Connected Vehicle

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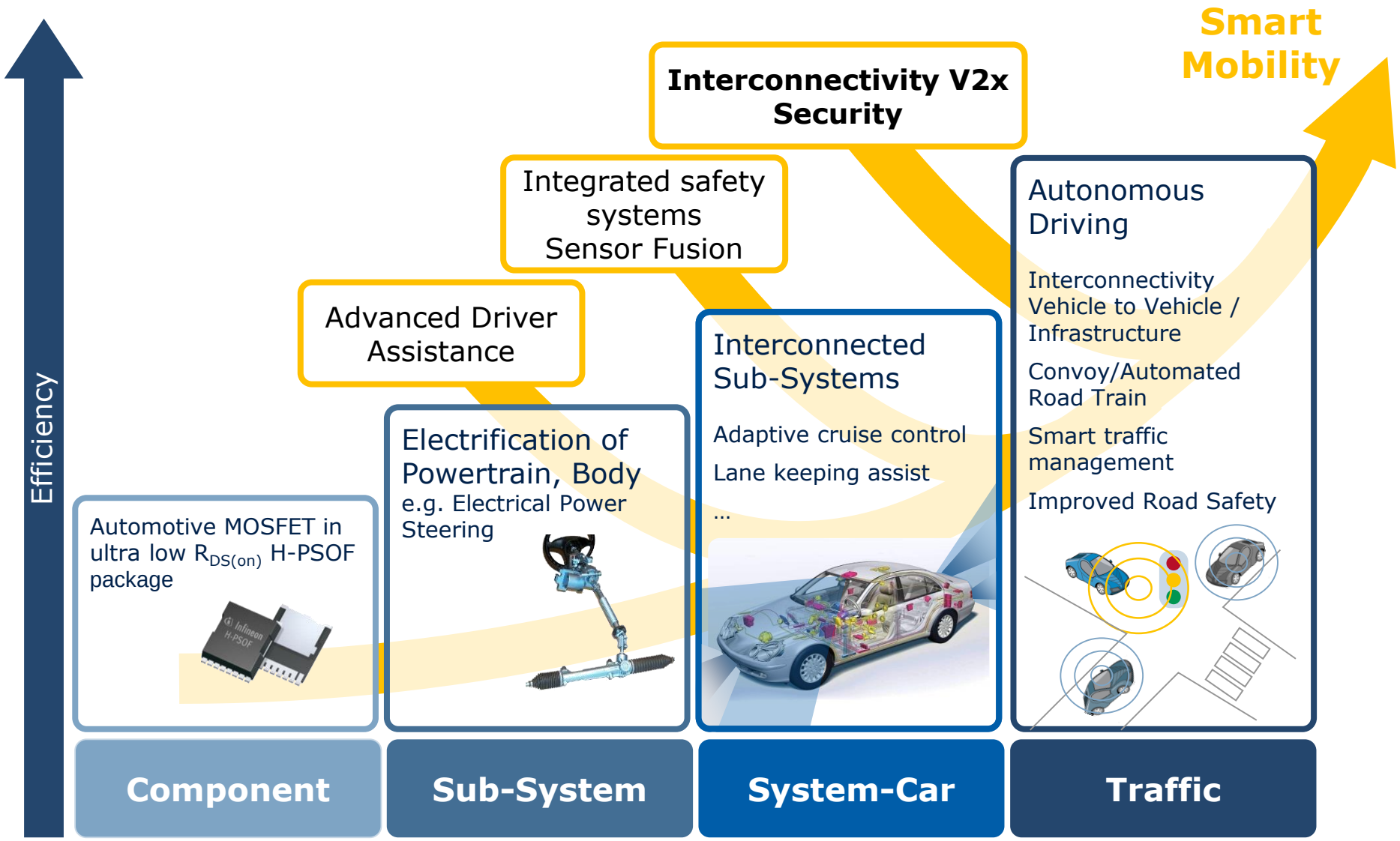
Agenda

