SNS R&I Work Programme 2025- Technical Content

SNS JU Information Day 2025

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SNS R&I Work Programme 2025
Top level priorities

1. Stream B: Topics of low-TRL for forthcoming disruptive 6G technologies as well as medium/higher TRL to reinforce European leadership, further integrate with verticals and enable new business models, support sustainability targets, mobilize stakeholders
2. Stream B: target technologies with high potential for standardization, covering promising areas like TN-NTN, energy efficiency, further advances on wireless and optical communications, focusing on “golden” spectrum bands, e2e cybersecurity and reliability, new devices, telco cloud, AI/ML, etc.
3. 6G Telco Cloud and service platform, using Open-Source technologies and addressing longer-term parts of the 3C Networks orientations.
4. Large-scale trials: exploitation of results and further development from previous SNS Stream C and D projects or other EC-funded initiatives as well as National initiatives is encouraged (though not a prerequisite)

Inter-SNS Projects cooperation is a must-have

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-01: Disruptive Technologies for 6G

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

SNS-2025-01-STREAM-B-01-01: Advanced Architectures Systems and Technologies
(5 projects)

Select one or more of the areas and clearly state the center of gravity

- **New Architectural Solutions**
- **Deep learning models**
- **Real-time serverless computing**
- **Autonomous cognitive agents**
- **Goal oriented communications**

Start at TRL 1-3 and to reach TRL 3-4 by the end of the project, **The projects must not reassess technologies, which currently are at higher TRL level in the state-of-the-art, covered under different Topics on this Call. Award not only based on ranking but also on coverage (under threshold and budget conditions)**

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-01: Disruptive Technologies for 6G

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

SNS-2025-01-STREAM-B-01-02: Advanced IoT and Device Technologies (3 projects)

Select one or more of the areas and clearly state the center of gravity

- **Sensing and connectivity for close to zero energy devices**
- **Communication technologies and architectures for 6G unlicensed operations for IoT**
- **IoT applications that benefit from 6G and perform better than 5G**

Start at TRL 1-3 and to reach TRL 3-4 by the end of the project, **The projects must not reassess technologies, which currently are at higher TRL level in the state-of-the-art, covered under different Topics on this Call. Award not only based on ranking but also on coverage (under threshold and budget conditions)**

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-02

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

Wireless Communication Technologies and Signal Processing – Standardization and Follow-up/ PoCs (3 projects)

select one or more of these issues

- **Physical Layer technologies for spectral and energy efficiency (e.g., modulation, coding, FEC, multiple access, duplexing, 6G air interface, security etc.)**
- **Extreme exploitation of MIMO, advanced beamforming, hybrid analog/digital FEM, CSI acquisition strategies, cell free, reliability and mobility support, etc**
- **AI/ML and semantic communications to improve RAN efficiency, protocol learning, customizable protocols, learning trade-offs, conflict/anomaly detection and resolution, explainable and trustworthy AI**

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

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-02

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

Wireless Communication Technologies and Signal Processing – Standardization and Follow-up/ PoCs (3 projects)

select one or more of these issues

- **Spectrum sharing and RAN co-existence to enable upper midband usage for 6G**
- **Automation and disaggregation in the RAN segment (AI/ML automation, micro-orchestration of RAN functions, exposure of network)**
- **Agile use of functional accelerators at the 6G RAN/compute continuum**

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

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-03 Communication and Infrastructure Technologies and Devices – Standardization and Follow-up/PoC

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

Horizon-JU-SNS-2025-01-STREAM-B-03-01: 6G NTN-TN Unification/Integration (1 project)

select one or more of these issues

- **Management of multiple access networks through a unified CP**
- **Independent reconfiguration of the NTN part (performance, security, resilience)**
- **Dynamic routing in multi-dimensional networks**
- **Multi-orbit constellation as an evaluation framework**
- **Spectrum issues**
- **Multi-tenancy and e2e resource slicing capabilities**
- **Cover non-satellite 3D connected objects to improve positioning**

Advanced payloads and multi-satellite antennas are not in scope from R&I perspective. Satellite architectures with different levels of data processing are in scope

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

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-03 Communication and Infrastructure Technologies and Devices – Standardization and Follow-up/PoC

