



Telecommunications
Standards Development
Society, India

TECH DEEP DIVE

TTDD 2025 CONFERENCE (8th EDITION)

STANDARDISING 6G:

ARCHITECTING INTELLIGENT, SECURE AND SUSTAINABLE NETWORKS & SERVICES

 **Date:** 15-18 July 2025

Media Partner

COMMUNICATIONS TODAY

**Workshop on New Network & Services
ecosystems for 6G: Services Aspects
18 July 2025**

Critical Use Cases & Vertical Domains from 6G Perspective

by

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Gold Partner

6G Vision

Shaping a Happier, Prosperous, and Sustainable Future through 6G



ITU-R IMT-2030 Framework (M.2160)

Usage Scenarios

4 overarching aspects: design principles for scenarios

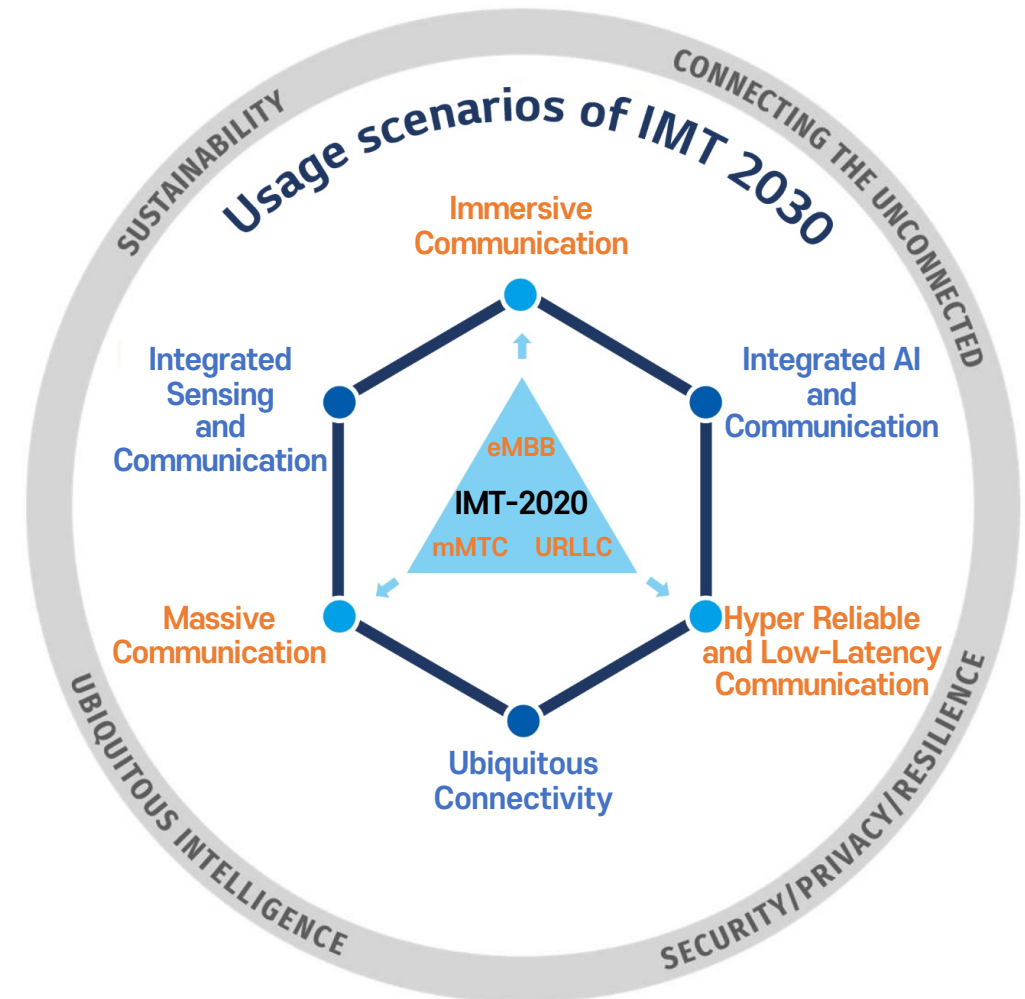
- ▣ Sustainability
- ▣ Connecting the unconnected
- ▣ Ubiquitous intelligence
- ▣ Security, Privacy, Resilience

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



3GPP TR 22.870

Use Cases and Service Requirements

3GPP TR 22.870 v0.2.0 (2025-02)

Technical Report

3rd Generation Partnership Project;
Technical Specification Group TSG SA;
Study on 6G Use Cases and Service Requirements;
Stage 1
(Release 20)



The present document has been developed within the 3rd Generation Partnership Project (3GPPTM) and may be further elaborated for the purposes of 3GPP.
The present document has not been subject to any approval process by the 3GPP Organizational Partners and shall not be implemented.
This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification.
Specifications and Reports for implementation of the 3GPPTM system should be obtained via the 3GPP Organizational Partners' Publications Offices.

