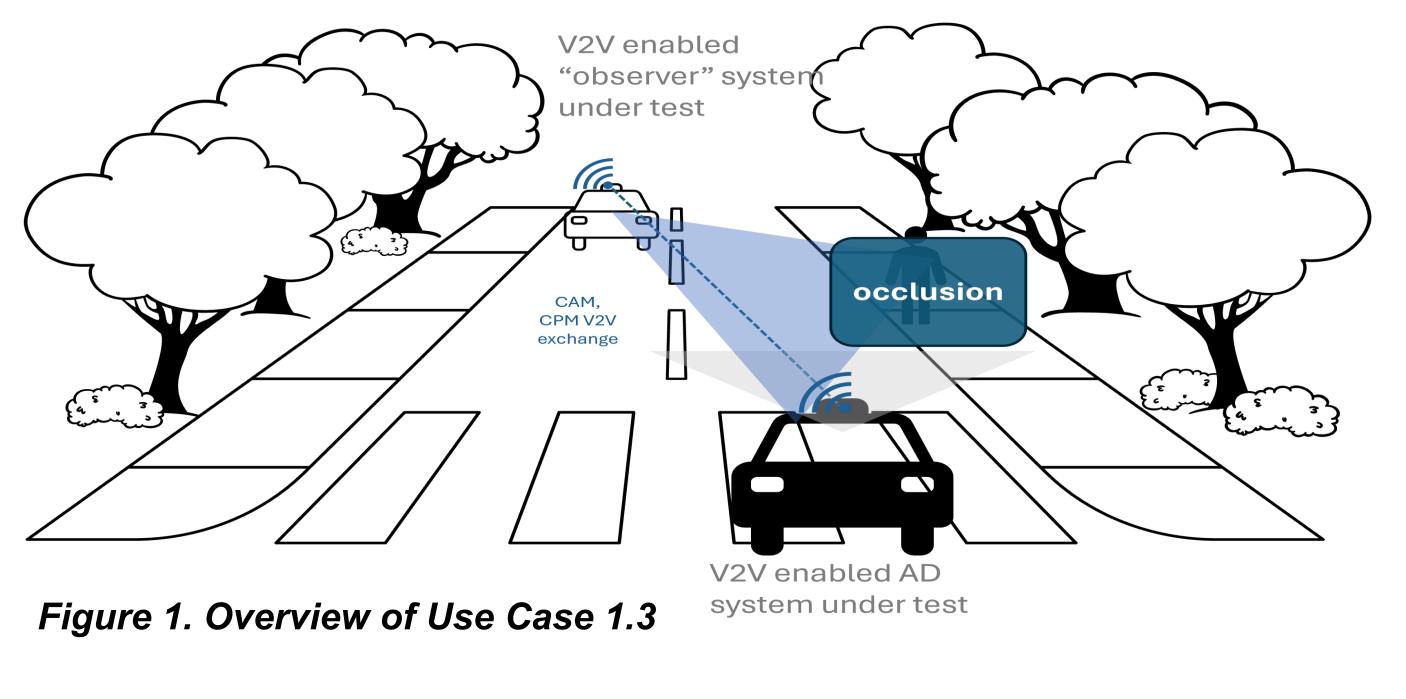
UC1.3 - COOPERATIVE PERCEPTION TESTING UCI - URBAN AD



Anastasia Bolovinou

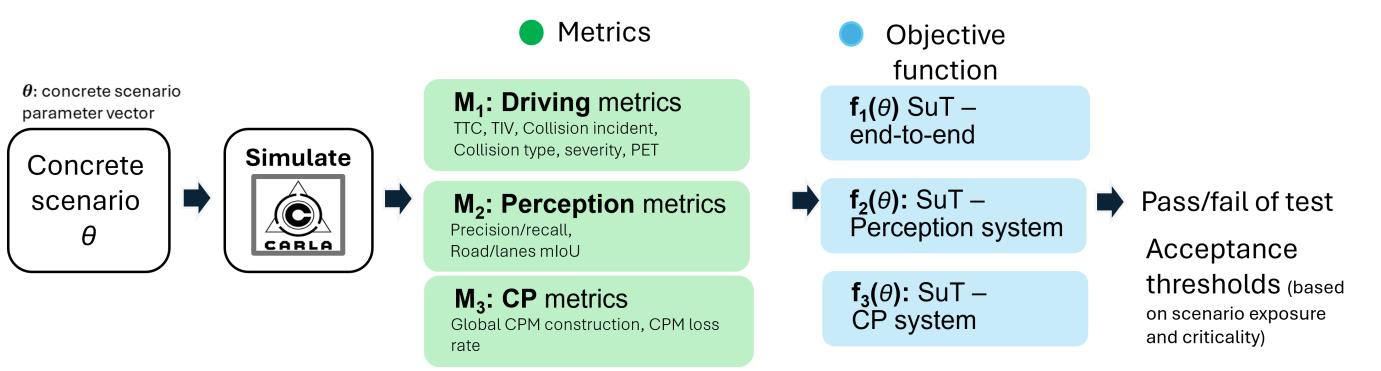
Use case overview



UC1.3 demonstrates SUNRISE safety Collective argumentation for urban Perception (CP) at pedestrian crossings, intersections and roundabouts, focusing on the driving environment and network cosimulation aspects.

Results

The initial allocation process of SUNRISE deliverable D3.3 is applied to compare test requirements with simulation case framework capabilities. High scenario coverage in virtual setup and space possible re-allocation is achieved through a Gaussian Process-based concretization method.



Objectives

- Safety case building of the perception layer of CCAM system in urban non-line-of-sight (NLOS) scenarios with V2X connectivity.
- Combine virtual with hybrid testing

