National Institute for Land and Infrastructure Management
Ministry of Land, Infrastructure, Transport and Tourism
Asahi1, Tsukuba-shi, Ibaraki, 305-0804, Japan

Release of effect verification of "Merging Support Information Provision System" by FOT
~ the first FOT of DAY2 System in Japan ~

March 16th, 2022

- The Government of Japan is working on the automated driving on expressways with the goal of bringing it to the Level 4 marketization by around 2025. Also, in the “Public-Private ITS Initiative/Roadmaps”, “Providing the merging support information on expressways” is positioned as the priority measure to make the automated driving on expressways more progress.

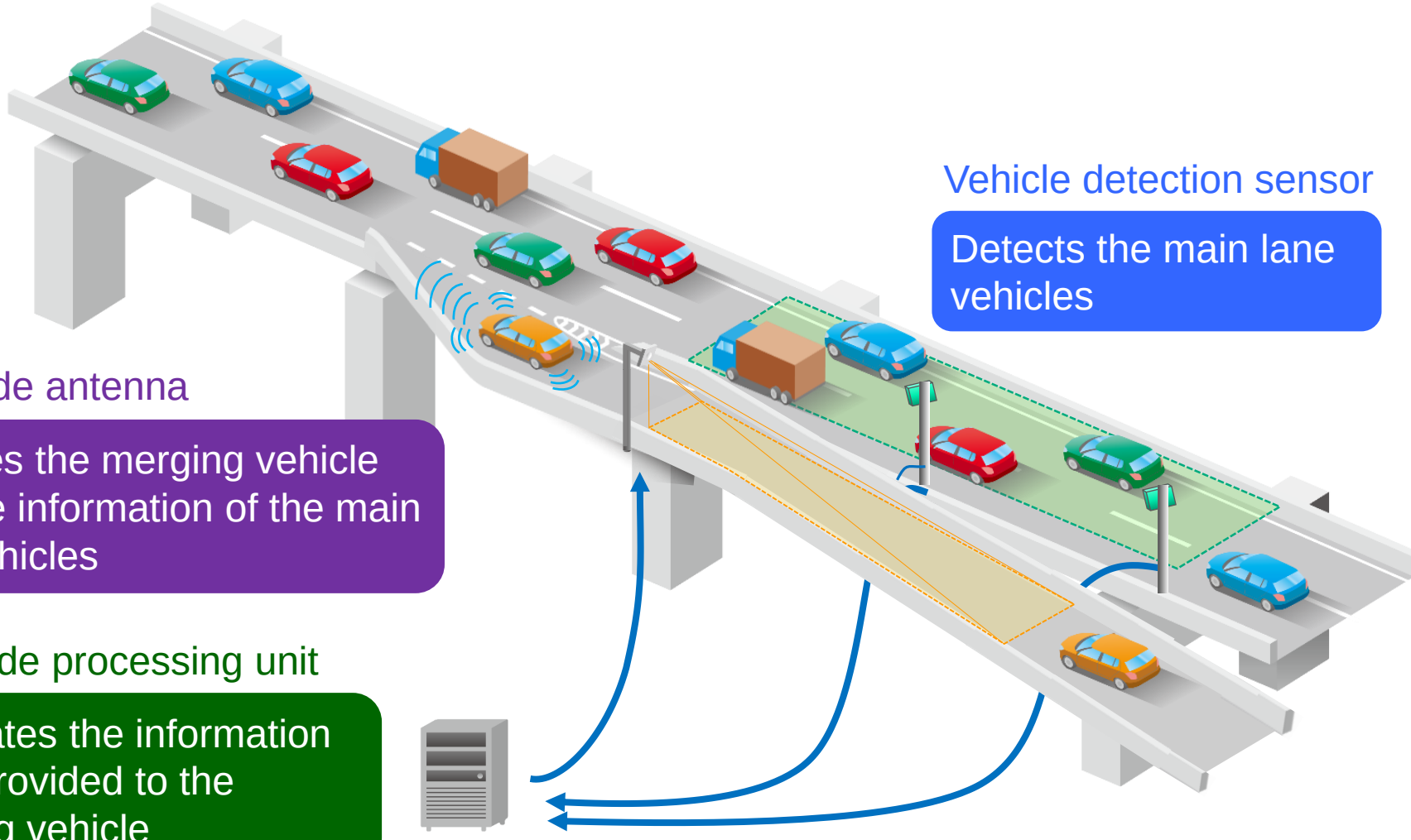
- The National Institute for Land and Infrastructure Management (NILIM) has conducted the “Joint Public-Private Research & Development Project for Cooperative ITS” in order to realize better road traffic by coordinating vehicles and roads. In the project we have been studying the practical application of the “Merge Support Information Provision System”.

