

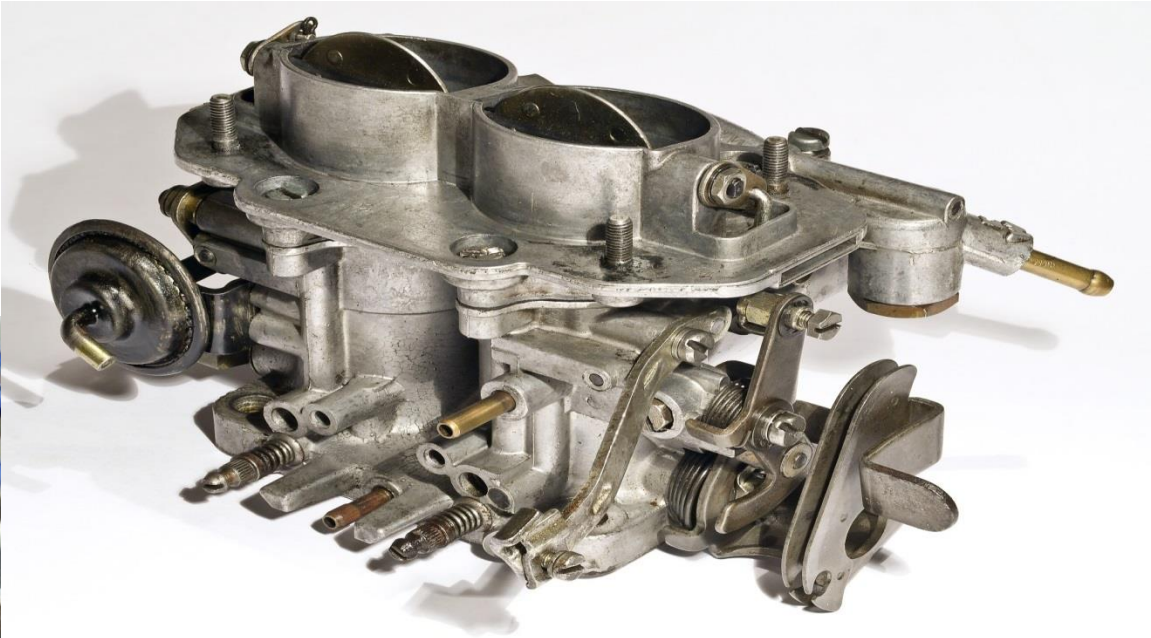


## Vehicles – The next Cyber Physical challenge

# Cyber what???

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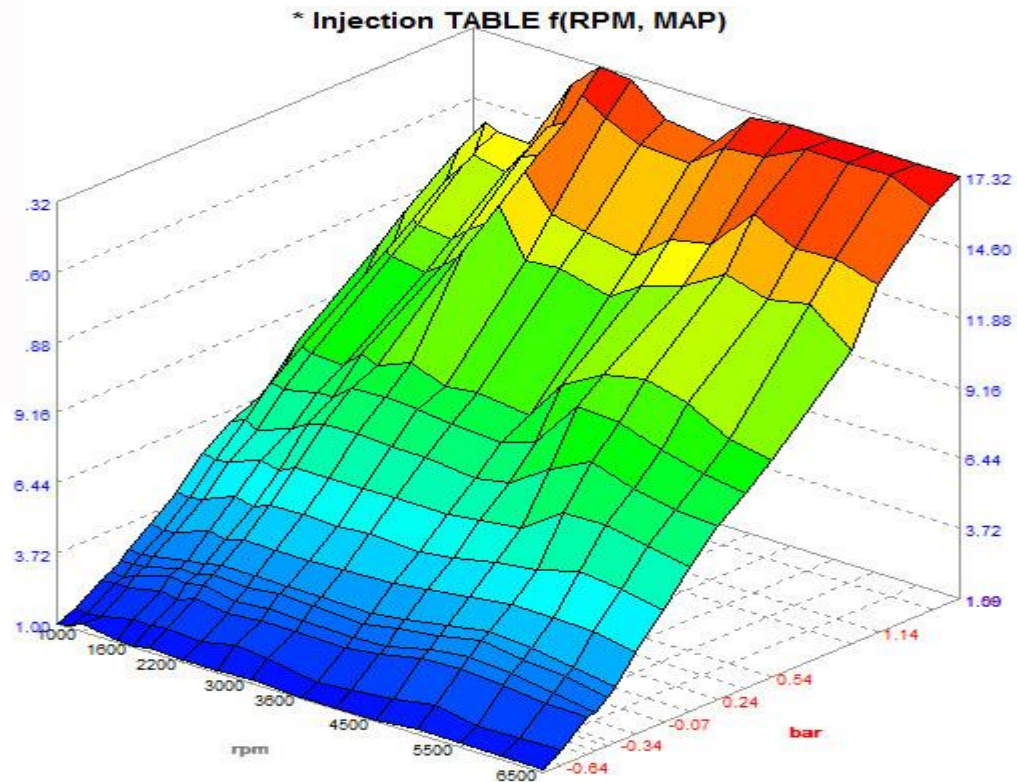


