5GSC
5G for Smart Communities

5GSC
Healthcare Subgroup

03.07.2025

European Commission

www.5GSC.eu

Visit our online networking and knowledge-exchange community for '5G for Smart Communities'

Over

1000

Members from 33 European countries in the 5 sectors of

Healthcare

Education

Agriculture

Public Protection and Disaster Relief

Local public services

Welcome

5GSC

5G for Smart Communities

www.5GSC.eu

Save the dates

Thursday July 10, 2025 - Online

Drones subgroup

Thursday July 17, 2025 - Online

Cloud & EdgeAI subgroup

Thursday September 18, 2025 - Online

Working Group 3 - Business and investment models for 5G pilots

Save the dates

Tuesday, October 7, 2025

CEF Conference & European Digital Connectivity Awards, Brussels

Wednesday October 8, 2025

5G Community Conference, Brussels

5G Deployment Guide

The 5G Deployment Guide, developed by the 5G for Smart Communities Support Platform, serves as a vital resource for public and private stakeholders aiming to bring 5G quality connectivity to life. Grounded in practical experience and shaped by collective expertise, the Guide provides clear direction for the establishment, funding, and implementation of 5G projects across Europe.

Learn more and download the 5G Deployment Guide here

5G Community Survey

A new study by the 5G for Smart Communities (5GSC) Support Platform offers a detailed overview of the public funding support made available at national level across the EU-27 for 5G deployment. The research spans the 2022–2024 period, while also looking ahead to planned support schemes for 2025–2027. The study captures not only the current state of investment but also highlights best practices, use case trends, and national project repositories.

Learn more and download the 5G Community Survey here

Agenda

Welcome and Introduction
Chair: Ioannis Patsouras, Senior Solutions Architect, WINGS ICT Solutions

Keynote speech: Importance of Cloud and Edge AI for healthcare / hospitals
Edgar Tamaliunas, 5GMEC4EU

Brief presentations and discussion including the following projects:
- 5G in Healthcare – Northern Region (PT)
- 5G4ASSAC and 5GCRESCA
- Flanders Smart Fields

Your perspectives on 5G & healthcare
slido poll & results

Open discussion

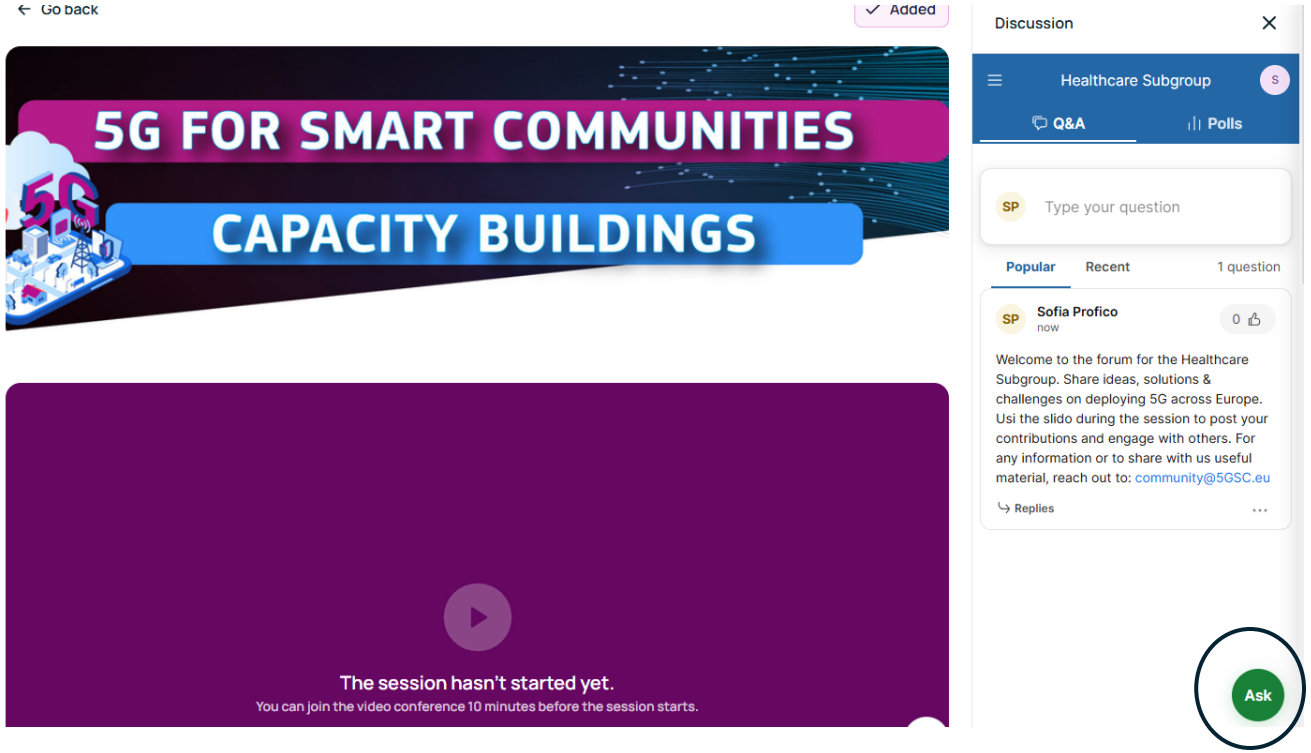
Q&A

Closing remarks

Live interaction

slido

OR



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5G for Smart Communities

Welcome Remarks

Chair: Ioannis Patsouras, Senior Solutions Architect, WINGS ICT Solutions

European Commission

Open discussion

Ioannis Patsouras

SENIOR SOLUTIONS ARCHITECT
WINGS ICT SOLUTIONS

Rajeshwari Kanesin

P5G LEAD
APOQLAR MEDICAL

Nikos Kastrinios

PRODUCT MANAGER
WINGS ICT SOLUTIONS

Projects:
5G-TRACE and 5G-SHEAL
wi.CARE+

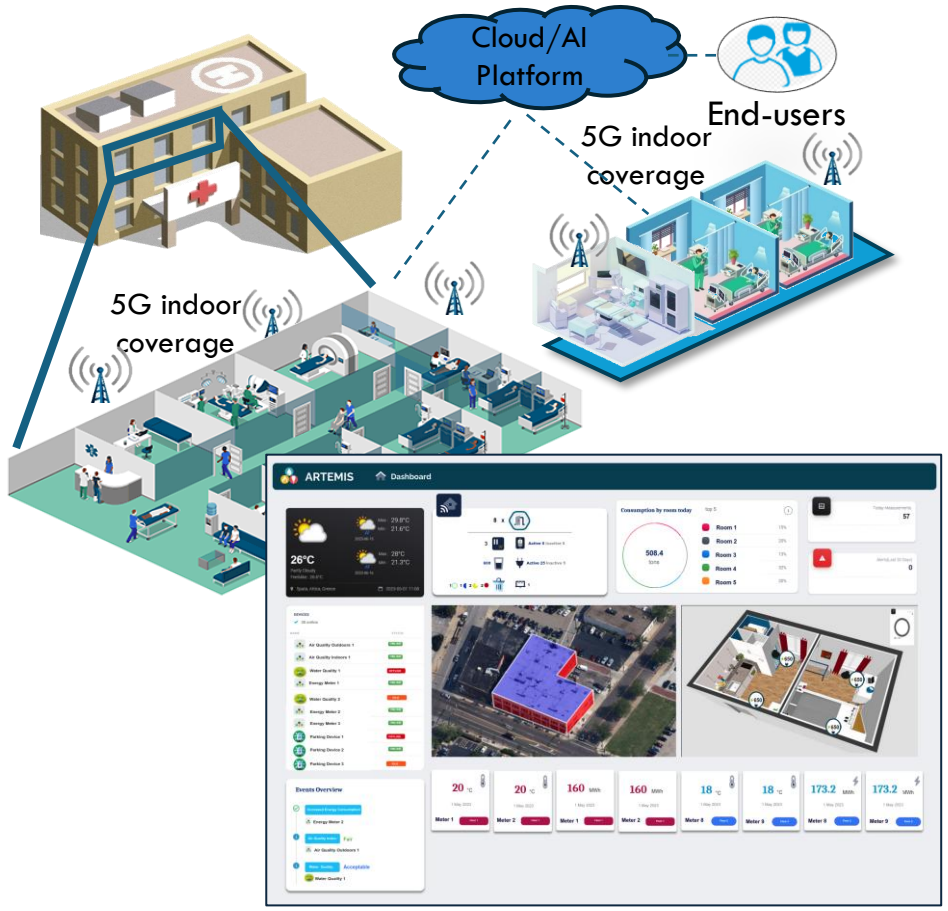
WINGS CEF Healthcare projects

5GSC SG1, July 3rd, 2025

5G-TRACE

5G-TRACE - 5G-based TRAnsformation of a CanCEr Hospital to support patients' treatment in a "home like" environment

