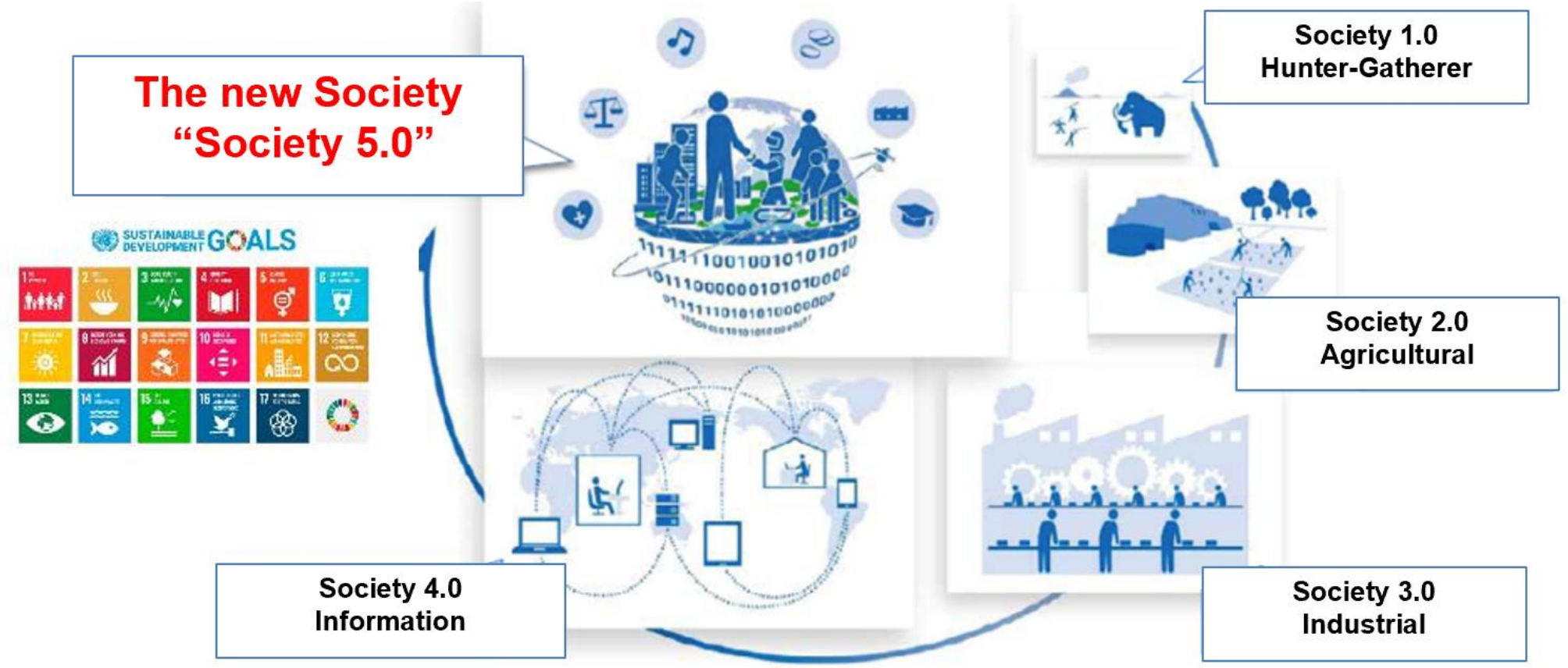
Date: Oct. 17, 2024

JAPAN's /MIC's /NICT's Visions for future society in the 2030s
- Creating / being supported by B5G/6G -

