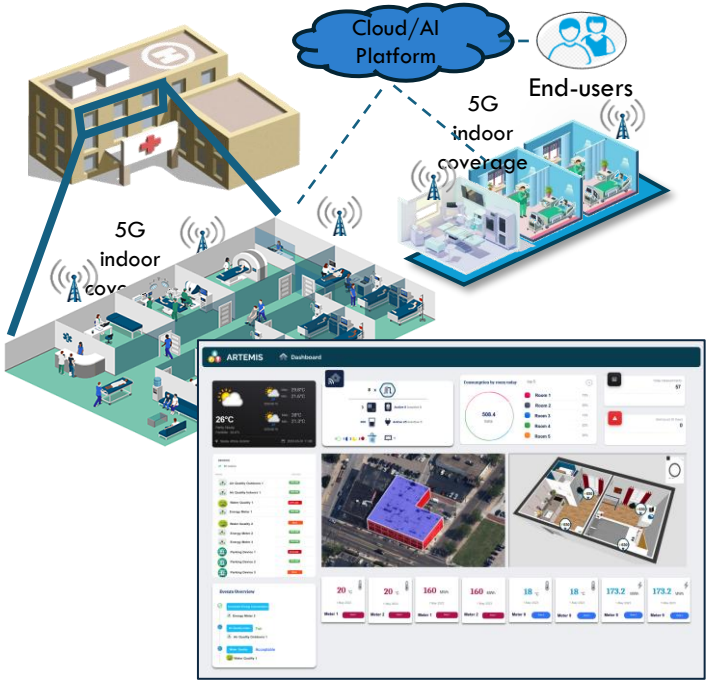
WINGS CEF Healthcare projects

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.**

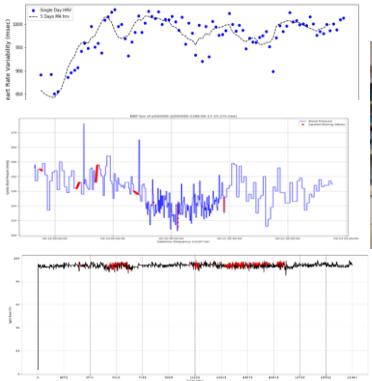


5G-TRACE project has received funding under grant agreement No 101181288.

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



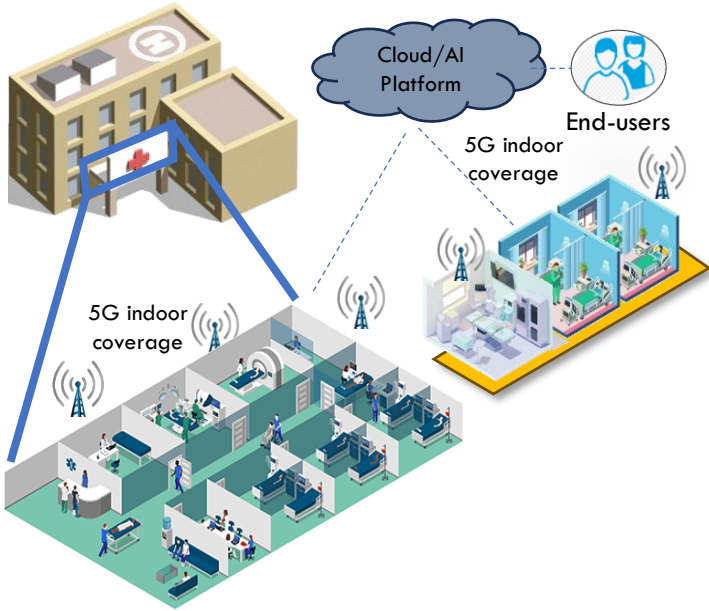
5G-SHEAL project has received funding under grant agreement No 101181166.