Target completion date: TSG#111 (Mar 2026)
Completion rate: **66% (as of June 2025)**

Objective: This study aims to identify **high level principles and use cases - to define potential requirements to enable the 3GPP system** to support the needs of new and enhanced services and scenarios, **based on, but not limited to, IMT-2030 usage scenarios.**

- System and Operational Aspects
- Artificial Intelligence
- Integrated Sensing and Communication
- Ubiquitous Connectivity
- Immersive Communication
- Massive Communication
- Further Use cases on Industry and Verticals
- Others

6G Use Case #1

Immersive Communication (XR & Holographic Presence)

- Context
 - Need for richer remote interaction across business, education, and entertainment
- Key Enabler
 - 6G eMBB with ultra-high bandwidth and ultra-low latency
- Use Cases
 - Holographic meetings and remote presentations
 - Virtual concerts and live XR media streaming
 - Cloud-rendered VR/AR for simulation and training
- Benefits
 - Realistic sense of presence across distances
 - More inclusive, creative, and immersive collaboration



6G Use Case #2

Remote Surgery & Telemedicine

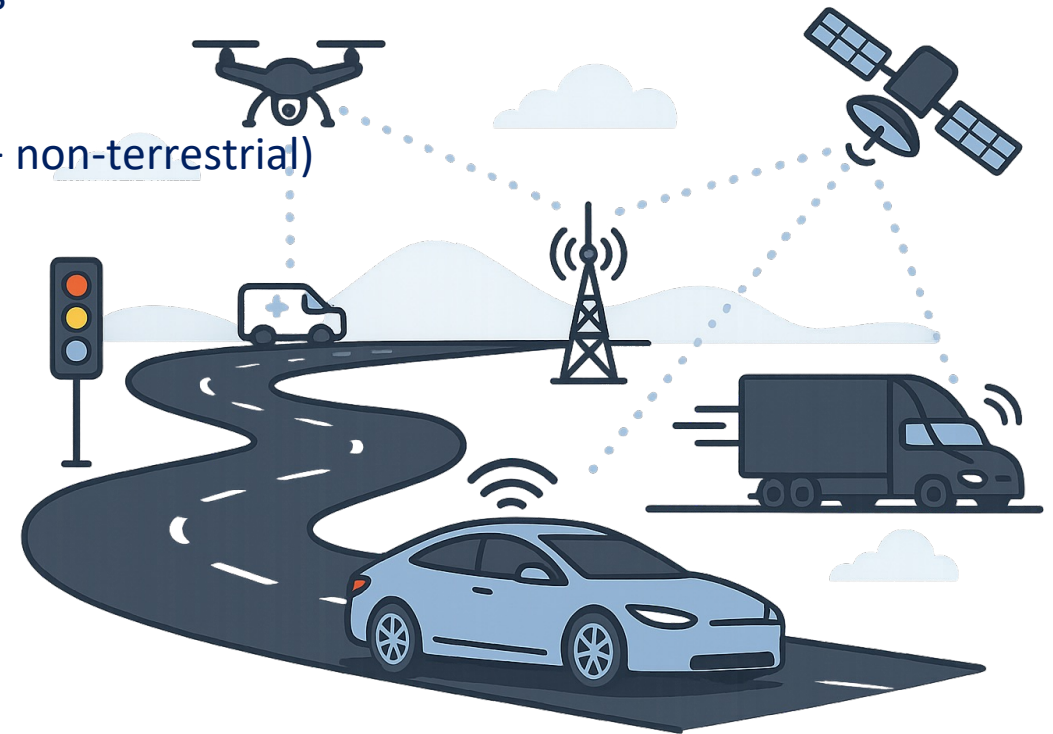
- Context
 - Need for real-time, safe, and accessible medical services in remote areas
- Key Enabler
 - 6G HRLLC (Hyper Reliable Low-Latency Communication)
- Use Cases
 - Remote robotic surgery with haptic feedback
 - AR-assisted diagnostics and procedures
 - Real-time health monitoring and emergency care
- Benefits
 - Life-saving medical services anywhere
 - Secure, precise, and collaborative healthcare delivery



