Multi-User Scenario Catalogue for CAVs (MUSICC)

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The Challenge – Assuring the Safety of Connected & Autonomous Vehicles

- The driving task requires: Perception > Decision Making > Control in an extensive range of complicated scenarios
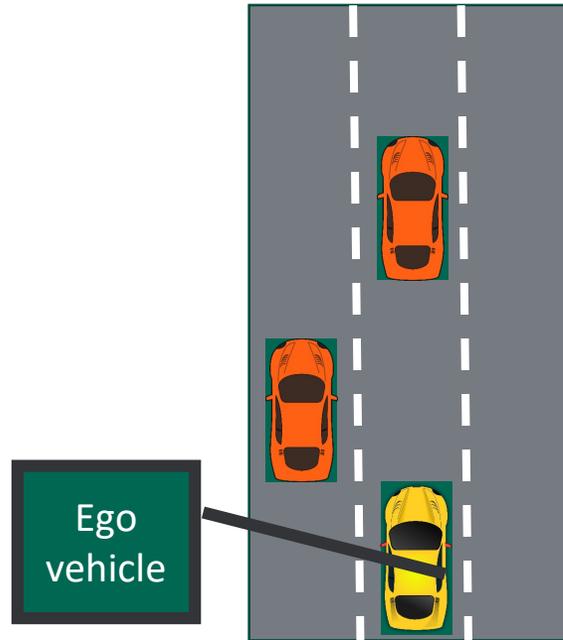
- Automation of the driving task brings a step change in the complexity of software deployed on road vehicles.

- The human driver is very good at this, the vast majority of the time.

- Traditional methods are insufficient to test so many possible scenarios

What is a Scenario?

