HAPS

~ 6G concept and HAPS/NTN ~

Ryuji Wakikawa

SoftBank

Vice President, Head of Advanced Technology Division

HAPS MOBILE

Board Director

HAPS Alliance
HIGH ALTITUDE PLATFORM STATION

Executive Board of Director

<Specialized field>
Research, development, and commercialization of new technologies, including 5G, IoT, HAPS and MaaS

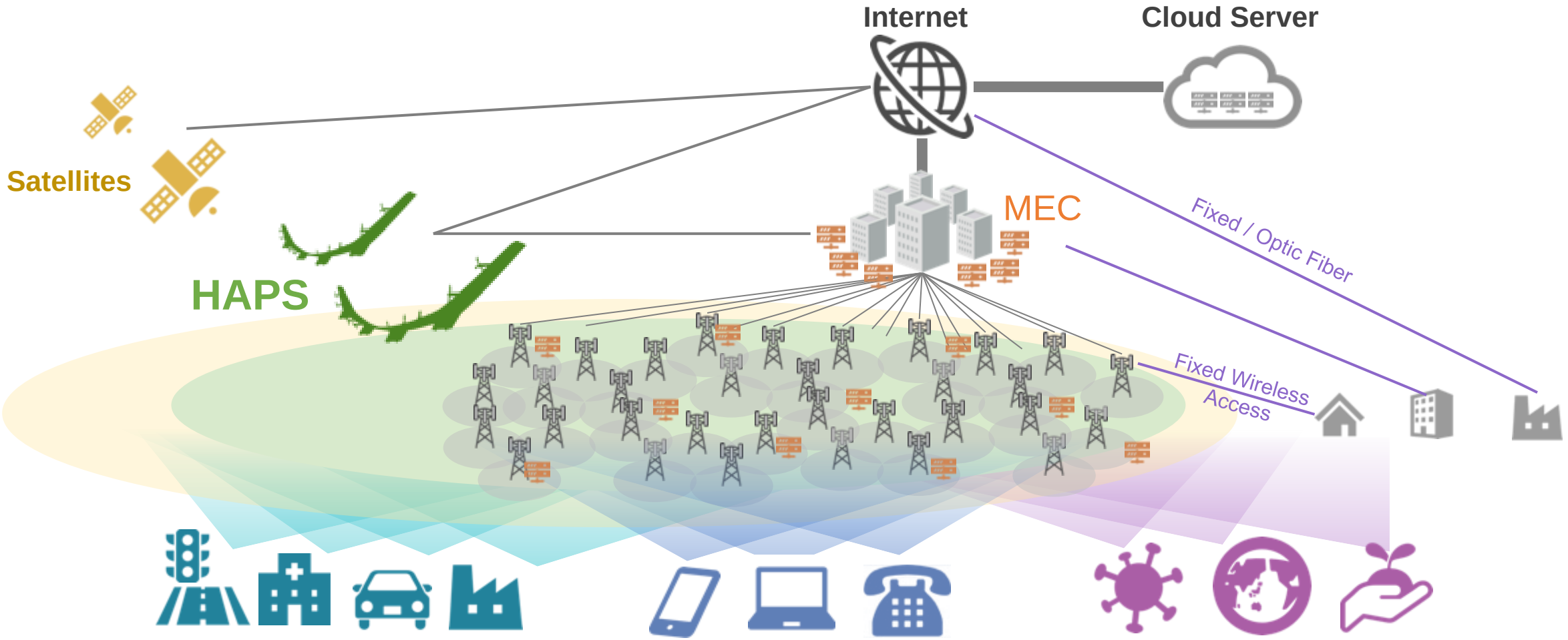
In 2030
Fully digitized society
Breaking away from legacy infrastructure

