Ministry of Science and ICT

Korea's 6G R&D Promotion Strategy

February 2024

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Contents

I Background: The Importance of Network

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Network: Imperative for Economy and Society

Key Infra for Digital Innovation

Foundation for creating new industries,
including innovative devices and services

Bastion of Digital Sovereignty

Linchpin of national economic security
that determines national economic
and communications sovereignty

High-Impact National Strategic Industry

Huge Market

Global Equipment Market (USD 1b)

High Growth Potential

* Gartner, 21.9

I Background: Evolving Landscape

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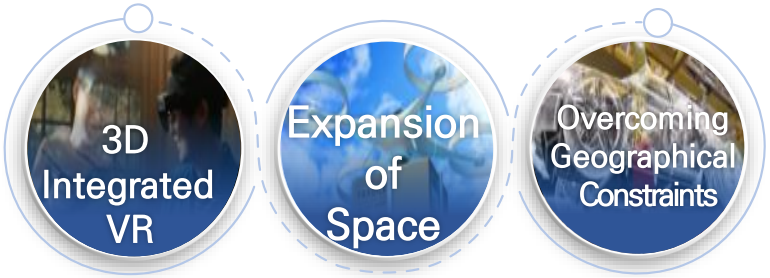
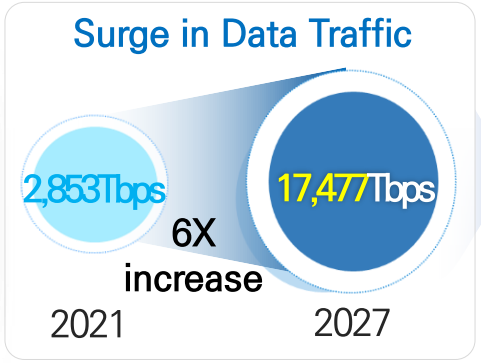
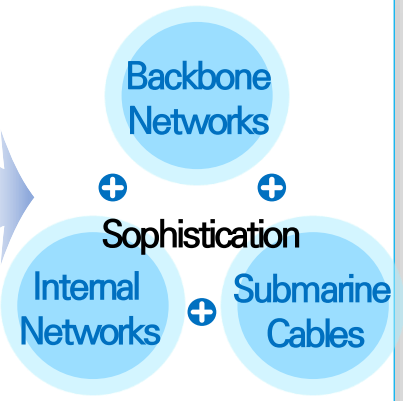
"Amplification of the Network's Role in Backing Digital Innovation"

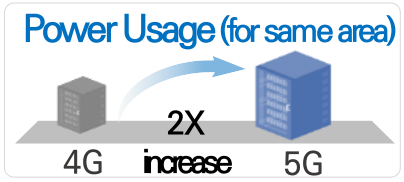
Advent of Innovative Services and Devices → Enhancement of Network Sophistication







Emergence of Energy and Security Concerns → Demand for Advanced Network Technologies



- Rise in Energy Consumption of Network Equipment

- Sophistication of Security Threats

I Background: Evolving Landscape

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Rapid Paradigm Shift to Cloud & Software-Centric Networks

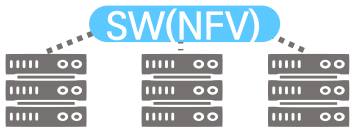
→ Urgent Preparation Required in the Industry

Past Hardware-Centric

Integrated HW-SW
(Legacy Network System)

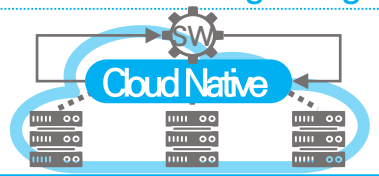
Present Central Control

General-Purpose Server + Virtualization



Future Cloud & Software-Based

Virtualization + Automation
+ Modularization + Lightweighting



Arrival of a New Industrial Ecosystem

Global Equipment Companies

HW-Centric
↓
SW-Centric

CISCO NOKIA

Subscription-based cloud & NW service('21)

Global Big Tech Companies

Entry into the Mobile Communications Market (Local 5G)

amazon

Google Microsoft

Telecom Companies

SW Companies

Platform Companies

Utilization of Open RAN

O-RAN ALLIANCE

Open RAN POLICY COALITION

Need to shift away from traditional HW-centric technology development and investment

Strive to transition to cloud and SW-based networks

I Background: Evolving Landscape

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> Securing cutting-edge network technology will determine the outcome of the competition.

