Development and substantiation of simulation technology for estimation of detailed traffic accident reduction effects
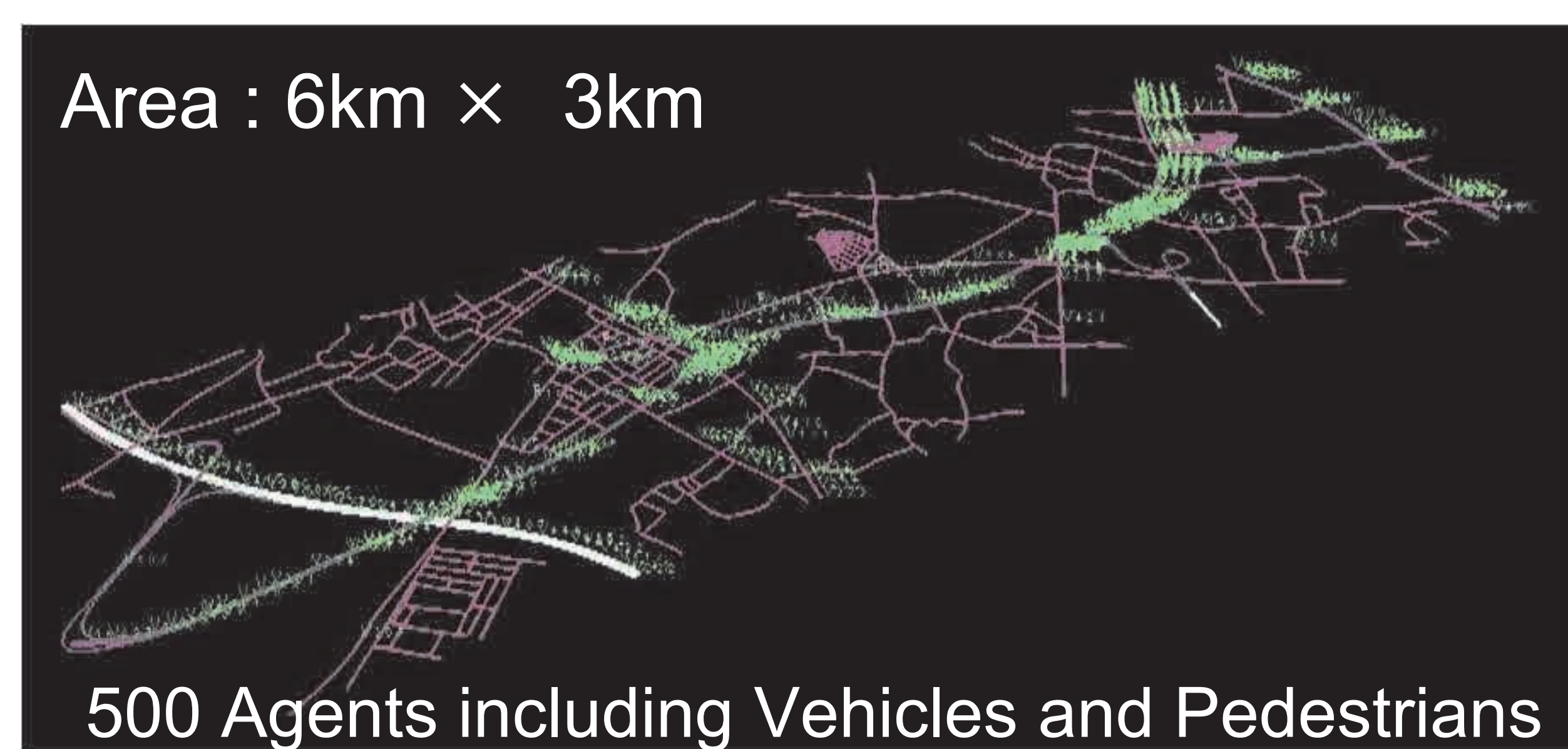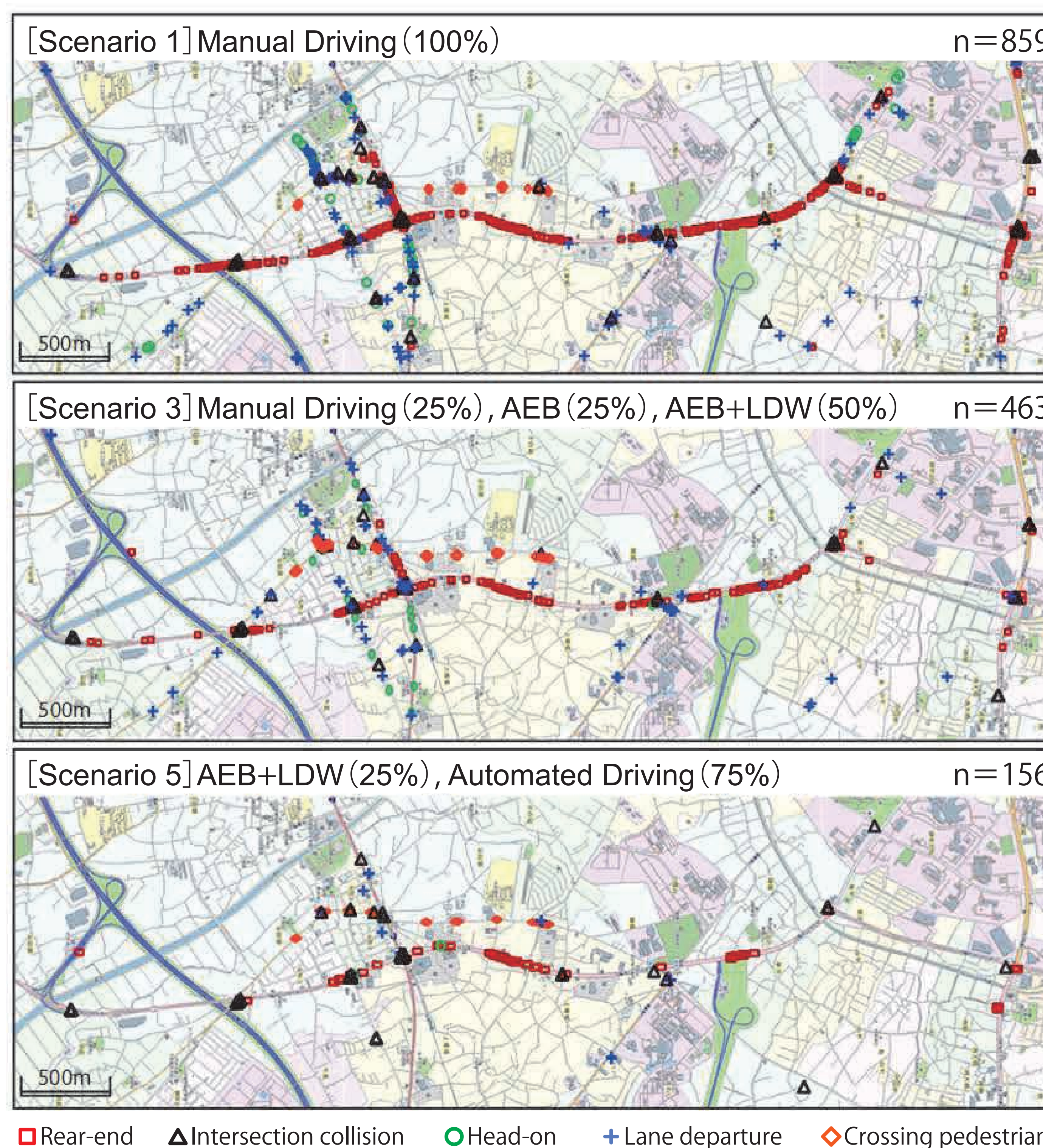
Research aim

