eNewsletter #3

Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks

June 2024

Co-funded by the European Union

6GSNS

ADROIT6G 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 Grand Agreement No 101095363.

Welcome to the 3rd ADROIT6G's eNewsletter!

Our partners are delighted about the new release of the 3rd ADROIT6G newsletter. In the present issue we showcase the recent progress of the project, the milestones and major achievements, as well as our preliminary research outputs in the 6G era. The ADROIT6G Project, since the end of 2023 that marked the successful compilation of the 1st successful year of the project is active in showcasing its primary results.

ADROIT6G (Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks) is a Smart Networks and Services Joint Undertaking (SNS JU) project supporting the European Commission's 6G policy by implementing the first phase of the 6G SNS roadmap towards the evolution of a 6G architecture. Briefly, ADROIT6G is an EU-funded project the world moves from the 5G towards the 6G era, 5G application types need to be redefined by morphing the classical service classes of URLLC, eMBB, and mMTC and introducing new services. ADROIT6G radical technological innovations, functionalities and performance will be validated through a set of representative extreme 6G use cases.

In particular, to evolve the existing service-based architectures of 5G mobile networks, and design, implement, and validate a fundamentally new approach for a future-proof, cognitive, next-generation 6G architecture by adopting a fully distributed AI-driven dynamic paradigm, with functional elements automatically deployed on-demand as virtual functions in cloud-native environments, across the far-edge, edge and cloud domains, operated by different stakeholders. This will ultimately lead to improved performance, a higher level of control, increased transparency in interactions with digital services, support of future-looking applications, and social acceptance.

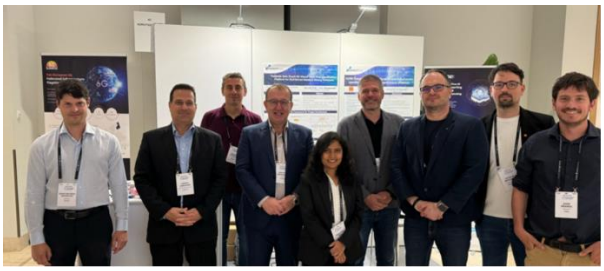
For more information about the project, please visit our website **adroit6g.eu**

ADROIT6G @ EUCNC Summit 2024

ADROIT6G was actively present on the 3rd to 6th of June 2024, in Antwerp, Belgium, in the context of 2024 EuCNC & 6G Summit, with its own Project booth, to showcase the two project's demos in the booth, along with the new posters with the complete description and objectives. Within the context of the EuCNC & 6G Summit 2024, the **Project Coordinator Prof. Christos Verikoukis** presented at the 6G Series Workshop organised by Hexa-X-II and CYENS presented at the Poster Session of the Summit.

EuCNC, which originated from the 6G Flagship programme in Finland, is supported by the EC and the 6G Summit, while sponsored by the IEEE Communications Society (ComSoc), the European Association for Signal Processing (EURASIP) and the European Association on Antennas and Propagation (EurAAP).

This prestigious event bridges cutting-edge research and world-renown industries, managing to bring together the brightest minds in the ICT industry and major global tech companies, creating an unparalleled platform for innovation and collaboration. Globally attracts more than 900 delegates from more than 40 countries, globally, to present and discuss the latest results. Moreover, the more than 50 exhibitors, demonstrate the technology developed within research projects from EU R&I programmes. The core areas of the event focus on 5G deployment and mobile IoT to 6G exploration and future communications systems and networks, including experimentation and testbeds, and applications and services.



All information about ADROIT6G's activities during the EUCNC & 6G Summit 2024 is accessible in our **News & Events** and on our **Linkedin** pages!

ADROIT6G Co-organizes CAMAD 2024

We are excited to announce the organisation of a Special Session at **IEEE Computer Aided Modeling and Design of Communication Links and Networks (CAMAD 2024)**, in collaboration with CENTRIC project.