- The project will build **5G Mobile Private Networks (MPNs) based on 5G-SA technology**, to provide indoor connectivity at two locations of cancer healthcare facilities in Thessaloniki, Greece, the main medical centre **Theageneio Hospital** and a separate and remote home-care unit, **Nikos Kourkoulos**.
- The new networks will be validated through innovative and demanding **patient monitoring** and **medical diagnosis services** use cases:
  - patient vital signs' remote monitoring,
  - remote advice of doctors to patients through conferencing tools,
  - fusion and analysis of signals,
  - personalized notifications
- Furthermore, **Smart and Green applications for building facilities** will be validated, which are monitoring the hospital environment through **AI analytics** by processing data from **smart sensors** for parameters such as **electricity metering & drinking water consumption monitoring** and **smart air quality measurement systems.**

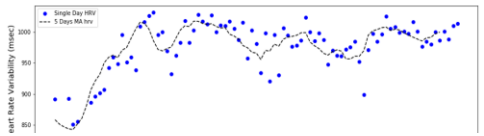


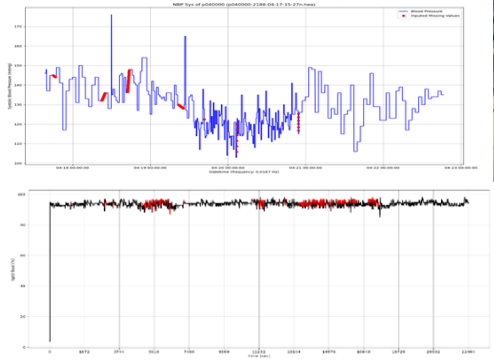
5G-TRACE project has received funding under grant agreement No 101181288.

5G-SHEAL

5G-SHEAL – 5G- enabled Surgery Planning with Holograms and Educational Streaming for NKUA Aretaieio HospitaL

- The project will deploy a **5G Mobile Private Network (MPN) based on 5G-SA technology,** along with the required upgrades in the backhaul equipment, antennas and links to the rest of the OTE network, supporting exclusively and only the needs of the **ARETAIEIO University Hospital** operating rooms, Surgical Wards, Education centre and Radiology-Radiotherapy Departments, providing 5G coverage, high capacity, reduced latency, and high reliability mobile services.
- The network will be accessible only by the users/devices (e.g. VR/XR glasses or smart wearable devices) equipped with designated SIM provisioned cards.
- Use Cases in scope:
  - Patient Monitoring:
  - Surgical Planning:
  - Oncology Imaging in Operating Rooms:
  - Surgical residency core training:
  - Medical Students and Patients education



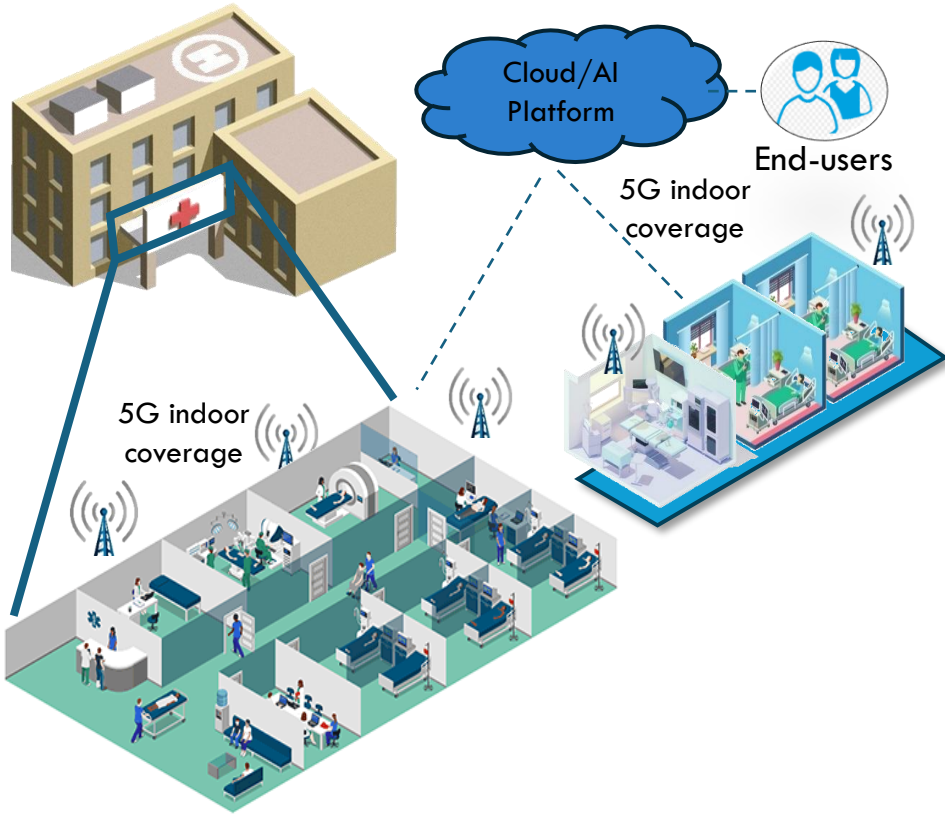


5G-SHEAL project has received funding under grant agreement No 101181166.

wi.CARE+ Innovations Our Use Cases Bring to Hospitals

wings.

- **Smart Hospital Monitoring & Automation**
  - Real-time monitoring of vital signs (24/7, in-hospital and at home)
  - Fall detection & panic alerts for emergency response
  - Remote post-operative care to reduce readmissions

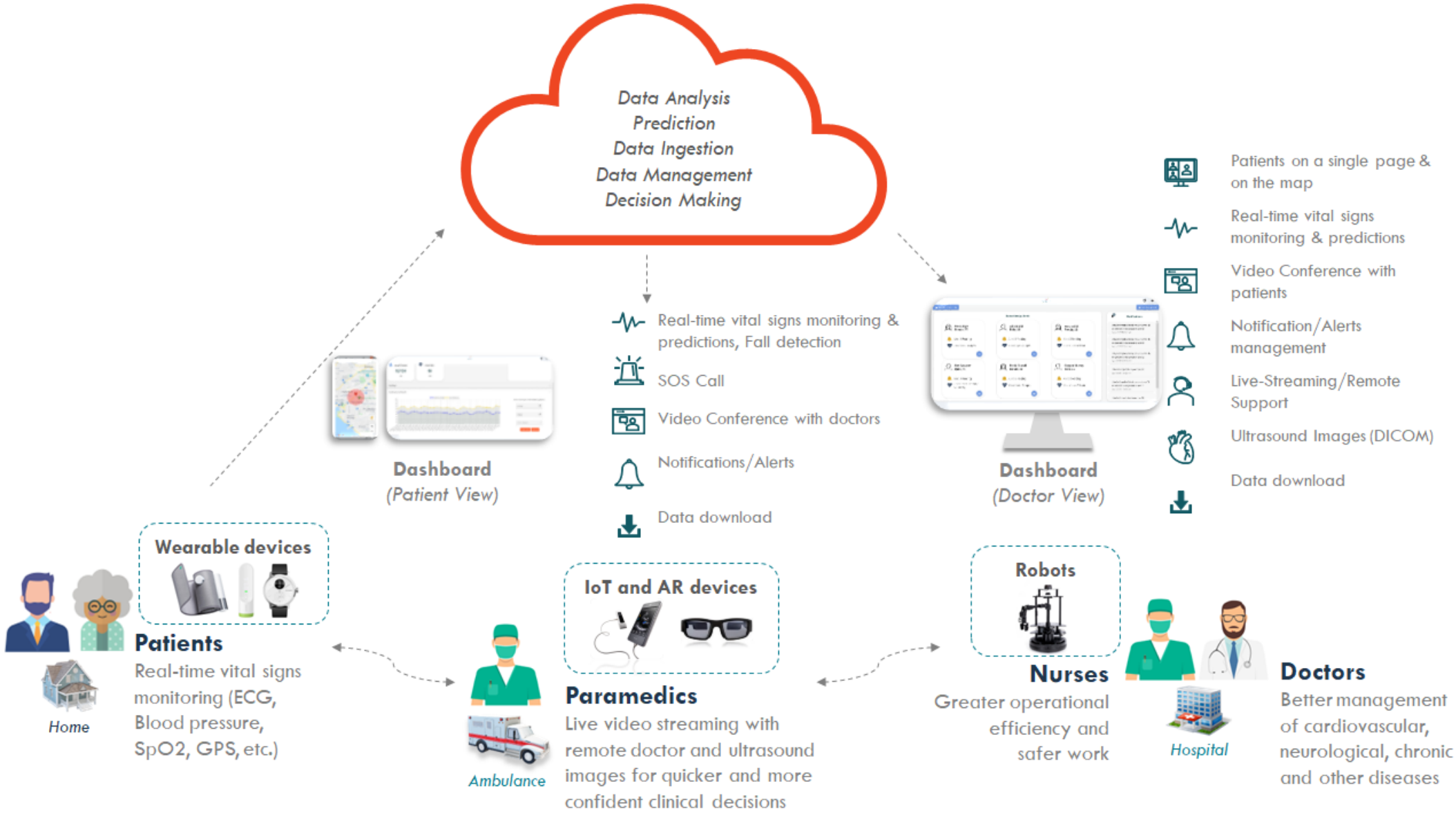


- **Edge AI & 5G-enabled Features**
  - Predictive analytics for early detection
  - Custom patient alert thresholds reduce false positives
  - Low-latency data processing via edge computing