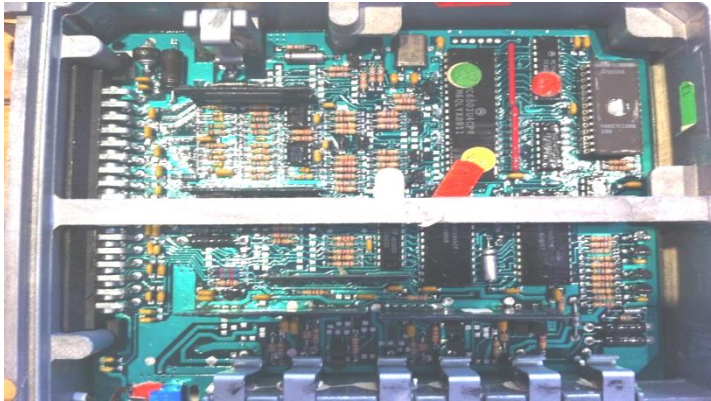
# ECU – Electronic Control Unit

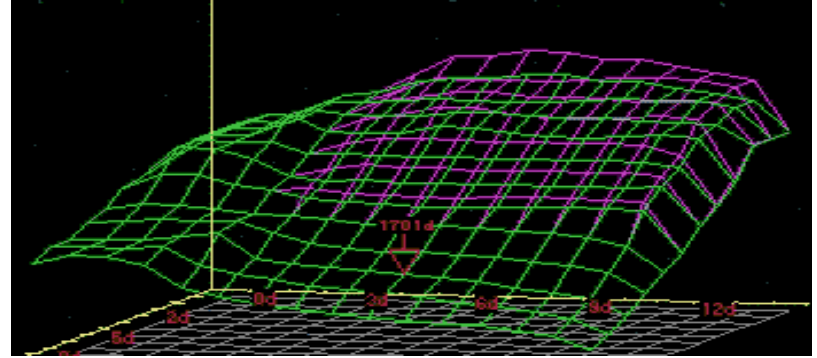
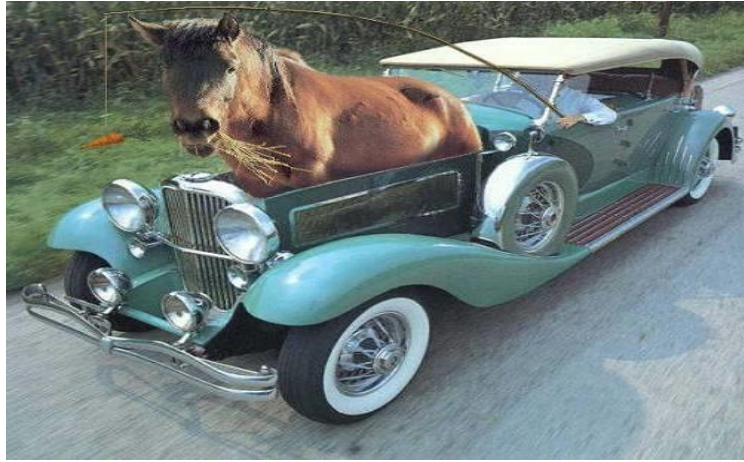


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# Firmware “update”



