Requirement Elicitation

TJAS 1

Questions:

1. What other safety system will ACC be interacting with? (ie. automatic breaking)
    a. Breaking sub system which includes automatic breaking. It should stop the vehicle, it will override any command given and will take the lead.
2. What hardware and sensors are incorporated into the vehicle(ie lidar)
    a. Rear view camera
    b. Lane dividing camera
    c. Windshield camera(rain detector)
    d. Radar system
    e. Throttle position
    f. Wheel speed sensor which is handled by another system
    g. What is the range for the sensors?
        i. Fairly accurate. Detects vehicle around half a mile away
3. How can the car guarantee the driver is engaged?
    a. Contact in the steering wheel and “tests” to make sure the driver is actually paying attention.
    b. Cameras can also be used for that.
    c. An annoying sound and a message in the dashboard is shown if the driver is not engaged.
    d. If the driver ignores the alert the system is disabled after alerting the driver for a certain amount of time.

4. What is the resistance for lane assist? How strong should it be?
    a. Resistance should be enough to make the driver notice and question what the vehicle is doing.
    b. Can not be overwhelming enough that you don’t/ can’t do the action
    c. Keep the force constant.

TJAS 2

Questions:

1. What happens if the vehicle engine shuts off but the electronic system is on?
    a. The electronics should continue running but the only thing that will happen is slow down(unless it's going down a hill). Usually the system gives control to the driver. The system does not respond.
2. If a collision is imminent what should the system do?

    a. The breaks need to be engaged.
    b. It will start the process to release airbags
    c. Will fully engage brakes when the vehicle passes threshold unless road conditions are not good. In that case it will give control to the driver.

3. How should the system respond if sensors are obstructed for any reason.
    a. Alert the driver and disable TJA.

5. What legal specifications are required?
    a. NITSHA Vehicle safety
    b.
6. Does TJA or ACC have a max speed?
    a. There is not set max speed

TJAS 3

Questions:

1. TJA only operates on approved highways. How does TJA recognize
    a. The GPS system should be accurate enough to recognize when you are on acceptable roads.
    b. Usually this would be sourced from the server, but it's cashed locally because it can not fail in case of lost connectivity.
    c. Updates is OTA

2. How is TJA activated/ deactivated:
    a. There is a switch in the steering wheel.
    b. There's a switch for ACC, switch to set speed and in some cases to set the closing distance for TJA.
    c. Stopping distance can be around half a car length
3. What performance constraints or expectations for the system?
    a. Following through the process. It needs to be end to end.
    b. How long does it take from noticing something to acting?
        i. Should be fast, around a second.
4. What existing systems in the vehicles communicate with TJA?
    a. Emergency system
    b. Analogue breaking system (communicates with wheel speed)

Additional Notes and Information:

- The system must tell the driver if lanes are not visible.(ie. Driving in construction)
- There is a connection between the speed and the stopping distance. The faster you are going, the more distance is needed to stop the vehicle.

- **AI integration**
    - With the presence of a front camera, AI could do target recognition after system identifying that there is an obstruction.
        - For example identifying something stationary under the car(ie deer)
    - AI can be useful for lane identification.

- Lane splitting is complex because technically they are not in the lane and they are not behaving the same way as every other vehicle. Blind spot detection on the mirrors might be helpful but it's still complex.