Creation of a Digital Twin environment based on the Mobility DX strategy

SAKURA DIVP

METI Ministry of Economy, Trade and Industry

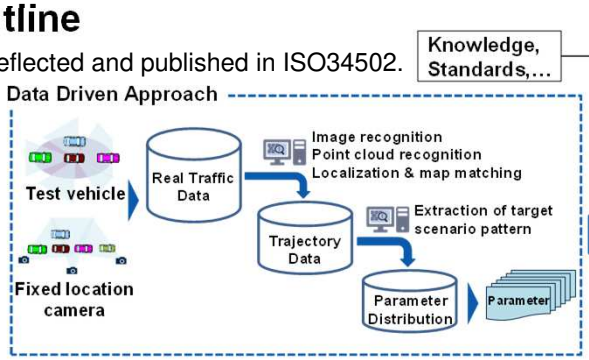
Summary

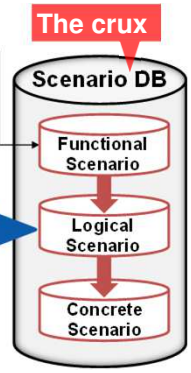
- Based on the Mobility DX Strategy, **the public and private sectors will work on seven collaborative areas** to accelerate the shift to SDV. In the area of digital twin environment construction, one of the collaborative areas, we are working on (1) formulation of a safety assessment framework for automated driving (**SAKURA** (Safety Assurance KUdos for Reliable Autonomous vehicles)) and (2) construction of a safety assessment platform (**DIVP** (Driving Intelligence Validation Platform)).
- In the SAKURA project, **international standardization of safety evaluation methods on highways** is realized in 2022 in cooperation with other countries. Currently, many activities are in progress, including the construction of a scenario DB based on an exhaustive scenario system including vulnerable road users, collection of actual traffic data, generation of safety assessment scenarios, and definition of safety criteria.
- In the DIVP project, an **autonomous driving simulator environment** is being built and collaboration is underway to enable development based on SAKURA scenarios.
- Through these activities, the scope of reasonably foreseeable and preventable accidents that autonomous driving should prevent is defined as scenarios, which can be used for various tests to evaluate necessary and sufficient safety performance.

Scenario Based Safety Evaluation Framework

SAKURA project outline

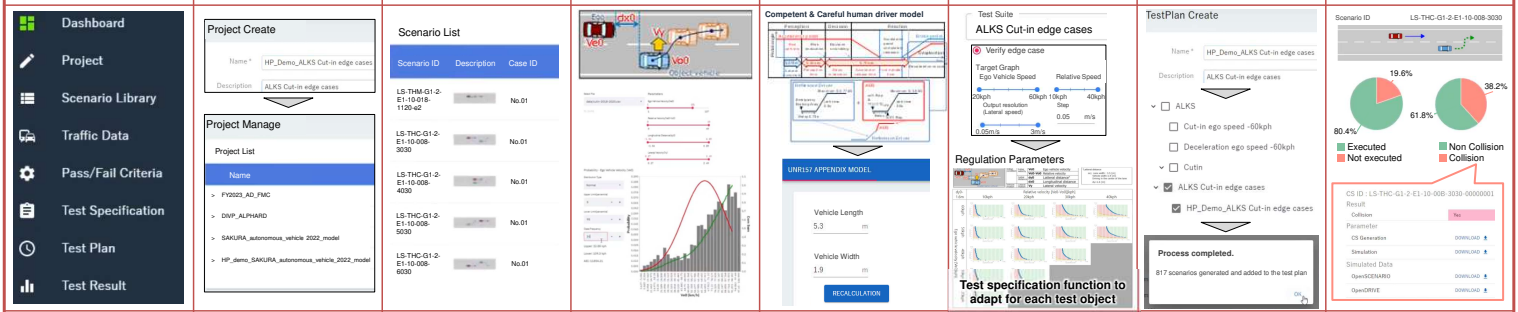
Some of the results have been reflected and published in ISO34502.





Development of scenario database to realize safer Automated Driving System

Scenario DB : the tool to support the safety evaluation of Automated Driving System

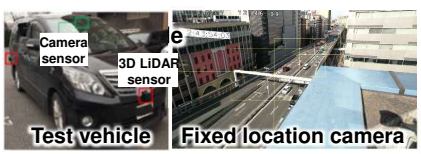


Project	Scenario Library	Traffic Data	Pass/Fail Criteria	Test Specification	Test Plan	Test Result
Manage the project which is a unit for managing evaluation scenarios	Define and register a project name that you will test in scenario DB	The systematized scenario catalogue for the safety evaluation of ADS	Flexible design of parameter range based on distribution in real traffic data	UNR157 C&C Driver Model recalculating according to the vehicle size	Parameter range to be tested for the scenario defined in the Scenario Library	Generation and management of Test Plan as a unit for safety evaluation	Function to display simulation result of test scenario created by Test Plan

Linkage Linkage

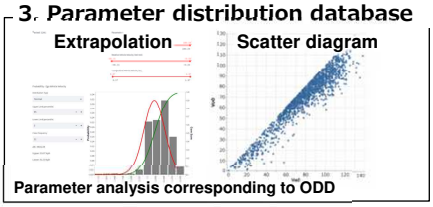
Real Traffic DB with data quality and traceability

1. Real traffic data acquisition



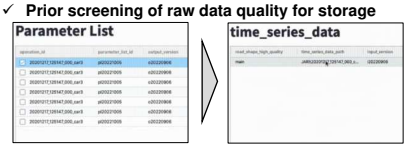
2. Real traffic data bank

3. Parameter distribution database



4. Traceability/quality assurance

✓ Prior screening of raw data quality for storage



✓ Ensuring traceability of raw data and trajectory data

Linkage with simulation models

- DIVP is an **initiative aimed at building an environment for evaluating the safety of automated driving in a virtual space**, where sensor reactions of automated vehicles can be **checked on a simulation**.
- It is expected that this will enable the **reproduction of environments that do not or are unlikely to occur in real environments**, thereby enabling **efficient demonstration of autonomous driving**.
- As one of the ISIP-adus projects, the project was conducted by Kanagawa Institute of Technology, Nihon Unisys, sensor manufacturers, and others. Based on the results of the research to date, **a new company was established in July 2022, and the product was commercialized in September**.