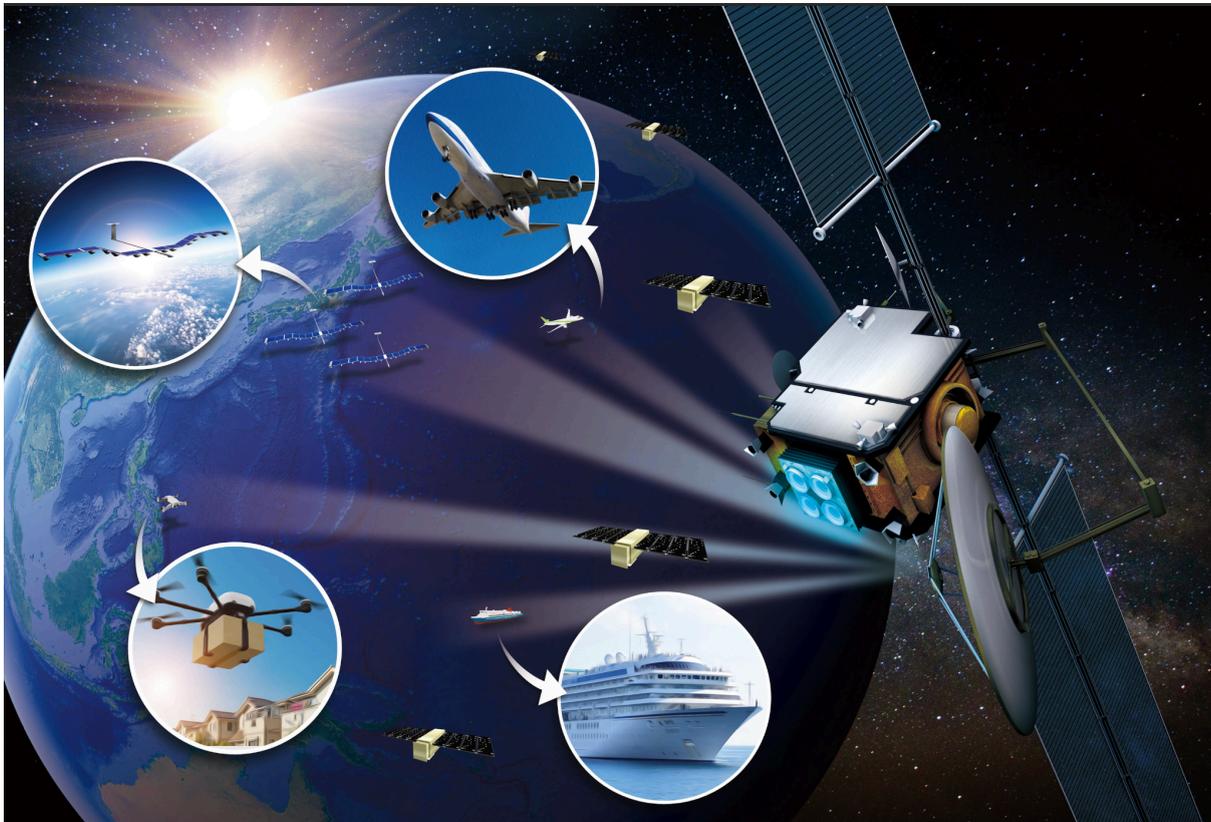


## NTN Lab Launched as SKY Perfect JSAT, Asia's Premier Private Satellite Operator Announces Dedicated Lab Environment for NTN (Non-Terrestrial Network) Technology

SKY Perfect JSAT Corporation, the leading satellite operator in Japan, has announced the launch and start of operations at their Universal NTN Innovation Lab (NTN Lab) inside the company's Yokohama Satellite Control Center (YSCC) from November 1st, 2024. The NTN Lab is designed to support SKY Perfect JSAT's space-based connectivity goals, and is dedicated to the development and testing of the company's Universal NTN initiative, a cutting-edge concept aimed to enable seamless access and connectivity anywhere and anytime.



