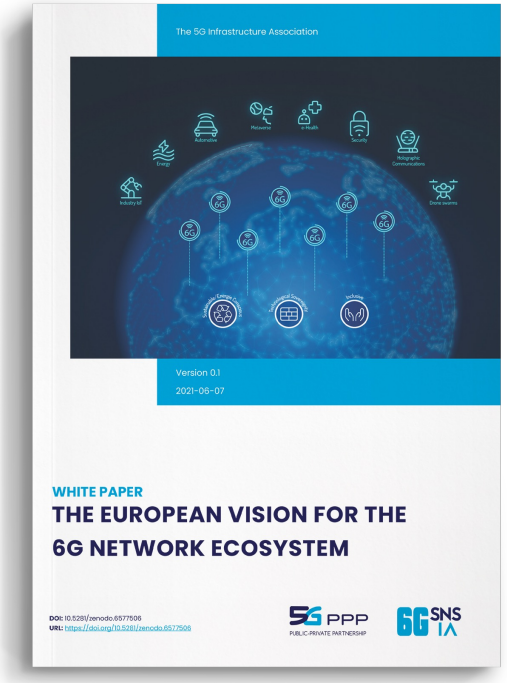
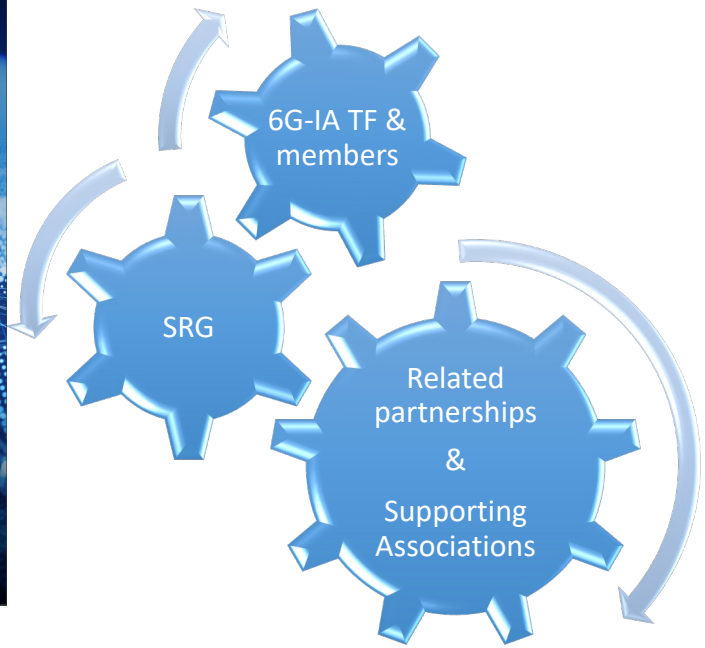
Smart Networks and Services R&I Work Programme 2023

Alexandros Kaloxylos, Executive Director, 6G-IA

Preparing the SNS WP 2023 – (2024)





ANNEX II TO DECISION No 03/2022 OF THE GOVERNING BOARD OF SMART NETWORKS AND SERVICES JOINT UNDERTAKING

ANNEX II to the 2023 SNS Work Programme 2023
SNS R&I Work Programme for 2023-2024

Collaboration

Stream B – Research for Revolutionary 6G Technologies and Systems

Challenges and objectives

- Reinforced European leadership in key 6G technologies (e.g., AI/ML, software and security, signal processing, micro-electronics, …)
- Disruptive & high value applications support (e.g., highly immersive and digital twinning apps)
- Support for Sustainable Development goals (e.g., energy savings, coverage, cost, accessibility, privacy,…)
- Innovative business models through flexible architectures going beyond SBA
- Global single standards (globally accepted KPIs and KVIs, interfaces, …)

Stream B – Research for Revolutionary 6G Technologies and Systems

Challenges and objectives

- Zero-touch, open and efficient solutions targeting drastic OPEX reduction
- Globally connected continuum (IoT, devices, HW and SW solutions, terrestrial and NTN)
- Dynamic end-to-end distributed security for connectivity, devices and service infrastructures
- Managed spectrum and dynamic spectrum sharing across multiple frequency bands
- Stimulation of international collaboration

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TRL 2-5: Complementary to Call1 but also new topics

Stream B – Research for Revolutionary 6G Technologies and Systems

Points for consideration

- Microelectronic components for future 6G platforms: a) support the collaborative framework with KDT JU and b) ensure the participation of the EU microelectronics industry in upcoming standardization
- Cloud and edge cloud technologies and software implementation of network/device are to be addressed with a clear strategy for EU supply capabilities and opportunities, including for security solutions, in the context of a future cloud continuum that may involve interoperation with non-EU systems such as the hyperscalers
- Sustainability is an important element of this second Work Programme
- Stream B activities are expected to demonstrate strong capabilities towards valorization of results in relevant 6G standardization bodies

