ROBUST-6G

NEWSLETTER NOVEMBER 2024

Welcome to the newsletter of ROBUST-6G!

ROBUST-6G is a European research project (HORIZON-JU-SNS-2023-STREAM-B-01-04) that pioneers the development of data-driven, AI/ML-based security solutions, addressing the evolving challenges presented by the dynamic landscape of forthcoming 6G services and networks within the future cyber-physical continuum.

Our mission encompasses not only advancing security measures but also safeguarding the integrity of AI/ML systems from potential security breaches and upholding the privacy rights of individuals whose data fuels these systems. ROBUST-6G initiative extends to the promotion of green and sustainable AI/ML methodologies, aiming to optimize energy efficiency in 6G network design.

Enjoy reading!

ROBUST - 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 101139068.

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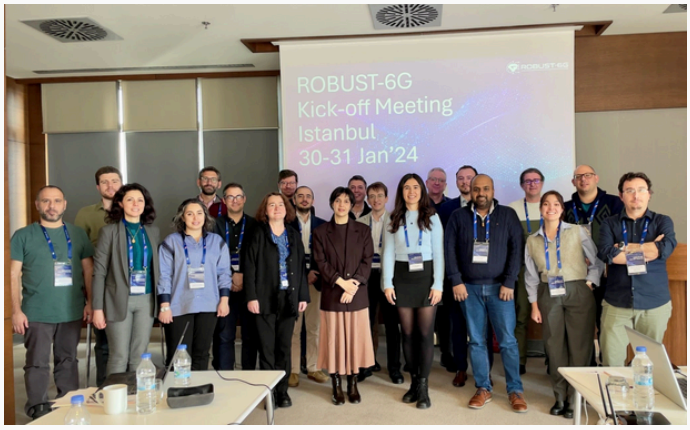
ROBUST-6G Officially Kicked-Off at Istanbul

ROBUST-6G officially began its journey into 6G cybersecurity on January 30-31, 2024, in Istanbul, hosted by Ericsson Türkiye. Led by Ericsson Research Türkiye, this collaborative effort unites 13 partners from across academia, SMEs, and large enterprises, all committed to shaping the future of secure 6G connectivity.



The kick-off meeting was a resounding success, with the participation and contributions of all our esteemed partners and collaborators. We extend our sincere gratitude to everyone involved, as we embark on this transformative journey together.

ROBUST-6G Showcases Secure 6G Vision at SNS JU Webinar

Earlier this year, the ROBUST-6G project participated in a webinar hosted by the European Smart Networks and Services Joint Undertaking (SNS JU). The event introduced the projects funded in the second phase of the SNS JU programme.

Our project coordinator, Gunes Fatma KESİK, delivered a presentation unveiling ROBUST-6G's potential to establish secure and reliable 6G networks. As part of our 13-partner consortium, we are developing a smart, automated, and reliable security service platform for 6G.

The SNS JU webinar provided an excellent opportunity to share our vision and connect with other 6G pioneers. We are grateful for this platform to contribute to the SNS JU's mission of facilitating European leadership in 5G and 6G technologies.

Watch here

ROBUST-6G Completes Key Deliverable on 6G Threat Analysis

Our team has successfully delivered the D2.1 – 6G Threat Analysis Report, a crucial document that lays the foundation for our ongoing work in 6G security.

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This comprehensive deliverable includes:

1. A state-of-the-art review of existing solutions for threat detection and protection
2. An in-depth analysis of security threats specific to 6G networks

The deliverable provides a state-of-the-art review on existing solutions for threat detection and protection, and an analysis of the characterization of security threats in 6G networks. The analysis is performed on selected key 6G technical enablers, use cases and applications with a focus on physical layer threats, for AI/ML modules, and for Application Programming Interfaces (APIs), within a common framework on threat analysis. This document will serve as basis for the design of cybersecurity capabilities within the other technical work packages in ROBUST-6G.

This deliverable is a significant step forward in our project, providing a common framework for threat analysis in 6G networks. It will serve as the basis for designing security capabilities in our subsequent work packages.

We are proud of this achievement and the collaborative effort of our partners in producing this valuable resource for the 6G security community. The report will be published on the ROBUST-6G project website.

ROBUST-6G Represented at Türkiye-Spain Digital Technology Platform

Several of our ROBUST-6G partners represented the project at the prestigious EuCNC & 6G Summit betweem 3-6 of June in Antwerp, Belgium. This included teams from Nextworks S.r.l., Telefónica Innovación Digital, University College Dublin, Universidad de Murcia, and the Chalmers University of Technology.

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Contributions of our dedicated consortium members helped raise awareness of our efforts to develop a smart, automated, and reliable security service platform for 6G networks.

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ROBUST-6G Represented at Türkiye-Spain Digital Technology Platform

Earlier this year, the ROBUST-6G project was represented at the Türkiye-Spain Digital Technology Platform event held in Madrid. The event featured roundtable discussions with entrepreneurs and investors, as well as an exploration of collaboration opportunities in EU programs.