Today’s network infrastructure

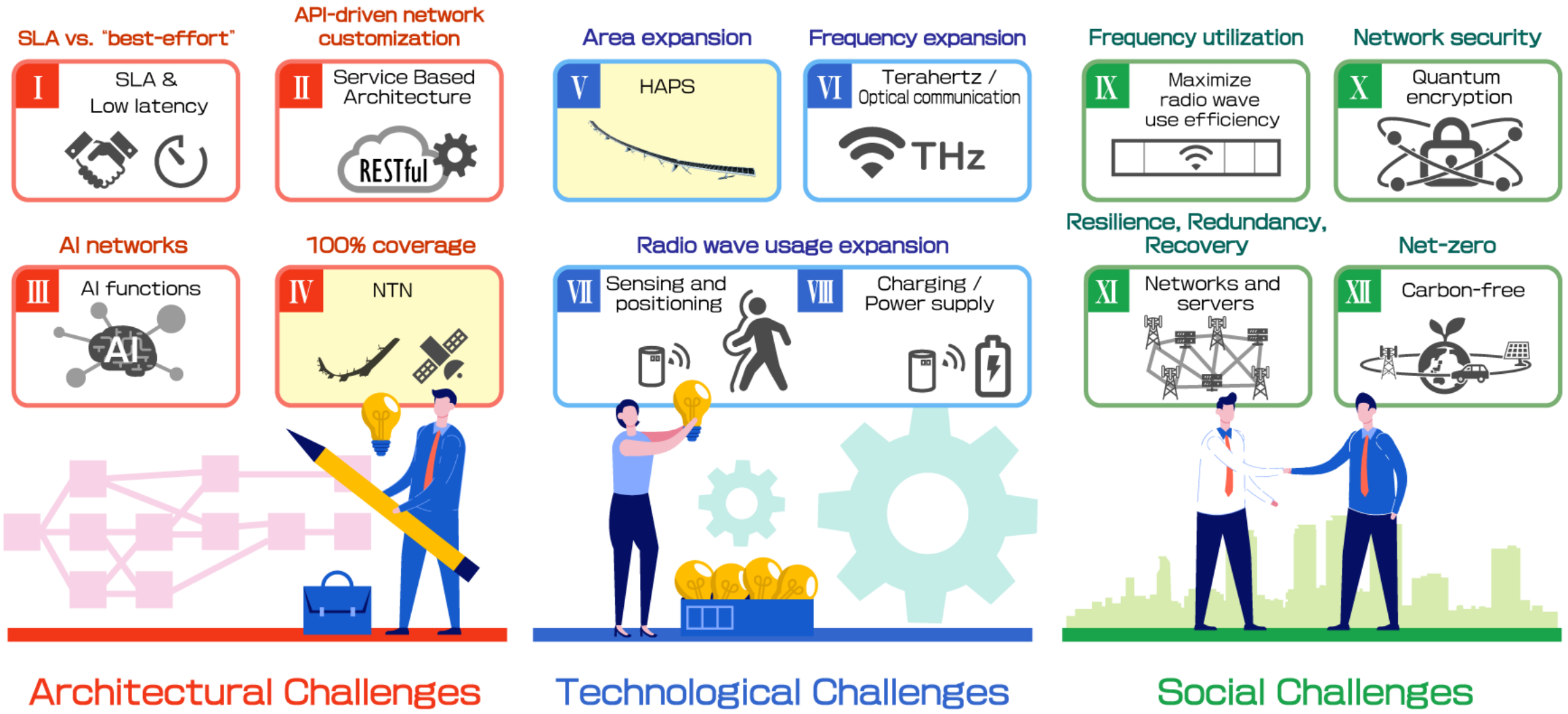
Consumer services

Smartphones・PCs・Telephones

The 6G world in 2030



12 Challenges for 6G



Communication

Economy

Education

Logistics

Agriculture

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Broadcasting

