

**SIP-adus
Workshop
2019**



Key Note Lecture

~Safety Assurance~

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Safety Assurance

Moderator

Satoshi Taniguchi

Lead of SIP-adus Safety Assurance International Collaboration

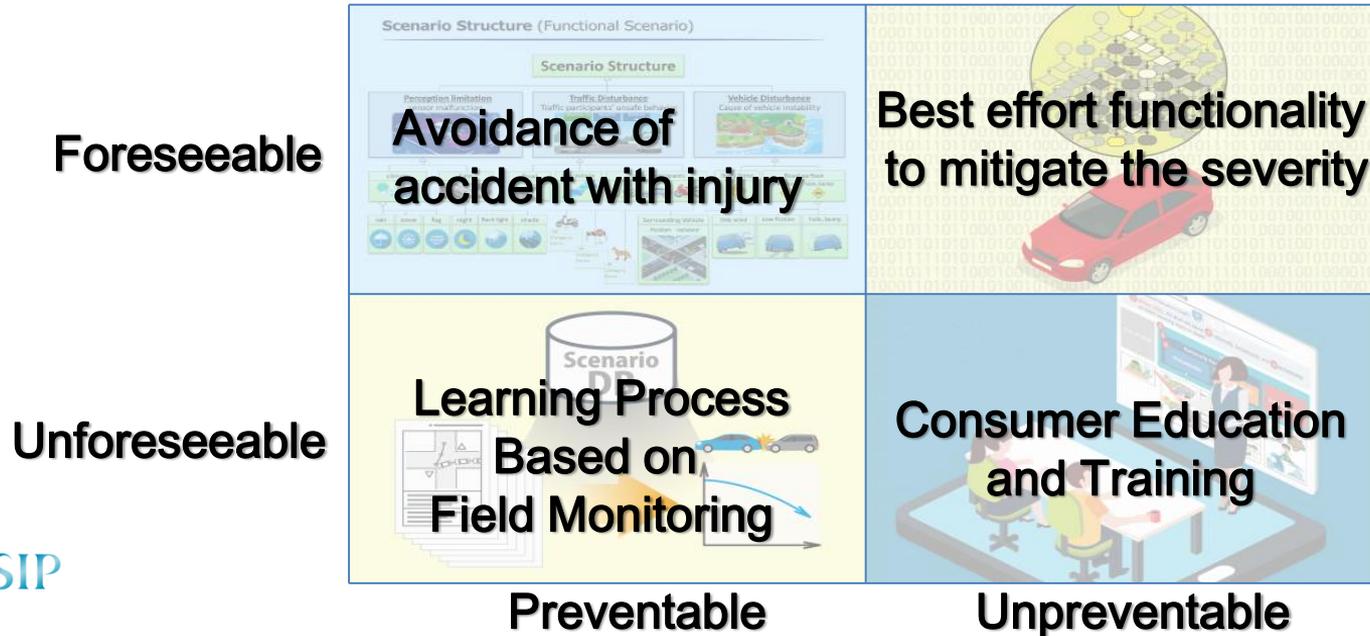
Global authority driven AD safety requirements



Safety Principle on WP29 GRVA Framework Document

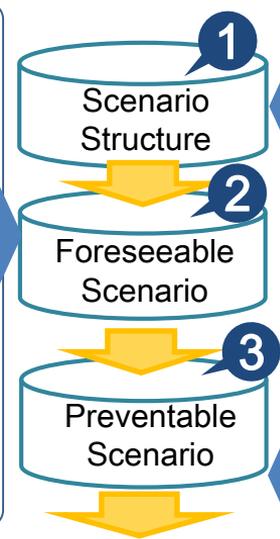
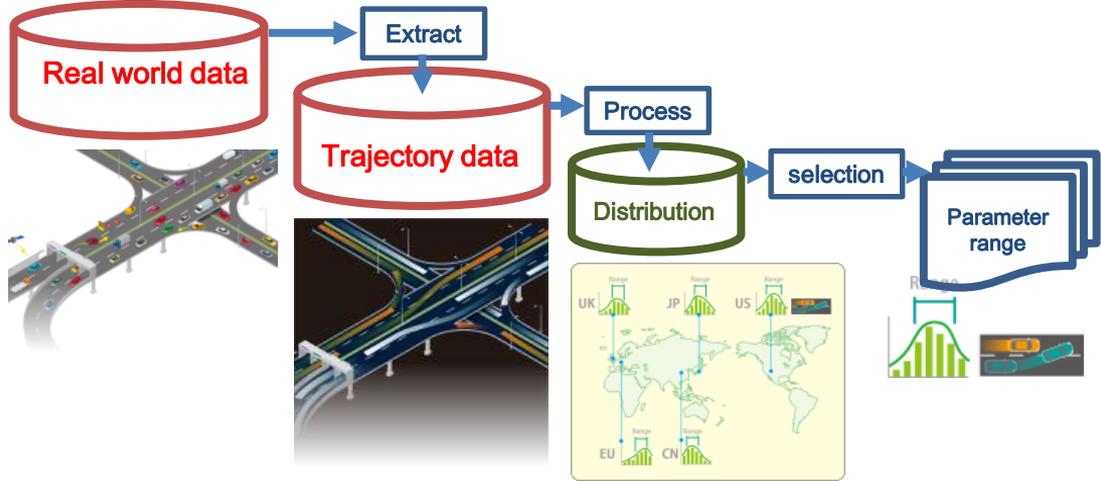
① Within ODD, AD shall not cause ② rationaly foreseeable and ③ preventable accident resulting injury or death