To develop a multi-agent traffic simulation software applicable to predict the potential safety improvements of different automated vehicle technologies.

Simulation to predict the impact of Automated Driving systems
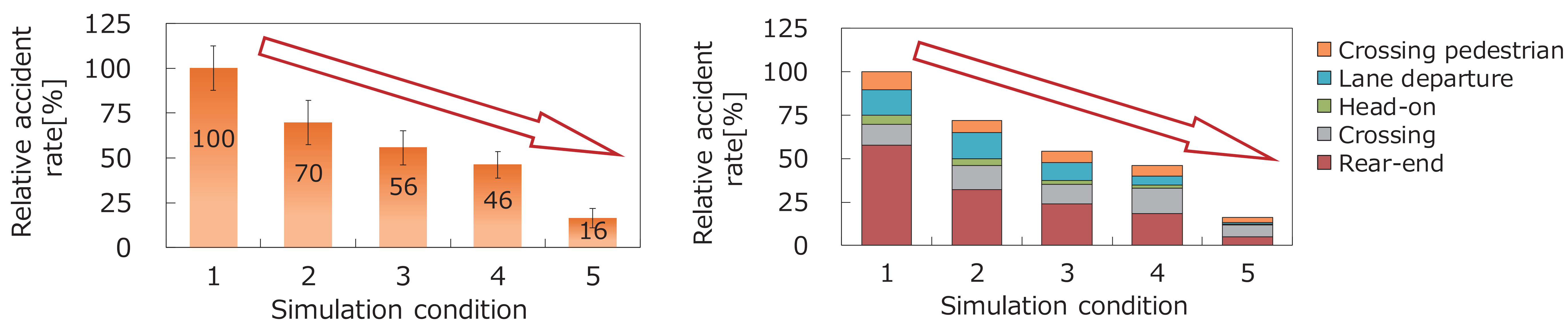
■Execution of simulation

Area : 6km × 3km

500 Agents including Vehicles and Pedestrians

■Simulation conditions

[%]

Simulation Condition	1	2	3	4	5
Manual driving	100	50	25	25	
AEB (SAE Lv.1~2)		50	25		
AEB+LDW (SAE Lv.1~2)			50	50	25
Automated Driving (SAE Lv.3~5)				25	75

■Occurrence spot by simulation condition

[Scenario 1] Manual Driving（100%）　　　　n＝859

500m

[Scenario 3] Manual Driving（25%）, AEB（25%）, AEB+LDW（50%）　　n＝463

500m

[Scenario 5] AEB+LDW（25%）, Automated Driving（75%）　　n＝156

500m

□ Rear-end　　△ Intersection collision　　◯ Head-on　　＋ Lane departure　　◇ Crossing pedestrian

Relative accident rates and accident proportions by Automation penetration level

Relative accident rate[%]

100, 70, 56, 46, 16

Simulation condition

Relative accident rate[%]

Crossing pedestrian
Lane departure
Head-on
Crossing
Rear-end

Simulation condition

✓ **Novel multi-agent traffic simulation software developed and applied to a 6 x 3 km area.**

✓ **Over a simulated period of time including more than 500 agents, the software can simulate at least five types of accidents.**

✓ **Different automated driving technology penetration scenarios can be set to estimate the potential impact of different technologies on safety.**