

# **27th IEEE Symposium on Wireless Personal Multimedia Communication (WPMC) 2024**

**Panel 1: Looking forward towards 6G - Research Opportunities, Challenges and Industry expectations”**

# 6G Smart Networks and Services Industry Association (6G-IA)

- Voice of European Industry and Research for next generation networks and services.
- Contribute to Europe's leadership on 5G, 5G evolution and SNS/6G research.
- Represents private side in both [5G-PPP](#) and [SNS JU](#)
- Brings together a global industry community of telecoms & digital actors, such as operators, manufacturers, research institutes, universities, verticals, SMEs and ICT associations.
- Strategic areas including standardization, frequency spectrum, R&D projects, technology skills, collaboration with key vertical industry sectors, notably for the development of trials, and international cooperation.
- The initiative builds on an EU contribution of €900 million b/w 2021-2027 to be matched by the private sector with the same amount.

# European 6G research

Implementation of 1 flagship system project with 10 - 6G exploratory projects under 5G PPP as a bridging phase into SNS partnership: [5G-PPP Smart Connectivity beyond 5G](#)



[Hexa-X](#) : Vision and system- New Radio Access Technologies, THz high-resolution localization and sensing; AI applicability, 6G architectural enablers;



[RISE 6G](#): Reconfigurable Intelligent Surfaces (RIS) technology for radio wave propagation control, to achieve dynamically programmable wireless environments



[REINDEER](#): large-scale intelligent surfaces and cell-free wireless access, distributed radio, computing storage



[6G BRAINS](#): AI based resource allocation in dense IoT environments



[DEDICAT 6G](#): Function placement AI/BC based for ultra low latency and security



[AI@EDGE](#): secure and automated roll-out of large-scale edge and cloud compute infrastructures



[DAEMON](#) : optimized radio/computation , energy reduction, high reliability >5X9



[MARSAL](#): Machine learning-based, networking and computing infrastructure resource management of 5G and beyond intelligent networks



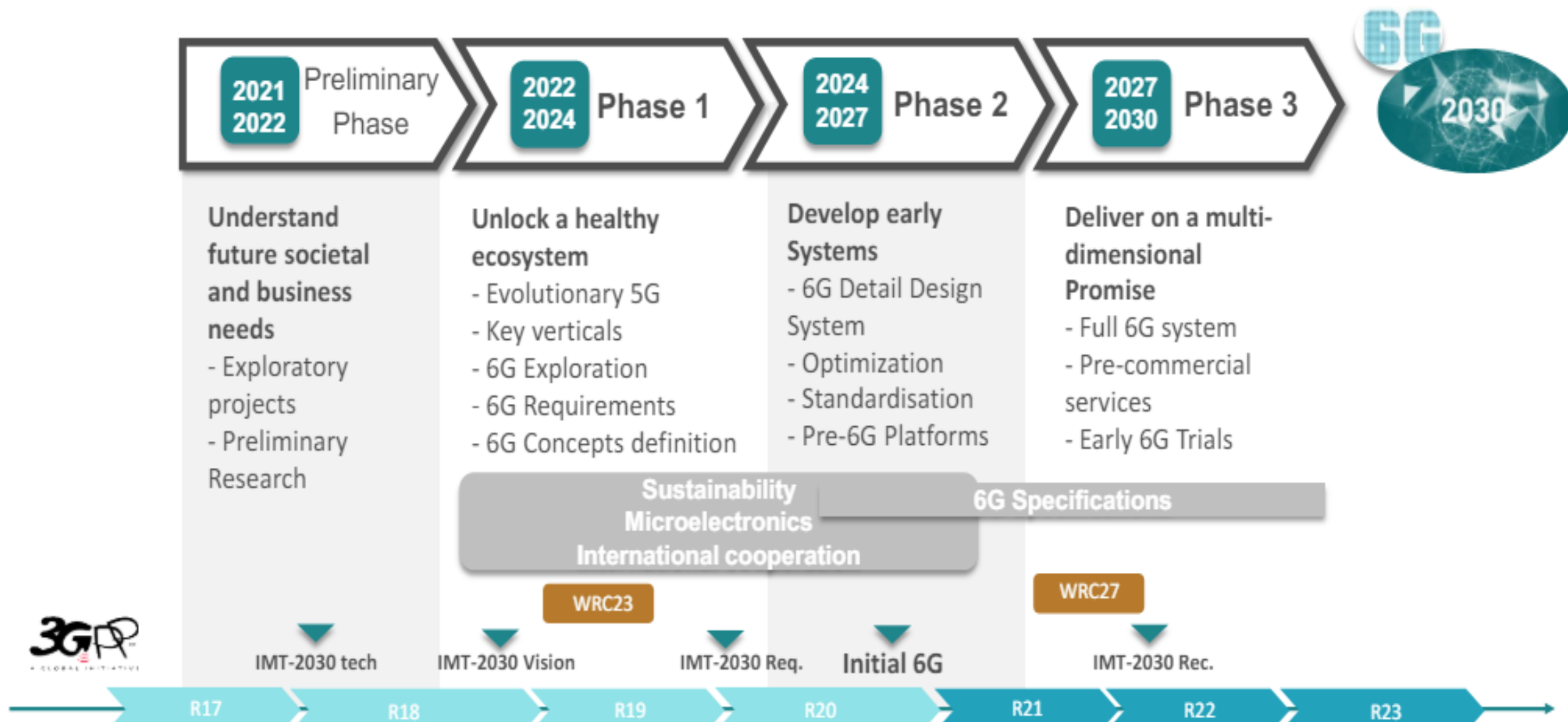
[TeraFlow](#): Autonomous Networks Beyond 5G, Automotive, and Cybersecurity through Unification of Network and Cloud Resource Management; ML-based security; and Distributed Ledger Technologies



