



Update and Status from European 6G Research

Dr. Colin Willcock
6G-IA Board Chair
SNS JU Vice-chair
ETSI Board Vice-chair

The Voice of European Industry and Research for Next Generation Networks and Services

Who We Are - What we represent

Strong contributors to EU economy:

- > € 210 Billion of European revenues (EU board Members)
- > € 420 Billion of European revenues (all EU industry members)
- > More than **200 5G Network** deployments in the world.

Focus on:

- > **advanced Networking** Tech, systems
- > EU industry competitiveness
 - > Sustainability
 - > Sovereignty.

6G SNS
IA

An industry driven
Association of
~400 Members

Committed to Innovation

- > Typical R&D investment: 20% of revenues for lead supply companies
- > About 40% of Standard Essential Patents from 2G to 5G
- > Leading the initiation of new Digital Markets, 5G and 6G for Verticals

Committed to collaborative research

- > € 900 millions of private investments in EC 6G Programme
- > Partnerships with >130 EU academics and RTOs

6G-IA International MoUs/Joint R&I



European Vision & Strategy for 6G networks



6G Infrastructure Association
Vision and Societal Challenges Working Group
Societal Needs and Value Creation Sub-Group

What societal values will 6G address?

Societal Key Values and Key Value Indicators analysed through 6G use cases

May 2022

Date: 2022-05-31

Version: 1.0

DOI: 10.5281/zenodo.6557534

URL: <https://doi.org/10.5281/zenodo.6557534>



5GPPP Architecture Working Group

View on 5G Architecture

Version 4.0, October 2021

Date: 2021-10-29

Status: Public Release

DOI: 10.5281/zenodo.5155657

URL: <https://doi.org/10.5281/zenodo.5155657>

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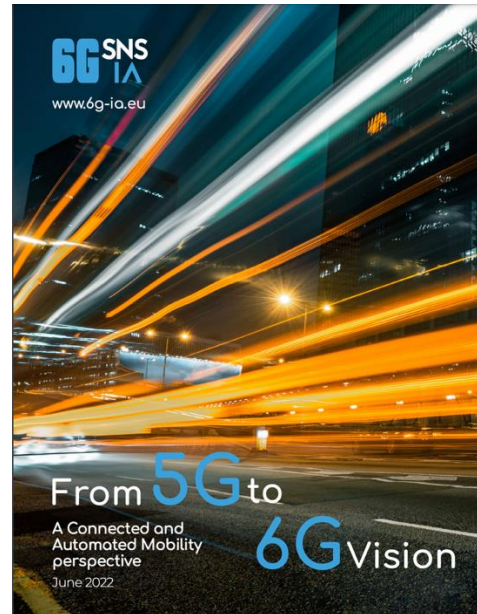


WHITE PAPER THE EUROPEAN VISION FOR THE 6G NETWORK ECOSYSTEM

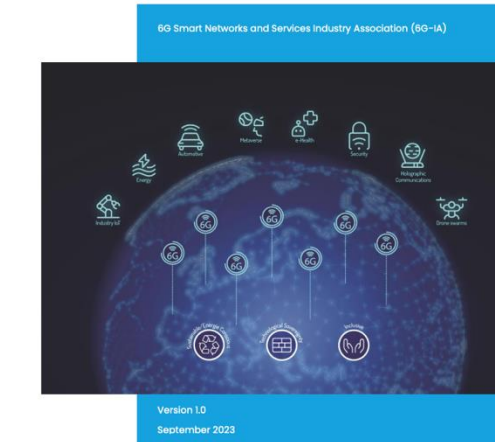
DOI: 10.5281/zenodo.6577506
URL: <https://doi.org/10.5281/zenodo.6577506>



[Download the White Paper](#)



From 5G to 6G Vision A Connected and Automated Mobility perspective June 2022



Position paper KEY STRATEGIES FOR 6G SMART NETWORKS AND SERVICES

DOI: 10.5281/zenodo.8315347
URL: <https://6g-ia.eu/plans-papers/>



[Download the White Paper](#)



5G Public Private Partnership
Test, Measurement and KPIs Validation Working Group

Whitepaper Beyond 5G/6G KPIs and Target Values

Version 1.0 – June 2022

Date: 02-06-2022

Version: 1.0 June 2022

DOI: 10.5281/zenodo.6577506
URL: <https://doi.org/10.5281/zenodo.6577506>



5G-PPP Software Network Working Group

Network Applications: Opening up 5G and beyond networks 5G-PPP projects analysis

September 2022

Date: 2022

Version: 1.0

DOI: 10.5281/zenodo.7123919
URL: <https://zenodo.org/record/7123919>
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More than 40 white papers. All of them are publicly available at <https://6g-ia.eu/plans-papers/> and at <https://5g-ppp.eu/white-papers>