Struggle for Dominance Reshaping the Future Industrial Landscape

Securing Domestic Supply Chains → Establishment of Communications Sovereignty

More Prominent Technology Blocs

- Cooperation on cutting-edge tech among allies

- Expanding the scope of economic security cooperation

Intense Competition for Network Leadership

☑ Major countries are ramping up infra and R&D investments.

- **Endless Frontier Act**(Jun. 2021)
- **Future Networks Act** (Passed House in Dec. 2021)

- **Promotion of international joint research** (Apr. 2021)
- **Expansion of Beyond 5G R&D** (Jun. 2021)

- **New Infrastructure Investment Plan**(Mar. 2020)
- **7 Infrastructure Tech Innovations** (May 2020)

- **Digital Compass Strategy** (Mar. 2021)
- **EU 6G SNS Program** (Jan. 2022)

A national strategy will be established to respond to the network paradigm shift and global competition, as well as to support the requirements of the deepening digitalization era.

I Background: Global 6G Competition Intensifying

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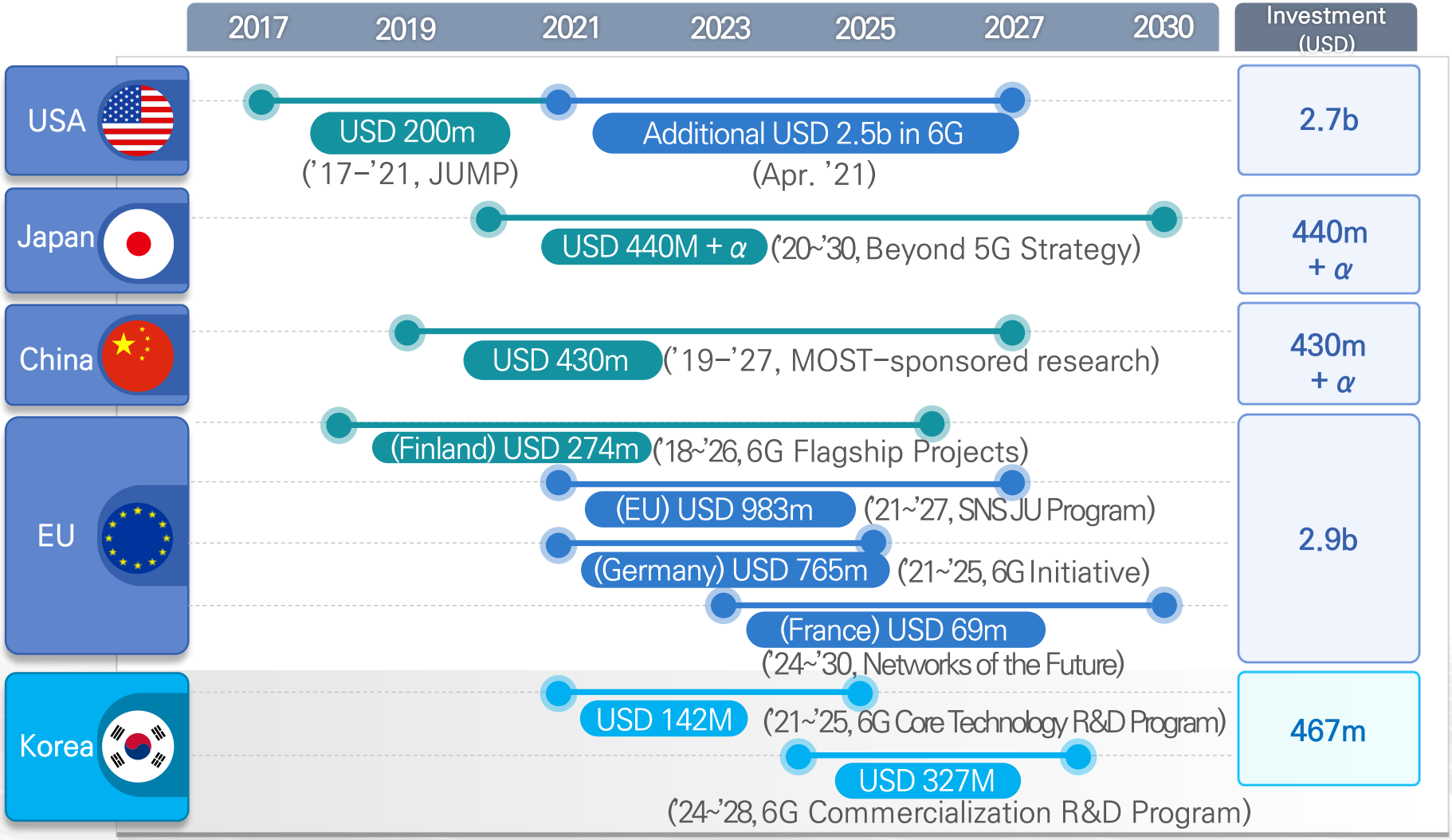
› Starting with the U.S.'s proactive investments, nations are competitively pushing for substantial R&D investments to secure pioneering 6G technologies.



