NEWSLETTER

ISSUE 6

April – June 2025

SAFE-6G

A SMART AND ADAPTIVE FRAMEWORK FOR ENHANCING TRUST IN 6G NETWORKS

SAFE-6G project has received funding from the Smart Networks and Services Joint Undertaking (SNS JU) under the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101139031

ISSUE HIGHLIGHTS

- ✓ SAFE-6G PROJECT INTRODUCTION
- ✓ COMMUNICATION & DISSEMINATION ACTIVITIES
- ✓ PERIOD DELIVERABLES
- ✓ SNS JU NEWS

The 6th issue of SAFE-6G Newsletter presents the project's activities during the third period April - June 2025. This specific issue focuses on the dissemination and communication activities of the period, along with SNS JU/6G SNS News, Period and Upcoming Deliverables.

In numbers, the activities of SAFE-6G during this 3-month period are:

1 Event

3 New YouTube videos

2 Research Paper

2 White Papers

1 SNS JOURNAL

1 Co-organised Workshop

1 Plenary Meeting

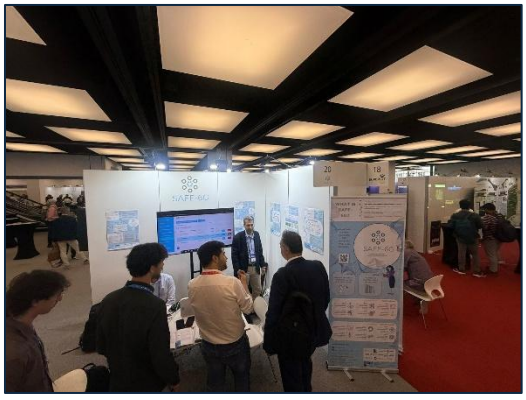
COMMUNICATION & DISSEMINATION ACTIVITIES

EVENTS

EuCNC 2025 & 6G Summit

The SAFE-6G project proudly participated in the EuCNC & 6G Summit 2025, one of Europe's premier events for next-generation communication technologies. Held in Poznań, Poland, the conference brought together researchers, industry leaders, and policymakers to shape the future of 6G.

At the SAFE-6G booth, visitors had the opportunity to explore our latest research and technological advancements focused on building secure, trustworthy, and resilient 6G networks. Our presence at the event sparked insightful discussions and fostered valuable new connections within the growing 6G ecosystem.



In addition, our Technical Manager, Dr. Harilaos Koumaras, contributed to the conference's technical programme by presenting insights from the SAFE-6G architecture during Special Session 2, titled "6G Architecture Blueprint and Key Innovations: A European Perspective." He also joined the panel discussion at Workshop 6, "6G Trustworthiness: Requirements, Challenges, and Considerations," alongside representatives from CERTH/ITI, Ericsson, Space Hellas, Friedrich-Alexander University, the University of Murcia, and i2CAT.

Our participation in EuCNC & 6G Summit 2025 marked an important milestone for the SAFE-6G project, reinforcing our commitment to advancing secure and reliable 6G technologies.

You may watch here the EuCNC 2025 & 6G Summit SAFE-6G Demo.

'The main objective of the demo is to showcase the trust capabilities of the SAFE-6G framework MVP, demonstrating how it adapts the trustworthiness of a 5G/6G-based system based on end users' expressed needs, ensuring that "trust" is not just predefined by operators but is also shaped by real-time user input.'

Moreover, during EuCNC 2025, the 1st SNS Journal 2025, was released and SAFE-6G was featured inside.


SAFE-6G

SAFE-6G pioneers a holistic research approach, situating a native trustworthiness framework atop the open and distributed USN/NSN-based 6G core, leveraging (X)AI/ML techniques to coordinate user-centric safety, security, privacy, resilience, and reliability functions, strategically optimising the Level of Trust (LoT).

OVERVIEW

The SAFE-6G project aims to develop a trust-driven, user-centric 6G ecosystem using cognitive frameworks, AI/ML techniques, and distributed architectures. Its objectives include:

1. Defining trustworthiness requirements for a human-centric, zero-touch 6G framework using distributed AI/ML across the edge-cloud continuum.
2. Developing cognitive coordination frameworks and Machine Learning operations (MLOps) tools for trust management and AI/ML optimisation.
3. Designing AI-assisted functions for safety, security, privacy, resilience, and reliability with a zero-trust approach.
4. Adopting cloud-native paradigms for compatibility with 5G/6G networks and edge-cloud systems like xerCIS.
5. Validating SAFE-6G via Metaverse pilots to test configurations, trust levels, and AI/ML methods under security threats.
6. Promoting results via dissemination, standardisation, and stakeholder engagement for industry and regulatory adoption.

