

6G Forum's View on IMT-2030 Use Cases

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Executive Committee Chair

6G Forum

(ECE Dept., Inha Univ.)



6G Forum



A system to secure Global 6G Leadership

In line with the K-Network 2030 strategy of the Ministry of Science and ICT (May 30, 2023)



■ A public-private cooperation system to build an industrial ecosystem foundation

- ▶ To proactively set 6G strategies in respond to the rapidly changing technological advancement to secure global leadership
- ▶ To promote international cooperation with global 5G/6G-related organizations and support leadership in international standardization.
- ▶ To put efforts in the identification of new services to accelerate the convergence across various industries with 5G/6G

After 10 years of successful 5G Forum activities since its inception on May. 30, 2013.

➤ Support in expanding 5G into verticals & achieving global leadership in 6G

5G Evolution

B5G/6G Revolution

5G Expansion into Verticals (~Y2026)

5G Building a Platform for Expanding 5G into Verticals
Showcasing Exemplary Cases of 5G Verticals



Achieving Global 6G Leadership (~Y2030)

Global Cooperation System Set-up for 6G
World Best Communication Support for 6G

6G

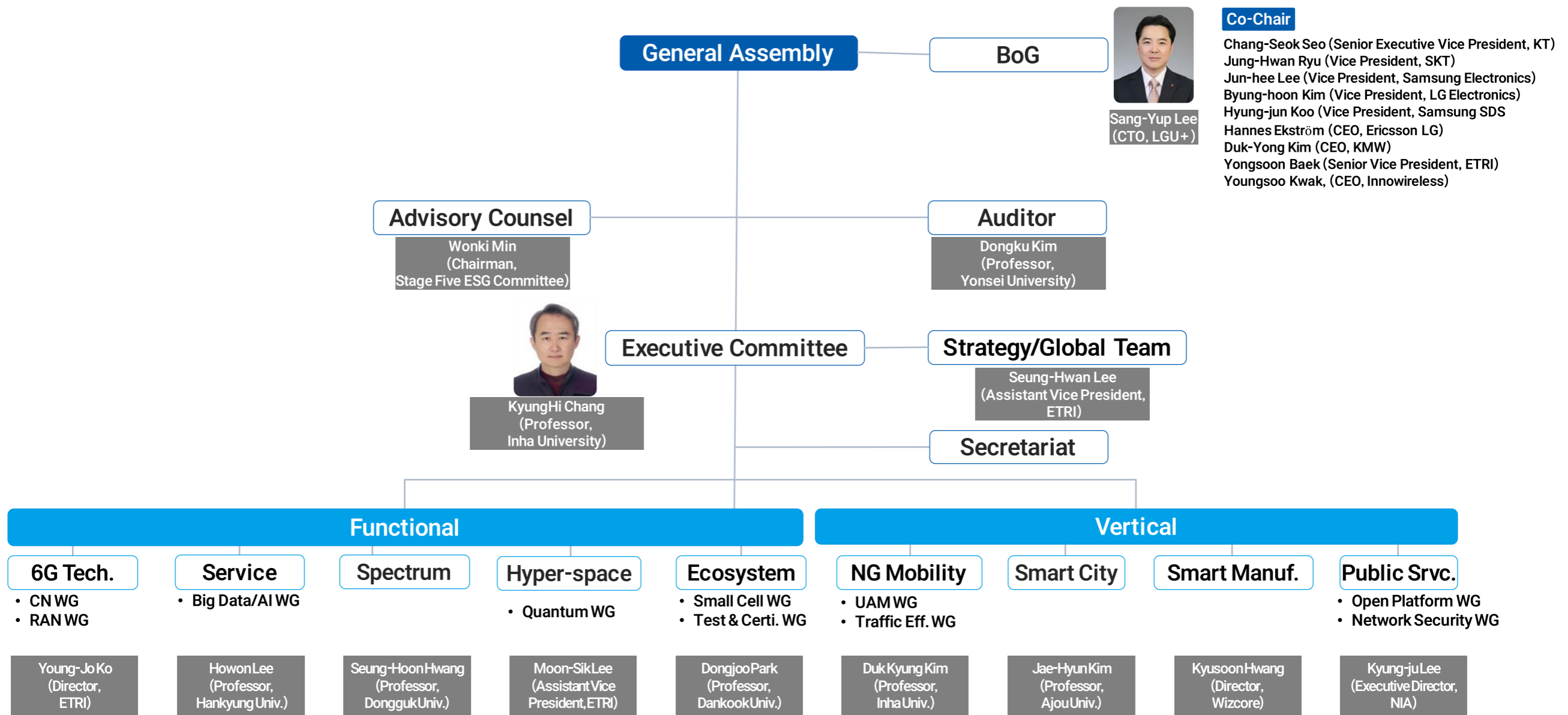


Experience and Lessons from 5G Commercialization

➔ Support Government, Research Institutes, Academies & Industries to Accelerate Innovation in 6G

Organization

➤ Advisory, Executive, 9 Technical Committees (10 WGs) + 2 Teams



> Domestic Telcos, Vendors, Solution Providers, SMEs, Gov. Agencies & Global Companies (Total 47 companies)

<h2>Chair Companies (10)</h2>						
<h2>Member Companies (37)</h2>						

- USA : 5G Americas, Next G Alliance
- China : IMT-2020, IMT-2030
- Japan : 5GMF
- Taiwan : 5G Alliance-CHT Pilot Team
- EU : 5G PPP, UK 5G IN, WWRF
5G ACIA, 5G AA, 6G-IA, one6G
- Turkiye : 5GTR
- Indonesia : i5G Forum
- India : TSDSI
- Malaysia : MTSFB
- GSMA



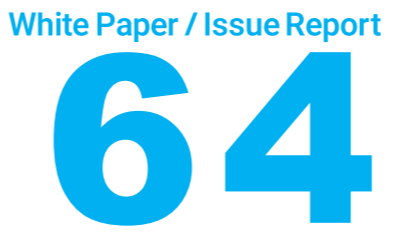
- Executive Committee
- Advisory Committee
- Strategy/International Collaboration Team
- 9 Technical Committees
- 9 Working Groups (WGs)



- Global 5G Events: 10
- 5G Vertical Summit: 8
- Regional Workshops: 7
- 6G Global Events: 4
- 5G Open Symposiums: 9



- Chairs : 10
LGU+ (Chair Company), SKT, KT, Samsung Electronics, LG Electronics, Ericsson LG, KMW, ETRI, Innowireless, Samsung SDS
- SMEs : 23
- Gov. : 7
- Global : 7



- White Paper : 46
 - ✓ 5G and its ecosystem, smart factories, autonomous driving, smart cities, disaster safety, dedicated networks, small cells, fronthaul, OpenRAN, UAM, converged services, etc.
- Issue Report : 16
 - ✓ wireless technology and frequency trends, V2X, vertical service standard trends, dedicated networks, network power efficiency, enterprise 5G wireless trends, etc.
- 6G Report : 6G Vision, 6G FTT

