



SKY Perfect JSAT



MEDIA RELEASE

NEW 5G SATELLITE TECHNOLOGY BY AN INTERNATIONAL RESEARCH TEAM ADVANCES GLOBAL MOBILE CONNECTIVITY

Singapore, 23 May 2025 – Satellite phones and devices are currently the main modes of communication with the rest of the world for remote regions like Antarctica.

But that is about to change.

Through a unique collaborative research and development effort between industry and academia, regular mobile phones may soon be able to achieve connectivity in such areas.

Five organisations, the Singapore University of Technology and Design (SUTD), SKY Perfect JSAT (JSAT), TMY Technology, Inc. (TMYTEK), Rohde & Schwarz, and VIAVI Solutions (VIAVI)¹, have jointly developed a new 5G non-terrestrial network (NTN) satellite technology to advance mobile connectivity in remote locations. The research team conducted a live demonstration today at the World Expo 2025 Singapore Pavilion in Osaka, Japan, showcasing the deployment of an end-to-end cross-country 5G new radio (NR) NTN. This is the first such transmission between the two countries. The live demonstration was witnessed by guest of honour, Mr Ong Eng Chuan, Ambassador of the Republic of Singapore to Japan.

Imagine the scenario, where a ship is sailing in a remote location when a crew member encounters an emergency health issue. With traditional satellite communication, the crew can only send a text message to the shore for assistance. However, with the new technology showcased at the live demonstration, real-time communication via video-call becomes possible. The live demonstration showed that a 5G signal can be

¹ Annex A lists the contributions made by each partner to this research.

transmitted from an end user equipment (UE), such as a communication device, located in SUTD, Singapore, via a satellite antenna, to a geostationary (GEO) satellite operated by JSAT. This signal was then forwarded from the satellite to a ground station in JSAT, Japan, which connects to a 5G base station and 5G core network emulator, demonstrating the feasibility of communications between NTN and terrestrial networks (TN).

The live demonstration successfully showed that an existing GEO satellite can reliably support the 5G NR standards as defined by the Third Generation Partnership Project (3GPP), which is a consortium that develops global standards for mobile telecommunications. Although current 5G deployments primarily rely on TN, upcoming 6G networks are expected to be a convergence of both TN and NTN to achieve global coverage and resilient connectivity. Today's demonstration will lay the foundation for future extensions to medium earth orbit (MEO) and low earth orbit (LEO) satellites, as well as 6G converged TN and NTN.

Said Professor Tony Quek, Director of Singapore's Future Communications R&D Programme (FCP) and the Head of SUTD's Information Systems Technology and Design pillar: "As host of the Singapore's National Future Communications R&D Programme (FCP) and its Future Communications and Connectivity Lab (FCCLab), SUTD is proud to bring together partners JSAT, TMYTEK, Rohde & Schwarz, and VIAVI to collaborate and push the boundaries of 5G technology. Each partner brought a different expertise to the research effort and together, we were able to achieve this breakthrough.

"This partnership also provided SUTD students and researchers with valuable hands-on experience working on cutting edge technologies to solve a real-world problem with experts from around the world. I believe this will enable them to enhance their technical abilities as well as develop essential soft skills for the benefit of their future projects," he added.

"We are proud to have participated in the world's first demonstration using our geostationary satellite and 5G NTN Lab at the prestigious World Expo, under the leadership of SUTD. Moving forward, we will continue to contribute to the advancement of telecommunications technology through collaboration and engagement with

stakeholders in Singapore and beyond. Additionally, we will provide a highly reliable communication environment through the Universal NTN, an innovative multi-layered communication platform, aiming to establish technologies that enable seamless connectivity between mobile and satellite networks,” said Mr Eiichi Yonekura, Representative Director, President & CEO of SKY Perfect JSAT.

Additionally, this joint collaboration is also among the first in the world to integrate an electronically steered antenna (ESA) for 5G NTN GEO communications. This enables NTN technology to be more suitable for challenging use cases, such as in the maritime and autonomous vehicles industries; or connecting 5G UE to high-speed moving satellites such as LEO or MEO. Mr Su-Wei Chang, Founder and President of TMYTEK said: “At TMYTEK, we are proud to contribute our ESA technology to this pioneering collaboration, demonstrating our expertise in satellite communications and reinforcing TMYTEK as the go-to partner for 5G NTN connectivity.”

Satellite operators, mobile network operators, equipment vendors and end-user application providers need to be able to evaluate the performance of NTN networks and the traffic that runs across them. Rohde & Schwarz and VIAVI have developed an NTN digital twin testbed covering LEO, MEO and GEO, and this was used in the testing and validation of the end-to-end connectivity and performance in the live demonstration.