CONCEPT ARCHITECTURE TECHNOLOGIES

The SAFE-6G project aims to create a user-centric 6G network framework that provides a trustworthiness level based on user intent. By integrating AI and ML techniques, it coordinates novel functions for safety, security, privacy, resilience, and reliability, which reflect various trust dimensions.

The architecture is adaptive, using a cloud continuum to deploy network functions close to users for efficient trust provisioning, tailored to individual needs. SAFE-6G avoids the "one-size-fits-all" approach and optimises the Level of Trustworthiness (LoT) as a key performance indicator for 6G.

YouTube VIDEOS

On our YouTube Channel we have new videos waiting for you to watch them and dive deep inside to our project's technical background.

1. SAFE-6G MLOps framework – '*The SAFE-6G MLOps framework streamlines the full lifecycle of machine learning (ML) models—from development to deployment—leveraging modern cloud-native technologies. It automates workflows, ensures reproducibility, manages versioning of models and data, and incorporates differential privacy to secure sensitive data.*'
2. SAFE-6G RESILIENCE FUNCTION DEMO – '*The Resilience Function is a core building block of the SAFE-6G framework, responsible for managing all resource-related functionalities required to instantiate and evolve user-centric, customized 5G/6G mobile networks. This function is empowered by AI capabilities that drive the continuous adaptation and lifecycle management of user-specific network instances in response to dynamic service requirements and contextual changes.*'

WEBINAR

5G Networks Security Through the Lens of SAND5G

On the 30th of April, our Technical Manager, Dr. Harilaos Koumaras, participated in a webinar organized by SAND5G project and hosted by p-NET Emerging Networks & Vertical Applications. Dr. Koumaras shared insights on next generation networks.

You may watch the webinar here.

RESEARCH PAPERS

The SAFE-6G conference paper entitled *"An AI-Assisted User-Intent 6G System for Dynamic Throughput Provision" and "Performance Comparison of NWDAF-Based Security Analytics Techniques in 5G/B5G Networks"* are available in IEEE Xplore here and here.

These papers were published and presented in **the IEEE 29th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD**), last October.

Paper 1*: This paper proposes an AI-assisted user-intent 6G system that dynamically provisions throughput by adjusting Time Division Duplexing (TDD) slot allocations based on the predicted user intent. An important feature of the system is the AI-powered chatbot which uses Natural Language Processing (NLP) to accurately recognize user needs, translating these into accurate TDD configurations. This paper examines the difficulties of the proposed system, highlighting its potential to enhance the network adaptability and user satisfaction. Through analysis and validation, this paper demonstrates significant improvements in network performance, setting a new standard for intelligent, user-centric telecommunications.'*

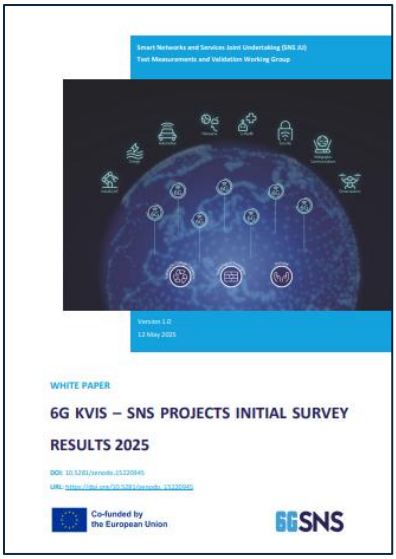
Paper 2*: This paper evaluates the performance of NWDAF-based security analytics techniques in 5G/B5G networks, focusing on anomaly detection for network security incidents. Utilizing a 5G testbed, the study examines both statistical methodsS (Z-Score, MAD, Hampel Filter) and machine learning techniques (Isolation Forest, LOF, One-Class SVM) for the detection of control-plane and data-plane DoS/DDoS attacks. Results indicate a better performance of statistical methods over ML algorithms in such volume-based*

attacks and suggest a hybrid approach, combining statistical and ML methods, to enhance anomaly detection and adapt to diverse network conditions for improved 5G security.'

WHITE PAPERS

In May 2025, the **SNS JU Test Measurements and Validation Working Group**, released a white paper titled '*6G KVIs – SNS Projects Initial Survey Results'* and SAFE-6G contributed along with other 14 projects.