Safety Argumentation Structure on Four Quadrat in accordance with Safety Principle

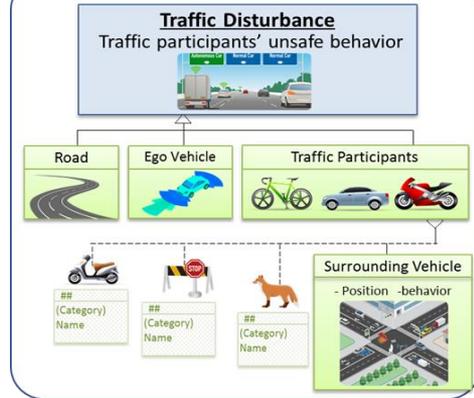


Safety Validation framework proposed in VMAD

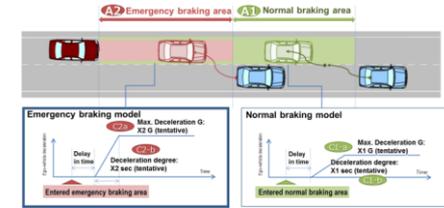
Data Driven Test



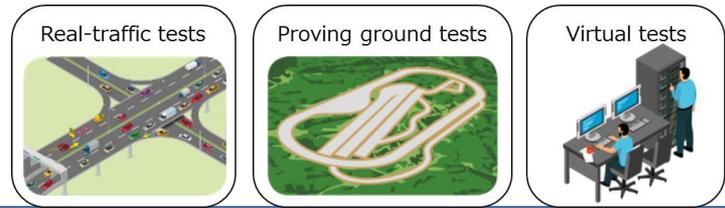
Scenario Structure



Comparison between... attentive skilled driver and AD Collision avoidance



Evaluation Environment



1. The scenario structure is defined by experts in order to cover the all root cause based on physical principle.
2. The foreseeable parameter range is defined by real world data collected third party.
3. The preventalbe boudary is defined based on the comparison with attentive skilled driver

