Requirements for ECALL Emergency Response System

Functional Requirements

1. **Accident Detection**
    - **ID:** ECALL-01
    - **Description:** The system must detect accidents based on sudden deceleration (e.g., rapid speed drop to zero).
2. **Emergency Call Initiation**
    - **ID:** ECALL-02
    - **Description:** Once an accident is detected, the system must automatically initiate an emergency call.
3. **Vehicle Data Transmission**
    - **ID:** ECALL-03
    - **Description:** The system must send vehicle-related data (speed, location, acceleration, time of accident) to the emergency response center.
4. **Notification Handling**
    - **ID:** ECALL-04
    - **Description:** The system must support multiple notification methods (e.g., SMS, email) to contact emergency services.
5. **Vehicle State Management**
    - **ID:** ECALL-05
    - **Description:** The vehicle class must encapsulate state information such as speed, location, and acceleration with private attributes and public getters/setters.
6. **Vehicle Type Differentiation**
    - **ID:** ECALL-06
    - **Description:** The system must support different vehicle types (e.g., Car, Truck), each potentially having unique accident detection parameters.
7. **Error Handling**
    - **ID:** ECALL-07
    - **Description:** The system must handle invalid input data (e.g., negative speed values) and simulate network failures when sending notifications.
8. **Accident Data Logging**
    - **ID:** ECALL-08
    - **Description:** Each accident event must be logged, including vehicle ID, speed, location, acceleration, and timestamp in a structured format (JSON/CSV).
9. **Historical Data Analysis**
    - **ID:** ECALL-09
    - **Description:** The system must allow reloading past accident data for analysis and review.
10. **User Input via Terminal**

- **ID:** ECALL-10

- **Description:** The system must provide a terminal-based interface for manually entering vehicle speed, location, and acceleration to simulate accident scenarios.

11. **Automated Simulation Mode (Optional)**

- **ID:** ECALL-11
- **Description:** The system should allow users to input a sequence of values for speed and acceleration over time to simulate driving conditions.

12. **Networking Support (Optional)**

- **ID:** ECALL-12
- **Description:** The system should support basic networking features to send accident data to a remote server for further processing.

13. **Observer Pattern for Notifications (Optional)**

- **ID:** ECALL-13
- **Description:** The system should use the Observer design pattern to notify components whenever an accident occurs.