

# F5G Proof-of-Concept Demonstrations of Low-Latency Industrial Applications

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with contributions from

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# F5G OpenLab

Enable Twin Transition through Ubiquitous Fiber Connectivity.



## Vision

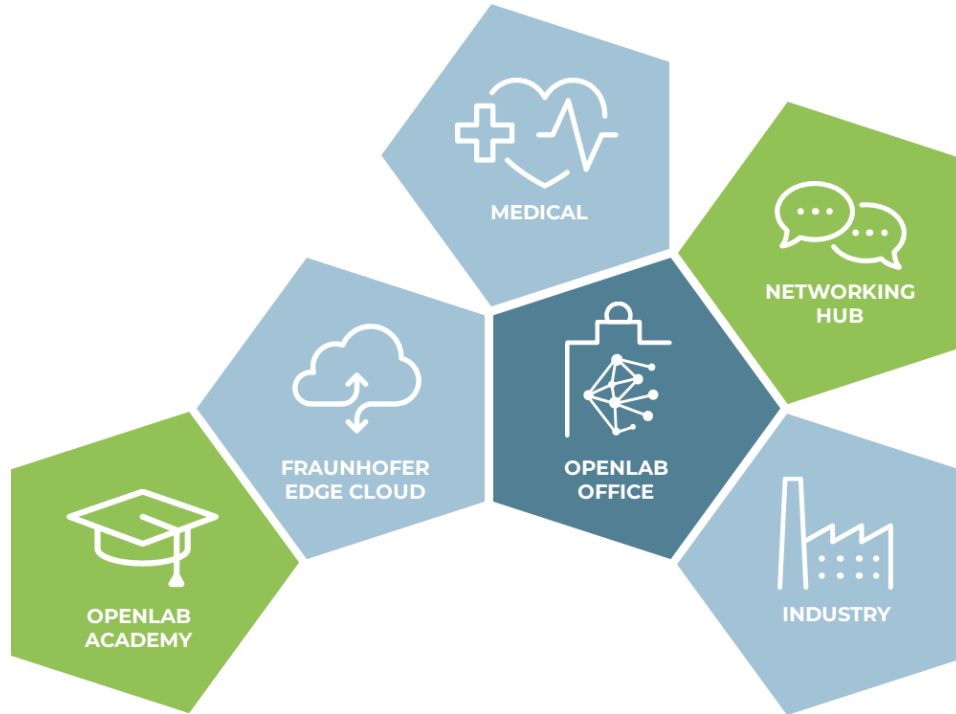
- Contribute to a green and sustainable ICT industry by promoting Fiber to Everything
- Accelerate digital transformation by highly reliable and trustworthy autonomous networking

## Mission

- Provide an ecosystem for validating networking solutions for twin transition
- Offer a vendor agnostic facility to verticals for evaluating their use cases
- Empower the development of fiber-based solutions

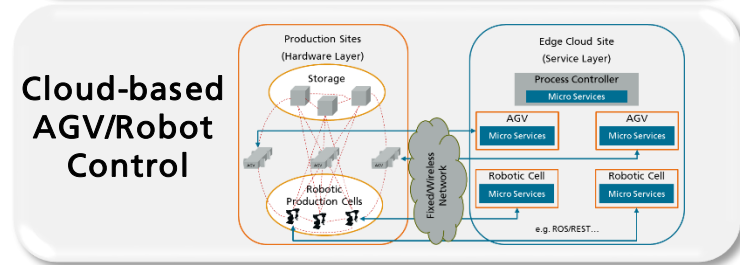
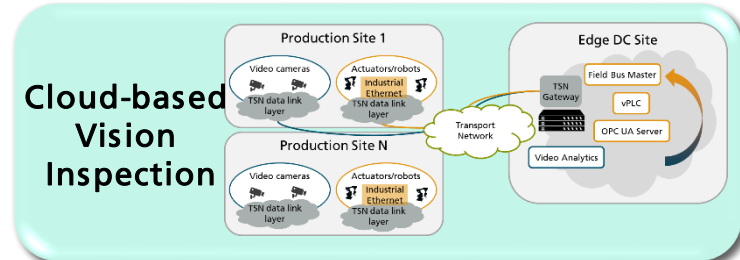
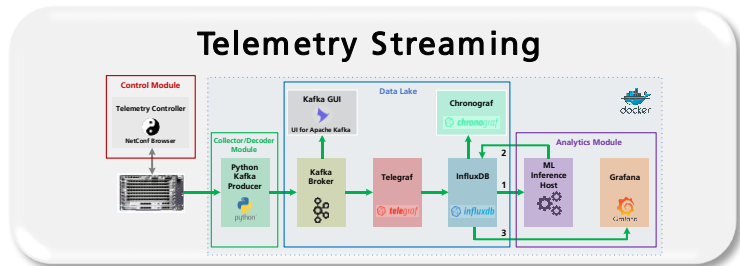
# F5G OpenLab

