

VCE 5500 Secure Vehicle Electronics

Project Proposal

V2V Communications using 5G Edge

- Stationary vehicles (*this immensely reduces the complexity of the project*)
 - Vehicles are both turned on, and have 5G Connectivity, and user consent is assumed to be already obtained
 - Secure communications initiated over 5G Edge
 - CAN Messages with VIN#, PRNDL Status, last 5 minutes (configurable) of speed data sampled at 10 seconds interval
 - Interior camera feed from one of the cars is shared on the screen of the other car
- Practical Situation
 - Someone pulled over by a police officer

Benefits

- Use Technology to make a situation safer for the officer primarily, and for the person being pulled over, no need to walk over before having a video call and ensuring safety ahead of time or in 80% of the cases, no need to get out of the car at all

Project Setup

- One Emulated ECU or if possible a ST Micro dev board that has a Mobile communication chipset onboard and a LVDS feed or a bridged camera feed from another ECU that has the camera attached
 - One process that acts as the person that was pulled over
 - Another process that acts as the
 - CANoe or a CAN Simulator that sends CAN Messages with VIN#, PRNDL Status, and last 5 minutes of Speed data sampled at Speed/10 secs intervals
- Another Emulated ECU or if possible an Infotainment dev board with a display
 - One process that acts as the Police officer's vehicle display screen
- 5G Edge Network Simulator <https://github.com/EdgeSimulation>
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Project Deliverables

- V2V Solution Proposal Document
 - V2V Architecture with 5G Edge Architecture
 - Software Components identified
 - Emulators identified
 - Software Modules (with the rest of the vehicle and networks stubbed out) Design
 - Identity Manager
 - CAN Message Collector or one layer above - Google VHAL
 - Edge Orchestrator
 - V2V Conversation clients
 - Face Recognition running in Edge (stretch goal) with information sent back to the police office's vehicle
- Running Project Code for Demonstration