

SHIFT Newsletter No.3

News on Sustainable Technologies Enabling Future Telecom Applications



SHIFT PROJECT'S CONTEXT AND OBJECTIVES

By SHIFT Consortium

The global market for next-generation telecommunications systems (B5G, 6G) demands products with higher speeds, better energy efficiency and sufficient power output. SHIFT aims to meet these needs by developing and industrializing next-generation semiconductor technologies (SiGe BiCMOS for ST, RF GaN for UMS) and the associated integrated circuit design and characterization environments. Innovative analog and digital RF integrated circuits will be designed with the technologies developed and integrated as 'FEM' modules of innovative telecommunications system demonstrators.

New assembly techniques that can solve RF signal integrity and heat dissipation issues, or greatly simplify RF systems, will also be explored.

Demonstrators of innovative telecommunications systems will be developed (10 demonstrators; by NOKIA, SAFRAN, SIAE, and other partners), to validate new semiconductor and assembly technologies, on use cases envisaged for wireless B5G/6G networks (more particularly for network access and network trunks), very high-speed optical networks, and Earth observation and satellite telecommunications.

The SHIFT consortium brings together players covering the entire value chain of these telecommunications applications, from laboratories to manufacturers, thus guaranteeing the highest scientific level and the possibility of validating the work carried out on suitable demonstrators. Activities will include environmental and economic impact assessments.



Newsletter Highlights

Description of SHIFT Project's Context and Objectives

SHIFT at Key Technology Events of 2024

SHIFT's Workshop at EuMW 2024

SHIFT General Assembly at Télécom Paris



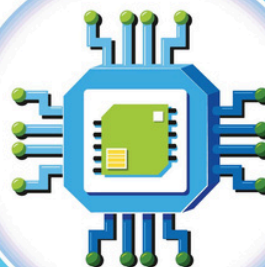
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SHIFT WORKSHOP AT EUROPEAN MICROWAVE WEEK 2024

Key Enabling Technologies for Future Wireless, Wired, Optical & Satcom Applications International Workshop



As part of SHIFT's mission, the SHIFT Consortium is organising a series of two workshops for a wide and impactful dissemination of the SHIFT results and outreach to stakeholders.

The first workshop was organised during the European Microwave Week EuMW 2024 conference, and took place in Paris on the 22nd of September 2024. This comprehensive conference in the field of microwaves is the largest in Europe. It was a highly interesting opportunity to present the initial results obtained in the context of the SHIFT project, and a close collaboration with the Move2THz project.



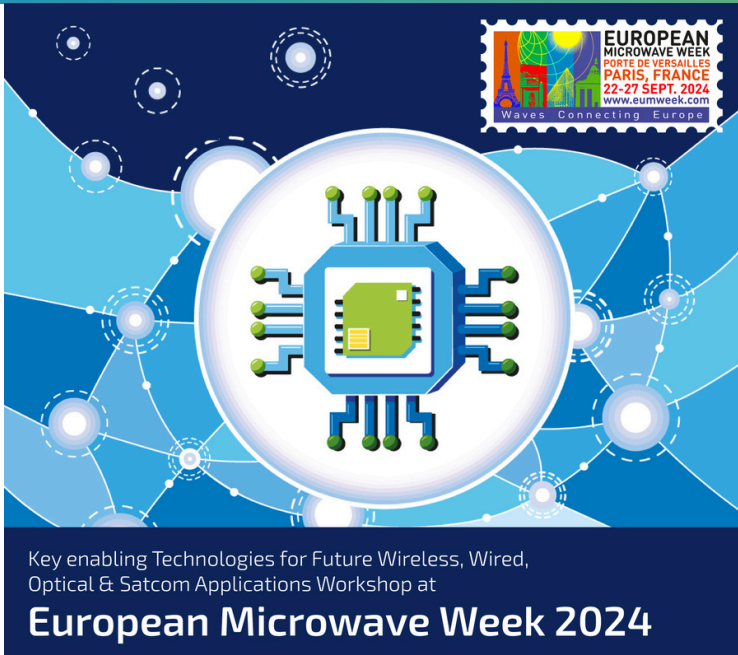
Waves Connecting Europe



The workshop featured 28 insightful presentations, divided into five thematic groups, each addressing different focus areas:

