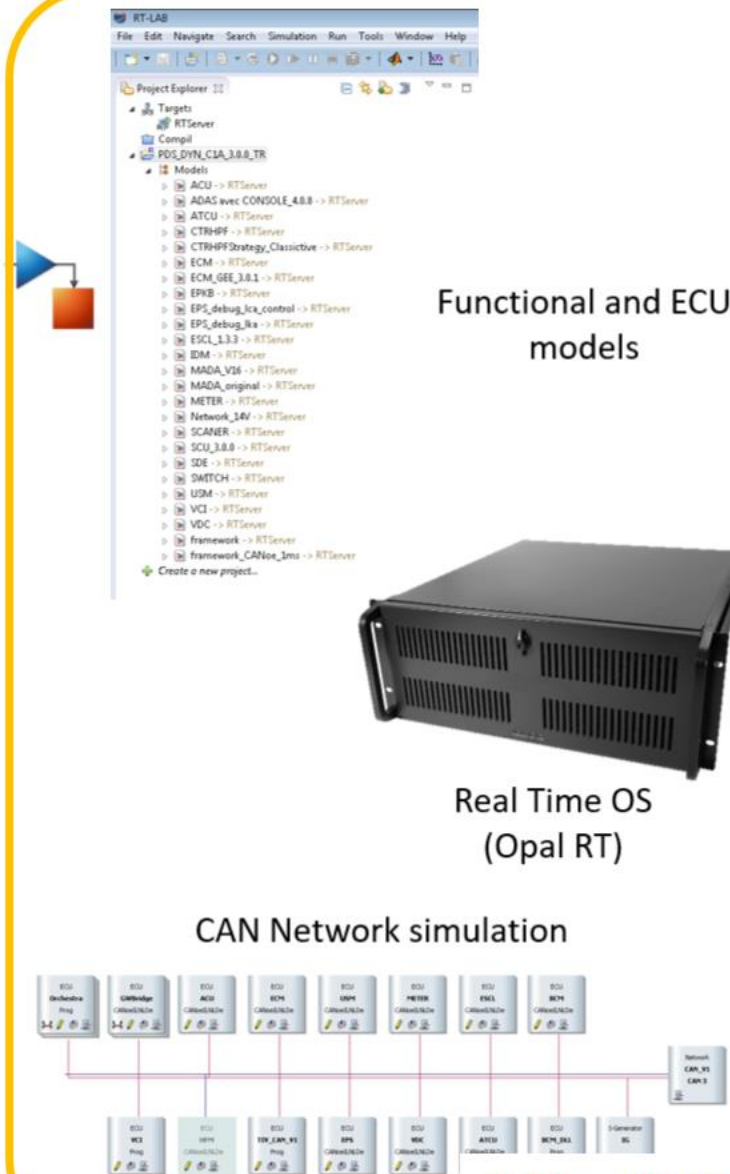
PARTNERSHIPS

Capitalization



DRIVING SIMULATOR: DRIVER IN THE LOOP



[illegible]

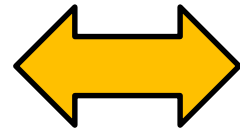
The screenshot displays the Gazebo 3.0.0 interface. At the top, a toolbar contains icons for file operations, simulation control (play, pause, stop, reset), and window management. Below this, a status bar shows the current simulation time as 14:23:58.7 on 04/26 at 8:46. The main 3D view shows a road scene with a white car and a blue truck. A green circle highlights the white car. On the left, the 'PARAMETERS' panel is open, showing a tree view of the simulation's hierarchy. The 'F4: JOURNAL' panel is visible at the bottom.

PDS – Platform of Development System

PDS INTERFACED TO DRIVING SIMULATOR



PDS: Digital Vehicle

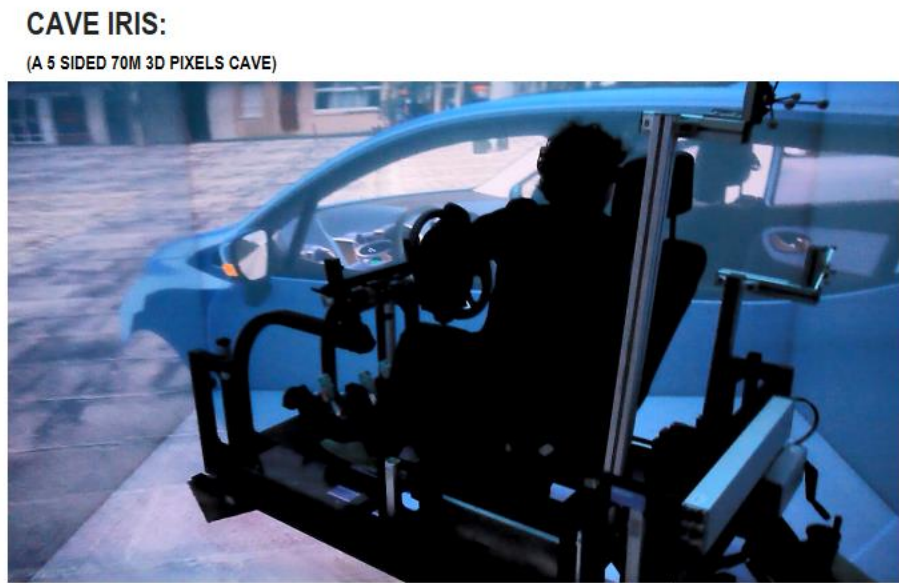
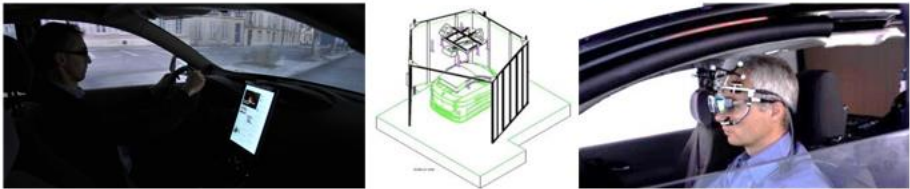