Internet : Social infrastructure

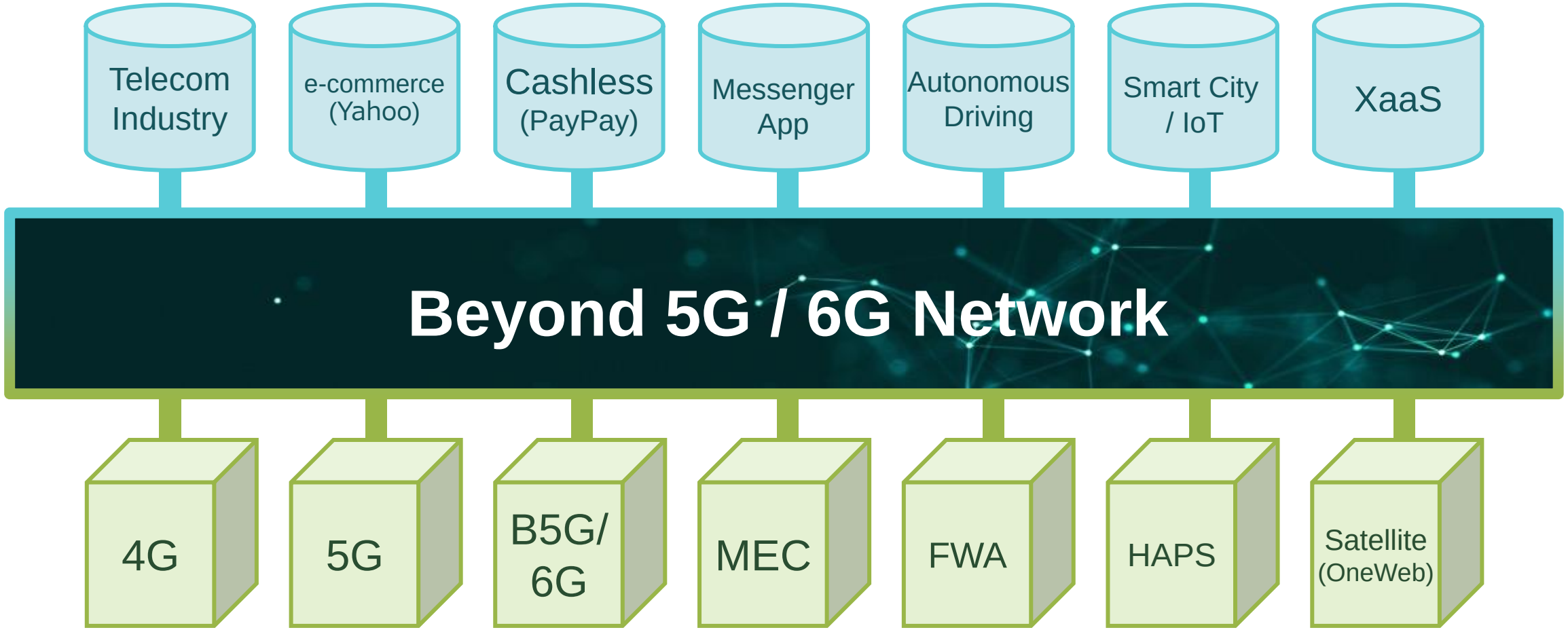
Mobile Network

Optic Fiber

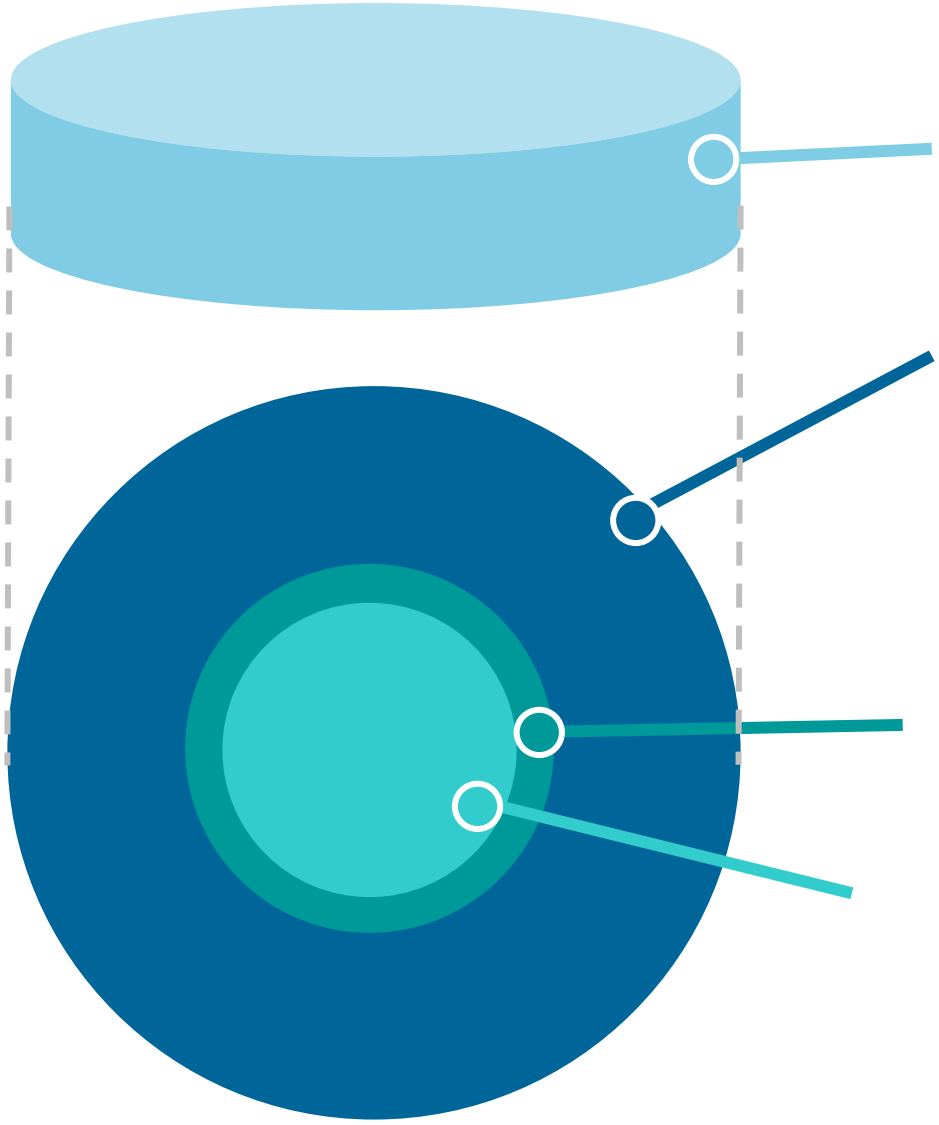
Satellite

Coaxial Cable

A backbone network that leads the digital industry



Future network area



Airspace

Isolated islands, mountainous area, etc.

