Functional Safety and Cybersecurity:

Dependencies
Standards
Pragmatic approaches

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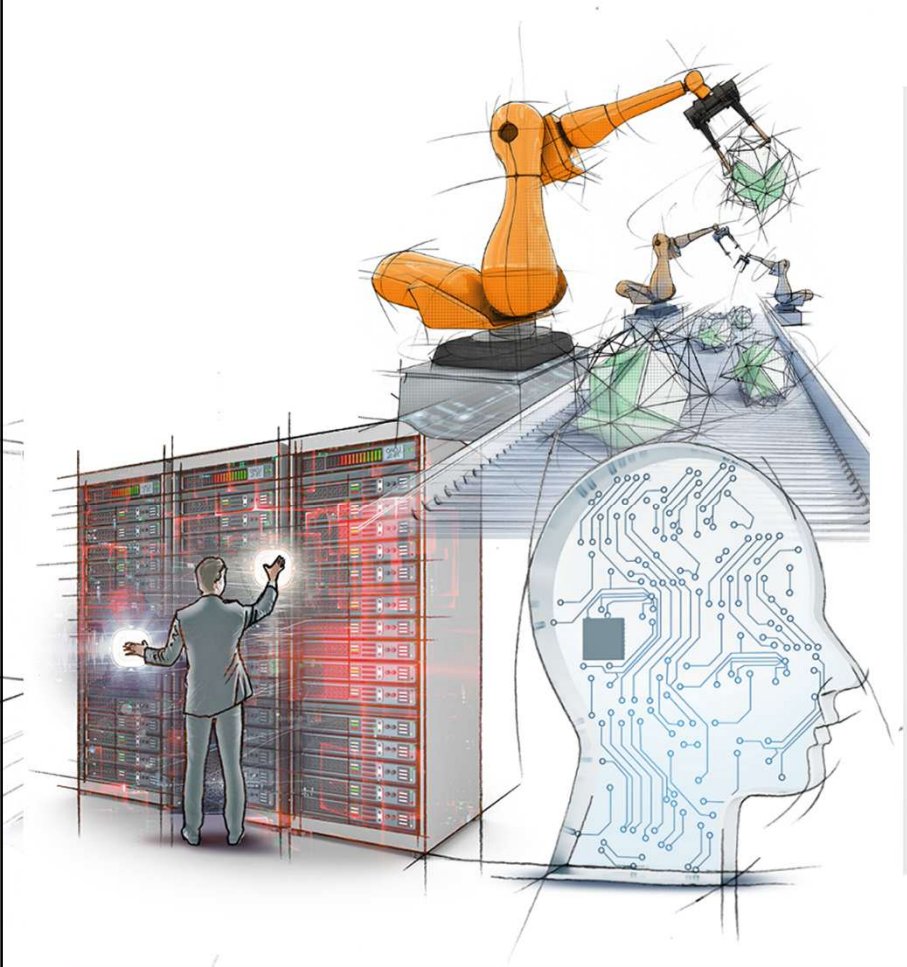
DKE

DKE is the trusted platform for:



- standardization,
- cooperation
- and the interaction of experts

in the areas of:

- electrical engineering
- Electronics
- information technologies

German member in IEC, CENELEC and ETSI

Short introduction

Find me
on LinkedIn:

Member of the DKE Executive Board, since 2019

- Leading the division External Relation & Support
- Analyzation of political and business environment; development of standardization strategies
- Responsible for bi- and multilateral international cooperation
- Representation of German interests IEC, CENELEC and ETSI

