HIL System

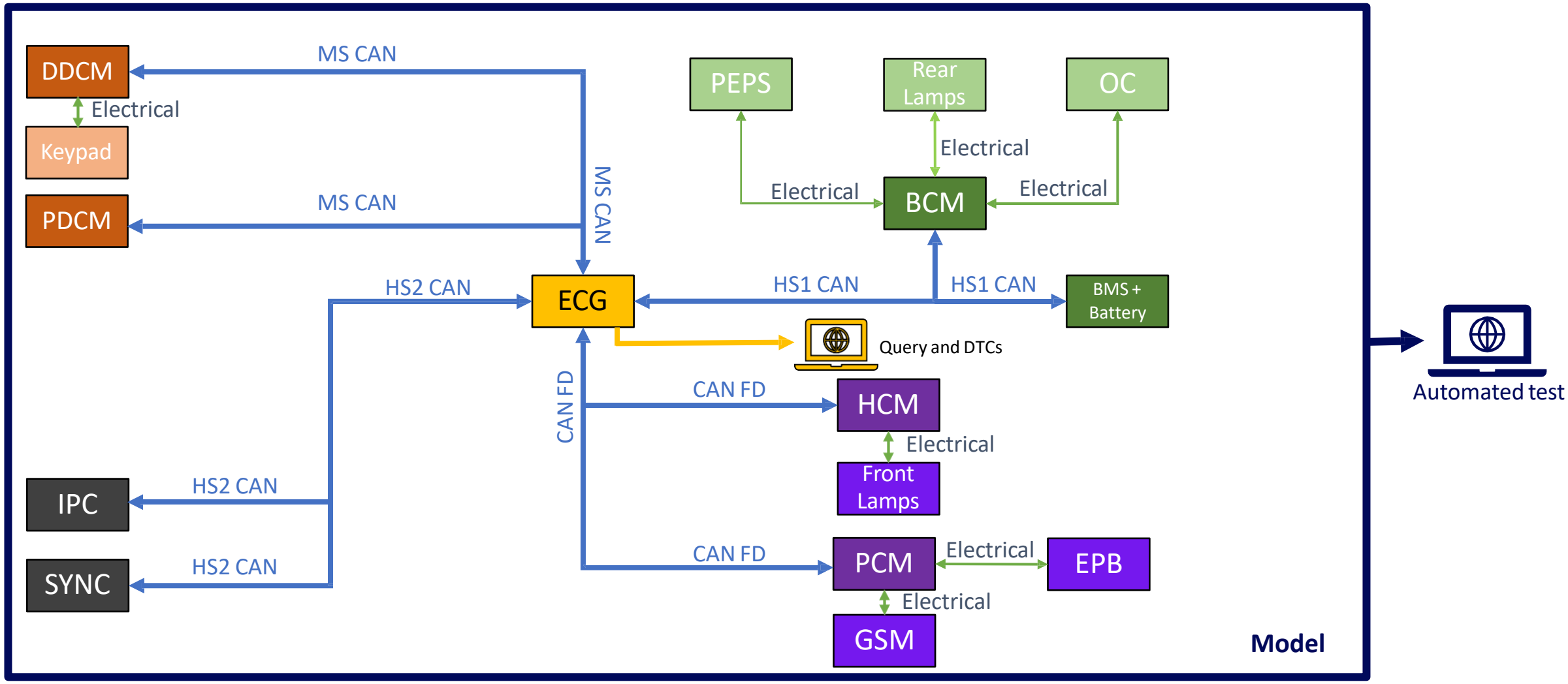
HiL Virtual Vehicle 5th Generation - BXHIL MY 22

Turn Around
Automotive Operations

Modernize
Everywhere

Disrupt
Ourselves

HiL Virtual Vehicle 5th Generation - BXHIL MY 22



Requirements

- Req 1: Windows should close automatically on Lock by keyfob;
- Req 2: Windows should only move if the car is on or within 10 s after it has been turned off;
- Req 3: Fold/Unfold the mirrors when the key lock/unlock the vehicle or by DDS command;
- Req 4: Control Driver and Passenger Door;
- Req 5: Fold/Unfold the mirrors by DDS command;
- Req 6: Driver must be able to open the car digiting a password in keypad;
- Req 7: DDS must have a child lock implemented.
- Req 8: If the vehicle speed is bigger than 8km/h, all doors should be locked.

