KICK-OFF CORNET TRUSTED-IOT

02 / 12 / 2022

VRIJE UNIVERSITEIT BRUSSEL

KU LEUVEN

AGENDA

10h00-10h20: Project summary + introduction of members

10h20-10h40: Introduction to embedded security

10h40-10h50: Use cases and technology (VUB)

10h50-11h10: RISC V

11h10-11h20: Use cases and technology (KULeuven)

11h20-11h35: Funding opportunities (Vlaio) and next TETRA call

11h35-11h45: Round table

11h45-12h30: Networking reception

SUMMARY

VUB	Environmental monitoring	Heterogeneous embedded architectures
KULeuven	Drones	Multi-core RISC-V
BTU	Industry 4.0	Coarse grained reconfigurable architectures (CGRAs)
TUD	Mobile robots	Ultra low-powered (FPGAs)
GFAI	Cooperative robots	Heterogeneous system solutions

VUB – INDI - RAPTOOLS

TEAM

Abdellah Touhafi

Bruno Da Silva

Laurent Segers

An Braeken

- **Reconfigurable architectures**
- **Wireless sensor networks**
- **Environmental monitoring**
- **Security**

VUB – INDI - RAPTOOLS

IN TRUSTEDIOT

Use case : Environmental monitoring

- Single sensors:
  - Humidity
  - Temperature
  - Air quality...
- Arrays of sensors
  - Audio
  - Video

Technology

⇒ - Low end platforms

⇒ - Middle to high end platforms

KULEUVEN – EMERGING TECHNOLOGIES, SYSTEMS & SECURITY

Nele Mentens

Md. Masoom Rabbani

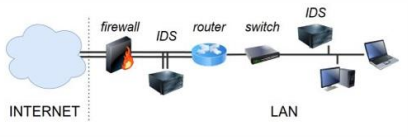
Jo Vliegen

Research group of KU Leuven

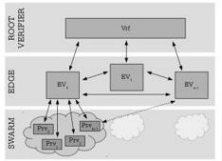
Faculty of Engineering Technology, campus Diepenbeek, Limburg, Belgium

Algorithm - hardware co-design

- High-speed network security

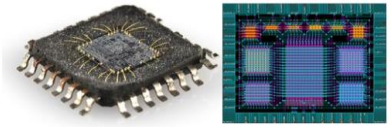


- low-cost & low-energy crypto and trusted computing

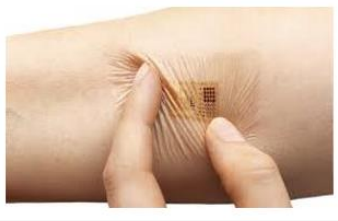


Hardware - technology co-design

Si-CMOS technologies



Emerging technologies



VUB VRIJE UNIVERSITEIT BRUSSEL

KU LEUVEN

KULEUVEN

ROLE WITHIN TRUSTED IOT

- Focused on multi-core RISC-V platforms
  - Attestation
- Use case: Drones 4.4
  - substitute every processor with a RISC-V, on a single FPGA

TU-DRESDEN – ADAPTIVE DYNAMIC SYSTEMS

Diana Groehringer

Sergio Pertuz

Domain-Specific Computer Architectures
- Processors
- Accelerators
- Network-on-Chip
- Memory

Hardware/Software Co-Design
- Modeling (e.g. UML)
- HW/SW Codesign of applications or middleware (ROS, RTOS)
- High Level Synthesis

Runtime Reconfigurable Systems
- Virtualization
- Self-adaptation
- Dynamic and Partial Reconfiguration

Programming Methods and Tools
- Design Space Exploration
- Application Partitioning and Mapping
- LLVM
- Processing-in-Memory

VUB VRIJE UNIVERSITEIT BRUSSEL

KU LEUVEN

TU-DRESDEN – ADAPTIVE DYNAMIC SYSTEMS

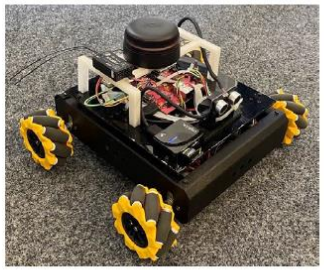
ROLE WITHIN TRUSTED IOT

Platform

- ***Ultra low-powered FPGAs:***
  - Potential IoT security criticalities for FPGA-based mobile robots.
  - Robot controller architectures focusing on hardware accelerators for machine learning, image recognition, compression, and security systems.

Use Case

- ***FPGA-based mobile robots***
  - Design a generic and flexible platform based on ultra-low powered FPGA technology for studying and prototyping a complete unified robot navigation system.



