HEARTS 1st Annual Meeting

6 February 2024

https://indico.cern.ch/event/1314502/

Miha Vitorovič
Cosylab

Funded by the European Union

HEARTS is a project funded by the European Union under GA No 101082402, through the Space Work Programme of the European Commission.

Overview

- Cosylab joined the project through the EU hop-on initiative and is planning to start work in M16
- WP 9
- Some information about Cosylab
- Our contribution

Tasks & Objectives

- Enhancing the user experimentation capabilities by providing direct user control over beam parameters that can affect test outcomes can enable users to extract the best possible data and make an optimal use of their beam time.
- Communicating with users via a user-friendly tool that allow all parties to keep track of the lifecycle of the proposed experiments will enable exploitation for the whole industry.

Current Situation	Solution from Cosylab
Reliance on several different scripts to perform beam tuning, not transferrable to users and requiring interaction with various operators working at different levels	Single tool solution for all beam tuning and test needs, documented and user friendly, requiring minimal assistance from a single facility operator
Procedures defined at the single facility level with minimal harmonization and with potential conflict arising from the different perspectives of the two infrastructures	Single tool solution that makes differences among facilities transparent to users and enable enhancement of the infrastructures as a service

Impact

- The main aim of Cosylab contribution is to enhance the quality and quantity of delivered beams as well as to improve the user experience with respect to the HEARTS project both at the level of the single infrastructures as well as overall as a service.
- Allow reaching TRL 7 (MS14 and MS15) and pave the way for maturing an even higher TRL level within 2-3 years of operation after the project is concluded.

What Cosylab brings to the project

Cosylab’s expertise is already uniquely coupled with a good knowledge of control system protocols and implementation of user interface tools for experimentations and user experiment lifecycle interface solutions due to successfully implementing past projects in the control system domain.

Likewise, they have demonstrated knowledge and experience with FESA API integration, development of display and control functionalities, beam properties overview and workflow applications.

Key personnel

Miha Vitorovič

WP Leader/PM

30 years of experience in SW development, 14 in CS domain

Nejc Smrkolj Koželj

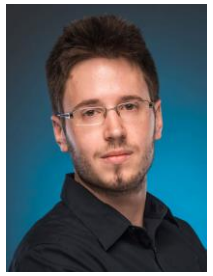
Senior SW Engineer/Project Manager

9 years of experience in SW development, 7 in CS domain

Domen Soklič

Technical Lead

12 years of experience in SW development, 8 in CS domain



Jan Pribošek

Senior Developer

10 years of experience in SW development, 6 in CS domain

About Cosylab

Cosylab at a glance

HEARTS

COSYLAB
Advancing humanity. Engineering remarkable.

400+
successful projects

20+ years of
experience & know-how

270+
skilled engineers

5 locations
worldwide

50% of activity in
scientific and 50% in
the medical domain

30+ PhD
holders from
STEM fields

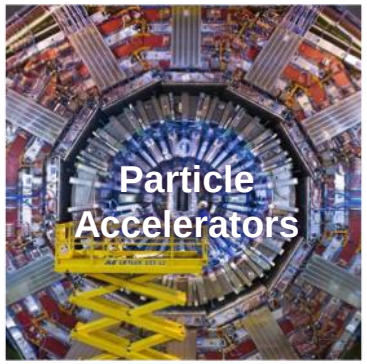
15% annual
growth rate over
15 years

Certified with ISO
9001, 13485, compliant
with 14971, IEC62304

Renowned organisations from across the globe trust Cosylab

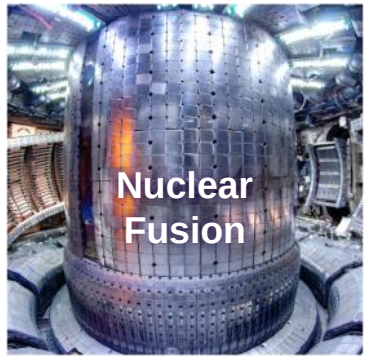

We work with organisations solving challenging problems in scientific, high-tech and medical domains

HIGH-TECH And BIG SCIENCE



Complex Systems **Manufacturers**

Scientific **Institutions & Projects**



Medical **Services**

MEDICAL

Medical **Products**

Hospitals

Device **Manufacturers**

HEARTS

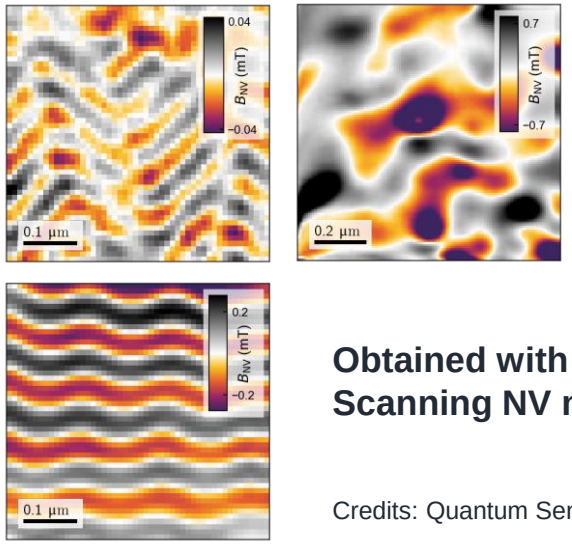
We do much more than deliver the software

