End-to-end healthcare and wellness by means of 5G and beyond

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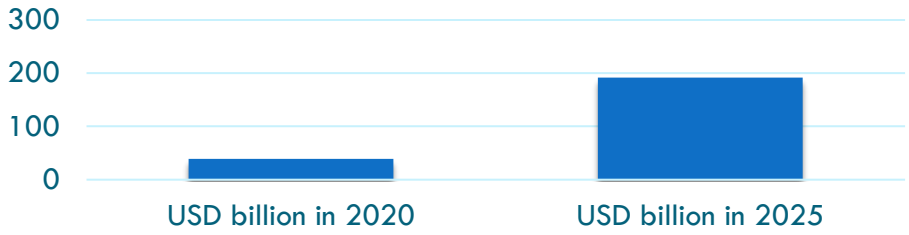
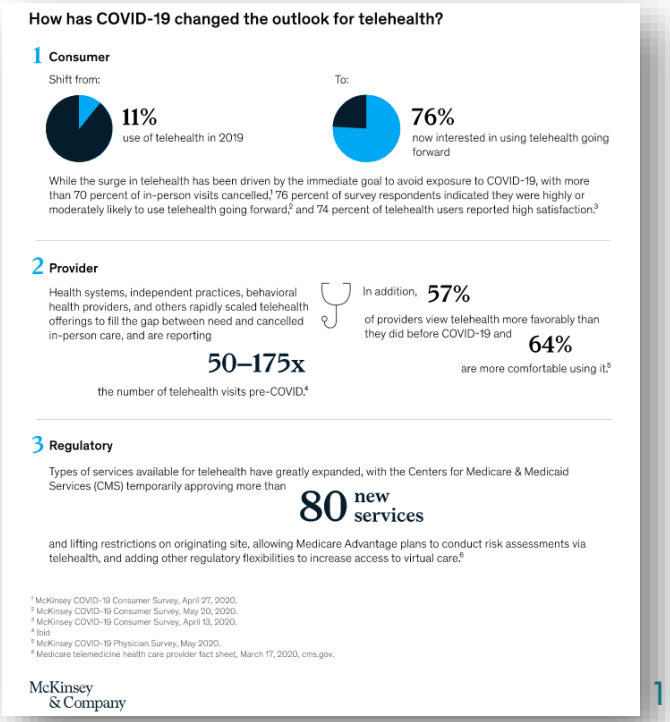
Global telehealth and telemedicine market trend

- The global telehealth and telemedicine market is expected to grow at a CAGR of 37.7% during the forecast period, to reach USD 191.7 billion by 2025 from an estimated USD 38.7 billion in 2020.
- The COVID-19 pandemic has increased the incentives for efficient remote health monitoring
  - Reduction of on-site referrals for routine care due to the risk of contamination in clinical settings;
  - Increase in the need to continuously monitor the status of non-critically ill COVID-19 patients (quarantined at home or at dedicated venues e.g., hotels).

The global telehealth and telemedicine market





How has COVID-19 changed the outlook for telehealth?

1 Consumer

Shift from: 11% use of telehealth in 2019

To: 76% now interested in using telehealth going forward

While the surge in telehealth has been driven by the immediate goal to avoid exposure to COVID-19, with more than 70 percent of in-person visits cancelled,[1] 76 percent of survey respondents indicated they were highly or moderately likely to use telehealth going forward,[2] and 74 percent of telehealth users reported high satisfaction.[3]

2 Provider

Health systems, independent practices, behavioral health providers, and others rapidly scaled telehealth offerings to fill the gap between need and cancelled in-person care, and are reporting 50–175x the number of telehealth visits pre-COVID.[4]

In addition, 57% of providers view telehealth more favorably than they did before COVID-19 and 64% are more comfortable using it.[5]

3 Regulatory

Types of services available for telehealth have greatly expanded, with the Centers for Medicare & Medicaid Services (CMS) temporarily approving more than 80 new services and lifting restrictions on originating site, allowing Medicare Advantage plans to conduct risk assessments via telehealth, and adding other regulatory flexibilities to increase access to virtual care.[6]

[1] McKinsey COVID-19 Consumer Survey, April 27, 2020.
[2] McKinsey COVID-19 Consumer Survey, May 20, 2020.
[3] McKinsey COVID-19 Consumer Survey, April 13, 2020.
[4] Ibid
[5] McKinsey COVID-19 Physician Survey, May 2020.
[6] Medicare telemedicine health care provider fact sheet, March 17, 2020, cms.gov.