SAF blocks demonstrated

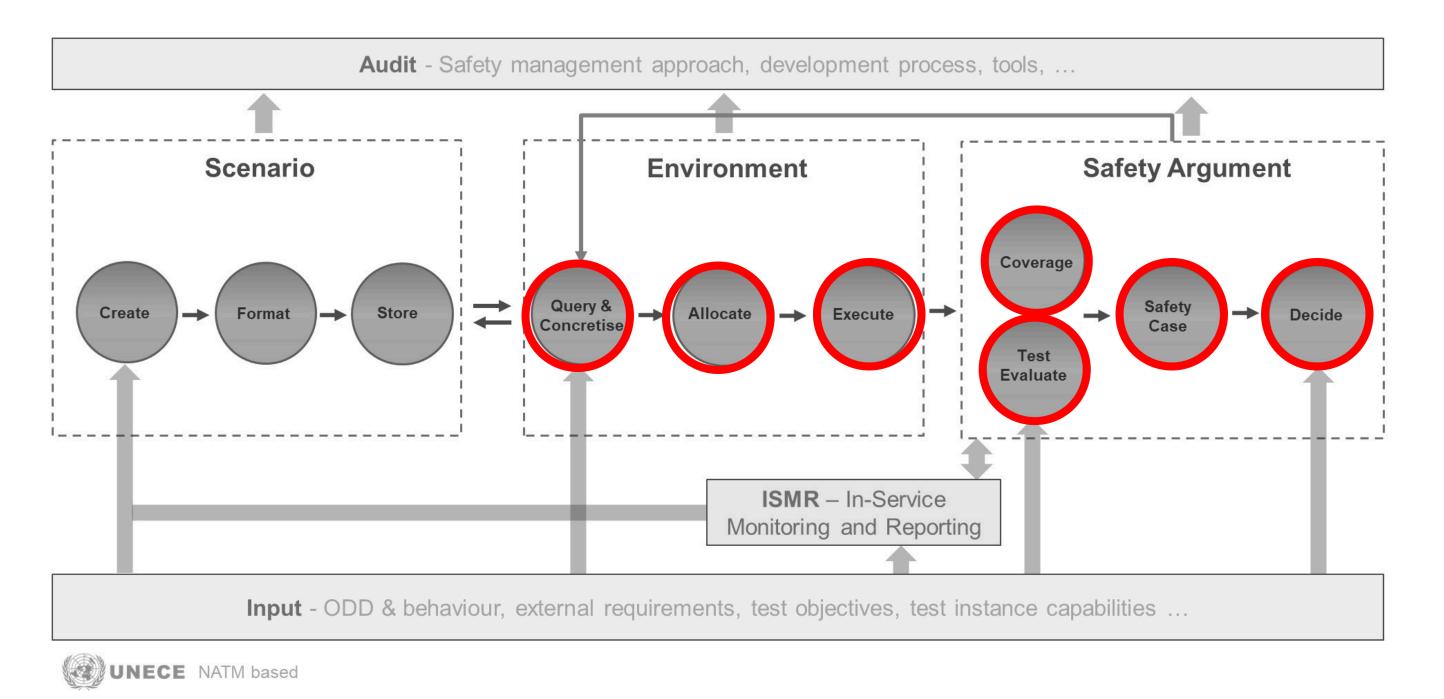


Figure 2. Overview of demonstrated SAF blocks

Test case setup

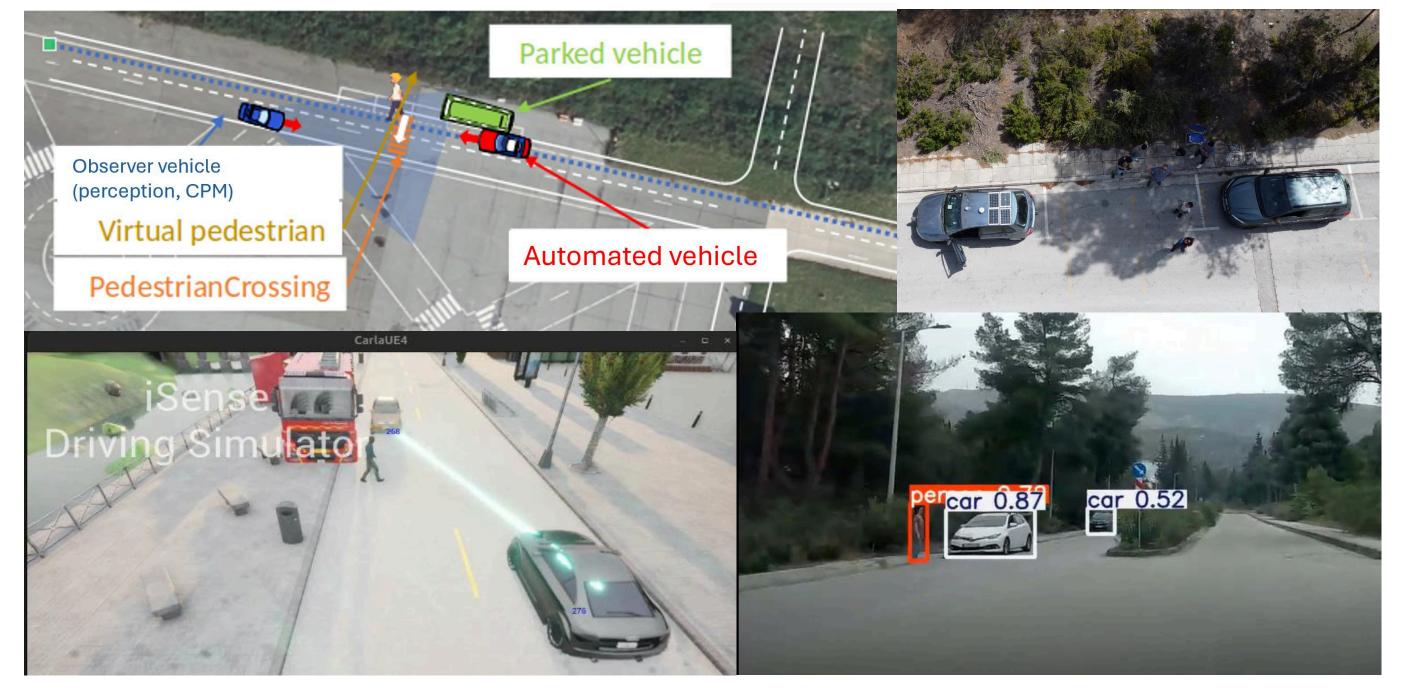


Figure 4. Car-to-Pedestrian Adult