## Environment for a Green and Digital Transition



- Collaboration with complementing stakeholders
- Learning and understanding of evolution of networks
- Access to large scale and forward-looking infrastructure
- Identify novel business models and revenue streams
- Impact and contribute to F5G standards and specifications

# ETSI ISG F5G Proof-of-Concepts @ F5G OpenLab



**ETSI PoC Partners**

**Fraunhofer HHI**    **CHINA TELECOM**    **Post LUXEMBOURG**  
**Fraunhofer IPK**    **GERMAN EDGE CLOUD**    **HUAWEI**  
**DENSO**    **Crafting the Core**

**AI@TI**  
**Testbed Partner**

# Digital Transformation of Industrial Automation

## Convergence of OT and IT

### ■ Field Level

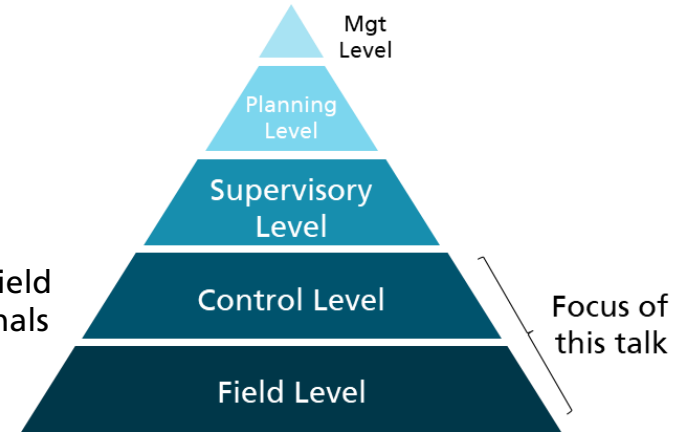
- physical manufacturing equipment on the factory shop floor such as motors, actuators, video cameras and other sensors.

### ■ Control Level

- receives sensor and monitoring information from the devices in the Field Level. Based on that information, decisions are taken and control signals for the devices in the Field Level are generated, e.g. by using Programmable Logic Controllers (PLC).

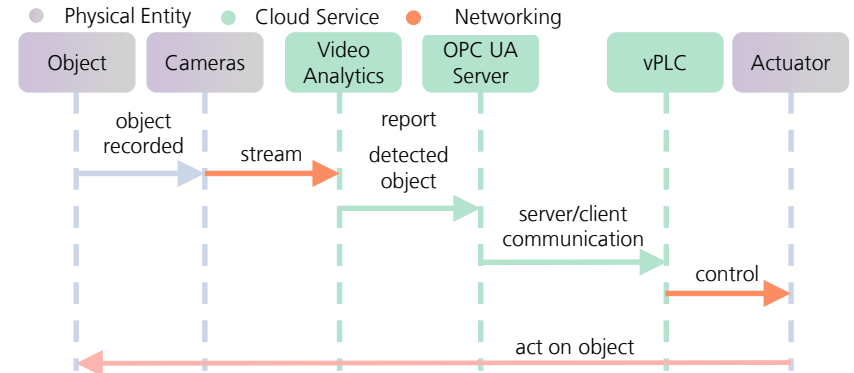
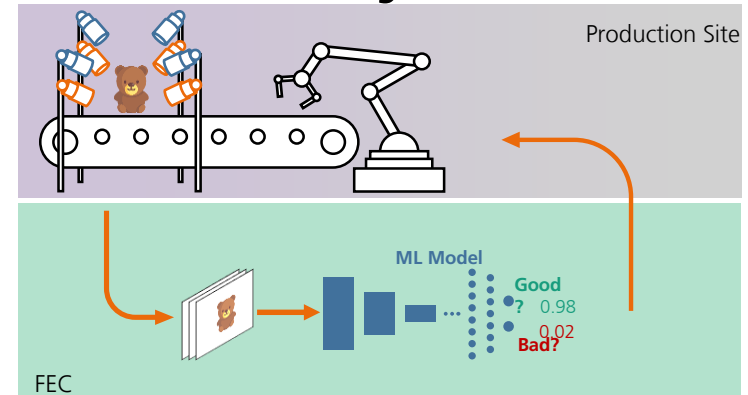
- The current trend is towards virtualization of control functions in the form of virtual PLCs (vPLC) running in edge cloud environments.

