Status of Connected Vehicle technology development for Automated Driving in Japan

2017.11.14

Norifumi Ogawa
International Cooperation WG SIP-adus
Mazda Motor Corporation

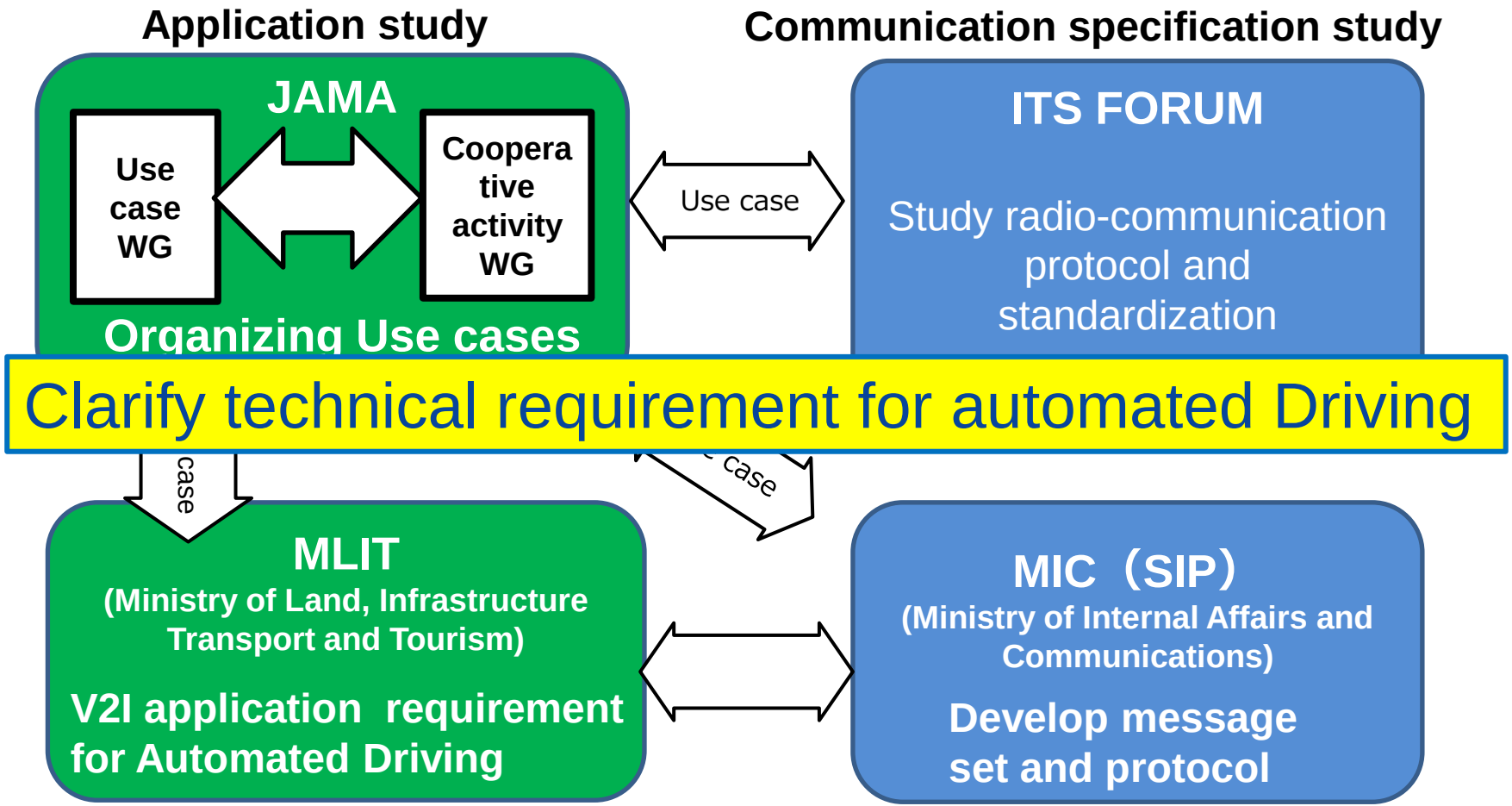
SIP Cabinet Office

INDEX

1. Connected and Automated Vehicle (CAV) development organization framework in Japan
2. Organizing the use case for CAV by JAMA
3. Study of message set and protocol for V2V and V2I by MIC
4. Examination of V2I application by MLIT
5. Summary

1. Connected and Automated Vehicle (CAV) development organization framework in Japan

1. CAV development organization framework



2. Organizing the use cases for CAV by JAMA

2. Organize the use cases for CAV by JAMA

- Several working groups are discussing realization of automated driving in JAMA .
- In order to discuss using the same language, the use case WG started to create the common use case.
- The common use case is shared not only to JAMA, but also to the other related organizations.
- Applications utilizing communication are being considered based on the use case.
- Currently, 4 prioritized use cases are considered.

