

Joint Press Release—for immediate release

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 —

TOKYO, JAPAN, January 17, 2022—Airbus, Nippon Telegraph and Telephone Corporation (NTT), NTT DOCOMO, INC. (DOCOMO) and SKY Perfect JSAT Corporation (SKY Perfect JSAT) jointly announced that they have begun studying the feasibility of collaborating on future high-altitude platform stations (HAPS)-based connectivity services as part of a future space-based wireless connectivity ecosystem.

Launched with a memorandum of understanding (MOU), the study will attempt to identify the early deployment requirements of a HAPS-based network. The collaboration will investigate the use of the Airbus Zephyr, the leading solar-powered, stratospheric unmanned aerial system (UAS), and the wireless communication networks of NTT, DOCOMO and SKY Perfect JSAT in order to test HAPS connectivity, identify practical applications, develop required technologies and ultimately launch space-based wireless broadband services.

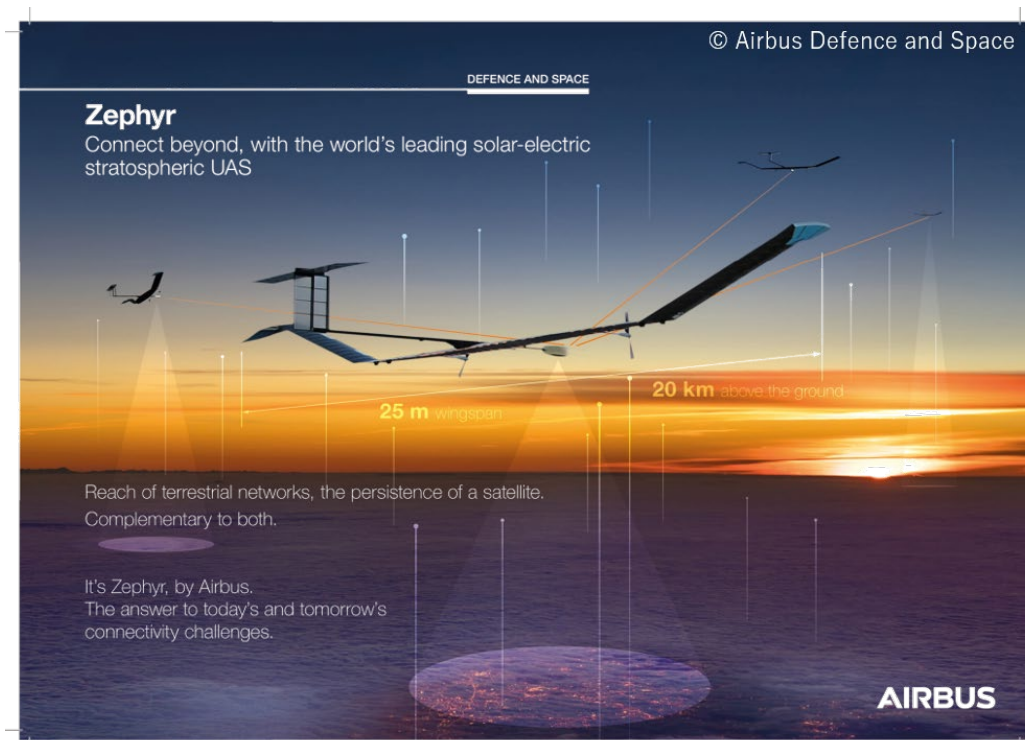


Fig. 1 Airbus "Zephyr" HAPS aircraft

In the global push to further advance 5G and eventually introduce 6G, initiatives are under way to expand coverage worldwide, including in the oceans and in the air. Such initiatives will include HAPS, which fly in the stratosphere about 20 km above the earth, and non-terrestrial network (NTN) technologies using geostationary-orbit (GEO) satellites and low Earth-orbit (LEO) satellites. HAPS networks are deemed to be a relatively easy

solution for air and sea connectivity and an effective platform for deploying disaster countermeasures and many industrial applications. The provision of space-based radio access network services using NTN technologies, collectively called Space RAN (radio access network), is expected to support worldwide mobile communications with ultra-wide coverage and improved disaster resistance as well enhanced 5G and 6G. In addition, HAPS platforms can also interconnect to the nearest terrestrial network gateway and extend the reach of existing mobile services directly to end-user devices, providing service options including as rural, emergency and maritime connectivity.