Ego vehicle

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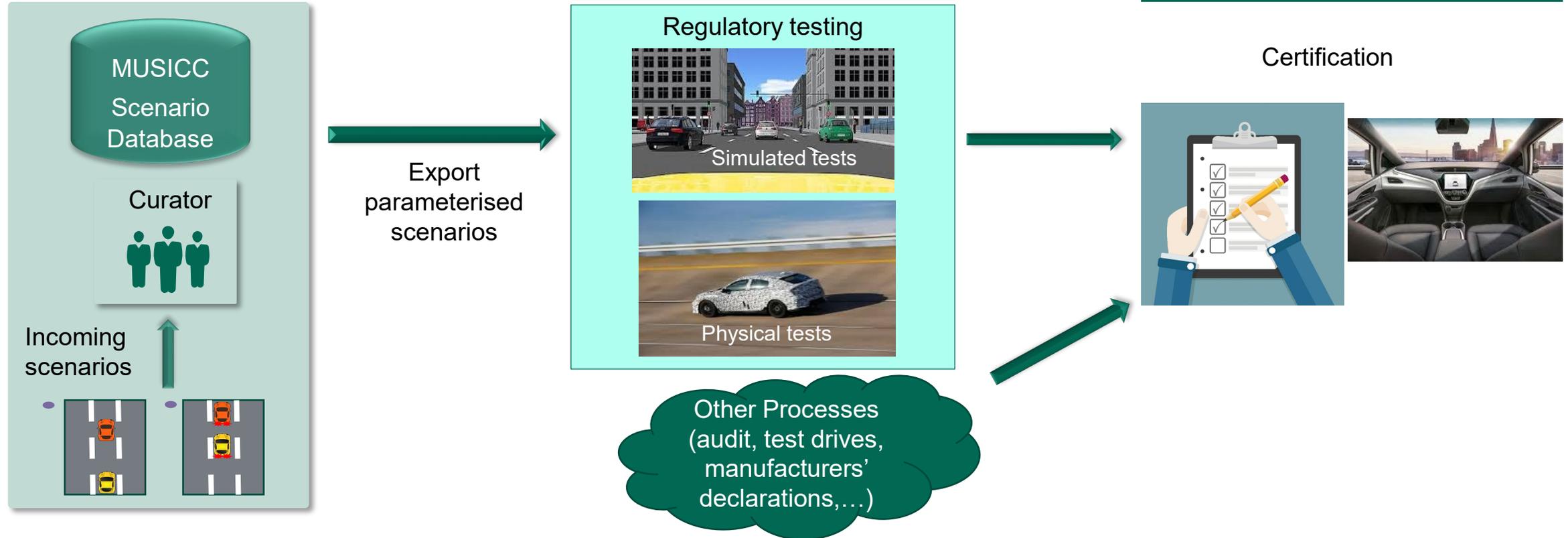Actor vehicle performs emergency braking
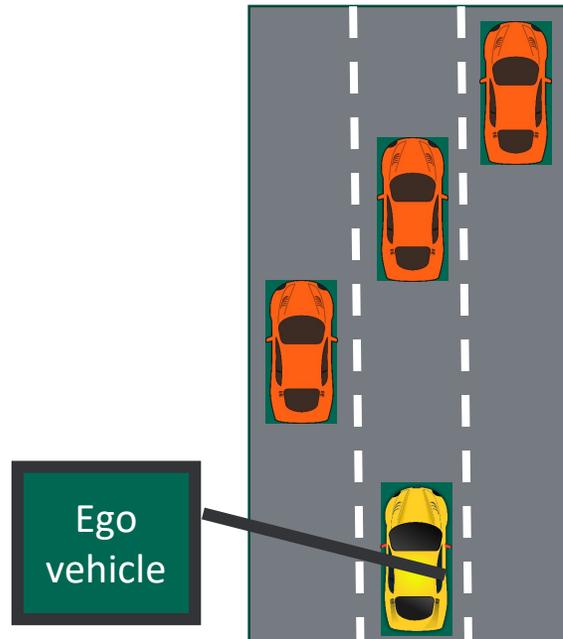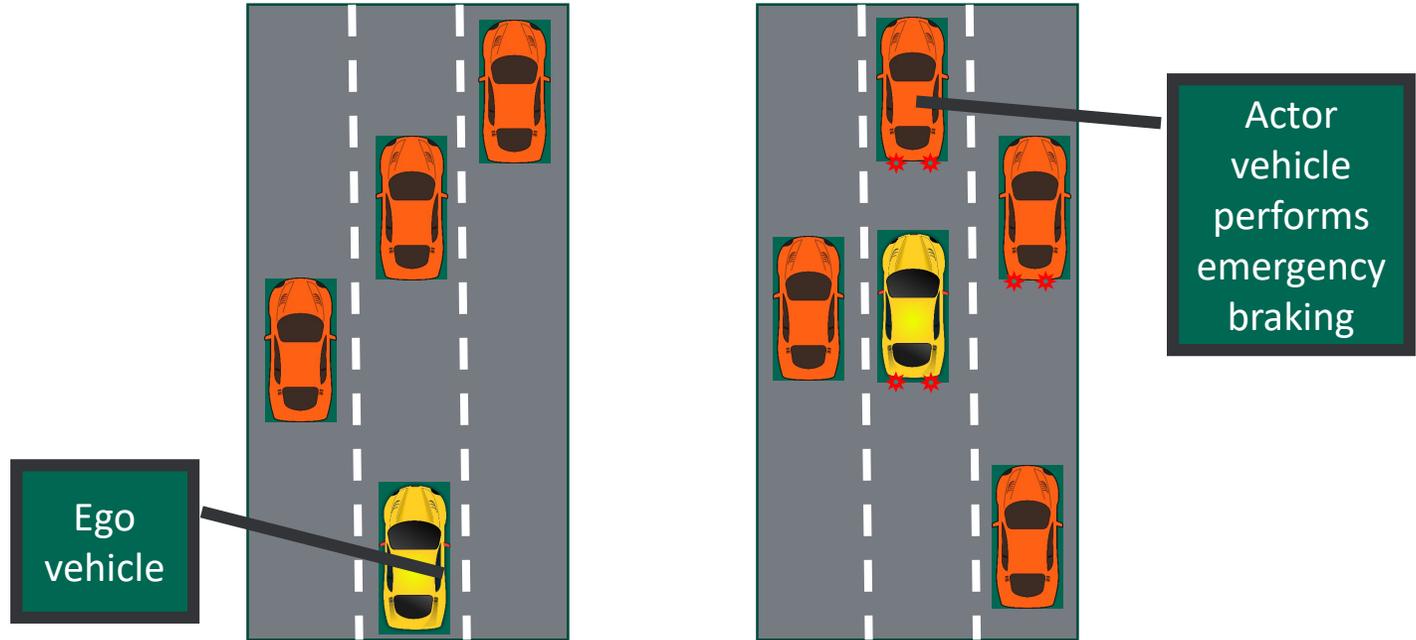
Defines:
- Initial conditions of actors
- Behaviour of actors
- Environmental and geographical factors
- Expected outcomes

