Idea for the next step of FRAV Discussion

Expert of JAPAN

19-21、July, 2022
30th FRAV, Paris

High level Concept of the Requirement

We have deepened our discussion of the requirement on FRAV Doc.5.

We think that detail requirement is important, but, before that, we can discuss the detail efficiently on the basis of the agreement of the high level concept of the requirement.

We would like to confirm our high level concept of the requirement of ADS.

What is the High Level concept of the requirement?

The principle concept of Pass / Fail criterion and performance requirements in accordance with it.
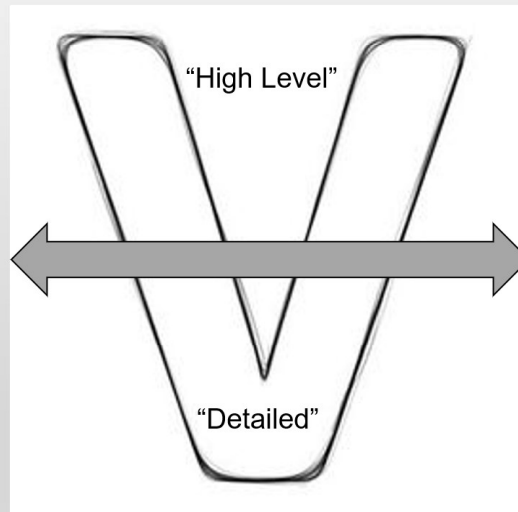
VMAD-06-05 at May 15, 2020

Relationship between NATM Master Document and FRAV-05 Document UNECE

REQUIREMENT DEFINITION

FRAV

"High Level"

ASSESSMENT METHODOLOGY

VMAD

Pass/Fail Performance Requirement(s)

Test/Assessment Procedure(s)

"Detailed"

7

Safety Vision on Framework Doc. on WP.29

from **Framework document on automated/autonomous vehicles** ECE/TRANS/WP.29/2019/34/Rev.2

3. Safety Vision

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7.   The level of safety to be ensured by automated/autonomous vehicles implies that "an automated/autonomous vehicle shall not cause any non-tolerable risk", meaning that automated/autonomous vehicle systems, under their automated mode ([ODD/OD]), shall not cause any traffic accidents resulting in injury or death that are reasonably foreseeable and preventable. Based on this principle, this framework sets out a series of vehicle safety topics to be taken into account to ensure safety.

This is the same requirement which is required for human drivers by traffic laws.

This approach is similar to the approach which is used by courts in various countries to determine illegality based on whether the driver was negligent or not.

How safe is safe enough?

At this early stage of automated driving, we believe that an appropriate Principle concept is to specify Safety Criteria for ADV as: accidents that can be avoided in situations where a typical human driver is driving carefully should not occur.
Therefore, Japan propose to set pass/fail criteria using the C+C Driver Model.

We need to break down the safety vision into the principle concept of Pass / Fail criterion <u>after agreement of the high level concept.</u>

4

Relation between FRAV and VMAD

from Annex table of F.W.Doc

First, need a kilogram prototype.

FRAV

What
Purpose of
the test

should cover the <mark>functional requirements</mark> for the combination of the different functions for driving and also Functional Safety

What is <mark>non-tolerable risk?</mark>
It means same as Defining an acceptable level of safety for AD Vehicle.

The international prototype of the kilogram

VMAD

How
Verification
method

Multi-pillar concept also cover the <mark>assessment</mark> of Functional Safety.
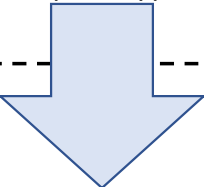
Why need a scenario?

In the conventional test method, it is possible to confirm that the requirements are met by establishing a representative point for the function and testing at that representative point.

However, in the safety verification of automated vehicles, it is not possible to set a representative point, and it is necessary to confirm that the vehicle can operate safely in all reasonably foreseeable and preventable situations.
We will study a method to reproduce these reasonably foreseeable and preventable situations in a scenario and confirm the safety of the vehicle.
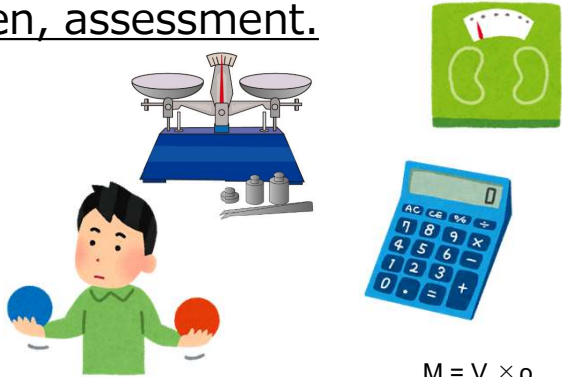
Then, assessment.

$M = V \times \rho$

Which assessment method is best?

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5

on revised ALKS

5. System Safety and Fail-safe Response

5.1. General Requirements

5.1.1. The activated system shall perform the DDT shall manage all situations including failures, and shall be free of unreasonable risks for the vehicle occupants or any other road users. The activated system shall not cause any collisions that are reasonably foreseeable and preventable. If a collision can be safely avoided without causing another one, it shall be avoided.

5.1.1.1. The ALKS shall respond whilst active to any collision which requires a response according to national traffic rules (e.g. bringing the vehicle to standstill) and which could be expected to be recognised by a competent and careful human driver. In the case of such a collision and without prejudice to paragraph 5.4.4.1.1., a transition demand shall be given, unless one is already being given.