I Background: Korea's 6G-Related Policy

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› The "K-Network 2030" strategy highlights the importance of and support for 6G development for securing future network leadership.

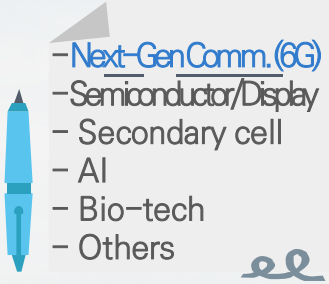
'Pre-6G Vision Fest 2026' announced

National Agenda Item No. 78 (Apr. 2022)

Promotion of 6G R&D and Commercialization

Korea's National Digital Strategy (Sep. 2022)

Next-gen tech. innovations including 6G



National Strategic Technologies Promotion Measures (Oct. 2022)

Development of 6G tech. and standard essential patent

K-Network 2030 (Feb. 2023)

6G Core Technology R&D Program('21~'25) → New Program for 6G Commercialization Technology R&D('24~'28)

II 6G R&D Direction: K-Network 2030 Strategy

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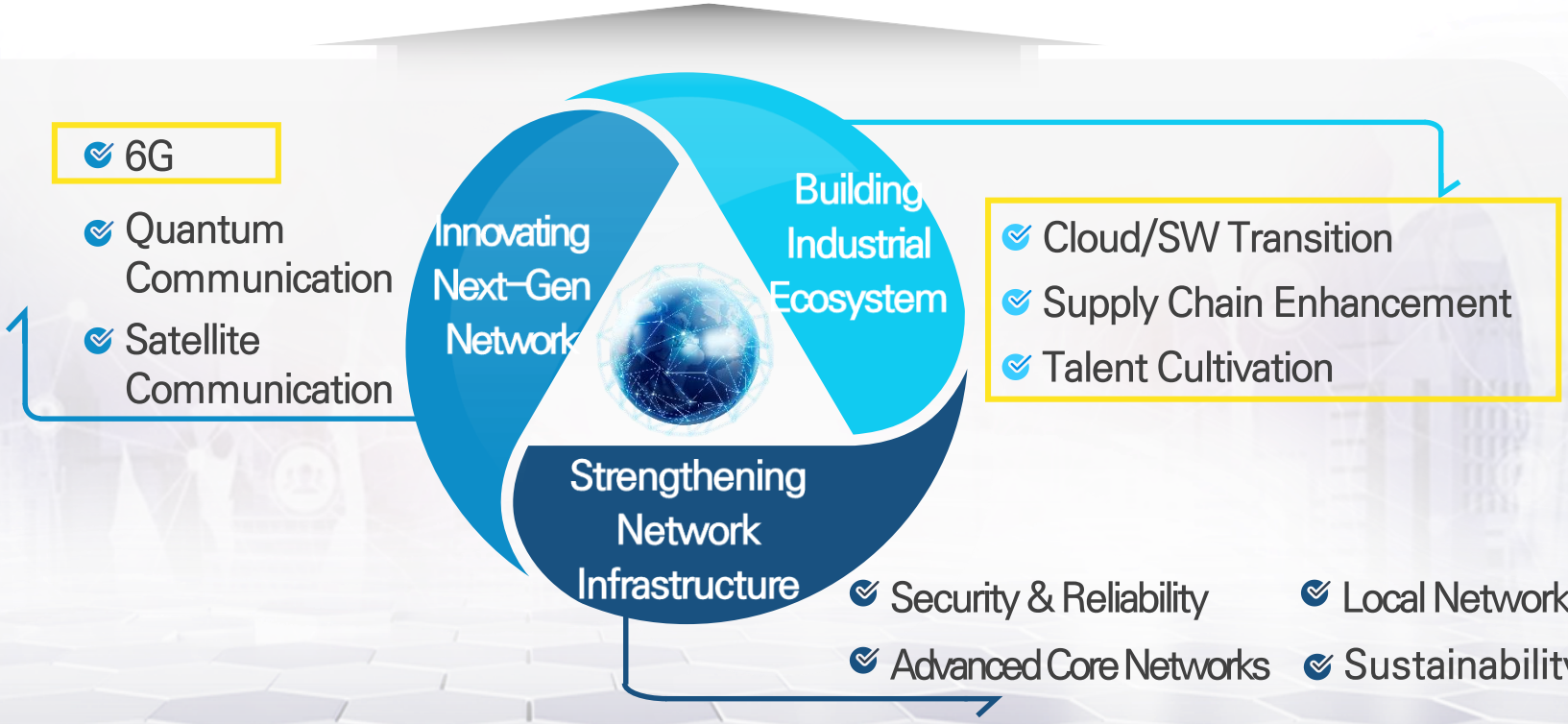
Comprehensive network innovation from technology and infrastructure to ecosystem