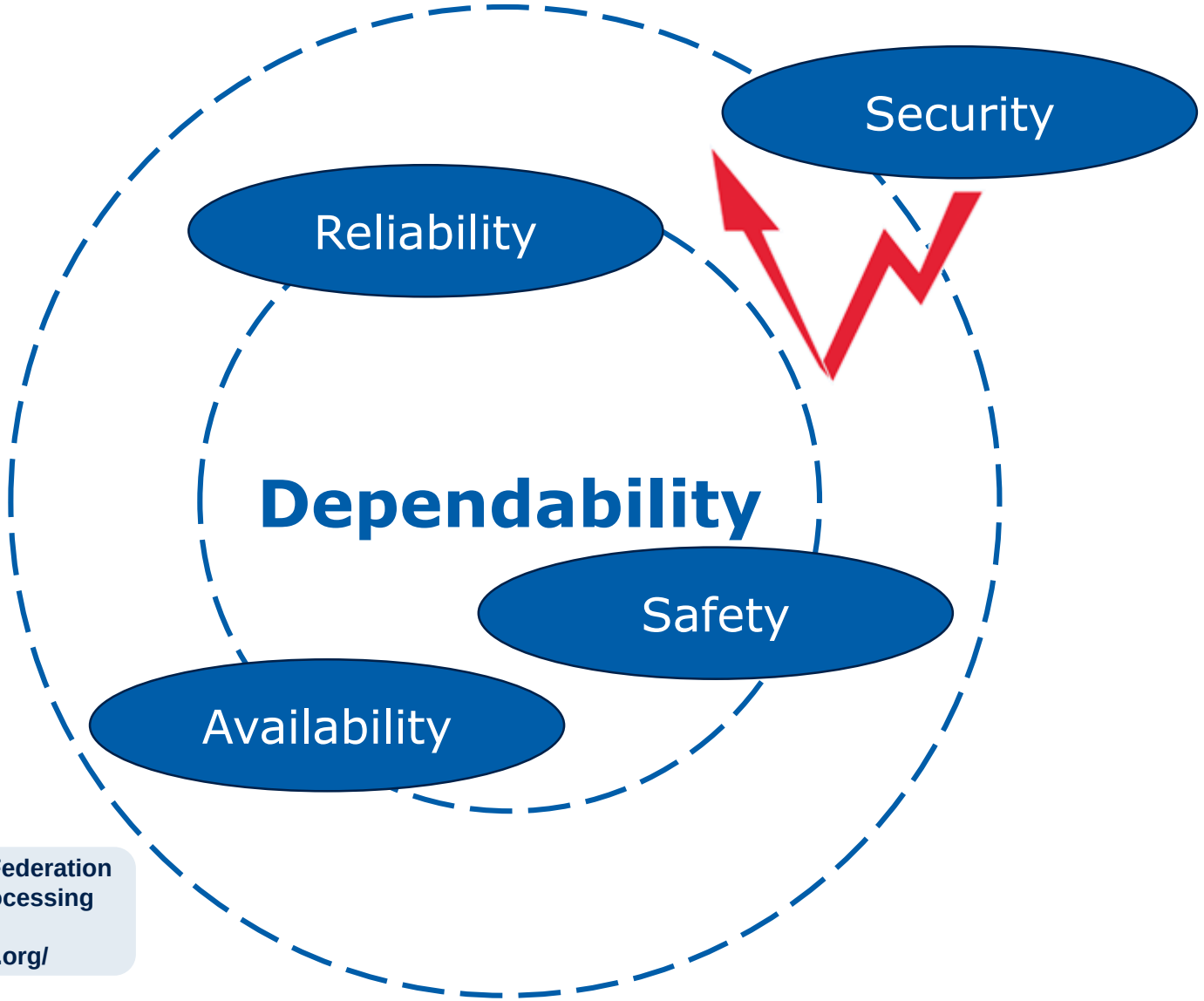
- Future Mobility Requires Reliability, Safety & Security
- Safety
- Security

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)



IFIP: **International Federation for Information Processing**

http://www.ifip.org/

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:

evita

HIS
Herstellerinitiative Software

Agenda

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Key Semiconductor Innovation for **Safety**