# OBDII



# Modern Vehicle

ve·hi·cle

**noun** \ 'vē-ə-kəl **also** 'vē- ,hi-kəl\  
a bunch of computers on wheels



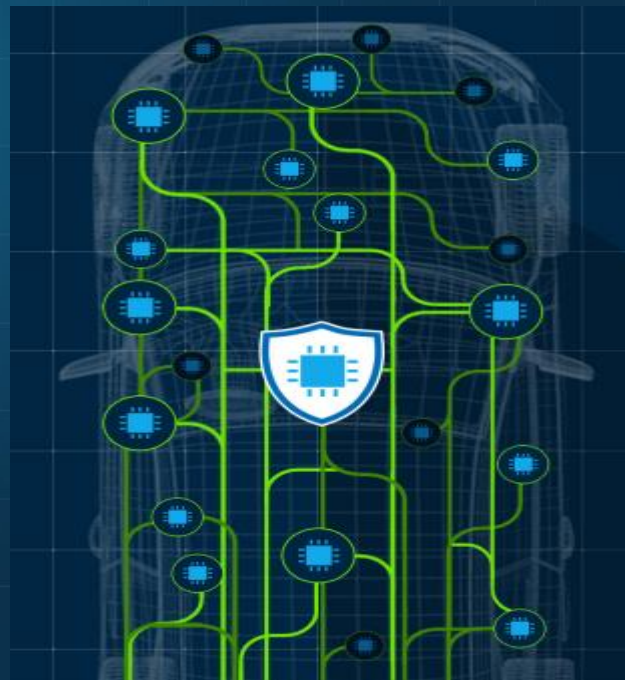
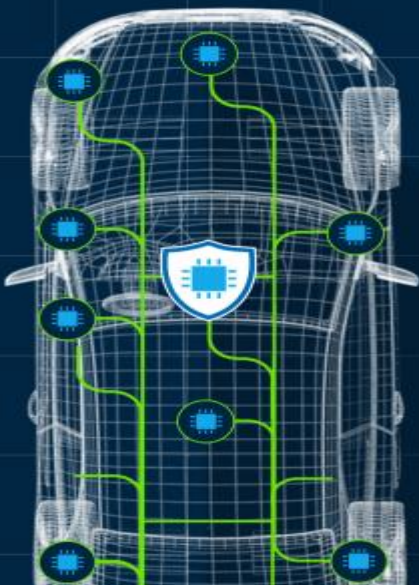
# Hell, let's just add another