Executive Director: Iwao Hosako

JAPAN's Vision for Future Society: Safe and Secure Society 5.0

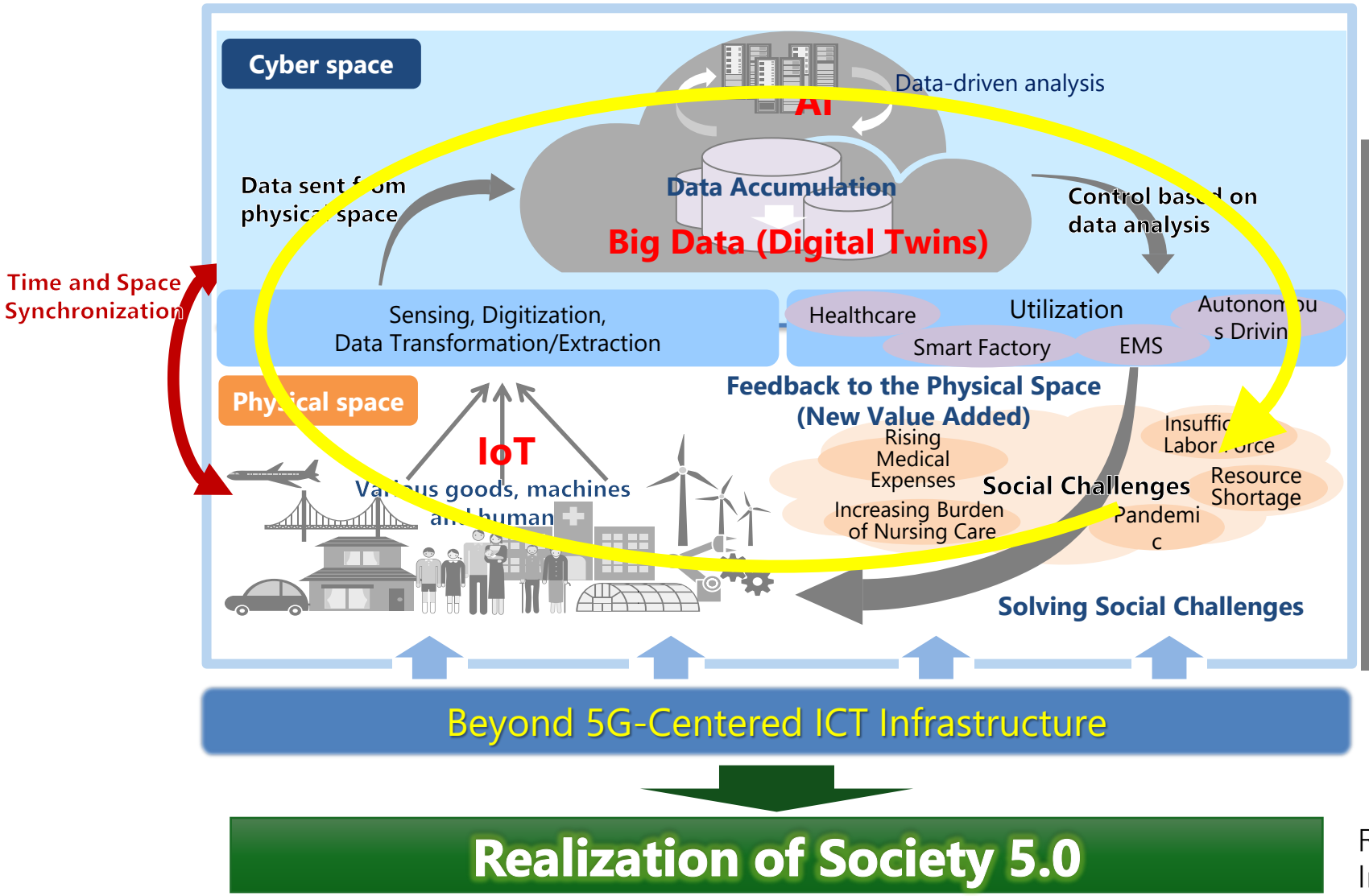
- **Safe and Secure Society 5.0 is a human-centered, sustainable and inclusive society.**
- **Through systems that achieve advanced fusion of the physcial and cyber spaces, we can solve both economic and social issues.**



(From the Cabinet Office, JAPAN)