Innovations for Driver-, Road- and Pedestrian Safety

Interconnectivity V2x Security

Zero deaths from traffic accidents

Integrated safety systems Sensor Fusion

Advanced Driver Assistance

Dual Chip 79GHz Radar System

24/77-79GHz radar

Radar : Antenna in Package

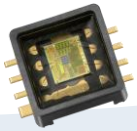
Tire Pressure

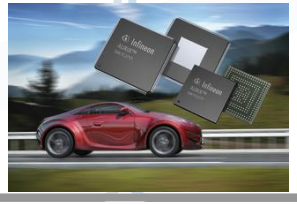
AIRBAG SoC

Driver IC for EPS

Dual Chip 24GHz Radar System

Side Airbag Sensor





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

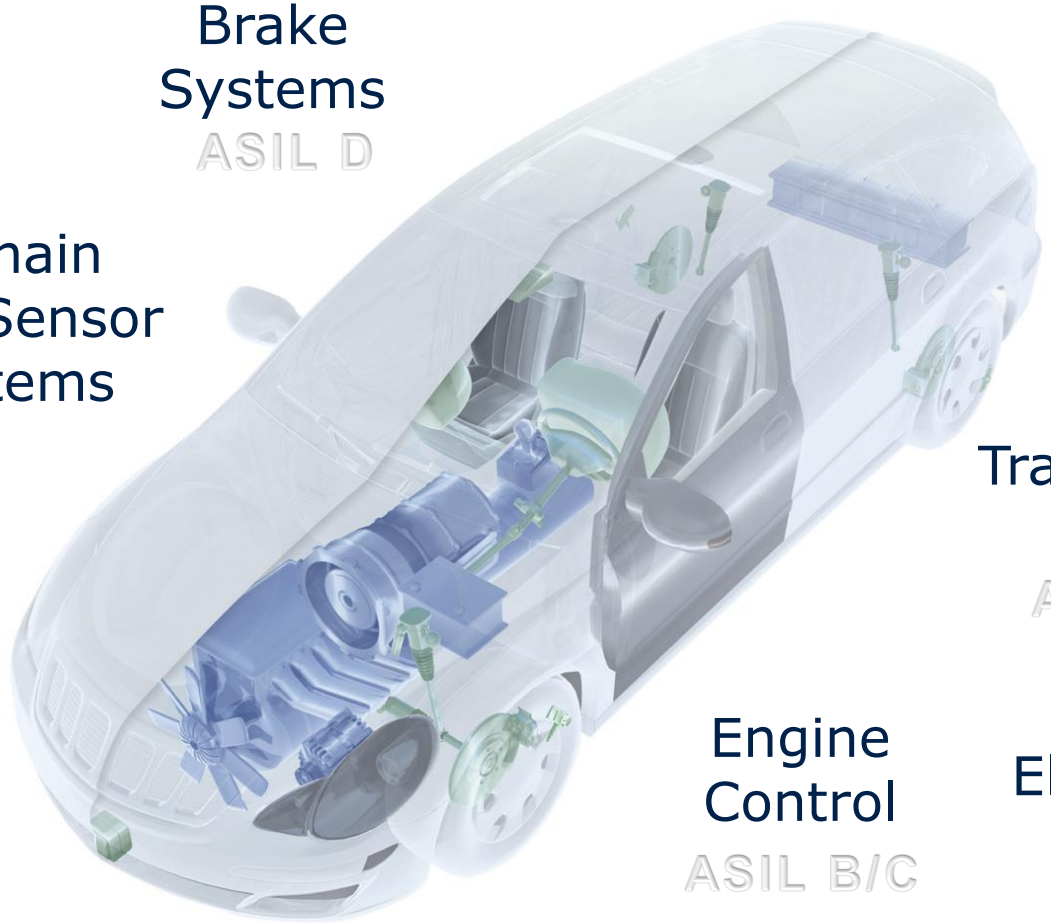
Expected Safety Levels from 2014 onwards

Airbag
ASIL B & D

Brake Systems
ASIL D

Advanced Driver Assistant Systems
ASIL B

Safety Domain Control and Sensor Fusion Systems
ASIL D



Transmission Control
ASIL C/D

Electronic Power Steering
ASIL 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