1. Substrate Technology Innovation for Emerging Applications.
2. Device Technology Modelling for Enhanced Performance and Sustainable Manufacturing.
3. Inventive Circuit Design and Architectures for High-Speed Communication.
4. Technology-Level Heterogeneous Integration for Enhanced Characteristics and Performance.
5. Disruptive System Design, Integration, and Packaging Technologies Enabling Future (sub-)THz and Optical Applications.

SHIFT WORKSHOP AT EUROPEAN MICROWAVE WEEK 2024



Following this SHIFT and Move2THz co-organised workshop "Key Enabling Technologies for Future Wireless, Wired, Optical & Satcom Applications" at the European Microwave Week, the consortium was proud to announce the publication of the book "Key Enabling Technologies for Future Wireless, Wired, Optical & Satcom Applications" (River Publishers).

This book presents the latest research roadmaps and achievements from the European ecosystem (industry, research, and academia) driving the development of future wireless, wired, optical, and satcom applications utilising the mm-wave and sub-THz bands.

The book covers the entire value chain, including technologies, devices, characterisation, architectures, circuits, 3D heterogeneous integration, and packaging. The book captures the synergetic interactions between European Chips JU projects SHIFT and Move2THz, the European 3D heterogeneous integration and packaging community, and the MTT-TC9 society. These interactions were forged during the International Workshop on "Key Enabling Technologies for Future Wireless, Wired, Optical and Satcom Applications" at the European Microwave Week in Paris, France, on 22 September 2024.

Whether you are a professional in the field or simply interested in the future of communication technologies, this book offers invaluable insights into the technological breakthroughs shaping our digital future.

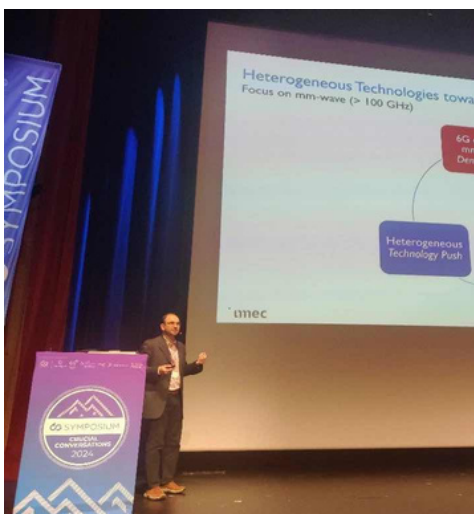
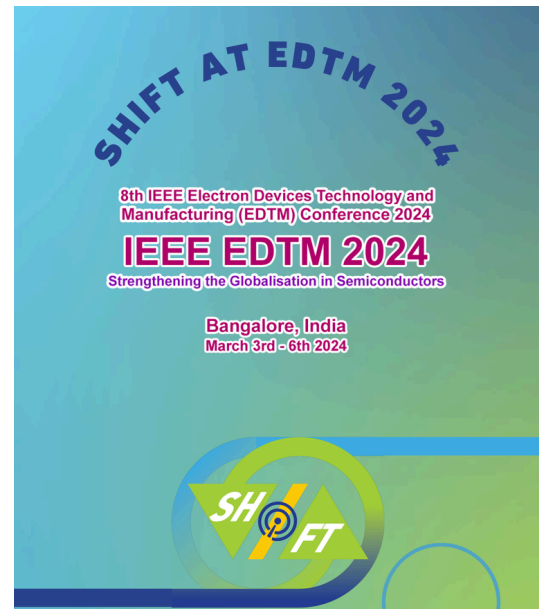


SHIFT COMMUNICATION NEWS

SHIFT AT IEEE EDTM 2024

SHIFT partners IMS Laboratory of the University of Bordeaux and ST presented SHIFT with a conference publication during the 2024 8th IEEE Electron Devices Technology & Manufacturing Conference (EDTM) in Bangalore, India on the 3rd -6th March 2024. SHIFT was presented with a publication titled “Next Generation SiGe HBTs for Energy Efficient Microwave Power Amplification”.