CPS Vision for Society in the 2030s by MIC

Cyber Physical System（CPS）
- integrating cyber and physical space



Society in the 2030s

Vigorous & Resilient Society

Inclusive

A society where everyone can play an active role regardless of their attributions (ex. Locations, nationalities, ages, and handicaps)

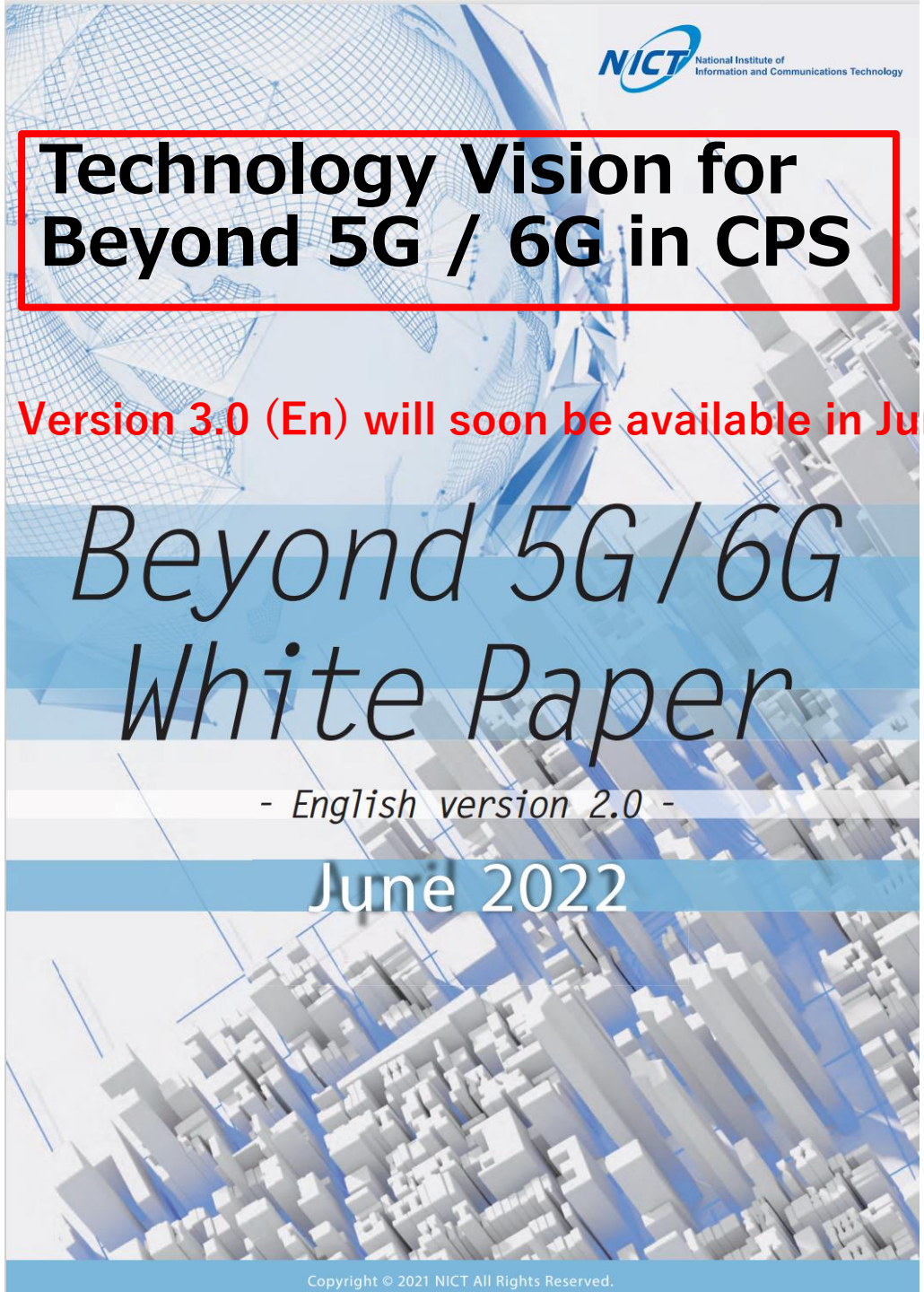
Sustainable

A society growing sustainably and efficiently, without social loss

Dependable

A human-centered society where safety and security are ensured, and trust is secured even under unprecedented circumstances

Ref.: Beyond 5G promotion strategy, Ministry of Internal Affairs and Communications, June 2020.



