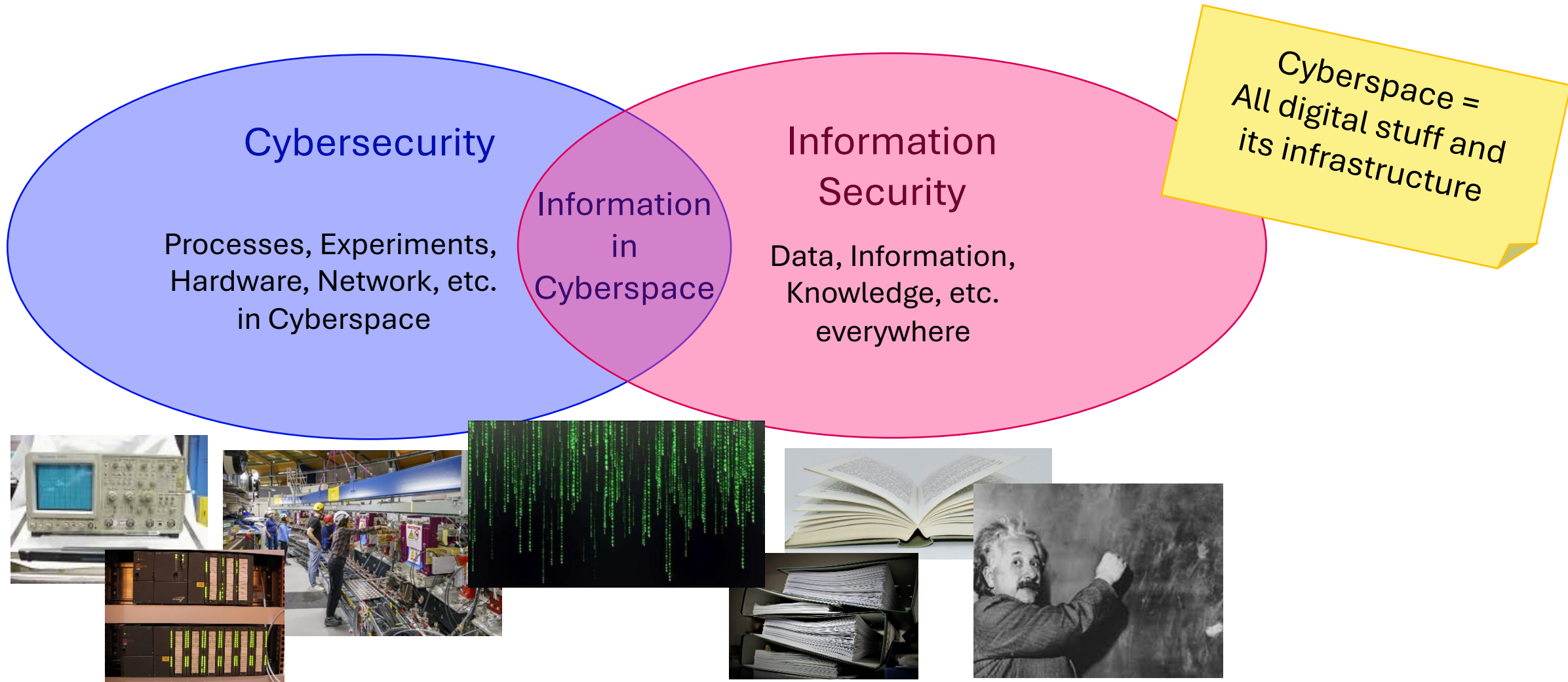