2. Organize the use cases for CAV by JAMA

Traffic information on road ahead

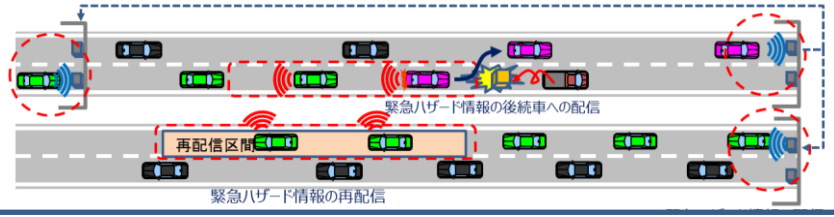
Realize smooth automated driving by using the safety related traffic information on road ahead

Merging/ Lane Change

Realize smooth merging by using the information of traffic flow and mutual communication between vehicles

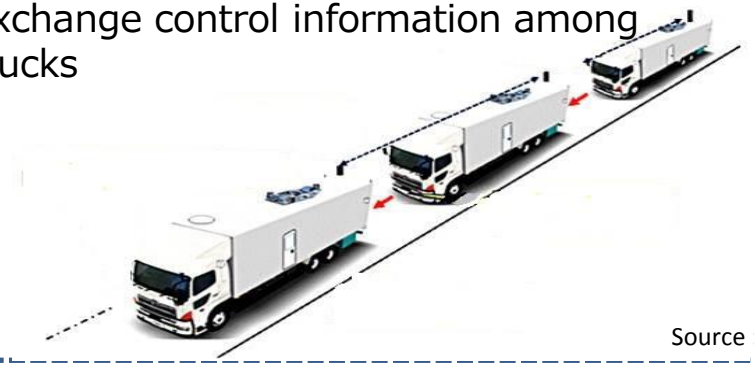
Emergency Hazardous Information

Correct Hazardous information and distribute following and oncoming vehicles



Truck Platooning

Exchange control information among trucks



Source : JAMA

2. Organize the use cases for CAV by JAMA

JAMA is conducting a survey of vehicles behavior on highway to quantify the use case

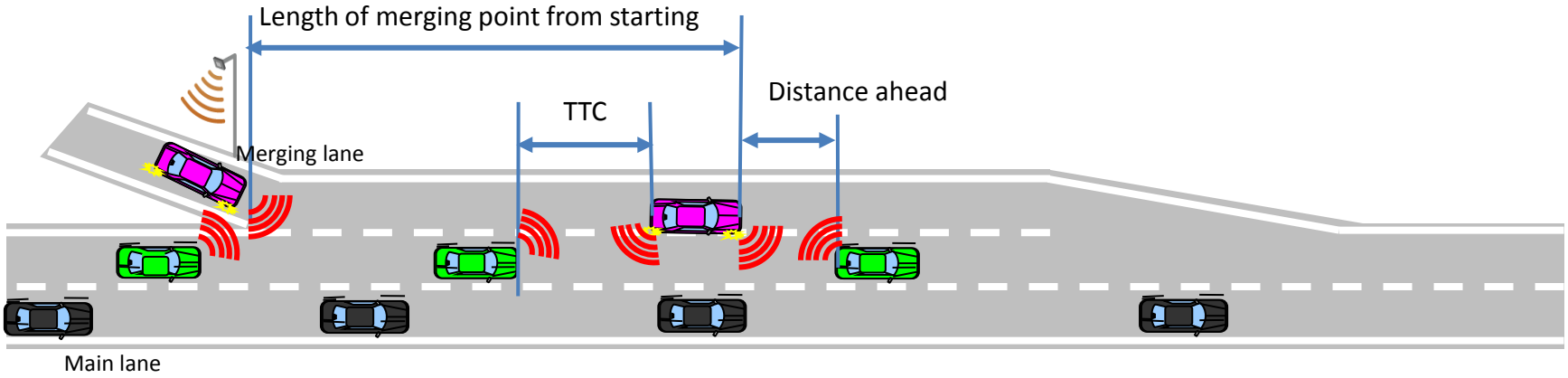
Video

CAV will help smooth merging without disturbing the traffic flow on main lane.