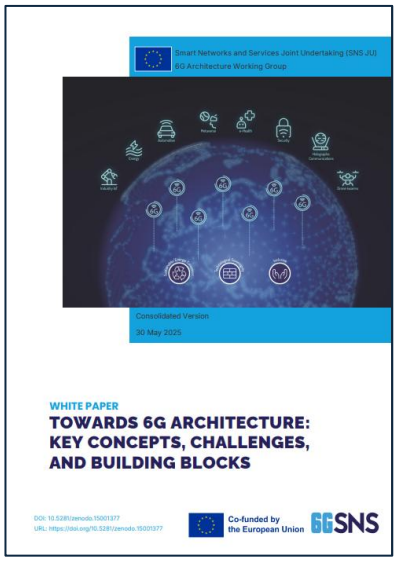
'In order to address the core objectives of the TMV WG in the area of KVIs, SNS-JU Phase I and Phase II projects were asked to provide the 6G Key Values and KVIs, that they have already identified - and which have been used to drive the projects' technical developments-, along with the key enables, the validation methodology and the target values. Depending on maturity of the work of the SNS-JU projects, the following 15 projects in total provided input for the questionnaires developed for this purpose: FIDAL, TRIALSNET, CENTRIC, 6G-SENSES, ENVELOPE, Deterministic6G, DESIRE6G, PREDICT6G, 6GXR, 6G-PATH, SAFE-6G, ORIGAMI, PRIVATEER, 6G-EWOC, ECO-eNET. All KVIs serve as critical benchmarks, helping to validate the effectiveness of technological interventions in real-world use cases.'



You may read it here

Additionally, the same period the **6G Architecture Working Group** released a white paper titled *'TOWARDS 6G ARCHITECTURE: KEY CONCEPTS, CHALLENGES, AND BUILDING BLOCKS'*.

Explore the latest architectural insights shaping the future of 6G networks, aligned with the IMT-2030 framework. This comprehensive document outlines innovative design components, current development efforts, and a forward-looking blueprint for next-generation mobile systems



You may read it here

WORKSHOP

Empowering 6G Networks: 2nd Workshop on Advancements in Research Infrastructures, Adaptive Frameworks, and Global Architectural Evolution

In the context of the IEEE NFV-SDN 2025 which will take place on 10–12 November 2025 in Athens, Greece, the SAFE-6G project, co-organises Workshop 3: Empowering 6G Networks: 2nd Workshop on Advancements in Research Infrastructures, Adaptive Frameworks, and Global Architectural Evolution.

The Workshop is co-organised with 6G-VERSUS, 66-SANDBOX, ENVELOPE Project, aerOS Project, O-CEI Horizon, 5G-TACTIC, ECO-eNET, OPTIMIST and SOVEREIGN MSCA Project

'The IEEE NFV-SDN 2025 conference is an important forum for the ongoing exchange of the latest ideas, developments, and results amongst ecosystem partners in both academia and industry. The conference fosters knowledge sharing and discussion on new approaches and works addressing gaps and improvements in virtualized-enabled architectures, algorithms, and operational frameworks for virtualized network functions and infrastructures.'

For more info you may go: https://nfvsdn2025.ieee-nfvsdn.org/sites/nfvsdn2025.ieee-nfvsdn.org/files/WS3.pdf and here => https://nfvsdn2025.ieee-nfvsdn.org/authors/call-workshops-and-special-sessions-papers

SAFE-6G 5th Plenary meeting

The SAFE-6G plenary meeting was as always, a great success! In June the 5th SAFE-6G plenary was held at **Thales** premises in Paris. The consortium is discussing administrative issues along with details for the upcoming mid-review.

SNS JU NEWSFLASH/NEWSLETTER

- ✓ **SNS JU Newsflash (April 2025):** https://smart-networks.europa.eu/sns-ju-april-2025-newsflash/
- ✓ **SNS JU Newsflash (May 2025):** https://smart-networks.europa.eu/sns-ju-may-2025-newsflash/
- ✓ **SNS JU Newsflash (June 2025):** https://smart-networks.europa.eu/sns-ju-june-2025-newsflash/
- ✓ **SNSJU Newsletter (April 2025):** https://smart-networks.europa.eu/sns-ju-april-2025-newsletter/

PERIOD & UPCOMING DELIVERABLES

D3.1 User-centric Distributed 6G Core over Edge-Cloud Continuum with MLOps supporting Metaverse pilots– M16 (PUB)

D6.3 Dissemination, Communication and 6G-IA/SNS Engagement Activities (Intermediate) – M18 (PUB)

D6.4 Standarisation, innovation, Exploitation and technology Transfer Activities (Intermediate) – M18 (PUB)

D4.1 Cognitive coordinator, AI agents and user-centric functions – M18 (PUB)

You can find all the Deliverables here => https://safe-6g.eu/deliverables//

Call: Reliable Services and Smart Security
Topic: HORIZON-JU-SNS-2023-STREAM-B-01-04
Type of action: RIA
Duration: 36 months
Start date: 1 January 2024

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