ADROIT6G and CENTRIC, both funded by Phase 1 of the SNS JU, conjoin their forces and expertise in a Special Session that seeks to offer conference participants a comprehensive understanding of the intricate interplay between the 6G architecture, AI-driven user-centricity, and Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks energy efficiency.

This Special Session on "***Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks***" serves as a platform to delve into the cutting-edge developments.

More specifically, ADROIT6G spearheads a visionary approach towards 6G network architecture, envisioning a system tailored to the specific requirements of diverse and innovative applications. This session aims to scrutinize ADROIT6G's disruptive innovations, focusing on Distributed AI for a high-performance core, the transition to fully cloud-native network software, and the achievement of software-driven, zero-touch operations. On a parallel trajectory, CENTRIC focuses on the development of an AI-enabled user-centric radio air interface, harmonizing seamlessly with ADROIT6G's objectives. The session will unfold the exploration of AI techniques in a top-down, modular approach to designing a wireless connectivity stack, emphasizing user-centricity through tailor-made solutions such as waveforms, transceivers, signalling, protocols, and Radio Resource Management (RRM) procedures.

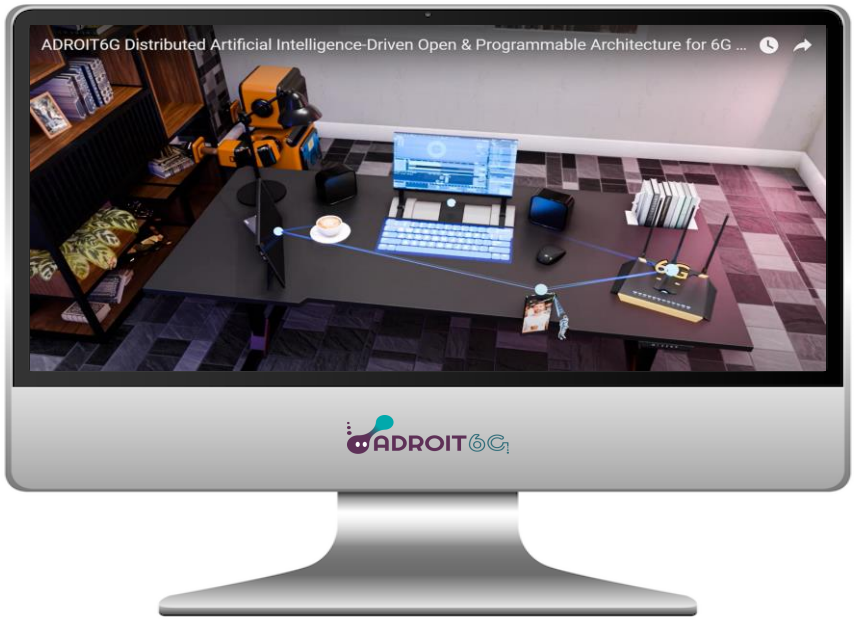
The IEEE CAMAD 2024 provides an opportune stage for the dissemination and discussion of these ground-breaking advancements, fostering collaboration and knowledge exchange among researchers, practitioners, and industry experts.

ADROIT6G Project Overview Video

ADROIT6G aims to explore and integrate disruptive, best-of-breed technologies to produce a truly novel system. The project is addressing a radically new approach for a next-generation AI-enabled open architecture for future 6G networks, and therefore, it requires continuous design and refactoring.

The design, implementation, testing, and usage of ADROIT6G will go in parallel with the validation in lab settings, and a lot of feedback and re-design of platform components may be expected because of a better understanding of the challenges faced with the integration of novel concepts, components, and their usage in future looking applications. Henceforth, new technologies and tools may succeed and be integrated into the design/development cycle of the project.

ADROIT6G is making significant strides in advancing next-generation wireless technologies, focusing on the integration of AI-driven solutions and smart network innovations. ADROIT6G will be open to rapid changes and elicitation of new requirements stemming from the UCs in the PoCs. The new video of ADROIT6G describes the Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks, with a unique emphasis on the transition from the 5G to the 6G era.