World-Leading Technology	SW-Based Networks Innovation	Strengthened Supply Chain
Securing 6G standards & patents Pre-6G demonstration in 2026	Fostering small giants in Open RAN & SW-based networks	Securing independent technology for key components of 6G, satellite, quantum, and backbone networks



II 6G R&D Direction

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Developing 6G innovative technologies that overcome the limitations of 5G and reflect the SW-centric future technology trends

Advanced Wireless Technology
- Upper Mid-Band
- Coverage Expansion

SW-Centric Network
- Open-RAN
- Cloud-Native
- AI-Native

Beyond Communication
- Computing + Communications
- Sensing + Communications

Energy-Saving Technologies
- AI Low-Power Technology
- High-Efficiency, Low-Power Parts

Supply Chain Enhancement
- UE/Base Station Components
- Optical Comm. Devices & Components

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

Ⅱ 6G R&D Direction

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› Promoting the development and standardization of 13 strategic tech. across 5 major sectors, aiming to make a pre-6G demonstration by 2026.

Overview of 6G Commercialization Technology R&D Program

Duration	2024 – 2028 (5 years)
Budget	KRW 440.7b – Government: 373.2b – Private Funding: 67.5b

5 Major Sectors	13 Strategic Technologies
01 6G Wireless	① E-MIMO systems ② E-MIMO base station component ③ 6G upper mid-band terminal component ④ 6G coverage expansion
02 6G Mobile Core Network	⑤ mobile core network architecture and framework ⑥ AI-Native mobile core network automation/optimization
03 6G Wired Network	⑦ 6G fronthaul optical link and transmission system ⑧ Integrated wireless and wired optical system ⑨ 6G networking transmission component
04 6G System	⑩ end-to-end service performance assurance framework ⑪ 6G system technology supporting AI-Native application services
05 6G Standardization	⑫ 6G open service verification platform ⑬ 6G standardization

