S1-241101

JSAT’s view on 6G NTN

3GPP SA1#106@Jeju May,2024
SKY Perfect JSAT Corporation

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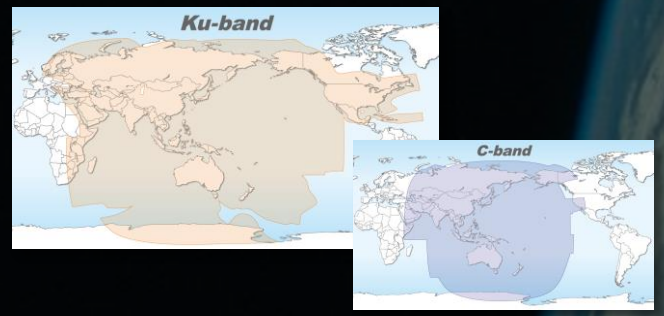
Participation in 3GPP since 2022

Space Business

Satellite capacity leasing, managed services and data intelligence services

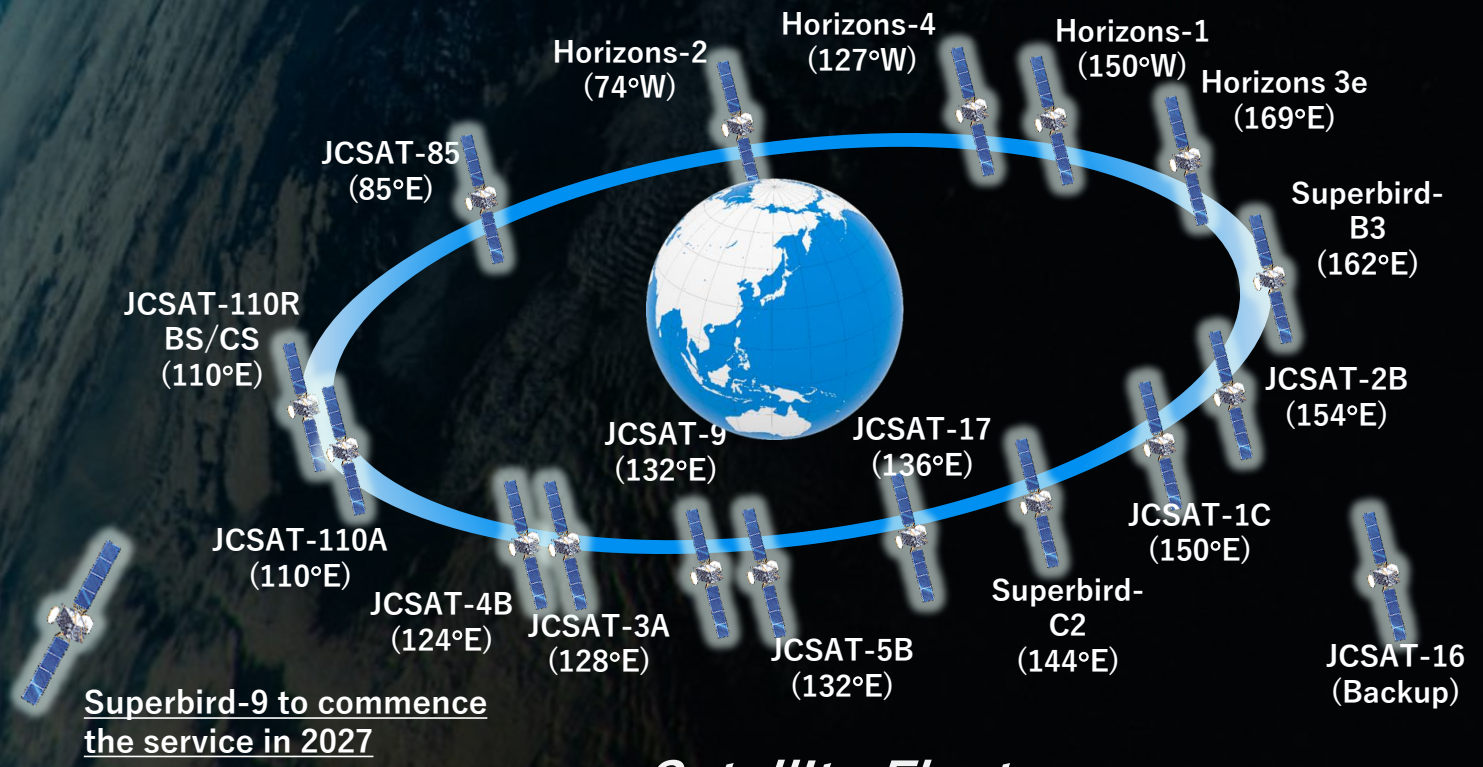
Government sector, public service companies, telcos, enterprises, broadcasters in Japan and other countries