- **Advanced Medical Applications**
  - Digital twins for simulation and maintenance
  - VR/XR for surgical planning and medical education
  - Deployment of top-tier medical devices and systems to fully digitize hospital operations, enhancing both patient care and hospital efficiency.

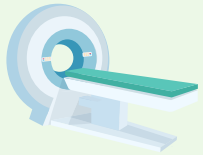
Covering the following: 24/7, Indoor Coverage, Capacity, Latency, Security of data

wi.CARE+ 1-Hospital & Remote Monitoring / Assistance



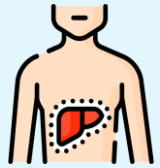
A Patient's Journey with 5G and HoloMedicine® technology – Value Driven

Patient Arrives at Hospital

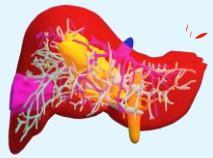


Patient CT/MRI scan is synced to hospital PACS

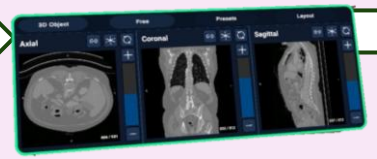
AI Pre-segmentation runs en-route to radiology



Patient diagnosis - in this case colorectal metastases of the liver



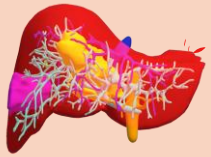
Patient Education part 1
HoloMedicine® Dicom Viewer (Hybrid rendering DICOM & AI Segmentation)



Patient case is discussed at Tumour board using HoloMedicine® Tumour Board

Patient Specific Treatment Plan is aligned via HoloMedicine® Tumour Board with AI transcription

Patient case is planned for surgical resection in VSI HoloMedicine®



Patient Education part 2
Patient consented based on surgical plan from VSI and multi-disciplinary

Patient is operated on and surgeon is Proctored via HoloMedicine® Robotics

Patient is discharged

Scan & Read	Diagnose & Communicate	Align Treatment Plan	Surgical Plan & Consenting	Proctoring
5G enables 1GB+ file transmission through PACS and AI model	Hybrid rendering in the cloud 'on the fly' enabled by 5G	Multi-user, multi-site XR visualisation of hybrid patient Dicom in cloud	Complex surgical resection planning in XR with the ability to share view across devices	ERAS programmes like mobilisation and at home patient support via IOT

Thank you

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5G for Smart Communities

Importance of Cloud and Edge AI for healthcare / hospitals

Edgar Tamaliunas, 5GMEC4EU

European Commission

5G for Smart Communities

Healthcare subgroup

03.07.2025

Edgar Tamaliunas

5G MEC
For EU Corridors and Smart Communities

Funded by the European Union

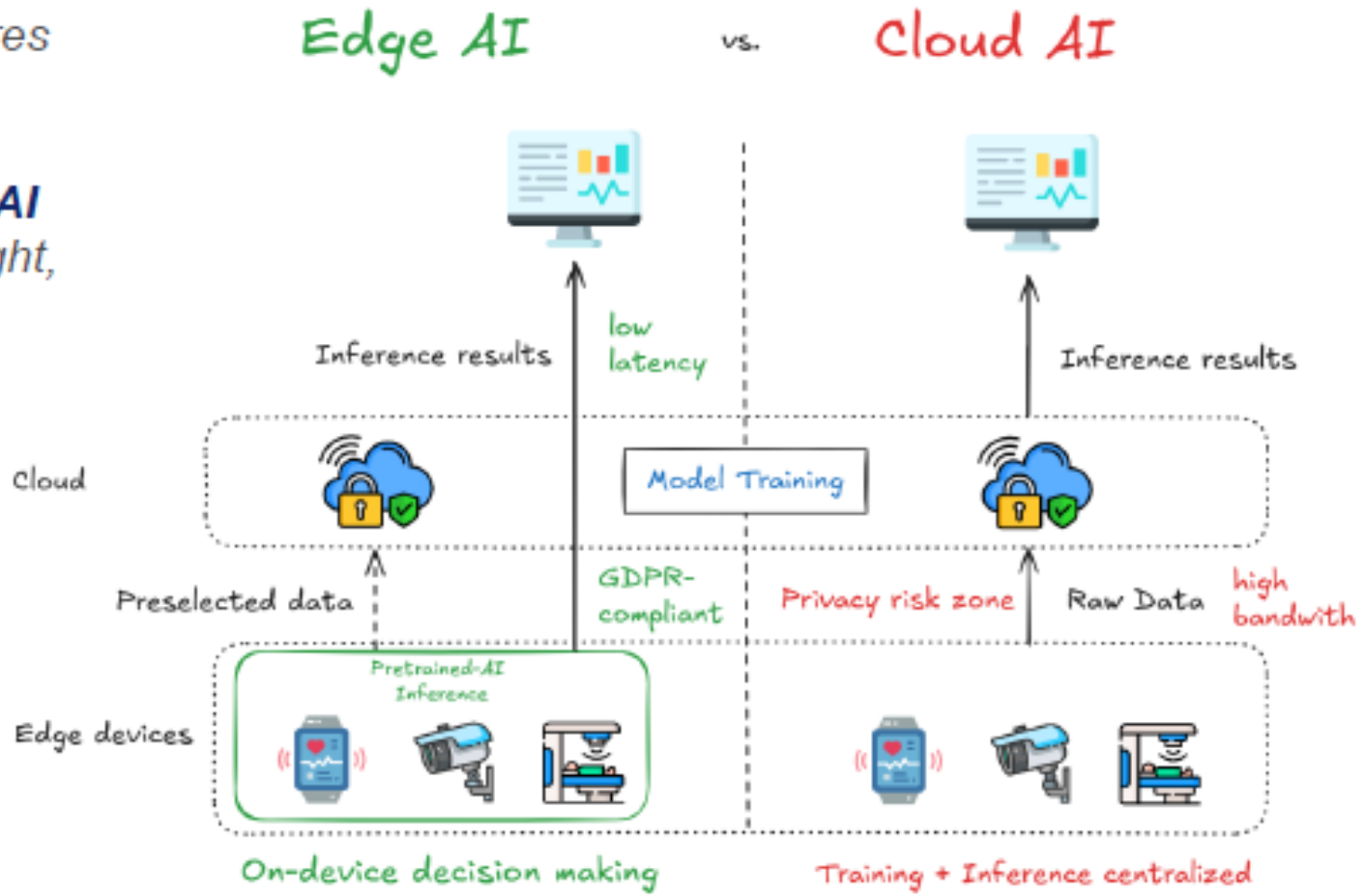
Cloud vs. Edge vs. MEC: What's the Difference?