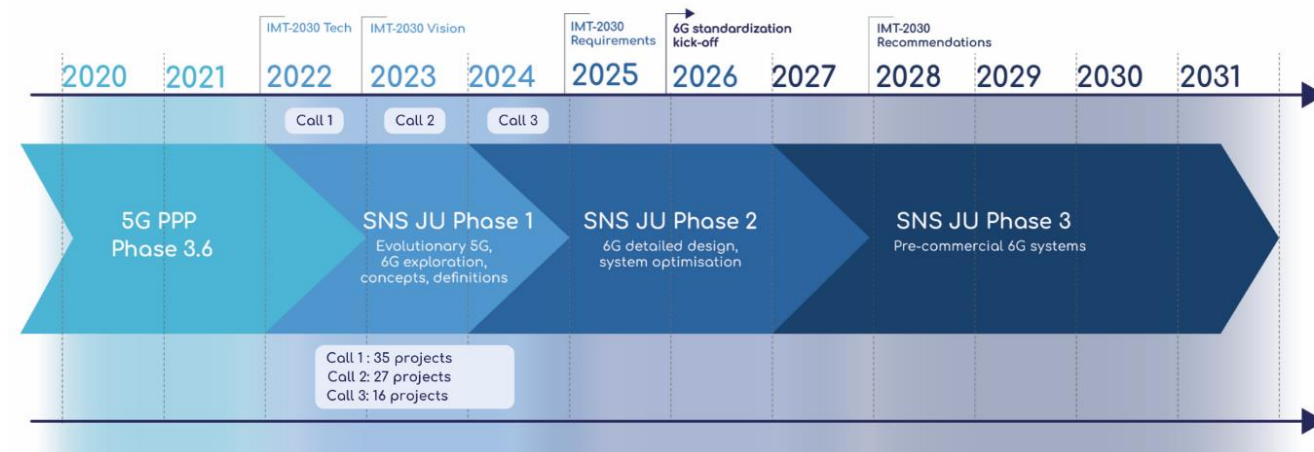
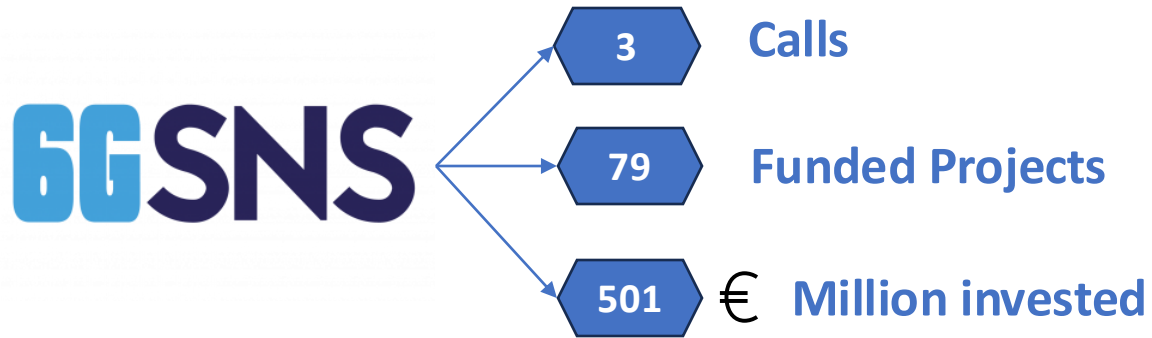


6G SNS

- The Smart Networks and Services Joint Undertaking is a major European 6G research program
- 1.8 B€ funding for Next generation networks [equal resources from the private side and public side]

[Know more here](#)

The SNS JU so far....