Universal NTN Use Case Image (c) SKY Perfect JSAT Corporation

SKY Perfect JSAT describes the Universal NTN as a multi-layered non-terrestrial network system which delivers optimal connectivity based on application and user needs. Leveraging GEO (Geostationary Earth Orbit) and non-GEO satellites, as well as HAPS solar-powered aircraft, the idea of the Universal NTN is to build an interoperable network by using these platforms aloft as base stations, hubs and relay nodes. Technical testing and confirmation activities at the NTN Lab will first focus on linking a GEO satellite, orbiting at about 36,000 km above the Earth's equator. The network will be operating in the Ku-band (12 - 14 GHz), a slice of the electromagnetic spectrum commonly used for satellite communications. At present, SKY Perfect JSAT owns a constellation of 17 satellites in geostationary orbit, providing a footprint which spans from the Americas to the Indian Ocean. Among the goals of the validation testing at the NTN Lab is to create a set of technologies which will establish robust and reliable connections in an optimal path without human intervention. This effort into space-based connectivity, using 5G technology and GEO satellite, is the first initiative of its kind in Japan. Other priorities and projects on the NTN Lab's plate include a focus on development and improvements on 5G NTN technologies, as well as supporting the development and refinement of new satellite communications technologies.

## PURPOSE AND VISION OF THE NTN LAB

In some ways, the NTN Lab can be thought of as kind of like a start-up business incubator one might find in California's Silicon Valley, but the lab is expressly for the advancement of the satellite communications industry and collaboration with non-terrestrial networks. Established with the idea of providing a focused, dedicated environment for accelerating development of space-based and terrestrial technologies, the NTN Lab provides the tools, equipment and testbed facilities required to do legitimate groundbreaking verification testing in communications and connectivity tech. Let's take research into 5G NTN technologies as an example. 5G terrestrial networks are already an established technology, and some initial airborne 5G tests have been conducted successfully.

However, establishing a resilient 5G-level network for NTN communications between multiple infrastructures and between various user terminals with dynamically changing environments presents a multitude of complex technical and logistical challenges. Among the challenges present are how to rapidly and accurately mesh terrestrial and non-terrestrial networks, integrate and enhance global infrastructure connectivity, and how to meet the divergent requirements presented in a diverse range of environments. The NTN Lab has set out to not only conquer those challenges, but to standardize the technologies, allowing them to be reliably deployed anytime and anywhere. To make this vision a reality, however, the concept needs to be tested and proofed. The NTN Lab has established a complete testbed environment, the first of its kind, for SKY Perfect JSAT to conduct technical viability assessments in alignment with 5G guidelines set out by the 3GPP (3rd Generation Partnership Project), which acts as a global standards development committee including NTN work and deployment.

The 3GPP is a kind of standards organization that consists of regional telecommunication standards organizations, including the TTC(Telecommunications Technology Committee) and ARIB(Association of Radio Industries and Businesses) of Japan.

The NTN Lab has embarked on an ambitious roadmap over the next few years, planning phased expansions along the way. Initially, the NTN Lab will put its focus on validating core 5G NTN technologies, leveraging the resources of geostationary satellites already aloft in the SKY Perfect JSAT network and the existing YSCC infrastructure. The goal of this first phase of work is for the NTN Lab to provide a stable and robust foundation for the commercial deployment of NTN technology. Building on those initial results, SKY Perfect JSAT plans to open the NTN Lab up to other companies and organizations in the second half of fiscal year 2025, hoping to enable collaborative trials and technical research and development, further advancing the 5G NTN platform and expanding use of the network. That, in turn, should bring more interest from other companies wanting to develop applications and use cases for the system.

The NTN Lab is stocked with high-performance emulators for 5G NTN-compatible user equipment and base stations, including the TM500 wireless network tester from Viavi Solutions in the United States, and the CMX500 one box signaling tester by Rohde and Schwarz in Germany, among many other testing tools and resources. The NTN Lab can validate experimental technologies and run through a wide range of testing scenarios, ensuring that future NTN platforms have proven, reliable technologies deployed at the commercial level.

