

Opening slide

A high-tech secure society requires a system level view at securing cyber-physical systems

Veilige samenleving | Embedded Systems

Wouter Leibbrandt – TNO-Embedded Systems Innovation

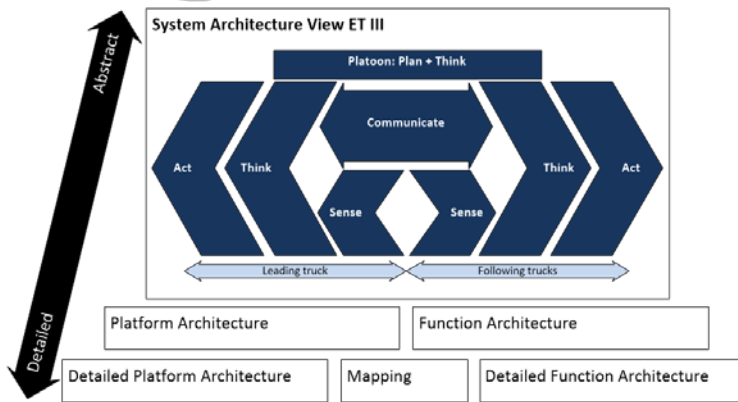
Strategische doelen MU veilige samenleving en HTSM-ES

Fysieke veiligheid

HTSM-ES:

Functional safety in systems

Example: Truck platooning



Digitale veiligheid

HTSM-ES:

System architecture of secure systems

See next slides

Operationele veiligheid

HTSM-ES:

Model-based virtual prototyping techniques

Example: Connected systems in smart buildings



Cyber-physical systems are vulnerable to attacks

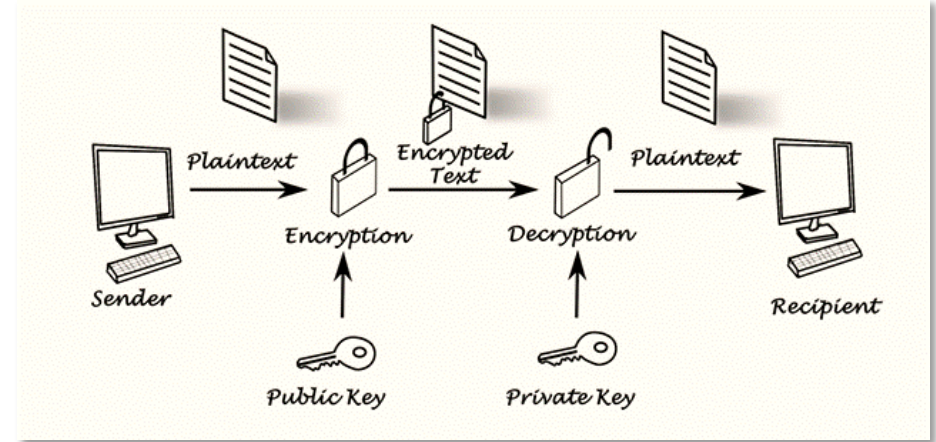
- Stuxnet – 2010: social engineering
- German Steel-mill – 2014: spear-phishing + social engineering
- Carbanak – 2014: e-mail infection of Banks, >500M\$
- Jeep Cherokee – 2015: over the air; brakes, steering, transmission



In all cases:

- Basic security technology was applied:

- Encryption
- Firewalls
- Secure key exchange mechanisms



- So, what is up?

- Look at the system as a whole
- Specific challenges for cyber-physical systems/embedded systems