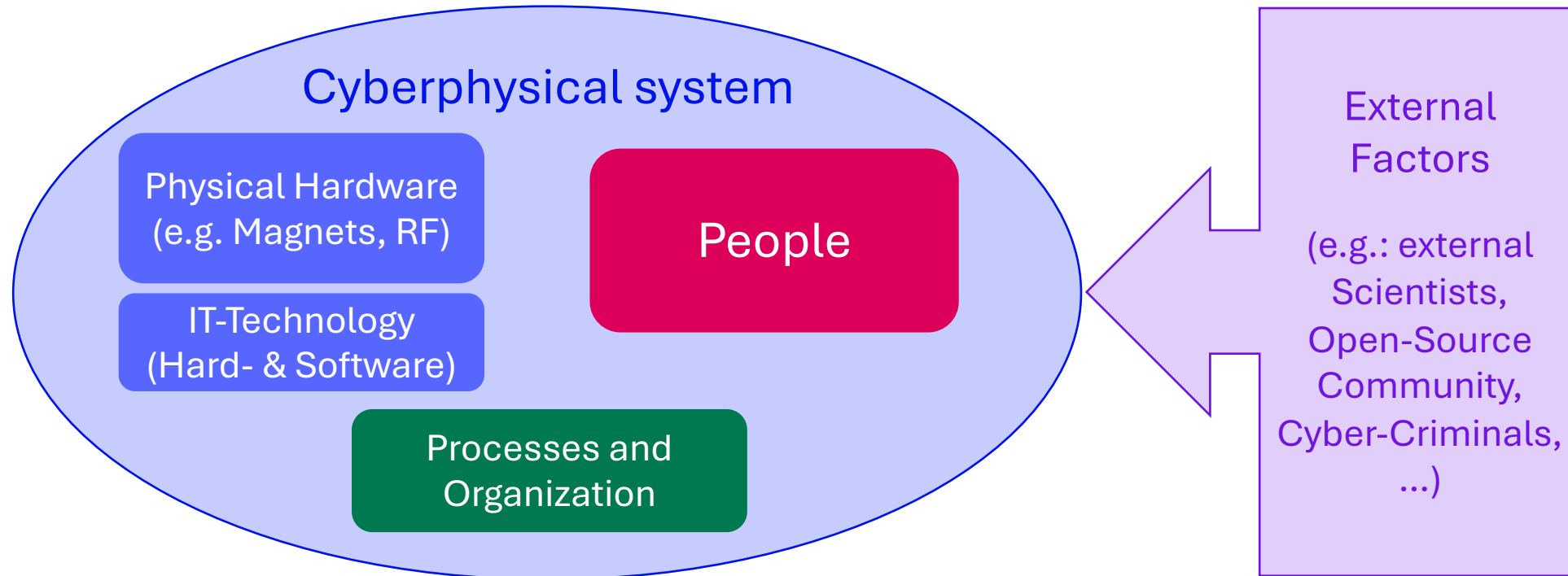**PSI**