Autonomous vehicle
application : Cut In
use case example



Driving Simulator: ULTIMATE

RENAULT DRIVING SIMULATORS



ROADS: NEW DRIVING SIMULATOR



- 9 DOF Driving Simulator
- Up-to 1g accelerations on all axis
- Dome with 360° 3D Ultra High definition projection
- Full instrumented cabin with 360°
- Turn-table inside the dome
- 30m x 30m evolution area (15 m x 15 m useable stroke)
- 10,5 MWatts (8MW from supercapacitors)



25
Bureaux
& 5 PDS

Simu
C-CARDS
& SEi

Simu
HELIOS



Localisation
Renault Technocentre
Guyancourt - France

ROADS BUILDINGS

EXTERNAL PREVIEW



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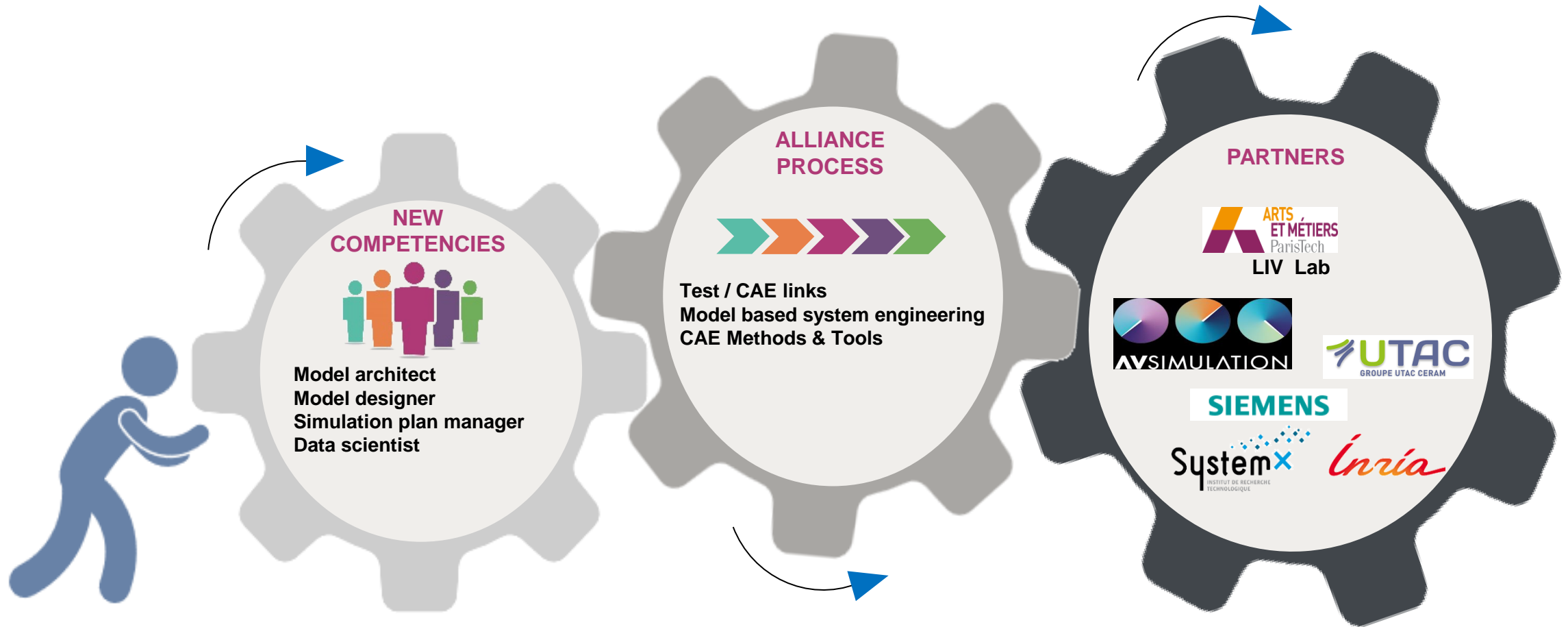
ROADS BUILDINGS

EXTERNAL PREVIEW



CONCLUSION

AD SIMULATION ECO-SYSTEM



Simulation and Driving simulator are key to develop and validate new connected and autonomous vehicles

A close-up, low-angle shot of a futuristic yellow car. The car's body is a vibrant yellow with a glossy finish. A glowing hexagonal light is visible on the front. Inside the car, a person in a white jacket and a person in a dark suit are visible. The background is dark with some blue and white lights, suggesting an indoor exhibition space.

EV
GO

<https://youtu.be/-8wWwYhBGhE>



Thank You for your attention

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