2. Organize the use cases for CAV by JAMA

To realize smooth merging in order not to disturb traffic flow on main lane

- Quantify merging scenario and establish the use case
- Consider merging strategy by V2V V2I application
- Study specific merging procedure using communication



3. Study of message set and protocol for V2V V2I by MIC in SIP

3. Study of message set and protocol for V2V V2I by MIC in SIP

- MIC created a whole picture of communication utilization for CAV
- In this year the activity focus on automated driving level 2, 3 on highway

Stage	Focus AD Level	Example of Information contents	C-ITS
1	ADAS Level1	-Vehicle status (location/speed) -sensor info/ Traffic signal etc.	V2V V2I
2.1	AD Level 2,3 (High way)	-Vehicle intention -traffic circumstance (Traffic flow speed , Object on road)	V2V V2I
2.2	AD Level L2,3 (General roads)	-Vehicle intention -traffic circumstance (Pedestrian , Signal)	V2V V2I
S1	Truck Platooning	-Info for electric towing (Monitoring Vehicle condition)	V2V
S2	AD Level 4 limited area	-Info for Remote monitoring and control (Monitoring Vehicle and circumstance)	V2I
3	AD Level 5	-Info for mutual intervention (Merging or lane change in traffic jam)	V2V V2I

MIC in SIP activity in 2017

Study message set and protocol for CAV based on the results of previous SIP activities and JAMA use cases.

Goal

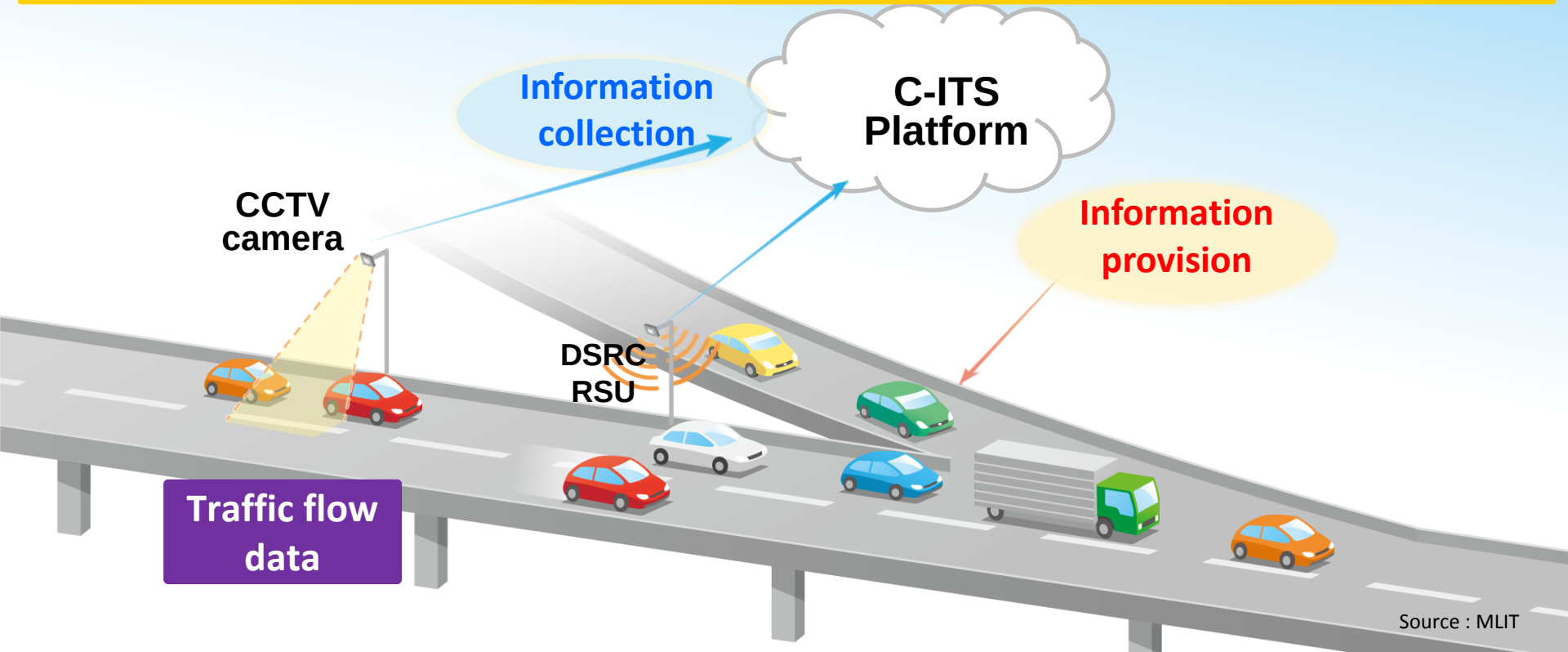
2017 Create draft of message set and protocol

2018 Evaluate the effectiveness of CAV with defined message set and protocol

4. Examination of V2I application by MLIT

4. Examination of V2I application by MLIT

Providing traffic conditions on mainline helps drivers and AD vehicles merge smoothly.