Said Dr Sameh Yamany, Chief Technology Officer of VIAVI Solutions: “At VIAVI, we are committed to enabling the future of global connectivity through innovation and collaboration. This breakthrough in 5G NTN technology marks a pivotal moment—not only proving that seamless mobile communication over satellite is achievable, but also laying the groundwork for resilient, borderless 6G networks. We are proud to contribute our test and validation expertise alongside global partners to turn this vision into reality.”

Mr Samuel Lur, General Manager of Rohde & Schwarz said: “As we unveil the latest in 5G NTN technology at the Osaka Expo, Rohde & Schwarz is proud to highlight our contributions in test and measurement that ensure the integrity and performance of these innovations. This achievement is a result of the collective efforts of our esteemed partners at SUTD and other collaborators. Thank you for your dedication and teamwork in pushing the boundaries of technology.”

About Singapore University of Technology and Design

The Singapore University of Technology and Design (SUTD) is the world's first Design AI university. With Design AI, artificial intelligence is treated as a partner and a member of the team – not just a tool. As a result of this unique SUTD treatment, AI and humans brainstorm, spar and prototype together, resulting in solutions that are elevated several-fold. This human-AI team concept has been made possible because of SUTD's unique cohort-based interdisciplinary pedagogy – which has been in place since the University's formation in 2009.

As a trailblazer in the field of design and technology education and research, SUTD has been pioneering innovative programmes and initiatives since our inception – including launching the world's first Design and AI degree in 2020 – well before AI was even a buzzword. The success of that pioneering degree has set the stage for a new growth strategy called SUTD Leap, which was launched in March 2024. Here, SUTD aims to redesign higher education with an even greater focus on design and AI, whilst nurturing the next generation of human-centric design x tech innovators and innovator leaders.

SUTD Website: www.sutd.edu.sg

About SKY Perfect JSAT

Asia's largest geostationary satellite operator, SKY Perfect JSAT, has been delivering reliable communications and broadcasting solutions for over 35 years. Our Space Business provides satellite coverage from North America to the Indian Ocean, supporting both commercial and government connectivity needs. We are expanding our Space Intelligence Business by leveraging satellite data and developing the non-terrestrial network "Universal NTN" to enhance connectivity, contribute to disaster preparedness and national security, and advance toward a super-smart society. In the Media Business, we operate the "SKY PerfectTV!" multi-channel Pay-TV platform in Japan and are extending our services through the Fiber-optic Alliance Business and tailored Media Solutions. We're also exploring Connected TV and Web3 to drive growth in the evolving media landscape.

SKY Perfect JSAT Group Website: www.skyperfectjsat.space/en

Space Business Website: www.skyperfectjsat.space/jsat/en/

About TMY Technology, Inc.

TMY Technology, Inc. (TMYTEK) is a leading provider of electronically steerable antenna (ESA) technology, specializing in design as well as hardware-software integration for sensing and communications. With extensive trial experience in non-terrestrial networks (NTN) and proven beamforming expertise, TMYTEK empowers global partners to achieve seamless, high-performance connectivity. Our cutting-edge phased array solutions support key applications in SATCOM, 5G/B5G, and defense, driving the future of next-generation wireless communication.

TMY Technology, Inc. Website: www.tmytek.com/

About Rhode & Schwarz

Rohde & Schwarz develops and markets innovative solutions for a safer and connected world. Our investments in future technologies like AI, IIoT, 6G, cloud solutions, and quantum technology position us for success. As a leading provider of Test & Measurement instruments and systems, we serve key industries such as mobile and wireless communications, automotive, aerospace and defense, and research and education.