- In March 2020, we have carried out the field operational test of DAY1 System on the Tokyo Metropolitan Expressway. After that we have summarized the technical requirements of DAY2 System based on the knowledge obtained in the FOT and the technical characteristics of the vehicle detection sensor for DAY2 System.

- In March 2022, we have conducted the FOT at the NILIM test track to verify the effect of “Merging Support Information Provision System (DAY2 System)”. We will inform you of the overview and the results of the FOT. For the details, you can see next pages.

Merging Support Services on expressways

Merging Support Services on expressways



Vehicle detection sensor

Detects the main lane vehicles

Roadside antenna

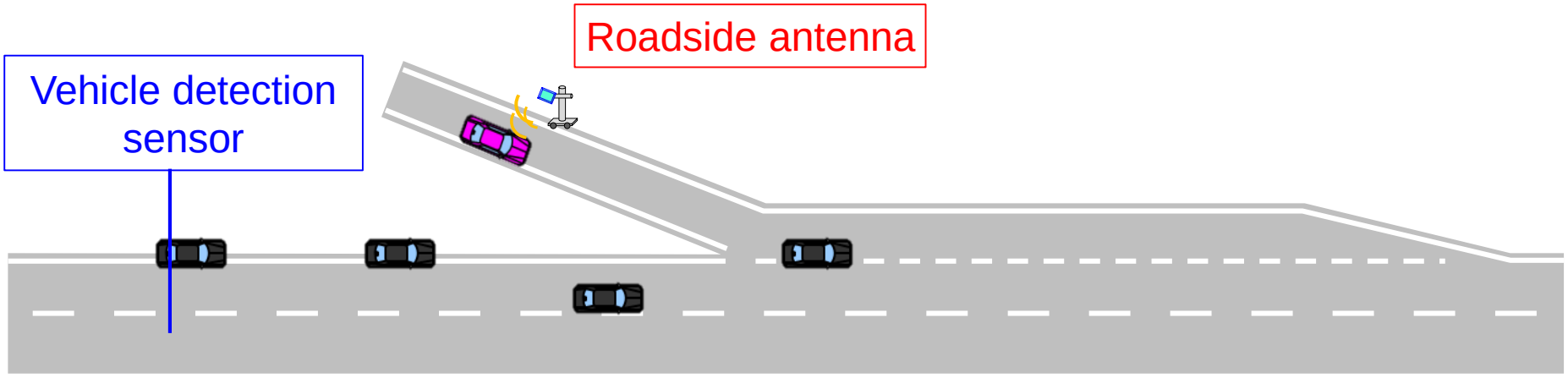
Provides the merging vehicle with the information of the main lane vehicles

Roadside processing unit

Generates the information to be provided to the merging vehicle

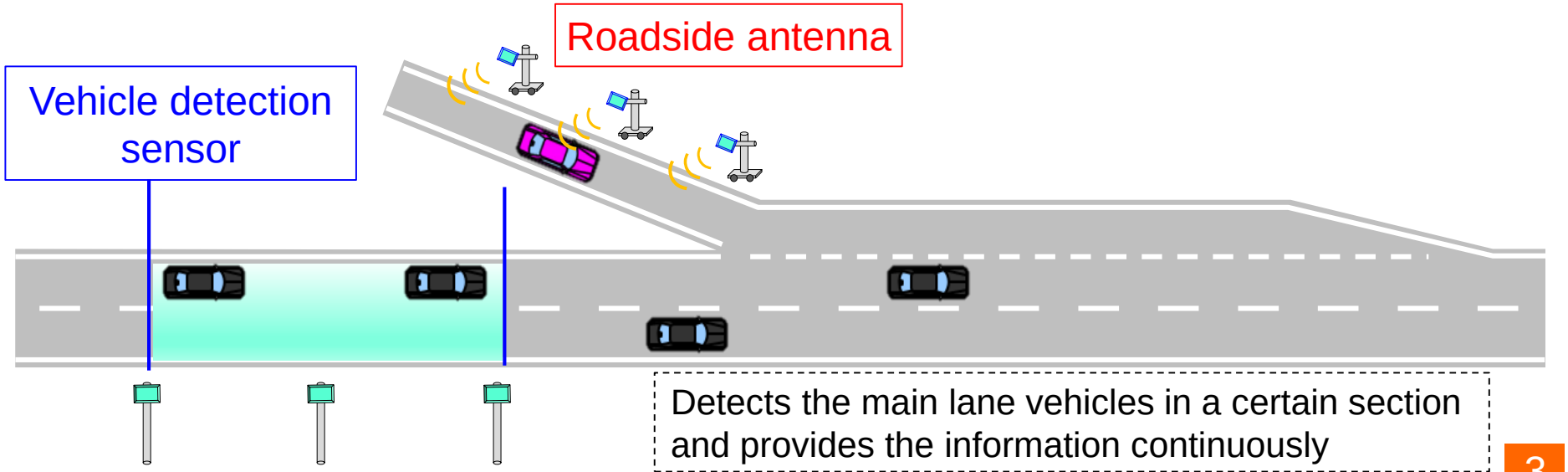
Merging Support Information Provision System (DAY1/DAY2)