Feature	Cloud Computing	Edge Computing	MEC
Location	Centralized data centers	Near data source (devices, gateways)	At telco edge (base stations, aggregation sites, central offices)
Latency	High	Low	Ultra-low, optimized for mobile/fixed networks
Scalability	Very high, flexible	Limited, local	High, telecom-grade, supports many sites
Management & Operations	Centralized, automated, managed via cloud platforms	Local, often manual or semi-automated, site/device-specific	Automated, orchestrated, integrated with network management and lifecycle operations
Telco Network Integration	General internet	Limited	Deeply integrated with mobile and fixed networks, supporting QoS, QoE, and SLAs.
Use Cases	Data storage, analytics, SaaS	IoT, industrial, local automation	Real-time apps, 5G/4G, AR/VR, connected vehicles
Data Privacy/Control	Depends on provider/location	More local control	High, with network-level data access
Standards	Cloud provider-specific	No single standard	ETSI standard, APIs for developers
Cost	Variable, usage-based, scales with resources	Higher per site/unit, lower central infrastructure costs	High, due to telecom infrastructure and SLA requirements

*MEC uniquely combines the ultra-low latency and local data control of edge computing with the scalability, reliability, and **deep network integration** of the cloud, making it essential for real-time, high-performance, and **telecom-enabled** digital services.*

Edge AI vs. Cloud AI – A Question of Trust, Speed, and Control

⚠️ *"Edge AI requires efficient **hardware accelerators and highly optimized AI models** – lightweight, low-power, and resilient."*



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From Wearables to Early Warnings – AI at the Edge for Predictive Health

To enable **real-time risk detection** for patients with cardiac conditions, by continuously analyzing vital signs through sensors **without sending raw data to the cloud**.

🔐 **Privacy by design:** All personal data stays on-device, fully GDPR-compliant.

⚡ **Real-time response**: Inference happens instantly — no roundtrip to the cloud.

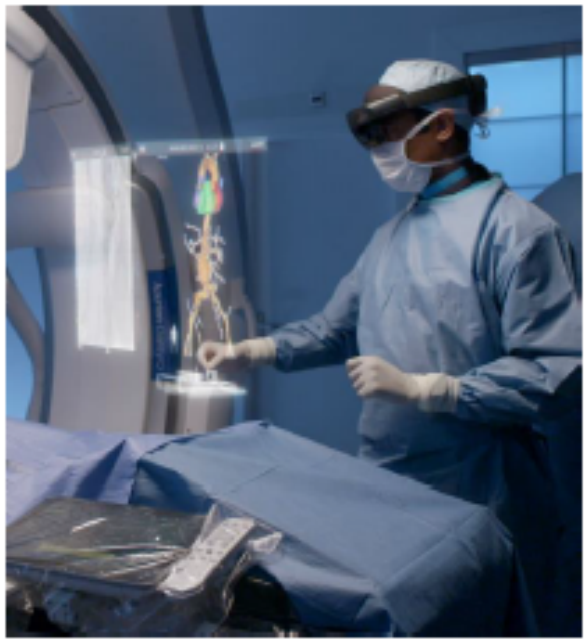
🌐 **Offline-capable**: Works in low-connectivity settings (rural areas, etc.).

🔋 **Low power:** Efficient AI allows long battery life for continuous monitoring.

Example EU-Horizon Project: https://www.digipredict.eu/

Augmented Surgery in Real Time – Powered by Edge AI and 5G

By combining **AR assets with 5G and MEC** medical teams receive visual overlays, step-by-step AI-assisted instructions, and live anatomical guidance — without relying on the cloud.



🔐 **Local processing:** No raw video or patient data sent to cloud

⚡ **Ultra-low latency:** Real-time visual overlays during surgery

🌐 **Offline-capable**: Works in low-connectivity settings (disaster sites, etc.).

Funded by the European Union

Thank you for your attention

Join us:

Edgar Tamaliunas

info@5gmec4.eu

Feel free to contact us with any questions, suggestions or assistance.

5GMEC4EU

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5G for Smart Communities

Open discussion

Chair: Ioannis Patsouras, Senior Solutions Architect, WINGS ICT Solutions

European Commission

Open discussion

Cinzia Campanella

CLUSTER LEAD 5G
VODAFONE ITALY

Ioannis Patsouras

SENIOR SOLUTIONS ARCHITECT
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Salvatore Vitabile

PROFESSOR
UNIVERSITY OF PALERMO

Rajeshwari Kanesin

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APOQLAR MEDICAL

Funda Goker

POST DOC RESEARCHER 5G
UNIVERSITY OF MILANO

Nikos Kastrinios

PRODUCT MANAGER
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Ricardo Dinis

MOBILE NETWORK ANALYTICS
NOS

Alain Verheyden

ALLIANCES MANAGER
E-BO ENTERPRISES

5GSC
5G for Smart Communities

European Commission

Challenges & Concerns

- **Operational**
  - Integration with legacy hospital systems
  - Device and infrastructure interoperability gaps
- **Regulatory & Compliance**
  - Ongoing ISO 13485 & CE certification for regulatory compliance
  - Standardization of remote care protocols
- **User Readiness**
  - Limited 5G-ready medical devices
  - Training required for digital tools & workflows
- **Scalability Concerns**
  - Infrastructure gaps in rural areas
  - Ensuring data security in edge/cloud settings

Future Directions in Smart Healthcare

- **Policy & Standardization**
  - Harmonized EU healthcare regulations
  - Accelerated certification of medical devices & AI tools
- **Technology Deployment**
  - Extend edge/5G access to underserved areas
  - Promote open platforms for device integration
- **R&D and Collaboration**
  - Fund clinical validation of smart health solutions
  - Foster cross-sectoral pilots (hospitals, municipalities)
  - Contribute to 5G Community Conference roadmap

Open discussion

Ricardo Dinis

MOBILE NETWORK ANALYTICS
NOS

Project:

5G in healthcare – Northern Region (PT)

5G in Healthcare – Northern Region (PT)

CEF2 Digital - 5G for Smart Communities

5GSC Working Group II - Healthcare Subgroup
Ricardo Dinis

July 3rd 2025

5G | HEALTH CARE
NOS • SÃO JOÃO • INEM

NOS SÃO JOÃO INEM ULSAM

Co-funded by the European Union

5G in Healthcare – Northern Region (PT)

Agenda

01. General overview

02. Connectivity Infrastructure

03. Use Cases

General overview

CEF2 guarantees the infrastructure to enable the use cases setup & integration for healthcare

March 2024
-
February 2027

- NOS, together with project partners, will use 5G technology to foster advanced use cases in Healthcare sector that will improve focused services for the community
- This project was designed to cover several use cases, in different environments, where the use of 5G technology will significantly improve medical care
- The main objective is to demonstrate the potential that 5G network connectivity can achieve in terms of improved services (quality and quantity) in the healthcare sector

Connectivity Infrastructure

CEF2 FUNDING

TOTAL
3.315 M€ Investment
2.487 M€ Funding*

NOS	SÃO JOÃO	INEM
Investment 2.715 M€	Investment 0.350 M€	Investment 0.250 M€
Funding* 2.036 M€	Funding* 0.263 M€	Funding* 0.188 M€

Use Cases

PT 2030 FUNDING

TOTAL
2.999 M€ Investment
2.399 M€ Funding*

SÃO JOÃO	INEM
Investment 2.624 M€	Investment 0.375 M€
Funding* 2.099 M€	Funding* 0.300 M€

Legend: Consortium Leader * Funding Rate = 75%

Connectivity Infrastructure

5G technology to foster advanced use cases in Healthcare sector

The project will be developed within the influence perimeter of the **Unidade Local de Saúde de São João**, where a **5G network will be made available**

- **Reinforced 5G Network** in the **ULS São João assistance area** (30min radius)
  - Increase NR700 and NR3500 coverage
- **High-capacity** mobility layer
  - Seamless coverage with top notch quality
- 5G Network at **ULS São João facilities** for indoor use cases
  - Dedicated coverage at UCI, Davinci robotic room, etc.
- **Response times less than 10ms**, with regional processing capacity
  - Mobile Edge Computing (MEC) at Porto Centre
- **Differentiated service quality** for critical use cases
  - 5G SA Core enables virtual private network/slicing

MAIN TECHNOLOGY ENABLERS

RADIO NR700+NR3.5 | CORE 5G NSA & SA | HIGH CAPACITY BACKBONE | MOBILE EDGE COMPUTING | VIRTUAL PRIVATE NETWORK/SLICING | ADVANCED FUNCTIONALITIES

VERY HIGH THROUGHTPUT | INSTANT ACTION | MASSIVE CONNECTIONS

Project progress

Infrastructure deployment and use cases setup

Connected Emergency vehicles

Provide live feed of vital signs and HR video between INEM emergency vehicles and INEM support center

SÃO JOÃO INEM

Robotic surgery live stream

Allows the live broadcast of a surgery using the DaVinci laparoscopic robotic system

SÃO JOÃO

Telemedicine within the Metropolitan Em. Net.