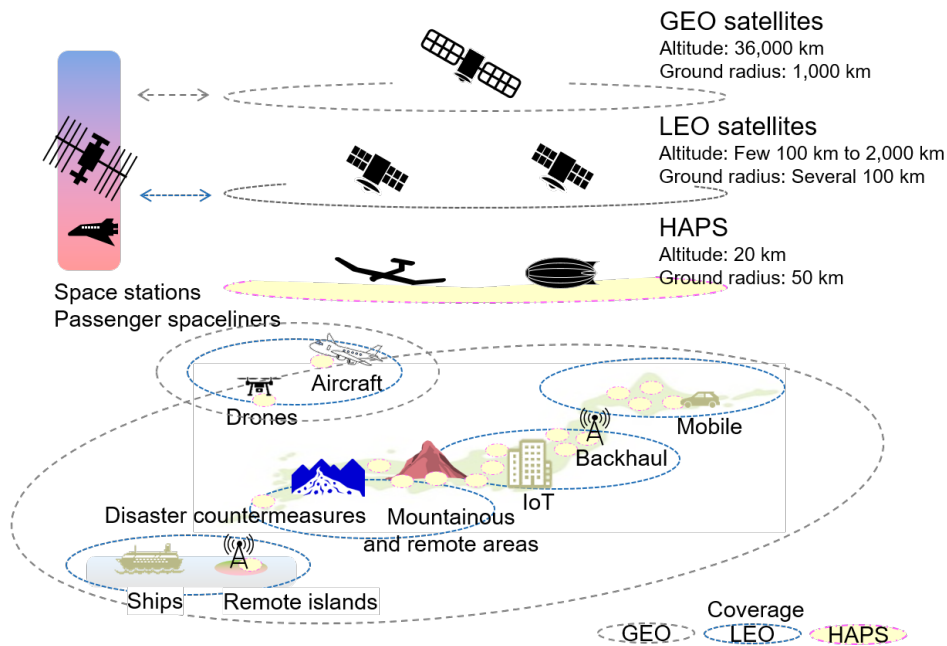


Fig. 2 Communication via satellites and HAPS

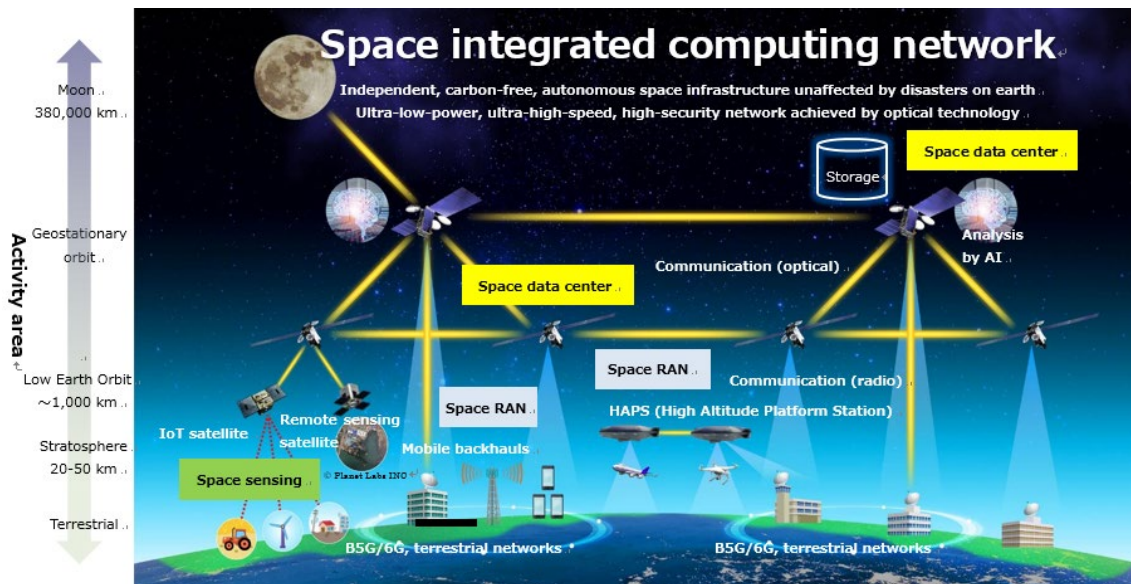


Fig. 3 Configuration of space integrated computing network

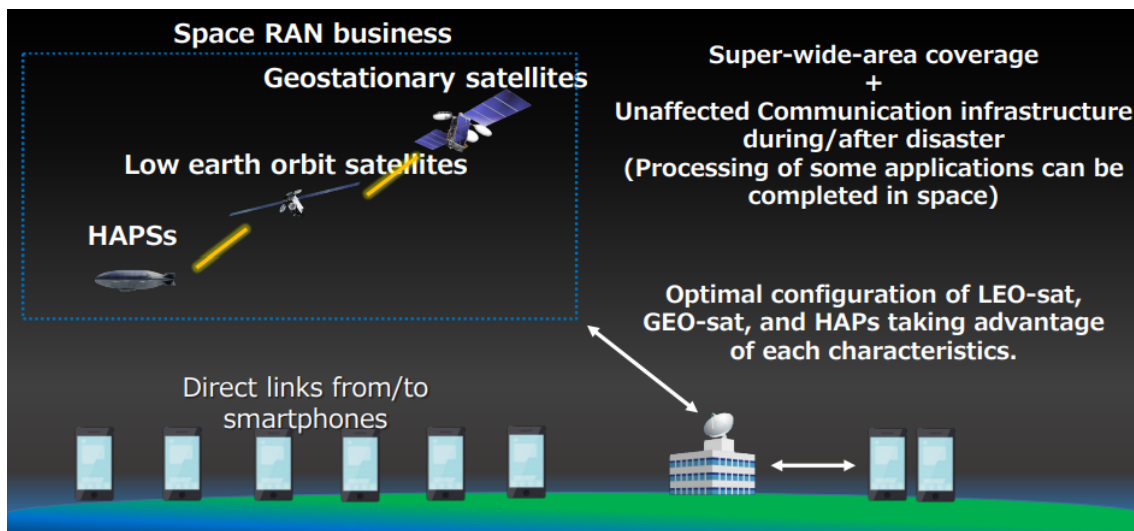


Fig. 4 Space RAN system structure

With the signing of the MOU, the four companies will discuss and identify possible future developments necessary to unlock future HAPS-based connectivity services, lobby for standardization and institutionalization of HAPS operations, and explore business models for commercializing HAPS services.

Specific themes will include the applicability of HAPS for mobile connectivity on the ground and base station backhaul,¹ the performance of various frequency bands in HAPS systems, the technological considerations for linking HAPS with satellites and ground base stations, and the establishment of a cooperative system to test a network combining NTN technology, satellites and HAPS.

As separately announced on November 15, 2021, DOCOMO and Airbus have successfully conducted a propagation test between the ground and a “Zephyr S” HAPS aircraft in the stratosphere, demonstrating the possibility of providing stable communication with such a configuration.

¹ Base station backhaul refers to a fixed line that supports high-speed, high-capacity information transmission between a large number of wireless base stations in a mobile communications network and the core network.

Related Releases

- May 20, 2021: NTT and SKY Perfect JSAT conclude collaboration agreement on new space enterprise to aid realization of a sustainable society
<https://group.ntt/en/newsrelease/2021/05/20/210520a.html>
- November 15, 2021: Zephyr High Altitude Platform Station (HAPS) achieves connectivity in trial conducted by Airbus and NTT DOCOMO
https://www.nttdocomo.co.jp/english/info/media_center/pr/2021/1115_00.html

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About Airbus

Airbus pioneers sustainable aerospace for a safe and united world. The Company constantly innovates to provide efficient and technologically-advanced solutions in aerospace, defence, and connected services. In commercial aircraft, Airbus offers modern and fuel-efficient airliners and associated services. Airbus is also a European leader in defence and security and one of the world's leading space businesses. In helicopters, Airbus provides the most efficient civil and military rotorcraft solutions and services worldwide.

