

# Visuelle Simulation & Robotik

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PROJEKT ROBOTIX

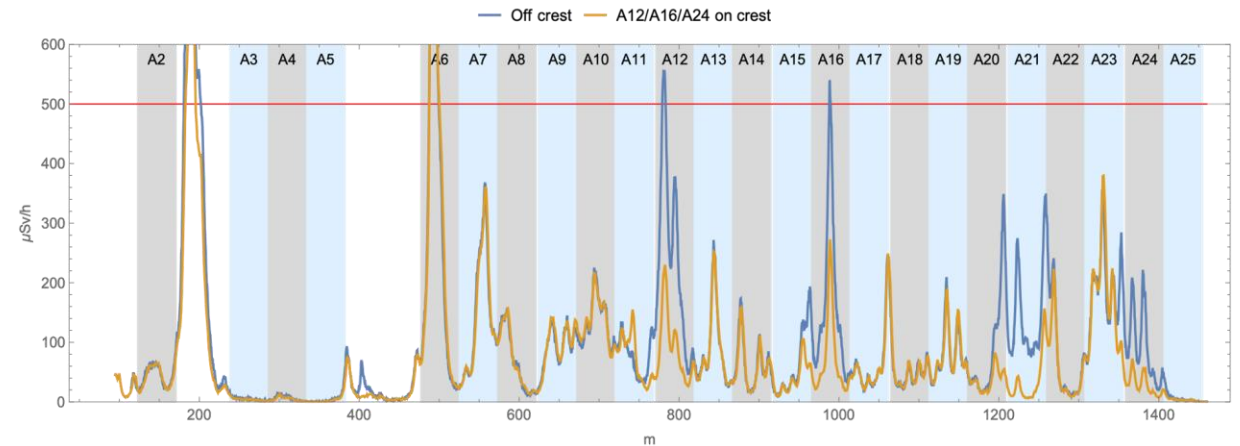
# An Accelerator in Operation

A place where you do not really want people are



EuXFEL Accelerator Tunnel

- Any access to the accelerator tunnel is undesirable because it interrupts operation
- Any access to the accelerator tunnel is prohibited because the radiation may be lethal



# Use of Robotics & Telepresence of Experts

A possible way out to avoid operation interruptions that require people on site



MARWIN2



MARWIN3

**MARWIN:** Mobile Autonomous Robot for Maintenance and Inspection

- Routinely used for radiation measurements with the EuXFEL accelerator switched on

**Project Proposal RobotiX:** Robotics and Immersive User Experience

- Versatile platform based on MARWIN3 that provides
  - Multiple sensors
  - Multi-axis manipulators
- Immersive remote control interface using mixed reality technologies
- Project partners: Hochschule21, HAW, UHH, DESY

# Project RobotiX

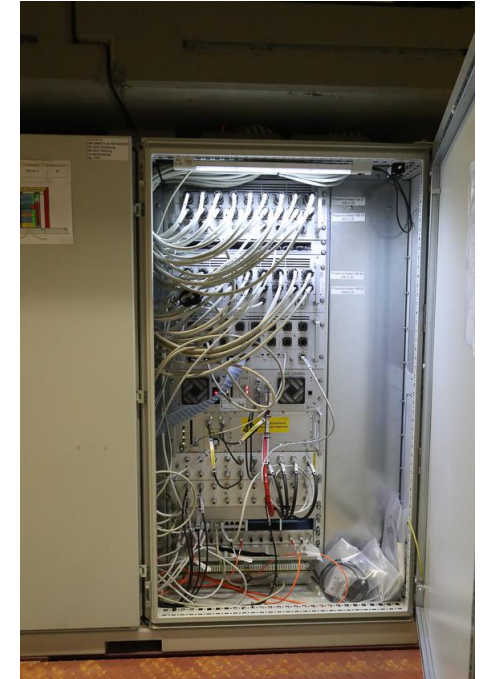
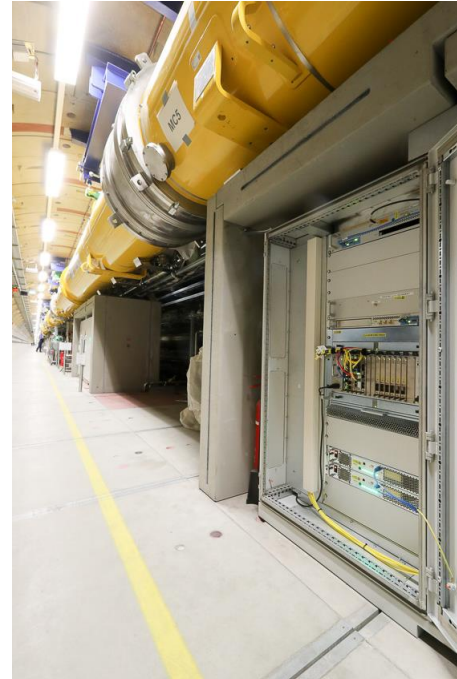
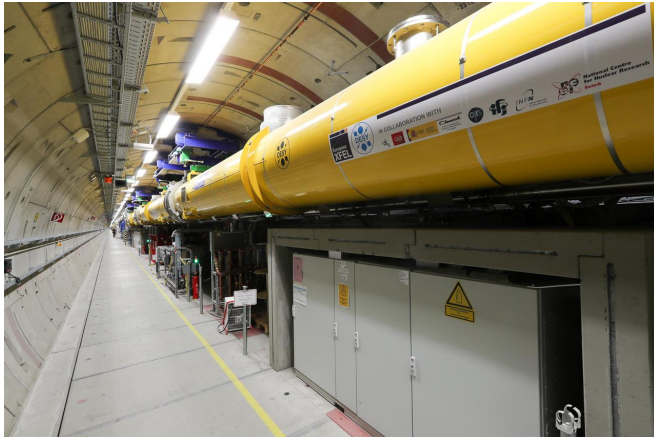
Use cases we want to address: 3D inspection tours with multiple sensors



Visual equipment inspections, detection of hot spots on broken power cables, measurement of the radiation level or localization of radioactive activation points, acoustic inspection of vacuum pump stations, ...

# Project RobotiX

Use cases we want to address: Semi-autonomous troubleshooting of electronics



Why semi-autonomous?  
Bandwidth limitations of the  
wireless network connection

Opening / closing electronics containers, monitoring status LEDs, switching on / switching off / resetting electronics crates, replacing electronics boards, unplugging and plugging in cables, ...

# Project RobotiX

## A wish list of features for the immersive remote control interface

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- Superimposing of live video images and location-synchronized digital models or pre-recorded images
- Overlay display of device-specific meta data (drawings, user manuals, ...)
- Overlay display of measured environmental data (radiation level, signal strength of wireless network, ...)
- Triggering of semi-autonomous robot actions using a domain-specific command set (reset electronics crate, ...)
- Providing of different 3D-perspectives (robot perspective, spectator perspective)
- Avoiding of motion sickness (redirected walking, ...)
- ...

Thank you.

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