Projects & Policy Supports

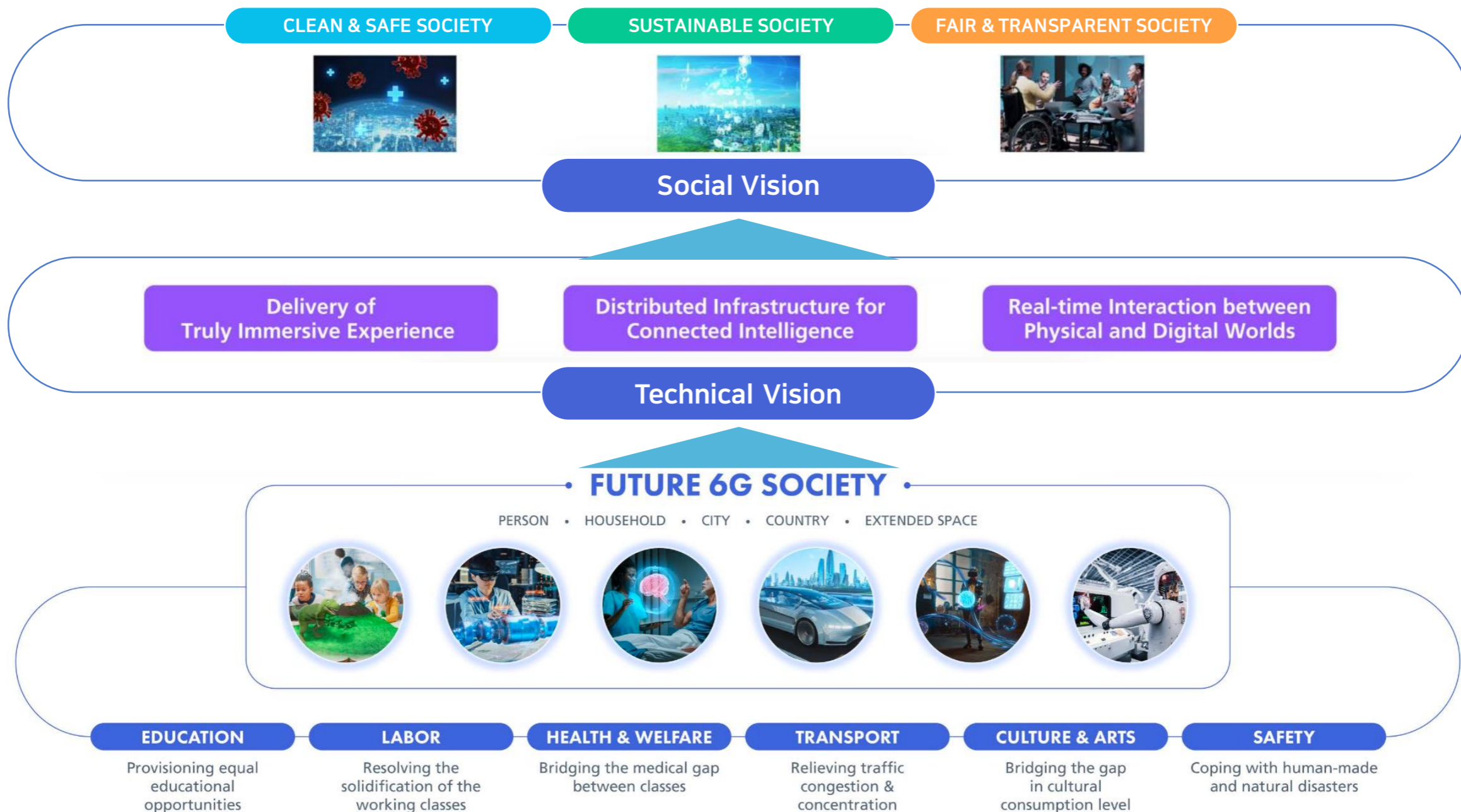


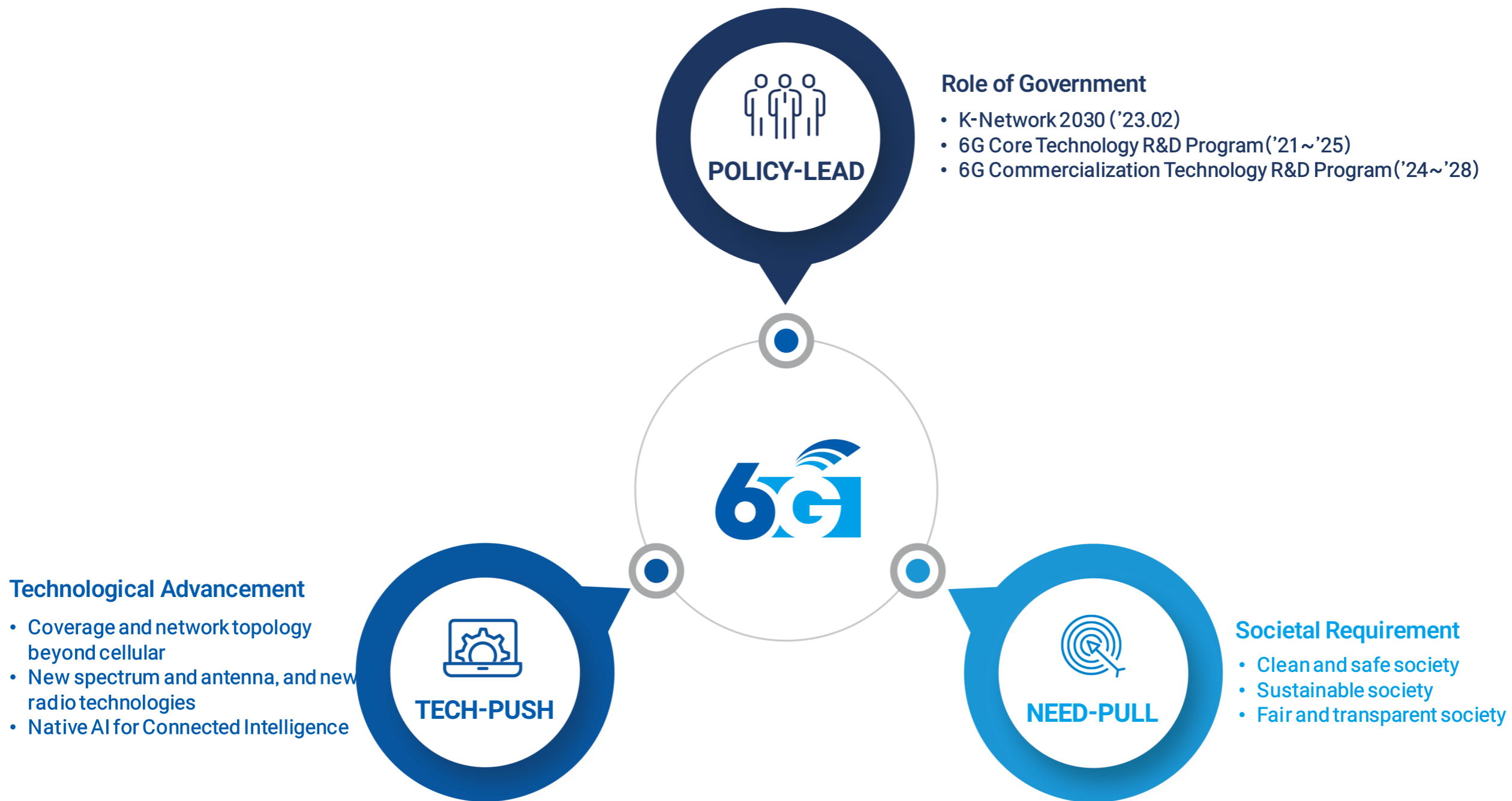
- Projects
 - ✓ TTA ICT Standardization Forum Support Program: 10 years
 - ✓ Study on 5G Smart City Convergence Technologies.
 - ✓ Study on 5G Smart Factories and Convergence Services.
 - ✓ Study on Open 5G Fronthaul and Small Cell Technologies.
 - ✓ Study on 5G Private Networks and 5G+ Convergence Services
- Policy Supports
 - ✓ 5G/5G+ Strategy and Working Committees
 - ✓ Support for 5G Convergence Service Pilot Projects
 - ✓ 6G R&D Strategy Committee
 - ✓ Advisory Activities on C-ITS Technology and Demo

6G Vision & Use Cases



Advancing Human Happiness, Prosperity, and Sustainability through 6G Technology





➤ The usage scenarios from ITU-R's Framework of IMT-2030

Extension from 5G usage scenarios

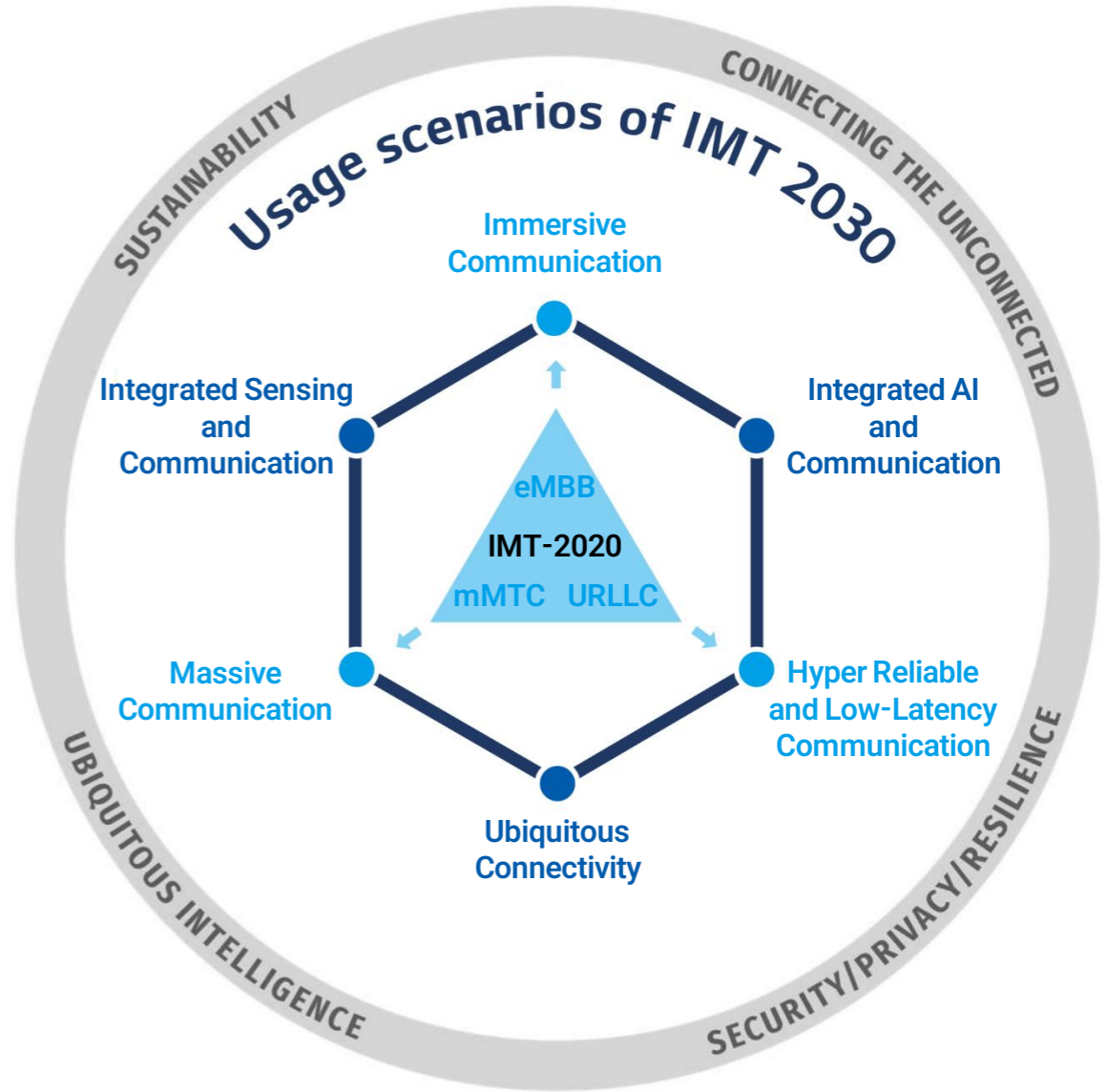
- eMBB → Immersive Communication
- URLLC → HURLLC (Hyper Reliable and Low-Latency Communication)
- mMTC → Massive Communication

