

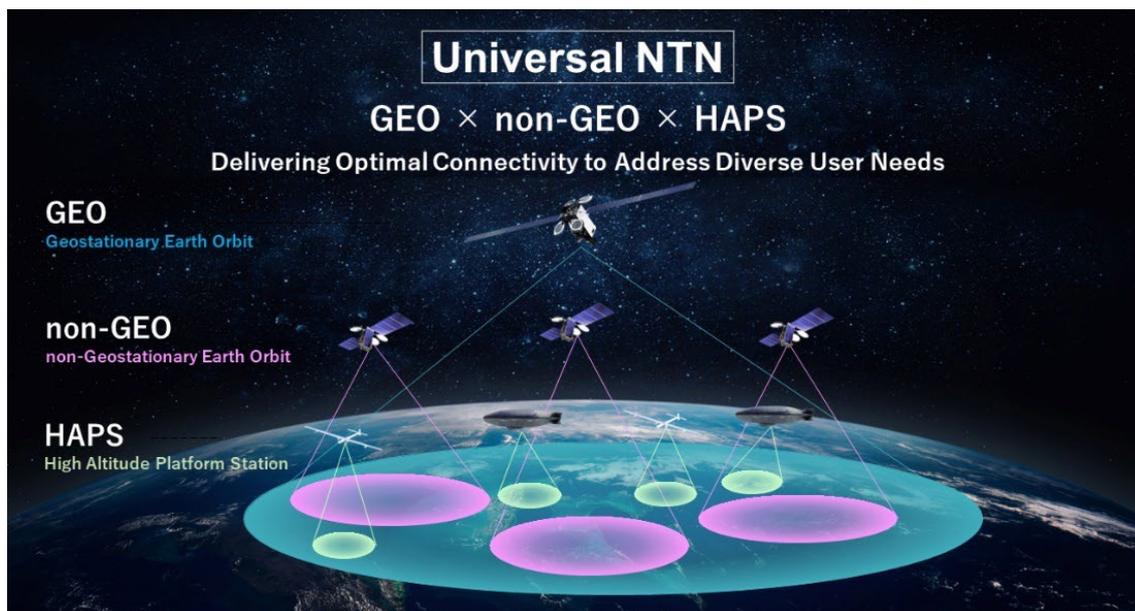


November 18, 2024

SKY Perfect JSAT Corporation

### SKY Perfect JSAT to Advance Development of "Universal NTN (Non-Terrestrial Network)"

SKY Perfect JSAT Corporation (Head Office: Minato-ku, Tokyo; Representative Director, President & CEO: Eiichi Yonekura, "SKY Perfect JSAT") is advancing the development towards "Universal NTN" — an innovative Non-Terrestrial Network ("NTN")<sup>\*1</sup> that will enable optimal connectivity anytime, anywhere, by integrating multiple communication infrastructures, including geostationary (GEO)<sup>\*2</sup> satellites, non-geostationary (non-GEO)<sup>\*3</sup> satellites, and high-altitude platforms (HAPS)<sup>\*4</sup>. Since 2021, SKY Perfect JSAT has been working toward this pioneering concept, and the initiative is now accelerating technical and commercial development, with testing set to begin this November.



Network Image of "Universal NTN"

With its multi-layered approach, "Universal NTN" is designed to deliver robust and reliable connectivity, especially in remote areas such as oceans and mountainous regions where traditional terrestrial networks are limited, while also supporting disaster resilience and recovery. As AI and IoT technologies become increasingly integrated into society, "Universal NTN" aims to address diverse connectivity needs, advancing toward a society where seamless coverage is available everywhere, with

automatic routing to the optimal communication path.

As Asia's largest satellite communications operator with 17 geostationary satellites, SKY Perfect JSAT actively supports global NTN infrastructure development. In April 2022, we joined 3GPP\*<sup>5</sup>, the international standardization project for mobile communication. Through standardization meetings, SKY Perfect JSAT has made proactive proposals to enhance the seamless integration of terrestrial and non-terrestrial networks, support multi-orbit and multi-operator NTN use cases, and promote the Ku-band\*<sup>6</sup> as a 5G NTN-compatible band. Testing of these technologies is underway and set to begin in November at SKY Perfect JSAT, moving towards practical application.