■ We created four scenarios,

V1.0 [Scenario 1] **Cybernetic Avatar Society**,

V1.0 [Scenario 2] **City on the Moon**,

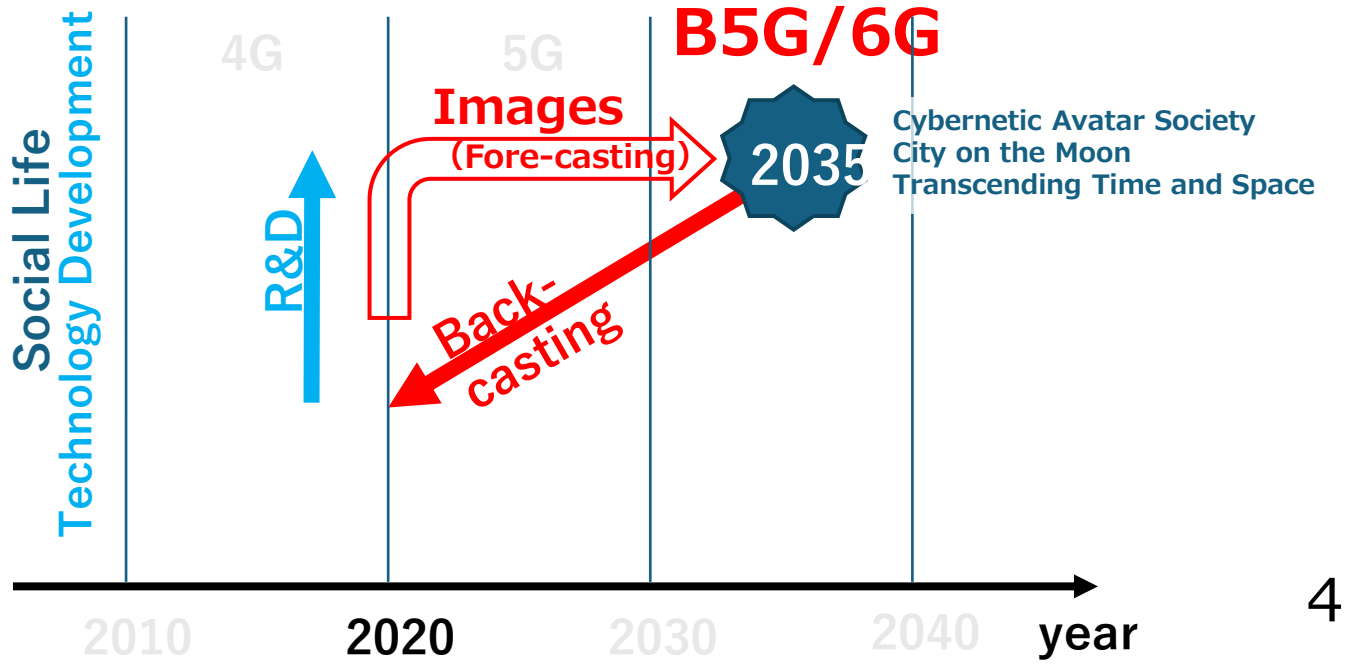
V1.0 [Scenario 3] **Transcending Time and Space** and

V2.0 [Scenario 4] **Light and Shadow of the Cyber World**

V3.0 [Special Scenario 1] **My new life in Apple Town**,

which are images of social life around 2035 and identified the necessary key technologies by back casting from the future society described in these scenarios.

■ The white paper shows the scenarios, the use cases that appear in the scenarios, the key technologies and requirements to realize them, the R&D roadmap, and the deployment strategy.