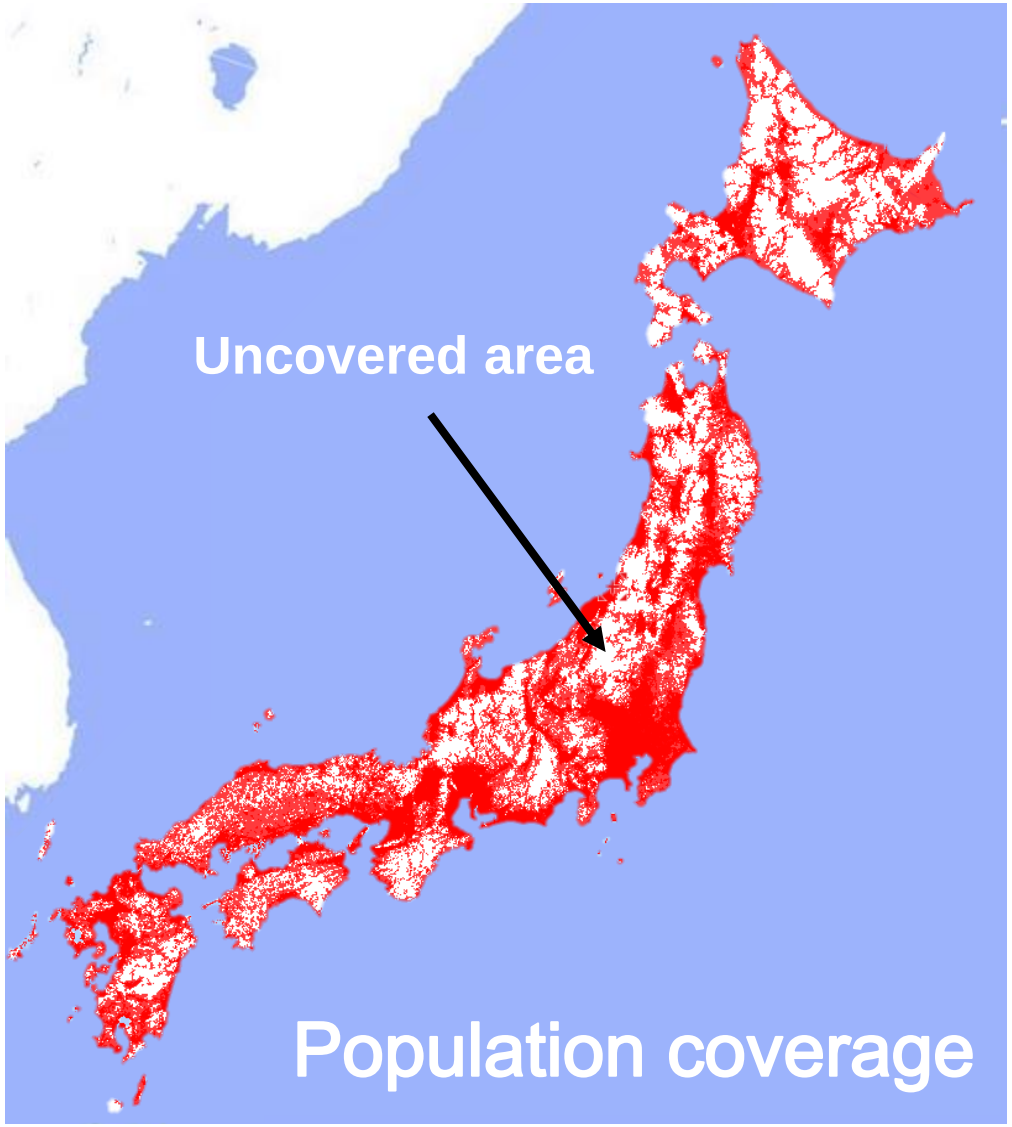
Human living area

Population Coverage

NW for IoT