1244 Total entities funded



505 Unique entities funded



297 6G-IA members (59% of Unique Beneficiaries)

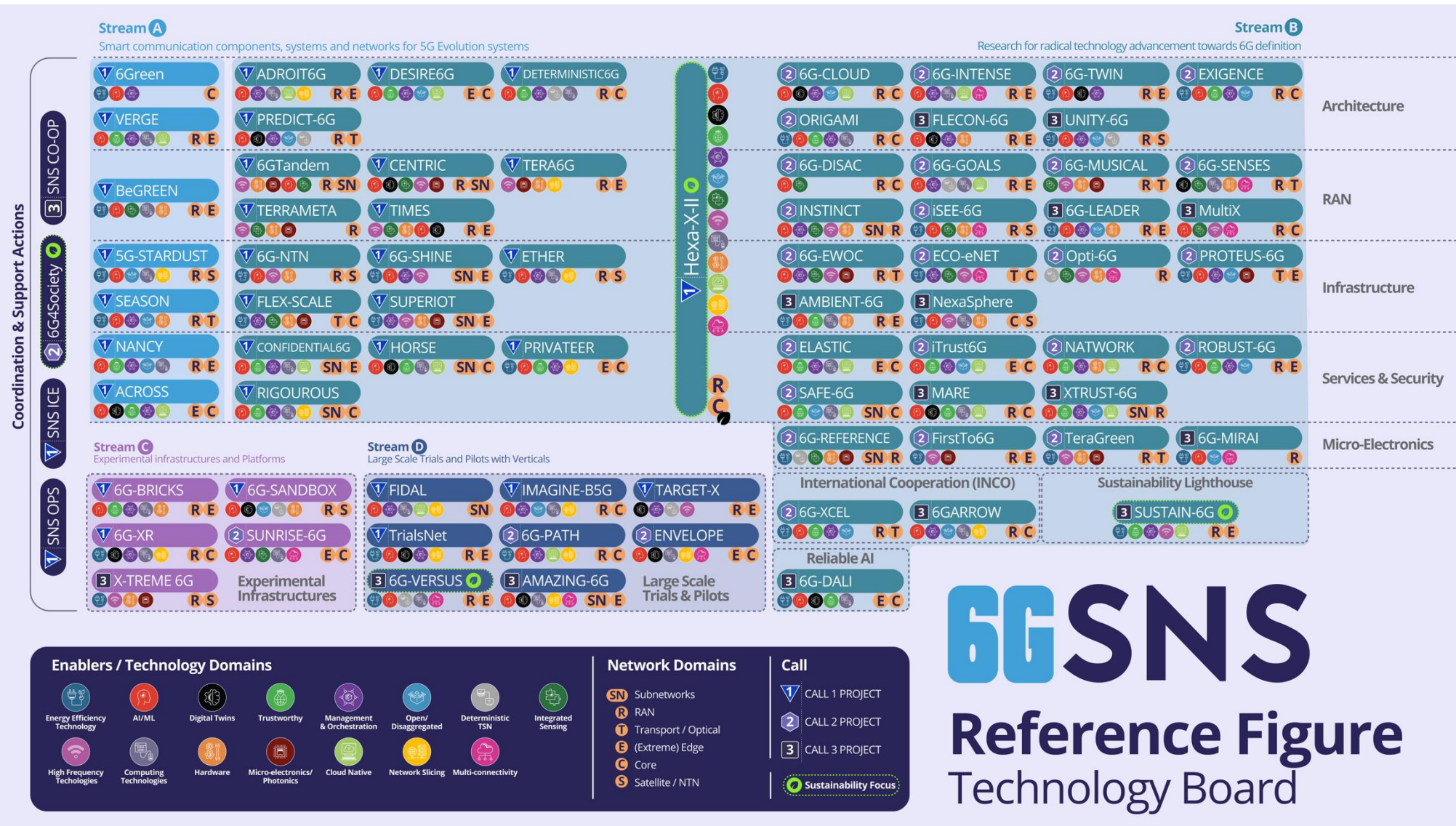


26% SME participants, claiming 24% of EU funding



33 participating countries

The SNS JU so far....



Key outcomes of SNS JU Program



European 6G Usecase Families

IMMERSIVE EXPERIENCE

Immersive Experience use cases are based on an evolving XR technology.

Immersive Experience is all about meeting the fundamental human need of "experiencing" a now digitally extended or virtual environment to understand and to act.

Use Cases

Seamless Immersive Reality | Immersive Enterprise & Industry | Immersive Education | Immersive Content Creation

COLLABORATIVE ROBOTS

The network's main users are machines.

Emphasis lies on task-specific local connectivity. Depending on the task or needs, the network topology may undergo frequent changes. The level of machine autonomy determines the communication requirements.

Use Cases

Cooperating Mobile Robots | Autonomous Embodied Agents with Flexible Manufacturing | Mesh Embodied Intelligence

PHYSICAL AWARENESS

Physical Awareness use cases build on beyond-communication capabilities in networks: sensing, positioning, compute, and AI. By gathering 3D data about physical scenarios and situations, efficiency and safety can be improved.

