Team: sdmay23-15

1.1 Requirements & Constraints

- ❖ Functional Requirements
  - The product should have a secure On-Board Key Management system for vehicular CAN communication
  - Implement secure protocols for message exchange defined in the SAE J1939-19C standard.
  - Determine the integrity of data flowing through the vehicle network (verify whether it is intentionally or unintentionally modified)
  - ➢ Constraints:
    - ■ Limited computational power in the ECU
- ❖ Physical Requirements
  - CAN adapters/cables to connect each component
  - ➢ Constraints:
    - ■ Strong adapters/cables that don't break easily
- ❖ Resource Requirement
  - Virtual Simulation Environment to simulate traffic on a CAN bus using J1939
  - ➢ Constraints:
    - ■ Some physical conditions or properties of CAN bus can't be simulated
- ❖ User Experiential Requirement
  - Must be fast enough to work on a real piece of large machinery and the user doesn't have to wait for key management to take place upon startup
  - ➢ Constraints
    - ■ This must be true on both new and old CAN buses in J1939
- ❖ Economic/Market Requirement
  - All the funding for resources and materials required for the project is provided by the client.

1.2 Engineering Standards

What Engineering standards are likely to apply to your project?
Some standards might be built into your requirements (Use 802.11 ac wifi standard) and many others might fall out of design. For each standard listed, also provide a brief justification.

- ***Standard:*** SAE J1939-19C
- *Justification:* SAE J1939-19C is the communication standard developed by the Society of Automotive Engineers to standardize communication on the CAN Bus used to communicate between ECUs or Control Units in an automobile or on a piece of heavy machinery.
- ***Standard****:* CAN Bus
- *Justification:* CAN Bus or Controller Area Network Bus is a widely used standard in automobiles and heavy machinery used to transfer information between control units or ECUs throughout the piece of equipment.
- ***Standard:*** X.509 Certificates
- *Justification:* We will likely be using X.509 Certificates for authentication of each ECU on the CAN bus to ensure that there are no unauthorized nodes on the bus.