NW for mobiles

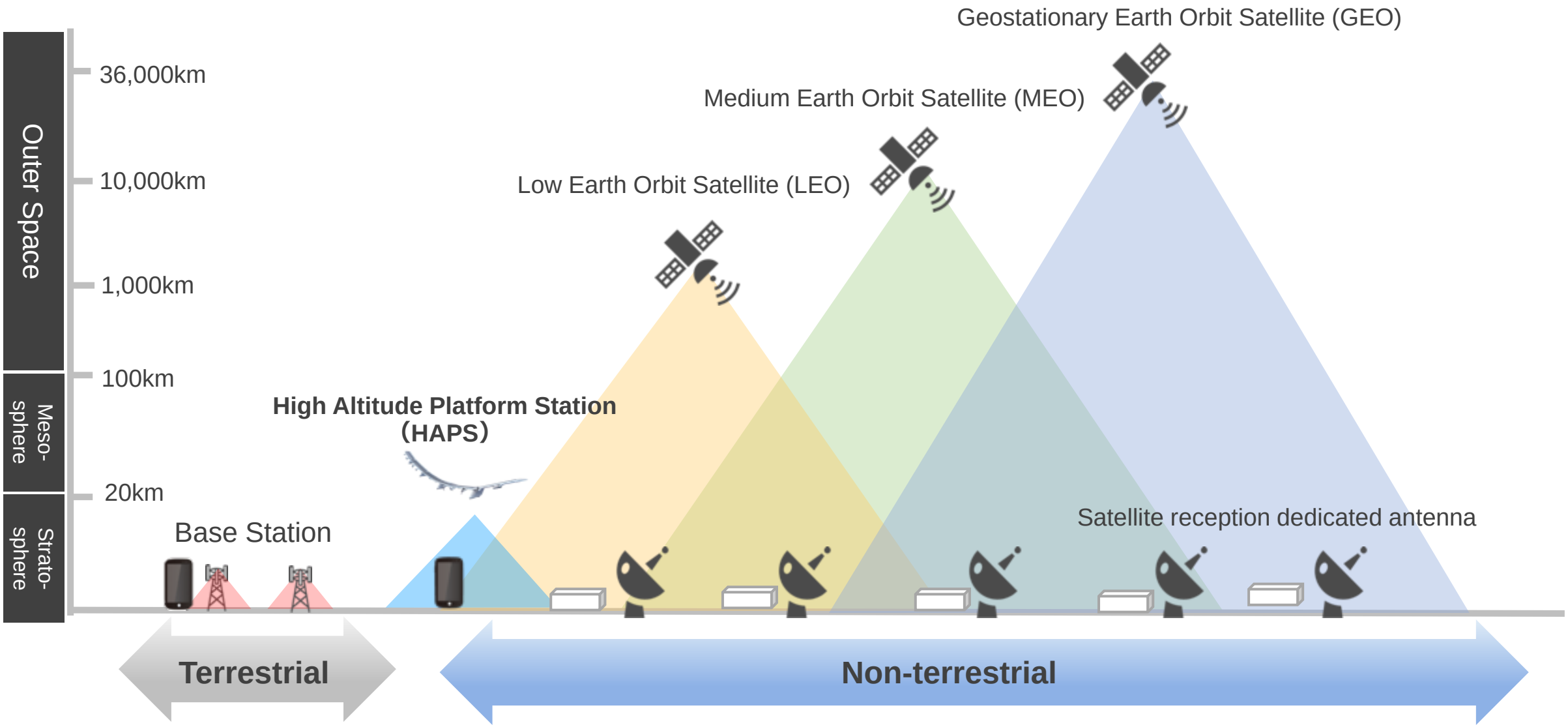
What type of coverage?