+ Low power consumption · Security · Reliability

R&D Focus Areas

① 6G Wireless

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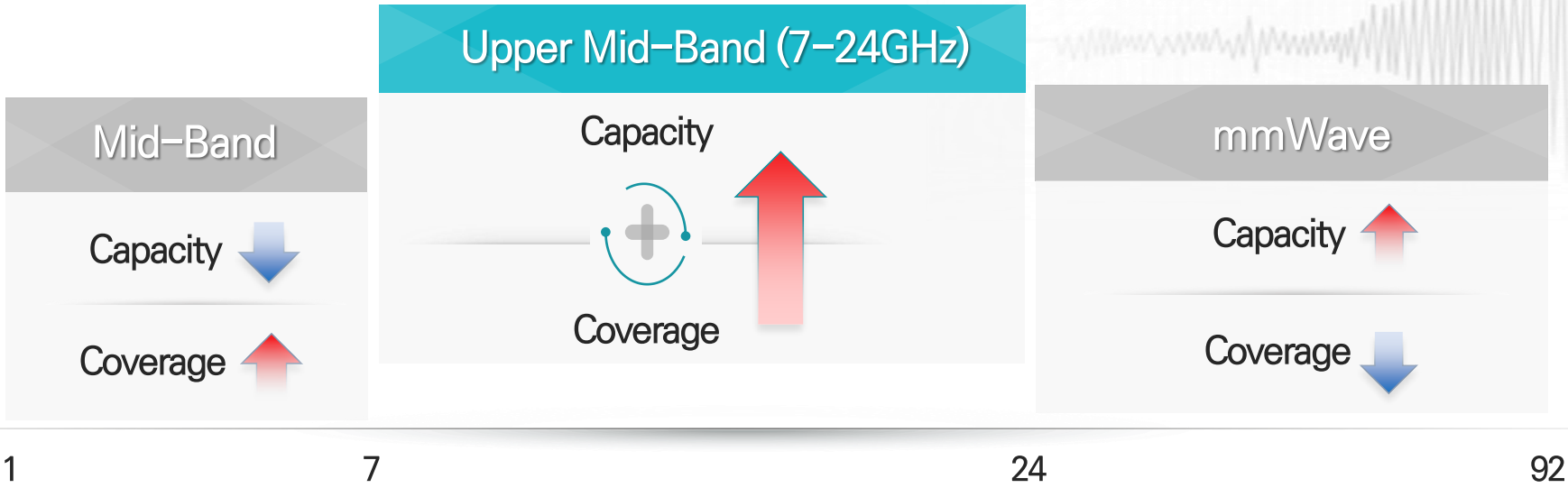
- Developing high-capacity, high-coverage communication technology based on the upper mid-band (7-24GHz).



Strategic Technologies

① E-MIMO Systems

② E-MIMO Base Station Components

③ Components for Terminals

④ Coverage Expansion Technology

III R&D Focus Areas — ② 6G Mobile Core

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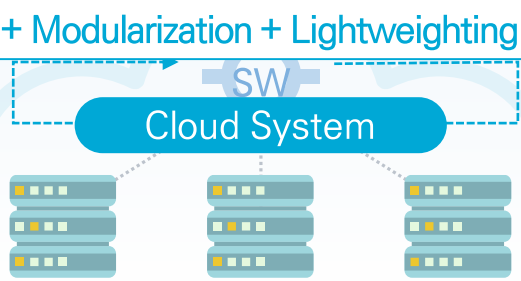
Developing cloud-native core network technology, along with AI-native mobile networking technology for quality assurance of services

Cloud-Native

Virtualization + Automation
+ Modularization + Lightweighting

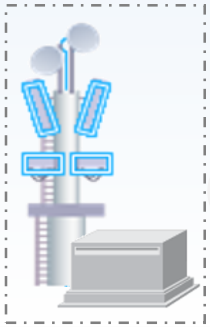
SW

Cloud System



Mobile Core Network
(utilizing general-purpose servers)