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For more information on the video stay tuned by subscribing on our YouTube channel **here**!

ADROIT6G Dissemination Material

Recently, ADROIT6G circulated new dissemination material, through our communication channels. More specifically, the consortium formed the new updated brochure and an updated roll-up banner. The purpose was to showcase the major innovations proposed within the ADROIT6G Project for the architectural frameworks of emerging 6G mobile networks intending to realize fundamental changes to the way networks are designed, implemented, operated, and maintained. The major innovations are the following:

(i) Crowdsourcing AI to minimize carbon footprint and enable efficient AI/ML in distributed systems.
(ii) Zero-Touch Management enabling AI-driven dynamic slice reconfiguration.
(iii) UEs as Virtual Base Station - computing concept
(iv) Decentralized AI Framework for D2D communication based on BDI agents
(v) Sustainable data, through learning representations at the edge and the far edge.
(vi) Closed-loop orchestration in multi-layer and inter-computing scenarios with multiple cooperation stakeholders.

More information about ADROIT6G's Dissemination Material can be found **here**.

ADROIT6G 2nd Plenary meeting

The ADROI6G Consortium held its second Plenary Meeting of the ADROIT6G project in Nicosia, Cyprus from the 30th to the 31st of January 2024! The meeting proved to be a resounding success as our dedicated project partners came together to engage in fruitful discussions and exchange invaluable insights. We discussed the progress made so far, as well as future actions and goals for the project, which focuses on 6G architecture.

During the meeting, our dedicated project partners engaged in insightful discussions and shared valuable insights. All partners participated in the extended discussions on the progress made so far, as well as the future actions and objectives for the project, which focuses on 6G architecture. In addition to the plenary meeting, an interactive workshop on the requirements of the use cases in the WP4 framework took place. This workshop facilitated collaborative brainstorming sessions among the participants, enabling a comprehensive exploration of the specific needs and challenges within the framework.

A big thank you to our dedicated team and partners for their hard work and collaboration. Together, we are shaping the future of connectivity!

Project's News and Events

ADROIT6G at EUCNC 2024
ADROIT6G participated in 2024 EUCNC, on June 3-6, 202. Read more **here**.

ADROIT6G at 6G Series Workshop by HEXA-X-II
ADROIT6G showcased its ground-breaking solutions and cutting-edge technologies. Read more **here**.

ADROIT6G at IoT Solutions World Congress
ADROIT6G showcased its ground-breaking solutions and cutting-edge technologies. Read more **here**.

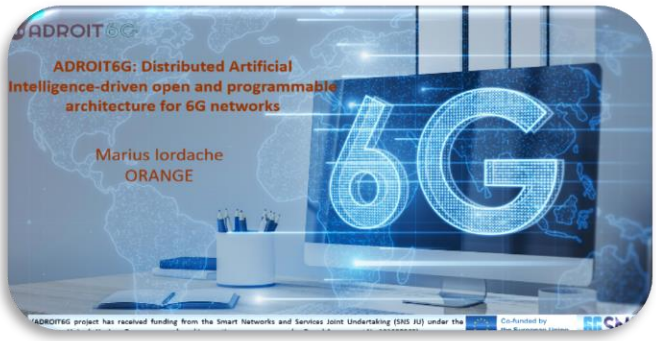
ADROIT6G at IEEE IC on Computer Communications
CNIT presented ADROIT6G at IEEE International Conference on Computer Communications on 20-23 May 2024. Read more **here**.

ADROIT6G at AIIoT 2024 Workshop
OULU presented ADROIT6G at AIIoT 2024 Workshop on 3-4 May 2024. Read more **here**.

