Railway Industry: People training and Cybersecurity

4th ERA-ENISA Conference on Cybersecurity in Railways

Lucia Capogna - 3rd October 2024

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SYSTRA is one of the world's leading engineering and consulting groups specialising in public transport and mobility solutions

+65 YEARS

Figures as at end of 2023

A turnover of **€1.071Bn**

76% of turnover achieved abroad

Orders of **€1.3 Bn**

An operational presence in **80 countries**

SYSTRA has contributed to **1 in 2** High-Speed lines in the world (>250 kph, outside China)

SYSTRA has designed **1** Metro network in service out of **2** in the world

About me

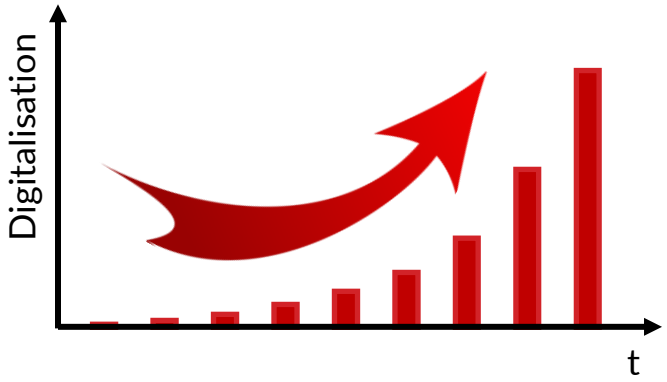
Lucia Capogna

Cyber Security and Software Assurance Team Leader

- Computer Science Engineer (BSc) and Systems Engineer (MSc) with over 17 years of experience in Software, Cyber Security, Requirements Management and Verification & Validation across various industries:
  - Cyber Security Technical Expert
  - Software and Software Assurance Technical Expert
  - Independent Lead Assessor
- Member of several CENELEC (Safety – EN 50129, Cybersecurity - TS 50701 & Software – EN 50716) and IEC Standardisation Groups (Cybersecurity – IEC 63452)
- School of Engineering, University of Birmingham:
  - Industrial Advisory Board member
  - Royal Academy of Engineering Visiting Professor in OT Cybersecurity
- STEM Ambassador & Woman in Rail (WiR) East Midlands committee member

Digitalisation – Stating the obvious

Digitalisation has been introduced exponentially in the railway solutions



New technologies and digitalisation provide a railway that is:

- more flexible,
- inter-connected,
- easier to enhance/customise,
- more advanced,
- more responsive to sub-system failures.

The digital evolution introduces new and diverse risks that evolve over time: **Cybersecurity risks**.

Do we have the right skills and competencies to manage and prevent these risks and/or recover from cyber incidents?

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Skill Shortage

S04: Cutting-edge competencies and capabilities in cybersecurity across the Union

Link

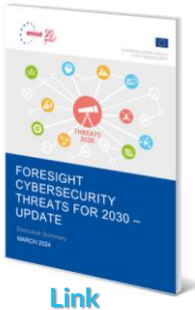

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Table 1. New prioritisation of threats

	THREAT	IMPACT * LIKELIHOOD	IMPACT	LIKELIHOOD
1.	**Supply Chain Compromise of Software Dependencies**	17,71	4,21	4,21
2.	**Skill Shortage**	17,20	4,10	4,20
3.	**Human Error and Exploited Legacy Systems within Cyber-Physical Ecosystems**	16,69	3,96	4,22
	.....			

Cybersecurity experts

Is it sufficient to have just more cybersecurity experts?

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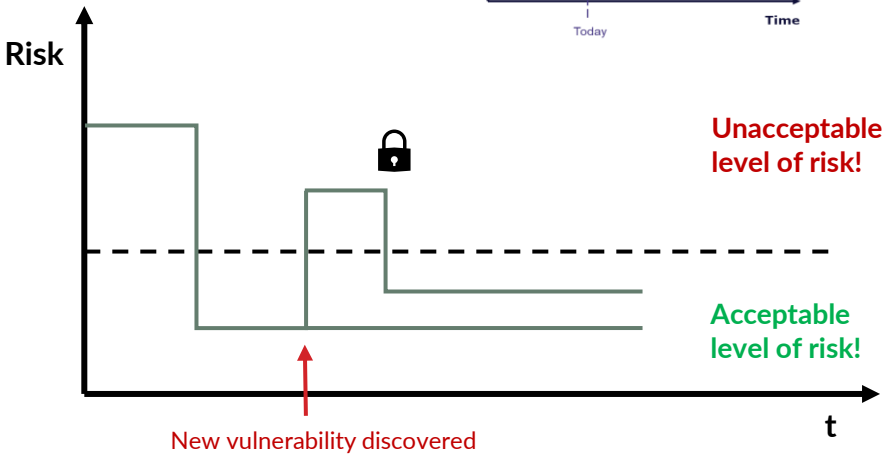
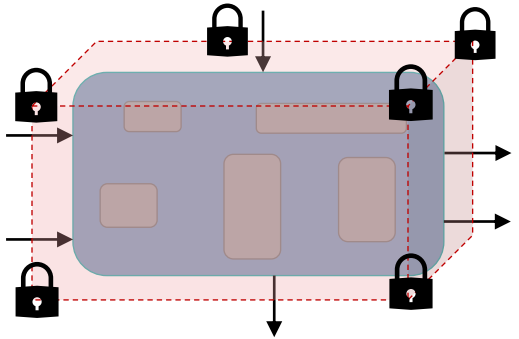
Defining the problem

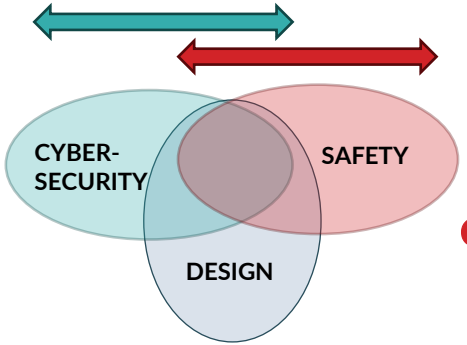
Rail systems are designed and built to achieve specific objectives/targets for Safety, Reliability, Availability and Functionality.