wi.CARE+ Innovations Our Use Cases Bring to Hospitals

- **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

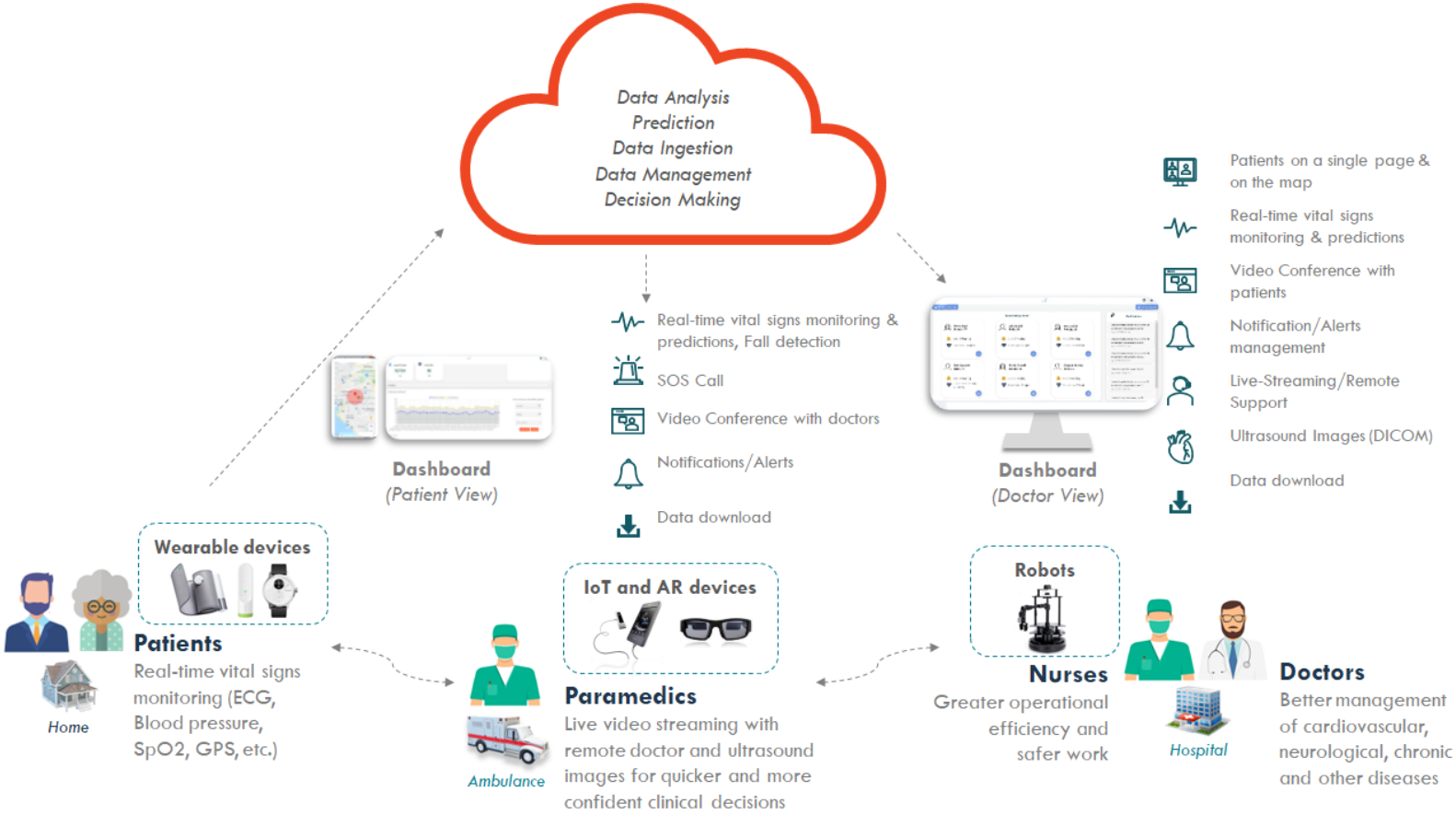
- **Edge AI & 5G-enabled Features**
  - Predictive analytics for early detection
  - Custom patient alert thresholds reduce false positives
  - Low-latency data processing via edge computing

- **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.