New usage scenarios

- Ubiquitous Connectivity
- Integrated AI and Communication
- Integrated Sensing and Communication

4 overarching aspects: design Principles for scenarios

- Sustainability
- Connecting the unconnected
- Ubiquitous intelligence
- Security, Privacy, Resilience



➤ Extension of the eMBB for rich and interactive immersive experience

Use Cases

- **Telepresence & Holographic communications**
 - ✓ Remote collaboration, education
 - ✓ Social interaction
- **Remote multi-sensory telepresence**
- **Hyper-realistic metaverse**
 - ✓ Immersive gaming and entertainment
 - ✓ Industrial training & maintenance
- **Remote healthcare - telesurgery**



Capabilities

- **Enhanced spectrum efficiency**
- **Higher data rates**
- **High reliability**
- **Low latency**



- Extension of the mMTC to support connectivity of a huge number of devices

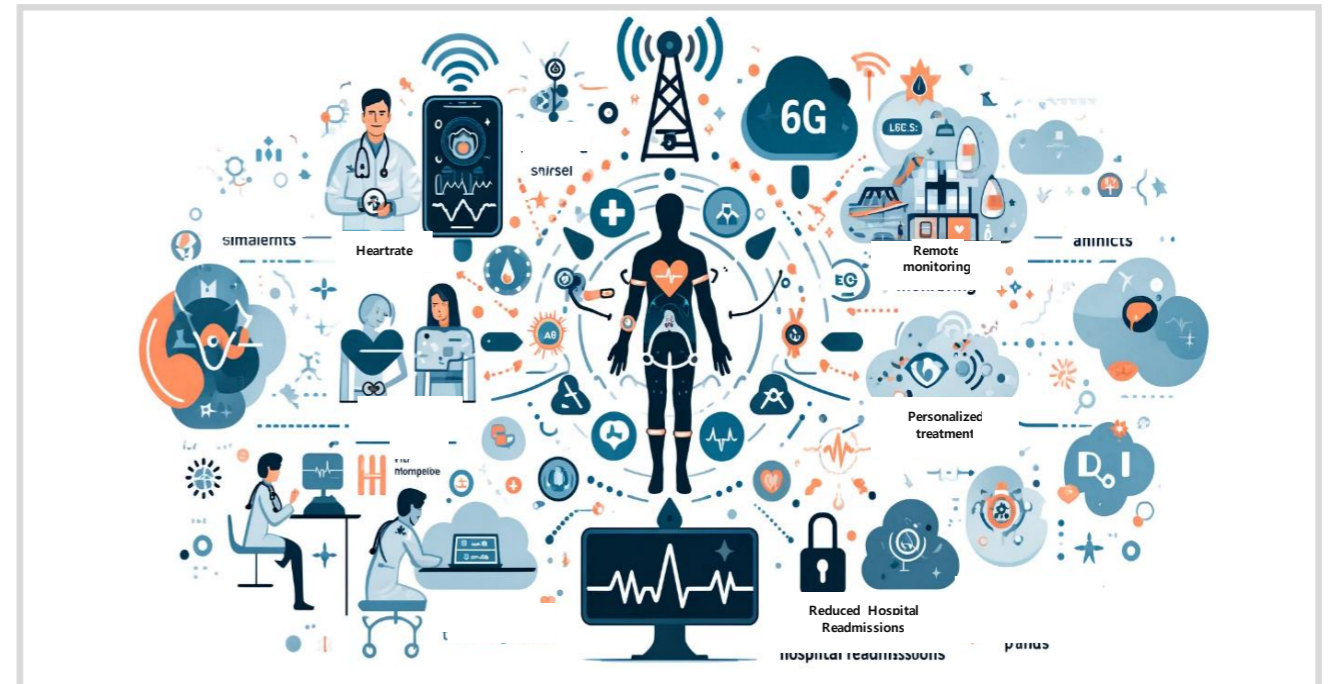
Use Cases

- **Massive Internet of Things**
 - ✓ Industrial automation and monitoring
 - ✓ Smart cities and infrastructure
 - ✓ Precision Agriculture
 - ✓ Smart manufacturing and logistics
- **Metaverse**
- **Ubiquitous personal connectivity**



Capabilities

- **High connection density**
- **Low power consumption**
- **Mobility**
- **Extended coverage**
- **High security and reliability**



- Extending the boundary of URLLC by covering more stringent requirements on reliability and latency

Use Cases

- **Industry and automation**
 - ✓ Collaborative robots (Cobots)
 - ✓ Precision manufacturing
- **Healthcare**
 - ✓ Tele-surgery
 - ✓ Remote diagnostics and monitoring
- **Fully autonomous driving**
- **XR and Tactile Internet**



Capabilities

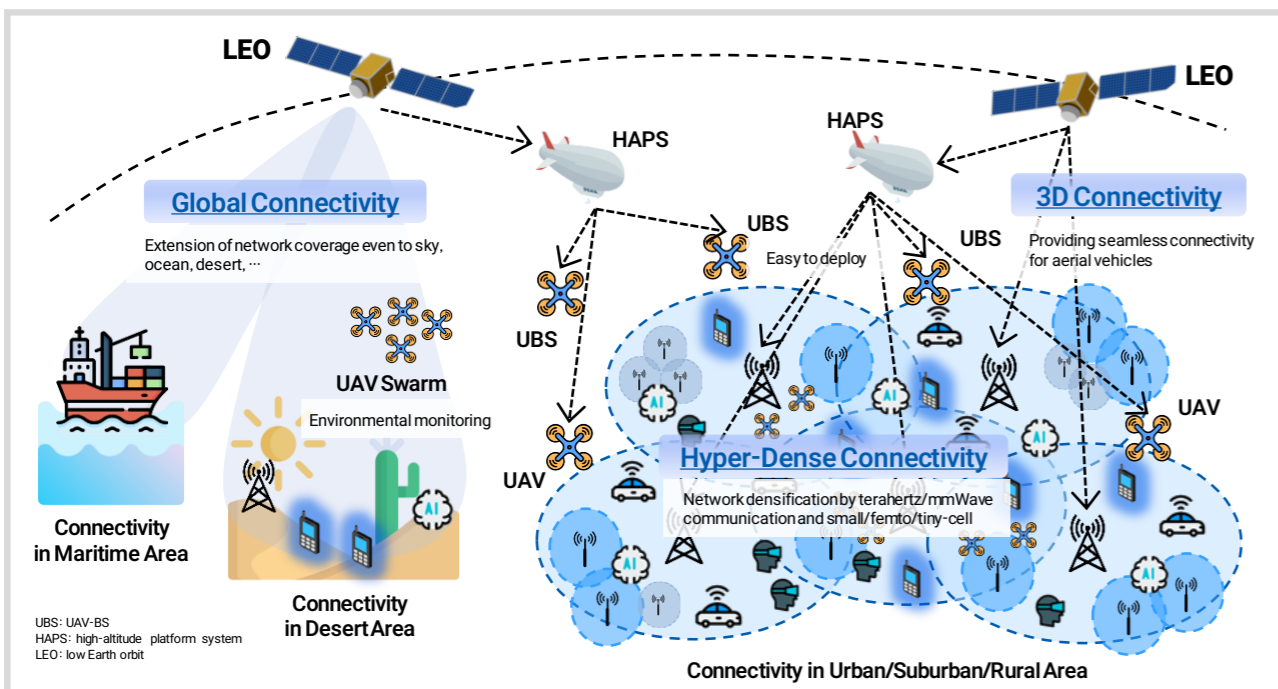
- **Enhanced reliability**
- **Enhanced low latency**
- **Precise positioning**
- **Connection density**