- vPLCs alleviates the need for costly and often proprietary solutions for local PLCs on the shop floor, where cooling, power consumption, space and environmental effects are critical issues.



# Edge/Cloud-based Visual Inspection for Quality Assurance

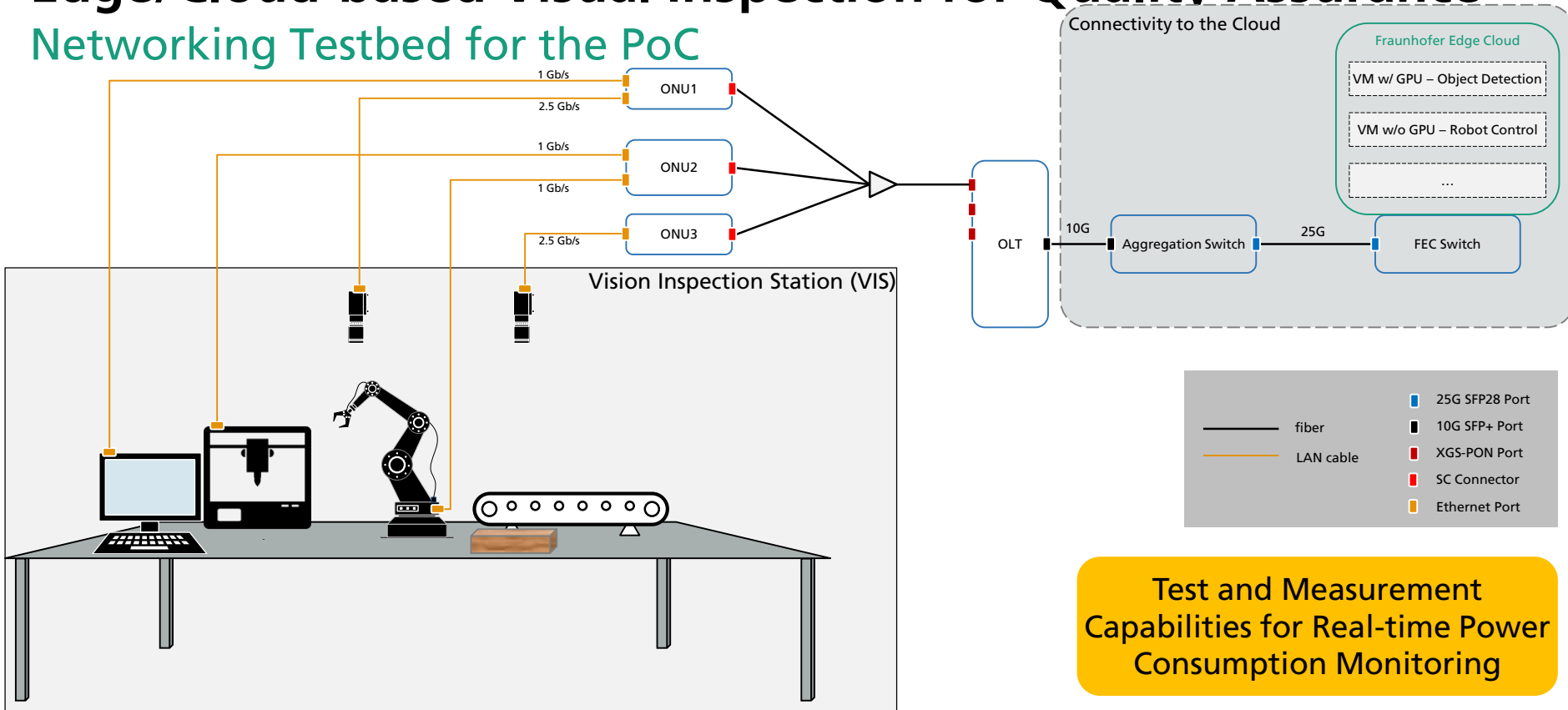
- Industrial-grade video cameras monitor produced objects and video streams are processed by AI-assisted video analytics on edge cloud to assess their quality.
- Automatic quality control measures are taken on the factory shop floor, such as e.g. controlling robotic actors to handle defect parts.
- The number of cameras per vision inspection station ranges from one to four.
- The upstream aggregated data rate per vision inspection station ranges from 1 Gb/s to 20 Gb/s.
- The data rates are asymmetric, since the downstream control signals have a comparably negligible data rate.



[ref] P. Safari, et al., "Edge Cloud based Visual Inspection for Automatic Quality Assurance in Production," in Proc. CSNDSP 2022.

