



MINISTÈRE
DE LA TRANSITION
ÉCOLOGIQUE
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DES TERRITOIRES

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Workshop on scenarios

1 – 3 July, 2024

Regulatory needs for scenario catalogue(s) / database(s)

Contribution by experts from France

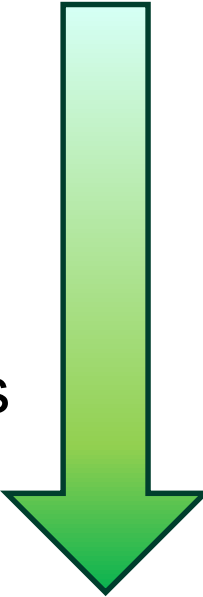
Back-ground + mandate + scope of the presentation

- **GRVA 18-50 (reminder) :**
 - Establish a catalogue of scenarios that can be used by the various NATM pillars
 - A scenario catalogue would not be exhaustive
 - Follow a common template
 - Work further on classifications, namely difference between nominal and critical
- **GRVA 19-44 (summary) :**
 - Focus on **public authorities'** use of the catalogue
 - **Clarify the needs, purposes and use cases (incl. link with ISMR)**
 - Address needs issued from either type-approval or self-certification approaches
 - Assess respective interest of centralized / decentralized approaches
 - List roles and responsibilities

Needs for a UNECE scenario catalogue(s) or database(s) ?

Framing the question

1. Regulatory needs for **scenarios** (*reminder from regulatory frameworks*)
2. Regulatory needs for **international exchanges** on scenarios
3. Needs for **catalogues / databases / descriptors** : thoughts for next steps



Regulatory needs : reminders from EU ADS 2022

(related to scenarios)

- ***Performance and safety requirements***
 - Perform the DDT under nominal and reasonably foreseeable critical scenarios
 - Detect and safely respond to failure scenarios
 - Identify new scenarios
- ***Documentation***
 - Scenario selection method
 - Tests for the most relevant scenarios
 - Validation methods, tools, results
- ***Check-tasks of approval authorities***
 - Robust scenario selection methods and validation plans
 - Reasonable coverage of scenarios + minimum list of behavioral scenarios
 - Scenario approach showing no risk increase

Regulatory needs : miscellaneous from GRVA 18-50 (related to scenarios)

- **Use a scenarios-based approach to :**
 - Organize efficient, objective, repeatable, and scalable safety validation activities
 - Be representative of what the ADS is reasonably likely to encounter in its ODD
 - Cover relevant nominal, failure, critical, and complex scenarios
 - Generate scenarios combining # sources / approaches
 - Randomize parameters and scenario composition (e.g. generate low probability events)
 - Show that the ADS will not increase the overall level of risk [..] compared to a manually driven vehicles within the ODD for each of the safety relevant scenarios
- **Document :**
 - Traffic scenarios relevant to each ODD
 - Methodology to select scenarios and choose the validation methodology
 - Management of unknown hazardous scenarios
 - Arguments and evidence to demonstrate reasonable coverage of chosen scenarios
 - Scenario-specific approach showing non overall risk increase.

Regulatory and international exchanges needs : typology

A. Help expand coverage through comparaison of respective scenario spaces

- Assess “reasonably foreseeable” coverage of a given catalogue compared to others
- Ease and avoid effort duplication in scenario generation (benefit from others’ practices)
- Enrich probability laws (identify distribution tails)
- Avoid lock-in of ODD-pushed generation approaches → cover all use cases & ODDs
- Identify new unknown-unsafe scenarios based on others’ scopes
- Optimize IMSR (new scenario reported → less new scenarios to report)

B. Optimize use of scenarios in safety assessment / NATM through best practices in :

- scenario selection for representativeness and edgeness
 - allocating [# scenarios] ↔ [real / track / virtual / audit]
 - feasibility of virtual (resp track, real) tests
 - qualifying a) nominal / b) critical / c) failure / d) extreme scenarios
 - identifying {trans-use-cases} / {trans-ODD} / {trans-region} vs {OD-specific} scenarios
- Enabling regulators to consider generic / trans-regional scenarios to avoid duplicated tests

Considerations for next steps

- Identified needs correspond to a catalogue approach rather than a database approach
- Diversity of scenario generation methods / catalogues is likely to better address needs
- Risk for a unique database or catalogue to “freeze” the necessary combinatory approach
- Functional or logical descriptions are likely to better match coverage needs in a first step
- Concrete scenarios are likely to be more and more useful since scenario databases grow, allowing better distribution / exposure assessments and transferability of (parametrized) tests among regions / regulators
- Be it in functional, logical or concrete approaches, harmonization of descriptors is key
- In order to maximize cross-usages of scenarios among regulators (and use-cases + ODDs), and to avoid industrial property concerns, split descriptors into two main sub-categories :
 - Endogenous to the ADS’ response+performance
 - Exogenous to the ADS’ response (infrastructure + environment + target behaviors)
- NB : quid for scenarios when hazards (multiple targets) respond to the ADS’s response ?