The 8th IEEE Electron Devices Technology & Manufacturing Conference (EDTM 2024) took place in Bangalore, bringing together global leaders in electron device technology and manufacturing. This prestigious event showcased the latest advancements, trends, and innovations in microelectronics and semiconductor manufacturing. With a focus on bridging academic research and industrial applications, EDTM 2024 featured technical presentations, interactive workshops, and valuable networking opportunities.



SHIFT AT 6G SYMPOSIUM

In a gathering of industry pioneers and thought leaders at the 6G Symposium, the spotlight shone brightly on the SHIFT project, presented by Giovanni Mangravitti from imec. This symposium, held in Sirkka, Finland, served as a crucible for envisioning the next frontier of wireless communications. SHIFT was presented with a presentation titled ‘Heterogeneous Technologies towards a Sustainable and Efficient 6G’.

Over 150 distinguished delegates representing academia, equipment manufacturers, governmental bodies, CSPs, and semiconductor entities congregated to engage in substantive dialogue regarding the potential and constraints of 6G technology. The convergence of such multifaceted expertise fostered an environment conducive to profound insights and strategic collaborations.

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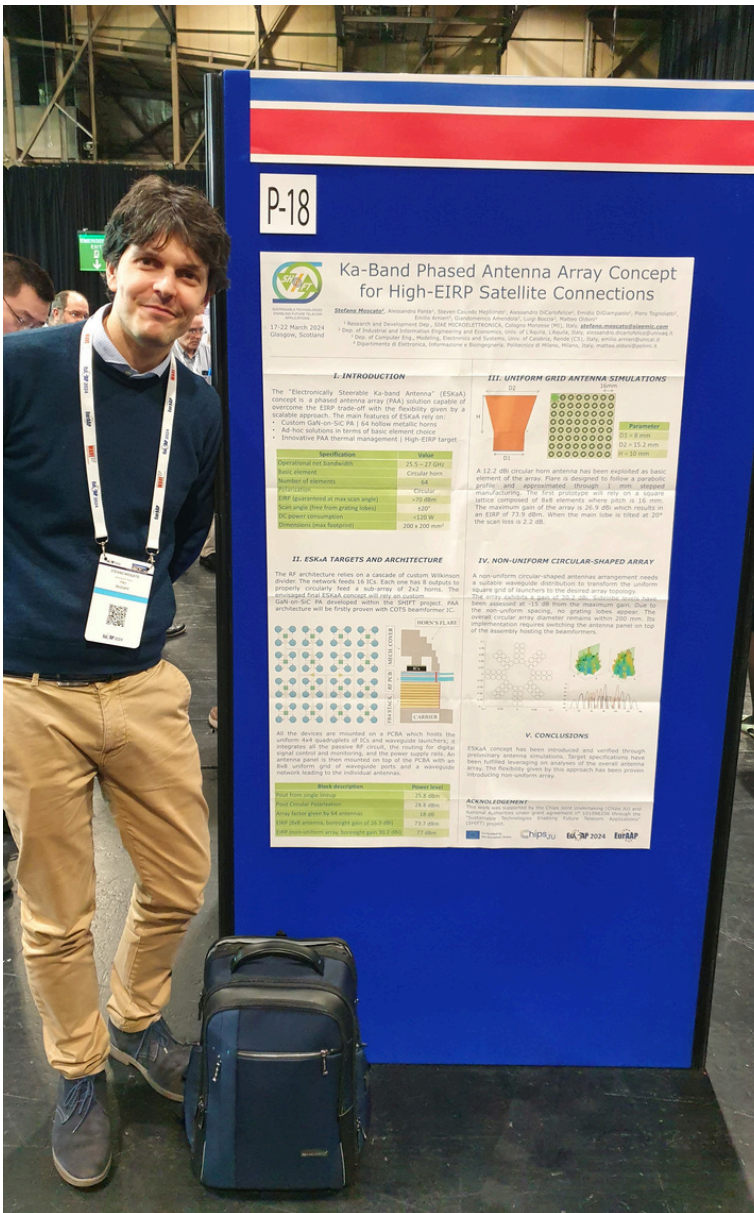
SHIFT COMMUNICATION NEWS