Specialists access real-time patient data, conduct telemedicine consults, and assess the need for hospital transport

SÃO JOÃO

5G IoT for health monitoring environment

Establish a healthcare and monitoring environment using 5G IoT devices in selected patients' homes

SÃO JOÃO

Virtual reality in the intensive care unit

Use 5G-powered VR technology as a non-pharmacological intervention for patients in ICU

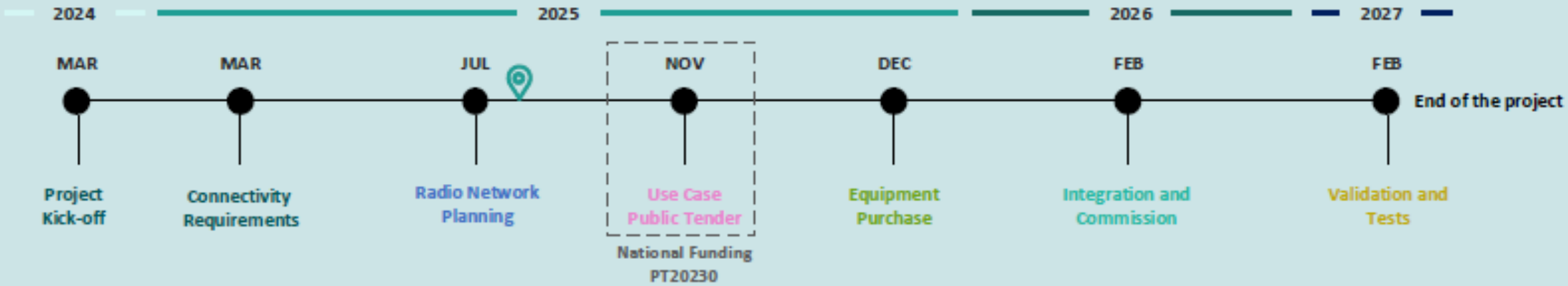
SÃO JOÃO

Off-site anatomical pathology diagnosis

Enables remote pathology with high-quality digital images from scanned tissue, solving large file issues remotely

ULSAM

Macro Milestones



Thank you

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NOS SÃO JOÃO INEM ULSAM

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Open discussion

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POST DOC RESEARCHER 5G
UNIVERSITY OF MILANO

Projects:
5G4ASSAC and 5GCRESCA

Università degli Studi di Palermo

5G4ASSAC

FASTWEB + vodafone

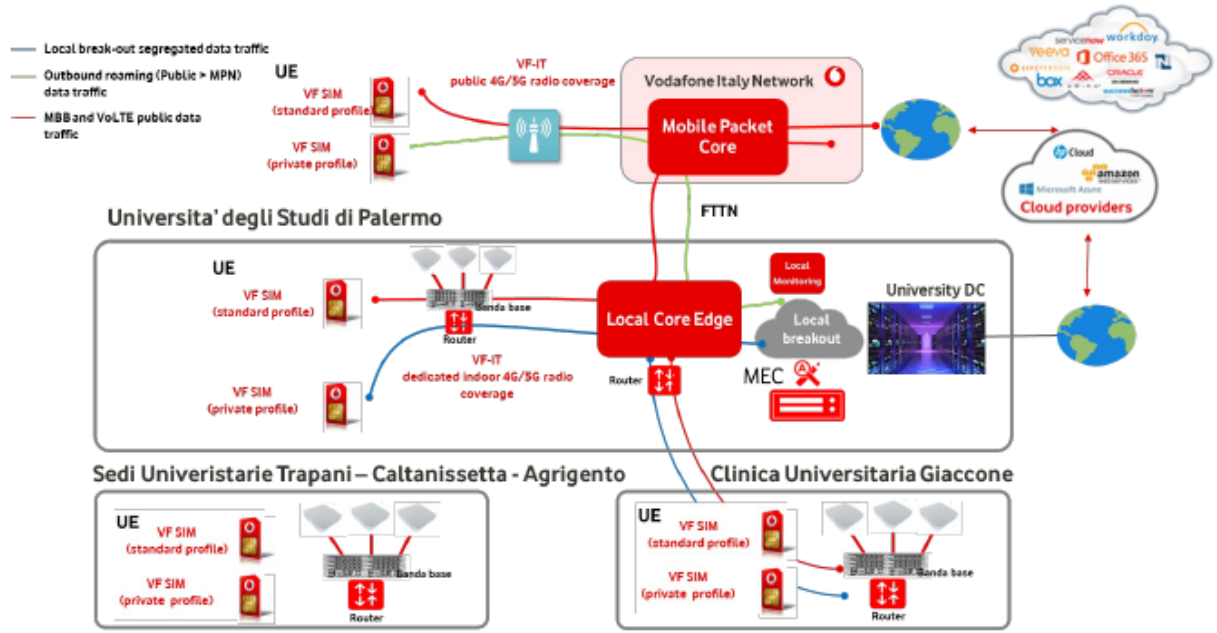
Cofinanziato dall'Unione europea

5G4ASSAC - Infrastructure

KEY FEATURES

- **Data transmission speeds** up to **10x faster** than current ones
- **30x to 50x lower latency** than current services
- **Limited energy consumption**
- **Massive machine communication**
- **High reliability** and security
- **Remote seamless access** to the Campus applications