Solid and diverse customer base



Global Coverage

The Largest in Asia/5th Largest in the world Satellite Communication Company by revenue



Satellite Fleet

17 GEO Satellites = Leading Asia-Pacific Operator

JSAT's vision towards 6G: 3 Important Topics

5G

Terrestrial Network

Interworking

NTN-NTN Roaming

+GSO (HTS/VHTS)

GSO +NGSO Constellation

Non-Terrestrial Network

Expansion of renewable energy utilization

Achieve carbon neutral by FY2025

5G-Advanced

5G System is designed for TN but integrated with NTN. NTN is also controlled by 3GPP RAN/5GC and managed by 3GPP NMS.

Integrated

3GPP NTN(NR)

Space RAN

NTN-TN Roaming

Sustainability on the ground

+Regenerative GSO/NGSO/HAPS

More flexible inter-operator collaboration

Independent

A part of computing & storage resources is operated on a common computing platform (e.g., NTN-MEC).

Interworking

Data relay

Computing platform

Space DC (Data Center)

Computing in space

AI for sustainability

6G

In 6G, NTN access can be assumed from the initial standardization stage, and an architecture, **waveform**, and protocols would be optimized **for both NTN and TN.**

Waveform optimization

3. Space Coverage

No awareness of communication lines e.g., seamless HO between operators

1. Unified

Synergy creation between telecommunication and computing

Space RAN (**Communication Platform**) and Space DC (**Computation Platform**) are merged and operating on the same 6G architecture.

2. Sustainability

6G NTN for sustainability

https://space-compass.com/en/

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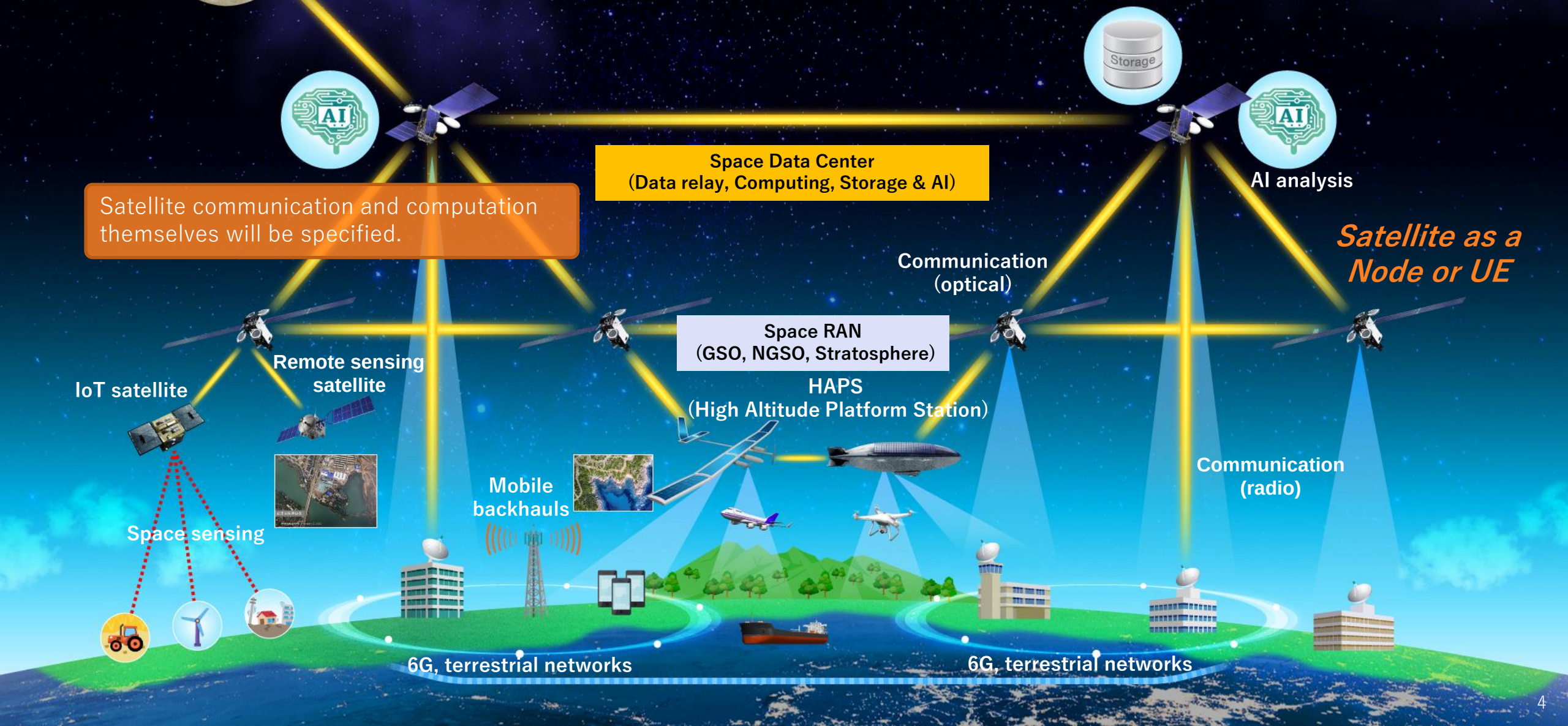
1. Unified