## THE FIRST STEP

Initial testing at the NTN Lab has centered on RF experiments with the Ku-band at 12-14 GHz and 5G NTN technology, building on proof of concept validation, and conducting further 5G NTN work as defined in 3GPP Release 19. The goal of this meticulous testing schedule is to overcome challenges and establish a commercial-grade high reliability communication environment over a satellite network, and ensure seamless connectivity between terrestrial and non-terrestrial networks.

Going forward from these first steps, the NTN Lab will pave the way for SKY Perfect JSAT to drive technological innovation, and expand collaboration landscape with more companies and research institutions to advance the commercialization of NTN technologies and create many new business opportunities. NTN connectivity, it is hoped, will someday soon be as normal as terrestrial networks for people to connect.

## PROVIDING CONNECTIVITY WHERE NONE EXISTS

“Japan experiences many types of natural disasters, so we would like to accumulate experiences across various use cases, and eventually, we aim to expand our efforts to help solve global issues.” said Hiroyuki Yagihashi, Deputy Group President of Business Innovation Group.

This is certainly true. On January 1, 2024, the Noto Peninsula Earthquake was a 7.5 shock which struck the Sea of Japan coast, causing widespread damage, upending roads,

knocking out infrastructure and communications throughout the region, and causing ongoing hazards for hundreds of thousands of people. A critical step in putting the pieces back together again after any major disaster is the re-establishment of communications and connectivity, and disaster recovery has become one paramount mission of the NTN Lab. To that end, one immediate and practical use of all this technological development at the NTN Lab is to provide platforms internationally to restore connectivity in areas which are cut off from communications due to typhoons, earthquakes or other disasters. SKY Perfect JSAT has already been providing emergency satellite connectivity throughout Japan including government agencies, municipalities, and companies supporting lifelines. More testing could lead, it is hoped, to the development of other rapid response deployment resources, such as mobile base stations and receivers to work with NTN networks to provide aid distribution assistance and infrastructure support.

In years to come, the NTN lab is expected to play an increasingly important role in supporting NTN communications infrastructure. The list of applications and new developments coming from the demonstration experiments conducted at the NTN Lab will doubtlessly grow as time goes on, and the technological innovation coming out of the NTN Lab will continue to provide more business opportunities for cooperation and collaboration with companies and research institutions around the world.

#### Related links

About 5G NTN Concept Testing

<https://www.skyperfectjsat.space/en/news>

SKY Perfect JSAT to Advance Development of “Universal NTN (Non-Terrestrial Network)”

[https://www.skyperfectjsat.space/en/news/detail/\\_universal\\_ntn\\_en.html](https://www.skyperfectjsat.space/en/news/detail/_universal_ntn_en.html)

SKY Perfect JSAT Launches “Universal NTN Innovation Lab” Environment at Yokohama Satellite Control Center

[https://www.skyperfectjsat.space/en/news/detail/\\_universal\\_ntn\\_lab\\_en.html](https://www.skyperfectjsat.space/en/news/detail/_universal_ntn_lab_en.html)

About SKY Perfect JSAT:

<https://www.skyperfectjsat.space/en>

By John Lawrence, Journalist.

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**SKY Perfect JSAT Corporation**

pr@sptvjsat.com

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Photo 6 in press kit



Universal NTN Use Case Image (c) SKY Perfect JSAT Corporation



Photo of Emulators at Universal NTN Innovation Lab (c) SKY Perfect JSAT Corporation



VSAT used for Universal NTN Tests (c) SKY Perfect JSAT Corporation



Ground Station Image at SKY Perfect JSAT Yokohama Satellite Control Center (c) SKY Perfect JSAT Corporation



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SKY Perfect JSAT Corporation\_Deputy Group President of Business Innovation Group\_Hiroyuki Yagihashi (c) SKY Perfect JSAT Corporation