McKinsey & Company

Europe's strategic goals in healthcare

The four strategic orientations for grater impact of Horizon Europe's first strategic plan 2021-2024, which highlight the critical role of health care systems and digital technologies.

- Very ambitious strategic goals in healthcare have been set by the EU, the importance of which has been strengthened due to COVID-19 crisis. Indicatively,
  - The decongestion of primary care units by enhancing telehealth solutions and remote care solutions
  - Maximization of the digitization and efficient data exchange between patients, doctors, carers, relatives, to enhance quality of care and reduce cost or inconvenience.
  - Enrichment of health data for the development of personalized (or not) solutions and new holistic policies for the protection of public health.

10/29/2021

https://www.medtecheurope.org/digital-health/

Why do we need 5G in healthcare?

- Why 5G is important for the health vertical?
  - 5G offers high-speed, ultra-reliable low-latency communication which benefit patients, healthcare professionals, governments and insurers by:
    - Improved experience
    - Personalized and preventative care
    - Higher quality of care
    - Healthier population
    - Increased insights for epidemiology

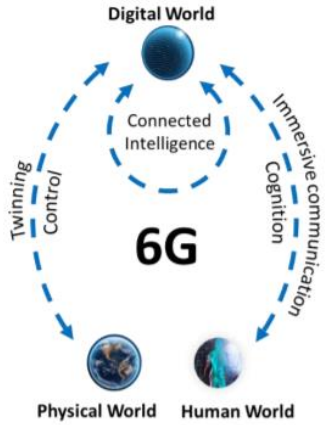
- Technical requirements of 5G networks for healthcare use cases
  - 1000x higher mobile data volume per area
  - 100x higher number of connected devices
  - 100x higher user data rate
  - 10x longer battery life for low power massive machine communications
  - 5x reduced End-to-End (E2E) latency

https://www.alliedmarketresearch.com/europe-5g-infrastructure-market

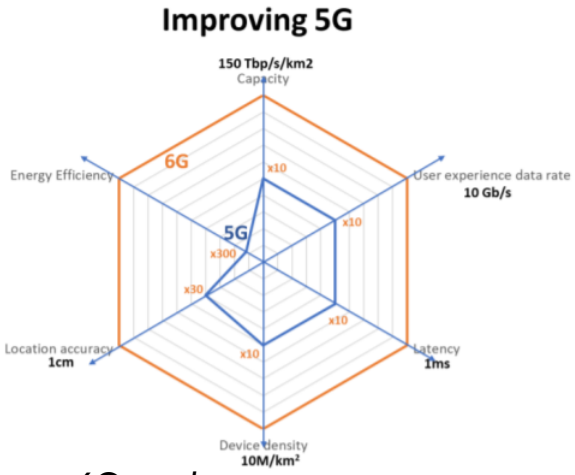
Why do we need 6G in healthcare?

- 6G goals:
  - The convergence of physical, human, and digital worlds in 6G will require support for digital twinning, immersive communication, cognition, and connected intelligence.
  - To provide flexibility, programmability.
  - To support deterministic end-to-end services.
  - To provide integrated sensing and communication enabling high accuracy localization and high-resolution sensing services.
  - To reduce its footprint on energy, resources, and emissions and improve sustainability in other parts of society and industry.
  - To become a truly trustworthy infrastructure that will become the basis of societies of the future.
  - To ensure that 6G can be inclusive for all people across the world, it needs to be scalable and affordable.
  - Significantly stretch the KPIs that 5G can achieve now.

"6G will help us to tackle the challenges we will face in 2030 and beyond achieving a lot more goals than just providing fast mobile Internet access."