➤ To enhance connectivity to bridge the digital divide

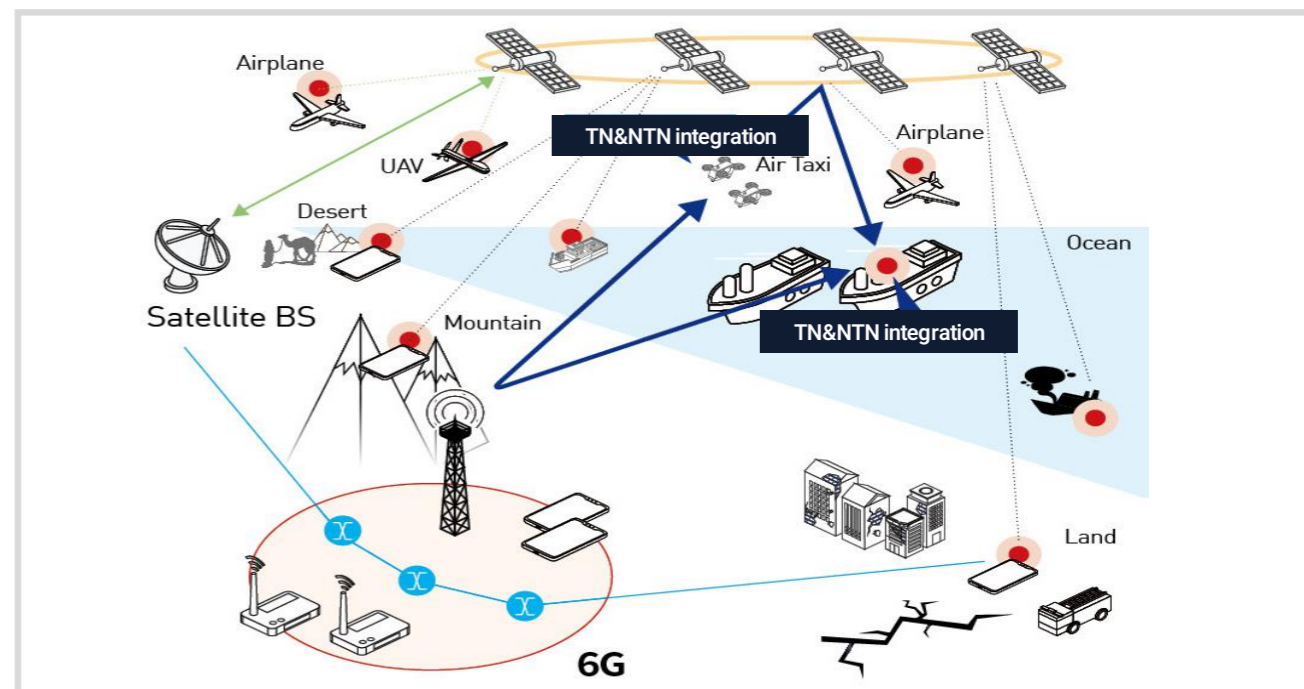
Use Cases

- **Global Internet connectivity**
 - ✓ Remote and underserved areas
 - ✓ Seamless rural coverage – smart agriculture, education, ...
 - ✓ Aerial node connectivity, e.g., UAM, etc.
- **IoT networks**
 - ✓ Smart cities
 - ✓ Environmental monitoring, etc.



Capabilities

- **TN & NTN Integration**
- **New spectrum and frequency bands**
- **RIS**
- **AI/ML**



- To support distributed computing and AI (especially LLM) applications

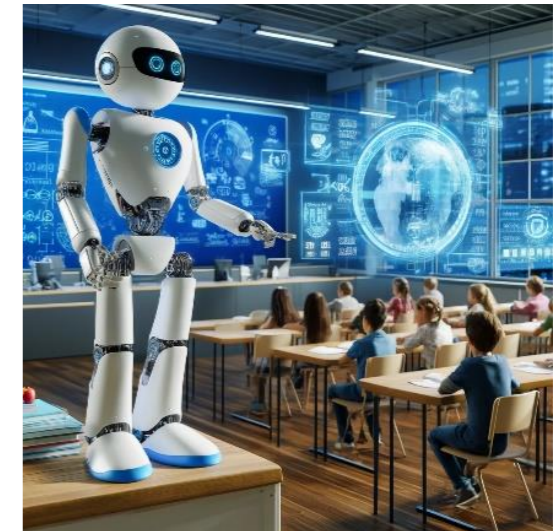
Use Cases

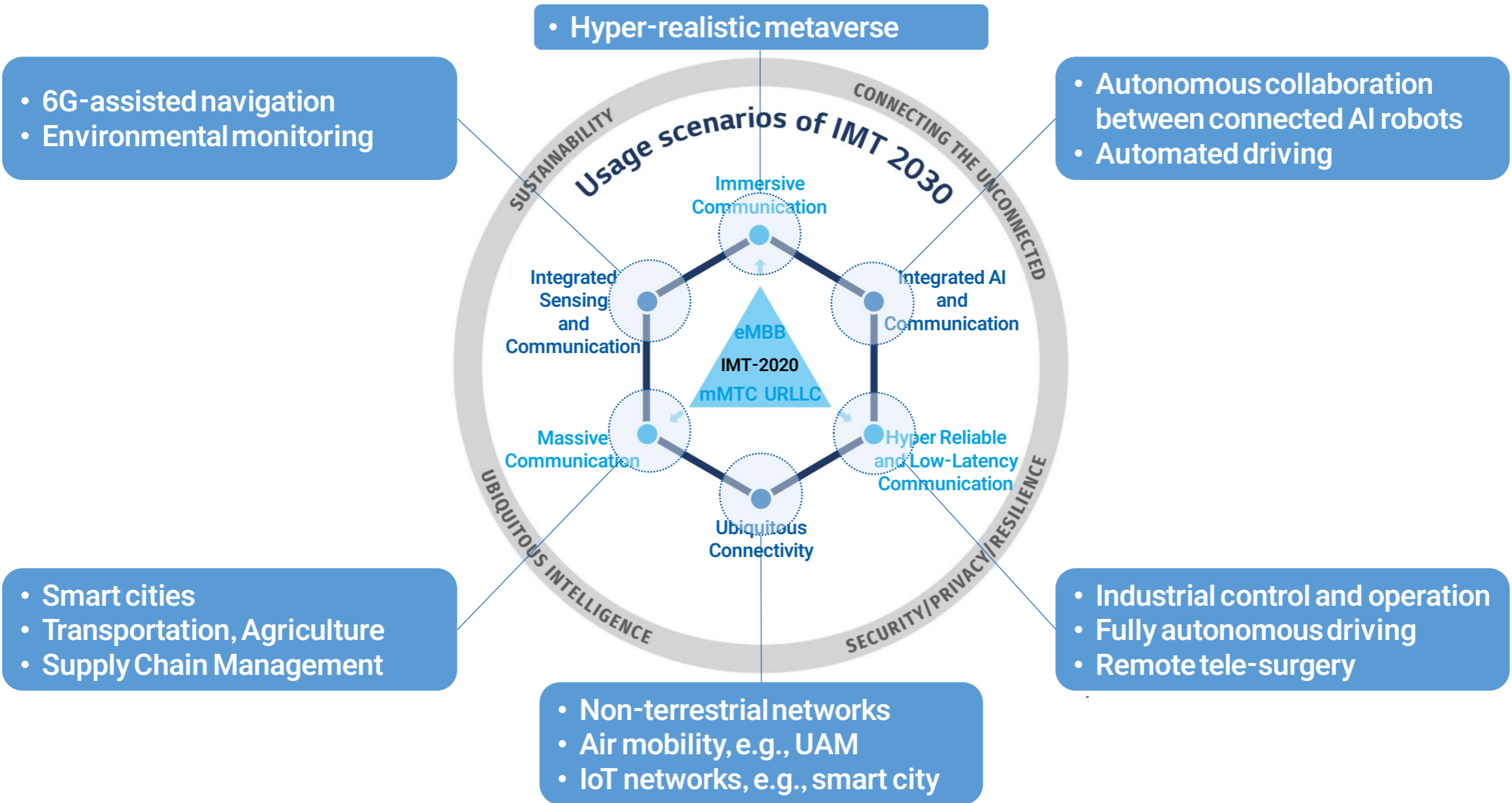
- Autonomous collaboration between connected AI robots (smart city, manufacturing plant, rescue missions, etc.)
- Offloading of heavy computation operations across devices and networks
- 6G-assisted automated driving



Capabilities

- High area traffic capacity
- Low latency and high reliability
- Capabilities related to the integration of AI and compute functionalities in 6G
 - ✓ Data acquisition, processing, model training, sharing, etc.