The ROBUST-6G project showcased at this forum with two partners from each of two countries, highlighting our work on research collaboration between the two countries.

We are grateful to the organizers - DEİK - Foreign Economic Relations Board, TÜBİTAK, and the European Union Delegation to Türkiye - for providing this platform to present the ROBUST-6G project as a success story in international partnerships.

ROBUST-6G Holds Successful Plenary Meeting at Chalmers University

ROBUST-6G project recently held its second plenary meeting at the Chalmers University of Technology in Gothenburg, Sweden on June 29-31, 2024

This was an invaluable opportunity for our consortium partners to come together, share progress updates on each work package, and engage in fruitful discussions. The active participation of all our partners during this meeting was truly remarkable, and we are thrilled with the significant progress made.

A heartfelt thank you goes out to Tommy Svensson and the entire Chalmers University of Technology team for their gracious hospitality in hosting this event. We were particularly delighted to have the chance to experience the historic 110-year-old ship, Bohuslan, operated by the Steamboat Society.

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ROBUST-6G Showcased at ICUFN 2024 Conference

On July 4th, 2024, Giovanni Perin from our project partner Università degli Studi di Padova (UNIPD), presented the ROBUST-6G project at the ICUFN 2024 conference in Budapest, Hungary.

Through Giovanni's insightful presentation, we were able to share our vision and the progress we have made in developing a smart, automated, and reliable security service platform for 6G networks.

The ICUFN 2024 conference brought together researchers, industry experts, and 6G enthusiasts from around the world, making it a valuable opportunity for the ROBUST-6G project to engage with the broader 6G community. We are grateful to have had this chance to showcase our work and contribute to the ongoing discussions shaping the future of 6G.

ROBUST-6G at IEEE-HPSR Conference!

On July 24th, our partner Nextworks S.r.l. had the opportunity to present at the IEEE-HPSR conference. We are thrilled to share that the ROBUST-6G project was highlighted during their presentation.

The IEEE-HPSR conference is a prestigious event that brings together researchers and industry experts from the field of high-performance switching and routing. Having the ROBUST-6G project represented at this forum allowed us to engage with the broader community and contribute to the discussions shaping the future of network technologies.

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ROBUST-6G Presented at 6G Security and Privacy Seminars

Dr. Madhusanka Liyanage, the Technical Management Committee leader of the ROBUST-6G project, presented our work at the 6G Security and Privacy Seminars. This event was part of the 6G Security Research and Development Program, which aims to shape the development of 6G telecommunications standards.

The ROBUST-6G presentation took place on August 1st, 2024, in an online virtual format. This was an excellent opportunity for us to share our progress and innovative approaches in establishing secure and reliable 6G networks with a global audience of 6G experts.

SSIE 2024 – Collaboration with ROBUST-6G

From July 8-12, 2024, the 33rd PhD Summer School of Information Engineering (SSIE) was held in Brixen, Italy. Co-organized by the University of Padova and IEEE Italy Section, the event welcomed nearly 100 participants and 26 speakers. Endorsed by the ROBUST-6G project (EU grant no. 101139068), SSIE 2024 offered two tracks: telecommunications and electronics.

Track 1 focused on machine learning for 6G systems, covering topics like quantum machine learning, energy efficiency, and next-generation MIMO systems. A student workshop showcased PhD research, with Elena Ferrari winning the Best Presentation Award in Telecommunications.

Networking opportunities were enhanced by included coffee breaks and lunches, making SSIE 2024 a successful event for fostering academic collaboration and innovation.

Watch the recap

ROBUST-6G 3rd Plenary Meeting in Madrid, Spain

Progressive Steps in 3rd Plenary Meeting in Madrid for ROBUST-6G! The ROBUST-6G team met in Madrid on October 30-31, 2024, for the third plenary meeting, hosted by Telefónica Innovación Digital. This meeting was a critical point as we accelerate the project, aiming to deliver seven additional project deliverables by year's end.

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Marking the 10th month of our journey, the Madrid plenary highlighted essential updates from each work package. These presentations offered insights into recent achievements and evolving strategies, underscoring the steady progress toward our goals. Between face-to-face plenary meetings, several cross-work package sessions were conducted online to keep momentum and foster collaboration. During the plenary, the questions and challenges raised in these online sessions were thoroughly addressed, ensuring that teams are aligned and prepared to tackle complex issues together.

ROBUST-6G Project Introduction Video Now Live!

ROBUST-6G project introduction video is now available. This video provides a brief overview of our project's goals, focusing on security, resilience, and sustainability for 6G networks.

The video, produced by Michele Rossi and created with the collaborative efforts of our project partners, offers insights into the unique challenges and technological advancements that ROBUST-6G is addressing. It showcases the project's key goals, including developing smart, automated, and reliable security services that will form the backbone of secure 6G networks.

The introduction video is now available on our official Website and YouTube channels.