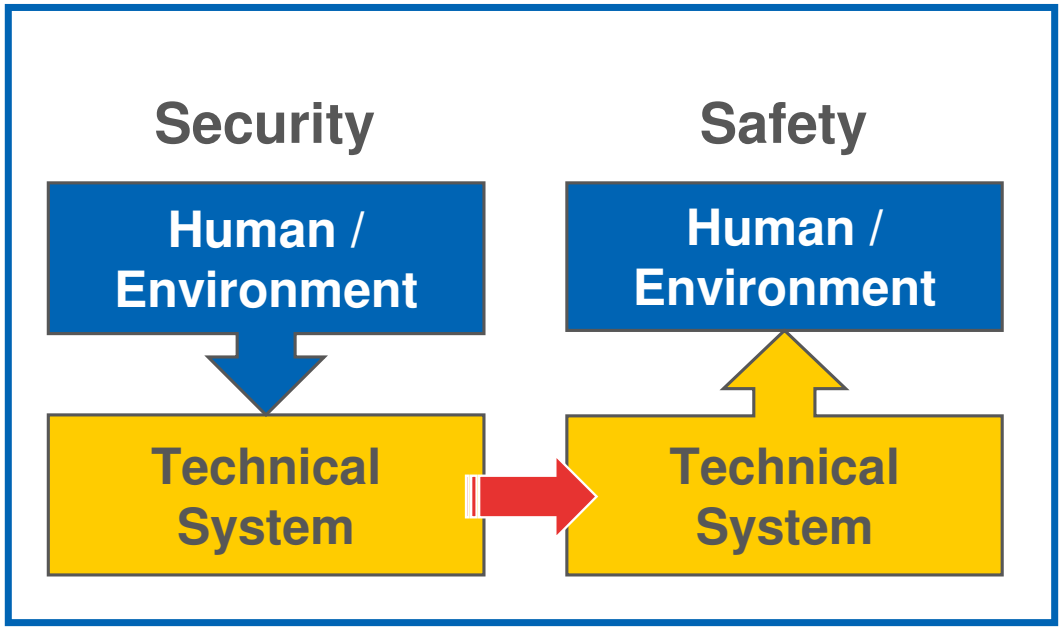
Industry Experience

- Former Director of Sales and Marketing, Test Manager and Test Engineer in the Automotive Industry for safety critical products

Education

- Diploma (Master equivalent) in Electrical Engineering, Electronics and Information Science of Friedrich-Alexander University Erlangen-Nürnberg, Germany
- EMBA of Quantic School of Business and Technology, Washington DC, USA
- Program for Executive Development (PED), Diploma of IMD, Lausanne, Switzerland

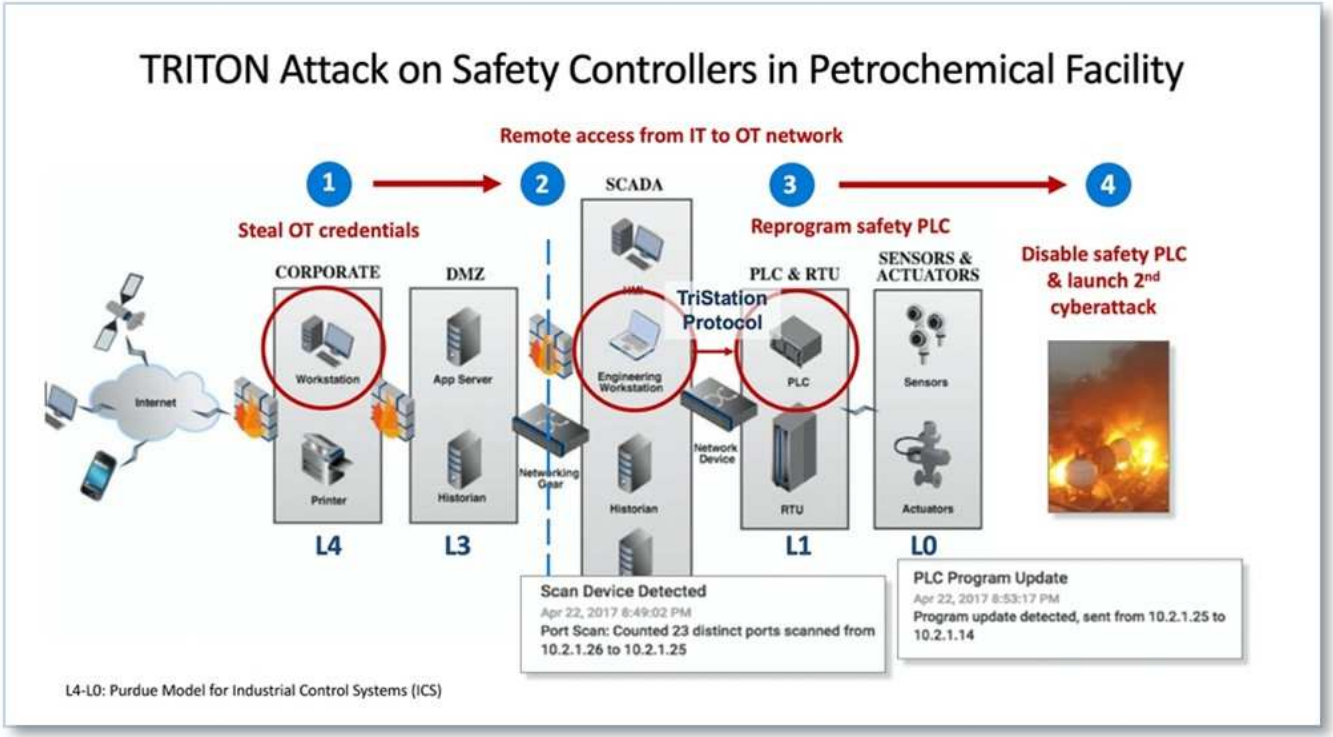
What is Security and what is Safety?