Convergence of digital, physical, and personal domains

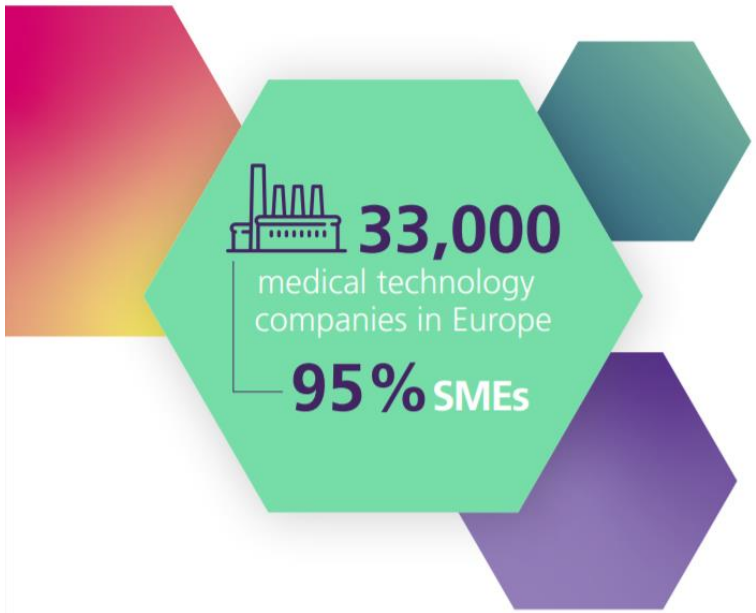


6G goals

https://5g-ppp.eu/wp-content/uploads/2021/06/WhitePaper-6G-Europe.pdf

Why SMEs are vital for healthcare innovation?

- European Pharmaceutical Sector
  - **10 to 15%** of the applications to the European Medicines Agency (EMA) for the marketing authorisation of new medicines were SMEs
  - More than **one in two medicines developed by SMEs** in the past 10 years (contained a new active substance and 42% of these medicines being orphan medicines for rare diseases)
  - **1619 registrations as SMEs** from companies in the EMA (2016)
- Medical Technology Sector
  - More than 33,000 medical technology companies in Europe
  - 95% of which are SMEs - less than 50 employees (MedTech Europe, 2021)
- Digital Health Sector
  - Digitally-enabled healthcare play a major role to mitigate the economic and societal challenges
  - More and more innovative SMEs are enabling Europe's "forced digitalisation"



https://vb.northsearegion.eu/public/files/repository/20200826062928_D_ZE_SHINE_NHS_Reportinternationalisation_Sept2017.pdf
https://www.medtecheurope.org/wp-content/uploads/2021/06/the-european-medical-technology-industry-in-figures-2021.pdf

5G Infrastructure Public Private Partnership (5G PPP)

- The 5G PPP is a **joint initiative between the European Commission and European ICT industry** (ICT manufacturers, telecommunications operators, service providers, SMEs and researcher Institutions)
  - Phase 1 performed fundamental research for 5G networks
  - Phase 2 used those technologies for the digitisation and integration of vertical industries
  - Phase 3 will now address the development and rollout of a 5G platform across Europe

https://5g-ppp.eu/wp-content/uploads/2021/06/5GPPP_Phase3_Brochure_v7.2-web.pdf
https://www.telecomtv.com/content/5g/european-commission-launches-5g-ppp-phase-3-31346/

5G PPP and the involvement of SMEs

SMEs involvement in 5G PPP

- The participation of SMEs in the 5G PPP has reached **21.95%** of EU funding, representing a total of 156.3 M€.
- SMEs have contributed to **24.43%** of the total participation in 5G PPP projects.
- **65%** of the SMEs participated in one project, and **35%** in two or more projects.
- **167** SMEs are participating in 5G PPP Phase 3, for a total EC funding in the range of **100 M€.**