SHIFT AT THE 18TH EUROPEAN CONFERENCE ON ANTENNAS AND PROPAGATION

SIAE MICROELETTRONICA presented SHIFT's scientific publication "Ka-Band Phased Antenna Array Concept for High-EIRP Satellite Connections" written with the support of the Università degli Studi dell'Aquila, the Università della Calabria and the Politecnico di Milano during the 18th European Conference on Antennas and Propagation. This event took place on the 17-22 of March 2024 in Glasgow, Scotland, and brought together leaders from the antenna and propagation community.

The SHIFT paper and poster introduced an innovative transmitting antenna array for the Ka band (27 GHz) intended for space connectivity.

"This publication represents an important milestone in both technical and dissemination activities of the SHIFT European Project – Stefano Moscato explains - since summarises one of the major outcomes of the first year of our activity. The audience was really interested in the topic. In fact, Phased Array Antenna Systems are foreseen to be massively deployed for the next generation wireless interconnections".



SHIFT COMMUNICATION NEWS

SHIFT AT CSW 2024

III-V Lab showcased the groundbreaking SHIFT project during the Compound Semiconductor Week (CSW), held from June 3-6, 2024, at Lund University in Sweden. CSW 2024, the premier conference in the field of compound semiconductors, brings together experts and researchers to discuss the latest advancements in science, technology, and applications of these critical materials. The SHIFT project was presented with a focus on the TiW-based InP Double Heterojunction Bipolar Transistor (DHBT) technology with high fabrication yield, designed for next-generation communication systems' analog front-end integrated circuits. This technology will enable $<0.4\text{-}\mu\text{m}$ -emitter-width DHBTs with reduced base-link resistance, promising enhanced frequency performance. TiW-based InP DHBT driver and analog-multiplexer driver integrated circuits demonstrating state-of-the-art performances with high yield were presented.



SHIFT AT RADEC 2024

SHIFT partner IES presented SHIFT with a conference publication during the 2024 RADIATION Effects on Components and Systems (RADECS) Conference in Maspalomas, Gran Canaria on the 16th – 20th of September 2024. SHIFT was presented with a conference publication titled “Total Ionizing Dose in 130-nm and 55-nm SiGe:C Heterojunction Bipolar Transistors”.

The RADIATION Effects on Components and Systems (RADECS) Conference is an annual European (and, more generally, international) scientific and industrial forum on radiation and its effect on electronics and photonics materials, devices and systems. Every year it attracts hundreds of scientists and engineers from all over the world, focusing on the latest advances and results about open topics and challenges related to radiation effects.



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SHIFT COMMUNICATION NEWS

SHIFT GENERAL ASSEMBLY TÉLÉCOM PARIS

SHIFT project successfully conducted its second General Assembly Meeting at Télécom Paris on November 26–27, 2024. The event brought together key stakeholders, partners, and team members for two days of collaborative discussions, strategic planning, and progress updates. This meeting was an opportunity to reflect on the progress made, address challenges collectively, and lay a solid foundation for the next phases of the SHIFT project. It underscored the consortium's commitment to achieving its ambitious goals through teamwork, innovation, and strategic planning.



SHIFT AT EF ECS 2024 IN GHENT

SHIFT had the opportunity to present its progress and vision at the European Forum for Electronic Components and Systems (EF ECS) 2024, held in Ghent, Belgium, on December 5-6. This premier event brought together over 800 participants, including industry leaders, researchers, and policymakers, to explore advancements in the semiconductor and ECS sectors.

EF ECS 2024, themed “Strengthening EU Competitiveness,” highlighted the role of the Chips Joint Undertaking in addressing key societal and industrial challenges. The forum emphasised strategic autonomy and innovation within the ECS sector, showcasing Europe’s growing leadership in advanced chip technologies.



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