HAPS

Technology to realize communication infrastructure for next-gen industries

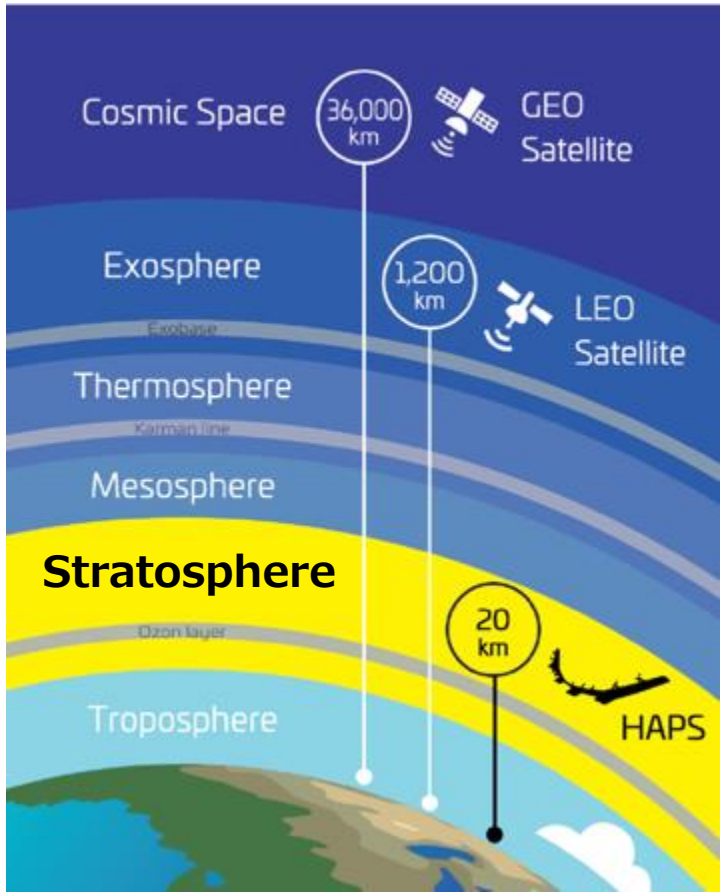
Internet from the sky



Mobile direct access with HAPS

	LEO Satellite	HAPS
Altitude	More than 1,000km	20km
Channel access method	Satellite system (TDMA, FDMA, etc.)	LTE, 5G, 6G
End user device	Dedicated terminals	Standard mobile handsets
Service Area	Extensive	200km in diameter
Latency	20ms~500ms	0.3ms (One-way)

