Test Case No.	JAMA Scenario No.	JAMA Parameter				Additional Parameter								
							Ego car			NPC car				
		Road Geometry	Vehicle behavior	Position of NPC	Motion of NPC	Traffic Lanes	Starting Position	Max Accelerate, Decelerate Rate (m/s^2)	Max speed (m/s)	Types of NPC	Starting Position	Max Accelerate, Decelerate Rate (m/s^2)	Target Speed (m/s)	Goal
Case No. 1	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.112"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}	(-447.51, -3.07, -24.21)	1, 2.5	16.67	Taxi	("TrafficLane.112", 0f)	1, 1	{"TrafficLane.112", 0.5f}, {"TrafficLane.114", 0.5f}, {"TrafficLane.278", 0f}, {"TrafficLane.122", 0f}	("TrafficLane.122", 0f)
Case No. 2	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.112"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}, {"TrafficLane.282"}, {"TrafficLane.514"}, {"TrafficLane.515"}, {"TrafficLane.516"}, {"TrafficLane.124"}, {"TrafficLane.335"}	(-444.56, -3.35, -23.87)	1, 2.5	13.89	Taxi	("TrafficLane.112", 0f)	1, 1	{"TrafficLane.112", 10f}, {"TrafficLane.114", 5f}, {"TrafficLane.278", 0.5f}, {"TrafficLane.122", 5f}, {"TrafficLane.282", 10f}, {"TrafficLane.514", 10f}, {"TrafficLane.515", 5f}, {"TrafficLane.516", 5f}, {"TrafficLane.124", 0.2f}, {"TrafficLane.335", 0f}	("TrafficLane.335", 0f)
Case No. 3	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.112"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}	(-444.56, -3.35, -23.87)	1, 2.5	13.89	Taxi	("TrafficLane.112", 0f)	1, 1	{"TrafficLane.112", 2f}, {"TrafficLane.114", 1f}, {"TrafficLane.278", 0f}, {"TrafficLane.122", 0.2f}	("TrafficLane.122", 0.2f)
Case No. 4	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Stop	{"TrafficLane.282"}, {"TrafficLane.514"}, {"TrafficLane.515"}, {"TrafficLane.516"}, {"TrafficLane.124"}	(-444.56, -3.44, -23.87)	1, 2.5	16.67	Taxi	("TrafficLane.282", 15f)	1, 1	{"TrafficLane.282", 0f}, {"TrafficLane.514", 0f}, {"TrafficLane.515", 0f}, {"TrafficLane.516", 0f}, {"TrafficLane.124", 0f}	("TrafficLane.124", 60f)
Case No. 5	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate and stop	{"TrafficLane.282"}, {"TrafficLane.514"}, {"TrafficLane.515"}, {"TrafficLane.516"}, {"TrafficLane.124"}	(-165.85, -1.63, -27.47)	1, 2.5	16.67	Taxi	("TrafficLane.282", 15f)	1, 1	{"TrafficLane.282", 10f}, {"TrafficLane.514", 10f}, {"TrafficLane.515", 10f}, {"TrafficLane.516", 10f} {"TrafficLane.124", 10f}	("TrafficLane.124", 60f)
Case No. 6	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.282"}, {"TrafficLane.514"}, {"TrafficLane.515"}, {"TrafficLane.516"}, {"TrafficLane.124"}	(-164.9, -1.63, -27.73)	1, 2.5	16.67	Taxi	("TrafficLane.282", 15f)	1, 1	{"TrafficLane.282", 10f}, {"TrafficLane.514", 10f}, {"TrafficLane.515", 10f}, {"TrafficLane.516", 10f} {"TrafficLane.124", 0f}	("TrafficLane.124", 60f)
Case No. 7	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.282"}, {"TrafficLane.514"}, {"TrafficLane.515"}, {"TrafficLane.516"}, {"TrafficLane.124"}	(-168.87, -1.52, -27.18)	1, 2.5	16.67	Taxi	("TrafficLane.282", 15f)	0.5, 0.5	{"TrafficLane.282", 0f}, {"TrafficLane.514", 0f}, {"TrafficLane.515", 0f}, {"TrafficLane.516", 0f} {"TrafficLane.124", 0f}	("TrafficLane.124", 60f)
