



Cross-ministerial Strategic Innovation Promotion Program

# **Status of Connected and Automated Vehicle development in SIP-adus**

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**17 Nov. 2016**

**Norifumi Ogawa**

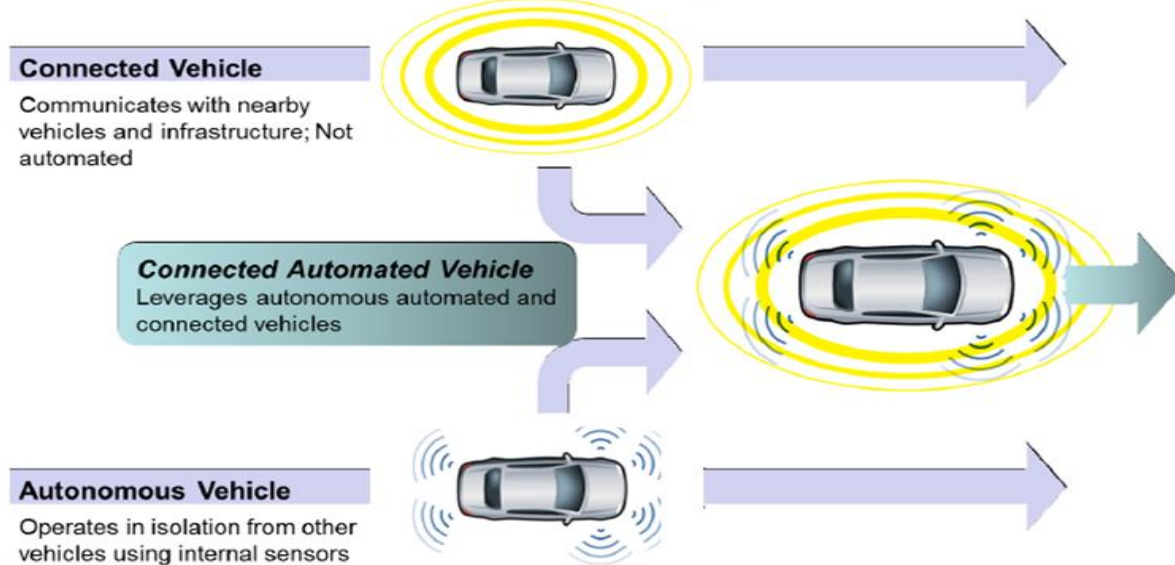
**International Cooperation WG, SIP-adus  
Mazda Motor Corporation**

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# 1. How should we address the automated vehicle with connectivity?

The autonomous vehicle and the connected vehicle should be integrated into ultimate automated vehicle



**Having the common USE CASE should be starting line**

## 2. Common use case for Connected and Automated by JAMA

### JAMA defined 4 typical USE CASE

#### Traffic information from road

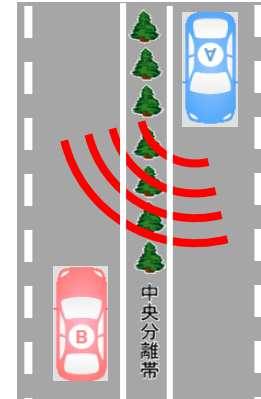
Realize smooth automated driving by using the safety related information from the road which couldn't be gotten by vehicle sensor



#### Detect and distribute the information

A Send the information

B automated vehicle



1. Detect hazardous information on the road by vehicle sensor and distribute the information

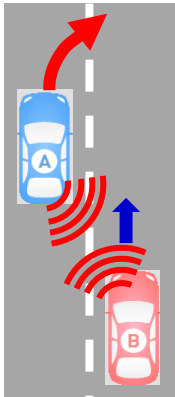
2. Receive the information from other vehicle and re-distribute to on coming automated vehicle

