VIAVI

ACADEMIC RESEARCH

Accelerate Advanced 5G and 6G Research and Development Projects

Research to Reality

VIAVI is your trusted partner is advanced research projects for 5G and 6G Networks

VIAVI offers unparalleled expertise and solutions to support your research projects.

VIAVI TECHNOLOGY EXPERTISE

Network Digital Twins

Digital representations of live networks.

Ray Tracing

A powerful solution for generating channel data deterministically from a 3D model of an environment.

AI RAN — Neural and Neuromorphic Receiver Research

VIAVI developed AI- enabled receivers, to test benefits of this new network technology.

Communications and Sensing

Supporting the implementation of JCAS and ISAC technology into next generation networks.

Non-Terrestrial Networks

VIAVI's portfolio of NTN solutions, including powerful pre-deployment testing to ensure reliable deployment and timing and synchronization products that support lab to live satellite networking.

Advanced Beamforming Solutions

MU-MIMO Test solutions and AI-enabled beamforming technique research.

Open RAN Solutions

Lab and Field Open RAN testing solutions, adhering to TIP, 3GPP, and O-RAN Alliance specifications.

Cybersecurity Solutions

Comprehensive cybersecurity solutions including O-RAN Security Test Specifications, Secure Access Service Edge (SASE), Post Quantum Cryptography (PQC), and firewall testing.

Network Component, Environment and Traffic Modeling

Device emulation, Network component and Interface emulation, AI-powered RAN Scenario generation.

Automation and Orchestration Solutions

Automated test campaigns, cases, and executions in a single cloud-based platform.

VIAVI offers development and testing solutions to support your research goals, the applications listed above are underpinned by products tried and tested in a commercial setting.

VIAVI works with Network Equipment Manufacturers, Service Providers, Chipset Vendors, System Integrators in the Telecommunications Ecosystem, leading Research Institutions, Government Bodies and Universities. We contribute to industry specifications such as 3GPP and O-RAN ALLIANCE and Co-chair at several working groups.

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TM500 – MOBILE DEVICE EMULATION FOR NETWORK TESTING

Developed and designed to test and validate the function and performance of cellular networks in the lab. The TM500 offers a proven, robust and reliable solution to test 4G, 5G and future-proofed for 6G networks. It provides 3GPP feature sets before they are available in real mobile devices. Thousands of UEs can be available to you, as and when you need them.

The TM500 shows how the network behaves from a user perspective. This scalable solution provides flexibility for many different applications.

Known as the defacto standard UE emulator in the telco industry, the TM500 has been traditionally used in Network Equipment Manufacturers and Network Operators, however this proven solution has evolved to suit the needs of many other organizations across the telecoms ecosystem, from Chipset providers to academic institutions. Universities can now validate their Proofs of Concepts with an industry-standard solution.

Capabilities

- **Network Testing:** Supports comprehensive 4G and 5G (Non-Standalone and Standalone)

- **Use Cases:** Open RAN, NTN, MU-MIMO, eMBB, URLLC, Private 5G, Security, Massive IoT, MilComm

- **Device Emulation:** Simulates thousands of mobile devices

- **Types of Test:** Functional, performance, regression, E2E.

- **Comprehensive Testing:** Test across the entire protocol stack, from the physical layer to NAS and application layers.

- **Roadmap:** Advanced 3GPP Roadmap including 16, 17 and 18 including NTN and RedCap, Supports O-RAN ALLIANCE Specifications and is 6G ready

- **Features:** 10 CC Carrier Aggregation Embedded Fast Fading Mobility Models, Real Data Applications, MU-MIMO 16 Layers, Mixed Numerologies, FR1 and FR2: Carrier Aggregation, VoLTE, Handover, Mobility, Real Data Application (Voice, Video, data)

- **Connectivity:** Supports Over the Air (OTA), RF, and eCPRI

- **Compatibility:** Works with real and VIAVI emulated core network (vendor agnostic)

- **Automation:** In built automation for testcase management, execution and report generation.

TERAVM

Complementing and working with the TM500, the TeraVM offers a scalable, virtualized test solution, enabling the flexibility to run anywhere — lab, datacenter and the cloud. This powerful tool can be used for, Security Testing, Wireless Core Interface Testing and Wireless RAN and Core Emulation.

Capabilities

- **Security Test:** Cybersecurity Threat and Malware Penetration, Secure Access Firewall/VPN Testing. Post Quantum Cryptography (PQC) Test — Ensure PQC algorithms withstand cryptographic attacks and do not impact network performance.

- **Core Testing:** Performance, capacity or stress testing — Make sure the network works at scale (loaded with thousands of devices), works consistently over long time periods and delivers the Quality of Experience (QoE) expected by end users across each individual device. It is also vital in assuring the network is achieving maximum data rates, optimum latency per application and achieving the QoS targets necessary.

- **Core Emulation:** Enables the network to be validated as stable and verifies that it behaves in the same way, repeatably.

- **RAN Intelligence:** Tests in simulated real-world environments facilitate validation of the different mobility, traffic, and handover scenarios for 4G and 5G. End-to-end validations continue to be particularly important when testing disaggregated RAN networks leveraging Open RAN based components.

VAMOS – VIAVI AUTOMATION AND ORCHESTRATION SYSTEM

Integrated with TM500 and TeraVM, VAMOS automates test campaigns, cases, and executions in a single cloud-based platform. Customizable workspaces and configurations streamline the testing process and improve resource use across teams and lab locations. Shared tool testbeds and individual sandboxes accommodate many test needs, while the platform's solid analytics and reporting help boost test accuracy. VAMOS is also available to integrate into existing lab solutions.

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VIAVI MARCONI LABS

Dedicated to technology research for advancing network capability.

The VIAVI research team at VIAVI Marconi® Labs advances telecommunications through cutting-edge research, collaboration, and knowledge sharing. At VIAVI Marconi Labs, we honor Marconi's legacy by continuing to innovate and shape the future of wireless technology. With a mission to create transformative solutions that enhance network efficiency, security and accessibility. Fostering a collaborative environment that encourages creativity, diversity and excellence, to tackle evolving telecommunications challenges.

Current focus is on pioneering 6G technologies, from new access methods, Air Interface emulation techniques, integrated Network Intelligence to Digital Twins. VIAVI's 6G Forward Program includes industry leading research and development from VIAVI Marconi Labs. **We are ready to show you our pre-standards 6G Test Bed now.**

PARTNER WITH US TO ADVANCE NEXT GENERATION WIRELESS

With a focus on innovation and collaboration, VIAVI is committed to support the advancement of secure, efficient, and cutting-edge wireless technology.

A Century of Expertise in Network Innovation	3GPP/Open RAN
Complete Testing, Automation, and Optimization Portfolio, from RANtoCore	Lab testing, field deployment, and live optimization
Market-leading AI-driven RAN Scenario Generation and Ray Tracing	Simulate real-world RAN environments
Comprehensive Use Case Coverage	NTN to Open RAN, functional to performance testing from RAN to Core
Test Automation	VIAVI Automation Management and Orchestration System (VAMOS)
Network Digital Twin	Tailored digital replicas of the network, available as individual components or complete solutions
Cost-Effective Capex and Opex Models	Benefit from the VALOR Lab, funded by NTIA's Public Wireless Supply Chain Innovation Fund, Testing-as-a-Service (TaaS), and Lab-as-a-Service (LaaS) options
Cybersecurity	Solutions to ensure network performance after latest security software in installed

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