SNS R&I Work Programme 2024- Technical Content

SNS JU Information Day 2024

Dr. Alexandros Kaloxylos Executive Director, 6G-IA

SNS R&I Work Programme 2024
Top level priorities

1. Stream B: Continuity from 2022 and 2023
2. Stream B: Target higher TRL, PoC, Impact in Standardization
3. Sustainability Lighthouse in Stream B and main expected outcome in Stream D
4. Microelectronics Lighthouse
5. Reliable AI for 6G
6. International Collaboration (Japan, ROK)
7. Synergy with EU Rail

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Stream B (6G Technological advancements)

System Architecture
(2 projects)

select one or more of these issues

- **New design approaches for 6G system architecture systems**
- **Native and trustworthy integration of AI for telecommunications**
- **Network exposure to vertical application developers**
- **New Data Transfer Paradigms**
- **Digital network twinning for 6G**

Start at TRL 2-3 and to reach TRL 4 by the end of the project, and if/where relevant up to maximum TRL 5 (mature 6G technologies and solutions for verticals). Parts of the project may only target TRL 3 by the end of the project

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Stream B (6G Technological advancements)

Wireless Communication and Signal Processing
(2 projects)

select one or more of these issues

- **Novel techniques for integrated sensing and communication**
- **Machine learning empowered physical layer evolutions**
- **Cell-free and extreme exploitation of MIMO technologies potentially including reconfigurable surfaces**
- **Key functionalities and technologies for 6G RAN system design**
- **Seamless integration of multiple frequency bands**

Start at TRL 2-3 and to reach TRL 4 by the end of the project, and if/where relevant up to maximum TRL 5 (mature 6G technologies and solutions for verticals). Parts of the project may only target TRL 3 by the end of the project

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Stream B (6G Technological advancements)

Communication Infrastructure Technologies and Devices (2 projects)

select one or more of these issues

- **Ultra-high energy efficiency especially in optical networks**
- **3D networking for 6G networks**
- **Development of low-energy communication solutions**
- **New IoT components and devices**
- **Unified NTN service provision**
- **Integration of Optical and Wireless Technologies**

Start at TRL 2-3 and to reach TRL 4 by the end of the project, and if/where relevant up to maximum TRL 5 (mature 6G technologies and solutions for verticals). Parts of the project may only target TRL 3 by the end of the project

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Stream B (6G Technological advancements)

Reliable Services and Smart Security
(2 projects)

select one or more of these issues

- **Exploitation of (distributed) trusted AI/ML for 6G infrastructures**
- **Cooperative holistic E2E security and privacy for 6G architectures**
- **Smart and trustworthy service frameworks**
- **Efficient security and privacy enablers**
- **Zero-touch integrated security deployment**
- **Integration of secured 6G communications via Quantum key distribution and post-quantum cryptography support**
- **Timing sensitive & responsive SW/HW techs for distributed, multi-stakeholder multi-system service provision.**

Start at TRL 2-3 and to reach TRL 4 by the end of the project, and if/where relevant up to maximum TRL 5 (mature 6G technologies and solutions for verticals). Parts of the project may only target TRL 3 by the end of the project

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Stream B (6G Technological advancements)

International Collaboration EU-JP
(1 project)

- AI-enabled radio access network (RAN) solutions including physical layer and signal processing technologies for 6G RAN such as distributed MIMO and user centric network, RIS implementations and AI-enabled integrated RAN/Core network functions
- Streamlined views on a) the use of AI and b) potential extensions on the radio interface
- Impactful contributions to standardization bodies are also in scope of this project

Applicants are invited to explain how EU-JP cooperation will be implemented

Activities are expected to achieve TRL 2-4 by the end of the project

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Stream B (6G Technological advancements)

International Collaboration EU-ROK
(1 project)

- Algorithms for 6G RAN that improve transmission performance and reduce complexity in wireless transmission
- Procedures and protocols empowered by AI that improve efficiencies of the wireless communications through mobility management, wireless resource management, automated maintenance, and self-optimization of network parameters
- Streamlining of the use of AI, interfaces and mechanisms that are expected to be developed by mirror R&I activities in ROK where the focus could be on the devices' side