AI-Native



AI Semiconductor

AI Technology

Base Station + Mobile Core Network

Strategic Technologies

⑤ Mobile Core Network Architecture and Framework

⑥ AI-Native 6G Mobile Core Network Automation & Optimization

III R&D Focus Areas

③ 6G Wired Network

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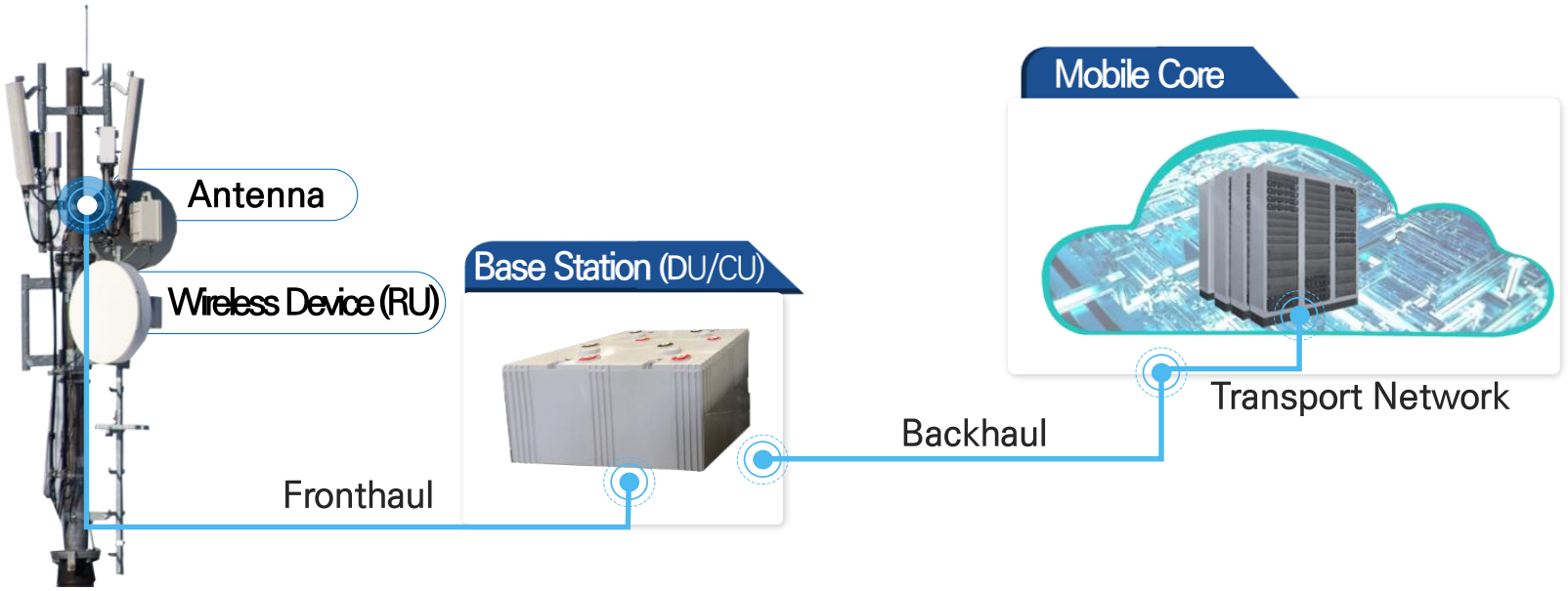
Developing ultra-high-speed, high-capacity optical transmission system and component technology for the 6G fronthaul-backhaul



Strategic Technologies

- ⑦ 6G Fronthaul Optical Link and Optical Transmission System
- ⑧ Integrated Wireless and Wired Optical Access System & Components
- ⑨ 6G Networking Transmission Equipment and Components

R&D Focus Areas — ④ 6G System

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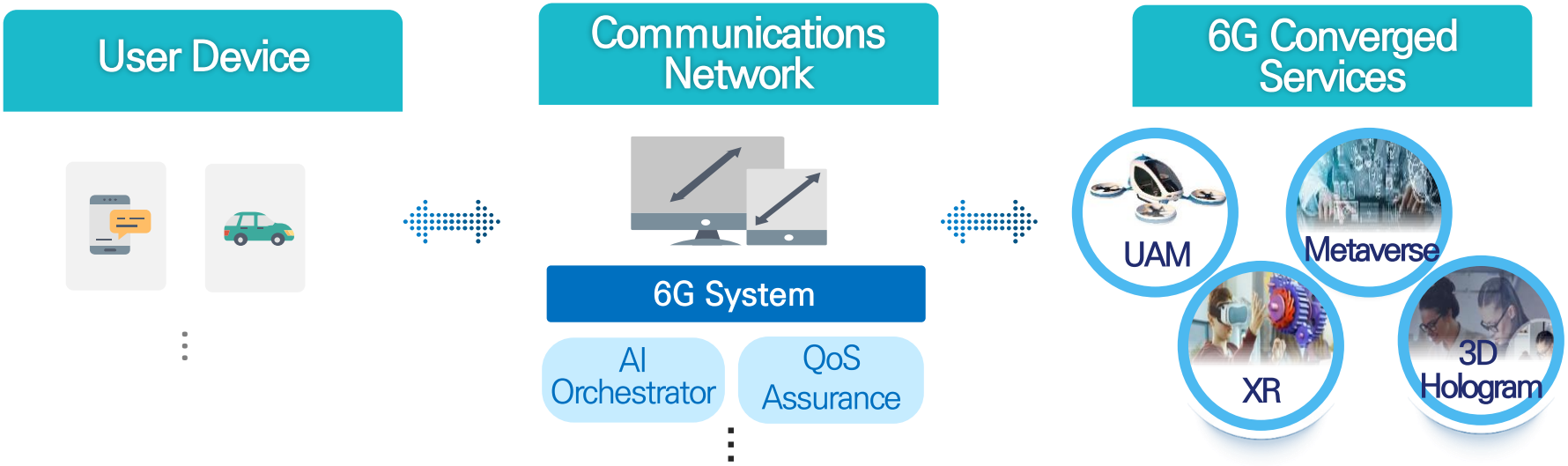
Developing wireless and wired resource orchestration technology and AI-native application service operating system to ensure diverse composite QoS performance for 6G converged services