Scenario execution and metrics' recording

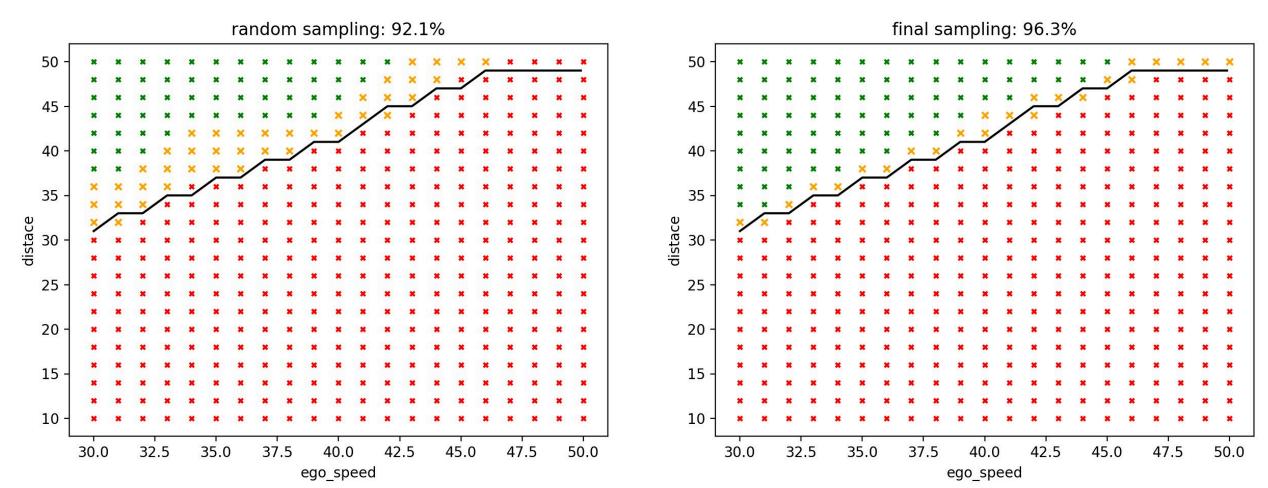


Figure 5. Scenario space pass/fail boundary discovery achieving 96.3% scenario space coverage in virtual setup (scenarios classified