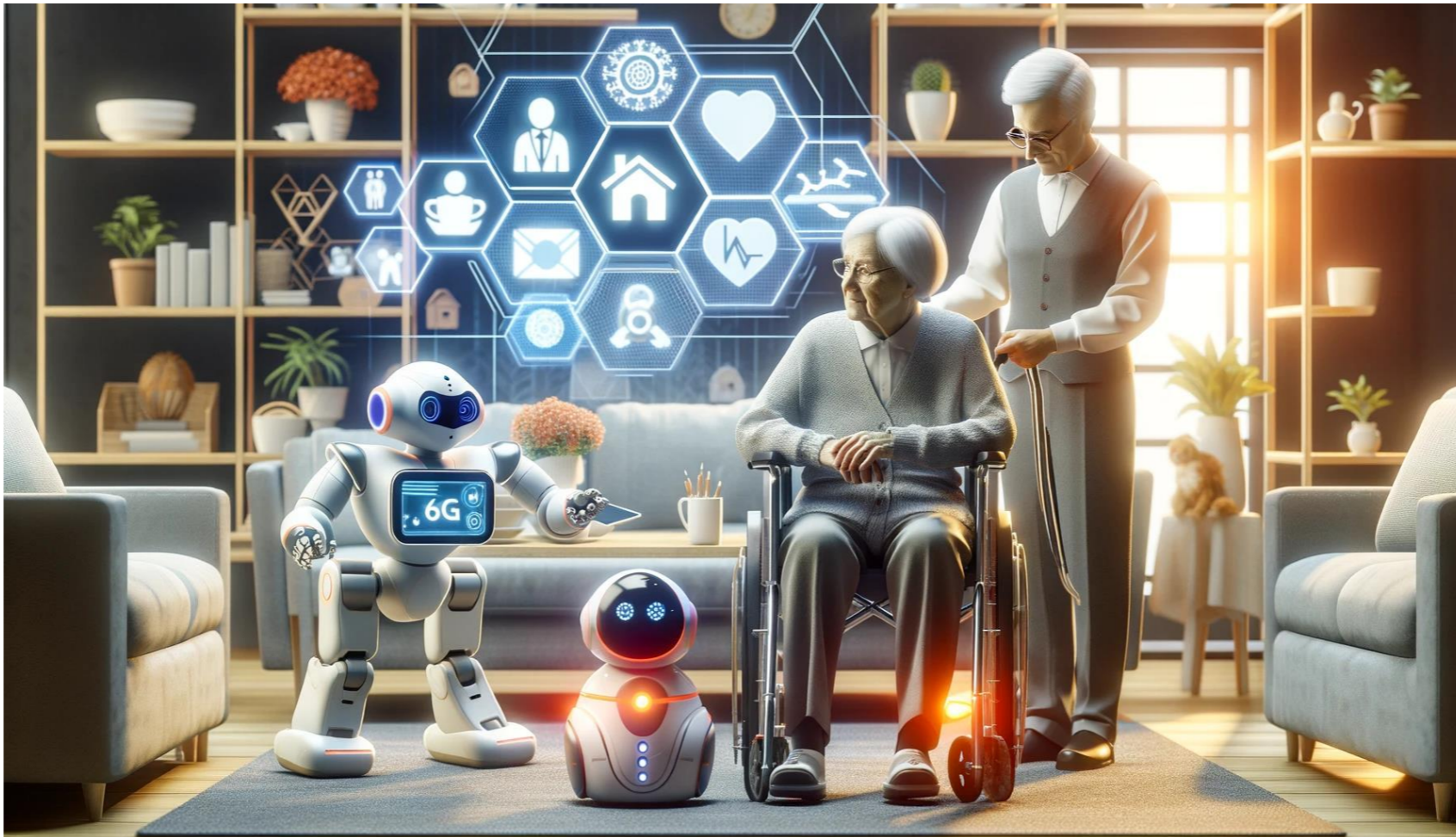
- Korea's rapid entry into a super-aging society (the elderly over 65 : >30% in 2035, >43% in 2050) persistently low birth rate, the lack of caregivers, etc.

Increased need to pursue welfare and safety for the elderly

→ Realization of the elderly care services by combining Sensing, AI, Robot mobility with Communications