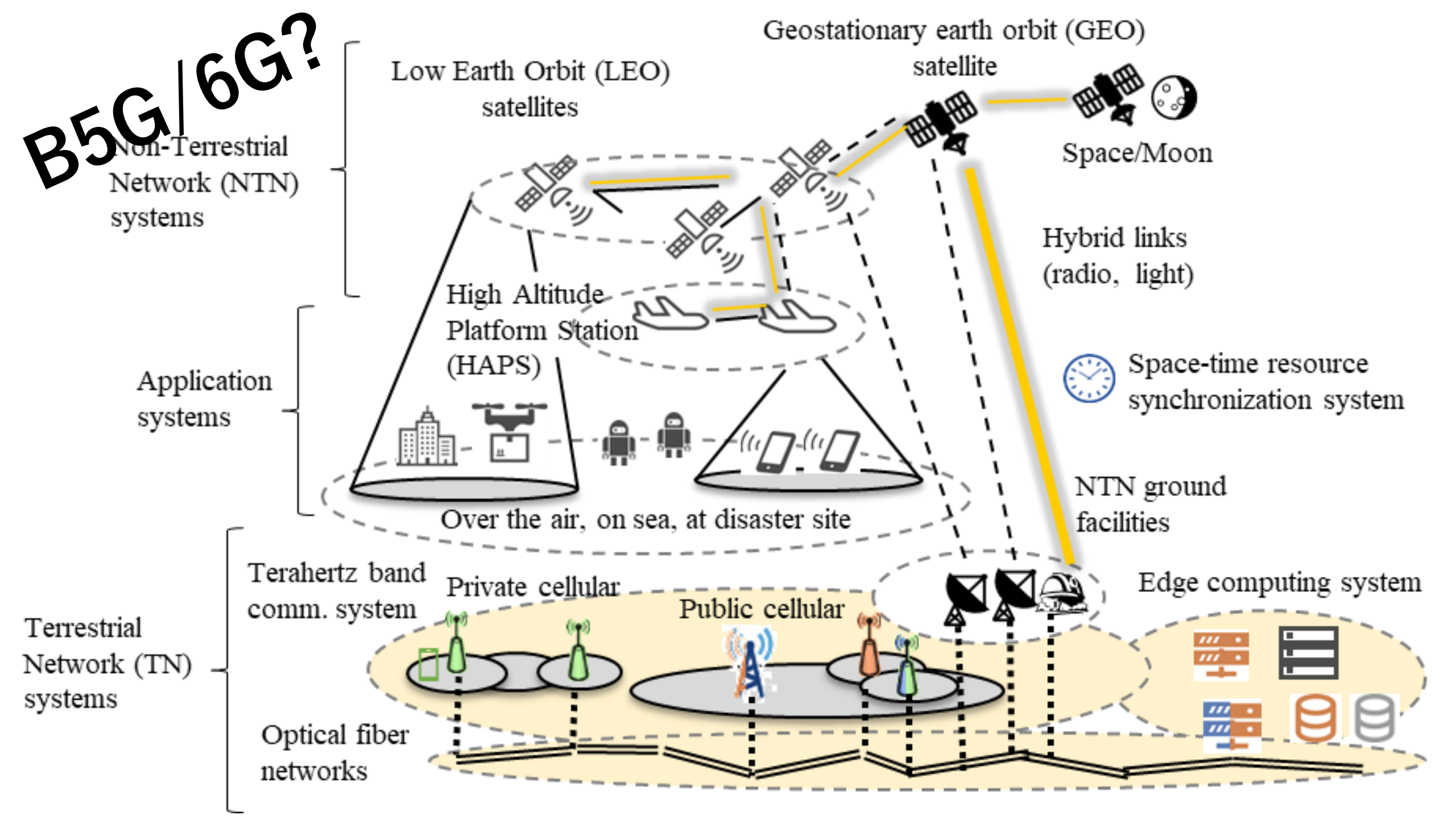


Key Technologies for Beyond 5G / 6G

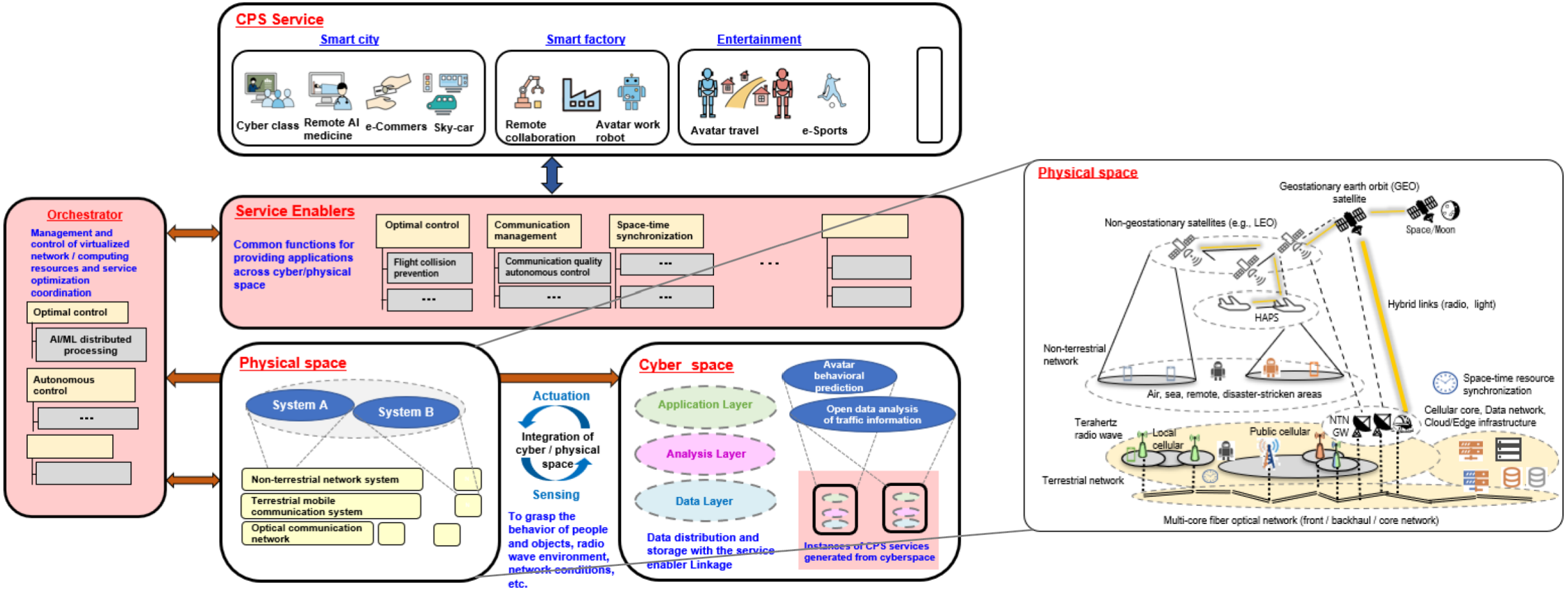
T1.	Ultra-high-speed and high-capacity wireless communication	
	T1.1	Terahertz wave
	T1.2	All-optical network (high-capacity optical fiber communication)
	T1.3	All-optical network (optical and radio convergence technology)
T2.	Ultra-low latency and ultra-multi-source connection	
	T2.1	Edge computing technology
	T2.2	Adaptive wireless network construction technology
	T2.3	Adaptive wireless network application technology
	T2.4	Autonomous localization, tracking and reservation technologies for radio wave radiation space
	T2.5	Autonomous M2M network construction technology with super multi-connection
T3.	Wired and wireless communication and network control technology	
	T3.1	Network control technology (Zero-touch automation)
	T3.2	Frequency allocation and sharing management
	T3.3	Private wireless system management (Local Beyond 5G)
	T3.4	Advanced wireless emulator
T4.	Multi-Layer wireless systems - NTN	
	T4.1	Satellite and non-terrestrial communication platform
	T4.2	Optical satellite communication
	T4.3	Maritime communication
	T4.4	Underwater and submarine communication
	T4.5	Cooperative control of multi-layered networks