## 2. Common use case for Connected and Automated by JAMA

### Merging/ Lane Change

A Merging vehicle

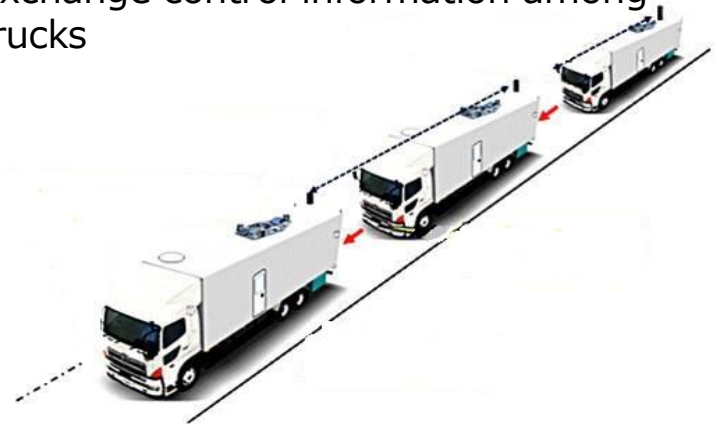
B Following vehicle



- ① Merging or Lane change request from merging vehicle
- ② Following vehicle respond and make gap
- ③ A detect the safe gap and start merging
- ④ Done safe and smooth merging and lane change

### Truck Platooning

Exchange control information among trucks



JAMA

**Merging on highway junction is one of the most critical scenario to evaluate communication protocol capability**

### 3. Use of common use case

**MIC** (Ministry of Internal Affairs and Communications)



Study policy of radio-communication

**NILIM** (National institute for Land and Infrastructure Management)



Study V2I application

**SIP adus** (Cabinet Office)



Study communication performance by proving test

**JAMA** (Japan Automotive Manufacturing Association)

Establishing use case for automated driving



**Common  
USE CASE**

**ITS Forum** (ARIB)



Study radio-communication protocol and standardization

Studying radio-communication application by using **common use case.**<sup>6</sup>

## 4. SIP Connected and Automated Vehicle activities



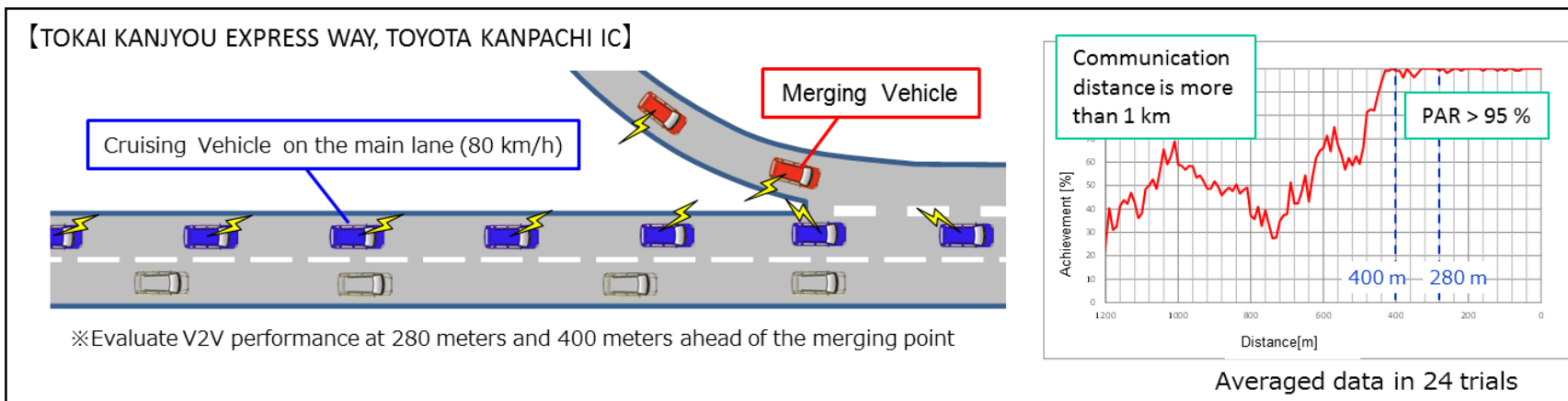
**SIP is studying Connected Vehicle applications for automated driving**