Use Cases

Network Assisted Environment

TRUSTED ENVIRONMENTS

Comprehends use cases in local environments (streets, hospitals, schools, retirement homes) delivering human-centric services and promoting health, well-being, safety, inclusion, and autonomy in daily life.

These are based on sensing technologies as well as AI/ML and compute support to create spatial and situation awareness and enable context-driven interventions.

Use Cases

Human-Centric Networks | Industrial Sensors Network for Safe Production & Manufacturing | Wireless In-Vehicle Network

DIGITAL TWINS

Digital Twins is a set of use cases where digital equivalents of the real world are created and displayed for interaction, control, maintenance, as well as process and component management.

Use Cases

Realtime Digital Twins | Cloud Continuum | Smart Maintenance | Digital Twins (Building Management) | PPDR Digital Twin

FULLY CONNECTED WORLD

Ensuring connectivity everywhere, expanding beyond purely traditional terrestrial networks to deliver the benefits of communications to everybody.

Besides expanding coverage cost-effectively, it also enables network function availability for crisis management, earth monitoring, digital health services, virtualisation of device functionalities, or support of autonomous supply chains.

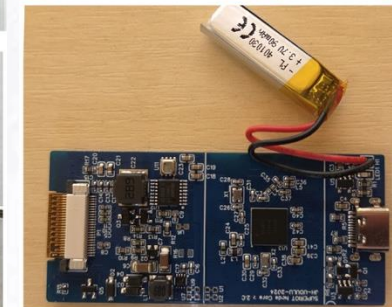
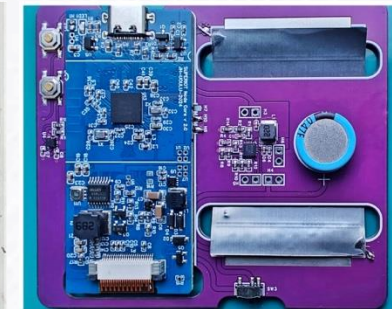
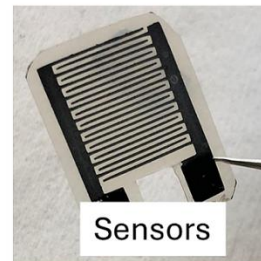
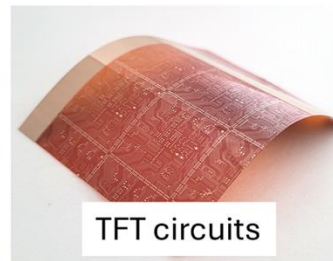
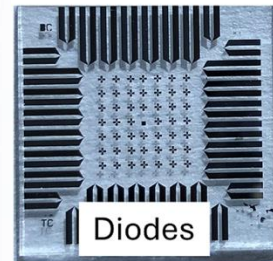
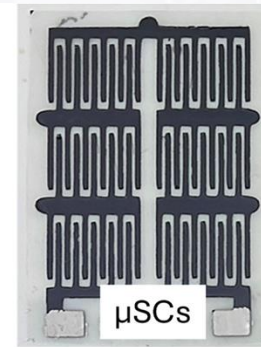
Use Cases

Ubiquitous and Resilient Networks | Digital Sobriety and Enhanced Awareness | Earth Monitor & Sustainable Food Production | Autonomous Supply Chain | Virtualization of Device Functionalities | Resilient Communication for Safety Critical Applications

Scalable electronic components via printed and thin-film deposition for sustainable IoT sensor nodes

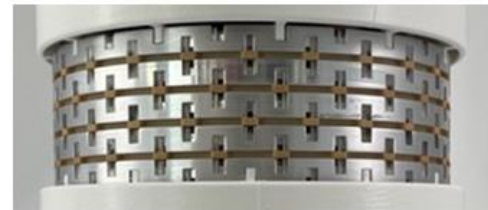
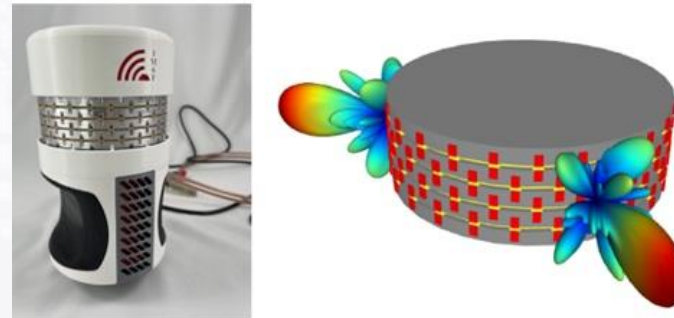
SUPERIOT

