

TÜV SÜD in numbers



One-stop technical solution provider

150

years of experience

850

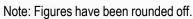
locations worldwide

2,220

million Euro in sales revenue for 2015

24,000

employees worldwide as of February 2016*



^{*}As of 29.02.2016: Inclusive of acquisition in January 2016.



Slide 2

Adding value through quality, safety and sustainability solutions



MOBILITY



Ensure 100 years in safe mobility:

- Periodical Technical Inspections
- Homologation
- Car business services
- Fleet management

Employees: 5,539
Revenue: € 639 million

INDUSTRY



Maximise reliability, safety & efficiency for:

- Chemical, oil & gas
- Power & energy
- Manufacturing & ind. machinery
- Rail
- Real estate and infrastructure

Employees: 8,164
Revenue: € 945million

CERTIFICATION



Achieve market access for:

- Manufacturing & ind. machinery
- Consumer products & retails
- Healthcare & medical devices
- Telecommunications & IT
- Transportation (Automotive, Aerospace & Marine)

Employees: 6,061

Sales Revenue: € 557 million

Slide 3

TÜV®

TÜV SÜD 02.09.2016

The car of tomorrow - a PC on wheels, but much more challenging





Eliminating all comments (which are ignored at compile time) Windows 10 has 27 - 50 Mio lines of executable code.

- + Motherboard +Graphics Card +Applications (Office = 40 Mio lines)
- → Estimate total 100 Mio. lines of code...
 ...but no sensors, no actors and in 1 place



- > 50 different sensors in 15 sensor sets
- 28 microprocessors. 6 communication area networks
- 3000 different signals = 300Mbit / s equivalent > 100GB / h

Challenge: getting all the signals to talk to each other while making sure "when one sensor shuts down it doesn't crash the whole system".

- 10 Mio lines of 'mission critical' software code...
 - ...3 Mio more than a Boeing 787, 8 Mio more than an F22
- → Estimate distributed 100 Mio. lines of code...
 ...and rebooting in drive is not an option

Source: Ford Performance chief engineer Jamal Hameedi

Software Defined Cars = threat AND opportunity beyond the OEMs



Always assume you are in a hostile network with a multitude of attack vectors

- Today: CDs, Smartphone Apps, Communication Intercepts¹⁾, direct NW access²⁾
- Tomorrow: IT-infrastructure of dealer/repair shop, OEM/SP-datacenter, other elements of digital delivery chain

SW protection and quality control become increasingly important

- Existing standards (ISO 26262, OWASP Top 10, CWE/CVSS) not enough
- Ensure quality of commonly used SWlibraries / Open Source without stifling innovation

Cybersec = necessity
& differentiator for entire
value chain

Just gateway(s) and anti-virus won't help

- ADAS requires ECUs on both sides of gateways (functions crossing domains)
- Architectures evolving currently no implemented reference security architecture
- (Managed) Security as a Service?

Holistic view on Cybersecurity needed

- Convergence of IT and OT in analogy to manufacturing automation
- SAE J3061 auto specific, but what about datacenter of OEM, qualification of system integrators, security processes