Safety principles and corresponding engineering framework



Safety Principle

Audit Pillar

Safety by Design



Documentation structure in accordance with

-ISO21447 SOTIF

-ISO26262 Functional Safety, etc

Testing Pillar

Safety by V&V



Scenario base approach
- ISO TC22/SC33/WG9



Foreseeable

Avoidance of accident with injury

Best effort functionality to mitigate the severity

Unforeseeable

Learning Process Based on Field Monitoring

Consumer Education and Training

Preventable

Unpreventable



Testing Environment

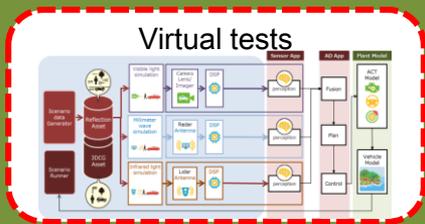
Real-traffic tests



Proving ground tests

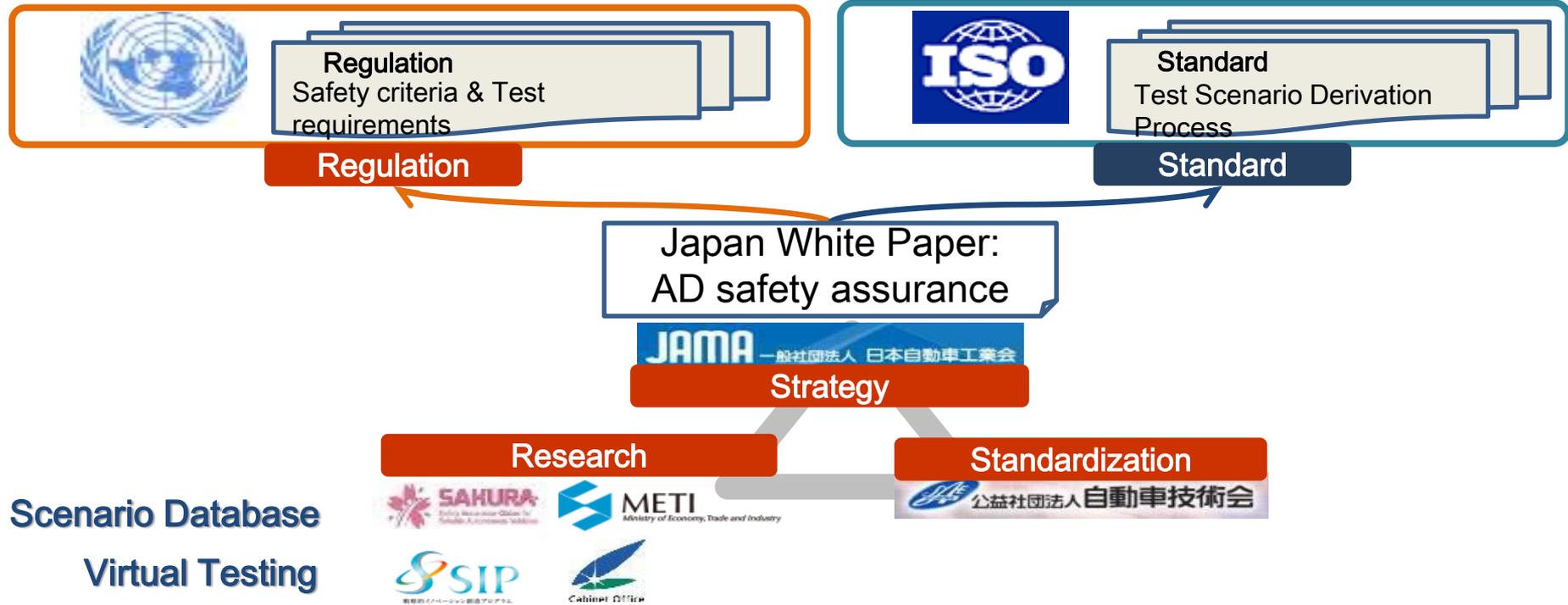


Virtual tests



A comprehensive safety assurance methodology and corresponding virtual testing environment are the key.

Japanese efforts for global regulation and standardization



Japanese industry and authorities are closely working to develop safety validation methodologies, databases and criteria that support the development of national and international regulations and standards.

Safety Assurance Speakers



Name	Affiliation	Overview
Adrian Zlocki	ika (V&V, HEAD START)	IKA's safety assurance related research and its role in current German projects following PEGASUS.
Emmanuel Arnoux	French Automotive Platform (PFA)	French industry position and approach to safety assurance and scenario databases, and PFA contribution to international regulatory and standardization efforts.
Fabrizio Minarini	Joint Research Centre (EU commission)	JRC and EU commission's framework and approach to AD safety assurance.
Michelle Chaka	VTTI (AMP director)	VTTI 's Naturalistic Driving Database latest activities and VTTI's role in US national safety assurance regulatory and standardization activities.
Chen Zhenyu	CATARC	CATARC approach to AD safety assurance and related efforts to support regulatory and standardization activities in China and internationally.
Hideo Inoue	Kanagawa Institute of Technology	Virtual safety evaluation environment program involving major players in Japan and overseas, including a prototype collaborative environment starting January 2020.



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Thank you

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Safety Assurance

Adrian Zlocki

fka GmbH

Germany



Safety Assurance

Emmanuel Arnoux

PFA (French Automotive Platform)

France

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Safety Assurance

Fabrizio Minarini

European Commission Joint Research Centre

Italy

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Safety Assurance

Michelle Chaka

VTTI

USA

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Safety Assurance

Chen Zhenyu

CATARC

China

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Safety Assurance

Hideo Inoue

Kanagawa Institute of Technology

Japan