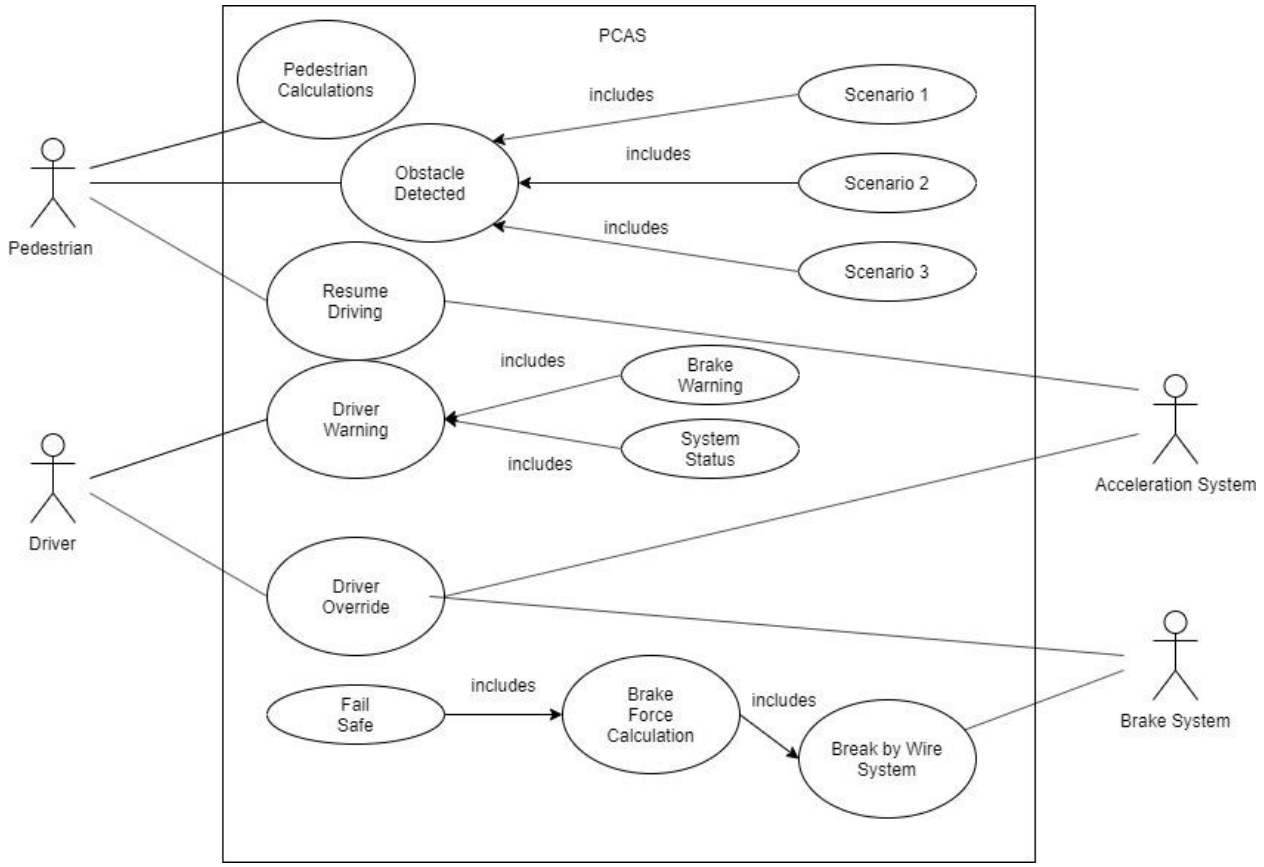
Use Case Diagram



Use Case Diagram Descriptions

Use Case:	***Pedestrian Calculations***
Actors:	***Pedestrian***
Description:	***The pedestrian speed, direction, and distance from vehicle is calculated. In this service the Pedestrian Detector Camera Sensor is implemented. The Pedestrian Detector Camera Sensor is used only in the PCAS system. The calculation will occur for one pedestrian at a time, the calculations of the pedestrian will be executed every 100 ms***
Type:	***Primary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***1.1, 1.2, 1.3, 1.4***
Use cases:	***N/A***