6G Use Case #3

Autonomous Vehicles & Smart Transportation

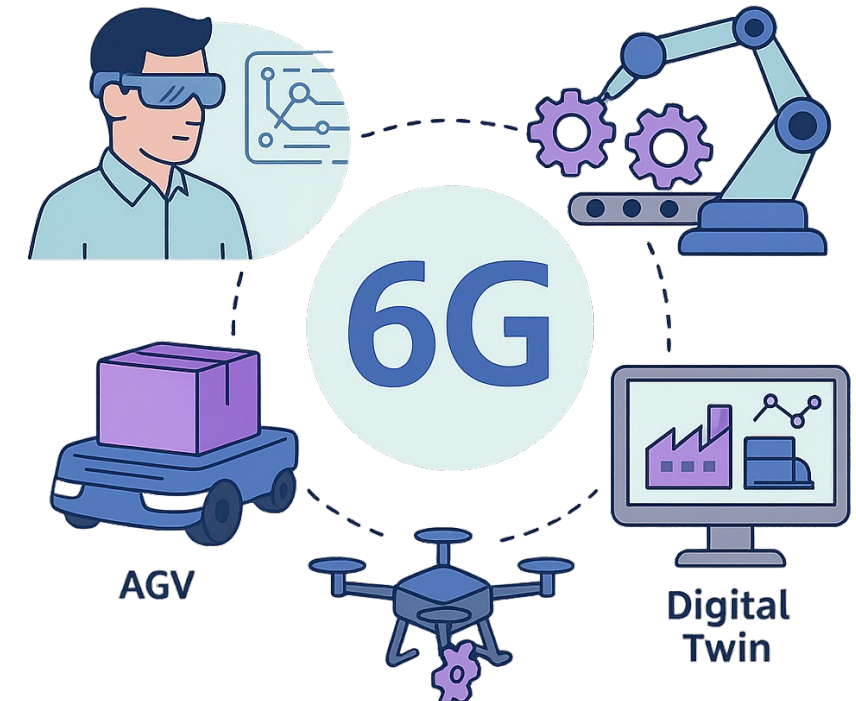
- Context
 - Demand for safe and intelligent transportation systems
- Key Enabler
 - 6G V2V and V2X with ubiquitous coverage (terrestrial + non-terrestrial)
- Use Cases
 - Autonomous driving with real-time coordination
 - Drone delivery in remote areas
 - Smart intersections and traffic rerouting
- Benefits
 - Reduced accidents and congestion
 - More efficient and sustainable mobility



6G Use Case #4

Industry 4.0 & Smart Manufacturing

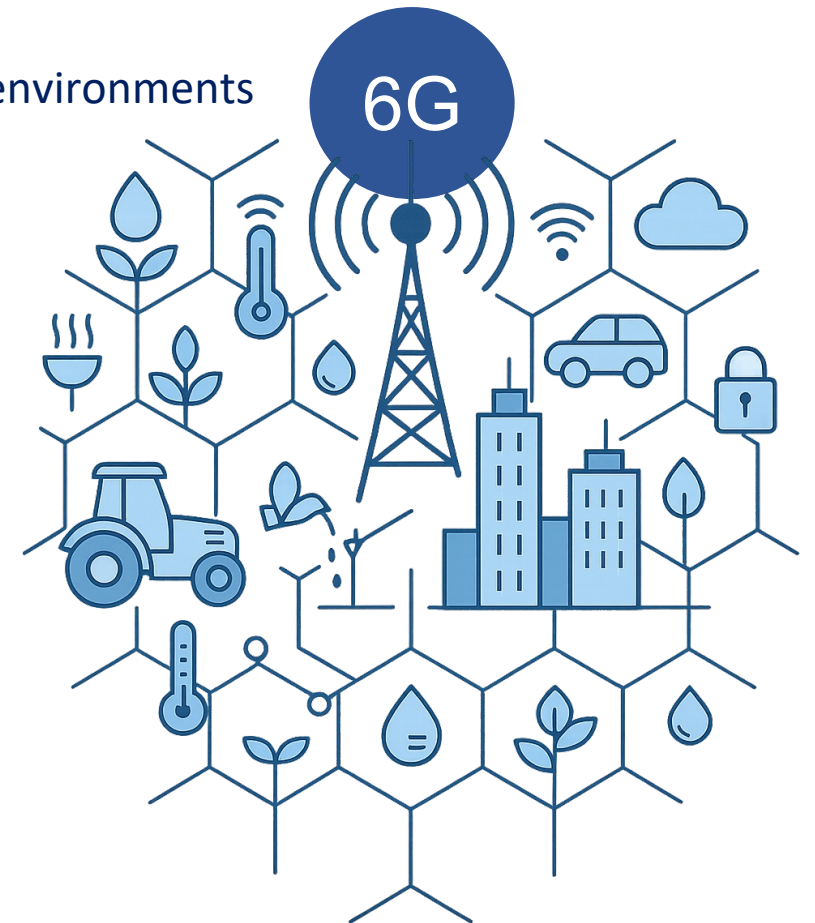
- Context
 - Need for ultra-flexible and highly automated industrial operations
- Key Enabler
 - 6G ultra-reliable low-latency communication and AI-powered digital twins
- Use Cases
 - Predictive maintenance via real-time sensor data
 - Remote robotic control with haptic feedback
 - AR-assisted diagnostics and workflow adaptation
- Benefits
 - Increased productivity and uptime
 - Safer and more efficient factory operations