as 'pass', 'fail' or 'uncertain' by green, red and orange crosses respectively; the orange ones are not considered 'covered')

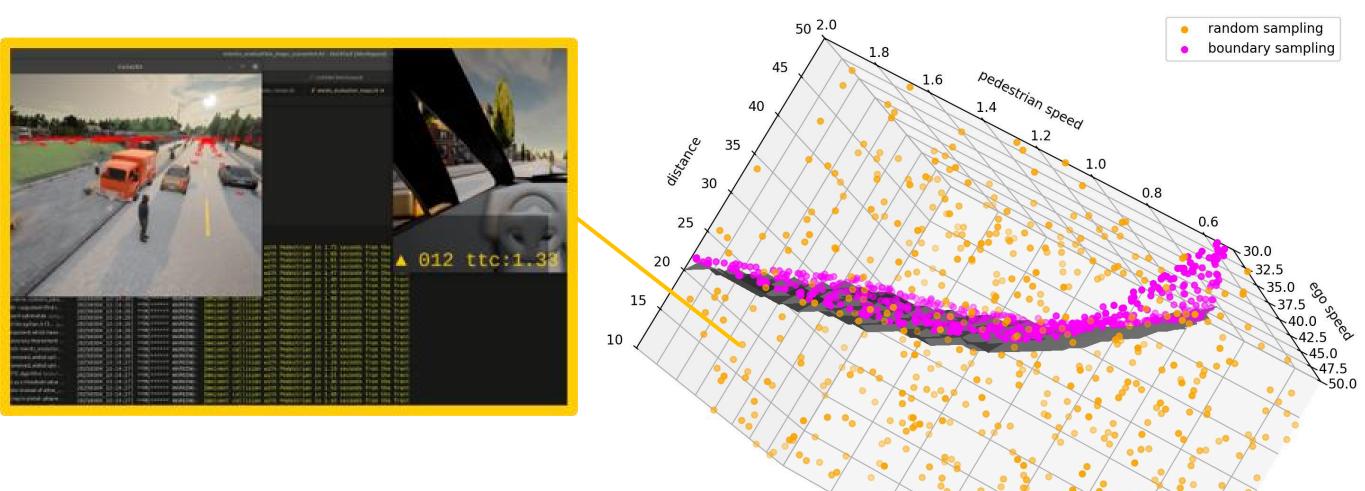
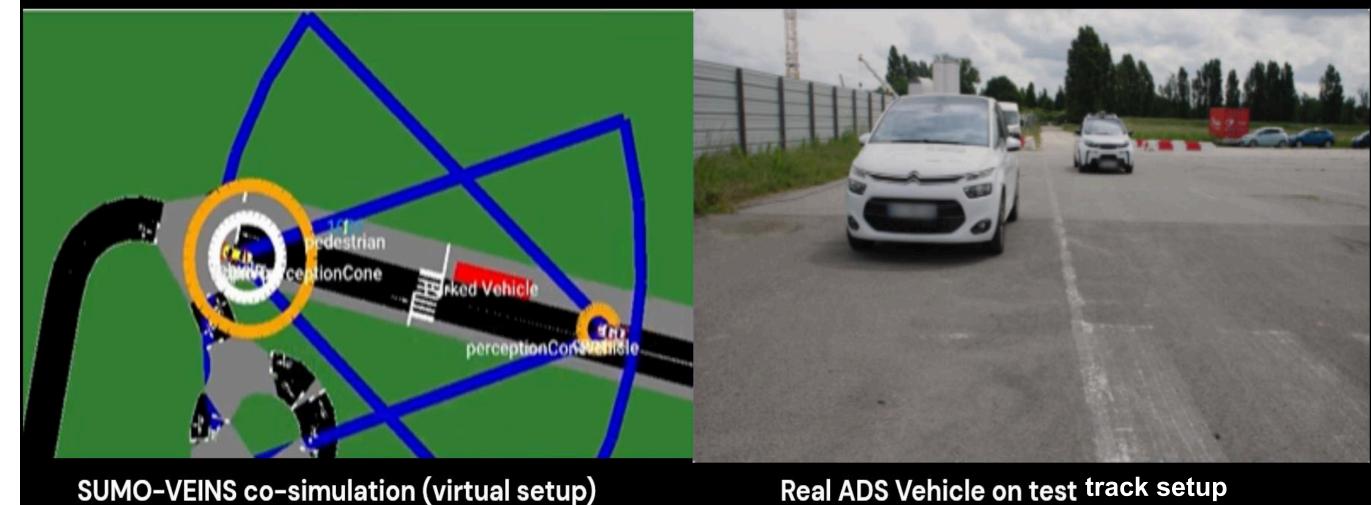