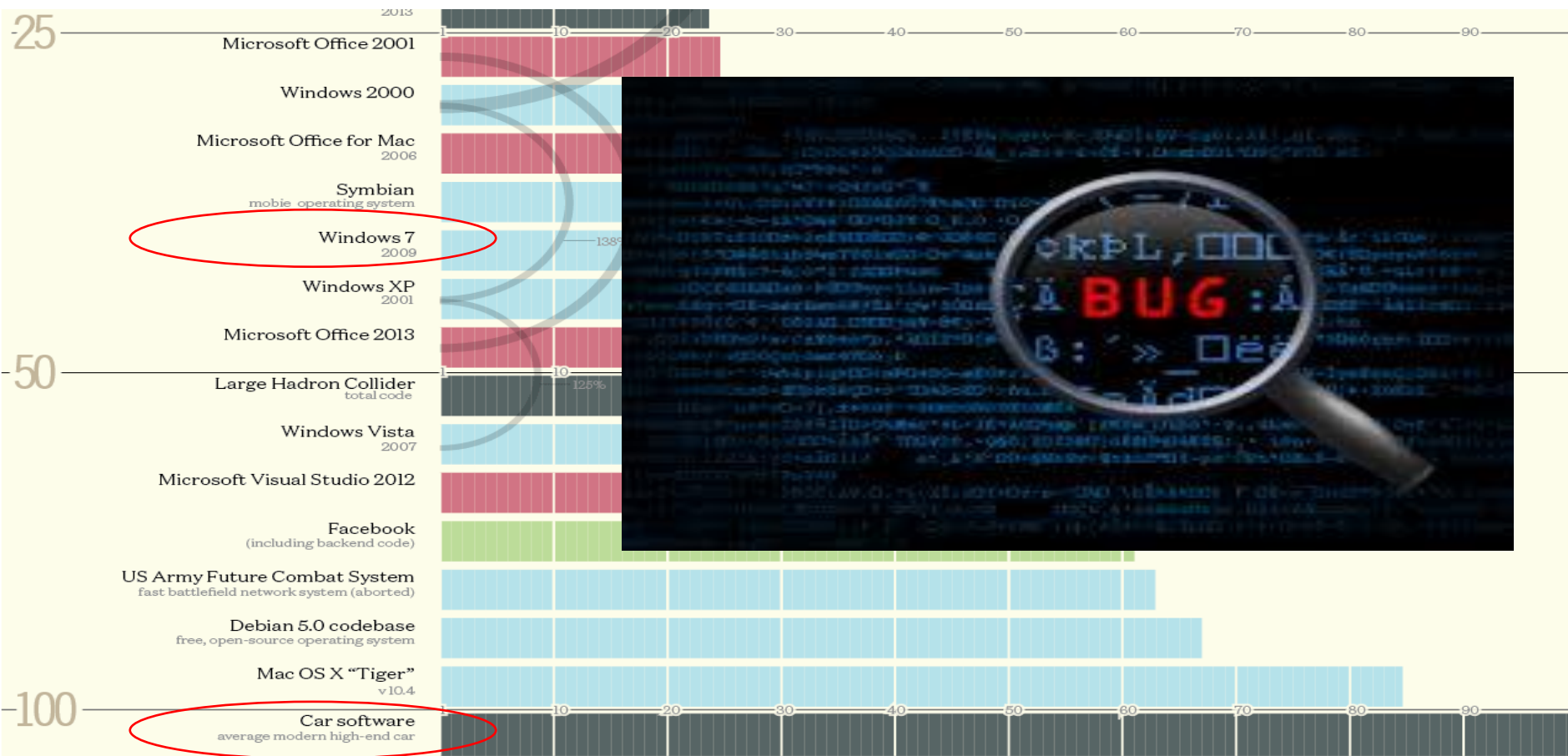


# Moore who?!

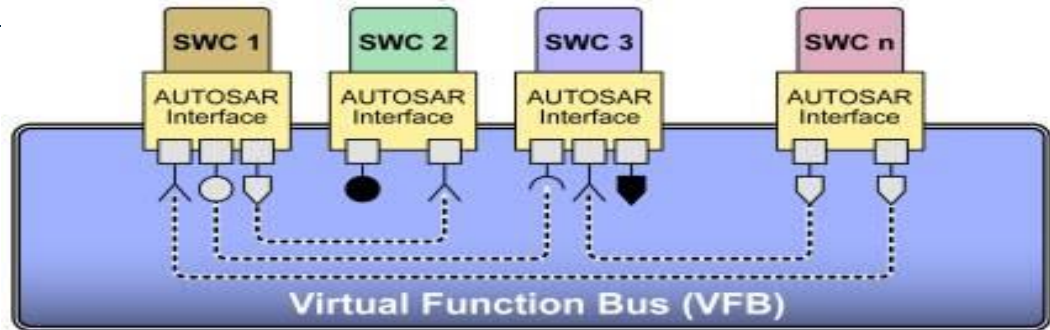
80's – One main ECU

2014 > 50 ECUs on average





# Under the hood

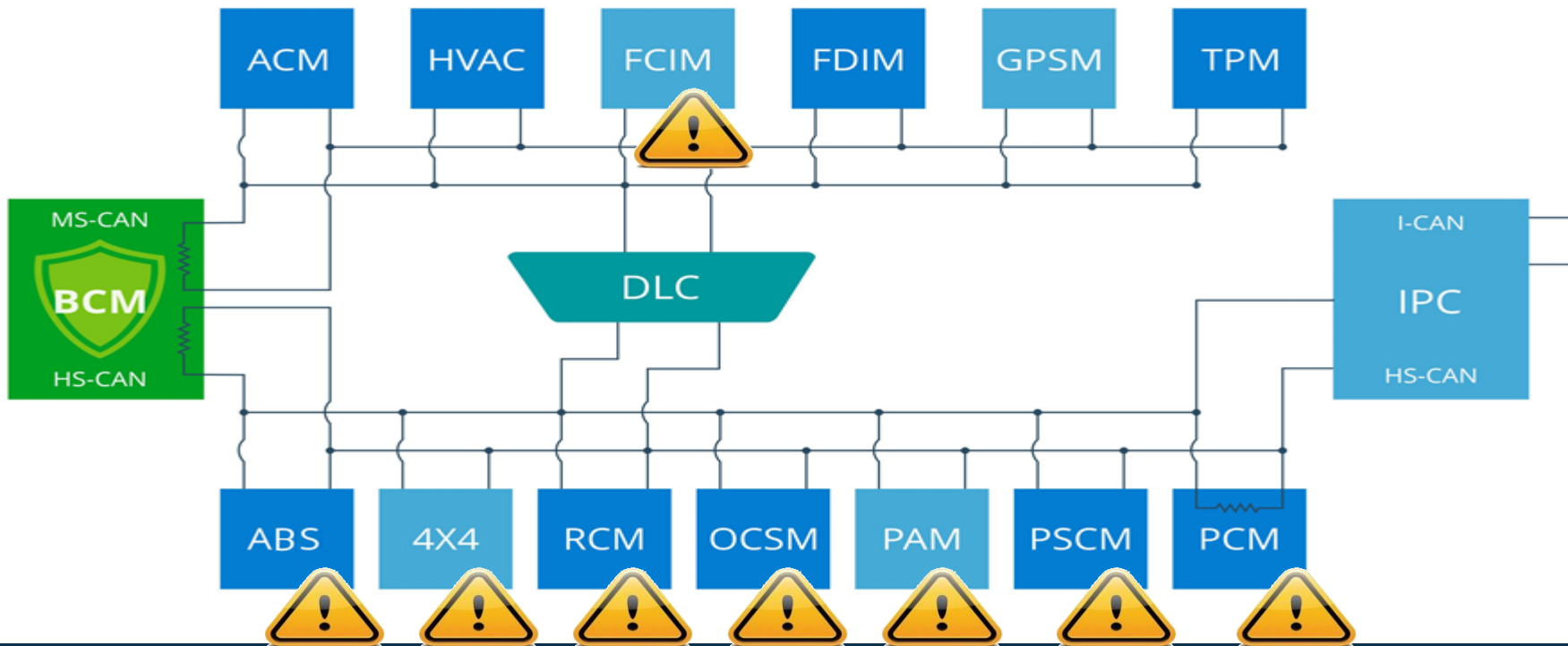


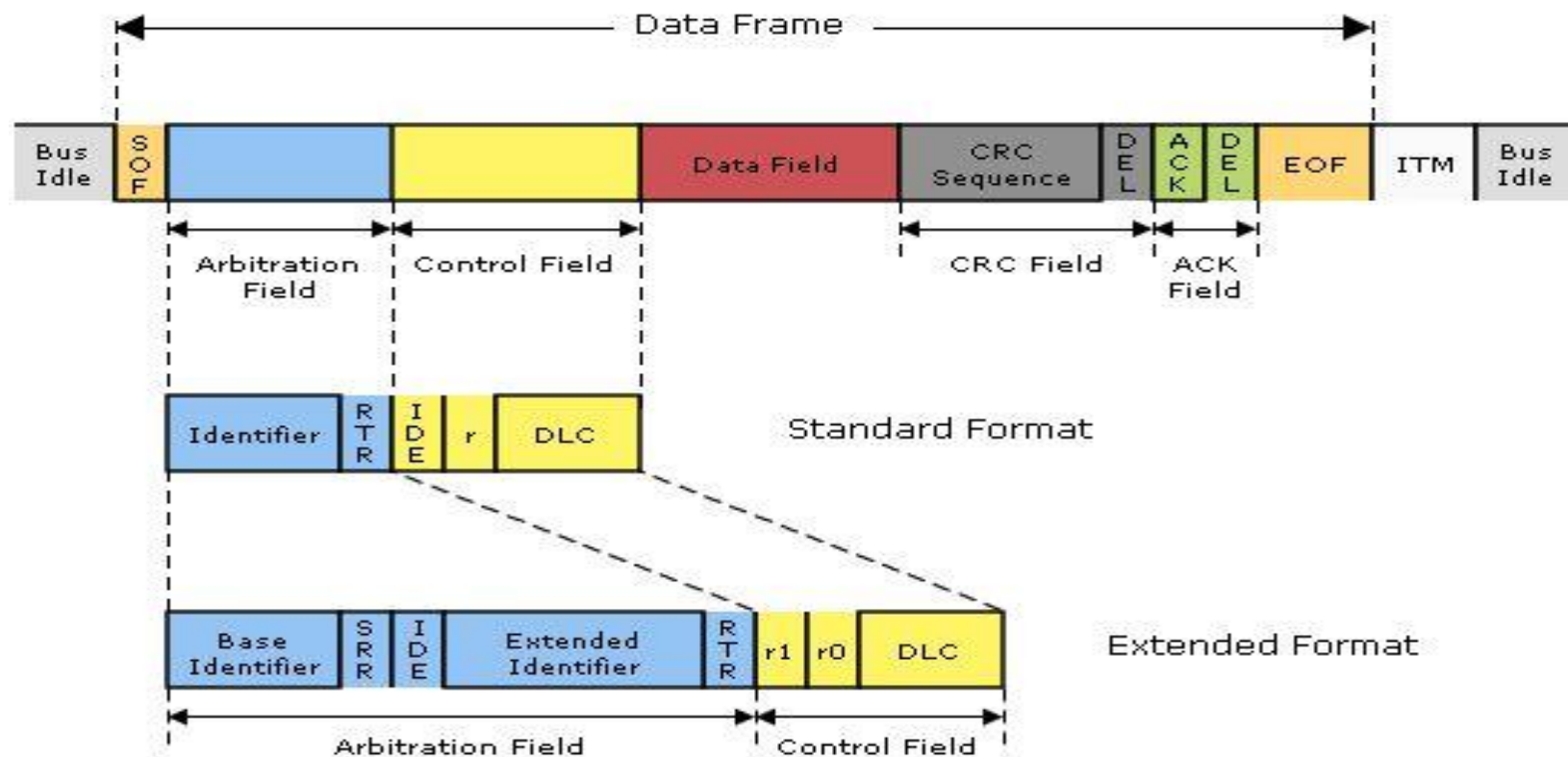