Use Case:	***Obstacle Detected***
Actors:	***Pedestrian***
Description:	***In this service a pedestrian is detected. The pedestrian speed, direction, and distance from vehicle are used to identify which scenario is executed. There is also a flag set in the system that a pedestrian is detected. If a pedestrian is on the side of the road or on the road it will be detected.***
Type:	***Primary***
Includes:	***Scenario 1, Scenario 2, Scenario 3***
Extends:	***N/A***
Cross-refs:	***1.5, 2.1, 2.2, 2.3, 2.4***
Use cases:	***Pedestrian Calculations***

Use Case:	***Scenario 1***
Actors:	***Pedestrian***
Description:	***In this service the pedestrian is moving then stops in the collision path of the vehicle. The initial position of the vehicle is 0,0. There are 4 specific instances of this scenario that need to be passed:***
Type:	***Secondary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***2.1***
Use cases:	***Obstacle Detected***

Use Case:	***Scenario 2***
Actors:	***Pedestrian***
Description:	***In this service the pedestrian is static then moves into the collision path of the vehicle. The initial position of the vehicle is 0,0. There are 3 specific instances of this scenario that need to be passed:***
Type:	***Secondary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***2.2***
Use cases:	***Obstacle Detected***

Use Case:	***Scenario 3***
Actors:	***Pedestrian***
Description:	***In this service the pedestrian is static in either the driver path or on the side of the road. The initial position of the vehicle is 0,0. There are 3 specific instances of this scenario that need to be passed:***
Type:	***Secondary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***2.3***
Use cases:	***Obstacle Detected***

Use Case:	***Resume Driving***
Actors:	***Pedestrian, Acceleration System***
Description:	***In this service the velocity of the vehicle prior to PCAS system mitigation is reestablished only when the pedestrian is no longer a collision threat***
Type:	***Primary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***6***
Use cases:	***Pedestrian Calculations***

Use Case:	***Driver Warning***
Actors:	***Driver***
Description:	***In this service the driver will be provided a warning when an object is detected and when the brake is engaged.***
Type:	***Primary***
Includes:	***Brake Warning, Driver Warning***
Extends:	***N/A***
Cross-refs:	***3.1, 3.2***
Use cases:	***Enumerate use cases that are dependent upon the current one.***

Use Case:	***Brake Warning***
Actors:	***Driver***
Description:	***If the system activates the brake, the driver will be warned with a brake warning on the center console screen and a seat vibration***
Type:	***Primary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***3.2***
Use cases:	***Driver Warning***

Use Case:	***Obstacle Warning***
Actors:	***Driver***
Description:	***If the system detects a pedestrian a warning will display on the center console screen.***
Type:	***Private***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***3.1***
Use cases:	***Driver Warning***

Use Case:	***Driver Override***
Actors:	***Driver, Acceleration System, Brake System***
Description:	***In this service if the driver presses either the gas or brake pedal the system will disengage and the driver is given full control of the vehicle.***
Type:	***Primary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***7***
Use cases:	***N/A***

Use Case:	***Fail Safe***
Actors:	***Brake System***
Description:	***In this service called "Safety Mode" the response time to reach requested decel is changed from 200 ms to 900 ms***
Type:	***Primary***
Includes:	***N/A***
Extends:	***N/A***
Cross-refs:	***8, 5.5.1, 5.5.2, 5.5.3***
Use cases:	***Brake Force Calculation***

Use Case:	***Brake Force Calculation***
Actors:	***Brake System***
Description:	***In this service the pedestrian speed, direction, and distance from the vehicle are used to calculate the necessary brake force to avoid collision.***
Type:	***Primary***
Includes:	***Fail Safe***
Extends:	***N/A***
Cross-refs:	***4.1, 4.2***
Use cases:	***Brake by Wire System***

Use Case:	***Brake by Wire System***
Actors:	***Brake System***
Description:	***This service responds to deceleration requests by interrupting the*** ***steady state velocity control (cruise control) and then applying brake torque via elctro-mechanical actuators at all four wheels of the vehicle and sensing the actual vehicle decel for closed loop control. The BBW system can respond to these brake requests about as fast as a human driver is capable,***
Type:	***Primary***
Includes:	***Brake Force Calculation***
Extends:	***N/A***
Cross-refs:	***5.1, 5.2, 5.3, 5.4***
Use cases:	***N/A***