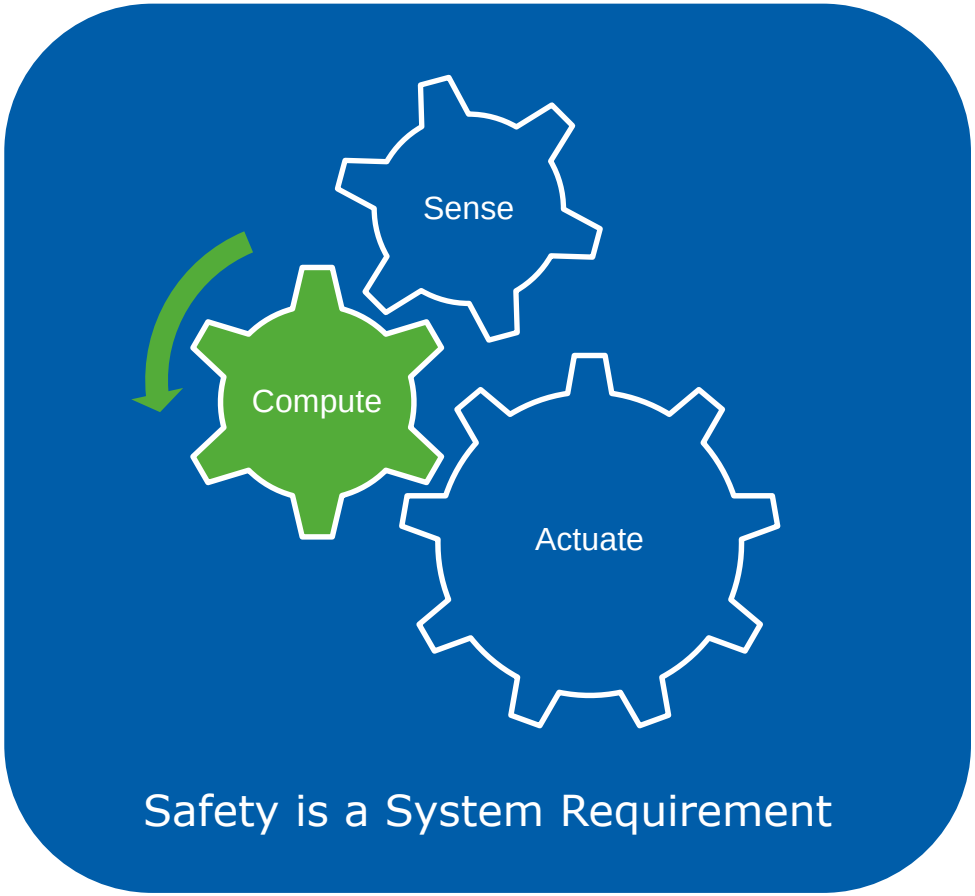
Microcontrollers are …

… a complex system component which needs to run safe

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

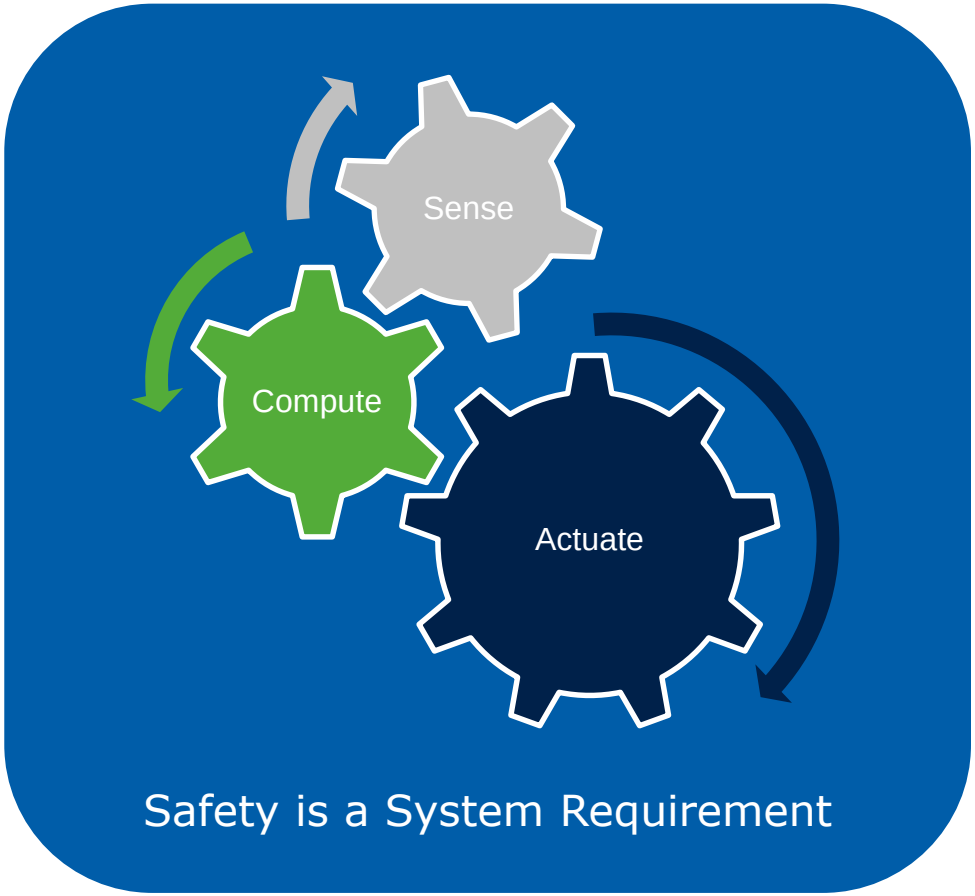
… a central system control unit which needs to make sure that other system components run safe