DAY1 System



Detects the main lane vehicles in a specific cross section and provides the information at the spot

DAY2 System



Detects the main lane vehicles in a certain section and provides the information continuously

FOT of DAY2 System (Overview)

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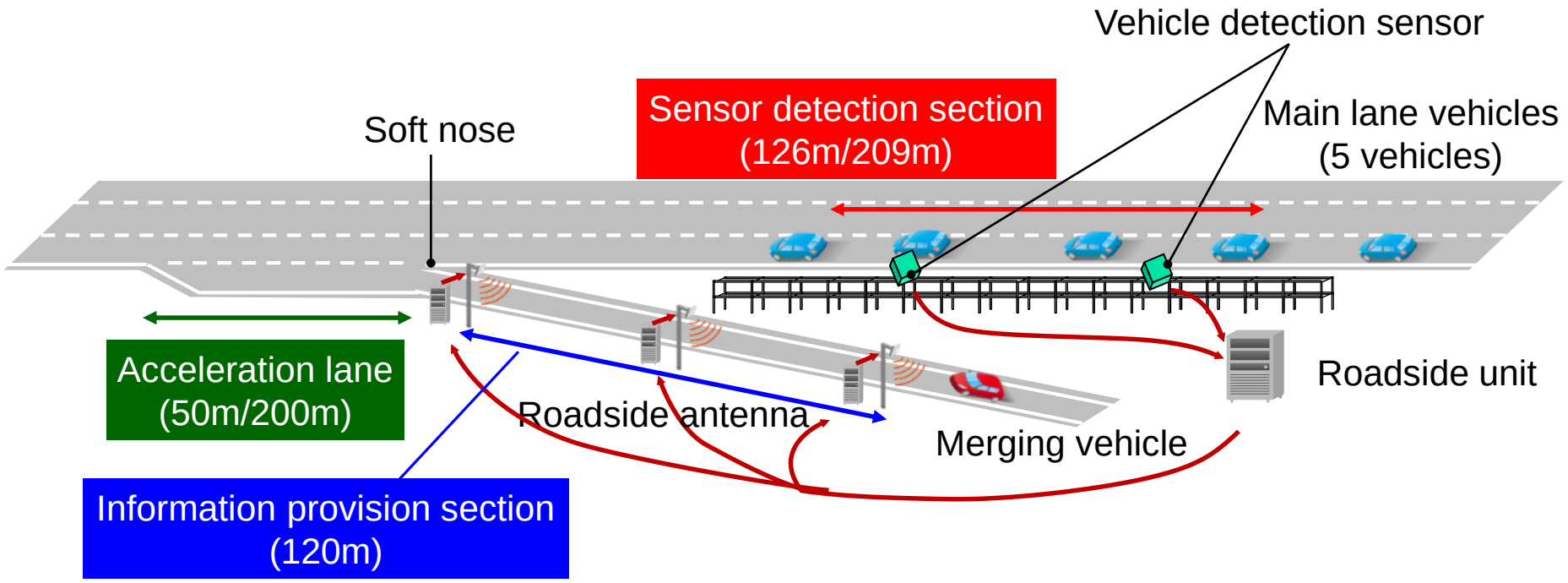