- We are primarily physicists, engineers who understand the entire process of operating highly complex systems.
- Starting from the **client‘s description of the expected outcome**, we develop turnkey software solutions that power the world's most complex machines to end up with **precisely the physical/clinical process** they need.
- We don't just deliver the software; we **ensure that all the complex subsystems work harmoniously,** and that the entire device fulfills its **purpose**.

Qnami ProteusQ

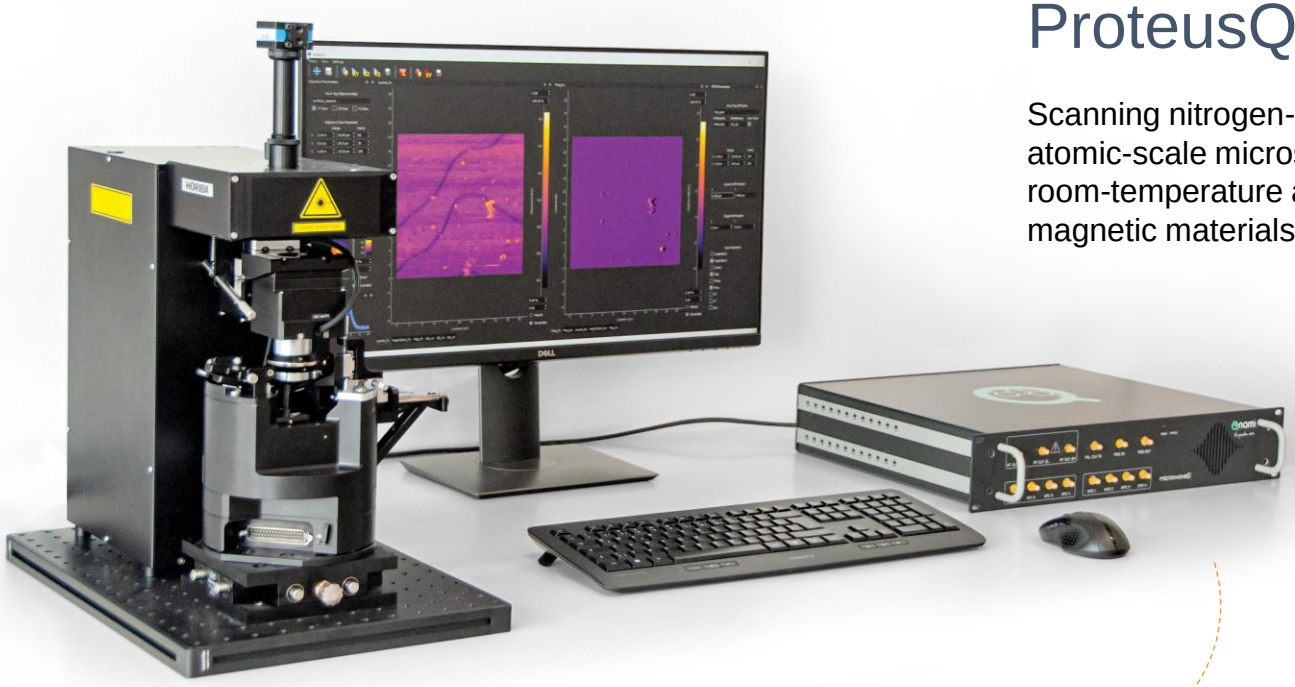
the first complete Quantum Microscope system with CE marking

„Qnami got first to market thanks to Cosylab“



Obtained with a table-top Scanning NV magnetometer

Credits: Quantum Sensing Group, Uni Basel



ProteusQ

Scanning nitrogen-vacancy (NV) atomic-scale microscope for room-temperature analysis of magnetic materials