WINGS ICT Solutions | Mission

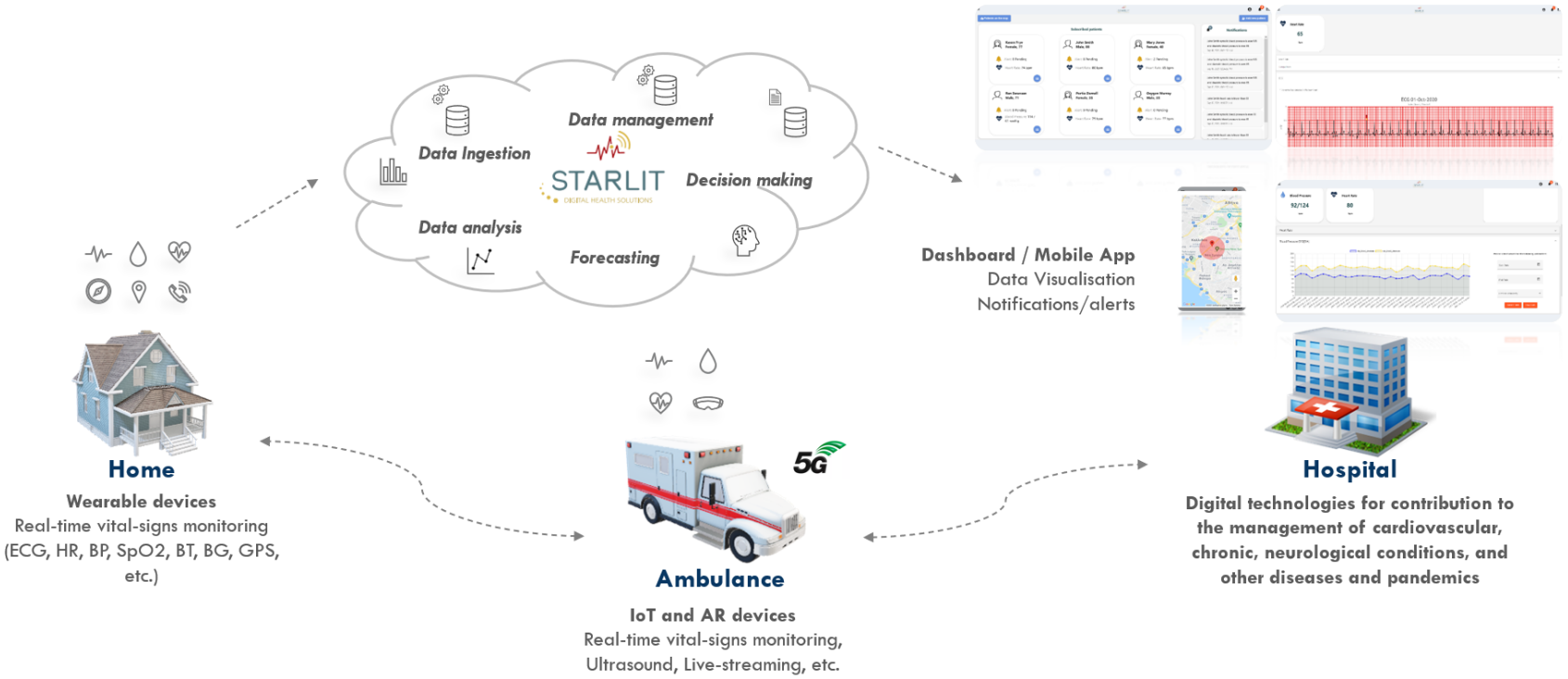
Digital solutions (software and hardware) and transformations for **vertical sectors**

Advanced **technologies**: wireless (4G/5G/B5G/Wi-Fi), IoT, cloud and big data platforms, trustworthy AI, blockchain and distributed ledger technologies, orchestration / performance evaluation / diagnostics, AR/VR

Vertical sectors: Environment (air quality, natural disasters), utilities and infrastructures (energy/water/gas, transportation, construction), production – manufacturing (food, factories/logistics), service sectors (health, education/culture, government, security/defense)

Digital solutions for **Sustainability** and for Liveable / Smart / Digital **Cities**