6G Sensing

- Health & Behaviors monitoring



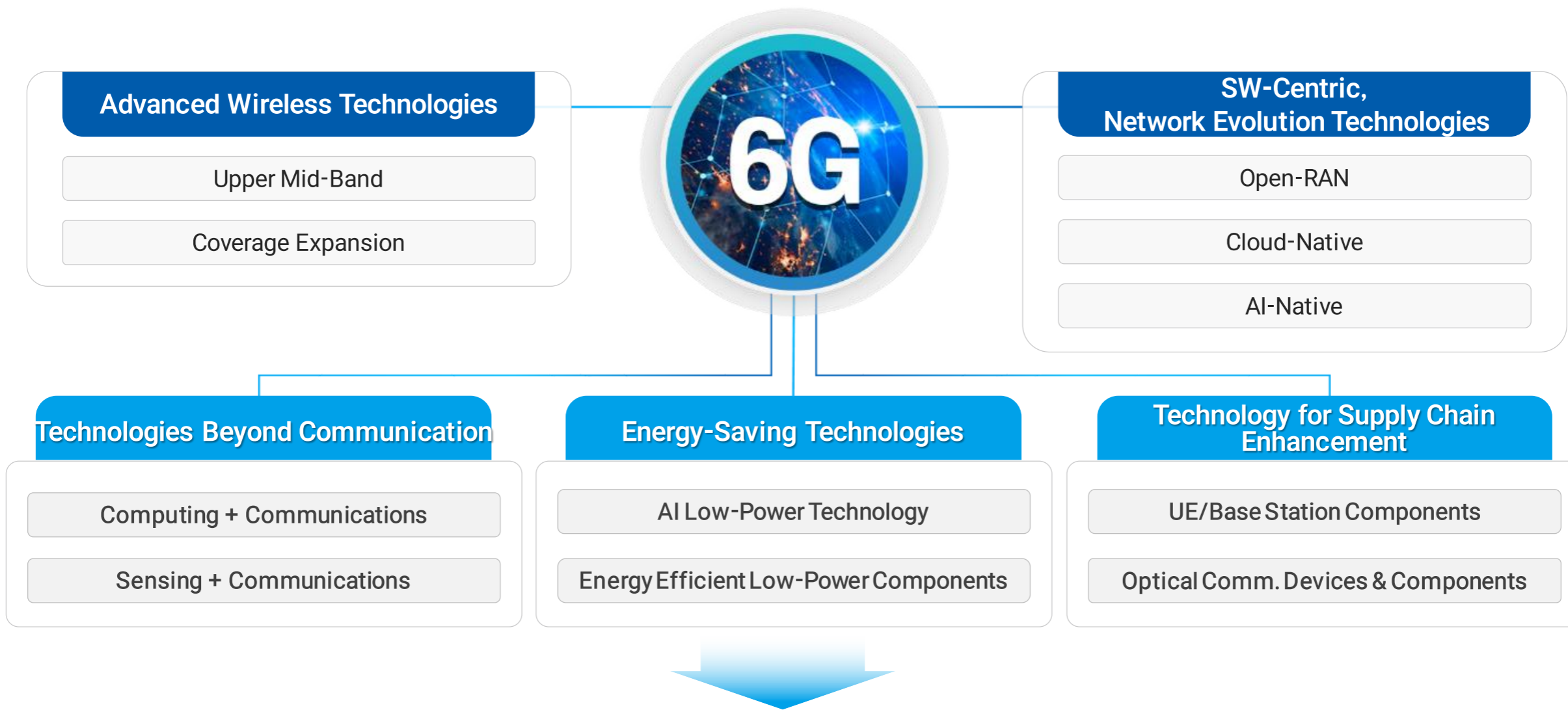
6G AI & robot mobility

- Connected AI robots
- AI/LLM-based health diagnosis/prescription

6G Day-1 R&D in Korea

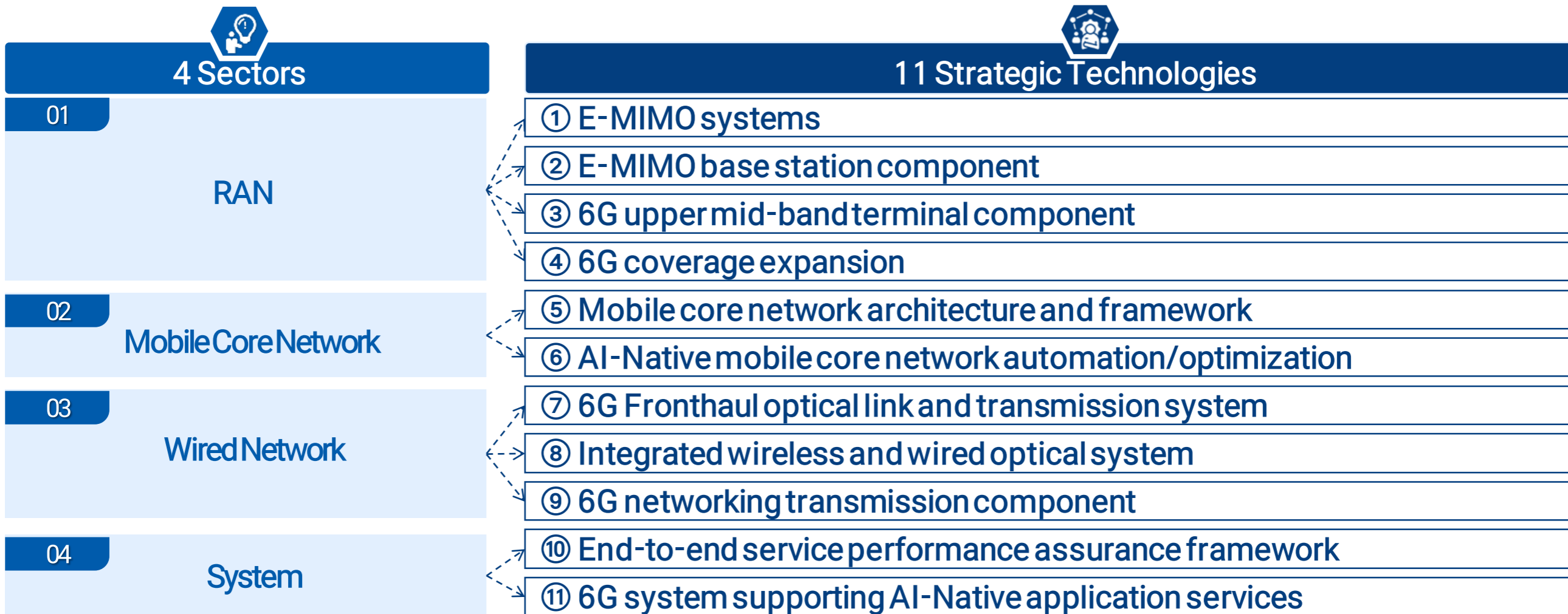


➤ To overcome the limitations of 5G reflecting the future technology trends



6G Commercialization Technology R&D Program launched (USD 327m, 2024-2028)

> 11 strategic technologies across 4 sectors

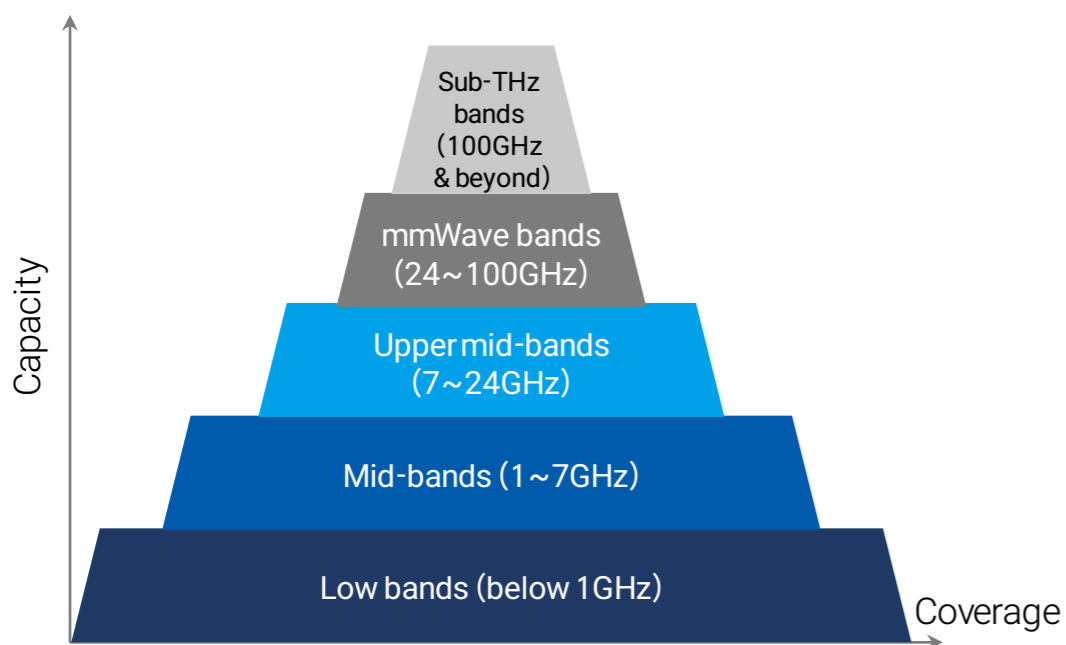


Sustainability (
 Low power consumption
 Security
 Reliability)

➤ A layered approach, from low band to high band, to support diverse usage scenarios

Mobile
Communication
Integrated into
the whole industry

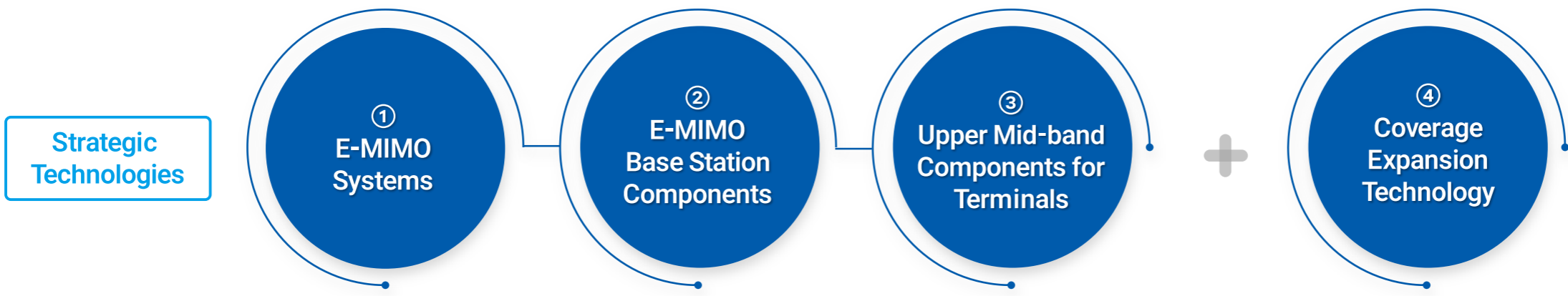
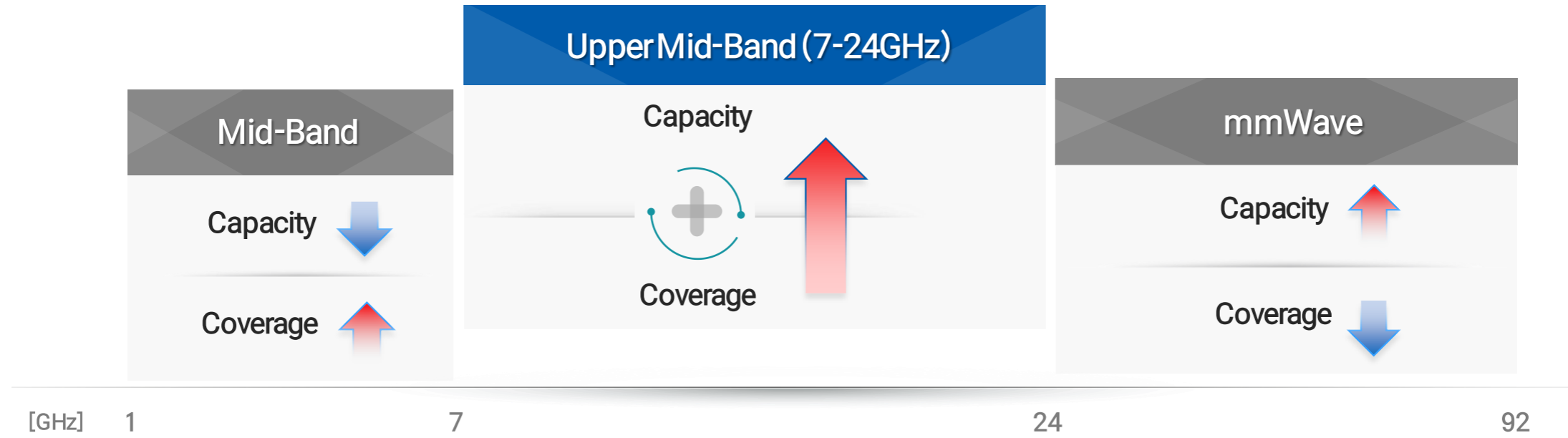
- High Band (mmWave + Sub-THz) → Sensing & Ultra Capacity
- Upper Mid-Band (7-24GHz) → Coverage & Extreme Capacity
- Mid Band (1-7GHz) → Coverage & Capacity
- Low Band (below 1GHz) → Extended Coverage



- KOREA 6G Candidate Upper Mid band | 7.125 ~ 8.4, 12.75 ~ 13.25, 14.8 ~ 15.35GHz
- APT view | 7.125 ~ 15.35GHz for IMT spectrum in WRC-23
- Wider Channel Bandwidth | 400MHz in the Upper Mid Band
- Spectrum Technology
 - 4G: Carrier Aggregation
 - 5G: Dual Connectivity
 - 6G: Advanced Duplex

Upper-mid Band Spectrum (7-24 GHz)