[B5G-OPEN](#): design, prototyping and demonstration of a novel end-to-end integrated packet-optical transport architecture based on MultiBand (MB) optical transmission and switching networks

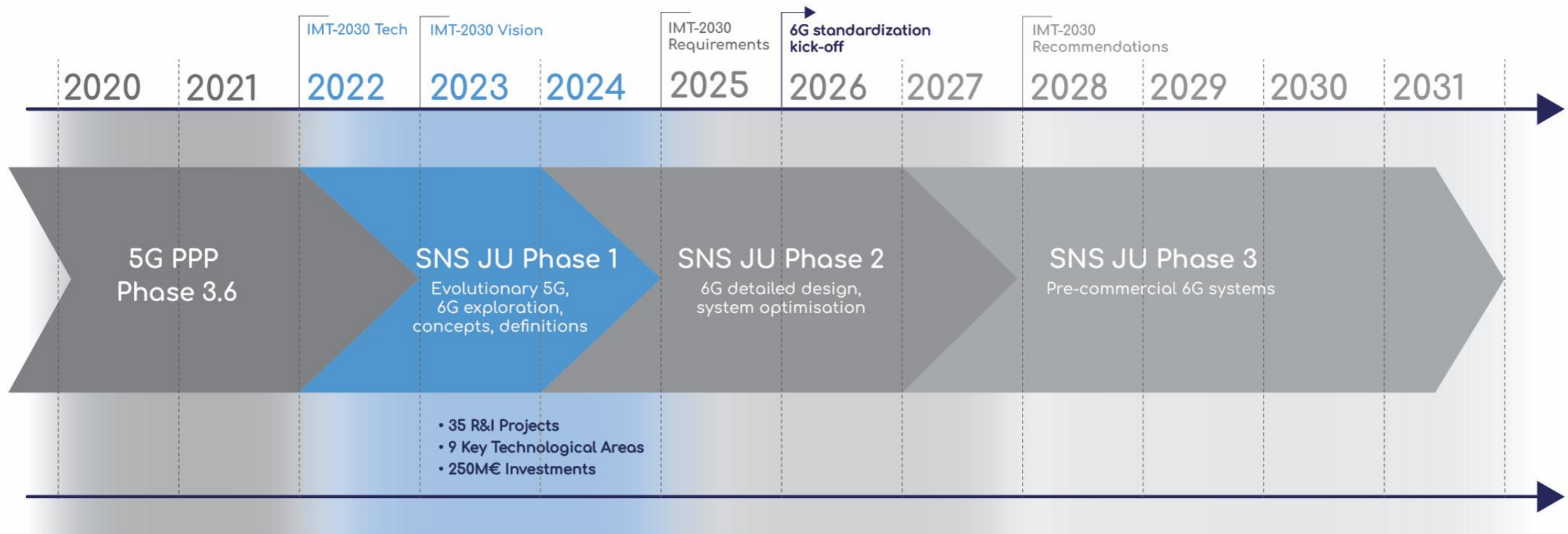
**A majority of these projects started in January 2021 and will run for three years.**