Applicants are invited to explain how EU-ROK cooperation will be implemented

Activities are expected to achieve TRL 2-4 by the end of the project

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Stream B (6G Technological advancements)

Sustainability Lighthouse
(1 project)

- "Sustainable 6G" and "6G for Sustainability"
- Environmental Sustainability
- Societal Sustainability
- Economic Sustainability
- Reference sustainability scenarios and benchmarks
- Characterisation of sustainability KPI and KVI's, in view of their potential use at standardization level
- Validation of critical technologies for the sustainability solutions in experimental platforms and use case pilot

Activities are expected to achieve TRL 2-5 by the end of the project

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Stream B (6G Technological advancements)

Reliable AI for 6G Communication Systems and Services (1 project)

- Development of a reference framework for end-to-end AI usage
- Development of appropriate data infrastructure and functionalities (AI as a Service to vertical industries)
- Training, assessment, conflict resolution, vulnerability assessment, reliable and trustable AI lifecycle
- Production of data sets and validation methodologies
- Potential future links to future Stream C and Stream D projects
- Harmonization/coordination with other SNS projects and national initiatives

Start at TRL 2-3 and to reach TRL 4 by the end of the project, and if/where relevant up to maximum TRL 5 (mature 6G technologies and solutions for verticals). Parts of the project may only target TRL 3 by the end of the project

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Stream C (Experimental Infrastructures)

select one or more of these issues

Microelectronics Lighthouse (1 project)

- Advanced baseband capabilities (open approaches, technologies for JCAS, HW platforms supporting virtualization, HW accelerators)
- Integration of the THz communications technology into a complete THz communication chain and demonstrator
- Address an E2E x-hauling demonstrator prototype with extended transmission reach at Sub-THz frequencies (>140GHz)
- Inclusion of microelectronics solutions in the transport domain or unified solutions with NTNs and support of the IoT-connectivity-service provision value chain

- Mainly focus on Radio Access Network computing and communication capabilities (potentially covering a wide spectrum e.g., from cmWave up to THz)
- Opportunity to create a bridge between the SNS JU and the Chips JU

Activities are expected to achieve TRL 6 by the end of the project

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Stream D (Large Scale Trials)

2 Projects – expecting results on sustainability

- Demonstration of clear benefits for stakeholders using advanced technologies
- Tangible results for environmental, societal and economic aspects
- Involvement of SMEs/scaleups/ startups is targeted in the projects
- Stream D projects should aim to take advantage from developed platforms and/or elements from the SNS Phase 1 Stream C projects, platforms developed in the context of national initiatives or any other solutions that integrate and offer preliminary 6G network solutions

Open to applicants to select from any already advanced 6G use cases that are in line with the 6G vision

Activities are expected to achieve TRL 5-7 by the end of the project

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Synergy between SNS JU and EU-RAIL

- The EU-Rail and Smart Networks and Services (SNS) Joint Undertakings, based on an identified synergy area, agreed to launch a call “HORIZON-ER-JU-2024-FA2-SNS: EU-RAIL – SNS SYNERGY: Digital & Automated testing and operational validation of the next EU rail communication system”, with a contribution of up to EUR 1 000 000 from the SNS JU budget.

- The selection criteria and the call conditions can be found in the EU-Rail JU Work Programme “Europe’s Rail Work Programme 2023-2024”.

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Coordination and Support Action

CSA- 1 project

- Support the SNS promotion and communication, international cooperation & collaboration with Member State initiatives
- Stakeholder management towards R&I orientation and SNS cross-project coordination and cooperation
- Europe wide cartography of relevant initiatives
- SNS web site and program infrastructure (web sites, mail systems, repositories, etc.).
- Working group management
- Monitoring and communication with peer JU Partnerships and Vertical Associations
- Organisation, management and support of IAFAs
- EuCNC and 6G Summit organization and support