Vehicle detection sensor

Roadside antenna

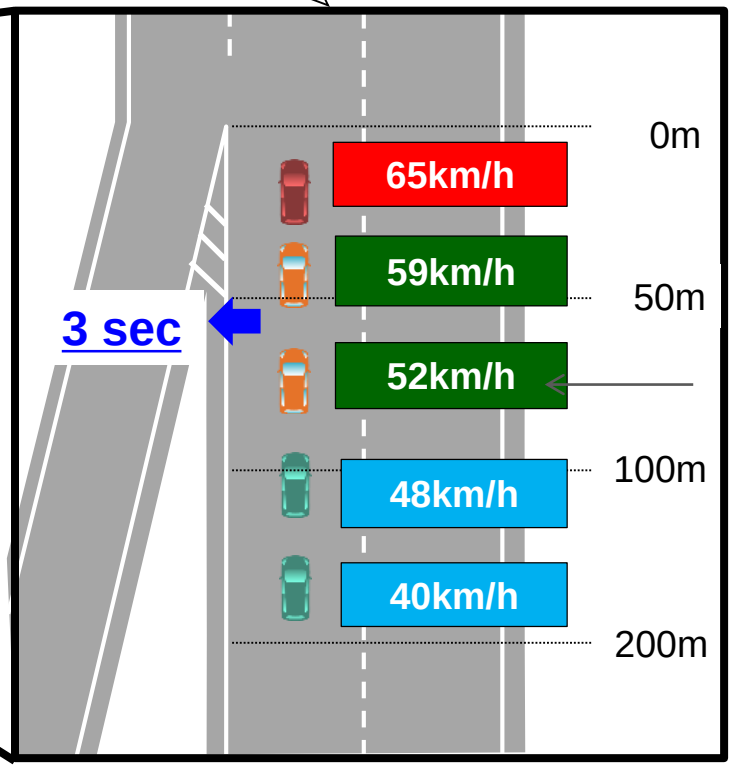
Roadside unit

Merging section

* In the FOT, the merging to the main lane is performed by the driver's operation based on the information from DAY2 System.

FOT of DAY2 System (Information provision in the merging vehicle)

Displayed the speed and the position of the main lane vehicles, and the longest inter-vehicle time among them



FOT of DAY2 System (Evaluation)

Evaluation Item		Evaluation Criteria
Merging vehicle	Success rate of merging	The number of times the merging vehicle could or could not merge to the main lane by the end of the acceleration lane
	Distance from the start to the end of the merging	Distance required for the merging vehicle to merge to the main lane from the acceleration lane
	Acceleration	Acceleration or deceleration when the merging vehicle traveled from the connecting road to the acceleration lane
	Angular velocity	Angular velocity when the merging vehicle traveled in the acceleration lane
Main lane vehicle	Avoidance	Whether or not there is a avoidance of the main lane vehicle before or after the merging vehicle merges
	Deceleration	The amount of deceleration of the main lane vehicle when the merging vehicle merges to the main lane

Result of FOT (Success rate of merging)