Strategic Technologies

- ⑩ End-to-End Service Performance Assurance
- ⑪ AI-Native Application Services Support
- ⑫ 6G Open Service Verification Platform

III R&D Focus Areas — ⑤ 6G Standardization

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- Operating a dedicated research support system for the development of 6G standard technologies; support for standardization activities; and training of standardization experts

'23	'24~'25	'26~'27	'28~'30
Announcement of 6G Vision (WRC-23) Discussion of Frequency	Development of Standards launched	Standardization Completion Commercialization Development	6G Commercialization

Support for Standards Development and Standardization Activities

Strategic Technologies

⑬ Support for 6G Standardization

Ⅳ Pre-6G Demonstration

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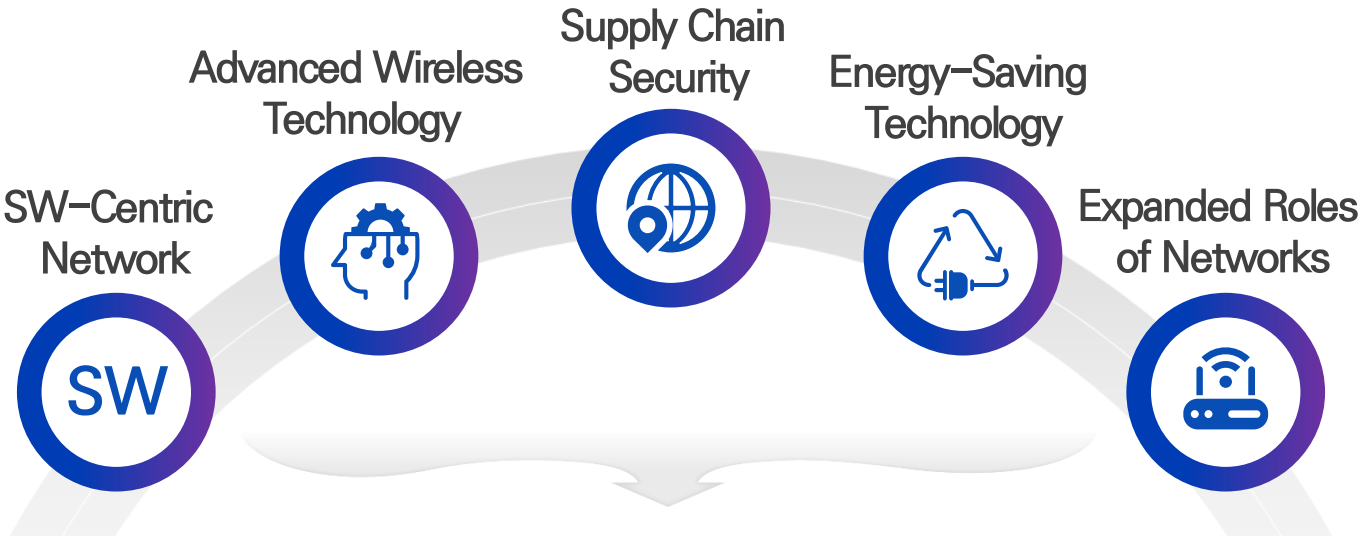
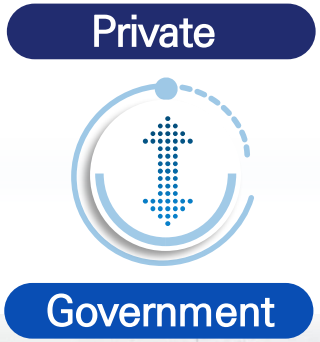
Demonstration of Pre-6G technology in 2026, leveraging advanced technological innovations and large-scale public-private joint investments in 6G research





과학기술정보통신부

Thank you!