System "brain" running the application software and controlling the system condition



ISO 26262 Impact on Automotive Companies

- 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



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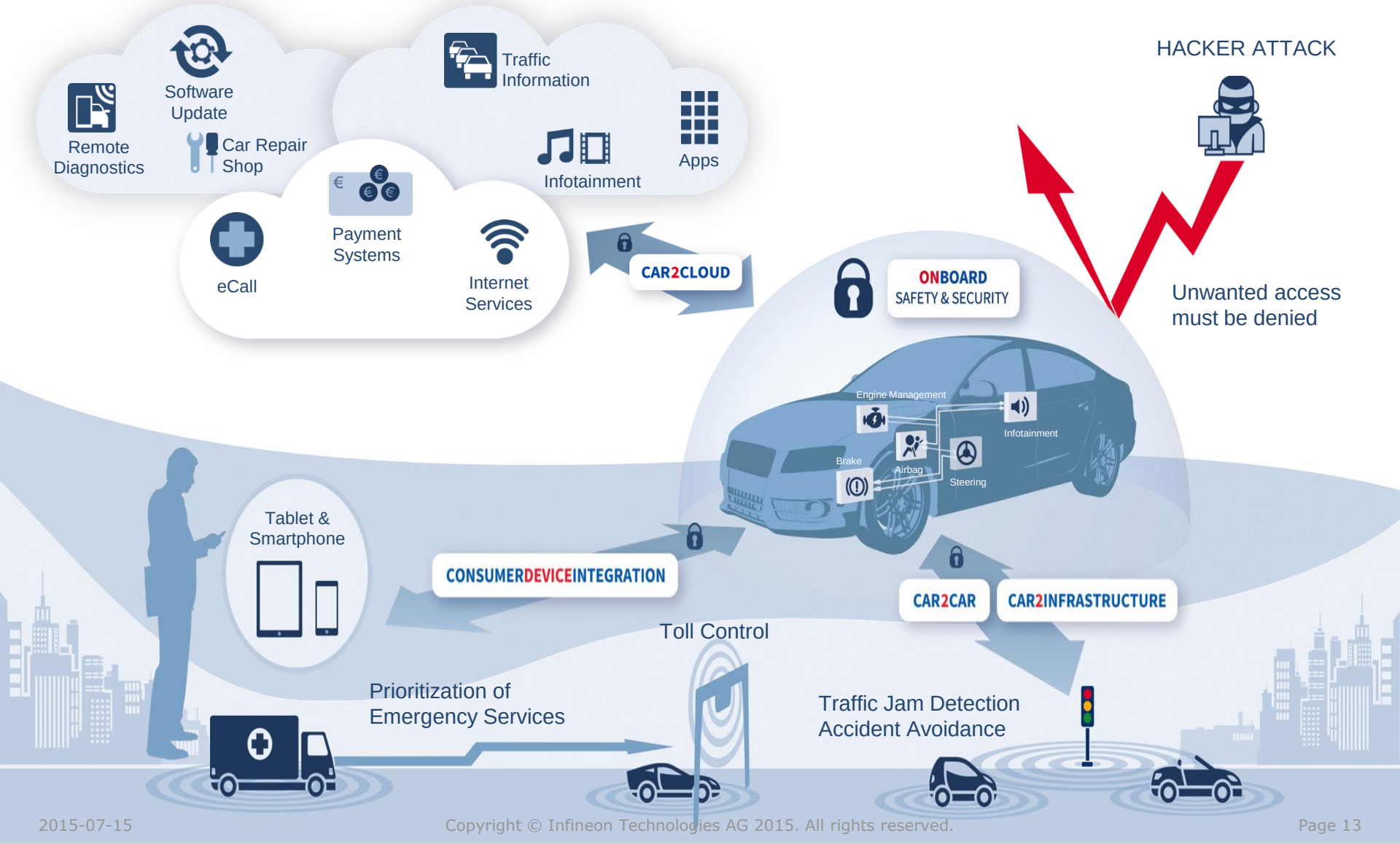
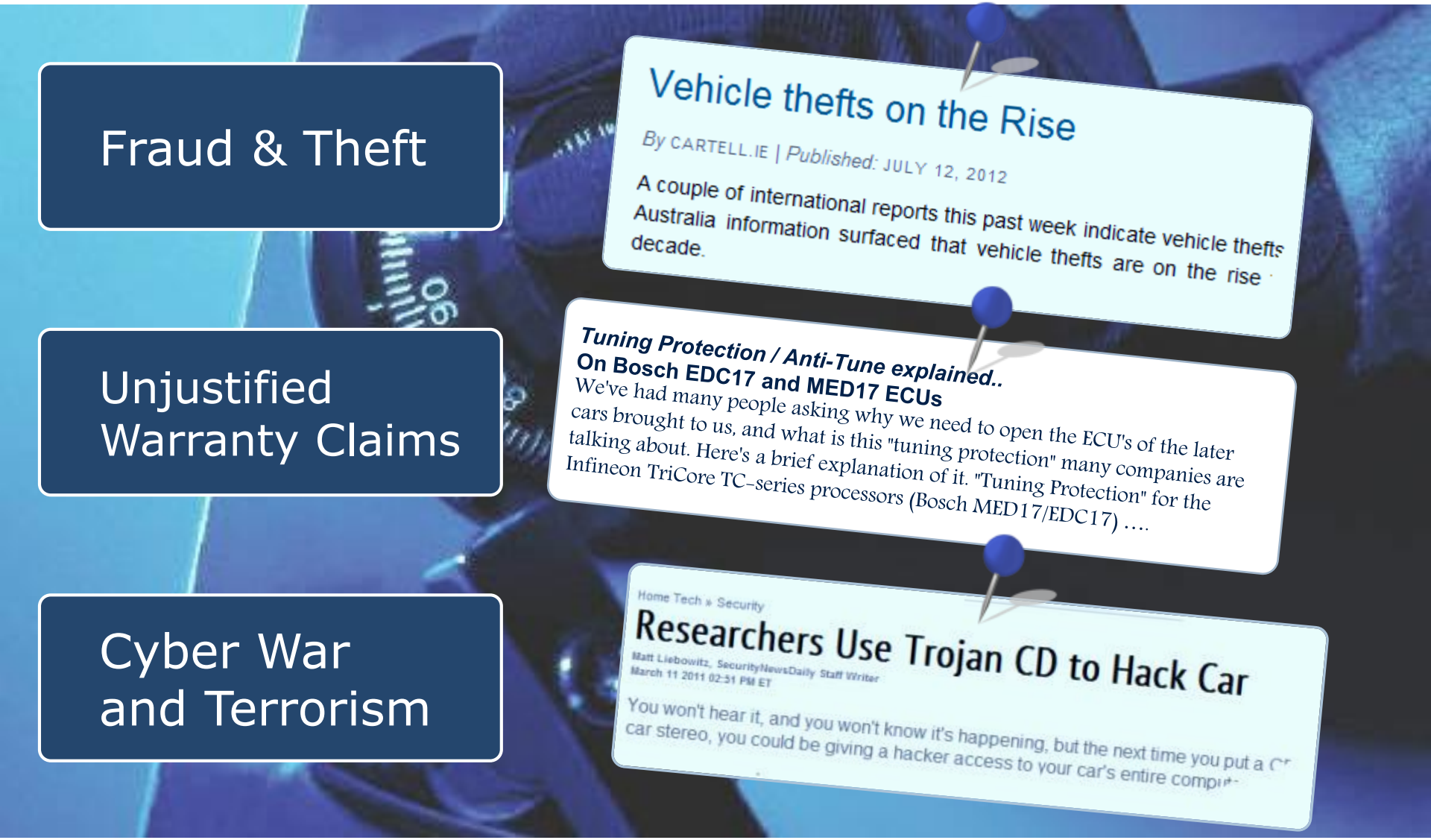
Overall Security Architecture inside the car & with controlled interfaces to the outside world