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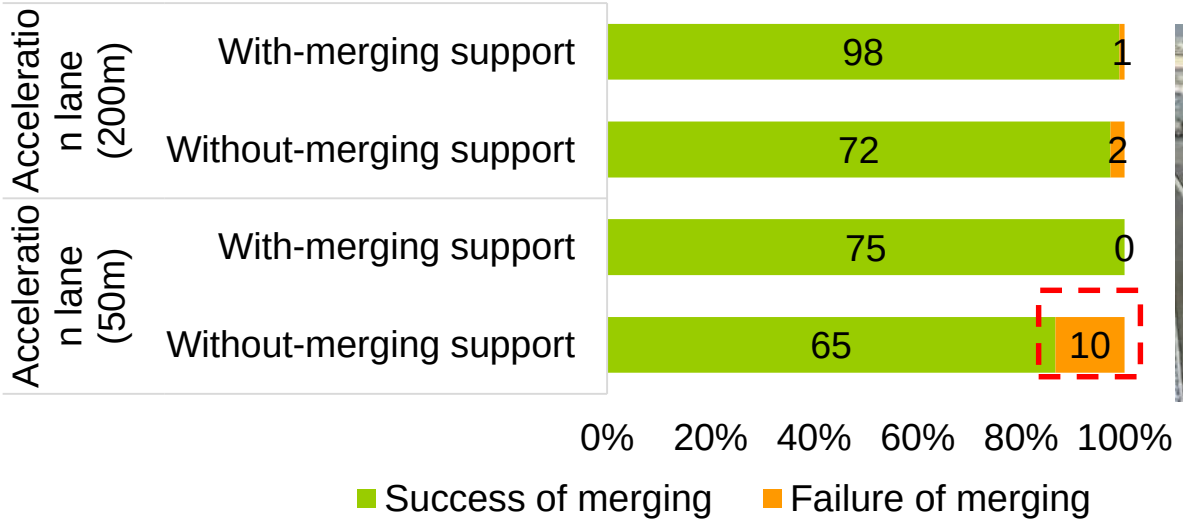
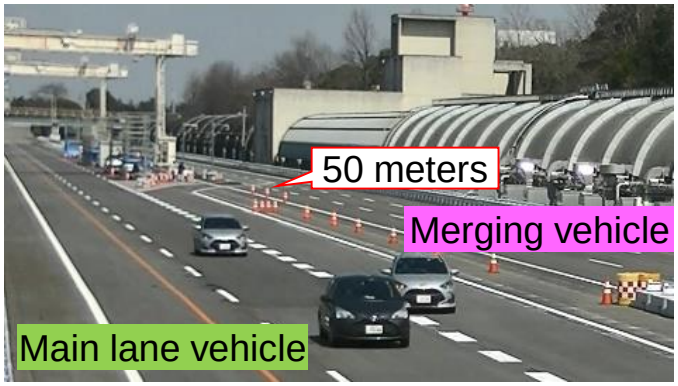
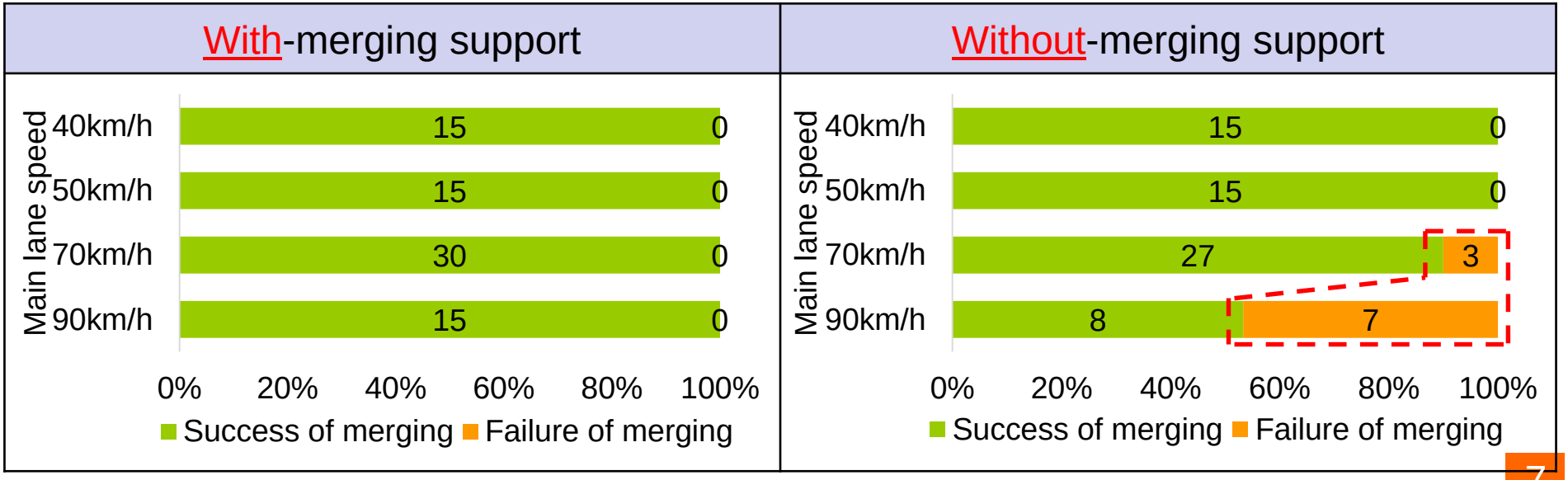
■ Total



■ Example of “Failure of merging”