Attack-Framework TRITON

Discovered 2017

- First public incident of an attack against a SIS (Safety Instrumented System)
- Software to intrude an ICS network (Industrial Control Systems) and manipulate safety products
- Intention: cause physical damage
- Target: Triconex products of Schneider Electric



Cybersecurity needs continuous processes due to the changing threat environment

Changing threat environment*

Break-in via internet

Human failure and sabotage

Unauthorized access

D-DOS Attacks

Attacks on standard components

Malware

Changing infrastructure

Increasing interconnection and integration

Cloud applications

IT standard components

Collaboration in the digital world

Big Data and Internet of Things

Information Technology (IT) & Operational Technology (OT)

IT – Management of information

- web/app/data/email server, management systems
- Primary security objective: **confidentiality**
- e.g., ISO/IEC 27000 series

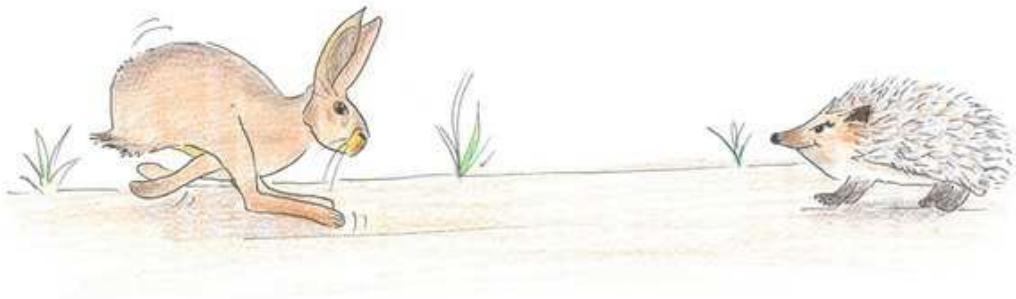
OT – Management of physical processes

- Industrial Controls (PLC, DCS, SCADA & I/O), sensors, embedded systems, …
- Primary security objectives: **availability & integrity**
- e.g., IEC 62443 series

Why cybersecurity in standardization?

What is the goal?

Cybersecurity	Standardization
dynamic	(placid)
agile	(lengthy)
unpredictable	clever!



Goal of the hedgehog: Not be as fast as the rabbit, but cleverer!

Goal of standardization: No 100% specification but develop guidelines and assistances!

Quelle: https://www.ndr.de/fernsehen/service/leichte_sprache/haseundigel118_v-contentgross.jpg © Universität Hildesheim

To reduce complexity: use standardization!