## Base assumptions

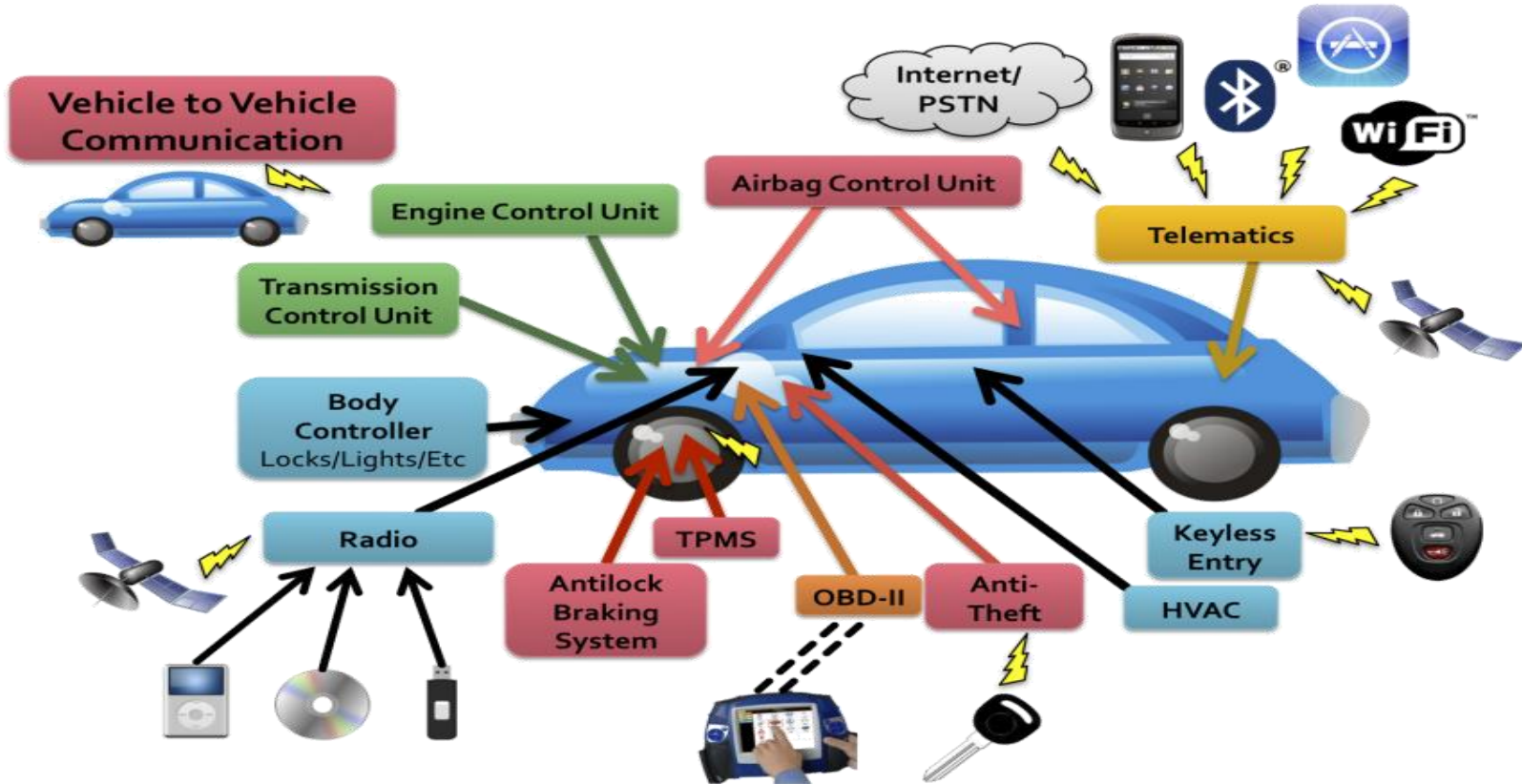
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- 🛡 The firmware is well secured (ASPICE/MISRA)
- 🛡 The network is trusted – all components are legit
- 🛡 The network is isolated
- 🛡 The protocols are known only to the OEM







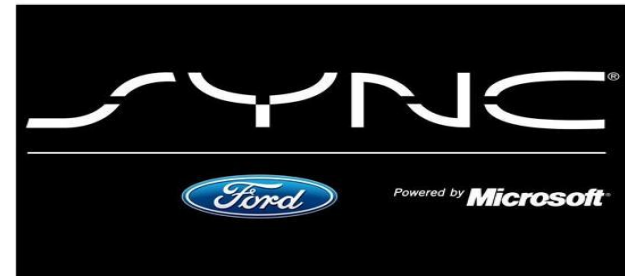


Comprehensive Experimental Analyses of Automotive Attack Surfaces  
 University of California, San Diego, University of Washington 2011