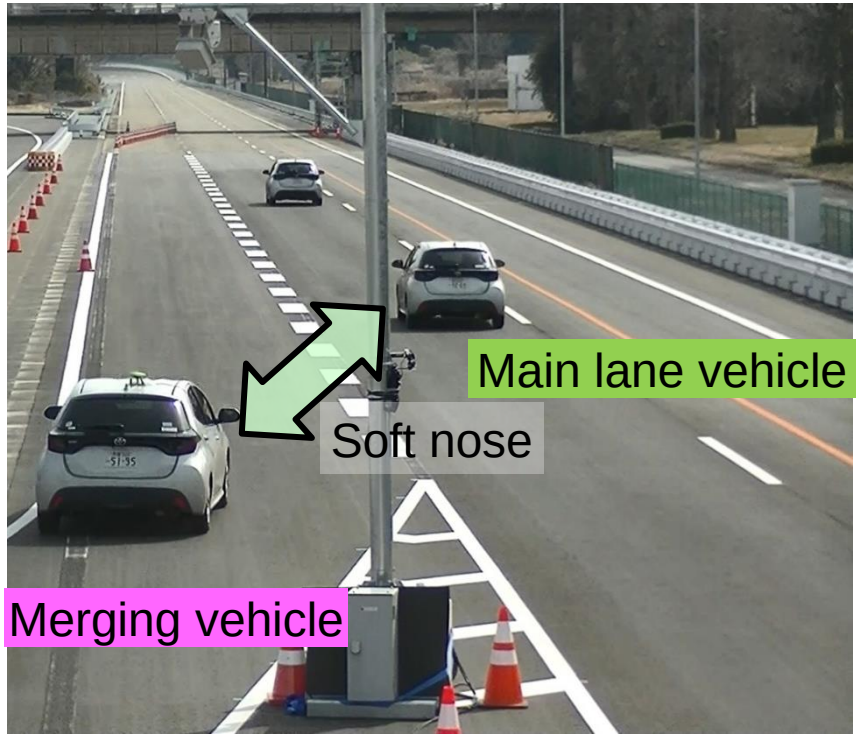


■ By the speed of main lane vehicle (Acceleration lane: 50 meters)

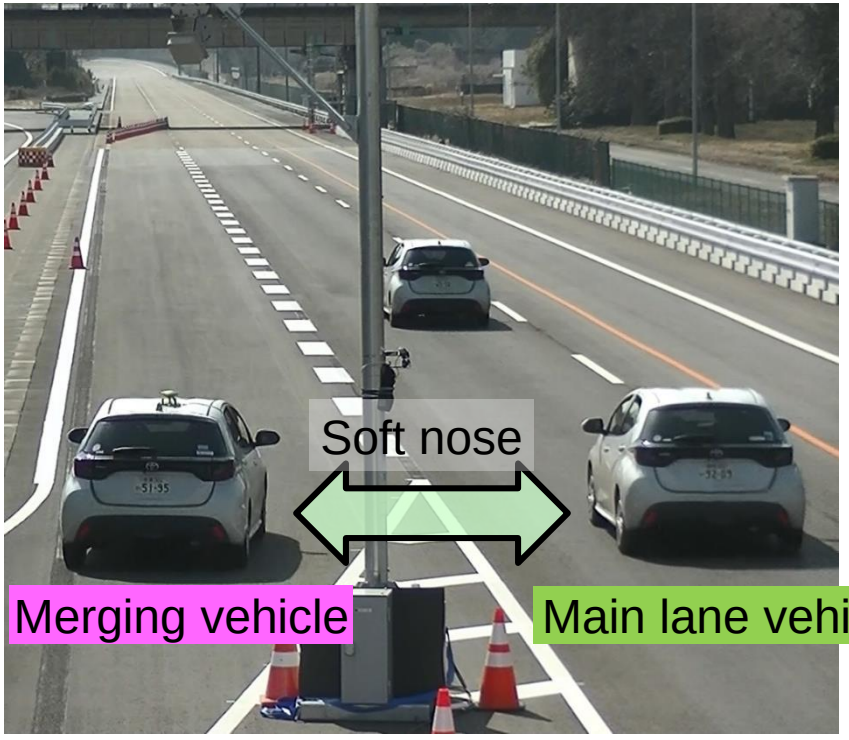


Result of FOT (Success rate of merging)

■ With-merging support



■ Without-merging support



Result of FOT (Acceleration)