6G Use Case #5

Massive IoT

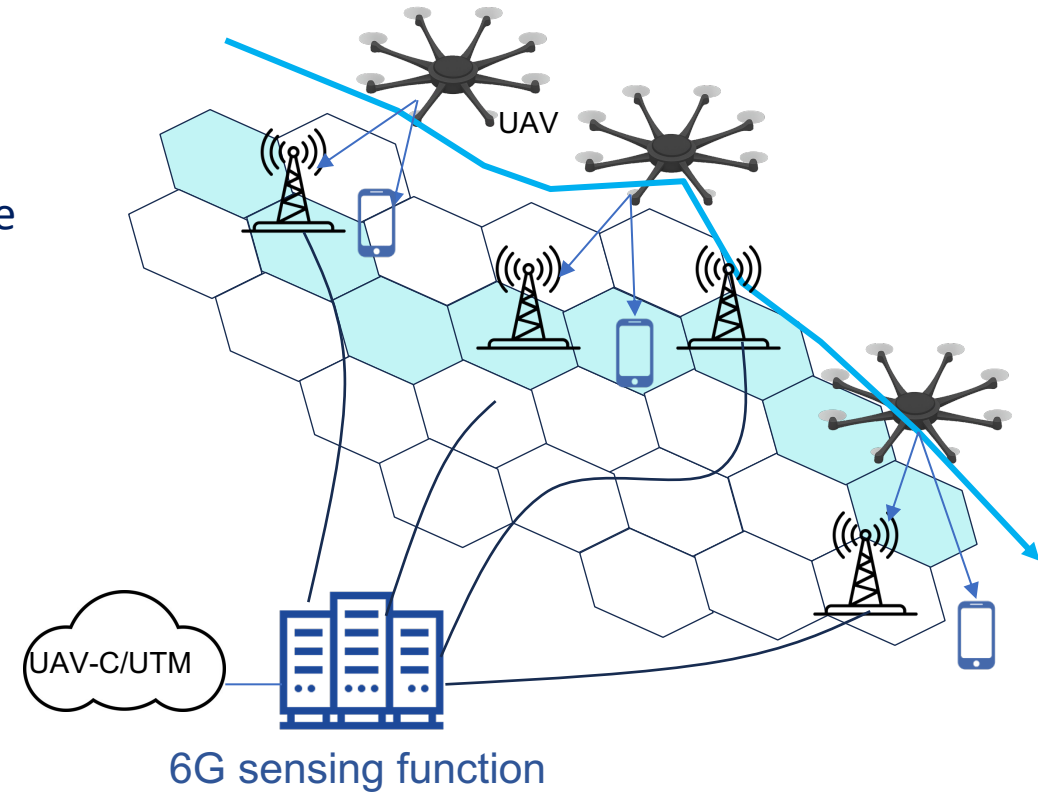
- **Context**
 - Explosive growth of connected devices across cities, industries, and environments
- **Key Enabler**
 - 6G massive machine-type communication (mMTC)
- **Use Cases**
 - Smart agriculture soil, crop, and livestock monitoring
 - Urban sensors for air quality, traffic, and noise
 - Disaster warning systems through environment monitoring
- **Benefits**
 - Energy-efficient, scalable infrastructure
 - Autonomous, real-time data collection and action