- 1) V2V Application for Merging scenario based on the use case**
  - Clarify capability of current communication protocol (760MHz)
  - Study improvement of communication quality
  
- 2) V2Pedestrian application**
  - Development of portable communication equipment
  - Study pedestrian location identification

# 4. SIP Connected and Automated Vehicle activities

## 1) V2V Application for Merging scenario based on the use case

-Current ITS communication protocol in Japan is capable under the open air condition (use of 760MHz)



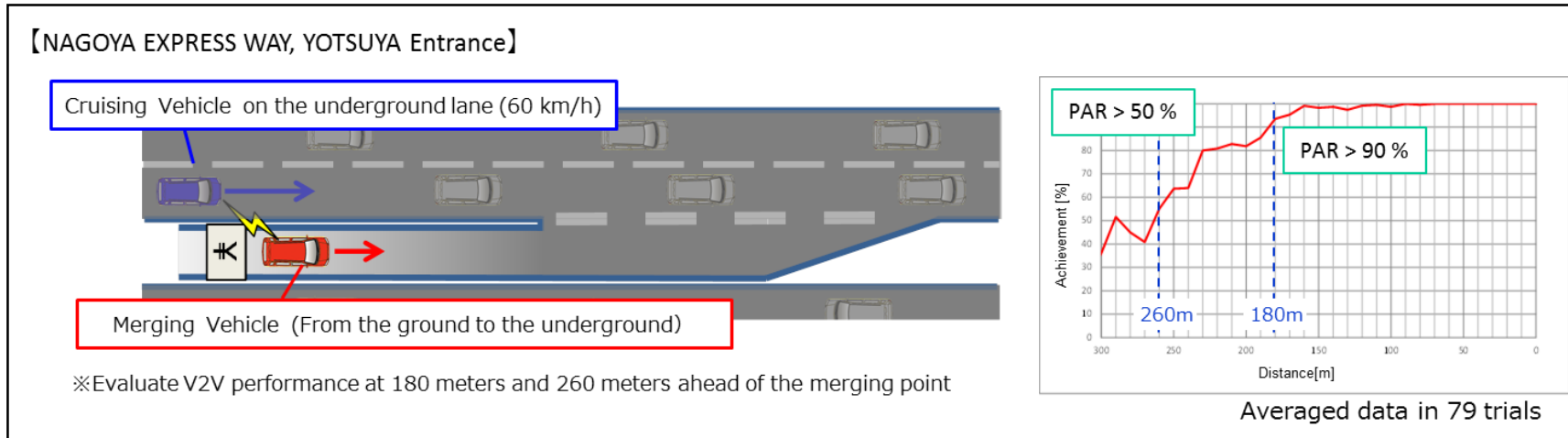


# 4. SIP Connected and Automated Vehicle activities

## 1) V2V Application for Merging scenario based on use case



-Communication performance is not enough under the isolated condition between merged road and main lane. (e.g. tunnel)



