Agenda

- Future Mobility Requires Reliability, Safety & Security
- Safety
- Security
Cars have to be considered as one element in traffic system to reach next mobility level
Electrification, ADAS and **interconnectivity** facilitate a smart mobility vision ...
Dependability (as defined by IFIP WG 10.4)
Convergence of Safety and Security within Automotive Context

Safety

Protection against *unintentional* errors, malfunctions and anomalies

- Wrong Calculations
- Uncontrolled behavior of Safety related systems
- HW Fails within Lifetime

Focus on:

Security

Protection against *intentional* errors, malfunctions and anomalies

- Theft
- Hacking
- Tuning
- ...

Focus on:

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Agenda

- Future Mobility Requires Reliability, Safety & Security

- Safety

- Security
Key Semiconductor Innovation for Safety

Zero deaths from traffic accidents

Advanced Driver Assistance

Integrated safety systems
Sensor Fusion

Interconnectivity V2x
Security

24/77-79GHz radar

Tire Pressure
AIRBAG SoC
Driver IC for EPS

Side Airbag Sensor

Dual Chip 79GHz Radar System

Radar : Antenna in Package

Dual Chip 24GHz Radar System

MultiCore Microcontroller Family for Safety & Security

Reactive Safety
Active Safety
Proactive Safety
Preventive Safety

1990
Today
> 2020

Semiconductor IC dedicated for Safety
Semiconductors to enable Functional Safety Systems and Security Functionalities
Expected Safety Levels from 2014 onwards

Airbag
- ASIL B & D

Safety Domain
- Control and Sensor Fusion Systems
  - ASIL D

Brake Systems
- ASIL D

Electronic Power Steering
- ASIL D

Advanced Driver Assistant Systems
- ASIL B

Transmission Control
- ASIL C/D

Engine Control
- ASIL B/C

Hybrid & Electric Vehicle
- ASIL C/D

Safety level requirements are defined by OEMs depending on their application. Above target levels represent Infineon’s expectation based on customer feedback.
Key Safety Component: Microcontrollers

**Microcontrollers are ...**

... a complex system component which needs to run safe

*System-on-a-chip (SOC) with many components (CPU, memory, bus systems, peripherals, interfaces)*

... a central system control unit which needs to make sure that other system components run safe

*System “brain” running the application software and controlling the system condition*
Development Process must follow ISO Requirements

Organization must follow ISO Requirements

Supporting Process must be implemented following ISO

Safety Analysis must be done according to ISO

Documentation must be done according to ISO
Agenda

- Future Mobility Requires Reliability, Safety & Security
- Safety
- Security
Overall Security Architecture inside the car & with controlled interfaces to the outside world

HACKER ATTACK
Unwanted access must be denied

- Remote Diagnostics
- Software Update
- Car Repair Shop
- Traffic Information
- Infotainment
- Apps
- Payment Systems
- Internet Services
- eCall

Tablet & Smartphone

- Traffic Information
- Infotainment
- Apps
- Payment Systems
- Internet Services
- eCall

Prioritization of Emergency Services

Toll Control

Traffic Jam Detection
Accident Avoidance

ONBOARD SAFETY & SECURITY

CAR2CLOUD

CONSUMER DEVICE INTEGRATION

CAR2CAR
CAR2INFRASTRUCTURE
Security Alerts

Fraud & Theft

Unjustified Warranty Claims

Cyber War and Terrorism

Vehicle thefts on the Rise

By CARTELL.IE | Published: JULY 12, 2012

A couple of international reports this past week indicate vehicle thefts Australia information surfaced that vehicle thefts are on the rise decade.

Tuning Protection / Anti-Tune explained.
On Bosch EDC17 and MED17 ECUs

We've had many people asking why we need to open the ECU's of the later cars brought to us, and what is this "tuning protection" many companies are talking about. Here's a brief explanation of it. "Tuning Protection" for the Infineon TriCore TC-series processors (Bosch MED17/EDC17) …

Researchers Use Trojan CD to Hack Car

You won't hear it, and you won't know it's happening, but the next time you put a CD in your car stereo, you could be giving a hacker access to your car's entire computer.
Legislation


- **EU**: no regulation announced yet.
  - Germany, Dutch and Austria committed to support PKI Infrastructure in certain regions

- **Japan**: Proprietary FM Radio with locally transmission existing ITS existing. Also regulation expected.

- **Korea**: ?
  - Considering using V2V as tolling systems

- **China**: ?

OEM Feature Differentiation

- Seen by leading German OEMs therefore introduction of V2V independent of regulation
Enabling the root of trust for internal and external communication

Trust anchors

Protected Execution Environments hosting
- Key storage and related cryptographic operation
- Security Applications

Integrated on MCU
- High speed
- Secure Onboard Communication
- Logical security

Discrete Security Controller
- External communication
- Protecting high value
- By certified hardware security
Hardware Security Solutions – Protect sensitive data, components & IP

Flexibility

Security

Automotive Environment Quality

Crypto Performance
Enabling System Security in Automotive

Forecast for cars with eCall

<table>
<thead>
<tr>
<th>Year</th>
<th>Units (m)</th>
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Applications subject to hacker attacks

- Internet
- E-Call
- Navigation
- Automatic toll collection
- Power on demand
- Traffic alerts / V2V
- Local-based services & advertisement
- Maintenance updates

System Design Consideration

- Threat & Attack Scenario Analysis
- Scalable HW & SW Security Solution
- Security-Certified Production Security Personalization
- Large Portfolio of Common Criteria Certified Products
- Security-Certified Concept, Design and Development Process

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Microcontrollers with Integrated Security Trust Anchor

Secure Elements for Telematics & V2x

Source: Strategy Analytics; active and inactive systems, cumulative
ENERGY EFFICIENCY
MOBILITY
SECURITY

Innovative semiconductor solutions for energy efficiency, mobility and security.