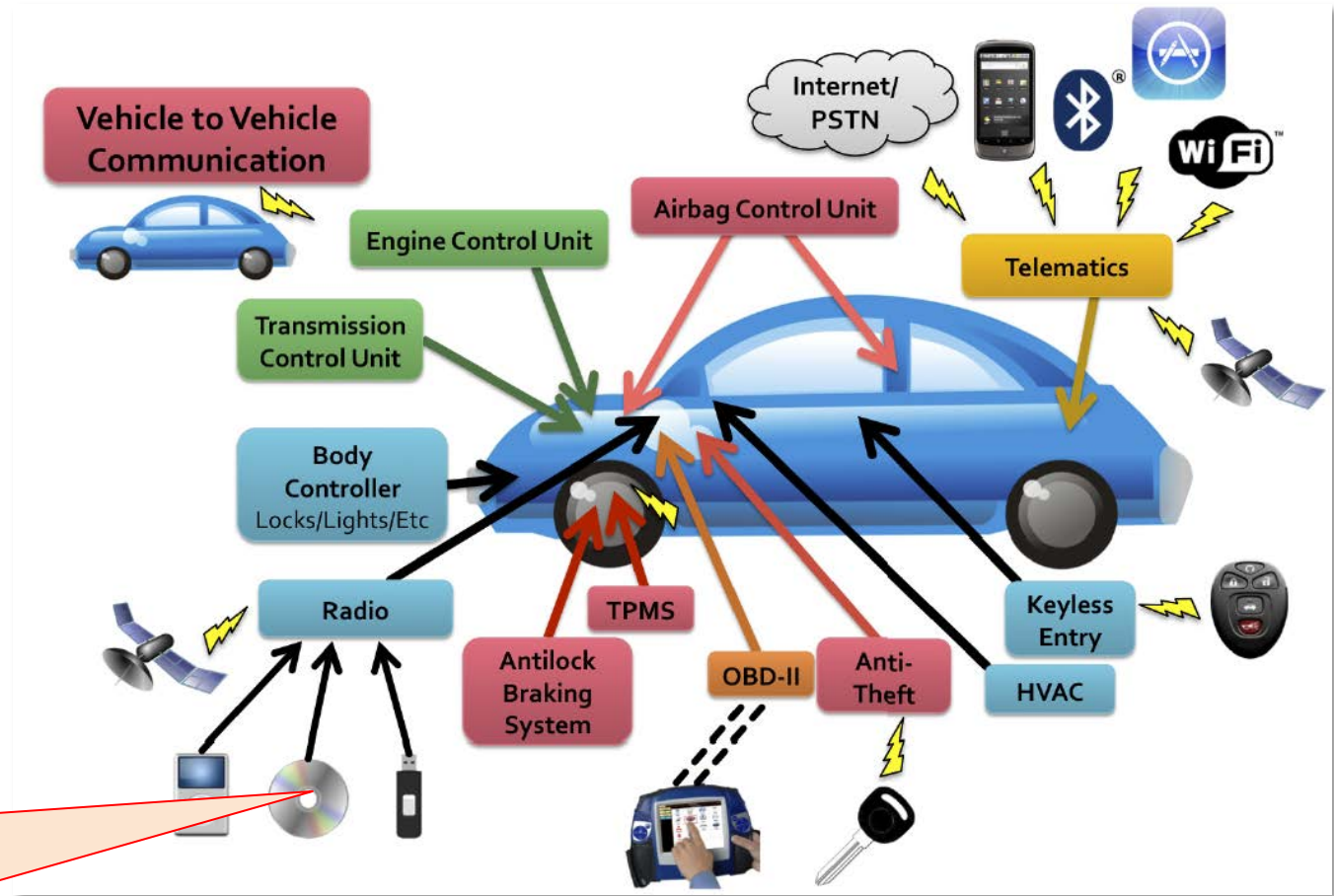
Architectural view on security in automotive

USENIX Security, August 10–12, 2011

Comprehensive Experimental Analyses of Automotive Attack Surfaces

Stephen Checkoway, Damon McCoy, Brian Kantor,
Danny Anderson, Hovav Shacham, and Stefan Savage
University of California, San Diego

Karl Koscher, Alexei Czeskis, Franziska Roesner, and Tadayoshi Kohno
University of Washington



“We modified a WMA audio file such that, when burned onto a CD, plays perfectly on a PC but sends arbitrary CAN packets of our choosing when played by our car’s media player.”

By the way: this is the car of today, think about the future ...

Challenge: dependencies between architectural views

- Security vs safety
- Security vs performance
- Security versus functionality
- Security vs maintainability



Laatste slide

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