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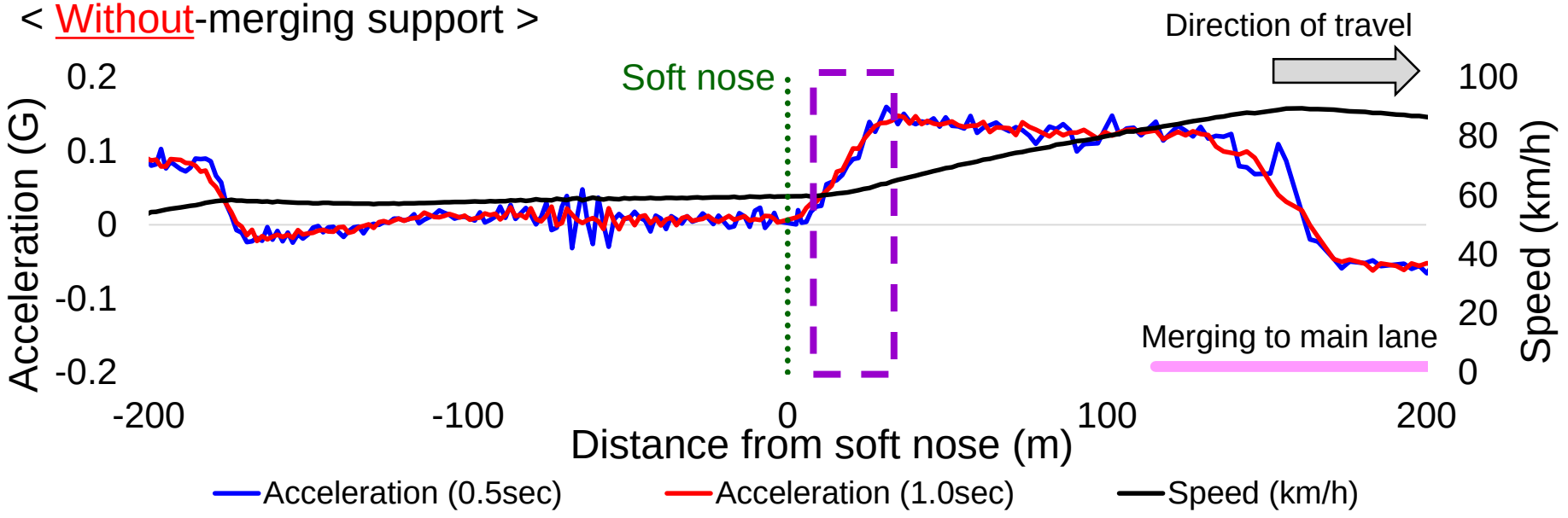
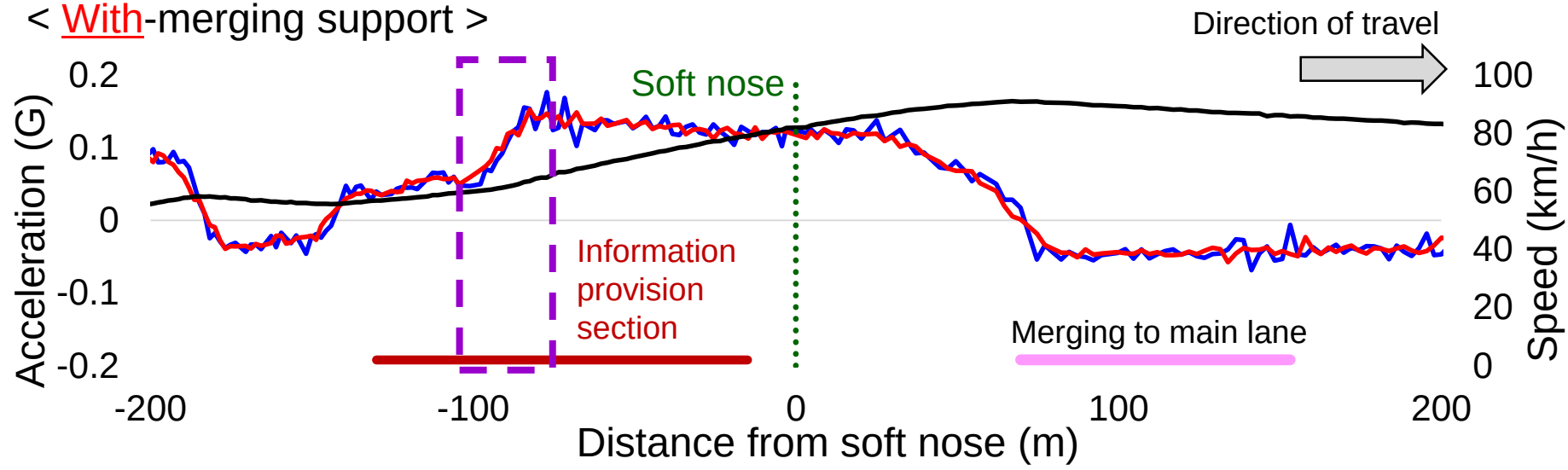
< Without-merging support >



< With-merging support >



Result of FOT (Avoidance)