Space Integrated Computing Network

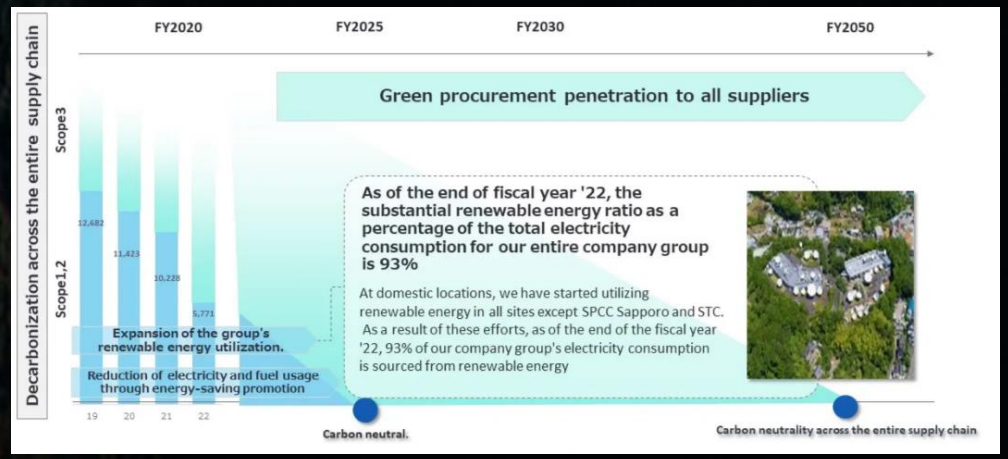
- Independent, autonomous space infrastructure unaffected by disasters on earth
- Ultra-low-power, ultra-high-speed, high-security network achieved by optical technology



6G NTN for Sustainability

2. Sustainability

- Rationalizing power consumption on the ground
  - 6G Radio Access Network
    - Considerations including satellite ground systems (e.g., HPA, Modem)
  - 6G Core Network
    - Mechanisms to support and promote optimization of power consumption utilizing AI
- Applications and use cases
  - Promote carbon neutrality by utilizing 6G. For example, using data that can be collected via 6G
- Sustainable products
  - We aim to green procurement to all suppliers
  - e.g., making criteria that can be referred to during a procurement process