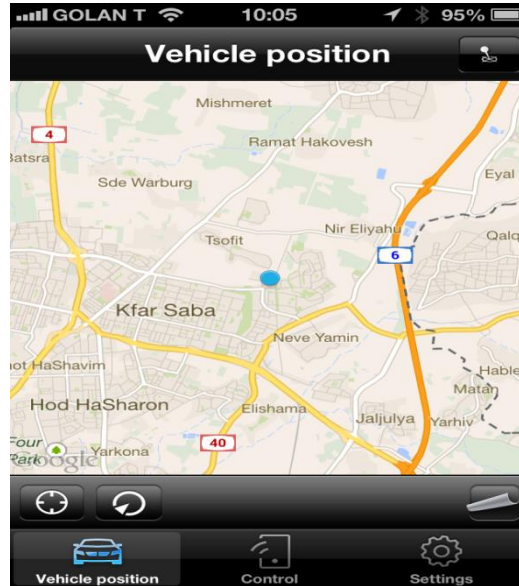
# Telematics



BMW ConnectedDrive



# Remote Control



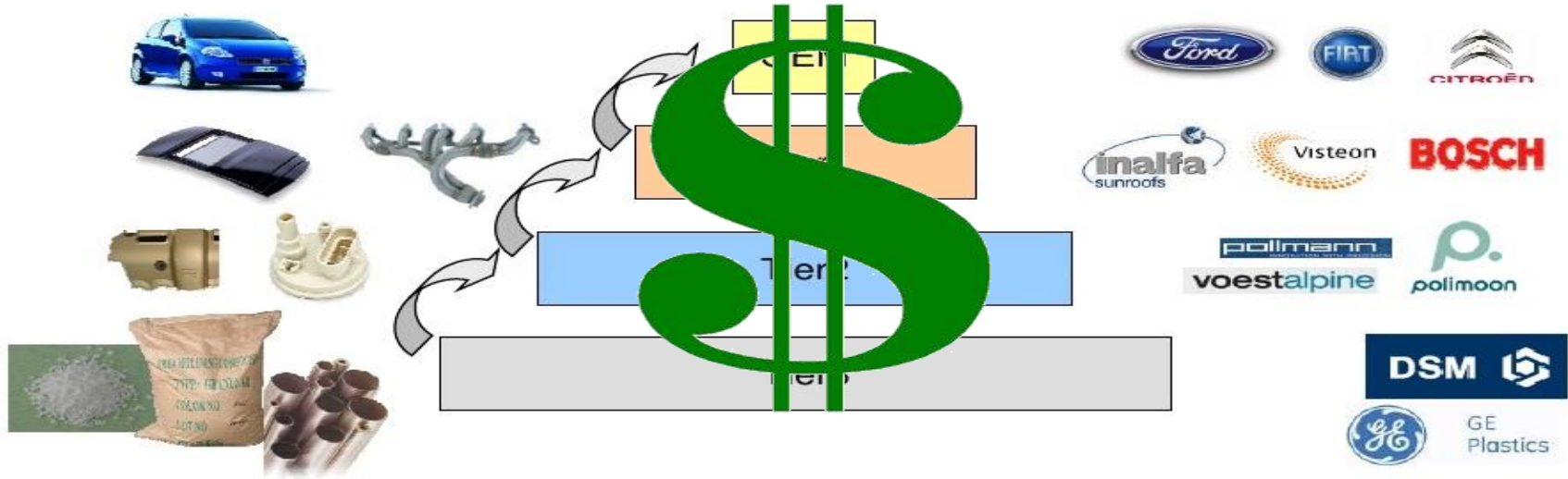


## Current efforts

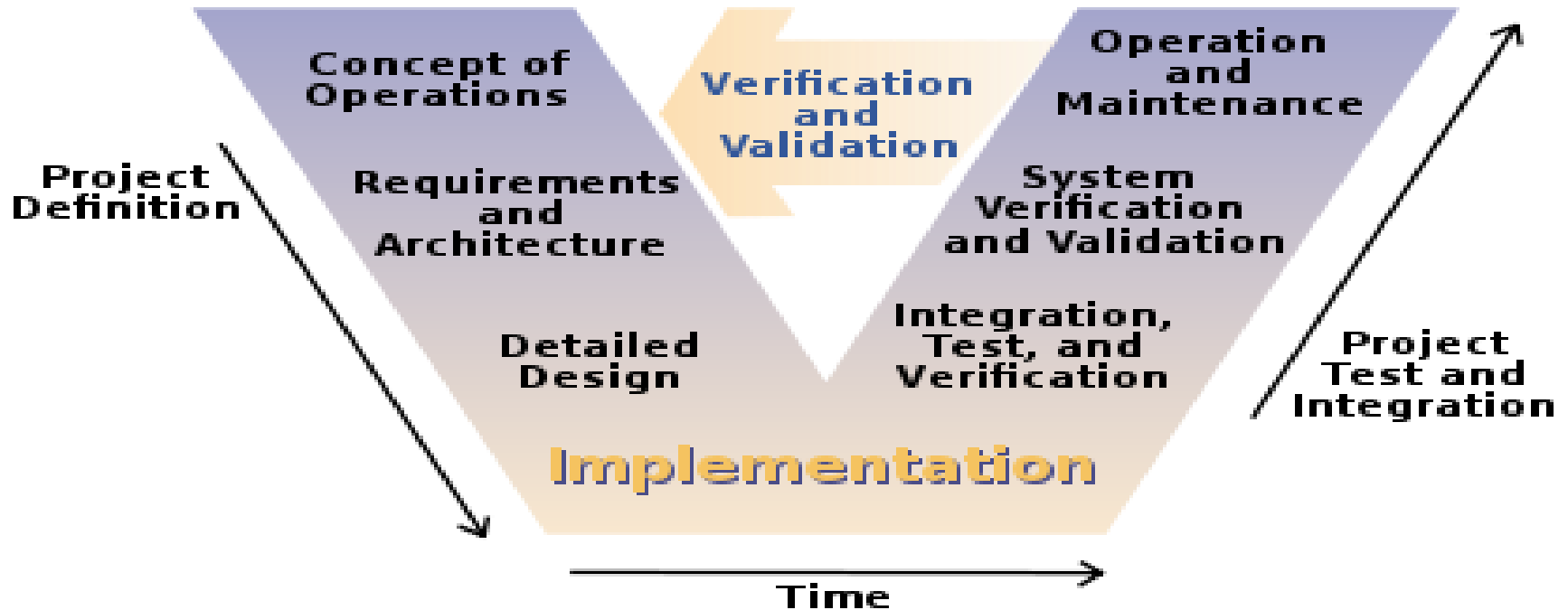
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- Defining best practices and metrics (SAE, NHTSA) (Regulation?)
- Security Engineering
  - Adopting secured coding (CERT)
  - High Assurance ECUs (HSMs, Secured Boot, ...)
- Network Security