### Image of “Universal NTN” Use Cases



Superbird-9 Satellite

- Mar 2021**
  - Demonstration Experiment Measuring 39GHz Radio Wave Propagation for the Expanding Communication Coverage from Above
  - Procurement of Software-defined Satellite “Superbird-9”



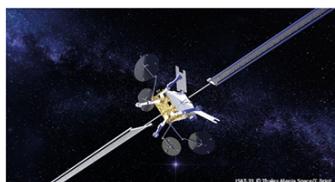
HAPS (Zephyr)

- May 2021**
  - NTT and SKY Perfect JSAT Sign Collaboration Agreement on New Space Enterprise to Advance a Sustainable Society

- Jan 2022**
  - Selected for Research Proposal on “Network Development of NTN Nodes and System Development & Demonstration for Coverage Expansion Use Cases” under NICT’s Beyond 5G R&D Promotion Program

- Apr 2022**
  - Formation of NTN Business Division at SKY Perfect JSAT
  - Commitment to Supporting Society 5.0 through the Development of “Universal NTN” Announced at the FY2021 Full-Year Financial Results Briefing
  - Initiated Participation in 3GPP International Standardization Project

- Jul 2022**
  - NTT and SKY Perfect JSAT Establish “Space Compass Corporation”



JSAT-31 Satellite

- Nov 2023**
  - Amazon’s Project Kuiper and NTT/SKY Perfect JSAT Form Strategic Collaboration to Bring Advanced Satellite Connectivity Options to Japan

- Dec 2023**
  - Accelerated Development for Direct-to-Device Service via Space-based NTN, with R&D on High-Speed, High-Capacity Technology Targeting Widespread Post-Implementation Use as part of NICT’s Innovative ICT Fund Projects for Beyond 5G/6G

- May 2024**
  - Procurement of Software-defined Satellite “JSAT-31”
  - World’s First Successful Demonstration of 5G Communication Using 38GHz Radio Waves in 4km Attitude

### “Universal NTN” Development Initiatives (2021-Present)

Collaboration across industry, government, and academia, is essential to realizing "Universal NTN," fostering open innovation with partners in Japan and internationally to ensure feasible solutions. SKY Perfect JSAT will continue coordination and collaborations with partners to actively conduct testing and advance "Universal NTN," providing updates as we progress.

\*1 NTN (Non-Terrestrial Network): A network using non-terrestrial platforms, such as satellite and HAPS, to provide communication coverage beyond traditional terrestrial networks (TN).

\*2 GEO (Geostationary Earth Orbit): Orbit located approximately 36,000 km above the equator, where satellites synchronize with the Earth's rotation and appear stationary from the Earth's perspective.

\*3 non-GEO (non-Geostationary Earth Orbit): Refers to any Earth orbit other than GEO.

\*4 HAPS (High Altitude Platform Station): Unmanned aircraft that operate at around 20km altitude in the stratosphere, providing communication and observation services. HAPS is expected to enable high-speed, large-capacity, and low-latency communication with devices such as smartphones, particularly in remote areas with limited communication infrastructure.

\*5 Ku-band: Frequency range from 12GHz to 14GHz, commonly used for satellite communications.

\*6 3GPP (3rd Generation Partnership Project): An international project that develops standards for mobile communication systems.