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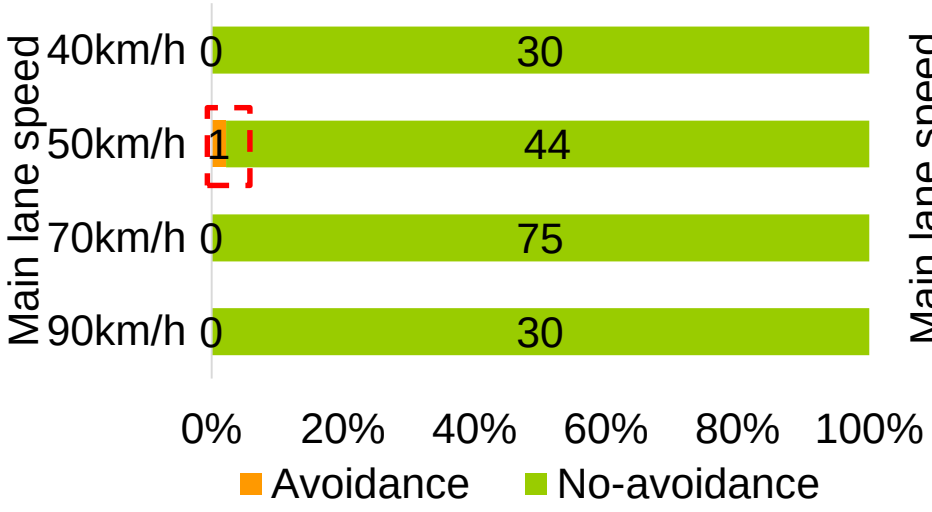
< With-merging support > (N=180)



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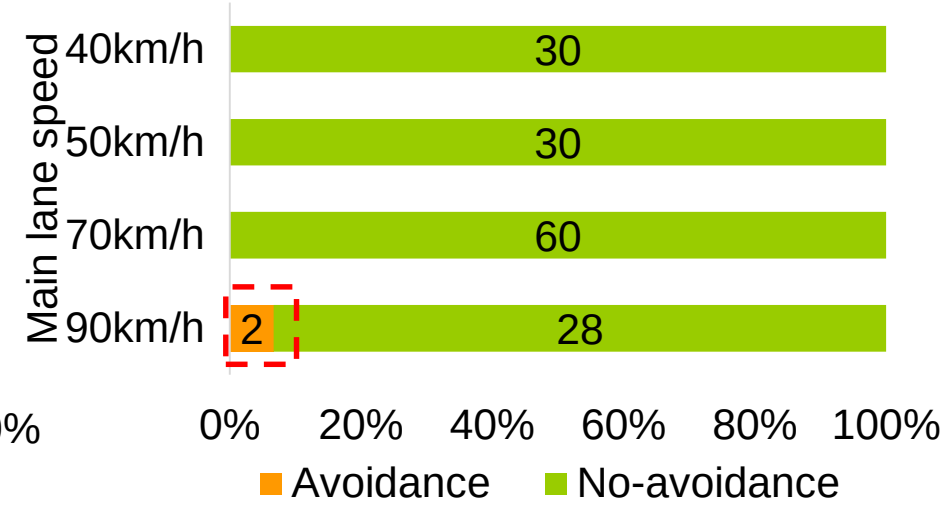

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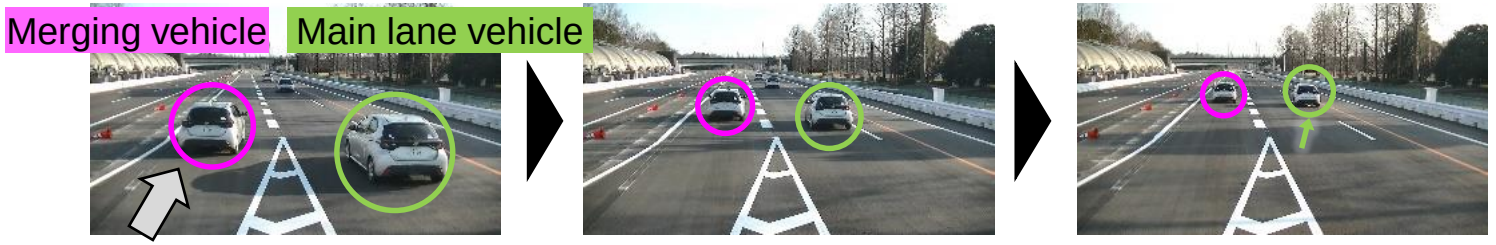
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