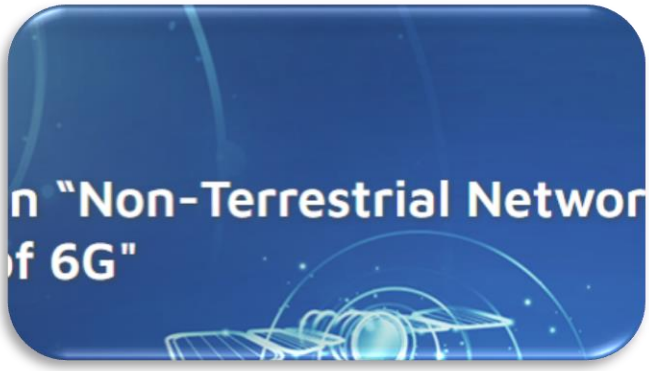
ADROIT6G at IEEE ICMLCN
OULU presented ADROIT6G at IEEE ICMLCN on 5-8 May 2024. Read more **here.**

Project's News and Events

ADROIT6G participated in BEYOND Expo
ADROIT6G participated in BEYOND Expo on April 25-27, 2024. Read more **here**.



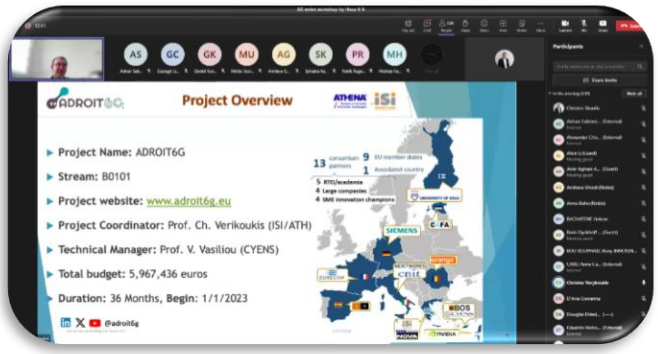
Orange RO presented ADROIT6G in Architecture WG!
Orange RO presented ADROIT6G in Architecture WG on 26th April 2024. Read more **here**.



ADROIT6G at ETSI Non-Terrestrial Networks 2024
Siemens AG presented ADROIT6G at ETSI Non-Terrestrial Networks 2024. Read more **here**.

ADROIT6G at WISPNET 2024
CYENS represented ADROIT6G at WISPNET 2024. Read more **here**.

ADROIT6G at MWC 2024 in Barcelona
ADRIT6G coordinator and several partners, were present in MWC 2024, showcasing the project's developments. Read more **here**.



ADROIT6G Presented at the 6G Series Virtual Workshop Organized by Hexa-X-II
Dr. Christos Verikoukis represented ADROIT6G project in the 6G Series Virtual Workshop Organized by Hexa-X-II. Read more **here**

Project's Scientific Publications

Please find below the latest papers submitted and accepted during the period January-December 2023, that acknowledge of ADROIT6G project. For the complete list of research papers, please visit our dedicated webpage **here**.

- Roy, S., Chergui, H., & Verikoukis, C. (2024). Towards Bridging the FL Performance-Explainability Trade-Off: A Trustworthy 6G RAN Slicing Use-Case. IEEE Transactions on Vehicular Technology. Available **here**.
- Ch.Christophorou, I.Ioannou, V.Vassiliou, L.Christofi, J.Vardakas, E.E.Seder, C.Fabiana Chiasserini, M.Iordache, Ch.B.Issaid, I.Markopoulos, G.Franzese, T. Jarvet and Ch. Verikoukis, "ADROIT6G Distributed Artificial Intelligence-driven open and programmable architecture for 6G networks" in IEEE Globecom 2023 WSs. Forthcoming so stay tuned on our **webpage**.
- Rani, S.J., Ioannou, I., Nagaradjane, P., Christophorou, C., Vassiliou, V., Yarramsetti, H., Shridhar, S., Balaji, L.M. and Pitsillides, A., 2023. A Novel Deep Hierarchical Machine Learning Approach for Identification of Known and Unknown Multiple Security Attacks in a D2D Communications Network. IEEE Access. Available **here**.
- Ioannou, I., Christophorou, C., Nagaradjane, P., & Vassiliou, V. (2024, March). Performance Evaluation of Machine Learning Cluster Metrics for Mobile Network Augmentation. In 2024 International Conference on Wireless Communications Signal Processing and Networking (WiSPNET) (pp. 1-7). IEEE. Available **here**.

