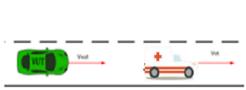
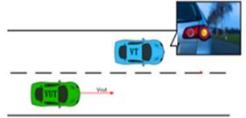
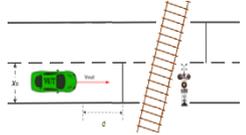


## Safety Requirements from Other Road User Workstream

This document includes the general safety requirements proposed from the Other Road User Workstream. In order to better illustrate the input from the perspective of ORU safety, and in line with previous FRAV work, we learned from the work in DDT task, review safety element and combined with the research of Property based Approach.

In this session, ORU workstream would like to provide a list of general requirements at a level where the VMAD subgroups can make decisions on the assessment methods.

	General Requirement	Detailed Requirements	Measurable / Verifiable Criteria	Figure Demonstration
<b>The ADS should interact safely with other road user.</b>				
1	<b>The ADS should detect, classify, and recognize different kind of ORU.</b>	<ul style="list-style-type: none"> <li>● ADS shall detect, classify, and recognize objects of a minimum size.</li> <li>● ADS shall detect an object and classify that object according to whether it may be capable of moving.</li> </ul>	<p><b>Scenario/Virtual test/Track test:</b></p> <ul style="list-style-type: none"> <li>● <b>Object:</b> Test vehicle/Dummy/Test cyclist, ego vehicle;</li> <li>● <b>Case:</b> Ego vehicle drives in the lane while there's a stationary(moving) cyclist, pedestrian, and vehicle targets on the same lane in a preset minimum distance.</li> <li>● <b>Goal:</b> verify the ADS detect, classify, and recognize ORUs in minimum distance.</li> <li>● <b>Aduit:</b> the audit should include a verification that the ADS has been programmed to recognize features of different ORUs.</li> </ul>	
2	<b>The ADS should avoid collision with ORU of a minimum size.</b>	<ul style="list-style-type: none"> <li>● ADS shall avoid contact with objects of a minimum size.</li> <li>● ADS shall ensure a safe minimum lateral distance when passing.</li> </ul>	<p><b>Scenario/Virtual test/Track test:</b></p> <ul style="list-style-type: none"> <li>● <b>Object:</b> Test vehicle/Dummy/Test cyclist, ego vehicle;</li> <li>● <b>Case:</b> Ego vehicle drives in the lane(adjacent lane) while there's a moving vehicle brake suddenly.</li> <li>● <b>Goal:</b> verify the ADS avoids hitting the object of these minimum dimensions.</li> </ul>	
3	<b>The ADS should respond in line with traffic laws to markings and signals used to identify the functions and authorizations of ORUs.</b>	<ul style="list-style-type: none"> <li>● The ADS should respond in accordance with traffic rules upon the operational status or dedicated signals displayed by emergency/enforceme nt vehicles.</li> </ul>	<p><b>Scenario/Virtual test/Track test:</b></p> <ul style="list-style-type: none"> <li>● <b>Object:</b> Emergency/Special vehicle with visual signal (flash/painting), ego vehicle;</li> <li>● <b>Case:</b> 2-lane road, an emergency vehicle moves at low speed (in operational state) ahead while test vehicle drives in the same lane.</li> </ul>	

		<ul style="list-style-type: none"> <li>● Visual, audible, and light signals should be detected to identify if it is running emergent/special task.</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Goal:</b> Verify if the ADS shall respond in accordance with traffic rules (eg.not overtake the emergency vehicle in the adjacent lane.)</li> <li>● <b>Audit:</b> the audit should include a verification that the ADS has been programmed to recognize markings and signals used by vehicles relevant to the ODD of the ADS feature(s).</li> </ul>	
4	<p>The ADS should predict the intents of ORUs and respond safely.</p>	<ul style="list-style-type: none"> <li>● ADS should response properly if signals detected from other ORU could indicate its drive intent.</li> <li>● ADS should keep a more cautious strategy if there detect ORU behave oddly.</li> </ul>	<p><b>Scenario/Virtual test/Track test:</b></p> <ul style="list-style-type: none"> <li>● <b>Object:</b> Test vehicle, Ego vehicle;</li> <li>● <b>Cases:</b> 2-lane road, test vehicle drives in the adjacent lane, flash the blinker to indicate a left turn to ego vehicle's lane.</li> <li>● <b>Goal:</b> Verify if the ADS could understand and decelerate in time.</li> <li>● <b>Audit:</b> the audit should include a verification that the ADS has been programmed to predict and understand ORU's usage of lightings and signals.</li> </ul>	
5	<p>The ADS should recognize pathways and related infrastructure designed to separate modes and lanes of traffic.</p>		<p><b>Scenario/Virtual test</b></p>	
6	<p>The ADS should establish a stable connection and response correctly if the vehicle has V2X options.</p>		<p><b>Scenario/Virtual test</b></p>	