Security Alerts



Drivers and Market Intelligence
Automotive Security

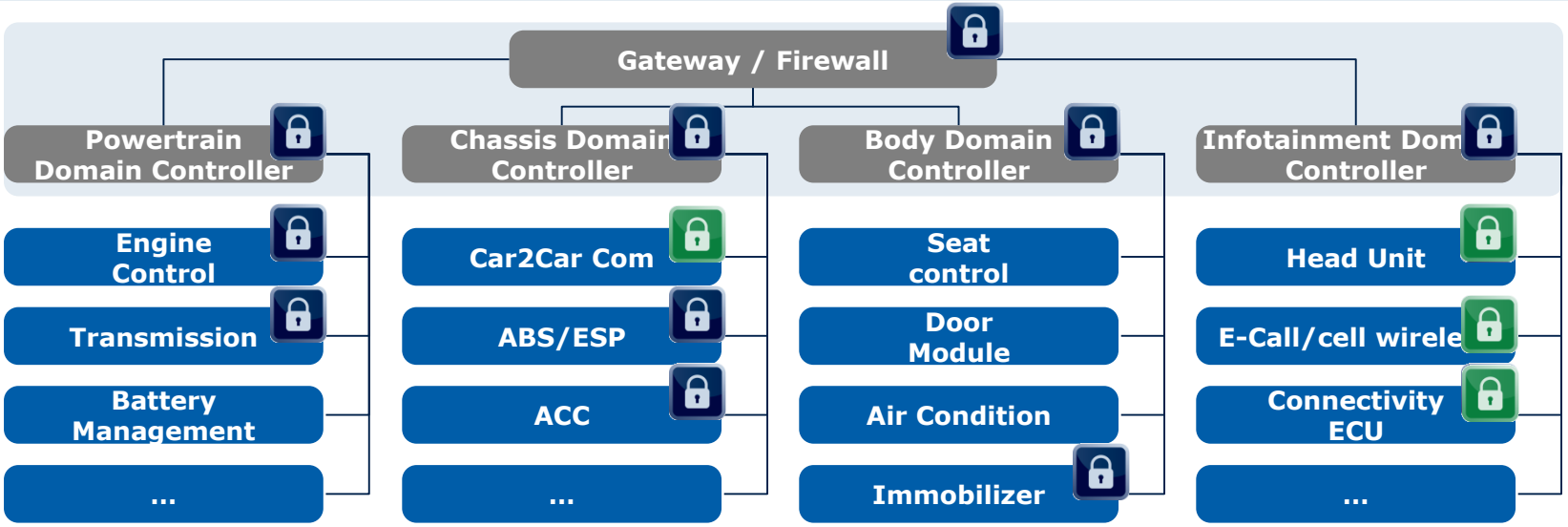
Legislation

- **US:** Willingness for regulation announced (2014).
  Regulation: 2017.
  Expectation: ~ 2019 mandatory deployment.
  Enforcement by after sales components on old cars: No
  US OEMs: Starting 1H 2014.
- **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

Automotive Security Architecture 2018+



Trust anchors

Protected Execution Environments hosting

- Key storage and related cryptographic operation
- Security Applications

1

Integrated on MCU

- High speed
- Secure Onboard Communication
- Logical security

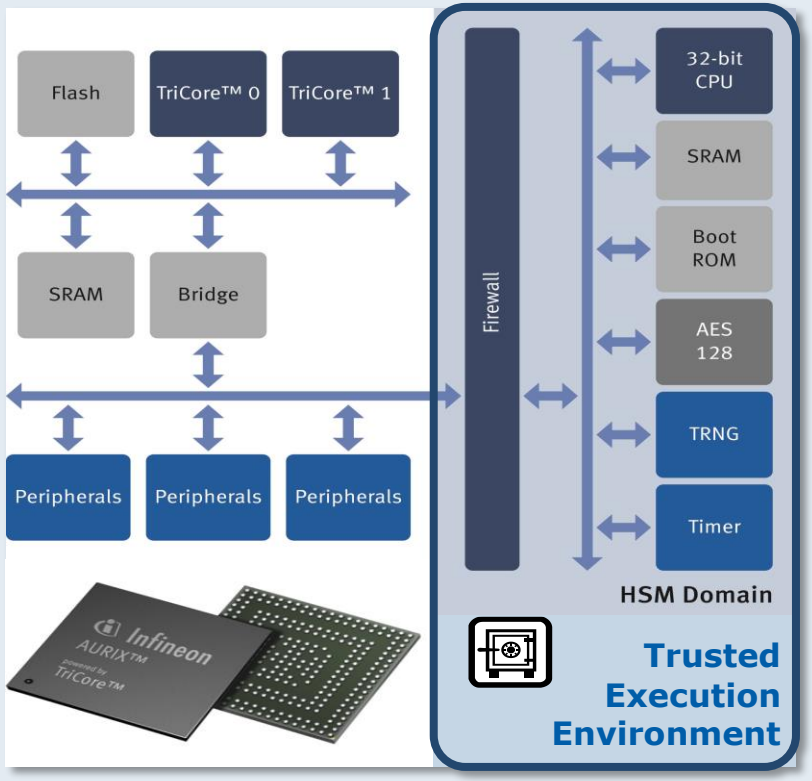
2

Discrete Security Controller

- External communication
- Protecting high value
- By certified hardware security