Cybersecurity: Humans in Cyberphysical Systems

Elke Zimoch
Research Software Engineer Community at PSI, 15. July 2025

Difference between Cybersecurity and Information Security

Cybersecurity

Processes, Experiments, Hardware, Network, etc. in Cyberspace

Information in Cyberspace

Information Security

Data, Information, Knowledge, etc. everywhere

Cyberspace = All digital stuff and its infrastructure

PSI

Cyberphysical system

Physical Hardware (e.g. Magnets, RF)

IT-Technology (Hard- & Software)

People

Processes and Organization

External Factors

(e.g.: external Scientists, Open-Source Community, Cyber-Criminals, …)

Cybersecurity Goals

PSI

Confidentiality of Data and Processes

- Only authorized people have access

Data is encrypted
Processes are patented

Integrity of Data and Processes

- Nothing is changed or forged

Data is read only
Processes … I hope everything works well

Availability of Data and Processes

- Stuff is available and accessible when I need it or when I am scheduled to use it

Data is backed up
Processes … I hope nothing broke

But for sure we (PSI) are safe from cyber crime …

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BESSY II back in operation after cyber attack on Helmholtz-Zentrum Berlin (HZB)

Since Monday 3 July 2023 BESSY II light source produces brilliant light for research again. It was shut down as a precaution after a hacker attack on the IT systems at Helmholtz-Zentrum Berlin (HZB) mid-June. The Physikalisch-Technische Bundesanstalt (PTB, national metrology center) which operates its own
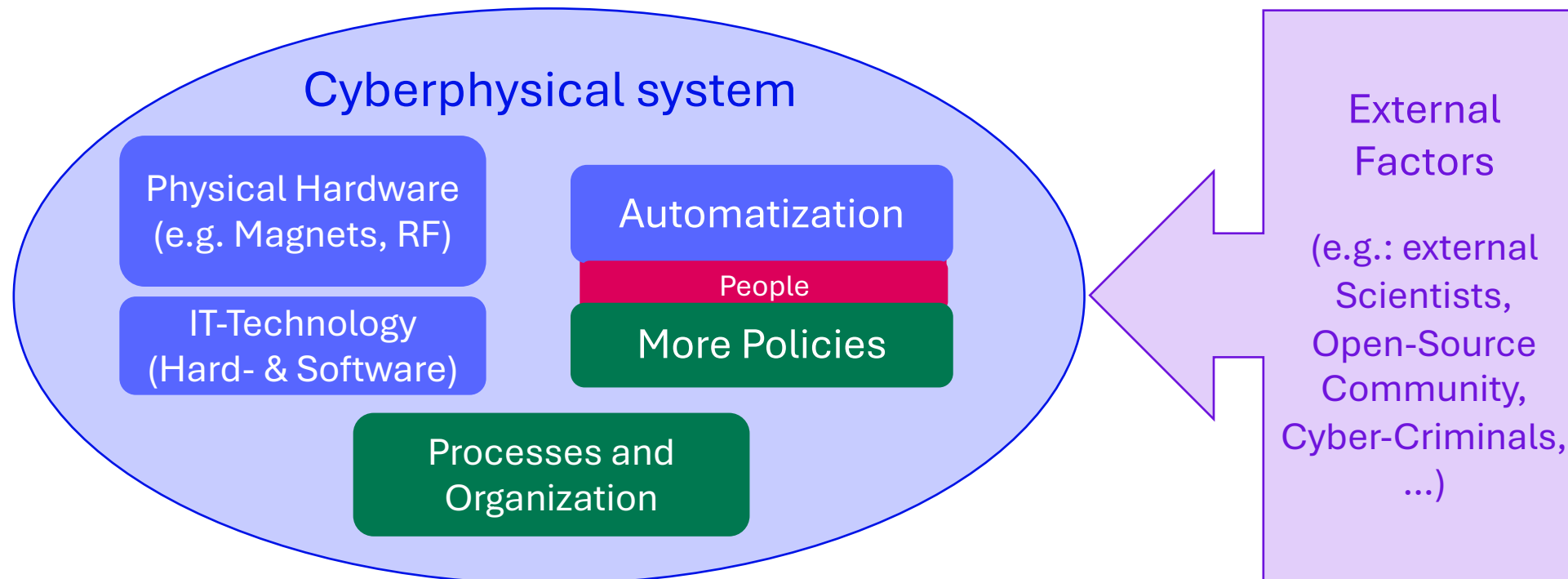
Humans as a Problem

To prevent errors

- Educate and Train – and control their behavior
- Exclude humans from the system (automatize)
- Use policies and constrains to limit what they can do

Leads to

- Inflexible systems
- Reduce people to rule followers
- Make policies responsible?

Cyberphysical system

Physical Hardware (e.g. Magnets, RF)

IT-Technology (Hard- & Software)

Automatization

People

More Policies

Processes and Organization

External Factors

(e.g.: external Scientists, Open-Source Community, Cyber-Criminals, …)

Humans as Part of the Solution

Build up resilience (make attacks easy recoverable)

- Encourage learning

- Communicate and collaborate

- Make people with expertise part of the decision process
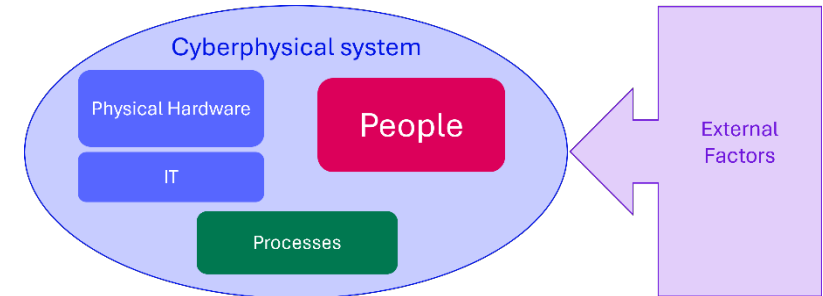
What is our contribution as research software engineers to cybersecurity at PSI?

Thank you for your attention

PSI

Literatur

PSI

Verena Zimmermann, Karen Renaud «Moving from a human-as-problem to a human-as-solution cybersecurity mindset», International Journal of Human-Computer Studies 131 (2019) 169-187, https://doi.org/10.1016/j.ijhcs.2019.05.005