



The Standards People

ETSI Research Conference 2023

Maximizing the Impact of European 6G
Research through Standardization

The 6G-SANDBOX approach towards 6G experimentation

Dr. Apostolis Salkintzis (Lenovo)

Standardization Manager

6G SNS

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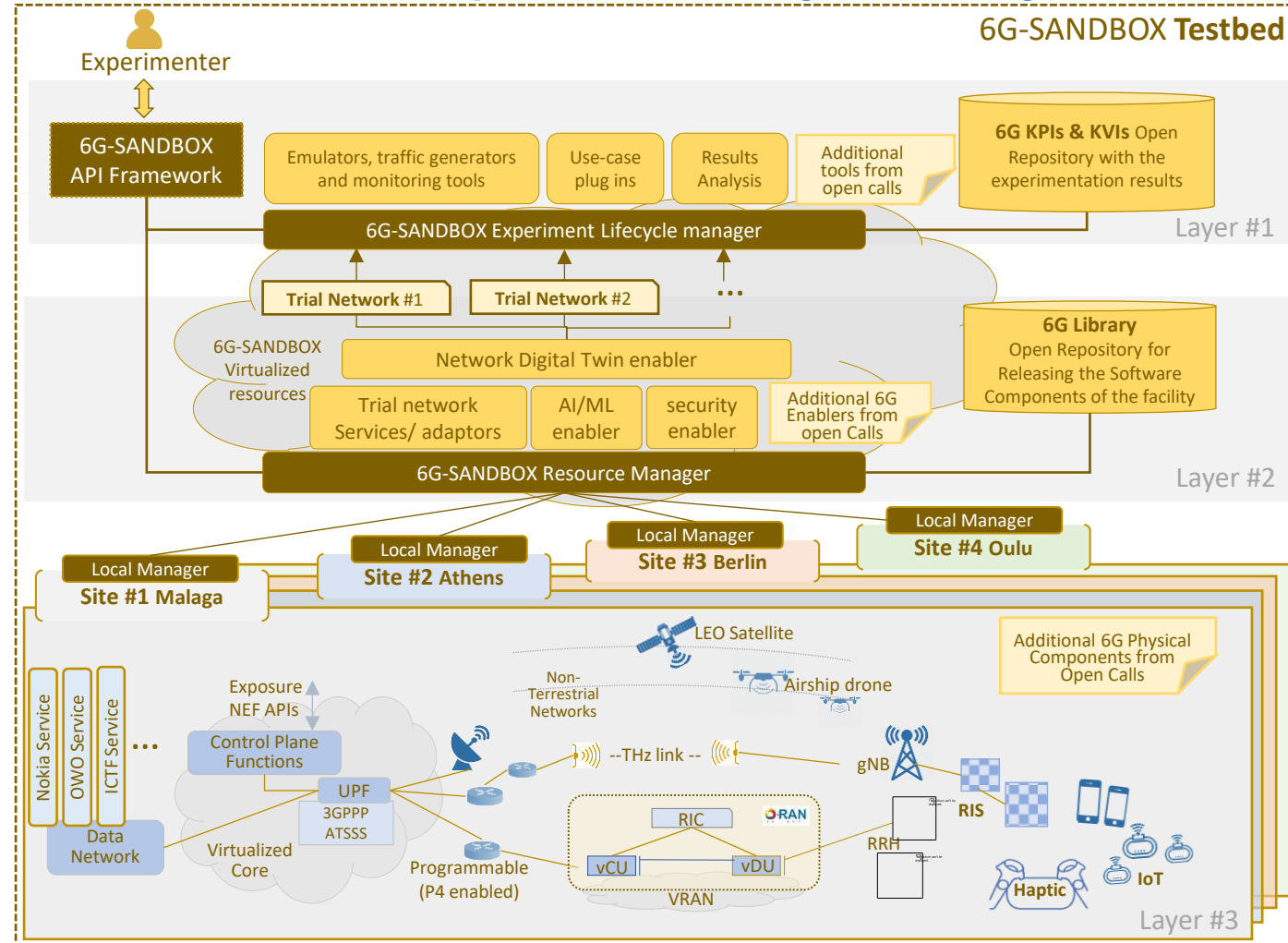
1. Project Overview