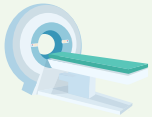
Covering the following: 24/7, Indoor Coverage, Capacity, Latency, Security of data

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



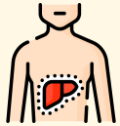
A Patient's Journey with 5G and HoloMedicine® technology – Value Driven

Patient Arrives at Hospital

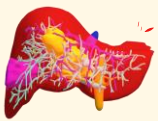


Patient CT/MRI scan is synced to hospital PACS

AI Pre-segmentation runs en-route to radiology



Patient diagnosis - in this case colorectal metastases of the liver

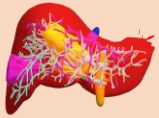


Patient Education part 1
HoloMedicine® Dicom Viewer (Hybrid rendering DICOM & AI Segmentation)

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

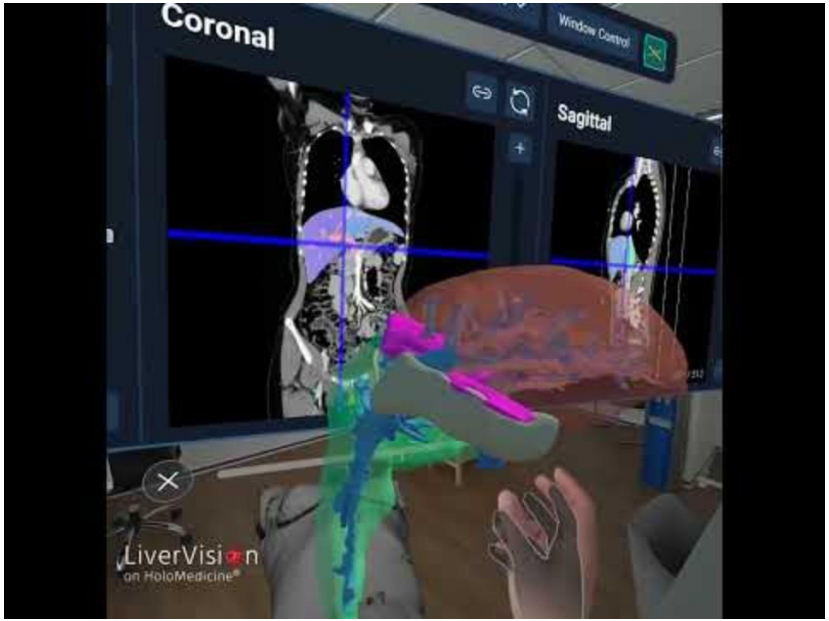
Scan & Read	Diagnose & Communicate	Align Treatment Plan	Surgical Plan & Consenting	Proctoring
5G enables 1GB+ file transmission through PACS and AI model	Hybrid rendering in the cloud 'on the fly' enabled by 5G	Multi-user, multi-site XR visualisation of hybrid patient Dicom in cloud	Complex surgical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

Detailed Use Cases : Surgical Planning and Patient Education with 3D HoloMedicine

Multi-disciplinary team reviews of complex cases is commonly known as **'Tumour Boards'.** Attended by oncologists, radiologists, radiation therapists, surgeons, fellows and residents, the goal of the tumour board is to align on a **'patient specific treatment plan'**

The problem: All attendees see the same images but have different understanding of what they see and therefore interpret them differently. The need to discuss together.

The solution: Using computer vision & AI models to simultaneously visualise in both 2D and 3D as the tumour board reviews patients scans, automatically highlighting pathology – and using LLM AI for tracking conversation and summarisation of the treatment plan



Tumor Board

- Remotely join shared sessions with medical professionals around the world in XR or 2D based on preference
- Receive AI-generated treatment plans & summarised reports
- Slice through 2D and 3D visualisations at the same time to ensure mutual understanding and slice position

Patient Education

- Walk patients through their CT or MRI diagnostic testing in an immersive environment
- Give real world context with 3D models for better understanding
- Engage real 'informed consent' and reassure patients and family

The 5G HoloMedicine® Platform: Transforming Medical Education & Surgical Precision

Connected in 5G and Hosted on Secure Medical Cloud

The HoloMedicine® Platform

HoloMedicine® Product & Immersive Experience

	EDUCATION in Virtual Reality	PLANNING in Extended Reality	ROBOTICS in Mixed Reality
	HoloMedicine® spaces	HoloMedicine® patient viewer	HoloMedicine® edu robotics
What is it for?	**Education & collaboration**	**Pre-op planning & collaboration**	**Proctoring and Robotics Skills Training**
Who is it for?	1. Residents & Fellows 2. Nurses Academy 3. Medical Students, Skills Lab 4. MedTech Companies Simulation	1. Multi-disciplinary teams 2. Surgical Planning 3. 3D Printing Overlay 4. Patient education	1. Surgical Consultants 2. Robotics Surgeons 3. Mentors/Proctors 4. Surgical Fellowships
Recommended Devices*			

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

Thank you

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