ARCHITECTURE

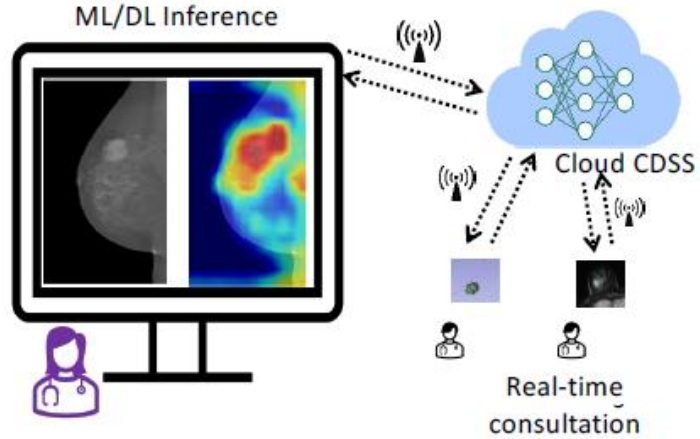


Immersive Education and real-time Telemedicine Services: Use Cases

Education

Videowall Classroom
XR Learning Platform
Mannequin based Simulation

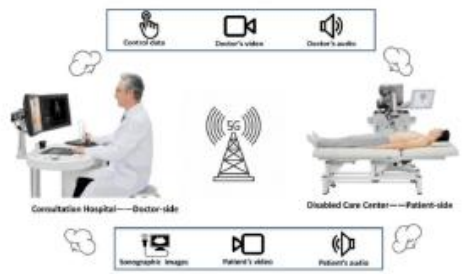
eHealth

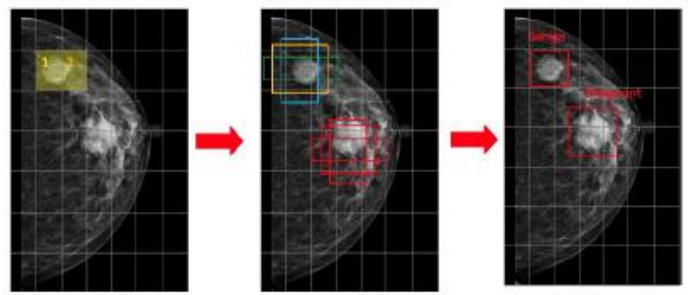


Medical Imaging
4k-8k real-time transfer
AI-Based Decision Support System

Project Challenges

- Use-Case centered calls
- Technology transfer triggers
- SME involvement





5G.CRESCA

European Commission

POLITECNICO MILANO 1863

vodafone

MADE Competence Center i4.0

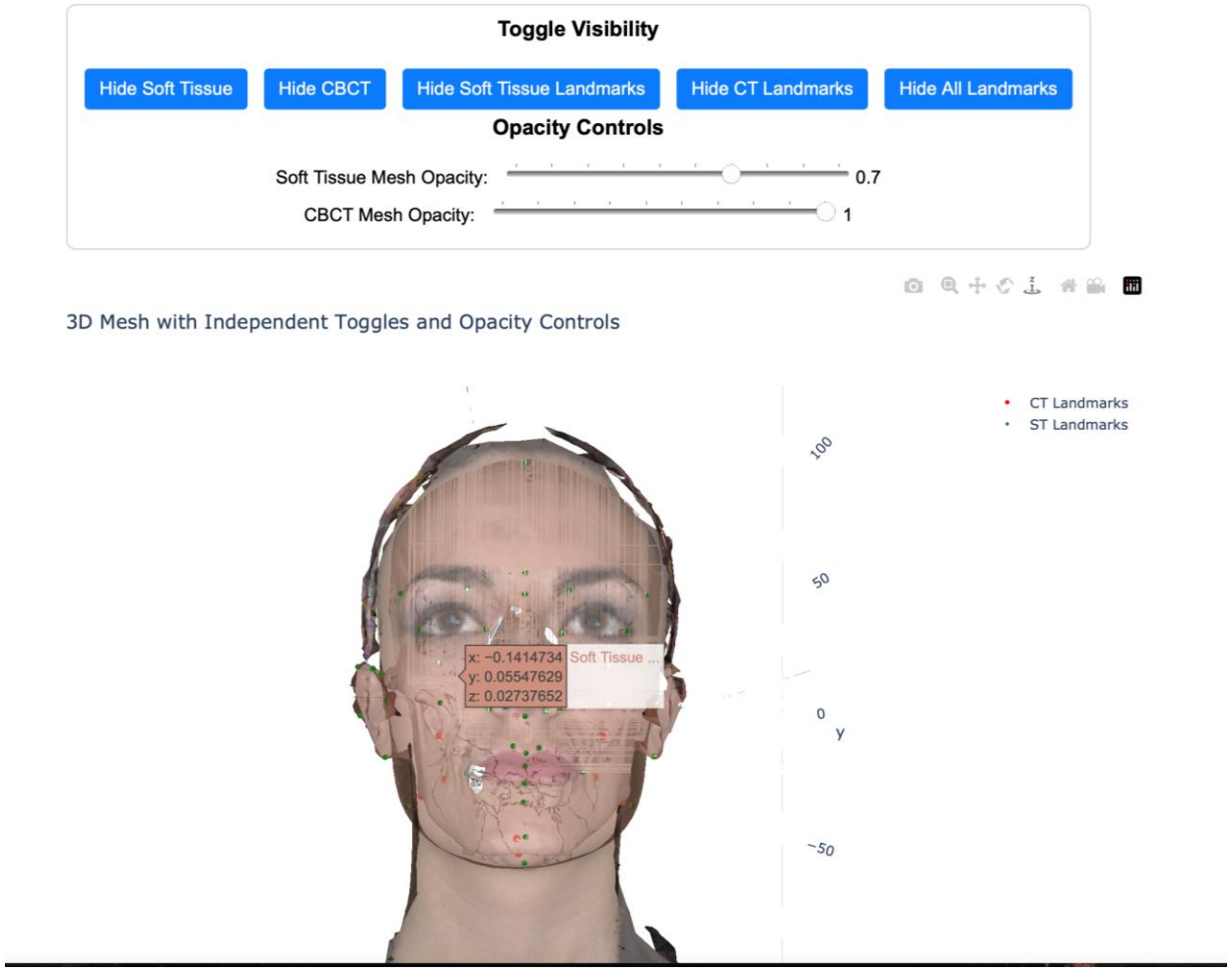
UNIVERSITÀ DEGLI STUDI DI MILANO

Museo del Violino

Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico

5G Holographic surgical simulation use case Purpose:

- Development of the holographic platform and integration in the university/clinic system
- At least 4 different teaching activities using the platform
- At least 30 students trained in the use of the platform



The use cases to be developed will demonstrate the project’s versatility in addressing complex scenarios beyond traditional education, such as the implementation of 5G holographic surgical simulation for medical students of the Università degli Studi di Milano….

UNIVERSITÀ DEGLI STUDI DI MILANO

ILLUMETRY

HOLOGRAPHIC DISPLAYS FOR XR EXPERIENCE

UNIMI

- Virtual Head
- Planning
- CBCT, MR, IOS, Facial Scan

GSNET

- Combining all data

ILLUMETRY

- Visualization
- Hardware

Holographic technology in clinical applications

- Visualizing Anatomical Structures,
- Medical Data
- Diagnostic Imaging

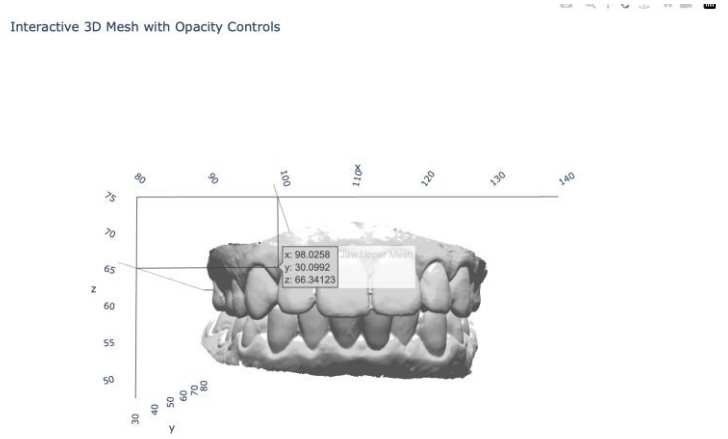
XR for healthcare industry

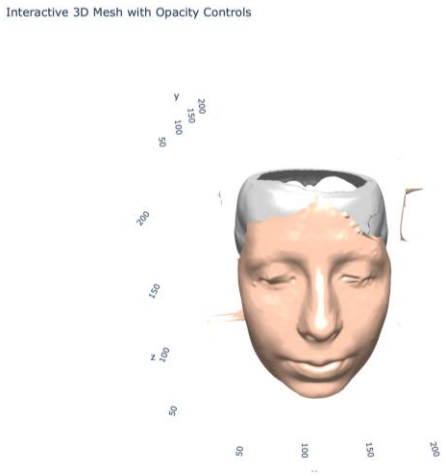
Solutions for aspiring physicians and healthcare pros to gain practical knowledge via precise medical virtual holograms.

LEARN MORE →

Goal:

- Enhance medical training, surgical planning, and patient awareness through immersive and detailed 3D representations.



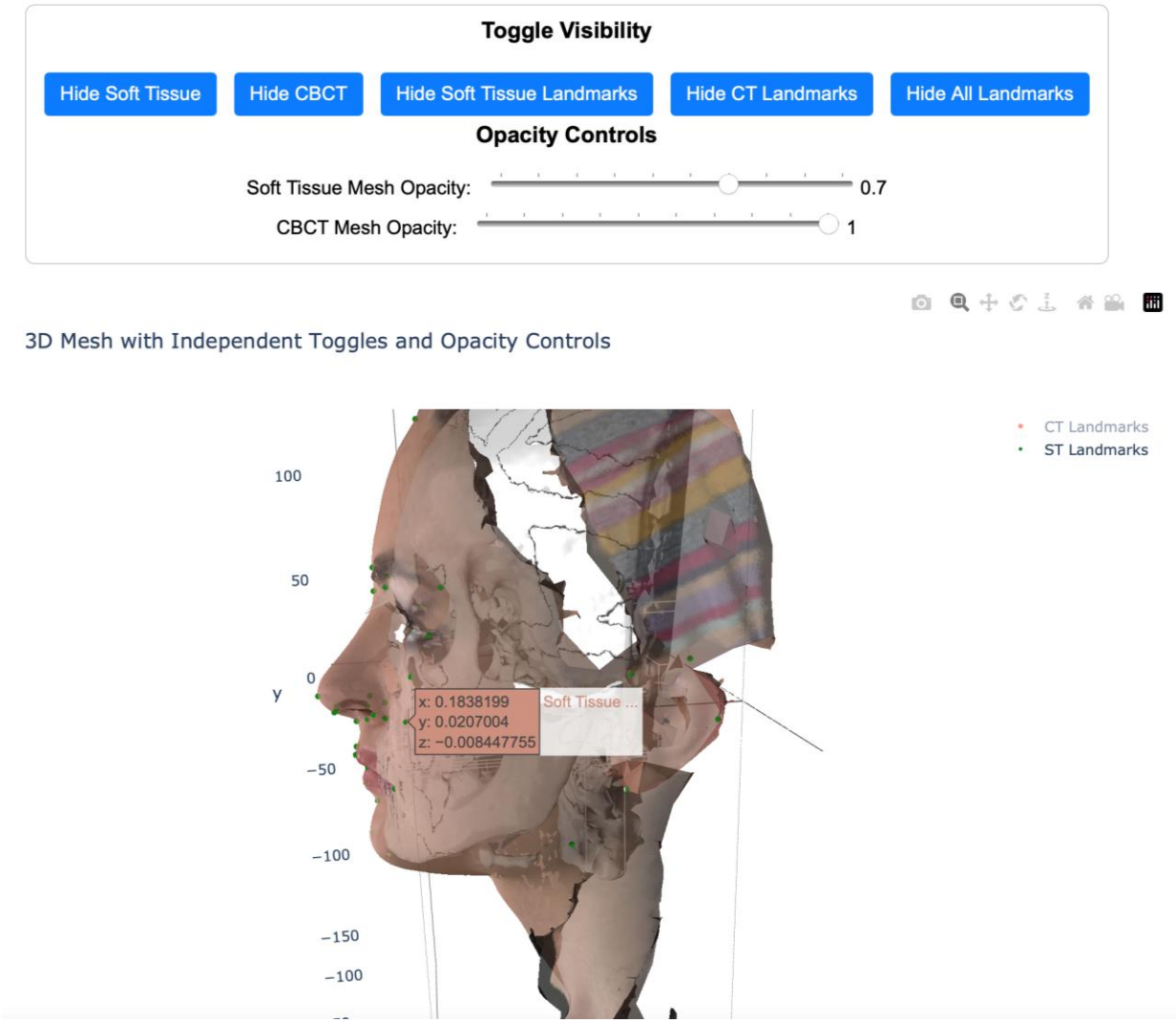


XR for K-12

Empower students with immersive learning experiences that stimulate curiosity and creativity while maintaining interaction with the teacher.

