

**Stream D (IA): Large Scale Trials and Pilots with Verticals**

- Demonstrate both **technological and business validation** with verticals
- The validation of SNS KVI and KPI's and in the context of very advanced digital use cases implemented through Large-Scale Trials and Pilots (LST&P)
- The identification of use case specific KVI and KPI's and how they may be matched by SNS platform KVI and KPI's
- A structured feedback loop from vertical users towards SNS stakeholders, in view of ensuring the best match between beyond 5G/ 6G systems capabilities and users.
- The activity should also target **visible and high-level exposure of European capabilities** and leadership in beyond 5G/6G technologies **through support of large showcasing events.**

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- **Reusability and evolvability** of the platforms over the lifetime of the SNS programme
- **Accessibility and openness** (e.g., modular implementation, open-source solutions, well-defined interfaces, complete documentation, etc.).
- **Directionality and optimisation** of previous and related investments (e.g., 5G PPP, End-to-End Facility projects or/and Vertical Pilots projects, IoT & Cloud platforms)
- **SMEs, scaleups and startups** are expected to play a key role
- **Concerning security**, due to the potential use of 5G and 6G infrastructures for safety-related services and their relevance to public security and public order, it is essential to ensure the highest level of cybersecurity in this sector.

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- Contribution to the long-term availability of sustainable seamless E2E **evolved 5G and 6G test infrastructures** including capability to **integrate vertical use cases** specific performance/KPI requirements, as applicable also across public and non-public networks and services.
- Validated **core technologies and architectures** (also developed in 5G Infrastructure PPP Phase 3 projects and in IoT and Cloud/Edge projects) in the context of specific **vertical large-scale pilots**
- **Viable business models** for innovative digital use cases tested and validated across a multiplicity of industrial sectors, including demonstration of required device/network/service resource control from the vertical industry business model perspective.
- Support to **Impactful contributions towards standardisation** bodies notably for 6G use cases and technologies.
- **Europe 5G Evolution and 6G know-how showcasing.**

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### Expected Outcome:

- **Mobilize the European ICT sector to validate technological trends for 6G networks.**
  - Repository of **requirements from verticals and of “lessons learned”** to **prepare for subsequent phases** of the SNS programme.
  - Contribution to a **repository of open-source tools and modules** that may be openly accessed and used by SNS projects over the programme lifetime.
  - Collection of **new requirements that will be used by SNS Phase II Streams A and B projects.**
- Requirements on the network infrastructure** will be collected and driven notably by the emergence of new application domains like:
- (1) the “Internet of Sense”, realizing a fusion between the communication and sensing environment,
  - (2) immersive environments like XR/VR,
  - (3) digital twins and
  - (4) holographic type communication.

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### Expected Outcome:

- The long-term **integration of different cloud/computing environments** towards a distributed network environment **with landscape unified management**
- The **blurring boundaries between networks**, computing and devices, leading to a need to redesign applications and functions that operate on a dynamically adapting environment, **enabled across public and non-public networks**.
- The need to reassess an optimized computing/connectivity continuum from an **energy consumption** perspective.
- The **native support of AI and ML** by future networks to optimize their operation and allow automated solutions that will be trustable.
- The **introduction of zero-touch solutions** targeting at OPEX reduction.
- The need to **offer the highest end-to-end trustworthiness** and supporting **security** measures in **public and/or private networks** and in the applications running on end devices that transfer actionable information.
- The need to consider **open architectures for innovation and vertical use cases integration**, enabled by APIs facilitating advanced application and network interaction and mutual awareness.

**Stream D (IA): Large Scale Trials and Pilots with Verticals****Validation**

-Application level:

i) **applications already possible with 5G like AR/VR**. Validation should demonstrate clear benefits of the considered technologies and architectures in terms of scalability, security, and performance improvements in line with medium to long-term socio-economic scenarios.

ii) **applications that are not considered within the 5G current developments**, such as applications to eventually create a **6G network with a sixth sense** that intuitively understands human intentions, making human interactions with the physical world more intelligent, effective, and anticipating our needs (towards Internet of Sense). In that case, the validation should primarily address technological feasibility and affordable deployment.

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### Validation

- Management level:
  - i) significant **improvement of (new) resource usage efficiency**, towards zero-touch management and effective OPEX;
  - ii) additional **capabilities offered to vertical users through open interfaces** enabling more efficient implementation of use cases (e.g., AI for networks vs. network for AI at the application level).
- Societal level: the validation should demonstrate significant improvement of key parameters like **energy consumption** (both for the SNS platform and the vertical use case), **safety** (inc. EMF exposure), **coverage** and **access, cost and affordability, trustworthiness, security and privacy** being part of the priority SDGs to demonstrate in “user context”.

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- Projects will involve and **call for SMEs, scaleups and startups.**
- In this early phase, the projects **may leverage the existing platforms**, or components from them, from 5G Infrastructure PPP Phase 3 End-to-End Facility projects or/and Vertical Pilots projects and/or relevant national or international (ESA) initiatives).
- The projects may also leverage **as relevant/appropriate existing IoT/Cloud/Edge platforms or components that may be integrated together.** A smooth transition is envisioned from 5G Infrastructure PPP activities to capitalize on existing results.