Vision: The Scenario Based Certification Process

UNECE
United Nations Economic Commission for Europe

MUSICC Scenario Database

Curator

Incoming scenarios

Export parameterised scenarios

OEM & Technical Service

Regulatory testing

Simulated tests

Physical tests

Other Processes (audit, test drives, manufacturers' declarations,...)

Type Approval Authority

Certification

Objectives and Approach

Objectives:
- Implement a language to describe scenarios, aligned with industry standards
- Build an open and expandable library for CAV certification scenarios


Approach:
- Proof-of-concept project, Apr 2018 – Mar 2020
- Close collaboration with vehicle manufacturers, ADS developers, organisations with expertise in CAV validation, and regulators
- Focus on simulation testing environments

Scenario Description Language

MUSICC Scenario Record
– Metadata
– Parameterisation
– Ego goal

ASAM Association for Standardization of Automation and Measuring Systems

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bringing content to the road

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managing the road ahead
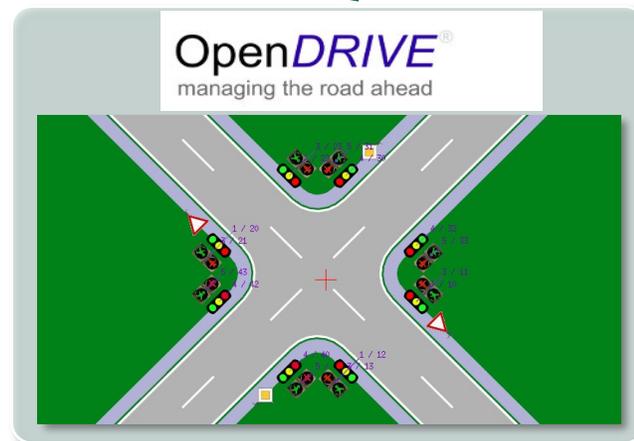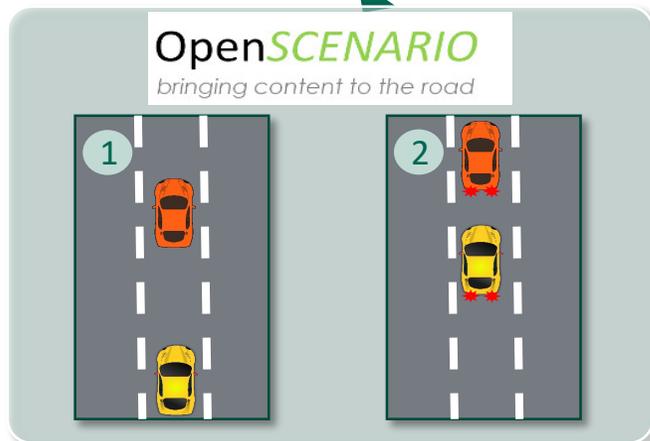
- The Scenario Description Language (SDL) defines a consistent format for representing scenarios

- Stakeholders will be more likely to engage if a standardised or widely compatible format is used

The MUSICC Roadmap

Phase 1: Apr '18 – Apr '19		Phase 2								2019			2020		
Phase 1A	**Phase 1B**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Engage stakeholders, map existing work and gaps												
	Design SDL											
	Develop beta DB system											
		User trials										
		Software development										
		SDL enhancements and alignment with emerging standards										
			Integration with simulation tools									
		Advisory group engagement and scenario population										
										User Acceptance Tests		

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