„The product/system is secure!“

- ...can never be shown due to unpredictability (environment changes almost daily)
- ...is not a useful goal (deterrent)

→ **complex!!**

„We have done everything reasonable to make the product/system secure."

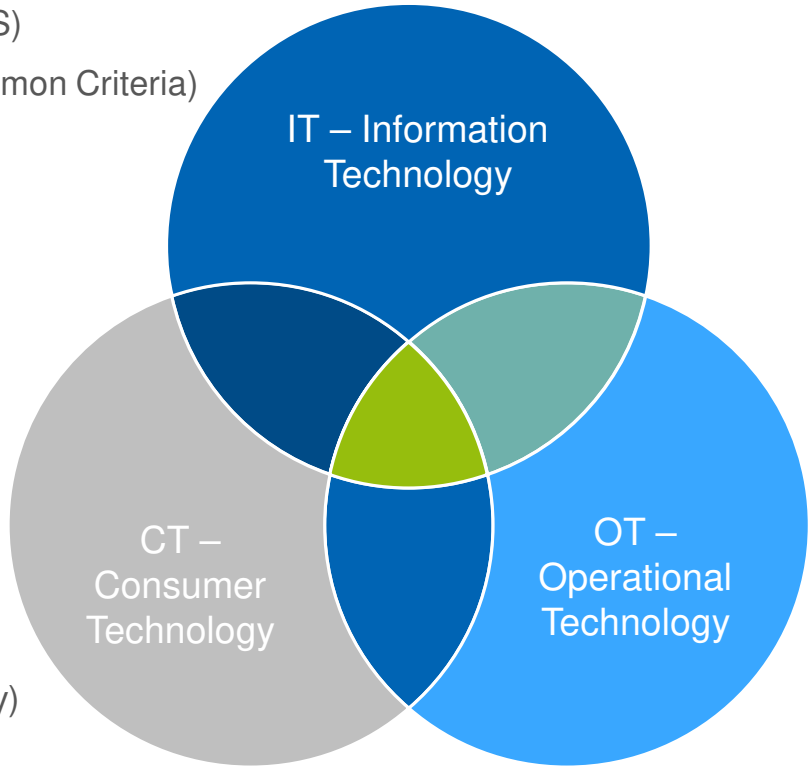
- …can be shown
- …can be documented and certified!

Improvement due to use of norms and standards!!!

Information Technology (IT) & Operational Technology (OT)

IT/OT/CT Standardization landscape

- ISO/IEC 27000 series (ISMS)
- ISO/IEC 15408 series (Common Criteria)



- ETSI EN 303 645 (IoT-Security)

- IEC 62443 series (Industrial Automation)
- IEC 62351 series (Smart Grid Communication)
- IEC 63096 (Nuclear Power Plants)
- IEC 80001 series (Medical Devices)
- IEC 63110 series (Charging Infrastructure)
- …

Sectors for Operational Technology

Energy Supply

Process Industry

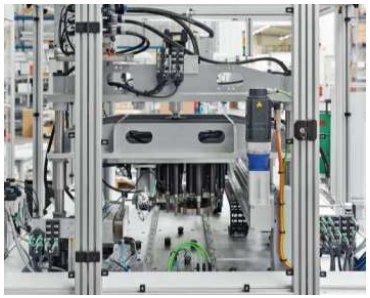
Automotive Industry

Renewable Energy

Shipbuilding

Railway Industry

Water Industry



Machine Building Industry

Industrial Electronics

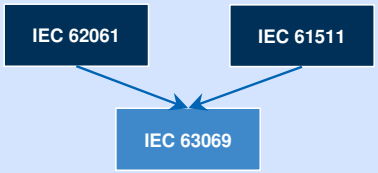
Building Automation

Examples for the interaction between standards for functional safety and OT security

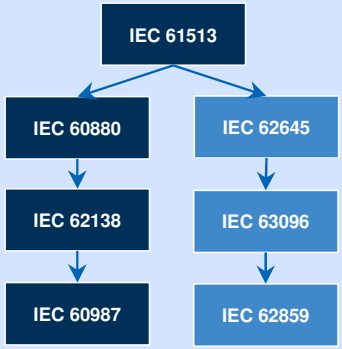
IEC 62443 „Horizontal“ series for OT security