5G/6G powered End-To-End healthcare and wellness solutions

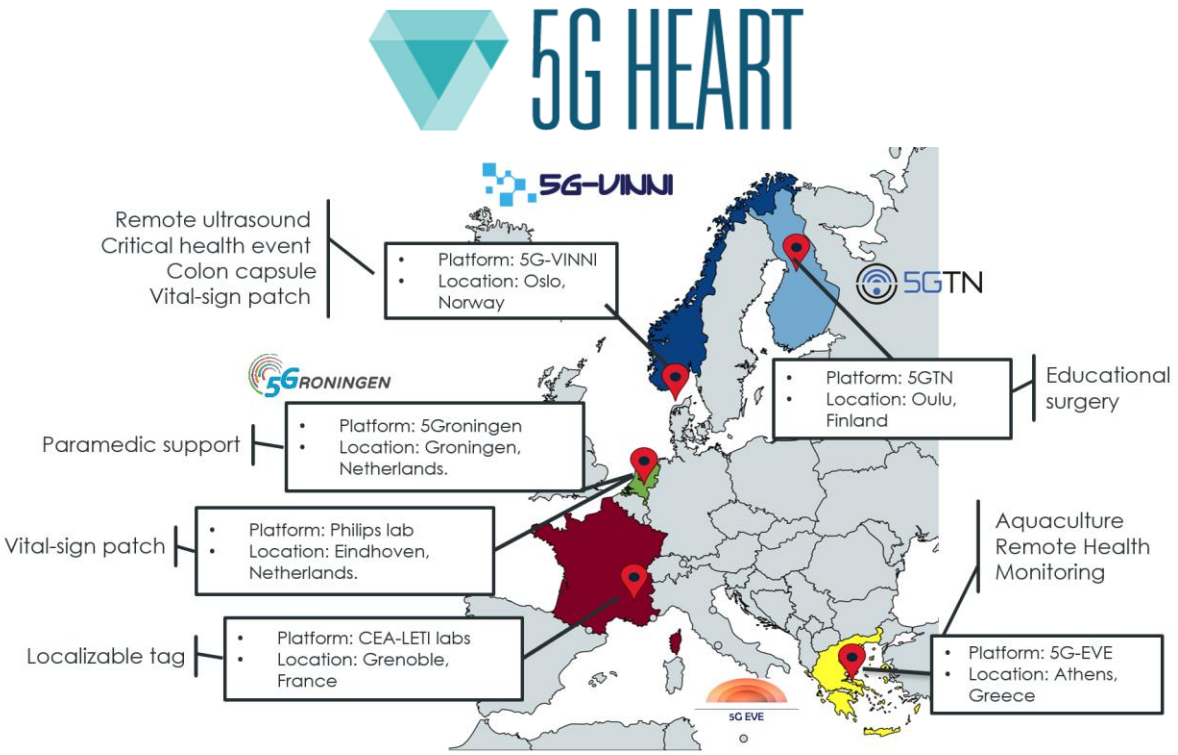


WINGS STARLIT platform

- End-To-End healthcare and wellness solutions
  - In-home
  - Emergency Services (Ambulance)
  - Scene (Accident side)
  - Hospital Settings / Emergency Departments
- The most common applications
  - Connected ambulance
  - Remote patient monitoring
  - HD virtual consultations
  - Video-enabled prescription management
  - Augmented reality/virtual reality healthcare

What is 5G-Heart?

- *"**5G HE**alth **A**quacultu**R**e and **T**ransport Validation Trials"*
  - Phase 3 project of the 5G PPP of the EU Horizon 2020 Framework Programme
  - Runs from June 2019-November 2022
  - The overall objective is to define and validate the cost efficient 5G converged network concepts, which enable an intelligent hub supported by multiple vertical industries
  - 5G-Heart will deploy innovative digital use cases involving healthcare, transport and aquaculture industry partnerships
  - The 5G-Heart is addressing the "Hospital without walls" vision



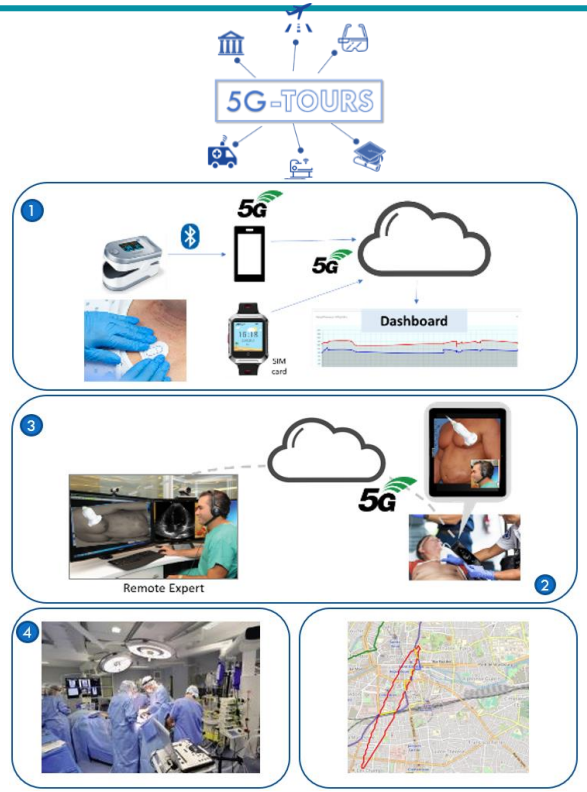
WINGS role in 5G-Heart

Aquaculture Remote Health Monitoring: Providing real-time monitoring and constant situational awareness of the health status and environment of workers or vulnerable people in remote locations, such as aquaculture sites.

https://5gheart.org/

What is 5G-Tours?