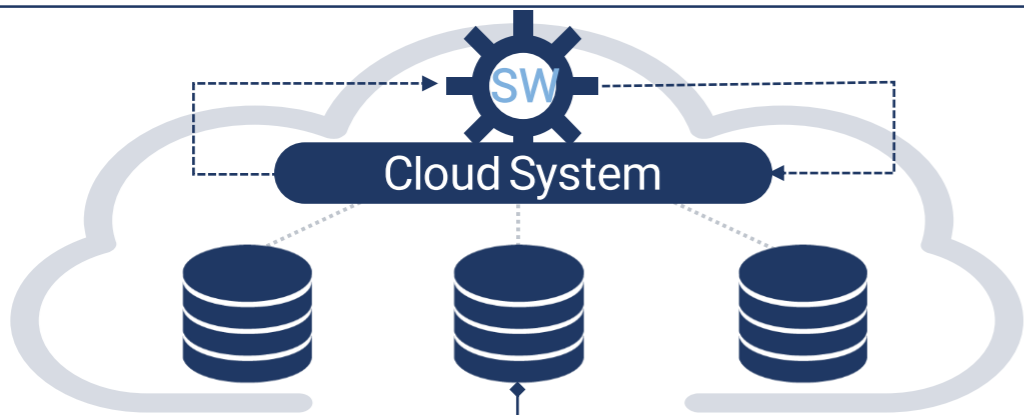
➤ Extreme MIMO and coverage expansion (RIS, NCR, advanced duplex, etc.) technologies in Upper-mid band



> Cloud-Native CN Technologies, AI-Native RAN & CN Technologies

Cloud-Native

Virtual + Autonomous + Modular + Lightweight



Mobile CN

AI-Native

AI Semiconductor



AI Technology



RAN + Mobile CN

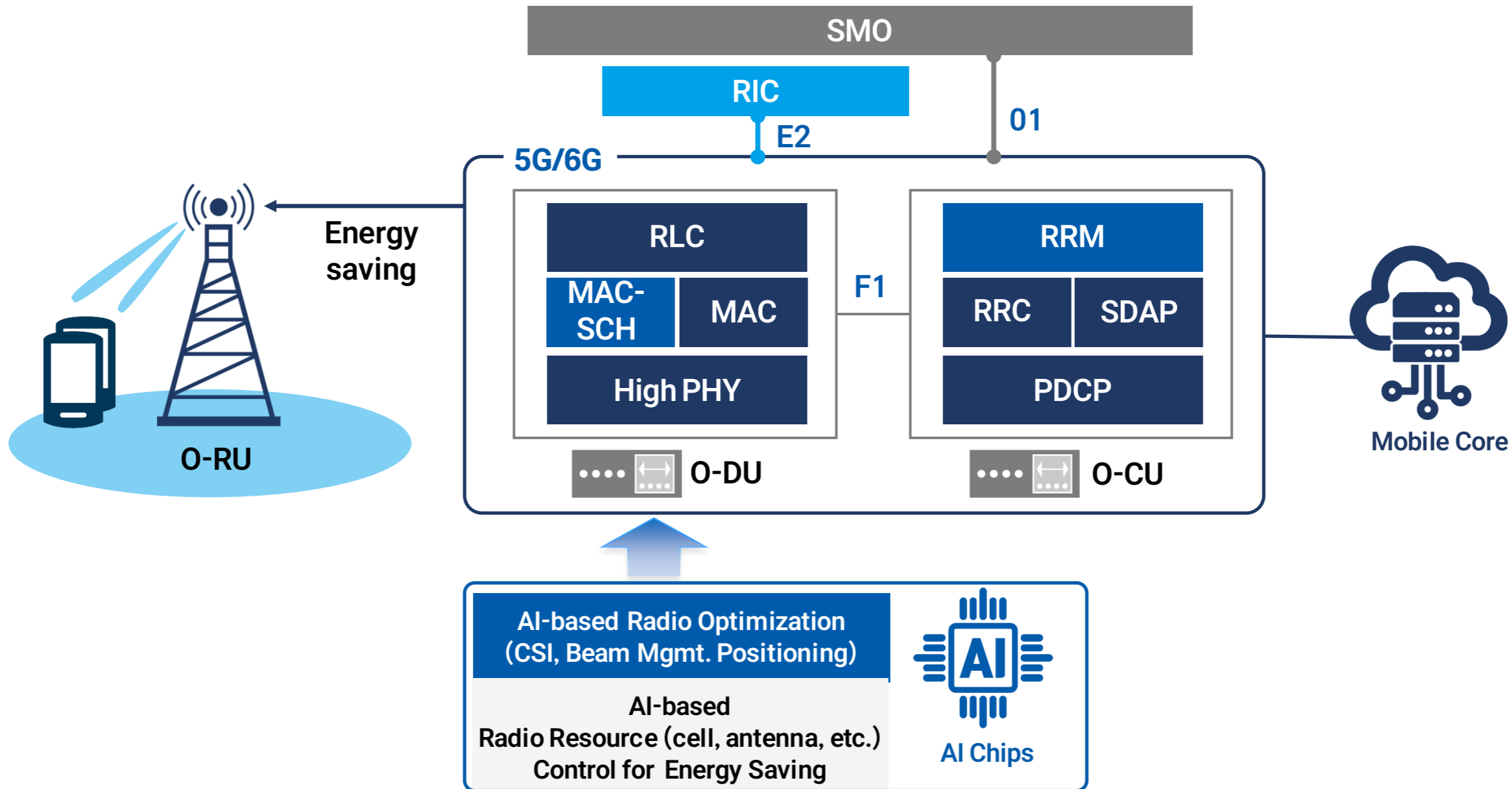


Strategic Technologies

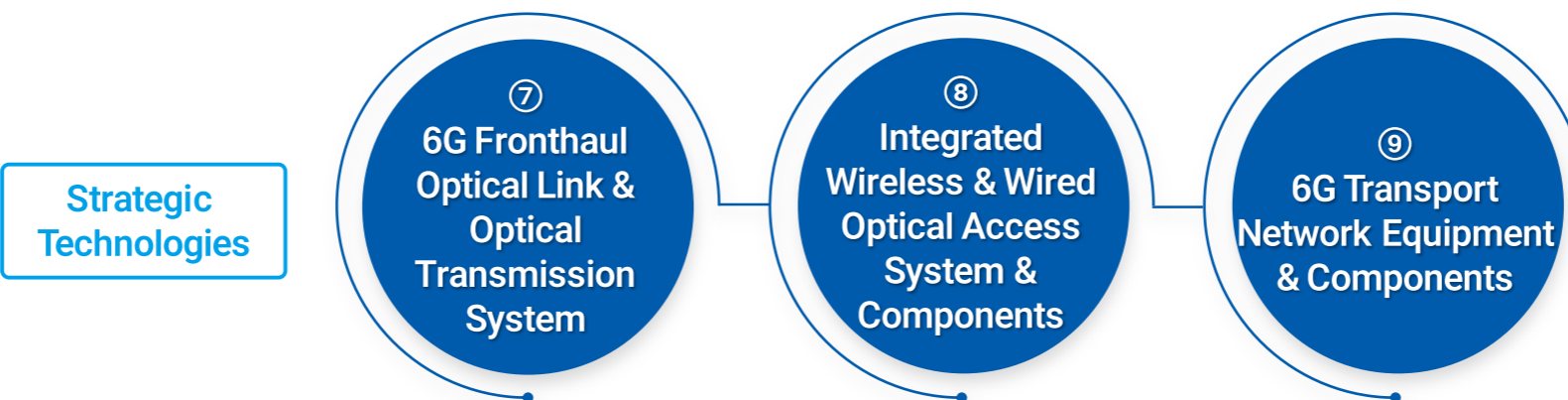
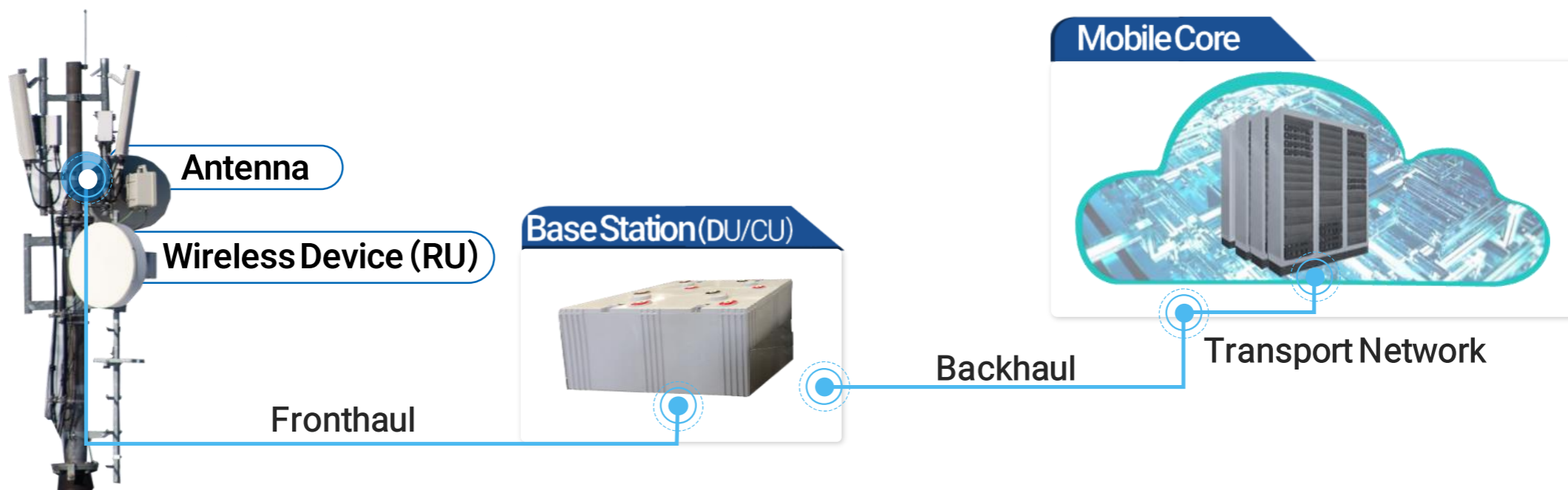


