**PCAS1 Requirements List**

**Global Invariants:**

* Prevent injuries to pedestrians and passengers
* Security breaches should be minimized.
* No outside access/changes to algorithm while driving.
* Time loss due to avoidance maneuvers should be minimized.
* Algorithm has access to sensor.
* There should be one algorithm/system for all 10 scenarios.

**Other Requirements:**

* Monitor path in front of vehicle for pedestrians. This includes processing information regarding location, speed and direction of pedestrians.
* Monitor the velocity of the car.
* Calculate the distance between the front bumper and anything in front of the car every 100ms.
* Identify potential collisions with pedestrians by analyzing monitoring information.
* Take avoidance action via braking through the Brake-by-Wire system.
* Cannot decelerate more than 0.7g.
* Identify when the hazard no longer exists.
* When hazard no longer exists, notify the vehicle to return to steady state velocity.
* The algorithm should avoid collision in all 10 scenarios it is presented with.
* Algorithm should be constructed assuming no prior knowledge of the upcoming scenario.
* The algorithm must remain functional (i.e. avoid collisions and minimize lost time) in fail operational mode. This means increasing response time for requested deceleration from 200ms to 900ms.
* Optimize the avoidance measures to avoid collisions with the least amount of lost time.