- Material-conserving and scalable printing and thin film deposition techniques
- Improved sustainability based on novel materials and fabrication processes
- Components enabling light sensing with resistive sensors
- Thin Film Transistors (TFTs)
- Energy harvesting with organic photovoltaics (OPV)
- Energy storage with micro supercapacitors (μ SC)

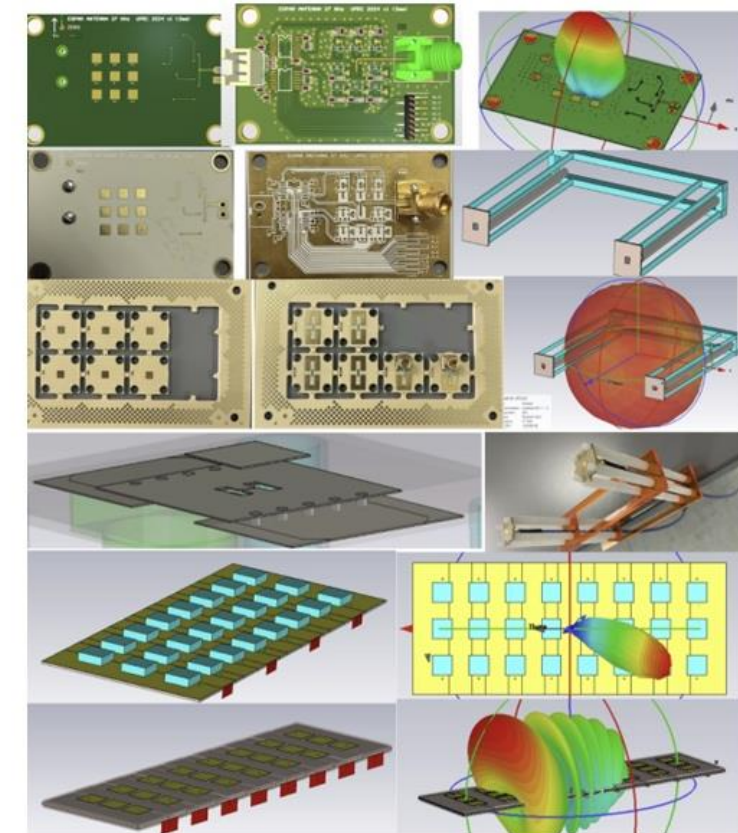
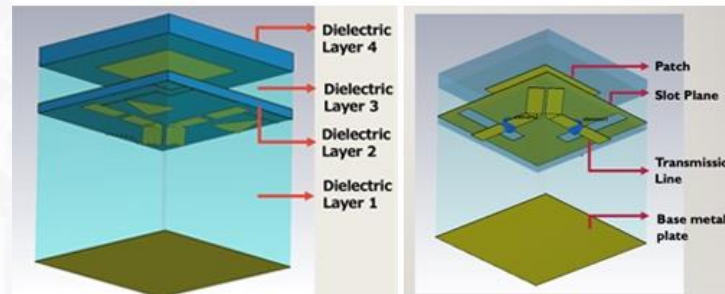


iSEE-6G

- Design & Fabrication of Tx/Rx cylindrical RIS Antenna
 - FR2 frequencies (24-30GHz)
 - Dual polarization with 24 beamformer
 - 2×96 elements
 - 48 patterns (7° beamwidth, 21dBi gain)
- Enabling real on-the-field testing of various RIS scenarios
- Tailored for UAV applications