Fact: In most cases, cybersecurity is addressed separately from system design and engineering.

Digitalisation and cybersecurity risks







It is NOT sufficient to have just more Cybersecurity experts!

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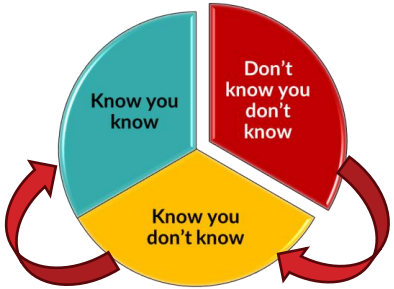
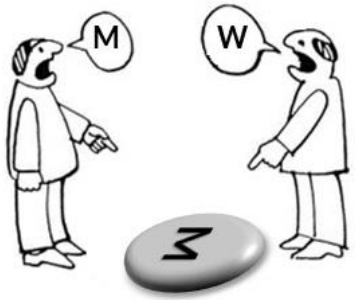
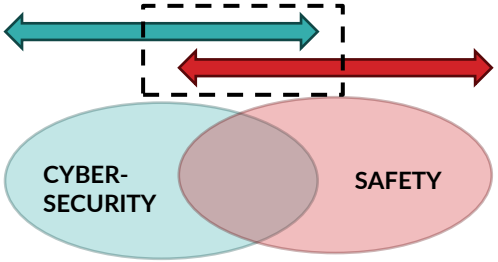
Goal – Increase resilience

Improve cybersecurity understanding of people working in critical areas

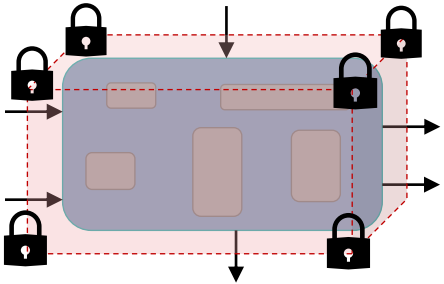
Cybersecurity experts and cybersecurity trained (Safety) engineers!





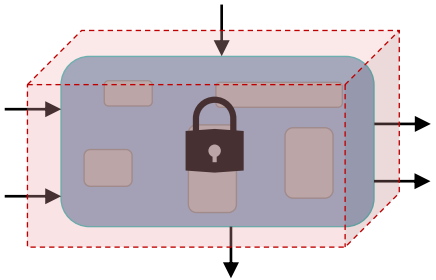


If it is not secure, it is not safe!



- Needs additional/external security technology
- More costly
- Less effective

- Reduces cybersecurity (and safety) risks
- Reduce costs
- Increases efficiency and effectiveness



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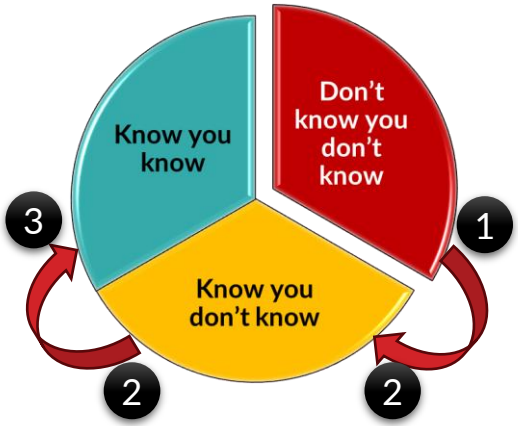
How: Step by Step



Keep testing you still know

1 Provide awareness across the industry and target people in critical areas

- Safety
- Assurance
- Incident Investigation
- Design
- Approval
- …

2 Embed Operational Technology (OT) cybersecurity into formal education and training (focused and oriented – a learning journey)

- Domain specific
- Linked to role and responsibility / ambitions
- Use terminology and examples specific to the role
- Teach what is needed only
- Use scenarios that are critical and relevant
- Highlight the importance of cybersecurity from concept phase

3 Collaborate, contribute and coordinate with "Body of Knowledge"

- Cybersecurity BoKs
- Individual discipline BoKs incorporating cybersecurity

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Conclusion

- Digitalisation and new technologies demand more knowledge in cybersecurity to keep systems safe, reliable, available, etc.. → **To make system more resilient.**
- The Railway Industry needs **professionals working in critical areas to be cybersecurity trained**
- Collaboration with cybersecurity experts is crucial from concept phase:
  - know you don't know and
  - know you know
- Training and teaching techniques must be specific and relevant to the role to be effective
- Initiatives to improve understanding and knowledge in critical areas are already ongoing:
  - Formal education is embedding OT cybersecurity in the engineering programs
  - National and international "Body of Knowledge" are more focused on specific needs

OT cybersecurity shall protect safe, reliable and available physical operations.

It is NOT sufficient to have solely more Cybersecurity experts.

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