Case No. 8	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.15"}, {"TrafficLane.17"}, {"TrafficLane.289"}, {"TrafficLane.29"}, {"TrafficLane.286"}, {"TrafficLane.33"}	(-20.41, -1.57, -176.22)	1, 2.5	16.67	Taxi	("TrafficLane.15", 15f)	2, 2	{"TrafficLane.15", 0f}, {"TrafficLane.17", 0f}, {"TrafficLane.289", 0f}, {"TrafficLane.29", 0f}, {"TrafficLane.286", 0f}, {"TrafficLane.33", 0f}	("TrafficLane.33", 0f)
Case No. 9	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.514"}, {"TrafficLane.515"}, {"TrafficLane.516"}, {"TrafficLane.124"}	(-147.40, -1.70, 153.02)	1, 2.5	16.67	Taxi	("TrafficLane.514", 10f)	1, 1	{"TrafficLane.514", 5f}, {"TrafficLane.515", 5f}, {"TrafficLane.516", 5f}, {"TrafficLane.124", 5f}	("TrafficLane.124", 0f)
Case No. 10	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Decelerate	{"TrafficLane.264"}, {"TrafficLane.354"}, {"TrafficLane.210"}, {"TrafficLane.333"}	(-173.82, -0.82, -214.52)	1, 2.5	16.67	Taxi	("TrafficLane.264", 15f)	2, 2	{"TrafficLane.264", 0f}, {"TrafficLane.354", 0f}, {"TrafficLane.210", 0f}, {"TrafficLane.333", 0f}	("TrafficLane.333", 0f)
Case No. 11	Scenario No. 2	Non-intersection	Going Straight	Lead (L)	Stop	{"TrafficLane.15"}, {"TrafficLane.17"}, {"TrafficLane.289"}, {"TrafficLane.29"}, {"TrafficLane.286"}, {"TrafficLane.33"}	(-20.41, -1.57, -176.22)	1, 2.5	4.17	Taxi	("TrafficLane.282", 0f)	2, 2	{"TrafficLane.15", 0f}, {"TrafficLane.17", 0f}, {"TrafficLane.289", 0f}, {"TrafficLane.29", 0f}, {"TrafficLane.286", 0f}, {"TrafficLane.33", 0f}	("TrafficLane.33", 0f)
Case No. 12	Scenario No. 4	Non-intersection	Going Straight	Parallel (Pl-f)	Cut-in	{"TrafficLane.111"}, {"TrafficLane.113"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}, {"TrafficLane.282"}	(-427.18, -3.46, -20.51)	1, 2.5	16.67	Taxi	("TrafficLane.111", 10f)	1, 1	{"TrafficLane.111", 10f}, {"TrafficLane.113", 8f}, {"TrafficLane.114", 5f}, {"TrafficLane.278", 5f}, {"TrafficLane.122", 5f}, {"TrafficLane.282", 0f}	("TrafficLane.282", 20f)
Case No. 13	Scenario No. 4	Non-intersection	Going Straight	Parallel (Pl-f)	Cut-in	{"TrafficLane.111"}, {"TrafficLane.113"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}, {"TrafficLane.282"}	(-425.02, -3.47, -20.16)	1, 2.5	16.67	Taxi	("TrafficLane.111", 10f)	1, 1	{"TrafficLane.111", 10f}, {"TrafficLane.113", 7f}, {"TrafficLane.114", 5f}, {"TrafficLane.278", 5f}, {"TrafficLane.122", 5f}, {"TrafficLane.282", 0f}	("TrafficLane.282", 20f)
Case No. 14	Scenario No. 4	Non-intersection	Going Straight	Parallel (Pl-f)	Cut-in	{"TrafficLane.111"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}, {"TrafficLane.282"}	(-436.60, -3.39, -22.44)	1, 2.5	16.67	Taxi	("TrafficLane.111", 0f)	1, 1	{"TrafficLane.111", 5f}, {"TrafficLane.114", 5f}, {"TrafficLane.278", 5f}, {"TrafficLane.122", 5f}, {"TrafficLane.282", 0f}	("TrafficLane.282", 20f)
Case No. 15	Scenario No. 4	Non-intersection	Going Straight	Parallel (Pl-f)	Cut-in	{"TrafficLane.111"}, {"TrafficLane.114"}, {"TrafficLane.278"}, {"TrafficLane.122"}, {"TrafficLane.282"}	(-381.54, -2.63, -12.26)	1, 2.5	16.67	Taxi	("TrafficLane.111", 0f)	1, 1	{"TrafficLane.111", 5f}, {"TrafficLane.114", 5f}, {"TrafficLane.278", 5f}, {"TrafficLane.122", 0f}, {"TrafficLane.282", 0f}	("TrafficLane.282", 20f)