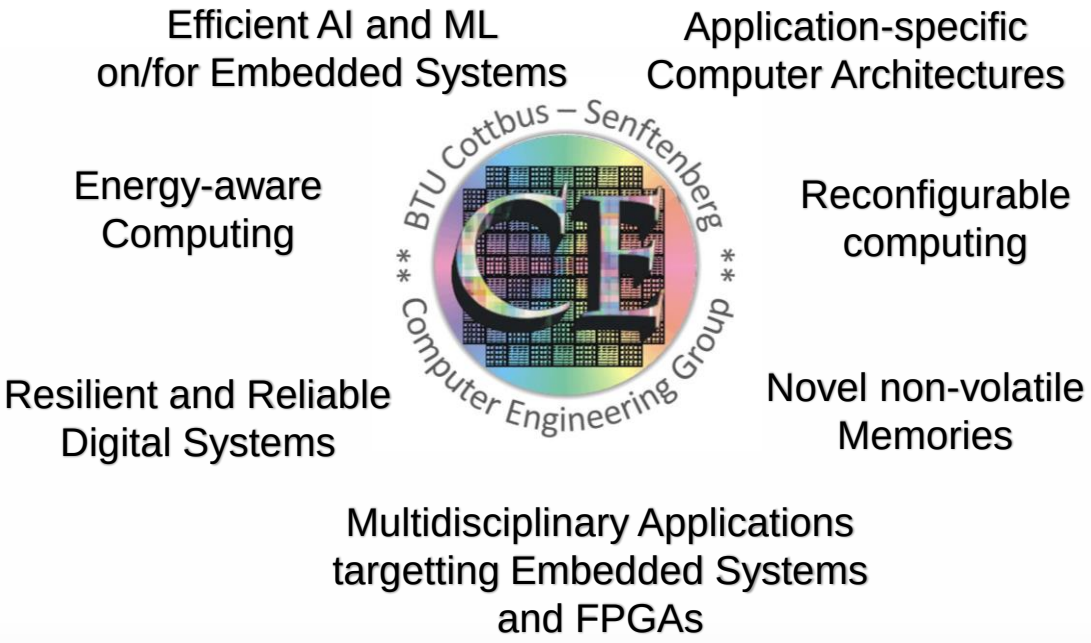
VUB VRIJE UNIVERSITEIT BRUSSEL

KU LEUVEN

BREMEN TU (BTU)

TEAM

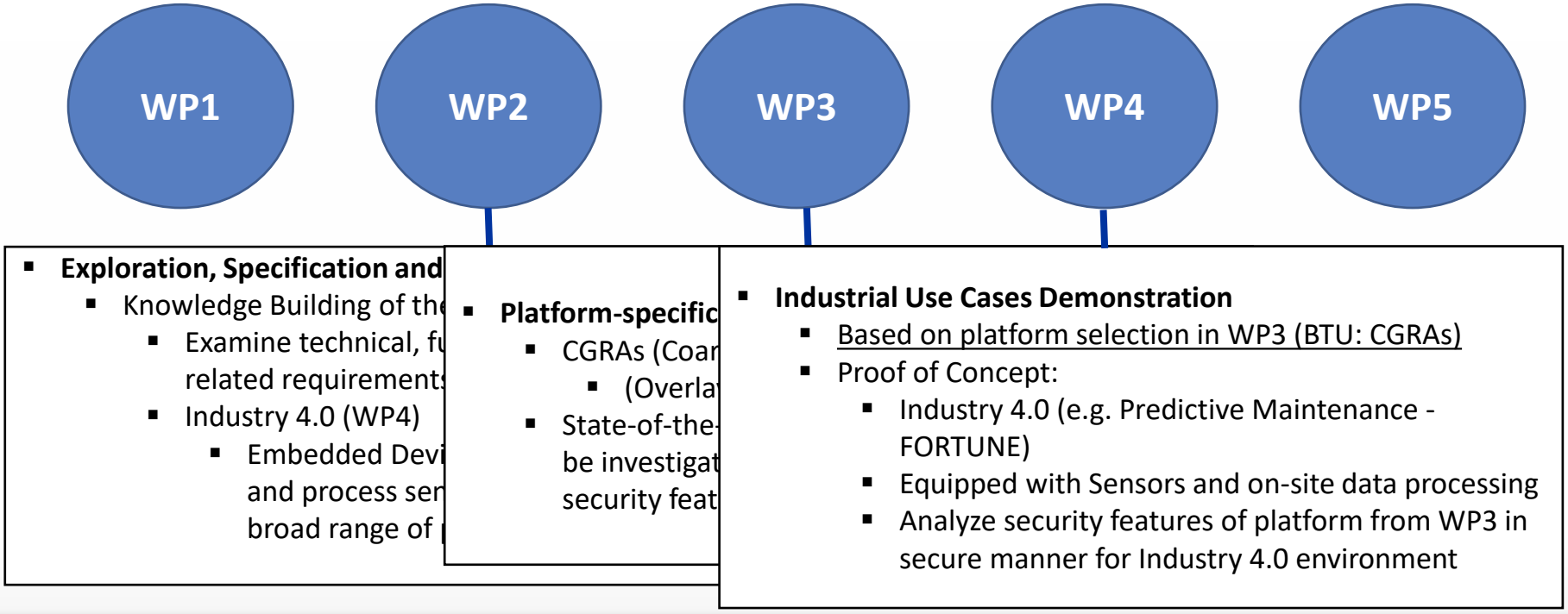
- **Chair of Computer Engineering**
  - ***Led by: Dr.-Ing. Marc Reichenbach***
  - *Prof. Dr.-Ing. habil. Michael Hübner (currently Vice President BTU)*
  - *Group of 15+ Phd Research Assistants*
  - *Contributing and Collabrating to/with Research Projects from German Research Foundation (DFG), Non-profit Organizations and EU based Research Organizations*