- Req 9: Overhead console must turn lamps on when the vehicle is: unlocked by the key and turned off;
- Req 10: Overhead console must turn off 10s after the driver leaves the vehicle;
- Req 11: Keyfob must have two commands: lock and unlock vehicle;
- Req 12: The vehicle will turn on only with the key inside it;
- Req 13: Rear lamp must turn on when brake is pressed;
- Req 14: The Driver must do a reset keycode sequence;
- Req 15: If the Driver forgets the key inside the car, this key must be placed in a “Blacklist” and will not work anymore. The vehicle will only work with a second key;
- Req 16: When the vehicle is turned off or stopped (Velocity = 0), the user can control the lights individually if the battery is able to support (Battery SoC > 80%);
- Req 17: When unlocking the vehicle, a hash code has to be verified and should be the same in the key, BCM and PCM;
- Req 18: BCM must check if the trunk and hood are open.

Requirements

- Req 19: When the driver opens the door on “welcome”, SYNC must show a welcome display and after 5s change to the radio interface;
- Req 20: IPC must have indicators (speed, odometer, gear, invalid key, key outside the vehicle) and telltales (park brake, airbag, turn lamp, seat belt, ABS, oil, TPMS);
- Req 21: Indicate door, hood and trunk ajar status;
- Req 22: Sweep speedometer and odometer pointers after ignition on;
- Req 23: IPC must indicate the battery level and warning in case of SoC;
- Req 24: Distance to empty must be indicated;
- Req 25: Indicate the average economy of the vehicle;
- Req 26: IPC screen must indicate the Ecocoach and the TPMS values;
- Req 27: SYNC must play audio files;

- Req 28: To turn on/off the vehicle, gear must be on PARK and brake pedal pressed;
- Req 29: To turn off the vehicle, Headlamp must be on OFF;
- Req 30: Turn lamps must blink once when the vehicle unlocked, and twice when locked;
- Req 31: DRL must be turned on when the vehicle is unlocked by the key;
- Req 32: The PCM must have a code to validate the key;
- Req 33: The PCM must receive the TPMS value and trigger a DTC in case of low tyre pressure;
- Req 34: The PCM must capture the tyres velocity aiming to detect the speed of the vehicle;
- Req 35: The vehicle will move if engine is On and EPB is off.

Requirements

- Req 36: Gateway must connect the different networks;
- Req 37: Generate a DBC file with messages;
- Req 38: Generate a diagnostic tool with Query and DTCs;
- Req 39: There must be four networks in the system: HS1, HS2, MS1 and FD1;
- Req 40: Calculate a Busload for each network.

- Req 41: Develop a test script to test the functional reqs;
- Req 43: Develop a stateflow test in Simulink;
- Req 44: Develop a test script in Python;
- Req 45: Run at least 5 different implemented tests.

Technical Constraints

- Must be implemented the following switches:
  - Keyfob → RF to BCM;
  - Door lock status switches;
  - Driver door power window switch;
  - Headlamp switch;
  - Brake Pedal;
  - Throttle Pedal;
  - Gear;
  - Start/Stop Button;
  - EPB.

- Implement dynamic screens
- OBS: ALL NETWORKS AND ECUs must communicate among themselves using CAN Network.

Additional Information

- For the **Modeling team:** MATLAB **2017a** version;
- For the **Tester**: Code must be developed in **MATLAB 2017a;**
- The team must create the repository of the project in GitHub;
- The evolution must be reported in **Jira** and **GitHub;**
- Deliver GitHub “Readmes” on **Due Date;**
- The team will be available on daily Scrums in the morning(starting 07:30 AM).

Deliverables

- Model team:
  - .slx file;
  - GitHub Readme of each network;
  - DBC file;
  - Report from Query, DTC and Busload;
  - Deliver a Device Transmittal of each ECU, switch and actuator.

- Tester:
  - Simulink stateflow test;
  - .m automatic MiL Test with logging file;
  - .py automatic MiL Test with logging file;
  - Generate a test report.