## Reference

- Other News Releases Related to “Universal NTN”
  - May 28, 2024: “Japanese Consortium Achieves World's First Demonstration of 5G Communication from Altitude of 4km Using 38GHz Band -- Major Step Toward Realization of 5G Communication from Stratosphere --”  
[https://www.skyperfectjsat.space/en/news/detail/japanese\\_consortium\\_achieves\\_worlds\\_first\\_demonstration\\_of\\_5g\\_communication\\_from\\_altitude\\_of\\_4km\\_usin.html](https://www.skyperfectjsat.space/en/news/detail/japanese_consortium_achieves_worlds_first_demonstration_of_5g_communication_from_altitude_of_4km_usin.html)
  - May 27, 2024: “SKY Perfect JSAT selects Thales Alenia Space to build a new cutting-edge software-defined satellite ‘JSAT-31’”  
[https://www.skyperfectjsat.space/en/news/detail/sky\\_perfect\\_jsat\\_selects\\_thales\\_alenia\\_space\\_to\\_build\\_a\\_new\\_cutting-edge\\_software-defined\\_satellite\\_.html](https://www.skyperfectjsat.space/en/news/detail/sky_perfect_jsat_selects_thales_alenia_space_to_build_a_new_cutting-edge_software-defined_satellite_.html)
  - December 7, 2023: “Space Compass, NTT DOCOMO, NTT and SKY Perfect JSAT to Develop Direct-to-Device Service via Space-based Non-terrestrial Network”  
[https://www.skyperfectjsat.space/en/news/detail/ space\\_compass\\_ntt\\_docomo\\_ntt\\_and\\_sky\\_perfect\\_jsat\\_to\\_develop\\_direct-to-device\\_service\\_via\\_space-bas.html](https://www.skyperfectjsat.space/en/news/detail/ space_compass_ntt_docomo_ntt_and_sky_perfect_jsat_to_develop_direct-to-device_service_via_space-bas.html)
  - November 28, 2023: “Amazon's Project Kuiper and NTT/SKY Perfect JSAT Form Strategic Collaboration to Bring Advanced Satellite Connectivity Options to Japan”  
[https://www.skyperfectjsat.space/en/news/detail/amazons\\_project\\_kuiper\\_and\\_nttsky\\_perfect\\_jsat\\_form\\_strategic\\_collaboration\\_to\\_bring\\_advanced\\_satell.html](https://www.skyperfectjsat.space/en/news/detail/amazons_project_kuiper_and_nttsky_perfect_jsat_form_strategic_collaboration_to_bring_advanced_satell.html)
  - April 26, 2022: “NTT and SKY Perfect JSAT Agree to Establish Space Compass Corporation -Novel Space Integrated Computing Network Enterprise to Aid Realization of a Sustainable Society-”  
[https://www.skyperfectjsat.space/en/news/detail/ntt\\_and\\_sky\\_perfect\\_jsat\\_agree\\_to\\_establish\\_space\\_compass\\_corporation\\_-novel\\_space\\_integrated\\_comput\\_l.html](https://www.skyperfectjsat.space/en/news/detail/ntt_and_sky_perfect_jsat_agree_to_establish_space_compass_corporation_-novel_space_integrated_comput_l.html)
  - January 17, 2022: “Airbus, NTT, DOCOMO and SKY Perfect JSAT Jointly Studying Connectivity Services from High-Altitude Platform Stations (HAPS) -- Targeting future global wireless-connectivity services combining satellites and HAPS”  
[https://www.skyperfectjsat.space/en/news/detail/airbus\\_ntt\\_docomo\\_and\\_sky\\_perfect\\_jsat\\_jointly\\_studying\\_connectivityservices\\_from\\_high-altitude\\_plat.html](https://www.skyperfectjsat.space/en/news/detail/airbus_ntt_docomo_and_sky_perfect_jsat_jointly_studying_connectivityservices_from_high-altitude_plat.html)
  - May 20, 2021: “NTT and SKY Perfect JSAT conclude collaboration agreement on new space enterprise to aid realization of a sustainable society”  
[https://www.skyperfectjsat.space/en/news/detail/ntt\\_and\\_sky\\_perfect\\_jsat\\_conclude\\_collaboration\\_agreement\\_on\\_new\\_space\\_enterprise\\_to\\_aid\\_realization.html](https://www.skyperfectjsat.space/en/news/detail/ntt_and_sky_perfect_jsat_conclude_collaboration_agreement_on_new_space_enterprise_to_aid_realization.html)
  - March 25, 2021: “SKY Perfect JSAT signs contract with Airbus to build Superbird-9 telecommunications satellite”  
[https://www.skyperfectjsat.space/en/news/detail/sky\\_perfect\\_jsat\\_signs\\_contract\\_with\\_airbus\\_to\\_build\\_superbird-9\\_telecommunications\\_satellite.html](https://www.skyperfectjsat.space/en/news/detail/sky_perfect_jsat_signs_contract_with_airbus_to_build_superbird-9_telecommunications_satellite.html)