Rohde & Schwarz Website: www.rohde-schwarz.com

About VIAVI

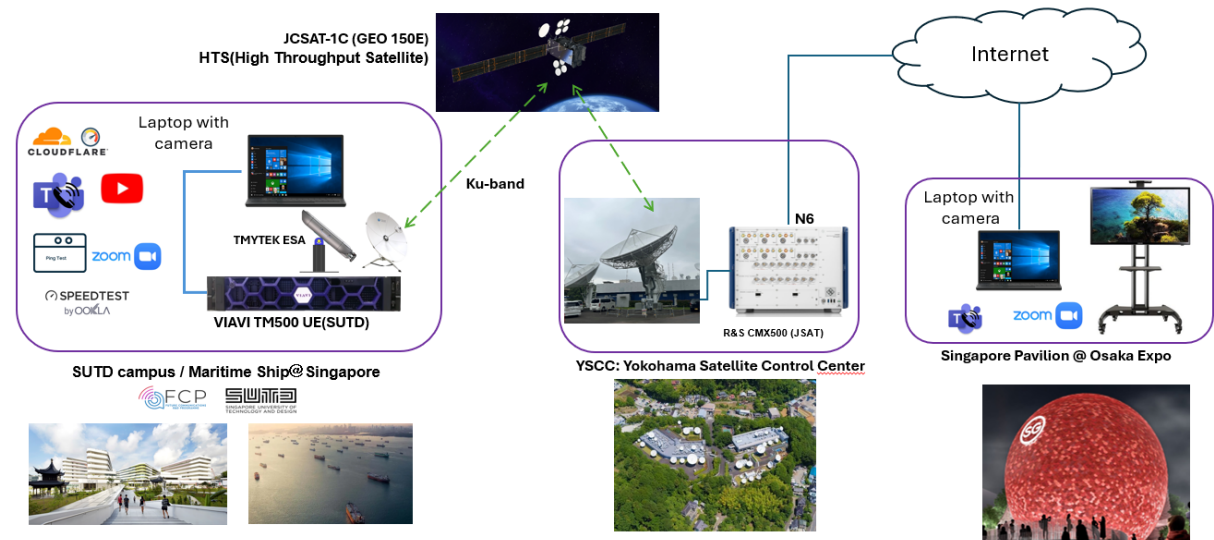
VIAVI (NASDAQ: VIAV) is a global provider of network test, monitoring and assurance solutions for telecommunications, cloud, enterprises, first responders, military, aerospace and railway. VIAVI is also a leader in light management technologies for 3D sensing, anti-counterfeiting, consumer electronics, industrial, automotive, government and aerospace applications. Learn more about VIAVI at www.viavisolutions.com. Follow us on [VIAVI Perspectives](#), [LinkedIn](#) and [YouTube](#).

Annex A – Contributions by Partners

<u>Partner Name</u>	<u>Contribution to Live Demonstration</u>
Singapore University of Technology and Design (SUTD)	<p>SUTD is the host of Singapore's Future Communications R&D Programme (FCP) and was tasked to strengthen Singapore's 5G ecosystem and accelerate research and translation of future communication technologies. Collaborations with international partners enable cutting edge 5G and 6G communication research and technologies to be conducted and this live demonstration is a result of this collaborative effort.</p> <p>The Future Communications Connectivity Lab (FCCLab) at SUTD is equipped with comprehensive NTN facilities to enable the testing of NTN solutions in the lab and transition to real-world NTN technology smoothly.</p> <p>The live demonstration signal was projected from an end-user device/equipment in SUTD's Singapore campus to the World Expo 2025 in Osaka for this world's first deployment of an end-to-end cross-country 5G new radio (NR) NTN.</p>
SKY Perfect JSAT (JSAT)	JSAT provided the satellite communication system design and a technical demonstration environment for 5G NTN ("Universal NTN Innovation Lab") including geostationary satellite, ground station, portable VSAT, and emulators.
TMY Technology, Inc. (TMYTEK)	Electronically Steered Antenna (ESA) with seamless hardware-software integration and extensive satellite trial experience.
Rohde & Schwarz	Utilising the R&S@CMX500 radio communication tester platform from Rohde & Schwarz, SUTD successfully simulated a range of RF conditions and network parameters for NTN testing. This facilitated the comprehensive verification and end-to-end IP data tests, encompassing both streaming and Voice over IP (VoIP) communications, under conditions representative of geostationary orbit (GEO) and low Earth orbit (LEO).
VIAVI Solutions (VIAVI)	<p>Satellite operators, mobile network operators, equipment vendors and end-user application providers need to be able to evaluate the performance of NTN networks and the traffic that runs across them. To support a variety of use cases, Rohde & Schwarz and VIAVI have developed an NTN digital twin testbed covering Low Earth Orbit (LEO), Medium Earth Orbit (MEO) and Geosynchronous Orbit (GEO).</p> <p>Use cases include validating end-to-end connectivity and performance; measuring Quality of Service over large coverage areas with different types of UEs; end user application performance while coping with distance, speed and mobility of both satellite and UE; and reliability and stability.</p> <p>The VIAVI TM500-AS2 will be used as 5G-NR UE. VIAVI TM500-AS2 is a streamlined version of the flagship used by global network equipment manufacturers for base station testing, fully supporting the 3GPP protocol including Doppler and delay pre-compensation.</p>

Annex B: Topology of the live demonstration

Topology of the live video call over 5G NTN technology



Caption: Topology of the live video call over 5G NTN technology across Singapore and Japan via GEO satellite