IEC 61508 „Horizontal“ series for functional safety

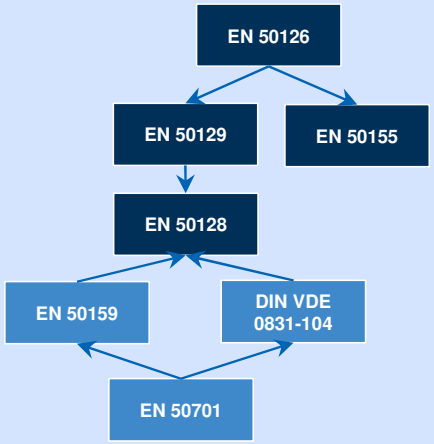
Process industry



Nuclear energy

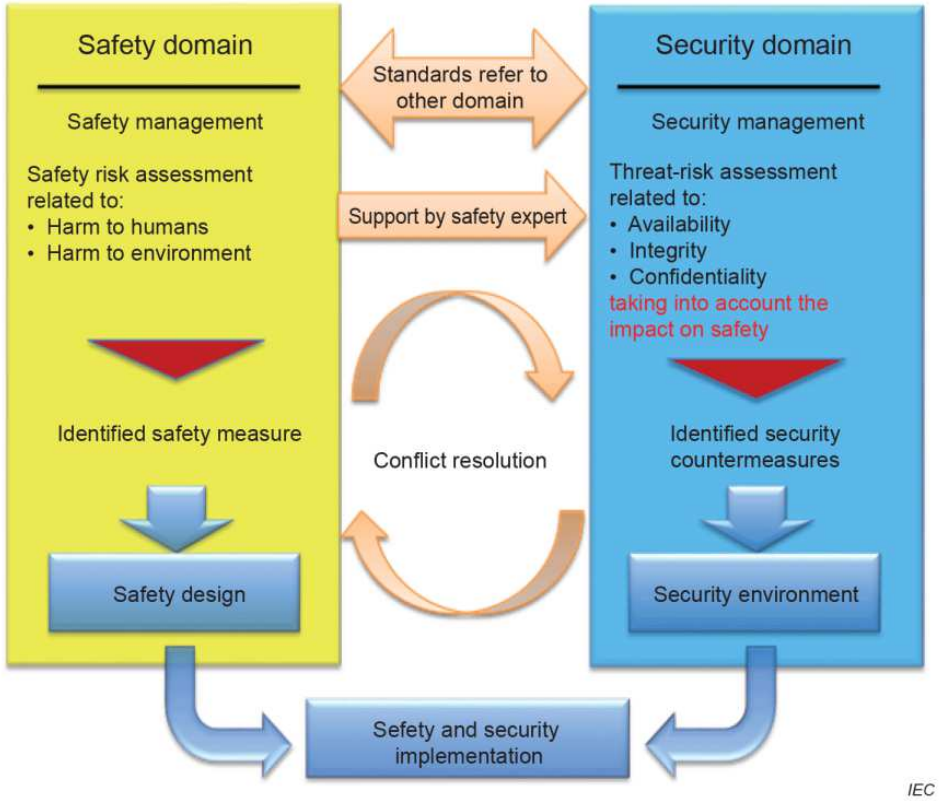


Railway



IEC TR 63069 – Industrial-process measurement, control and automation – Framework for functional safety and security

- Information and guidelines for a common application of IEC 61508 (Safety) and IEC 62443 (Security)
  - Guiding principle 1: protection of safety implementations
  - Guiding principle 2: protection of security implementations
  - Guiding principle 3: compatibility of implementations
- Product lifecycle should cover both safety and security measures:
  - Concept and development
  - Production, use and maintenance
  - Support und End-of-life
- IEC TR 63069 helps with the understanding of safety and security, but it is no magical bullet for the application



Thank you
for your attention!

We are building the e-dialistic future.
Please join us.

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