About NTT

NTT believes in resolving social issues through our business operations by applying technology for good. We help clients accelerate growth and innovate for current and new business models. Our services include digital business consulting, technology and managed services for cybersecurity, applications, workplace, cloud, data center and networks all supported by our deep industry expertise and innovation. As a top 5 global technology and business solutions provider, our diverse teams operate in 80+ countries and regions and deliver services to over 190 of them. We serve over 80% of Fortune Global 100 companies and thousands of other clients and communities around the world. For more information on NTT, visit www.global.ntt/.

About NTT DOCOMO

NTT DOCOMO, Japan's leading mobile operator with over 83 million subscriptions, is one of the world's foremost contributors to 3G, 4G and 5G mobile network technologies. Beyond core communications services, DOCOMO is challenging new frontiers in collaboration with a growing number of entities ("+d" partners), creating exciting and convenient value-added services that change the way people live and work. Under a medium-term plan toward 2020 and beyond, DOCOMO is pioneering a leading-edge 5G network to facilitate innovative services that will amaze and inspire customers beyond their expectations.
<https://www.nttdocomo.co.jp/english/>.

About SKY Perfect JSAT

SKY Perfect JSAT Corporation is a leader in the converging fields of broadcasting and communications. It is Asia's largest satellite operator with a fleet of 16 satellites, and Japan's only provider of both multi-channel pay-TV broadcasting and satellite communications services. SKY Perfect JSAT delivers wide range of entertainment through "SKY PerfecTV!", the most extensive broadcasting platform in Japan with a total of 3 million subscribers. In addition, SKY Perfect JSAT's satellite communications services, which cover Asia, Russia, Middle East, Oceania, North America and Indian Ocean to Pacific Ocean regions, play a vital role in supporting communications infrastructures for mobile backhaul, government, aviation, maritime, oil & gas and disaster recovery. For more information, visit our corporate website (<https://www.skyperfectjsat.space/en/>) and Space Business website (<https://www.skyperfectjsat.space/jsat/en/>).