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

Horizon-JU-SNS-2025-01-STREAM-B-03-02: Higher speed optical access networks and e2e packet optical architecture in 6G (1 project)

select one or more of these issues

- **Higher speed and energy-efficient optical access networks and future e2e packet optical network architecture supporting**
- **Access and backhaul, potential for optical space links, where components are developed in other initiatives**
- **Integration of wireless and optical sensing**
- **AI support for network automation for resource and energy efficiency**
- **Quantum networking over fiber for trustworthiness**
- **Impact of photonic systems on energy consumption**

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

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-04 Reliable Services and Smart security– Standardization and Follow-up/PoCs

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

HORIZON-JU-SNS-2025-01-STREAM-B-04-01:
Smart Security/ Security Services (1 project)

select one or more of these issues

- Integrate security services and security attributes of 6G services (e.g., security evaluation, exposition of Security attributes, holistic composition of services in multi-provider environments, user-centric monitoring/reporting capabilities)
- user-centric security, advanced security schemes applicable to 6G APIs, intent-based security, with security policies extraction, seamless integration of Managed Security Service Providers into the 6G architecture.
- Security evaluation (e.g., continuous security assessment, Safe code, DevSecOps to running phases, development of standardized metrics to evaluate security quality, certification frameworks, secure coding practices, vulnerability management during development, secure deployment and update procedures, etc.

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

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-04 Reliable Services and Smart security– Standardization and Follow-up/PoCs

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

HORIZON-JU-SNS-2025-01-STREAM-B-04-02:
Reliable Services operation (1 project)

select one or more of these issues

- Automation and intelligence in security operations (e2e attack detection and response, resiliency, self-healing, pro-active defense, Cyber Threat intelligence Platform,…)
- Service development methodologies supporting non-trustable providers
- New instantiation methodologies for service provision (new interfaces for energy efficiency, privacy, AI-usage limitations, user selection of tailor-cut solutions)
- Interfaces, protocols and mechanisms for cooperative remediation of failures/attacks
- Multi-stakeholder service auditing mechanisms providing near real0time information of the performance

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

SNS R&I WP2025 - HORIZON-JU-SNS-2025-01-STREAM-B-04 Reliable Services and Smart security– Standardization and Follow-up/PoCs

Stream B (Research for revolutionary and evolutionary 6G Technology and systems)

HORIZON-JU-SNS-2025-01-STREAM-B-05: Microelectronic – Front-End Module (FEM) (1 project)

select one or more of these issues

- Covers FR3 (7-15 GHz) range with possible extension up to 24GHz
- Possibility to support both cellular-like (FR1) and FWA-like (FR2) scenarios
- Progress for the ITU IMT 2030 target KPIs
- Based on technologies leading to European product developments
- Enables integration of heterogeneous classes of technologies i) computing, RF, power generation)
- Leverages European strongholds and is compatible with downstream transfer to Chip JU Pilot lines
- Address packaging
- Covers frequency sharing and co-existence with incumbent services (notable satellite at FR3)
- Enables integration of secure sensing and ISAC use cases

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

Stream C – SNS experimental Infrastructures

Stream C (Experimental Infrastructures)

HORIZON-JU-SNS-2025-01-STREAM-C-01: 6G Telco Cloud and Service Provision Enablers (1 project)

select one or more of these issues

- Service platforms and telco edge cloud leveraging and influencing open source developments
- Telco cloud solutions supporting 6G features and KPIs with clear objectives on standardization and market adoption
- Telco cloud continuum including 6G RAN capabilities (Hexa-X-II model)
- Demonstrate the applicability of telco cloud for 6G use cases, while contributing to sustainability targets

- Find synergies with ongoing related initiatives.
- Plan how to share your results for future phases
- Ensure maximum probability of transferring the results to operational networks (partners with proven record in standardization, open source development, and exploitation to monetize the produced solutions)

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

Stream D – SNS Trials and Pilots with Verticals

Stream D (Large Scale Trials)

HORIZON-JU-SNS-2025-02-STREAM-D-01: SNS Trials and Pilots (T&Ps) with Verticals (4 Projects)

- Focus on one – max 2 verticals – Better to go in depth rather than cover many verticals (use cases as presented by SNS in 3GPP SA1 meeting – May 2024 for (1) Industry/Manufacturing (including robotics), (2) Media (including gaming, broadcasting…), (3) Transportation/Logistics, (4) Emergency and Safety Services and (5) Health (indicative order not prioritized)
- Select use cases with high potential for future commercial adoption – help create the ecosystem
- Demonstration of clear benefits for stakeholders using advanced technologies
- 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 previous SNS Phases, platforms developed in the context of national initiatives or any other solutions that integrate and offer preliminary 6G network solutions

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