# SNS JU Roadmap



# 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> phases of 5G / 6G research projects: SNS JU (Horizon Europe : Calls 1, 2 & 3 - 78 Projects, EUR 510M

- At the beginning of 2023, [Smart Networks and Services Joint Undertaking \(SNS JU\)](#) launched 1<sup>st</sup> phase of 5G / 6G research projects, many of which will play a crucial role in the definition of next generation networks.
- In 2<sup>nd</sup> phase, 27 new research, innovation, and trial projects have commenced operations on 1<sup>st</sup> January 2024 and added themselves to running projects.
- Recently , 16 new 6G research projects were launched in 3<sup>rd</sup> phase



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## SNS JU Phase-1 (35 projects divided into 4 streams and a support actions one)

- **Stream A: Smart communication components, systems and networks for 5G mid-term Evolution systems**
  - 7 projects ([5G STARDUST](#), [6Green](#), [ACROSS](#), [BeGREEN](#), [NANCY](#), [SEASON](#), [VERGE](#))
- **Stream B: Research for revolutionary technology advancement towards 6G**
  - 19 retained projects ([6G-NTN](#), [6G-SHINE](#), [6GTandem](#), [ADROIT6G](#), [CENTRIC](#), [CONFIDENTIAL6G](#), [DETERMINISTIC6G](#), [DESIRE6G](#), [ETHER](#), [6G-FLEX-SCALE](#), [Hexa-X-II](#), [HORSE](#), [6G-PREDICT-6G](#), [PRIVATEER](#), [RIGOUROUS](#), [SUPERIOT](#), [TERA6G](#), [TERRAMETA](#), [TIMES](#)) include, inter alia, novel 6G system architectures, advanced wireless and optical communication technologies, advances in Non Terrestrial Networks, secure development of ultra-reliable, and low-latency communications (URLLC) applications.
- **Stream C: SNS experimental infrastructures**
  - 3 projects ([6G-BRICKS](#), [6G-SANDBOX](#), [6G-XR](#)) aim at developing EU-wide experimentation platforms that can incorporate promising technical 6G enablers for their further validation.
- **Stream D: Large-Scale SNS Trials and Pilots**
  - 4 projects ([FIDAL](#), [IMAGINE-B5G](#), [TARGET-X](#), [TrialsNet](#)) are implementing large-scale SNS trials and pilots with specific verticals of high economic and societal importance.

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## 6G Research Projects launched during 2<sup>nd</sup> phase (27 projects)