※ Based on HAPSMobile's vehicle, the "Sunglider"

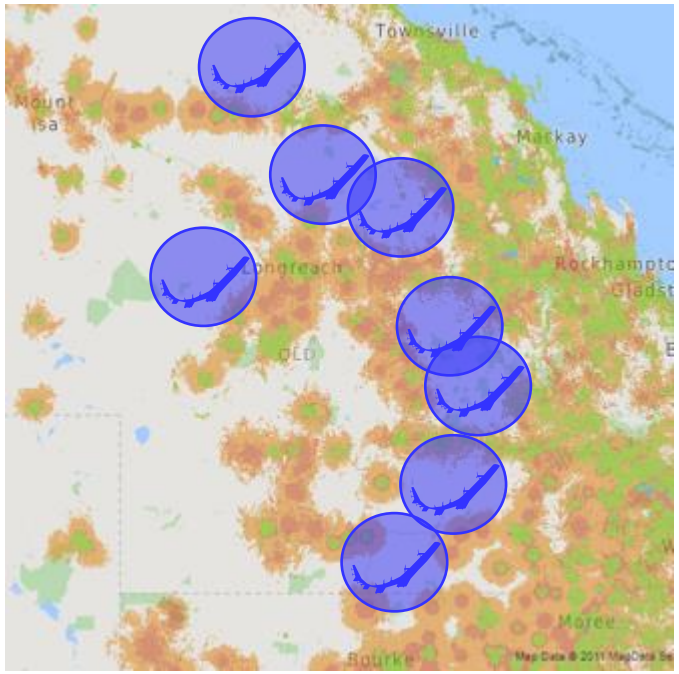


※ General airliner cruises at an altitude of about 10 km

Efficient deployment

HAPS

Flexible Deployment



LEO Satellite

Need extensive constellations

4-Year trajectory (HAPS)

2017

April
Started unmanned aircraft design for HAPS

December 21
Established HAPSMobile, Inc.

2018

June
Launched a development factory. Started research and development of aircraft.

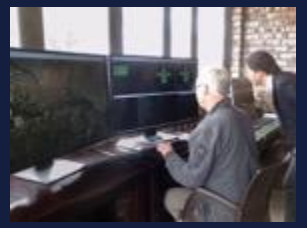
< performance test>

2019

April 5
Aircraft completion ceremony at the factory

April 25
Press conference.
Built a strategic relationship with Loon.

August 8
Participated in Facebook's HAPS demonstration in South Africa



September 11
Successful first test flight at NASA's AFRC

2020

Feb
Developed a payload for unmanned aerial vehicles jointly with Loon

Feb
Launched HAPS Alliance

July 23
Completed basic flight tests at Spaceport America in New Mexico, USA

Succeeds in stratospheric test flight in 2020

Maximum altitude： 62,500 ft

Flight time in stratosphere：5hours 38mins

Total flight time： ：20hours 16mins

Max. wind speed： 58kt

Lowest temp. ：-73℃

LTE connectivity from the stratosphere

Video call

SpA (used HAPS network)