Cylindrical array with 48 directional patterns

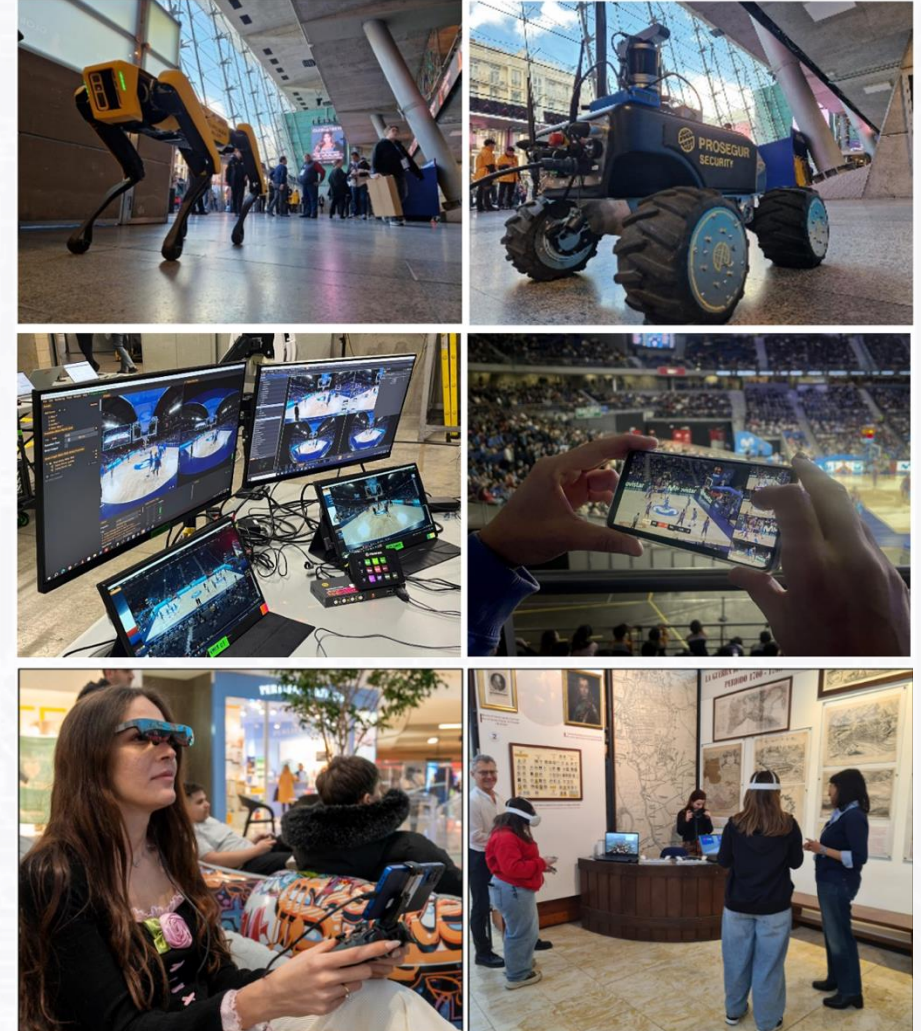


Semi-spherical patch and parasitic antenna designs

Vertical Trials during live events

Trials Net

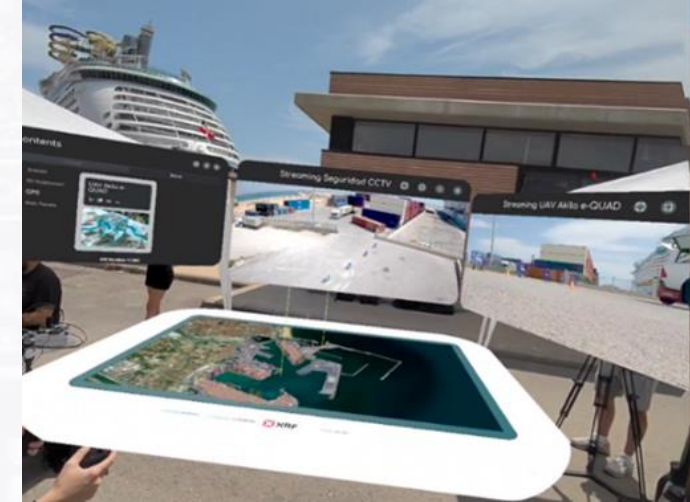
- Showcasing B5G capabilities to live audiences in actual vertical environments (more than 1000 real users)
- Technologies
 - AI event detection
 - mmW Tx-Rx
- Use Cases
 - Smart Crowd Monitoring
 - Immersive Fan Engagement (XR/AR)
 - Extended XR Museum Experience
- Locations
 - Movistar Arena (Madrid) – during Real Madrid match
 - 4 museums in Turin (IT)



Vertical Trials with live Port operations

Imagine B5G

- Trials in real port operational environment
- 5 Vertical companies participated in the Trials with real solutions
- Technologies
 - AI event detection
 - mmW Tx-Rx
- Use Cases
 - Remote maintenance,
 - Emergency response,
 - Multi-vehicle coordination using unmanned aerial/surface/ground vehicles (UAVs, USVs and UGVs)
 - XR tools
- Location
 - Port of Valencia (ES)





Thanks for your attention!

Dr. Colin Willcock

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Vice-Chairman of the Board Smart Networks and Services Joint Undertaking (SNS-JU)
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