CCAM

CONNECTED, COOPERATIVE
& AUTOMATED MOBILITY

Breakout Session
Cluster 3 “Validation“

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Projects in Cluster 3

There are four projects which have emerged from call topics prepared by Cluster 3:

- **SUNRISE** “Safety assurance framework for connected, automated mobility systems” (01/09/2022 – 31/08/2025), coordinated by Stefan de Vries, IDIADA
- **i4Driving** “Integrated 4D driver modelling under uncertainty” (01/10/2022 – 30/09/2025), coordinated by Vincenzo Punzo, University of Naples
- **BERTHA** “Behavioural replication of human drivers for CCAM” (01/11/2023 – 31/10/2026), coordinated by Begoña Mateo, Instituto de Biomecanica de Valencia
- **SYNERGIES** “Real and synthetic scenarios generated for the development, training, virtual testing and validation of CCAM systems” (01/06/2024 – 31/05/2027), coordinated by Jordi Pont, IDIADA

Just started!

Expected Outcomes from SUNRISE

Expected outcomes according to WP 2021/2022:

- Common methodologies and tools for the safety validation of CCAM systems defined, accepted and validated
  - by the CCAM value chain and its R&I partners for the efficient verification of CCAM systems in their ***R&I and product development processes***;
  - by authorities and certification bodies for the validation of CCAM systems ***within type approval schemes and in future exemption procedures***;
  - and by consumer testing campaigns for the ***safety rating of automated vehicles*** assisting users in identifying the safest choices for their needs.
- Verification, validation and rating procedures based on realistic and relevant test cases generated from an openly accessible European database, compliant with the FAIR data principles, providing the widest possible range of relevant scenarios, which CCAM systems will potentially encounter on European roads as a basis for ***robust system design***.

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Expected Outcomes from i4Driving and BERTHA

Expected outcomes according to WP 2021/2022:

A robust and scalable reference model of human driving behaviour:

- Replicating the full performance spectrum of human drivers, which allows comparing the performance of an automated driving system in a specific situation to the human driver population. This serves as a basis to define the required safety level of CCAM systems and to take decisions on validation requirements in ***type approval schemes***. The model will also help to define fair assessment criteria in ***consumer testing campaigns*** relative to human-driven vehicles and for the safety verification of CCAM systems in ***industrial development processes***.
- Serving as a reference for the automotive industry and its R&I partners to ***design*** humanlike and therefore easily predictable and acceptable behaviour of automated driving functions in mixed traffic.
- Helping the automotive industry, its R&I partners, certification bodies and consumer testing organisations to realistically represent the behaviour of other human-driven vehicles in the (virtual) simulation of mixed traffic. ***Virtual testing*** shortens development cycles and accelerates the implementation of CCAM technologies.

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Expected Outcomes from SYNERGIES

Expected outcomes according to WP 2023/2024:

- Improved ***validation*** of CCAM systems enabled by real and synthetic test scenarios, with the widest possible coverage of traffic situations CCAM systems can encounter on European roads.
- Efficient provision of relevant test scenarios in a permanently updated and therefore dynamic EU wide database.
- ***Accelerated AI development and training*** making use of the dynamic scenario database.
- Use of the most appropriate approaches (e.g. vehicle-based versus (quasi)-stationary sensor units) to record relevant traffic data, as a basis for the derivation of ***test scenarios***, in different traffic environments according to extending ODDs.
- 5. Commitment from key stakeholders to the validation methodology, the scenario database and its usage and to the provision of significant volumes of raw data and/or scenarios extracted from such data.

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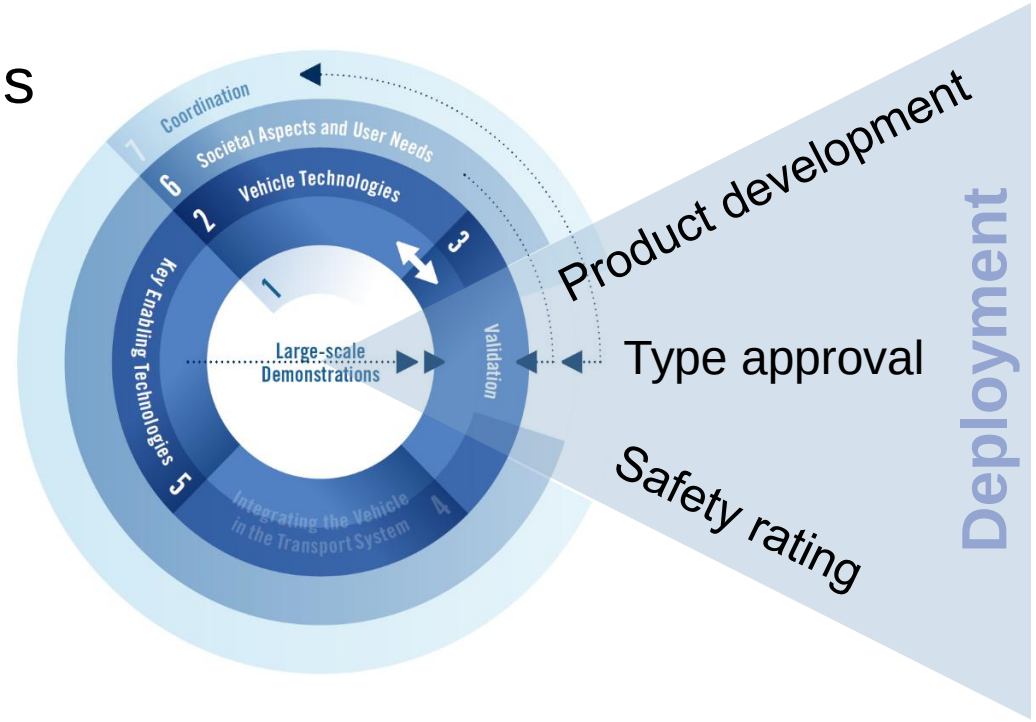
Conclusions from Expected Outcomes

- SUNRISE, i4Driving, BERTHA and SYNERGIES are primarily expected to support:
  - R&I and system design in product development processes
  - Type approval schemes
  - Safety rating in consumer testing campaigns (like Euro NCAP)

- They may also support LSDemos, but how?



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Outcomes from Preliminary Discussions

PROJECT	Results with potential for implementation in LSDemos	Lessons learned	What is hindering / what still needs to be done?
SUNRISE	• Safety Assurance Framework	LSDemos can profit from the results of preceding projects.  Ongoing research can also profit from LSDemos, offering opportunities for scaling up.	To be done: Data sharing
BERTHA	• KPIs for the acceptance of the behaviour of CCAM systems		Hindering: Human complexity To be done: Data sharing again
i4Driving	• Realistic representation of CCAM systems in multi-agent traffic simulations		
SYNERGIES	Project just started on 01/06/2024		

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