TABLE 1. TEST MATRIX - FULL VERSION

Complete Test Matrix

Table 1 shows the complete test cases that we conducted with Autoware and the AWSIM-Labs simulator. The tests are designed to assess Autoware's performance in various driving cases from the JAMA framework, focusing specifically on scenarios No. 2 and No. 4. In total, 15 test cases were created and executed, with test cases No. 1 to No. 11 corresponding to scenario No. 2, while test cases No. 12 to No. 15 corresponding scenario No. 4. In some test cases, traffic objects such as signals and lane markings were included, but they are omitted here due to the space limitations of the paper.

We made many trial-and-errors to find appropriate parameter settings to implement the scenarios in the AWSIM-Labs simulator. For scenario No. 2, the first three test cases (No. 1 to No. 3) examined how the ego car behaves when combining its maximum speed with different lane configurations, such as solid and dashed lane lines. The goal was to observe how the car maintains lane discipline and control at varying speeds, particularly under high-speed conditions. This test assessed the car's ability to adapt its driving behavior based on both speed and lane conditions, which is a base-line property for ensuring safe autonomous driving. In setting up the parameters, we identified appropriate locations with the lane lines and designated them as the traffic lanes in the table. We also set acceleration and deceleration rates for both the ego and NPC cars, ensuring that the ego car could catch up with the NPC car. Test cases No. 4 and No. 5 focused on the ego car's response to signals. In these cases, the ego car was tested to determine whether stops at a signal, with two variations: in one case, the NPC stops at the signals (No. 4), while in the other, the NPC moves before stopping at the signal (No. 5). These tests aimed to evaluate how the ego responds to traffic conditions involving NPC, where it must account for signal lights and the behavior of NPC. When setting up the parameters, we selected an appropriate location on the map with a traffic signal and designated it as the traffic lanes in the table. Additionally, we determined suitable acceleration, deceleration rates, and starting locations for both the ego and NPC cars to accurately implement these cases. Test cases No. 6 and No. 7 explored the ego car's braking performance varying the acceleration and deceleration rates. This was intended to assess how to handle different braking intensities, which is vital for ensuring during sudden stops or slow-downs. By modifying the rate we observed the ego car's ability to adjust to varying braking demands. Test cases No. 8 to No. 11 were designed to simulate more aggressive driving conditions, where both acceleration and deceleration rates were significantly increased. These tests included changes in location and introduce additional complexity, with the aim of evaluating how the ego car performs in more dynamic driving environments, such as rapid accelerations and hard braking.

For scenario No. 4, the four test cases (No. 12 to No. 15) focused on how the ego car responds to NPC cars cutting into its lane at different points along the drive. In these tests, the NPC car moved into the ego car' lane at various moments, while the starting position of the ego car and the target speed of the NPC car were adjusted to test how the timing of the cut-in affected its response. The NPC car's behavior remained consistent across the tests, allowing for a clear assessment of how the ego car reacted to the cut-ins at points in its trajectory.