New Mexico, US

Vint Cerf

Washington D.C. ,US

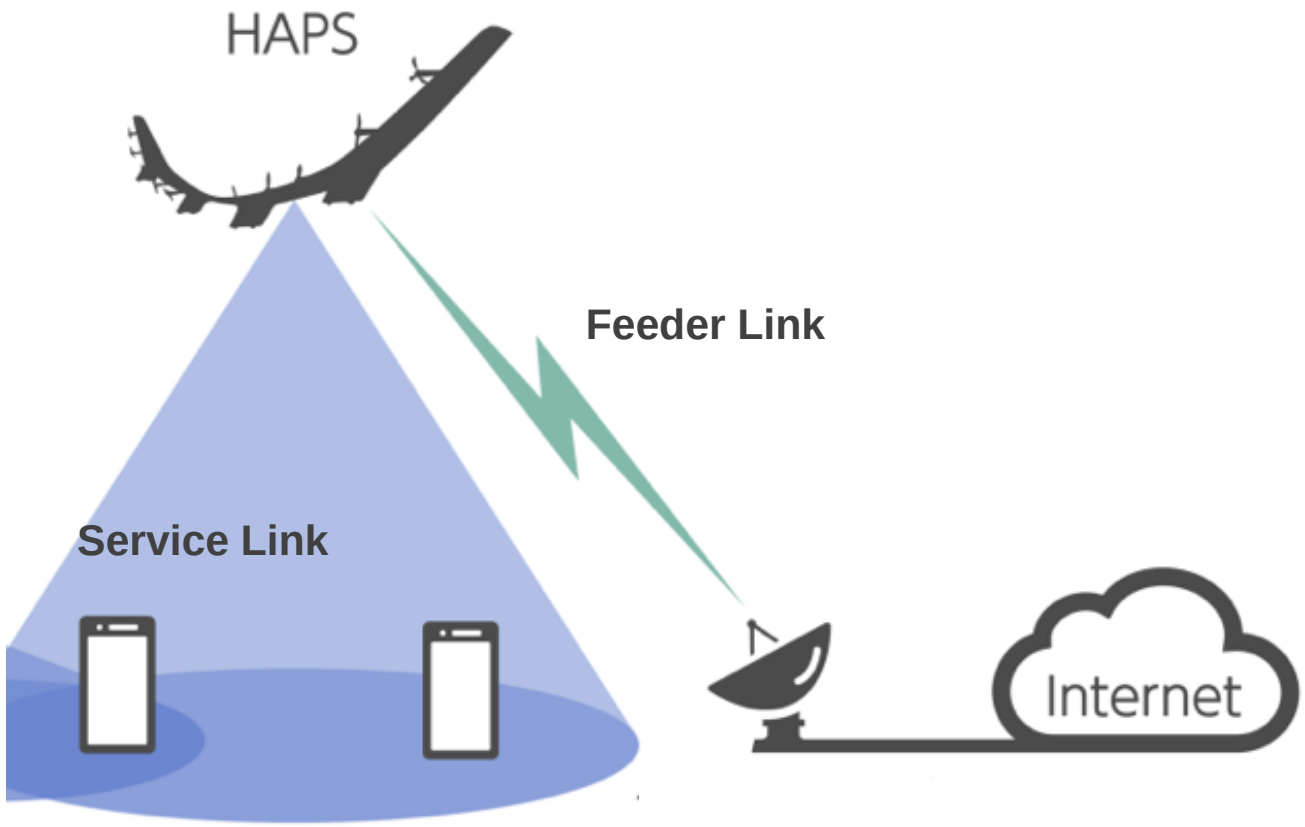
Jun Murai

Tokyo, Japan

Alastair Westgarth (Loon CEO)

California, US

Frequency expansion for HAPS



ITU Radio Regulation

Currently defined by ITU

To be considered at WRC-23

		Region2	Region2	
Feeder Link	6.5Ghz	21Ghz	26Ghz	28Ghz
	31Ghz	38Ghz	47Ghz	
Service Link	700Mhz	800Mhz	900Mhz	1.7Ghz
	1.9Ghz	2.1Ghz	2.6Ghz	

November, 2019 WRC19

Feeder Link：

Approved 3 new frequencies

Service Link：

Approved as new agenda for WRC-23

Market potential by country

Coverage by existing base stations

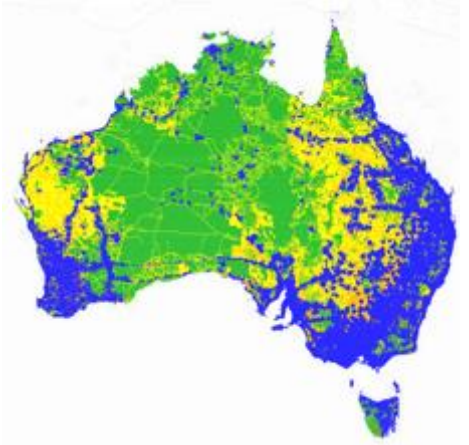
Japan

60%

Indonesia

28%

Australia



25%

Coverage by existing base stations are still low

Deliver Internet connectivity to people around the world

Thank you