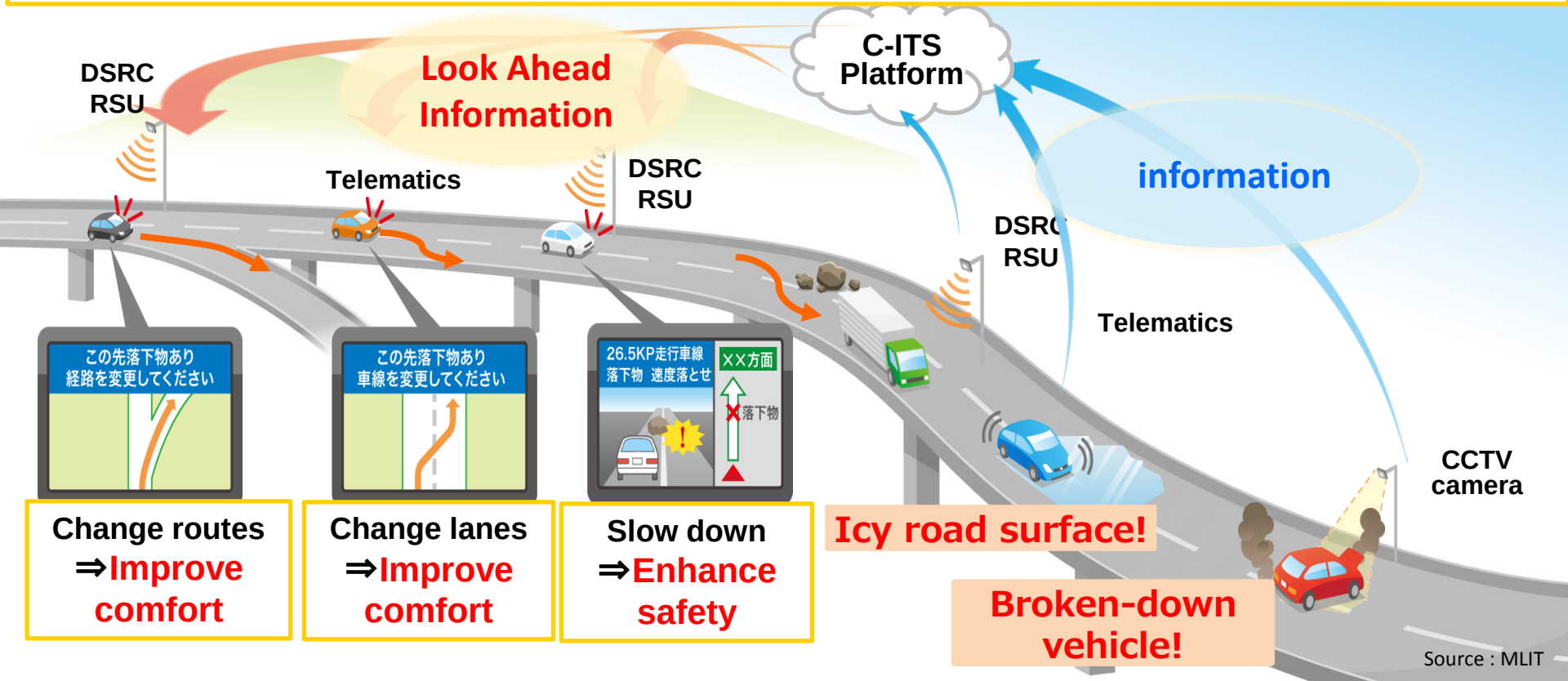


Source : MLIT

4. Examination of V2I application by MLIT

LAI* helps drivers or AD vehicles take safer maneuver.

*LAI(Look Ahead Information): information of anticipated events which can't be detected by on-board-sensors



Source : MLIT


SIP-adus Workshop
on Connected and Automated Driving Systems
2017

5. Summary

5. Summary

- JAMA is organizing the use case on highway and shares to related organizations.
- MIC create the whole picture of communication utilization for CAV and study message set and protocol on highway.
- MLIT develop road infrastructure to support for merging and utilize several infrastructure to provide look ahead information.


Thank you
SIP-adus Workshop 2017
on Connected and Automated Driving Systems