Enabling the root of trust for internal and external communication

Hardware Security Solutions –
Protect sensitive data, components & IP



Flexibility

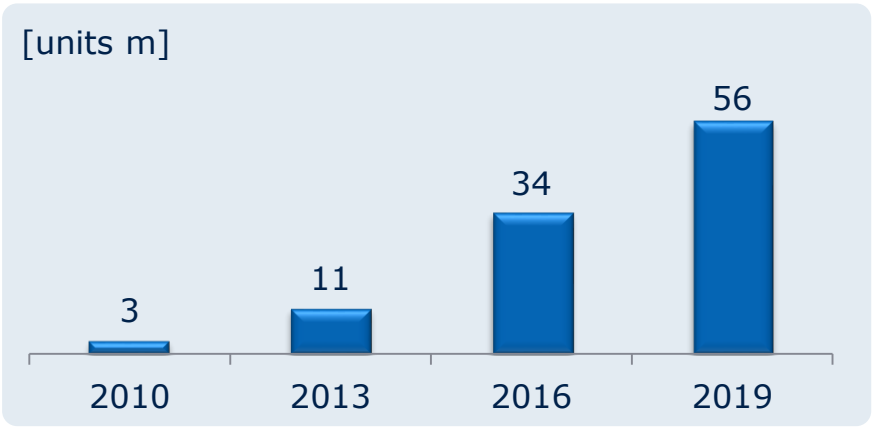
Security

Automotive Environment Quality

Crypto Performance

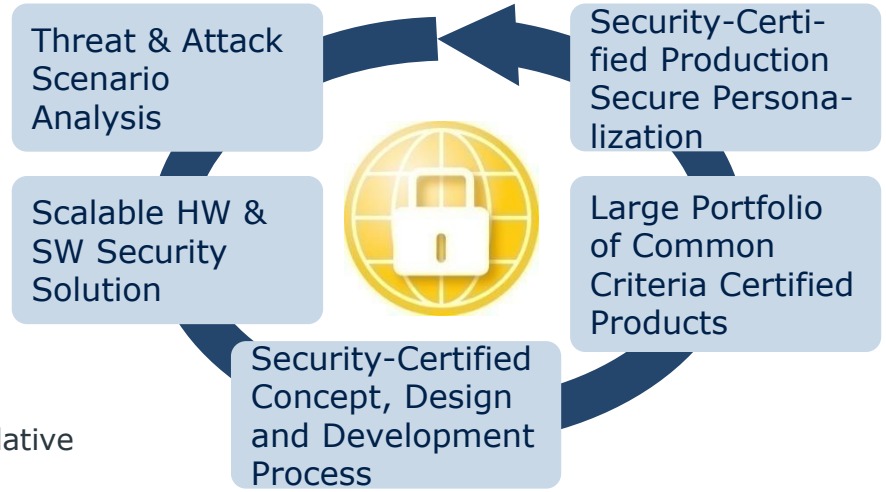
Enabling System Security in Automotive

Forecast for cars with eCall

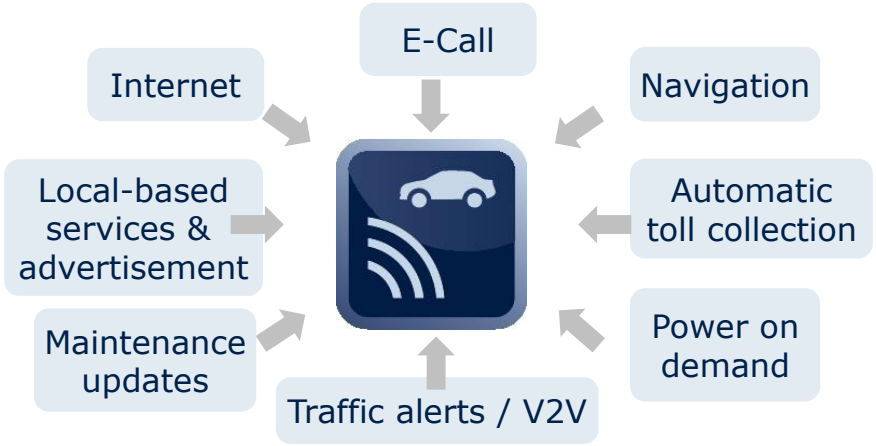


Source: Strategy Analytics; active and inactive systems, cumulative

System Design Consideration



Applications subject to hacker attacks



Microcontrollers with Integrated Security Trust Anchor

Secure Elements for Telematics & V2x

ENERGY EFFICIENCY
MOBILITY
SECURITY

Innovative semiconductor solutions for energy efficiency, mobility and security.