T5.	Space-time synchronization	
	T5.1	Wireless Space-Time Synchronization
	T5.2	Chip-Scale Atomic Clock
	T5.3	Generation and sharing technology for reference time
T6.	Ultra-security and reliability	
	T6.1	Emerging security technology
	T6.2	Cyber security technology based on real attack data
	T6.3	Quantum cryptography
	T6.4	Electromagnetic environmental technology
	T6.5	Resilient ICT
	T6.6	Sensing
T7.	Ultra-realistic and Innovative Applications	
	T7.1	Brain information reading, visualization, and BMI technology
	T7.2	Intuition measurement, transmission and assurance technologies
	T7.3	Real 3D avatars, multisensory communication and XR technology
	T7.4	AI analytics and dialogue technology using language and extra-linguistic information
	T7.5	Edge AI behavioral support
	T7.6	Simultaneous multi-lingual interpretation, paraphrase and summarization technology
	T7.7	Automated driving
	T7.8	Drones

- **The key technologies are extracted and categorized from the use cases.**
- **Beyond 5G/6G Services are created with proper combination of the technologies.**


B5G/6G?
Non-Terrestrial Network (NTN) systems
Low Earth Orbit (LEO) satellites
Geostationary earth orbit (GEO) satellite
Space/Moon
Hybrid links (radio, light)
High Altitude Platform Station (HAPS)
Application systems
Space-time resource synchronization system
Over the air, on sea, at disaster site
NTN ground facilities
Terahertz band comm. system
Private cellular
Public cellular
Edge computing system
Terrestrial Network (TN) systems
Optical fiber networks

B5G Architecture for open service framework



An open platform is expected to accommodate various systems and promote flexible service creation where ICT and other technologies are optimally integrated.

Shift in the place of value creation due to changes in social structure

- The place where value is created is shifting
  - from Physical space to Cyberspace
  - from GAFAM Data to Industrial Data

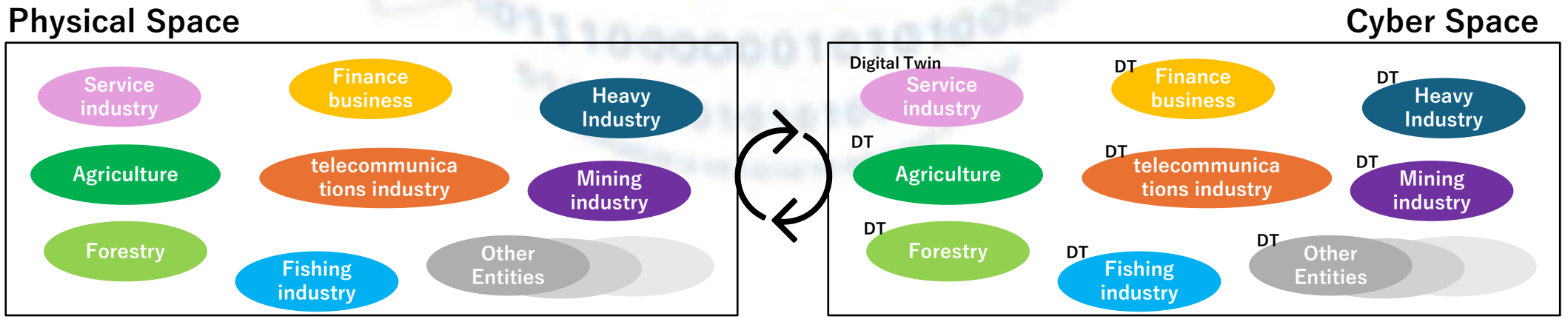
- GAFAM Data : Personal Data from Mobile phones
- Industrial Data : Wide variety of Data collected by IoT
- GAFAM Data << Industrial Data

End Users

CPS Services — Application

Service Enabler — Middle Ware

Orchestrator — OS



Resource