LEARN MORE →

- Automatic - segmentation and annotation tools crucial for dental and maxillofacial surgery workflows.
- These tools focus on identifying anatomical structures and will provide valuable insights for surgical planning.
- Leveraging 5G connectivity, these segmentations can be delivered in real-time to patients and clinicians.
- Using Mixed Reality (MR), clinicians can swiftly review and potentially modify results, expediting the data revision process. The high-speed, low-latency capabilities of 5G will enhance patient experiences by enabling remote visual assessments of their conditions and pathologies.



Toggle Visibility

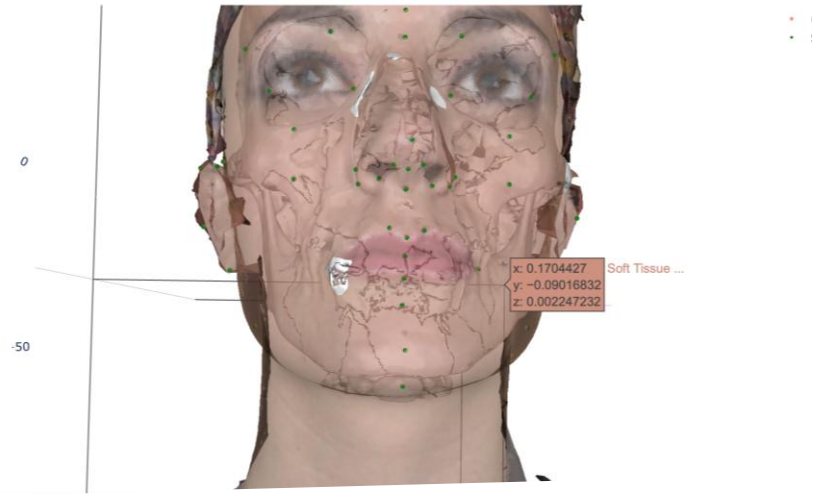
Hide Soft Tissue | Hide CBCT | Hide Soft Tissue Landmarks | Hide CT Landmarks | Hide All Landma

Opacity Controls

Soft Tissue Mesh Opacity: 0.7

CBCT Mesh Opacity: 1

3D Mesh with Independent Toggles and Opacity Controls



Toggle Visibility

Hide Soft Tissue | Hide CBCT | Hide Soft Tissue Landmarks | Hide CT Landmarks | Hide All Landmark

Opacity Controls

Soft Tissue Mesh Opacity: 0.7

CBCT Mesh Opacity: 1

Mesh with Independent Toggles and Opacity Controls

Toggle Visibility

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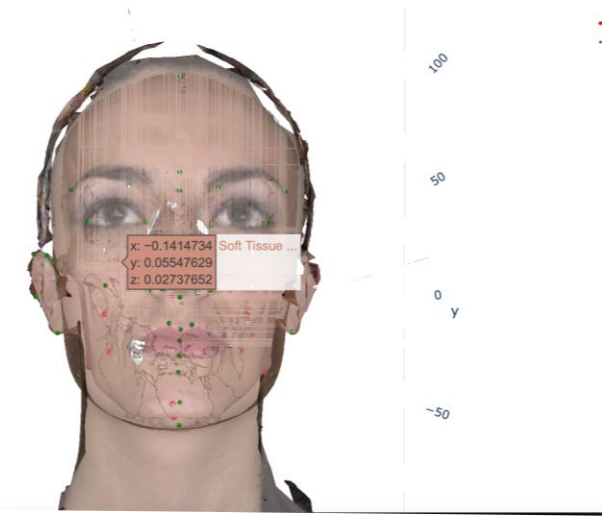


- **Please visit:**
- https://illumetry.com
- https://gsnetitalia.net

Open discussion

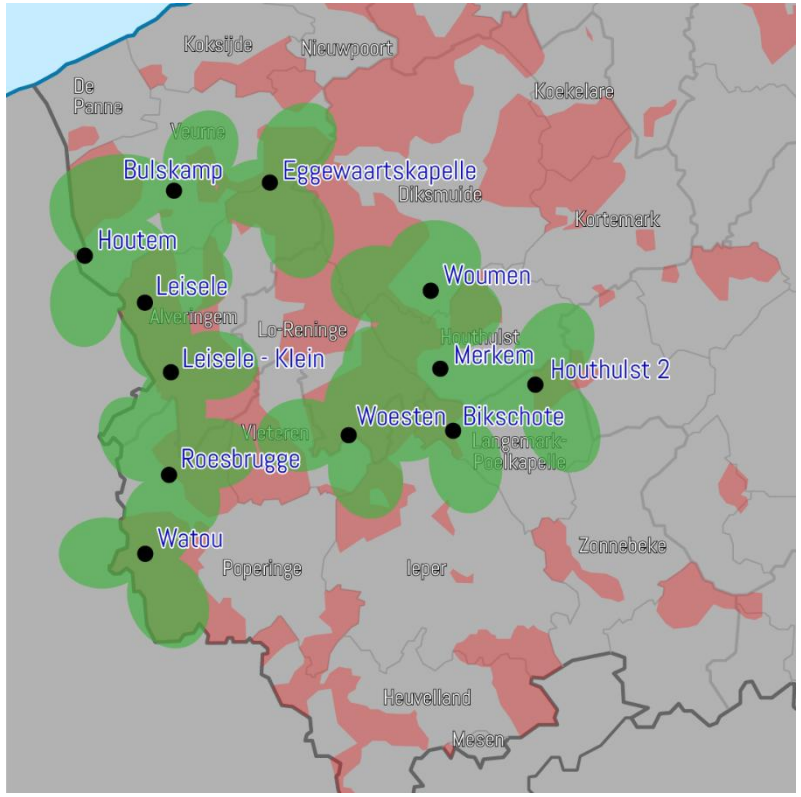
Alain Verheyden

ALLIANCES MANAGER
E-BO ENTERPRISES

Project:
Flanders Smart Fields

Digitally unlocking « Westhoek » by realizing 5G SA

New 5G SA Infrastructure is being installed



Simulation of possible blind spot coverage with 12 sites
Final location and coverage is subject of the ongoing site surveys

Flanders Smart Fields network :

- 12 sites to cover maximum of “blind spots”
- 5G Standalone Mobile Private Network
- Seamless roaming with public operators
- Deployment 2024 – 2025
- Field testing is very positive

Some technical details

The 5G SA network infrastructure contains the following advanced characteristics (not available on 4G or wifi) :

- uRLLC ultra-reliability & Low Latency Communication
- eMBB enhanced Mobile BroadBand : high bandwidth for streaming video, HD Upload
- MCPTT : mission-critical push-to-talk; also for first responders & other emergency teams connected
- Network slicing (more details in the deck by Stefaan later)
- IoT-layer : support for Internet of Things connectivity (eg. a.o. headset; 360° view camera, lidar, radar, …)

The goal :

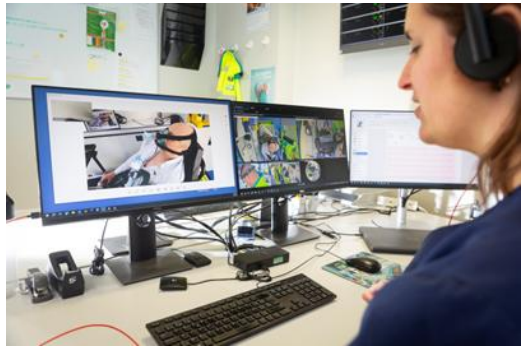
- Development of reliable communication between the remote operator control center and the semi-autonomous / automated ship. The preciseness & stability of the communication channels are important, as the ship is managed and steered remotely, from a distance (> 100 km's away).
- Compare 4G/LTE with / versus 5G SA uRLLC-component (ultra-Reliable Low Latency Communication).
- Compare 4G operator / VHF / satellite communication (current set up before this project) en operability (costs, easiness, control, legal, ...) with technical capabilities (Availability, Latency & Cyber security) of 5G SA
- Proof that 5G SA connectivity can support all ways of network traffic (inclusive business critical); and become an enabler for deployment and adaptation of semi-autonomous transport over the water ways.