- *"Smar**T** m**O**bility, media and e-health for to**UR**ists and citizen**S**"*
  - Phase 3 project of the 5G PPP of the EU Horizon 2020 Framework Programme
  - Runs from June 2019-November 2022
  - The concept is the dynamic use of the network to seamlessly provide different types of services adapted to the specific needs of individual use cases (monitoring & intervention enabled by 5G):
    1. Remote health monitoring and emergency situation notification
    2. Optimal Ambulance routing to get medical help to the incident as fast as possible
    3. Teleguidance for diagnostics and intervention support-connected ambulance
    4. Wireless operating room: Advanced surgical intervention enabled by 5G connected medical ultrasound



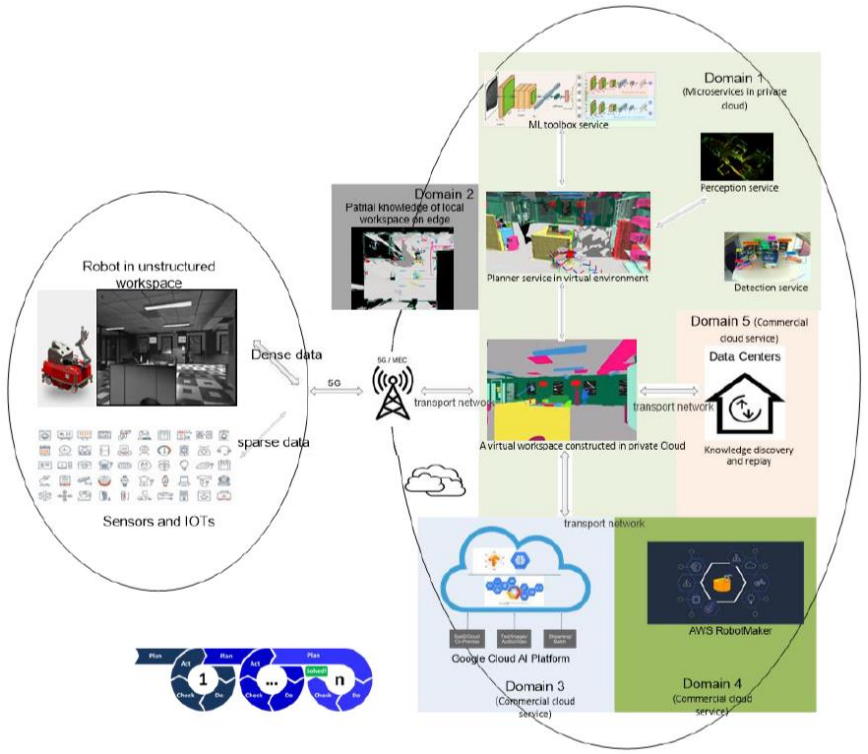
WINGS role in 5G-Tours

Remote health monitoring and emergency situation notification & Optimal ambulance routing: Solutions for remote health monitoring of people, especially when already diagnosed with a critical disease still compatible with home care and real time navigation of the ambulance, both to the site of the emergency and back to the hospital, to ensure the timely provision of medical help and patient immediate transfer.

https://5gtours.eu/

What is 5G-ERA?

- *"**5G E**NHANCED **R**OBOT **A**UTONOMY"*
  - 5G-PPP Phase 3 (part 2) project of the EU Horizon 2020 Framework Programme
  - Runs from January 2021-December 2023
  - The project's ambition is on the user-centric paradigm of integrating vertical knowledge into the existing standardised 5G testing framework to improve Quality of Experience (QoE) for vertical customers
  - Main Objectives:
    1. An intent-based networking paradigm for optimised QoE to support enhanced robot autonomy in real-world applications
    2. A 5G-ERA middleware which enables cloud native resource provision over autonomous robots
    3. Standardised APIs by integrating ROS with OSM
    4. Showcase enhanced QoE on experimental facilities for vertical applications



WINGS role in 5G ERA

5G-powered Robots for Security Screening and Public Protection and Disaster Relief (PPDR) at Airports.

https://5g-ppp.eu/5g-era/

Contact information

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谢谢 | Thank you!

Any Questions?