6G Use Case #6

Integrated Sensing and Communication

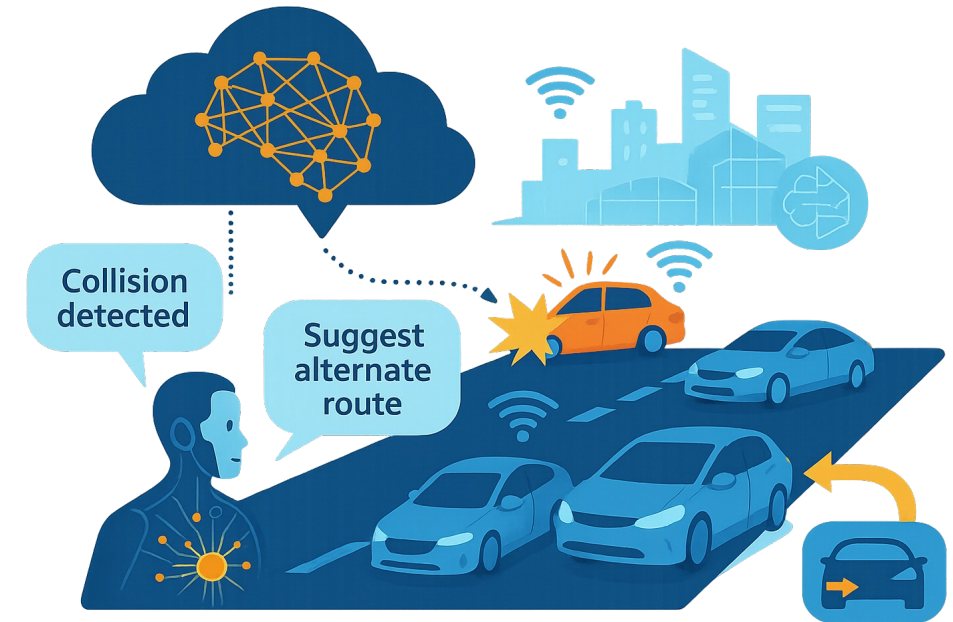
- Context
 - Demand for location-aware, context-sensitive networks
- Key Enabler
 - 6G radio signals enabling sensing and positioning alongside data transmission
- Use Cases
 - Indoor localization and object detection
 - UAV supervision and navigation
 - Smart city adaptation traffic, lighting, utilities
- Benefits
 - Enhanced real-time decision-making
 - Infrastructure that sees and responds intelligently



6G Use Case #7

Agentic AI

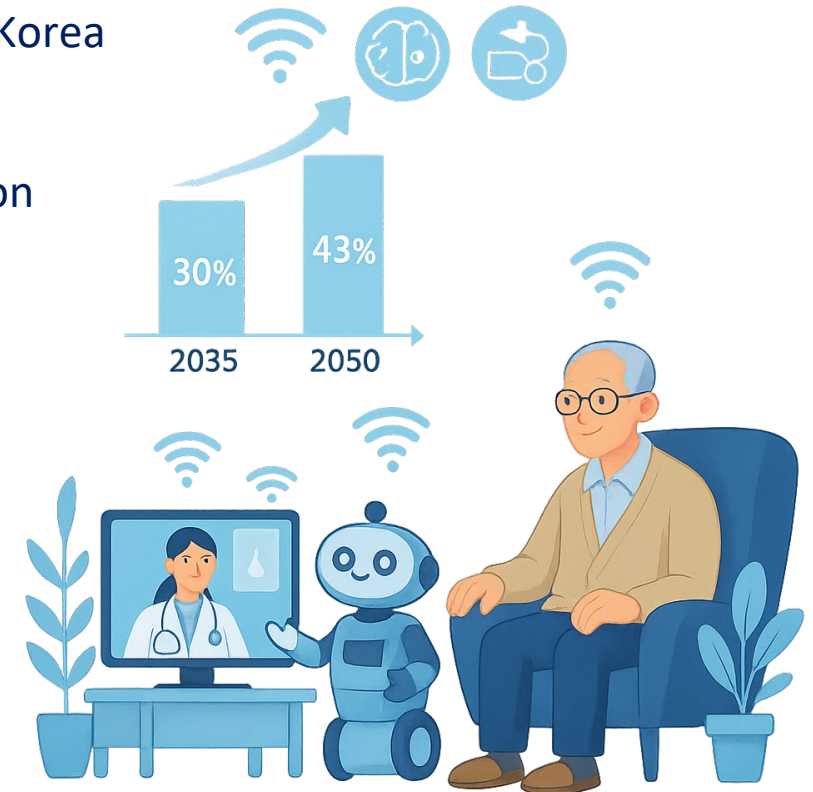
- Context
 - Need for AI agents that can collaborate autonomously across distributed systems
- Key Enabler
 - 6G enables low-latency, hyper-reliable, high-bandwidth communication between agents
- Use Cases
 - AI agents detect traffic incidents and reroute cars
 - Service robots respond to real-time events
 - Cloud-edge-device agents share goals and adapt behavior
- Benefits
 - Real-time cognitive collaboration
 - More adaptive, intelligent automation at scale