VUB VRIJE UNIVERSITEIT BRUSSEL

BREMEN TU (BTU)

ROLE WITHIN TRUSTED IOT



GFAI

- Project Leader:
  - **Immanuel Rettig**
- Scrum Master:
  - Nina Bakalova
- Head of Development:
  - Ben Drost
- Development:
  - Miriam Schneider
- Students:
  - Leonardo Maben
  - Orhan Stephan
- Consultants:
  - Ben Hohnhäuser
  - Stephan Brodkorb

- Develop a system that:
  - Has a safe communication
  - Is fully scalable
  - Is plug&play
- Use Case could be:
  - Communication and cooperation between multiple robots
  - Communication between multiple image processing units

VUB VRIJE UNIVERSITEIT BRUSSEL

KU LEUVEN

SUMMARY

VUB	Environmental monitoring	Heterogeneous embedded architectures
KULeuven	Drones	Multi-core RISC-V
BTU	Industry 4.0	Coarse grained reconfigurable architectures (CGRAs)
TUD	Mobile robots	Ultra low-powered (FPGAs)
GFAI	Cooperative robots	Heterogeneous system solutions

AGENDA

10h00-10h20: Project summary + introduction of members

10h20-10h40: Introduction to embedded security

10h40-10h50: Use cases and technology (VUB)

10h50-11h10: RISC V

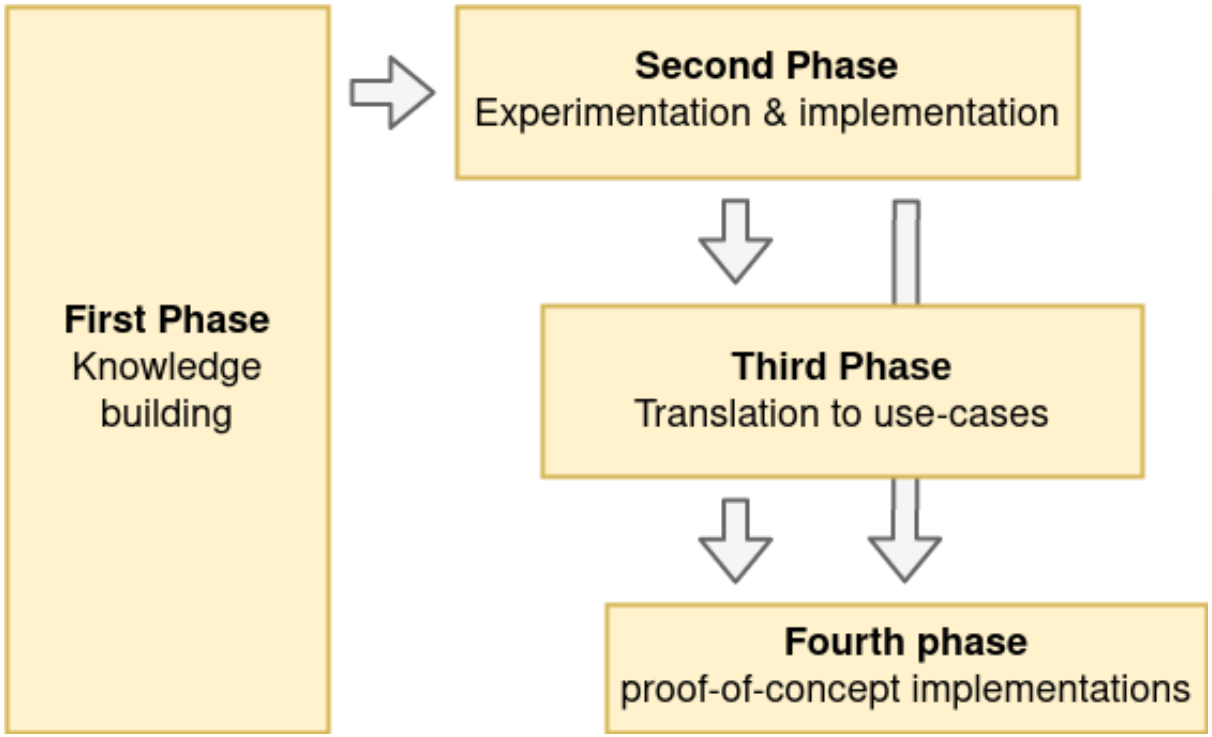
11h10-11h20: Use cases and technology (KULeuven)

11h20-11h35: Funding opportunities (Vlaio) and next TETRA call

11h35-11h45: Round table

11h45-12h30: Networking reception

PROJECT STRUCTURE



FINAL REMARKS

Input welcome: use case, internships,…

Contact to

- VUB: an.braeken@vub.be
- KULeuven: Jo.vliegen@kuleuven.be

More info available on

https://jvliegen.github.io/trusted_iot_website