HORIZON-JU-SNS-2023-STREAM-B-01-01: System Architecture

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates an EU contribution of around EUR 4 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 20 million
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 2-4 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-B-01-01: System Architecture

Expected outcome:

- Support extreme 6G use cases (e.g., using native AI)
- Higher flexibility and lower energy consumption
- Inter-computing and inter-networking solutions with different policies (security, routing,…), across various domains including 3D networks.
- Supporting multiple and sometimes conflicting application requirements
- Programmable connectivity spanning all resources a tenant is authorized to control
- Further optimizations for cellular, optical, and NTN communications as well as computing environments
- Architectures able to support new business models
- Impact to early architectural standardization work, for example under 3GPP SA TSG

HORIZON-JU-SNS-2023-STREAM-B-01-02: Wireless Communication Technologies and Signal Processing

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates an EU contribution of around EUR 4 million, would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 24 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 2-4 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-B-01-02: Wireless Communication Technologies and Signal Processing

Expected outcome:

- Wireless technologies and systems capable to meet expected 6G radio capabilities across a range of frequency bands mostly focusing on up to millimetre wave solutions.
- Innovative RAN solutions supporting multi-band operation, wireless caching, and integrated communication sensing techniques.
- Technologies enabling support of new higher efficiency mobile communication approaches, such as cell free networking, massive MIMO or Large Intelligent Surfaces, etc.
- Applicability and validation of innovative AI/ML based architectures to control adaptive L1/L2 functions with optimized feedback control and operations.
- Solutions to optimize sustainability issues, including energy efficiency visual acceptability and minimization of urban visual pollution.

HORIZON-JU-SNS-2023-STREAM-B-01-03: Communication Infrastructure Technologies and Devices

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates an EU contribution of around EUR 4 million, would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 2-4 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-B-01-03: Communication Infrastructure Technologies and Devices

Expected outcome:

- New access networks, focused on different set of devices, expanding the reach of 6G and reducing its environmental impact (expand network coverage to 3D coverage scenarios, with troposphere networks, UAVs, etc.).
- Availability of solutions enabling the “network of network” approach with capability to support ultra-short distance connectivity scenarios, based on nano things networking, and applicability to specific domains like health care or automotive.
- Ultra-low energy solutions for devices, including battery free device capabilities.
- Ultra-low energy and ultra-high capacity solutions for access or end to end connectivity based on optical technologies and their integration within a wireless-optical connectivity continuum.

HORIZON-JU-SNS-2023-STREAM-B-01-04: Reliable Services and Smart Security

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates an EU contribution of around EUR 4 million, would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 2-4 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-B-01-04: Reliable Services and Smart Security

Expected outcome:

- Support trustworthiness, resilience, openness, transparency, and dependability expected under the EU regulations (such as GDPR and Cyber Security Act, ….)
- Ensure secure, privacy preserving and trustworthy services in the context of a programmable platform accessed by multi-stakeholders
- Secure host-neutral infrastructure where multiple infrastructure providers are involved in the deployment, hosting and orchestration of the network service.
- Identification of the life cycle of smart services security and trust requirements
- AI technology applied to security and service deployment
- Operational security: End-to-End, system wide Security policies composition and management among multiple stakeholders

HORIZON-JU-SNS-2023-STREAM-B-01-05: Microelectronics-based Solutions for 6G Networks

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.0 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 15 million.
Type of Action	Research and Innovation Action
Technology Readiness Level	Activities are expected to achieve TRL 2-4 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-B-01-05: Microelectronics-based Solutions for 6G Networks

Expected outcome:

- Increased the capabilities of European microelectronics industry to provide solutions for communication networks
- Solutions from baseband and mixed-signal processing to RF and Antenna system and considering new spectrum that may be needed for 6G.
- Validated hardware solutions that may be used, especially from a physical layer radio perspective, in the context of the 6G standardization
- Open solutions that may support further innovation from the end devices to core 6G network components.
- Availability of solutions that will offer significant energy reduction for 6G communication systems.
- Solutions to be further leveraged under the KDT JU

HORIZON-JU-SNS-2023-STREAM-B-01-05: Microelectronics-based Solutions for 6G Networks

	Targeted KDT Focused Topic	SNS-2023-STREAM-B-01-05 (RIA)
Expected TRL at end of project	5 to 6 (ready to be integrated in a system-level prototype)	2 to 4
Frequency ranges	100 GHz and above (sub-THz and THz range)	From sub-6GHz up to THz
Transmission chain coverage	Radio front-end (from baseband interface to antenna)	From baseband and mixed-signal processing to RF and Antenna system

HORIZON-JU-SNS-2023-STREAM-B-01-06: EU-US 6G R&I Cooperation

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 3.0 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 3 million.
Type of Action	Research and Innovation Action
Technology Readiness Level	Activities are expected to achieve TRL 2-5 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-B-01-06: EU-US 6G R&I Cooperation

Expected outcome:

- Explore AI for 6G, towards global validation, adoption and standardisation, notably in the context of 6G KPIs.
- A widely accepted framework for meaningful evaluation of proposed AI/ML-powered solutions for 6G networks.
- Technology validation in platforms where appropriate.
- Joint progress towards AI large scale applicability in 6G networks and standardisation opportunities supported by availability of common data sets and learning sequences provided in an open manner.

