Scenarios / Use-Cases

ID:	SCE-		
Name:			
Created:		**Last Updated:**	
Description:			
Actors:			
Preconditions:			
Postconditions:			
Flow:			
Alternative Flows:			
Exceptions:			
Requirements:			
Test Cases:			

ID:	SCE-1		
Name:	Transportation from current position to target destination		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	The user enters a destination and the vehicle will transport him to the destination.		
Actors:	User, Autopilot		
Preconditions:			
Postconditions:			
Flow:	1. User enters a destination and starts the vehicle. 2. Autopilot computes the optimal path from the current position to the destination 3. Autopilot safely drives the vehicle to the destination		
Alternative Flow 1	1. User enters a path instead of a destination		

	2. Autopilot will compute the optimal way from the current position to the starting point of the given path 3. Autopilot safely drives the vehicle along the path to the destination
Alternative flow 2	1. The vehicle will display an error if the destination or a point of the path cannot be found or reached.
Requirements:	All
Test Cases	All

ID:	SCE-2		
Name:	Manual Speed control		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	The user changes the speed of the vehicle while driving		
Actors:	User, Autopilot		
Preconditions:	1. The vehicle is currently driving on a path to its destination.		
Postconditions:			
Flow:	1. User enters the desired speed 2. Vehicle checks the local speed limit 3. Vehicle changes the speed to desired value		
Alternative Flows:	3. Vehicle displays an error message if the desired speed is higher than the local top speed limit or lower than the local bottom speed limit		
Exceptions:			
Requirements:	REQ 2		
Test Cases	TC-2.2.*		

ID:	SCE-3		
Name:	Regenerative braking		
Created:	28.11.2020	**Last updated**	28.11.2020
Description:	When stopping the vehicle, the vehicle converts the kinetic energy into a form that can be stored for later use, thus charging the battery		

Actors:	User, Autopilot
Preconditions:	The vehicle is braking
Postconditions:	The battery is recharged (if sufficient amount of energy is stored)
Flow:	1. The vehicle starts braking 2. The vehicle slows down 3. The battery is charged
Alternative Flows:	The battery is not recharged when insufficient amount of energy is generated
Exceptions:	
Requirements:	REQ-3.1, REQ-12
Test Cases	TC-3.1.1, TC-12.1.1, TC-13.1.1

ID:	SCE-4a		
Name:	Collision Avoidance		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	The vehicle recognizes and avoids other vehicles and obstacles		
Actors:	Autopilot, Other vehicle		
Preconditions:	The vehicle is currently driving on a path to its destination.		
Postconditions:			
Flow:	1. Sensors detect a different vehicle in front 2. Vehicle keeps a safety distance to the other vehicle and follows it at the same speed until their paths separate		
Alternative Flows:	1. Sensors detect an obstacle (immovable object that is in the path of the vehicle) 2. Vehicle slows down and comes to a halt before the obstacle. If the vehicle is too close to the obstacle, emergency braking is triggered		
Exceptions:			
Requirements:	REQ-3		
Test Cases:	TC-3.1.*, TC-3.2.*, TC-3.3.*, TC-3.4.*		

ID:	SCE-5		
Name:	Unsignalized Intersection Handling		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	The autopilot approaches an unsignalized intersection and acts according to the local road traffic laws.		
Actors:	Autopilot , Other vehicles		
Preconditions:	3. The vehicle is driving along a path and reaching an intersection		
Postconditions:			
Flow:	1. Autopilot stops at the intersection 2. Autopilot checks if there are any other vehicles coming from one of the other entrances 3. Autopilot continues on its way through the intersection		
Alternative Flows:	4. Autopilot recognizes that other vehicle(s) has/have the way of right 5. Autopilot waits until the other vehicle(s) has/have crossed the intersection 6. Autopilot continues on its way through the intersection		
Exceptions:			
Requirements:	REQ-3.2, REQ-6.1		
Test Cases:	TC-6.1.*		