Watch the video and stay connected:

Watch the video

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ROBUST-6G Publications

Title	Authors
Secret Key Generation Rates for Line of Sight Multipath Channels in the Prescence of Eavesdroppers	Amitha Mayya, Arsenia Chorti, Rafael F. Schaefer, Gerhard P. Fettweis
Divergence-minimizing Attack Against Challenge-response Authentication with IRSs	L. Crosara, A. V. Guglielmi, N. Laurenti, and S. Tomasin
Physical-layer Challenge-response Authentication with IRS and Single-antenna Devices	A. V. Guglielmi, L. Crosara, S. Tomasin, and N. Laurenti
Energy-Based Optimization of Physical-Layer Challenge-Response Authentication with Drones	Francesco Ardizzon, Damiano Salvaterra, Mattia Piana, and Stefano Tomasin
One-Class Classification and the GLRT for Jamming Detection in Private 5G Networks	Matteo Varotto, Stefan Valentin, Francesco Ardizzon, Samuele Marzotto, and Stefano Tomasin
A Latent Space Metric for Enhancing Prediction Confidence in Earth Observation Data	I. Pitsiorlas, A. Tsantalidou, G. Arvanitakis, M. Kountouris, Ch. Kontoes
Decentralized LLM Inference over Edge Networks with Energy Harvesting	Aria Khoshsirat, Giovanni Perin, Michele Rossi
Semantics-Aware Active Fault Detection in Status Updating Systems	G. Stamatakis, N. Pappas, A. Fragkiadakis, N. Petroulakis and A. Traganitis
Version Age-based Client Scheduling Policy for Federating Learning	X. Hu, N. Pappas, H. Yang
Secure Status Updates under Eavesdropping: Age of Information-Based Secrecy Metrics	Q. Wang, H. Chen, P. Mohapatra, N. Pappas
ROBUST-6G: Smart, Automated, and Reliable Security Service Platform for 6G	Bartlomiej Siniarski, Chamara Sandeepa, Shen Wang, Madhusanka Liyanage, Cem Ayyildiz, Veli Can Yildirim, Hakan Alakoca, Fatma Gunes Kesik, Betul Guvenc Paltun, Giovanni Perin, Michele Rossi, Stefano Tomasin, Arsenia Chorti, Pietro G. Giardina, Alberto Garcıa Perez, Jose Marıa Jorquera Valero, Tommy Svensson, Nikolaos Pappas, Marios Kountouris
Advancing Security for 6G Smart Networks and Services	Madhusanka Liyanage, Pawani Porambage, Engin Zeydan, Thulitha Senevirathna, Yushan Siriwardhana, Awaneesh Kumar Yadav, Bartlomiej Siniarski
Transparent Intelligence: XAI for 6G Networks	Shen Wang, M. Atif Qureshi, Luis Miralles-Pechuan, Thien Huynh-The, Thippa Reddy Gadekallu, Madhusanka Liyanage
SHERPA: Explainable Robust Algorithms for Privacy-Preserved Federated Learning in Future Networks to Defend Against Data Poisoning Attacks	Chamara Sandeepa, Bartlomiej Siniarski, Shen Wang, Madhusanka Liyanage
A Novel Method to Mitigate Adversarial Attacks Against AI-as-a-Service Functionality	Ömer Faruk Tuna, Leyli Karaçay, Utku Gülen

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One-Class Classification as GLRT for Jamming Detection in Private 5G Networks	Matteo Varotto, Stefan Valentin, Francesco Ardizzon, Samuele Marzotto, and Stefano Tomasin
Analysis of Challenge-Response Authentication With Reconfigurable Intelligent Surfaces	Stefano Tomasin and Tarek N. M. Mohamed Elwakeel and Anna Valeria Guglielmi and Robin Maes and Nele Noels and Marc Moeneclaey
Securing Networks of the Future: A Programmable Security Monitoring Platform for Cloud Continuum	José María Jorquera Valero and Alberto García Pérez; Gunes Kesik; Ömer Faruk Tuna; Pietro Giardina and Enrico Alberti; Lucía Cabanillas Rodríguez; Ignacio Dominguez; Diego Lopez; Dhouha Ayed; Manuel Gil Pérez and Gregorio Martinez Perez
VREM-FL: mobility-aware computation-scheduling co-design for vehicular federated learning	Luca Ballotta, Nicolò Dal Fabbro, Giovanni Perin, Luca Schenato, Michele Rossi, Giuseppe Piro
Generalized Multi-Layer ML-IDS for Smart Buildings	Marco Ruta, Pietro Giuseppe Giardiana, Giada Lendi, Rosario Garroppo
Trustworthy Intrusion Detection: Confidence Estimation Using Latent Space	I. Pitsiorlas, G. Arvanitakis, M. Kountouris
Blocked Job Offloading Based Computing Resources Sharing in LEO Satellite Networks	Pei Peng, Tianheng Xu, Xianfu Chen, Charilaos C. Zarakovitis, Celimuge Wu
Impact of Residual Hardware Impairments on RIS-aided Authentication	Bilal Çiçek, Hakan Alakoca
Physical Layer Authentication Using Information Reconciliation	Atsu Kokuvi Angélo Passah, Rodrigo C. de Lamare, and Arsenia Chorti

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