

New validation approaches for automated driving safety

French views

UN-ECE / GRVA / VMAD

October 2019

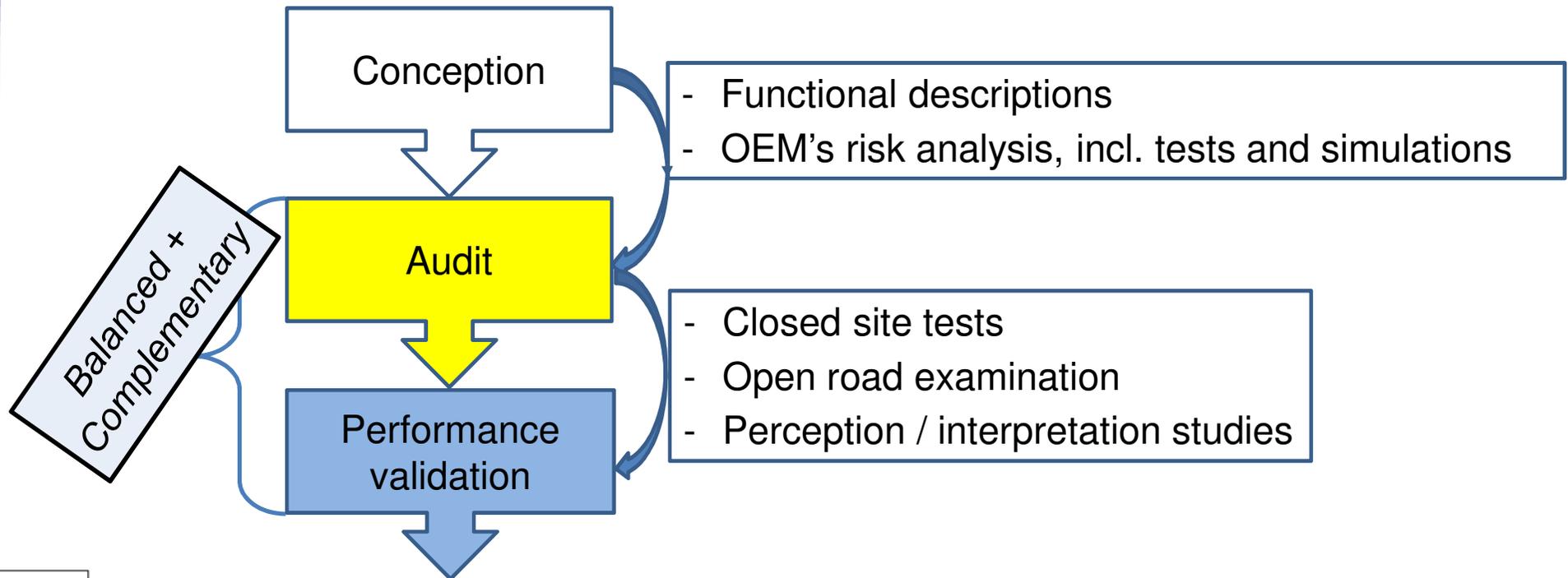
*Direction générale des infrastructures, des transports et de la mer
Direction générale de l'énergie et du climat*