HORIZON-JU-SNS-2023-STREAM-C-01-01: Complementary SNS experimental Pan-EU federated Infrastructure (RIA)

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 14 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 14 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 4-6 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-C-01-01: Complementary SNS experimental Pan-EU federated Infrastructure (RIA)

Expected outcome:

- Complementary to the first SNS call and additionally,
- European federated open platforms for advanced 6G wireless systems testing and integration within Europe with capability extension towards other national testbeds (e.g,. US)
- Support where possible the development of synergies with 6G platforms developed in EU Member States (MSs) or Associated countries
- Support integration of key 6G related KDT developments, though integration of wireless/processing advanced components within the platform

HORIZON-JU-SNS-2023-STREAM-D-01-01: SNS Large Scale Trials and Pilots (LST&Ps) with Verticals – Focused Topic

Specific conditions (see complementary conditions in Appendix 1 to this WP)	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 10-14 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 27 million.
Type of Action	Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 5-7 by the end of the project – see General Annex B.
Funding rate	100% non-for-profit organizations, 70% for profit organizations
Legal and financial set-up of the Grant Agreements	Financial Support to Third Parties (FSTP) is allowed up to 20% of the proposal budget. See details in appendix 1 section 1.9.

HORIZON-JU-SNS-2023-STREAM-D-01-01: SNS Large Scale Trials and Pilots (LST&Ps) with Verticals – Focused Topic

Expected outcome:

- Similar to the first SNS call
- **Scope**:
- **UseCasePriority1 –** Connected and automated mobility(CAM) vertical and intelligent terrestrial transportation.
- **Use Case Priority 2** included the following verticals : Health, Smart Cities, Farming, or Education (to be considered independently or in combination).
- Note: *To ensure a balanced portfolio covering both aforementioned Priorities grants will be awarded to proposals not only in order of ranking but at least also to one project that is the highest ranked within each of the two Priorities provided that the proposals attain all thresholds.*

HORIZON-JU-SNS-2023-STREAM-CSA-01: SNS Societal Challenges

Specific conditions	
Expected EU contribution per project	The Commission estimates an EU contribution of around EUR 1 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 1 million.
Type of action	Coordination and Support Action
Funding rate	100% non-for-profit organizations, 90% for profit organizations

HORIZON-JU-SNS-2023-STREAM-CSA-01: SNS Societal Challenges

Expected outcome:

- Summary of the positions of stakeholders on the impact of next generation (6G) technologies on the society and the expected improvements on citizens' everyday life.
- Technology acceptance model or roadmap building on outputs of relevant projects.
- Explanatory material (for non-experts)
- General public information events and publications in non-specialized media, studies, citizen/end-user panels, open public debates with experts
- Development of sustainability indicators, building on the Key Value Indicators (KVIs)
- Advice for projects and other stakeholders on how to reflect EU policy objectives as well as existing and future EU legislation

Backup slides

HORIZON-JU-SNS-2023-STREAM-B-01-01: System Architecture

Scope:

- AI powered edge cloud continuum
- Technologies for efficient Network and Service Resource Management in dynamic multi-tenant environments
- Energy efficient enablers
- Pervasive resilient autonomic resource control in virtualized systems
- Integrated and dependable sensing and actuation networks
- Digital network twinning applied in 6G
- New Communication Paradigms with enhanced intelligence

HORIZON-JU-SNS-2023-STREAM-B-01-02: Wireless Communication Technologies and Signal Processing

Scope:

- New physical layer technologies up to millimeter wave
- Extreme exploitation of MIMO technologies up to millimeter wave range
- Human-friendly Radio systems
- Spectrum Re-farming and Reutilisation
- Seamless integration of multiple frequency bands
- Optimal usage of wireless edge caching
- Novel techniques for integrated sensing and communication

HORIZON-JU-SNS-2023-STREAM-B-01-03: Communication Infrastructure Technologies and Devices

Scope:

- Troposphere Networking
- Integration of Optical and Wireless Technologies
- Development of low-energy communication solutions
- Packet optical technologies for 6G radio networks

HORIZON-JU-SNS-2023-STREAM-B-01-04: Reliable Services and Smart Security

Scope:

- Service deployment for complex services
- Cooperative holistic E2E security for 6G architectures
- Zero-touch integrated security deployment
- Exploitation of (distributed) AI/ML for 6G Infrastructures
- Developments on service technologies for secure time-sensitive and computation intensive applications
- Physical layer security
- Human Centric methods