# 4. SIP Connected and Automated Vehicle activities

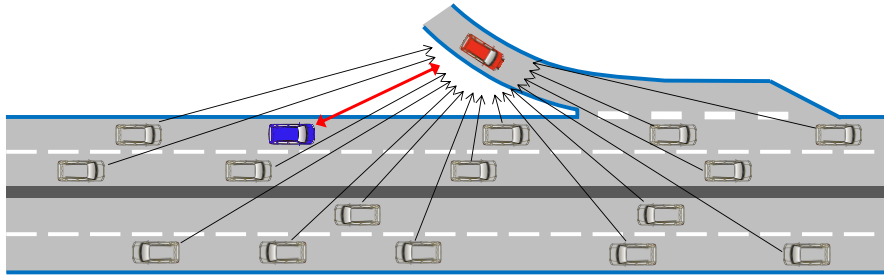


## 1) V2V Application for Merging scenario

**-Study the possibility of V2I application under difficult situation of communication**

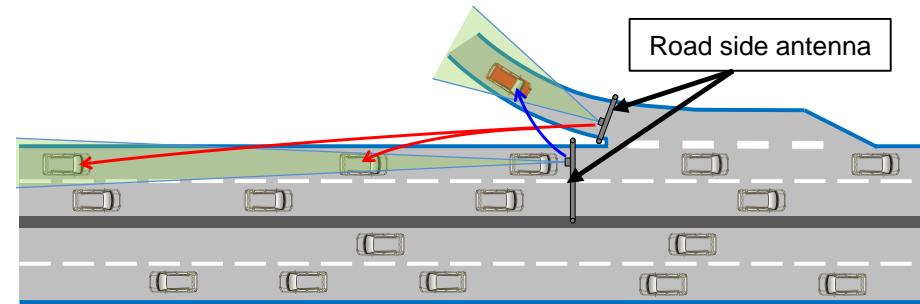
### V2V application

- Identify the vehicles location for mutual communication
- Messages for mutual communication



### V2I application

- Required messages to merging vehicle and vehicles in main lane

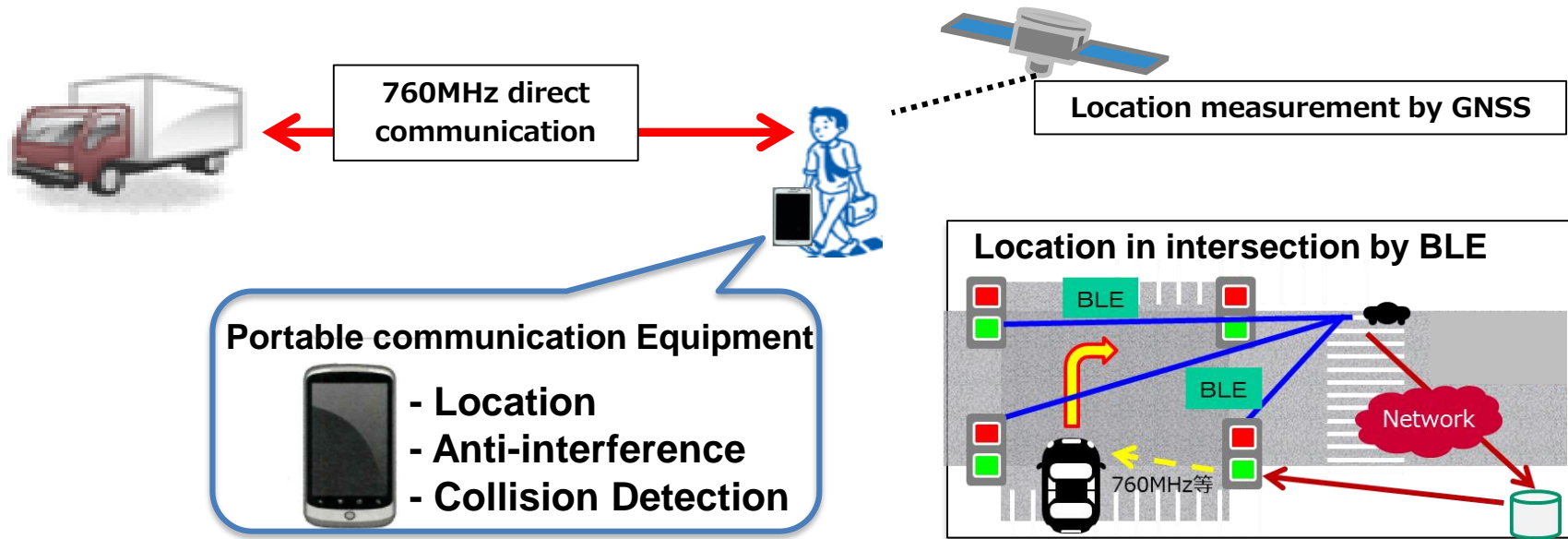


# 4. SIP Connected and Automated Vehicle activities



## 2) V2Pedestrian application

- Develop portable equipment for the pedestrian collision warning
- Pedestrian location measurement performance in urban area
- Communication performance in crowded condition



## 5. Summary

1. **Common use case is the starting line to consider connected and automated vehicle.**
2. **SIP is studying required performance of connectivity for V2V and V2P applications**

**Thank you for your attention**