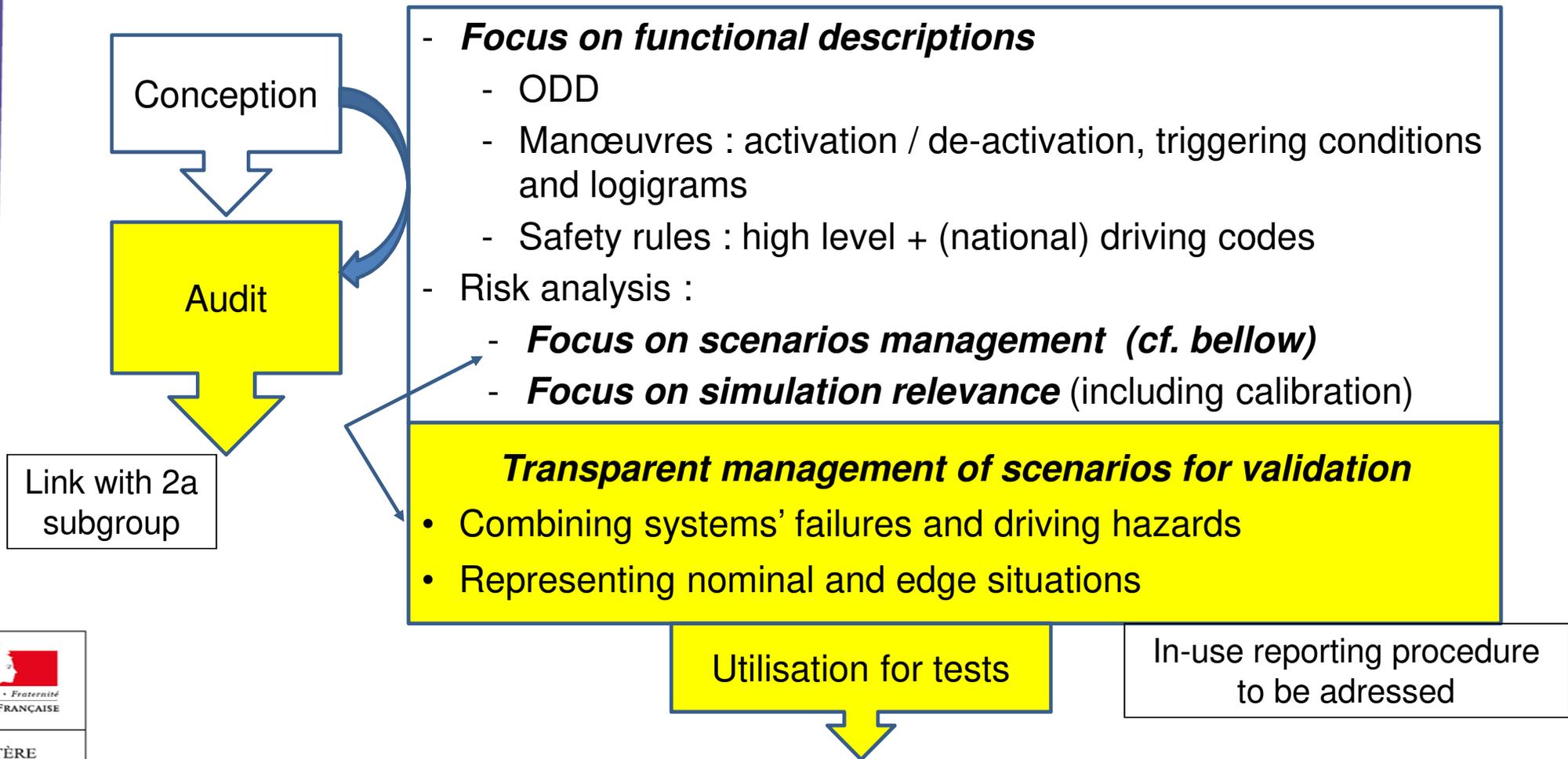
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French approach : bird-eye view