- **WIRELESS COMMUNICATION TECHNOLOGIES AND SIGNAL PROCESSING**
  - [6G REFERENCE](#), [6G-CLOUD](#), [6G-DISAC](#), [6G-EWOC](#), [6G-GOALS](#), [6G-INTENSE](#), [6G-MUSICAL](#), [6G-SENSES](#), [6G-TWIN](#), [6G-XCEL](#), [ECO-NET](#), [ELASTIC](#), [EXIGENCE](#), [FirstTo6G](#), [INSTINCT](#), [ISEE-6G](#), [ITrust6G](#), [NETWORK](#), [OPTI-6G](#), [ORIGAMI](#), [PROTEUS-6G](#), [ROBUST-6G](#), [SAFE-6G](#), [TeraGreen](#).
- **COMPLEMENTARY SNS EXPERIMENTAL PAN-EU FEDERATED INFRASTRUCTURE (RIA)**
  - [SUNRISE-6G](#)
- **SNS LARGE-SCALE TRIALS AND PILOTS (LST&PS) WITH VERTICALS–FOCUSED TOPIC**
  - [6G-PATH](#) and [ENVELOPE](#)

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- Recently, SNS JU announced a significant boost in EU funding for 6G research, accumulating over €500 million to accelerate next-gen telecom technologies.
  - [16 new projects in the 3<sup>rd</sup> call:](#)
    - **FLECON-6G:** Brings the “Intelligent 6G Network of Networks” vision to life delivering a flexible, secure and Open 6G Architecture.
    - **UNITY-6G:** Focuses on creating a highly sustainable and scalable **AI-native architecture** to support the diverse requirements of **6G networks**.
    - **6G-LEADER:** Is advancing the **physical and Radio Access Network aspects** of 6G such as **machine learning-empowered algorithms and disaggregated RAN implementation**.
    - **Multi-X:** Develops a **fusion 6G-RAN system** that will pioneer multi-sensor and multi-technology paradigms for sensing applications.
    - **AMBIENT-6G:** Introduces **energy-neutral devices** (ENDs) powered by ambient energy harvesting, aiming to achieve decades-long autonomy for IoT ecosystems.
    - **NexaSphere:** Conceptualises a sustainable **multi-connected 3D network**, integrating **radio and wireless-optical technologies** for sectors like **aeronautics** and **automotive**.
    - **MARE:** Will contribute a novel **6G security plane** offering transparent, multi-domain security and privacy provisioning.
    - **XTRUST-6G:** Will establish a robust **zero-trust security framework**, focusing on resilient, AI-driven and quantum-safe network and services.
    - **6G MIRAI:** Develops reliable AI-native wireless systems, leveraging **cell-free massive MIMO** and next-gen **virtualized RAN** for seamless communication.
    - **6G ARROW:** Focuses on leveraging **AI** in radio access networks, enhancing network efficiency and seamless device integration.
    - **SUSTAIN-6G (Sustainability Lighthouse):** Develops a holistic **sustainability framework** that addresses environmental, societal, and economic aspects of 6G and for key vertical sectors. It will be applied in an end-to-end manner, considering the full lifecycle of assets.
    - **6G-DALI:** Will deliver an **end-to-end AI framework** for 6G, integrating **AI experimentation as a service, data analytics and storage**.
    - **X-TREME 6G (Microelectronics Lighthouse):** Designs cutting-edge chipsets for 6G, including applications like **wireless back-hauling** and **joint communication and sensing**.
    - **6G-VERSUS:** Focuses on integrating **sustainable technologies** across five environmentally conscious industries, using innovative 6G platforms to optimise data and decision-making processes.
    - **AMAZING-6G:** Aims to showcase 14 use cases in the domains of **Healthcare, Public Safety, Energy and Transport** (including Rail) implementing large-scale trials and pilots across Europe. Innovative technology enablers are planned to be developed and tested in the areas of Communications, Compute-as-a-Service, Applications and AI, IoT and localization.
    - **SNS CO-OP:** Supports the overall activities of SNS JU, ensuring long-term continuity and coordination for 6G research and innovation efforts across Europe.
- These projects demonstrate **Europe’s commitment to research and innovation**, focusing on strategic areas such as **microelectronics, sustainability, AI integration, and cybersecurity**.



# Conclusion

- Early 6G expected “around 2030” alongside an evolved 5G.
  - Now is the time to share 6G visions, research and standards roadmaps.
- ETSI has an important role to play in linking the research and pre-standards in order to feed the global 6G standards activities in 3GPP