- **Project Name:** 6G-SANDBOX
- **Project website:** <http://6g-sandbox.eu/>
- **Stream:** C
- **Members:** Keysight Technologies Belgium BV (KEYB) • Universidad de Malaga (UMA) • Keysight Technologies Denmark AsP (KEYD) • Fogus Innovations & Services (FOG) • Infolysis (INF) • Boreal Technology & Investments (OWO) • Telefonica (TEL) • National Centre of Scientific Research "Demokritos" (NCSR) • COSMOTE (COS) • Nokia – Extended Reality lab (NOKIA) • Oulu University (OULU) • Ictficial (ICTF) • OpenNebula (ON) • Eurescom (EURE) • IS-Wireless (ISR) • Fraunhofer (FOKUS) • Lenovo (LNV) • The Queen's University of Belfast (QUB)
- **Other:**
 - Introduction of the *Trial Networks* concept
 - *Networks that combine virtual and physical nodes to provide services for 6G technology validation and 6G KPI measurements*
 - 4 experimentation platforms distributed around EU: **Malaga, Berlin, Athens and Oulu**
 - **Open calls:** budget of 1.8M€ with up to 60K€/experiment
 - In-project Use Cases: **Extended Reality and Haptic communication**

2. Technical Information

- Project Key Objectives:** To provide an early *6G Pan-European Testbed* that offers Trial Networks to experimenters.
 - The testbed incorporates high degree of automation, advanced measurement and monitoring equipment, interaction with standardised API framework, capabilities to validate 6G technologies and measure 6G KPIs and KVIs.
- Key technologies used/investigated:**
 - The 6G-SANDBOX project touches the entire service provisioning chain and provides tests for any plane (data, control, and management)
 - Key on-board technologies are: O-RAN (RIC with AI enabled Apps), RIS, Security as a Service, NTN (Satellite links), TSN (towards deterministic networks), Test Automation, Zero Touch management, 6G KPI/KVI aligned with SNS JU.
 - Trial Network:** fully configurable, manageable and controllable network which combines virtual and physical nodes and provides services for 6G technology validation and 6G KPI measurements.
 - A trial network may utilize resources from one or more experimentation platforms/sites.

Representative figure / diagram



3. Planned Standardization Activities

- **Standardization plans / objectives:** (a) Apply applicable standards to ensure the 6G experimentation platform is compliant, (b) identify / promote innovations and contribute to relevant SDO such as:
 - **ETSI INT, ETSI NFV, ETSI RIS, 3GPP SA2/SA5, O-RAN**
- **Project activities / technologies that may lead to standardization:**
 - Experimentation methods to measure 6G KPIs (relevant with ETSI TR 103 761)
 - AI-based Resource Allocation & Reshuffling (relevant with ETSI ISG NFV)
 - vRAN advancements: Intelligent xApps (O-RAN)
 - Optimizations for Telepresence / XR+touch senses: XR APIs, based on Network as a Code concept
 - Reconfigurable Intelligent Surfaces (RIS): Develop a novel 28 GHz RIS “tile” employing low latency technology (relevant with ETSI ISG RIS)
 - CAPIF implementation and possible extensions (relevant with 3GPP SA6)

3. Planned Standardization Activities

- **Project activities / technologies that may lead to standardization:**
 - Satellite for backhaul (3GPP)
 - Haptics / Internet of Senses: Support over 30 different sensations in real-time while playing video games, watching a movie, being in the metaverse, etc.
 - Digital Twins
- **Potential targeted standardization bodies / groups:**
 - **3GPP:** 6G-SANDBOX Project timeframe overlaps with Rel-19, Rel-20 & Rel-21 (Service Requirements). Main target: (a) 3GPP Rel-20 service requirements & studies, and (b) 3GPP Rel-21 (6G) service requirements (~ Sep. 24 – Sep. 25)
 - **Other:** ETSI RIS/INT/NFV, O-RAN (RIC & xApps), ITU-T (e.g. for interoperable testbed federations)
- **Standardization planning and estimated time plan:**
 - Full plan to be defined in M3

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