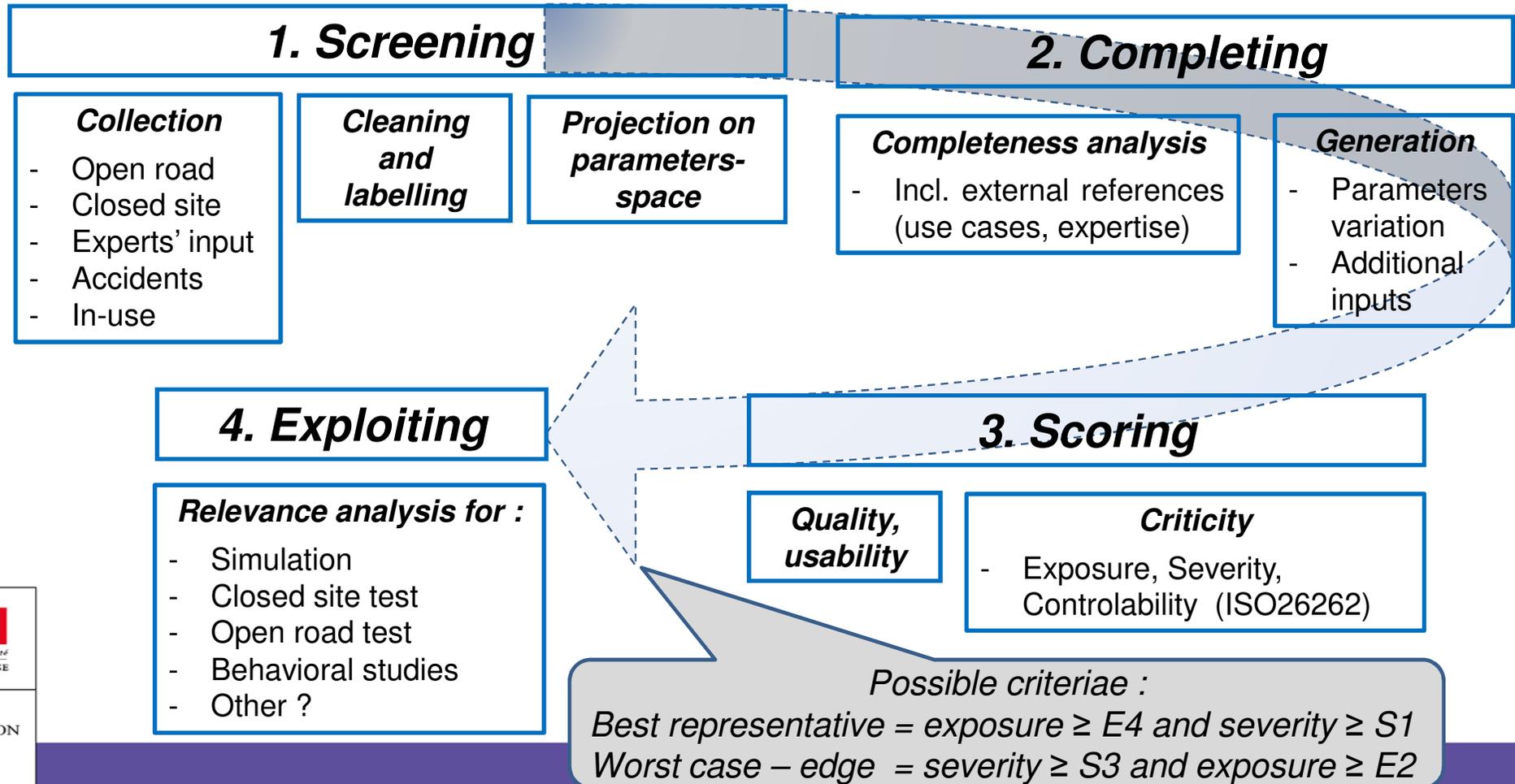


French approach : main focuses (1/3)



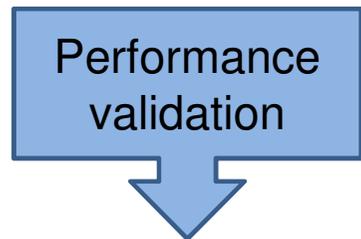
French approach : main focuses (2/3) : scenarios screening and scoring

Link with 1a
subgroup



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French approach : main focuses (3/3)



Link with 2b subgroup

- Closed sites tests
 - Unitary manoeuvres, including MRMs and limp-home
 - Edge-critical situations (pre-defined + randomly extracted from risk analysis / scenario screening)
- Open road evaluation / examination
 - Compliance with ODD
 - Compliance with (national) driving rules (e.g. signals)
 - Manoeuvres' chains / logigrams
 - Interactions with other road users (etiquette, anticipation)
- Perception / interpretation studies
 - ODD definition
 - Manoeuvres' triggering conditions / chains / logigrams
 - HMIs (internal and external)
 - Driver monitoring in real time to check well understanding of HMI



High level safety rules (extracts)

Technical	A single perception malfunction without failure should not induce a hazardous event. Consequently, the set of sensors used for the perception of a safety relevant environmental feature shall not be based on a single physical principle.
ODD	The vehicle shall not be in AD mode out of its ODD.
Driving	<p>The vehicle shall manage risks according to the following rules:</p> <ul style="list-style-type: none"> ○ Vehicle shall not create accident by its own ○ Vehicle shall be robust, as far as reasonably possible, to risks caused by others ○ Vehicle shall comply with applicable driving rules (including those applicable to human drivers) unless it is the only way to avoid an accident <p>This rule shall be fulfilled:</p> <ul style="list-style-type: none"> ○ wherever the vehicle is driving (e.g. country, road, ...) ○ whenever the vehicle is driving (e.g. despite dynamic lane assignment; time dependent rule, introduction of a new type of traffic sign; rule change ...)
Transitions AD ⇔ Manual	A deliberate driver action is required to activate AD mode.

Scenarios	The OEMs shall set up a common process to create and maintain a common catalog of scenario, including misuses, to be used for safety argumentation during design and verification/validation phase.
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Some open questions

- Learning systems and releases (in use performance monitoring and evaluation)
- AD systems where (dedicated) infrastructure provides a significant part of safety
- AD systems where connectivity (supervision) provides a significant part of safety
- Specific subsystems deserving specific validation focus (for learning systems ?)
 - Perception + recognition + positioning + mapping
 - Connectivity (cf. above)
 - HMIs



Thank you



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