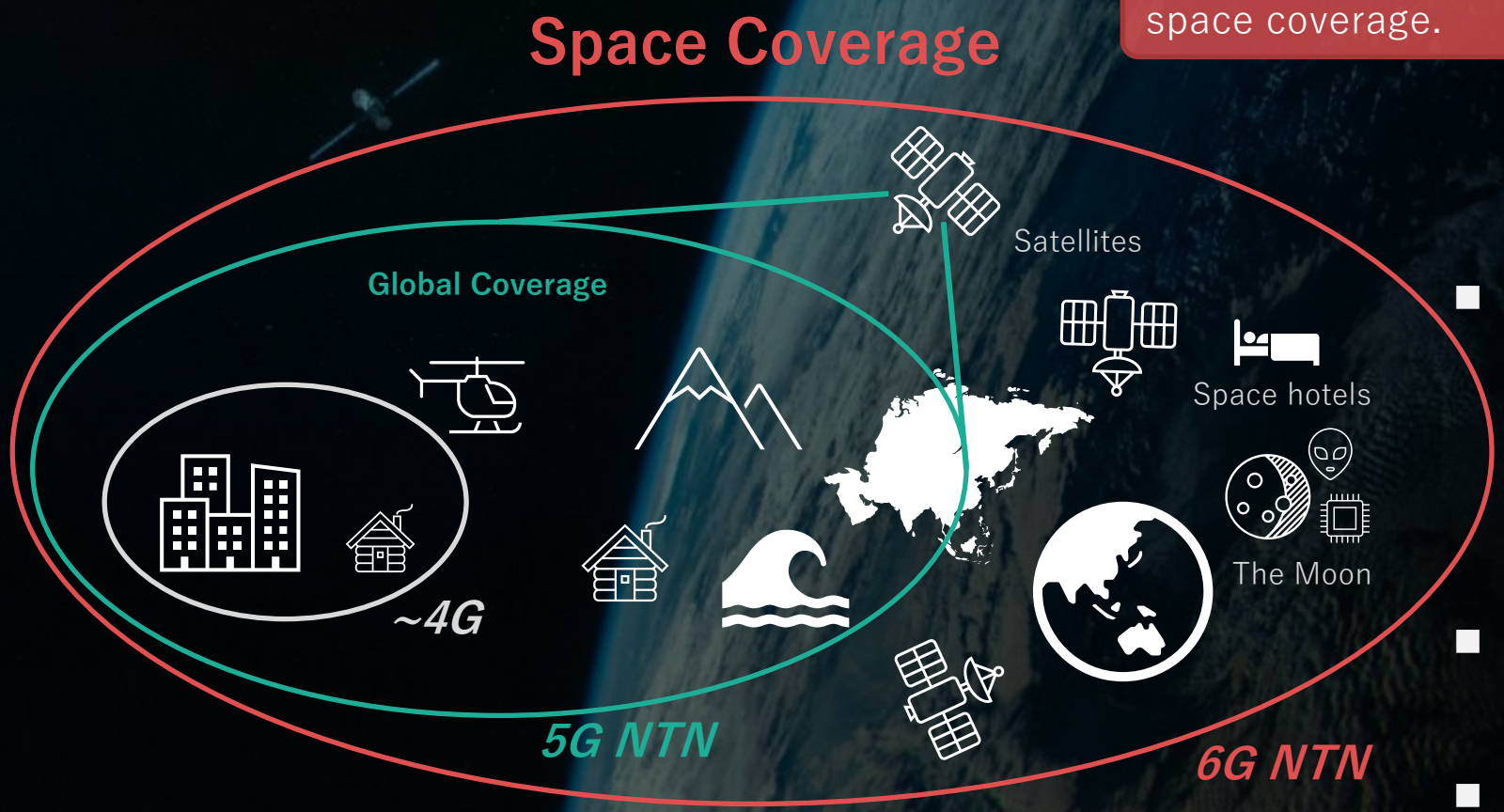
SKY Perfect JSAT Group Accelerates Carbon Neutral Goal Five Years Ahead of Plan to Fiscal 2025 ~Advancing Toward a Carbon-Free Society by Surpassing the Initial 2030 Target~

Achieving carbon neutrality, the place of power consumption will move from Earth to Space in the 6G Era.

Extensive Coverage

3. Space Coverage

Close cooperation between operators is expected to achieve space coverage.



More flexible inter connectivity is required

- Dealing with differences between operator. such as:
  - Mechanism to support multi polarization. (circular and vertical polarization, both polarization direction)
  - Mechanism to find satellites of a partner company. (Sharing ephemeris information)
  - New QoS concept assuming inter-operability between GSO, NGSO and TN operators.
- How to Steer/Switch/Split(/Select) these connectivity maintaining the user experience
- Some of these items could be included in the 5GA part ☺

From the user side, no awareness of the communication lines and operators.

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Space for your Smile