Figure 6. Example from a Car-to-Pedestrian Adult Scenario variation contributing to TTC-based pass/fail boundary discovery (Source: ICCS)



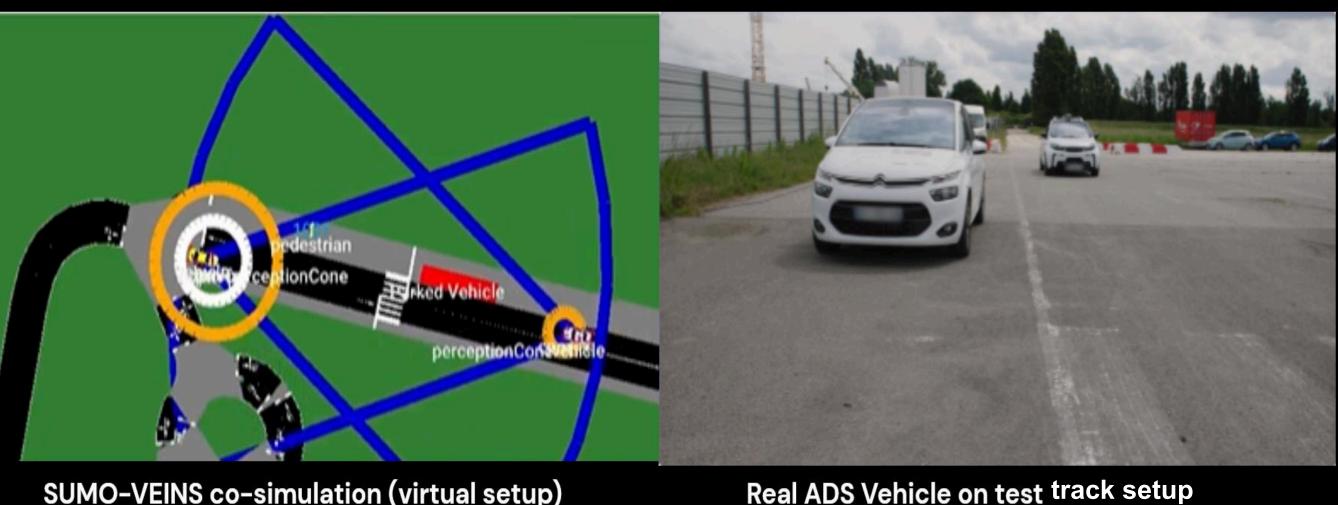


Figure 3. Test case setup (mixed real and virtual world)

UC1.3 consists of 2 partners testing different CP systems. The CP system object-level external integrates data received via V2X communications (ETSI CAM, CPM) from nearby vehicles or a virtual RSU. Two simulation frameworks (OMNET++/SUMO & MSVan3t/CARLA) and two proving grounds are available for test execution (both virtual and hybrid setups supported).

CCAM = Cooperative, Connected and Automated Mobility ODD = Operational Design Domain SAF = Safety Assurance Framework UC = Use Case

Figure 7. Car-to-Pedestrian Adult Scenario Hybrid (Source: VED)

Key take aways

- Co-simulation setup integrating network aspects made possible.
- SUNRISE's simulation-first approach used to derive test scenario allocation with hybrid components.
- Gaussian process works well for criticality-driven scenario sampling and boundary discovery pass/fail in scenario spaces of small dimensions

References

- SUNRISE Deliverable D3.3
- SUNRISE Deliverable D3.4
- SUNRISE Deliverable D4.6

CP = Collective Perception NLOS = Non Line Of Sight TTC = Time To Collision V2X = Vehicle-to-Everything RSU = Road Side Unit



Partners







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