# Edge/Cloud-based Visual Inspection for Quality Assurance

## Networking Testbed for the PoC



# Next Steps Towards Enabling Green Transition by ICT

## Open Space for Collaboration

### Component/System Vendors

Compare carbon footprint of different component/system versions

Live environment for product use phase testing

### Network Operators

Develop and test new networking paradigms

Test technologies for carbon footprint reduction in a sandbox

### Vertical Sectors

Quantify reduction of carbon footprint for use cases of interest

Evaluate/select best suited Green ICT technology



**Together, find the best solution for carbon footprint reduction by ICT.**



# Become a Member of the



**F5G**  
OpenLab

Collaboration with  
complementing  
stakeholders



Learning and  
understanding the  
evolution of networks

Access to large scale and  
forward-looking  
infrastructure



Identify novel business  
models and revenue  
streams

Impact and contribute to  
F5G standards and  
specifications



**JOIN  
NOW**



# Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI

## WE PUT SCIENCE INTO ACTION.

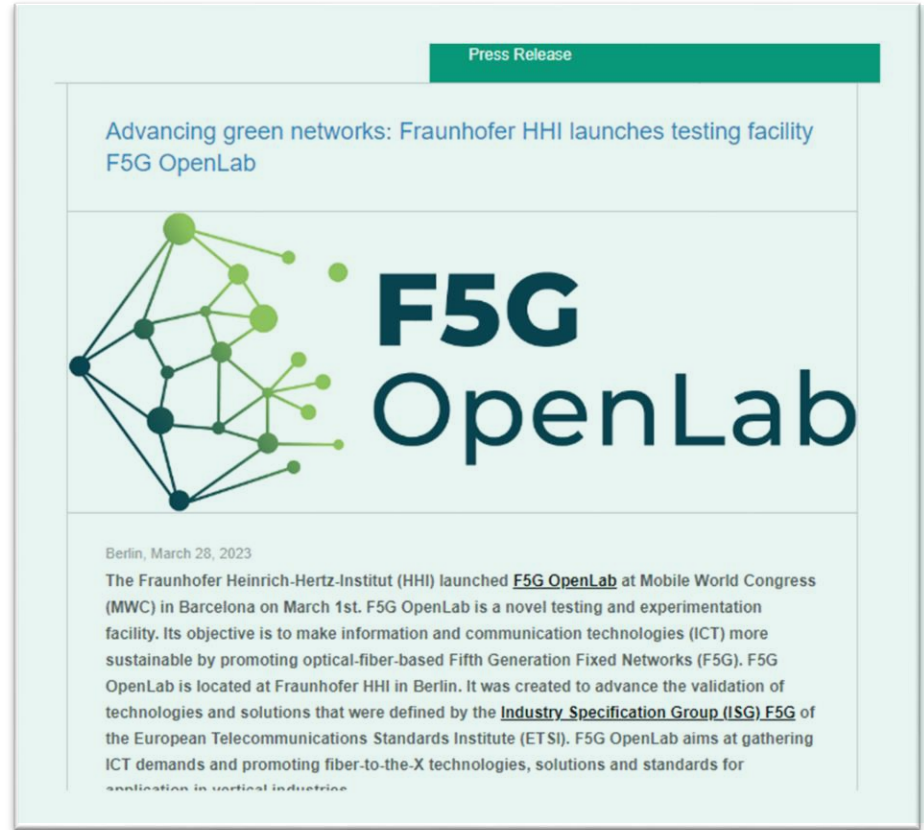
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The image shows a press release graphic with a green header that says "Press Release". Below the header, the title reads "Advancing green networks: Fraunhofer HHI launches testing facility F5G OpenLab". The main visual is a network diagram with nodes and lines, followed by the text "F5G OpenLab" in large, bold letters. At the bottom, the text states: "Berlin, March 28, 2023. The Fraunhofer Heinrich-Hertz-Institut (HHI) launched **F5G OpenLab** at Mobile World Congress (MWC) in Barcelona on March 1st. F5G OpenLab is a novel testing and experimentation facility. Its objective is to make information and communication technologies (ICT) more sustainable by promoting optical-fiber-based Fifth Generation Fixed Networks (F5G). F5G OpenLab is located at Fraunhofer HHI in Berlin. It was created to advance the validation of technologies and solutions that were defined by the **Industry Specification Group (ISG) F5G** of the European Telecommunications Standards Institute (ETSI). F5G OpenLab aims at gathering ICT demands and promoting fiber-to-the-X technologies, solutions and standards for application in vertical industries."