6G Use Case #8

Elderly Care – Regional-specific Use Case

- Context
 - Super-aging population and shortage of caregivers in regions like Korea
- Key Enabler
 - 6G-enabled integration of sensing, AI, robotics, and communication
- Use Cases
 - Fall detection and emergency alerting
 - Remote diagnostics and care planning
 - Companion and mobility-support robots
- Benefits
 - Supports aging-in-place and independent living
 - Reduces care burden while enhancing safety



Key Vertical Domains Transformed by 6G

- Healthcare (eHealth)

- Remote surgery, AR-guided operations
- Continuous monitoring with wearables & implants
- Enhanced telemedicine & diagnostics



- Automotive & Transportation

- Real-time V2X communication for autonomy
- Smarter traffic management & logistics
- Public transport optimization via 6G tracking



Key Vertical Domains Transformed by 6G

- Manufacturing & Industrial IoT

- Wireless factories & digital twins
- Remote machinery control in harsh zones
- Higher automation, efficiency, and safety



- Agriculture & Mining

- IoT sensors for crop/livestock monitoring
- Drones, autonomous farm equipment
- Safer, more efficient remote operations



Key Vertical Domains Transformed by 6G

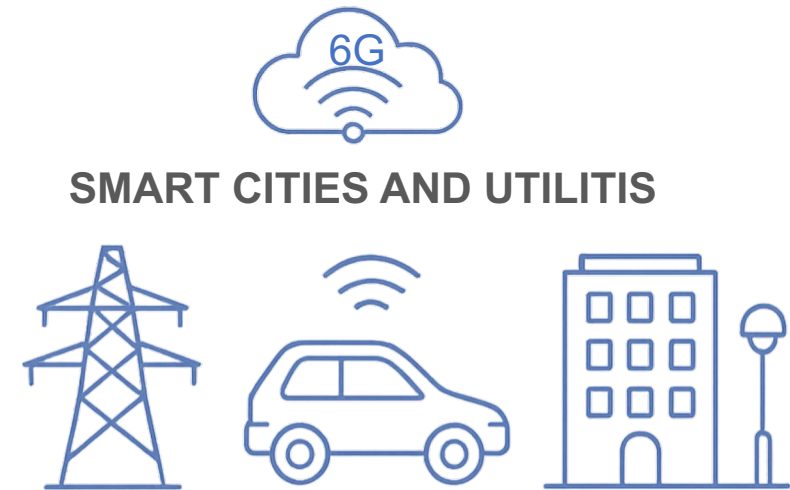
- **Public Safety**

- Resilient, mission-critical 6G communications
- Real-time data sharing during emergencies
- Search & rescue via connected drones & AR



- **Smart Cities & Utilities**

- Grid monitoring, intelligent transport systems
- Scalable infrastructure with low-power IoT
- Improved quality of life through automation



Key Vertical Domains Transformed by 6G

- Media, Entertainment & Education
 - Holographic concerts, XR-based learning
 - Seamless AR/VR content delivery
 - Immersive, personalized global education



MEDIA, ENTERTAINMENT & EDUCATION



Conclusion

A Road Ahead for 6G

- 6G is on the horizon with the potential to transform vertical industries and enable critical new use cases that will shape the future digital landscape.
- 6G is more than speed – it is a strategic leap
 - to empower new use cases from holographic telepresence and remote surgery to autonomous transport, smart industries, and beyond,
 - and to integrate the physical and digital worlds in real time.
- 6G could usher in an era of pervasive connectivity and intelligence that underpins innovations we haven't even conceived of yet.
- 6G blends technical ambition with societal goals: inclusion, economic growth, sustainability.
- Requires global collaboration: technology providers, industry verticals, regulators, and the research community.



Thank You

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