  - Secured OnBoard Comm. (Message Authentication)
  - Firewalling
  - Intrusion Detection/Prevention
- Remote patching (FOTA)

# Automotive Industry









TowerSec

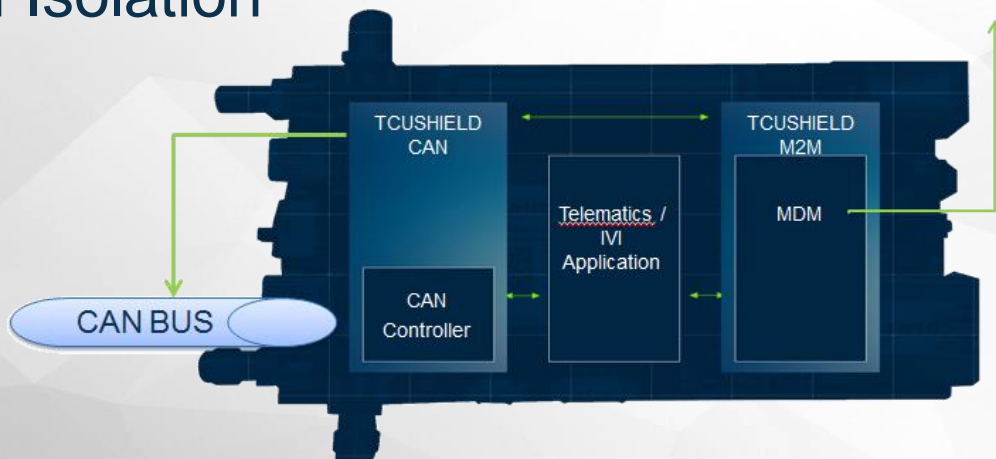
# ECUSHIELD

- Software
- Intrusion Detection & Prevention
- Firewalling (Gateway ECUs)



# TCUSHIELD

- Software
- Detection of out-of-bound attacks
- CAN Isolation



Thank You

**TOWERSEC** AUTOMOTIVE CYBER SECURITY

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