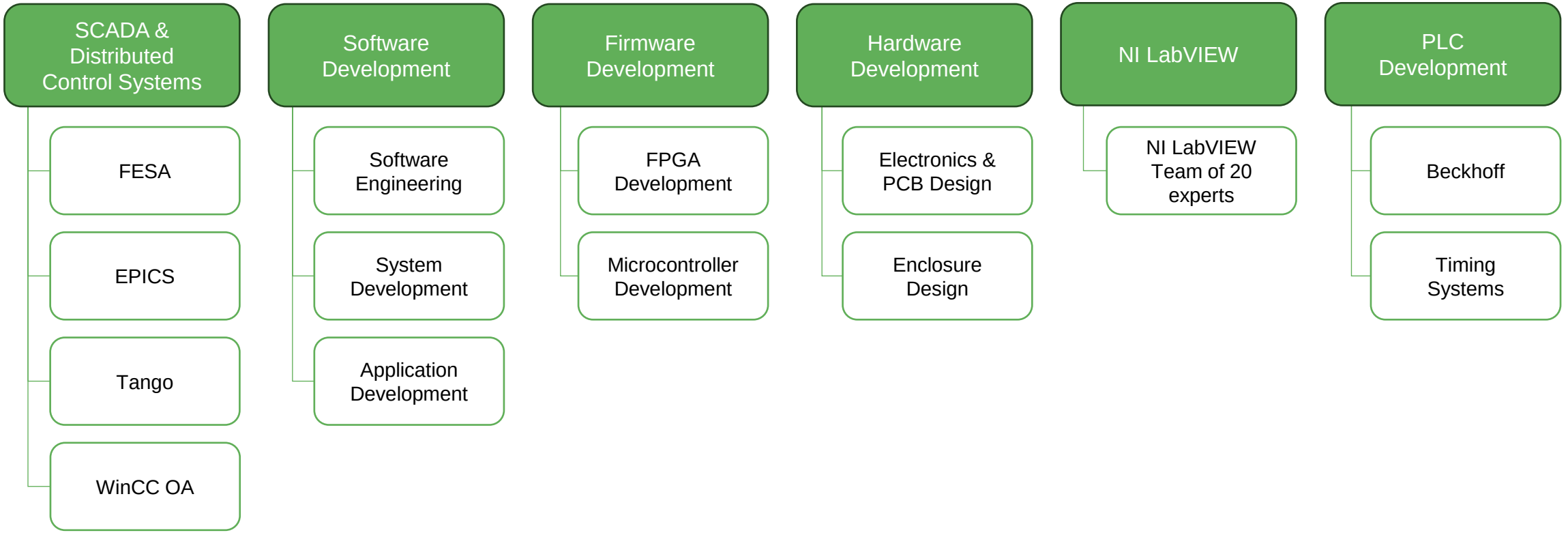
MicrowaveQ

ProteusQ

GIRAFFE
GIRoskope für Autonome Flug- und FahrzeugE

- FFG Quantum Austria Call; 1,9M; 1.1.2023 - 31.12.2025 fixed
- Led by Silicon Austria Labs
- NV-centre gyroscope; advantages over MEMS-gyroscopes
- From experiment & research phase to industrialization
- Applicability for self-navigation/driving/flight

Core Competences



Cosylab Contribution

WP 9

Cosylab will participate in two activities

1. Task 9.1 User interface tool for experimentation M16-M41
2. Task 9.2 User experiment lifecycle interface M33-M48

Next steps

1. Identify stakeholders from partners
2. Hold an activity specific detailed kick-off
   - Cooperation parameters/modus operandi
   - Timeline
   - Expectations, assumptions, prerequisites
   - Deliverables…

We propose a hybrid of Waterfall and Agile methodologies

- Start with workshops for goals, specifications, GUI mockups, workflows…
- Prepare a detailed plan and sync with partners
- Develop a simple mockup environment, and use it for development
- Show early prototypes and demos to external stakeholders
  - CERN and GSI (+ others)
- Test on production environment as much as possible

Cosylab will create the *User interface tool for experimentation*

- Present relevant information in real-time
  - A few simple screens to not overwhelm the users
  - For a selected number of devices and properties
- We will use production-ready data access libraries
  - Common backend interface for both CERN and GSI
- We will use standard display libraries and widgets
- GUI will be configurable to suit both facilities

User interface tool for experimentation GUI will provide basic controls

- Basic control over the experiment
  - Setting the beam flux
  - Turn beam ON/OFF
  - Using business logic, workflows and HW procedures supported by back-end
- Store data for post-processing (CSV files)

- Some things this tool is not
  - Not a general operator screen creation tool/editor
  - Not a video feed processing tool/editor
  - Not a motion control software

Cosylab will create the *User experiment lifecycle interface*

- A web-based application
- It will facilitate communication between facilities and external users
  - It will track the requests for beam line experiments
  - Single point of access for users
  - Including post-experiment usage
    - Access to beam parameters and all information gathered during experimentation
- Common workflow for both CERN and GSI
  - Will provide guidance to facility operators

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Thank you!

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