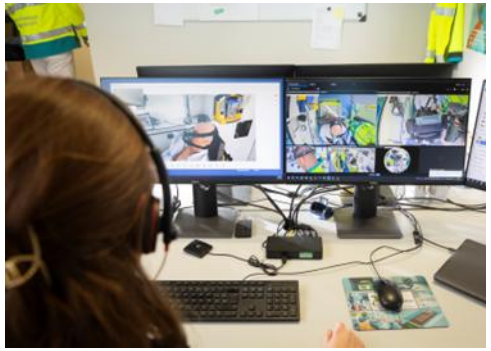
Full flow ‘PIT’

0. PIT-care worker needs advice during PIT-intervention → 1. PIT-care worker starts call → 2. Call request calls in hospital → 3. Doctor accepts call & livestream starts → 4. Acceptance call accepted in PIT → 5. Remote assistance is given → 6. PIT-care worker closes call

- PIT care worker accepts via button on smartglasses

- Audiovisual connection between doctor & PIT care worker; advice is given





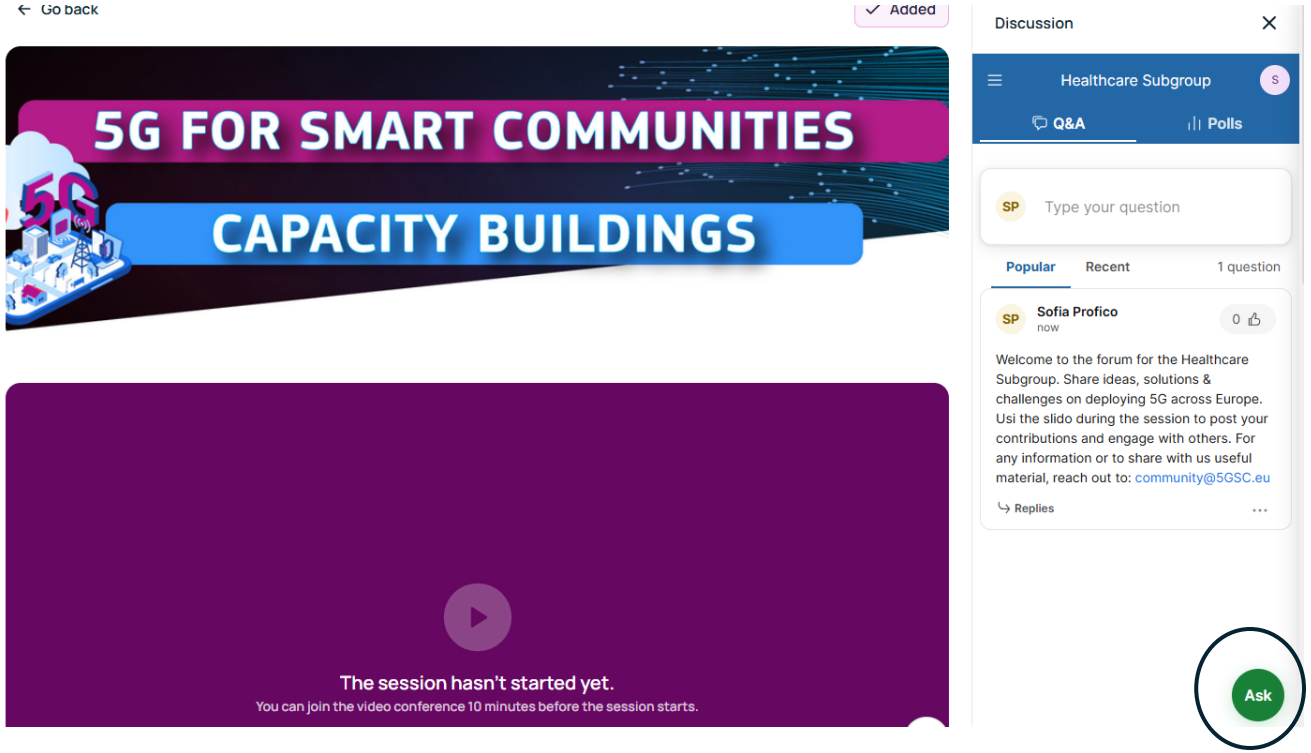
Full flow ‘Improved Care : from injection, pick-up to analysis’

0. Patient → 1. Blood sample → 2. Check-in → 3. Flight → 4. Landing → 5. Check-out → 6. Analysis

Your perspectives on 5G & healthcare

slido

OR



5GSC
5G for Smart Communities

Open discussion

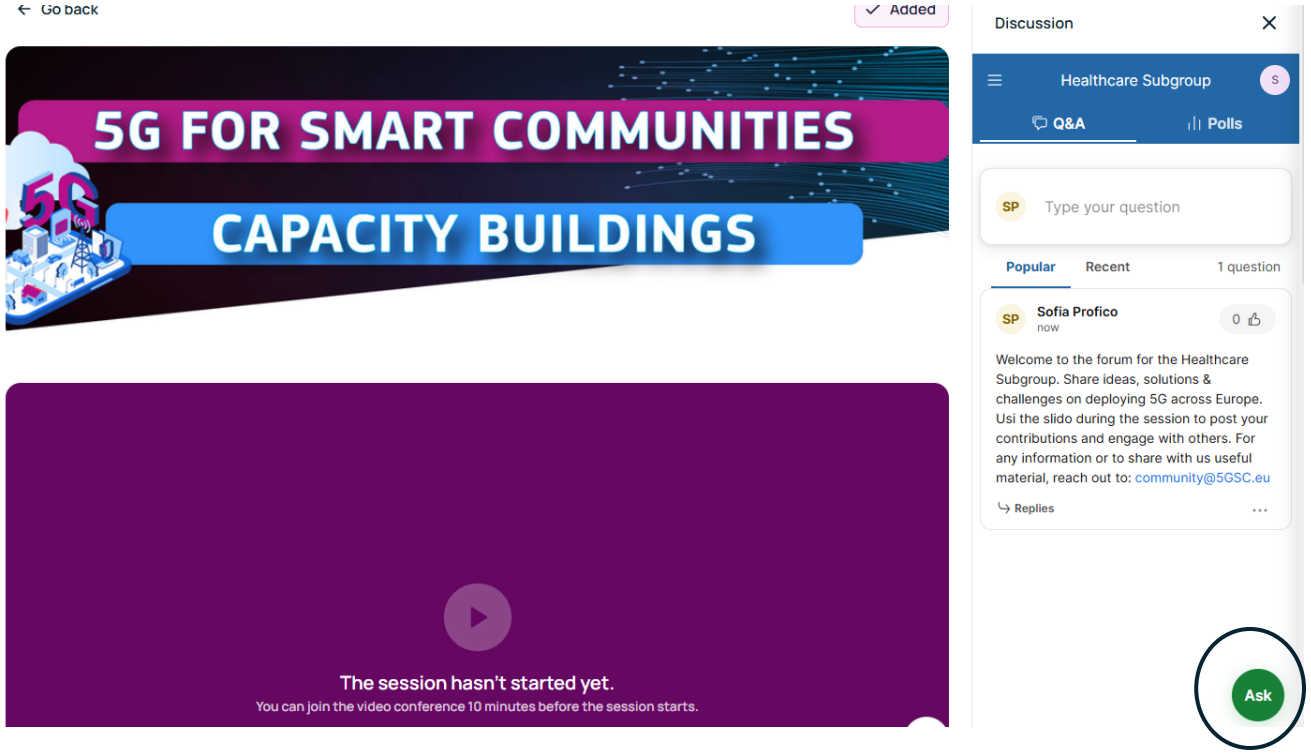
Chair: Ioannis Patsouras, Senior Solutions Architect, WINGS ICT Solutions

European Commission

Meetings & feedback polls

slido

OR



Closing Remarks

Dimitra Vasilia, Team Leader, 5G for Smart Communities Support Platform

5GSC
5G for Smart Communities

European Commission