Project's Deliverables

For the complete list of the published deliverables, please visit our dedicated webpage **here**.

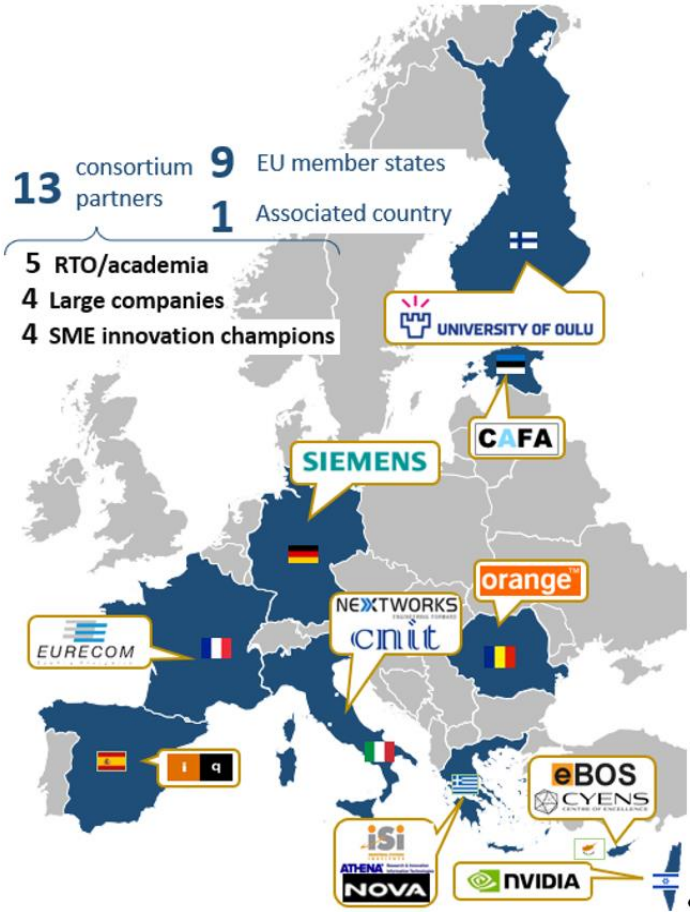
Deliverable		Lead Partner
D6.1	**Project website and social media presence**	eBOS
D2.1	**Requirements, use cases and system architecture - Initial**	CAFA/ IQU

Stay tuned on the updates of the developments of ADROIT6G for awareness of the recent developments in the 6G era.

Meet ADROIT6G's Consortium

ADROIT6G is a Smart Networks and Services Joint Undertaking (SNS JU) project supporting the European Commission's 6G policy by implementing the first phase of the 6G SNS roadmap towards the evolution of a 6G architecture.

All ADROIT6G 13 partners from 10 countries have already joined forces for 18 months, envisioning the built-up of the future architecture of mobile networks and services, the ADROIT6G project [See map at the right side of the page].



Meet Our ADROIT6G partners

Orange Romania is the leading telecom services provider for the Romanian market, offering a wide range of products and services, from networking or data center equipment, connectivity on both radio and cabled networks to compute /storage / networking services at data center level on an Iaas/Saas/XaaS model. ORO will especially work on observability and monitoring of the edge-cloud continuum, contributing to enabling edge agility and green elasticity operations. ORO will also contribute to the impact analysis of the project outcomes and in providing scenario information for obtaining datasets.

NVIDIA provides technologies for Accelerated Computing in the era of AI. In ADROIT6G, we investigate how high-performance, open, programmable data planes can support emerging 6G technologies. In particular, how open programmability may help in the discrimination of flows to implement network slicing in O-RAN and transport networks. This opens the door to extensively use AI to manage bandwidth utilization, allocation and management efficiently, reducing overall network congestion and energy consumption.

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Follow ADROIT6G