ID:	SCE-6		
Name:	Signalized Intersection Handling		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	The vehicle approaches a signalized intersection and acts according to the local road traffic laws.		
Actors:	Autopilot , Other vehicles, Traffic Light		
Preconditions:	1. The vehicle is driving along a path and reaching an intersection		
Postconditions:			
Flow:	1. Autopilot detects the current status of the traffic light 2. Traffic light is green		

	3. Autopilot wants to turn left (right) so it checks if there is incoming traffic 4. Autopilot waits for incoming traffic to pass through 5. Autopilot turns left (right) at the intersection
Alternative Flows:	Green traffic light: 3. Autopilot wants to continue straight or turn right 4. Autopilot continues along its path Yellow traffic light: 3. Autopilot checks distance to intersection 4. Autopilot slows down and comes to a halt before the intersection if the braking distance allows it otherwise it continues 5. Autopilot waits for the light to turn green again Red traffic light: 1. Autopilot slows down and comes to a halt before the intersection 2. Autopilot waits for the light to turn green again
Exceptions:	
Requirements:	REQ-6.1, REQ-6.2
Test Cases:	TC-6.1.*, TC-6.2.*

ID:	SCE-7		
Name:	Emergency braking		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	Maximum brake force is applied		
Actors:	Autopilot		
Preconditions:	The vehicle is going over a certain threshold between an obstacle and itself which implies immediate danger, if the vehicle doesn't stop		
Postconditions:			
Flow:	1. The vehicle is driving on it's path at a certain speed 2. The sensors detect an obstacle 3. The distance to the obstacle is calculated to be too little 4. Emergency braking is triggered		
Alternative Flows:	When the obstacle is too small like a small stick or a small pile of leaves, the vehicle does not ingage emergency braking.		
Exceptions:			

Requirements:	REQ-3.1, REQ 3.2
Test Cases:	TC-3.5.1

ID:	SCE-8		
Name:	Traffic jam detection		
Created:	28.11.2020	**Last updated:**	28.11.2020
Description:	The vehicle sends a signal and position to other nearby vehicles when it detects a traffic jam		
Actors:	User, Autopilot		
Preconditions:			
Postconditions:			
Flow:	Autopilot version 1. The vehicle notices the big amount of vehicles in its way which are all at a halt 2. The vehicle sends a signal and the location of the traffic jam to nearby vehicles which are moving towards where the vehicle is situated		
Alternative Flows:	Manual version 1. The User notices the traffic jam 2. The User manually sends a signal and the traffic jam's location by selecting a setting on the vehicle interface		
Exceptions:			
Requirements:	REQ-3.2		
Test Cases:	TC-7.1.1		

ID:	SCE-9		
Name:	Weather adaption		
Created:	28.11.2020	**Last Updated:**	28.11.2020
Description:	The sensors detect a weather change and the vehicle adapts its driving profile accordingly.		
Actors:	Autopilot		
Preconditions:	1. The vehicle is currently driving on a path to its destination.		

Postconditions:	
Flow:	1. Sensors detect snow, ice, a wet road or a dry road 2. Autopilot reduces the speed and increases its turning radius to prevent slipping
Alternative Flows:	
Exceptions:	
Requirements:	REQ-8
Test Cases:	TC-8.1.*

ID:	SCE-10		
Name:	Emergency corridor		
Created:	28.11.2020	**Last updated:**	28.11.2020
Description:	The vehicles must form an emergency corridor when there's an emergency vehicle approaching.		
Actors:	Autopilot		
Preconditions:	An emergency vehicle is seen or heard approaching		
Postconditions:	The vehicle should return to its previous position if possible		
Flow:	If on the leftmost lane: 1. An emergency vehicle is heard or seen to be approaching 2. The vehicle moves as far left as possible		
Alternative Flow 1:	If the vehicle is not in the leftmost lane: 2. The vehicle moves as far right as possible.		
Alternative flow 2:	The vehicle can't move because of obstacles that are in the way		
Requirements:	REQ-3, REQ-3.2		
Test Cases:	TC-9.1.1		