AI-based Energy Efficient Network

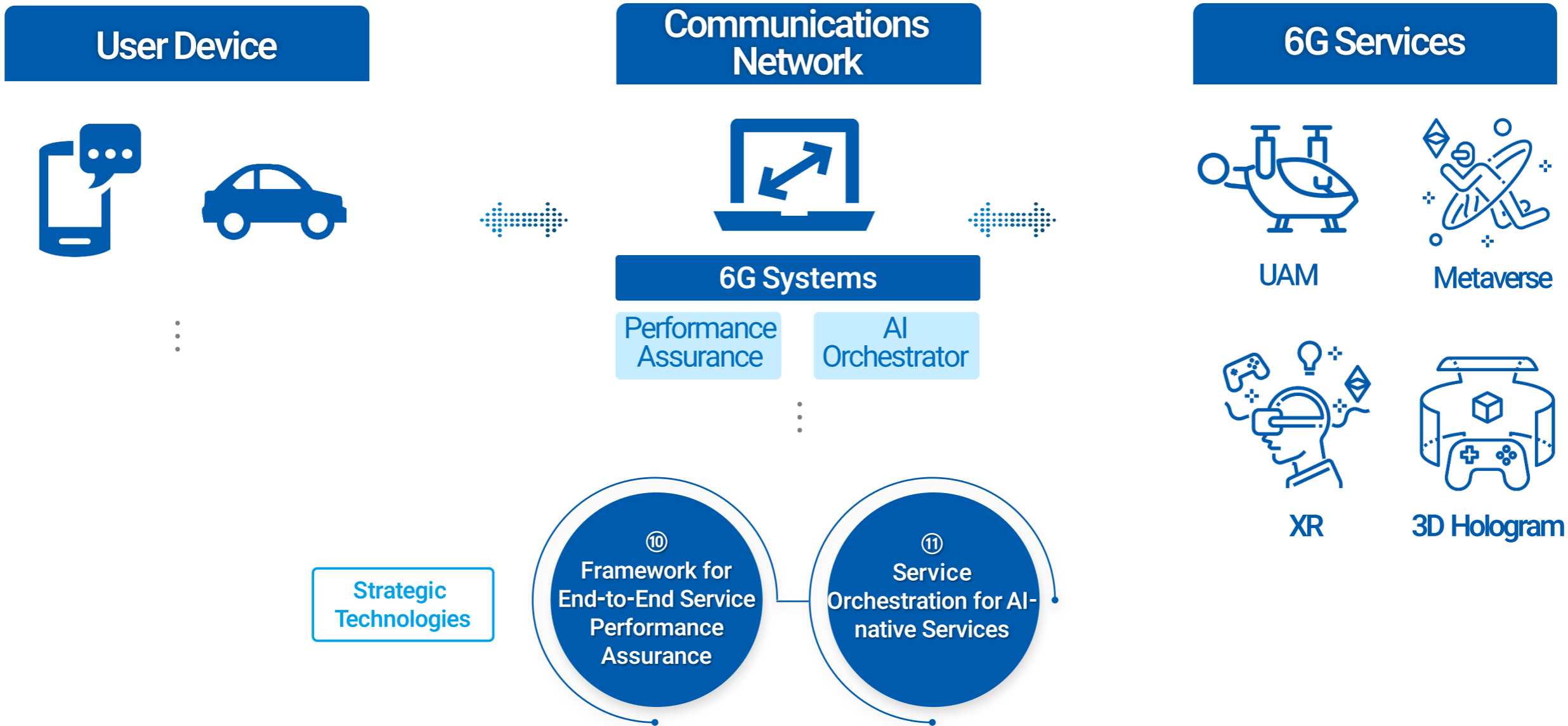
> AI-based radio resource control and optimization technologies for energy saving & radio efficiency enhancement



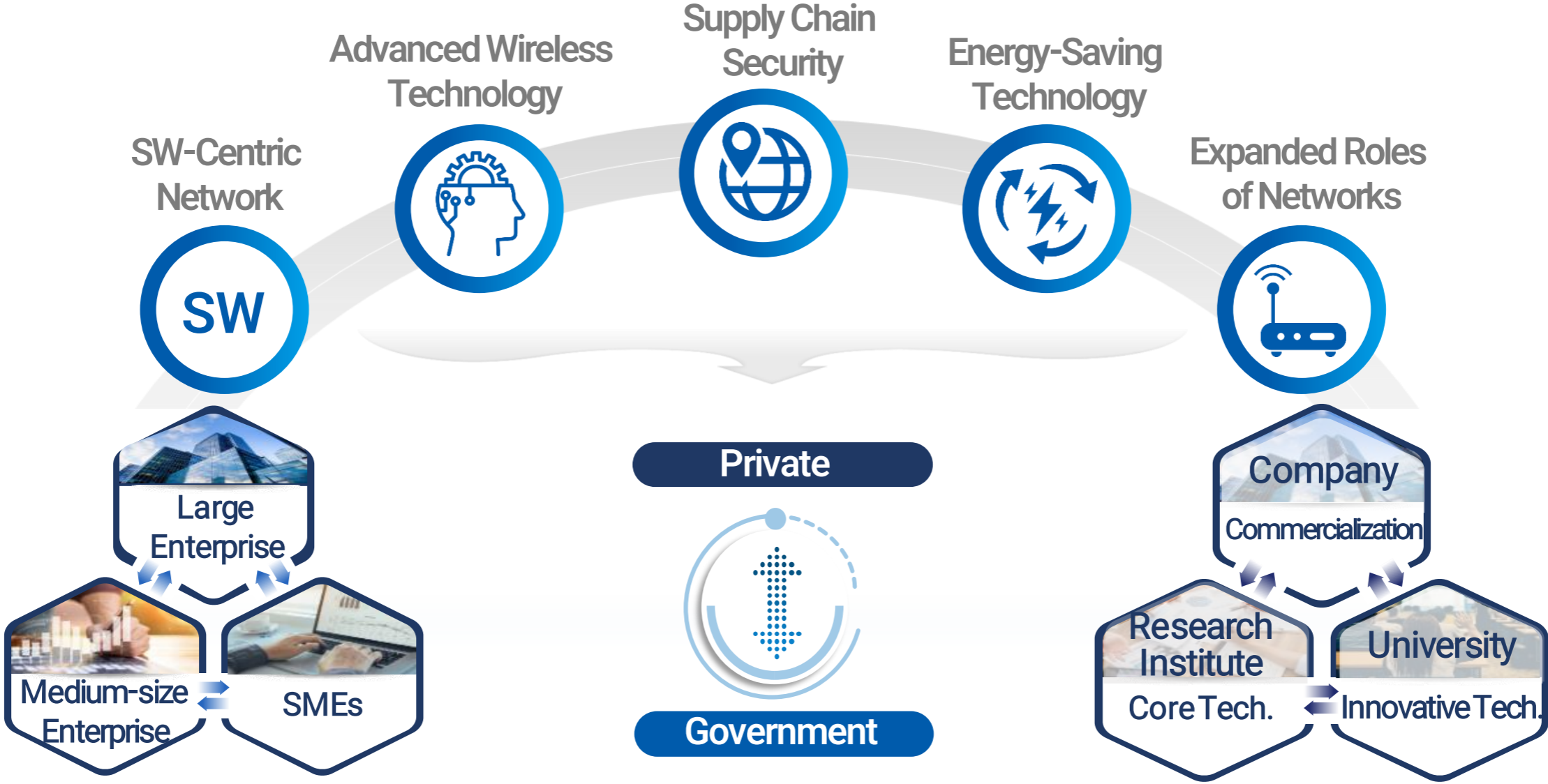
> Ultra-high Speed/Capacity Optical Transmission System & Component Technologies for 6G Front/Backhaul



> System technologies to ensure end-to-end performance assurance of diverse 6G services



> Demo of 47 core technologies in 11 strategic technology areas to secure the initiative in 6G commercialization



To realize 6G vision of advancing Human Happiness, Prosperity, and Sustainability through 6G technologies.

6G Forum

- ✓ coordinates 3 drivers (Societal Need-Pull, Technology-Push, and Policy-Lead) for 6G.
- ✓ identifies use cases that can be applied to various industries, reflecting regional characteristics.
- ✓ will actively pursue ongoing activities such as supporting 3GPP and ITU standardization, publishing technical white papers, and seeking global collaboration so that we can ensure the safe landing of 6G technologies.

감사합니다.
Thank you.

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