



NEXT G  
ALLIANCE  
An ATIS Initiative

# 6G Roadmap for Vertical Industries

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# NGA Overview

## Membership growth across the 6G ecosystem



Operators  
Vendors  
Hyperscalers  
Academia  
Government  
Research Labs

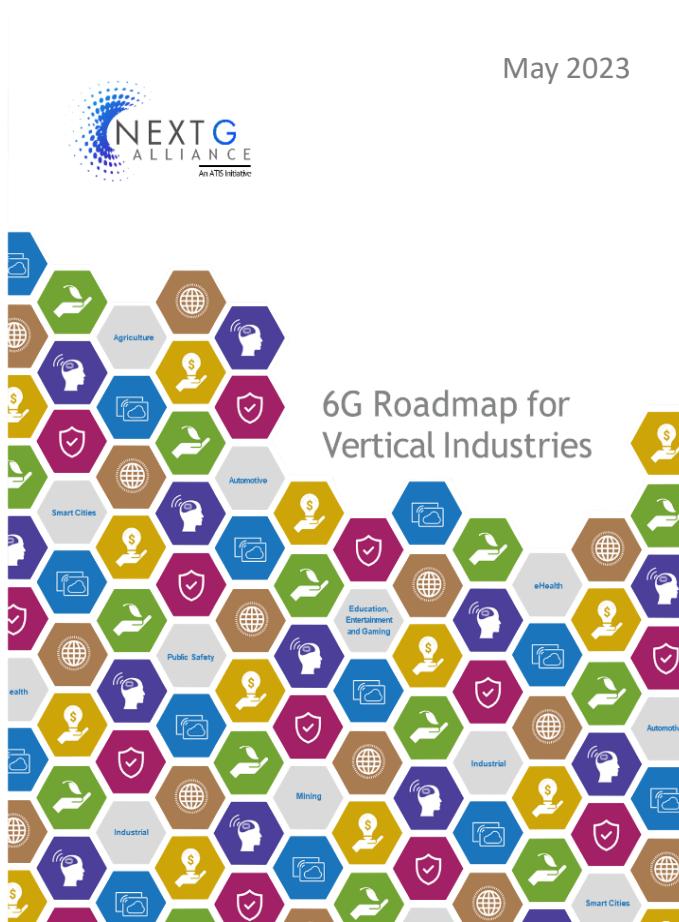
> More than 800 experts across 100+ members

## Strong foundation of NGA reports and white papers



> More than 15,000 downloads of NGA publications  
[6G Library – Next G Alliance](#)

# 6G Roadmap for Vertical Industries



Agriculture



Automotive



Education, Gaming  
and Entertainment



eHealth



Industrial



Mining



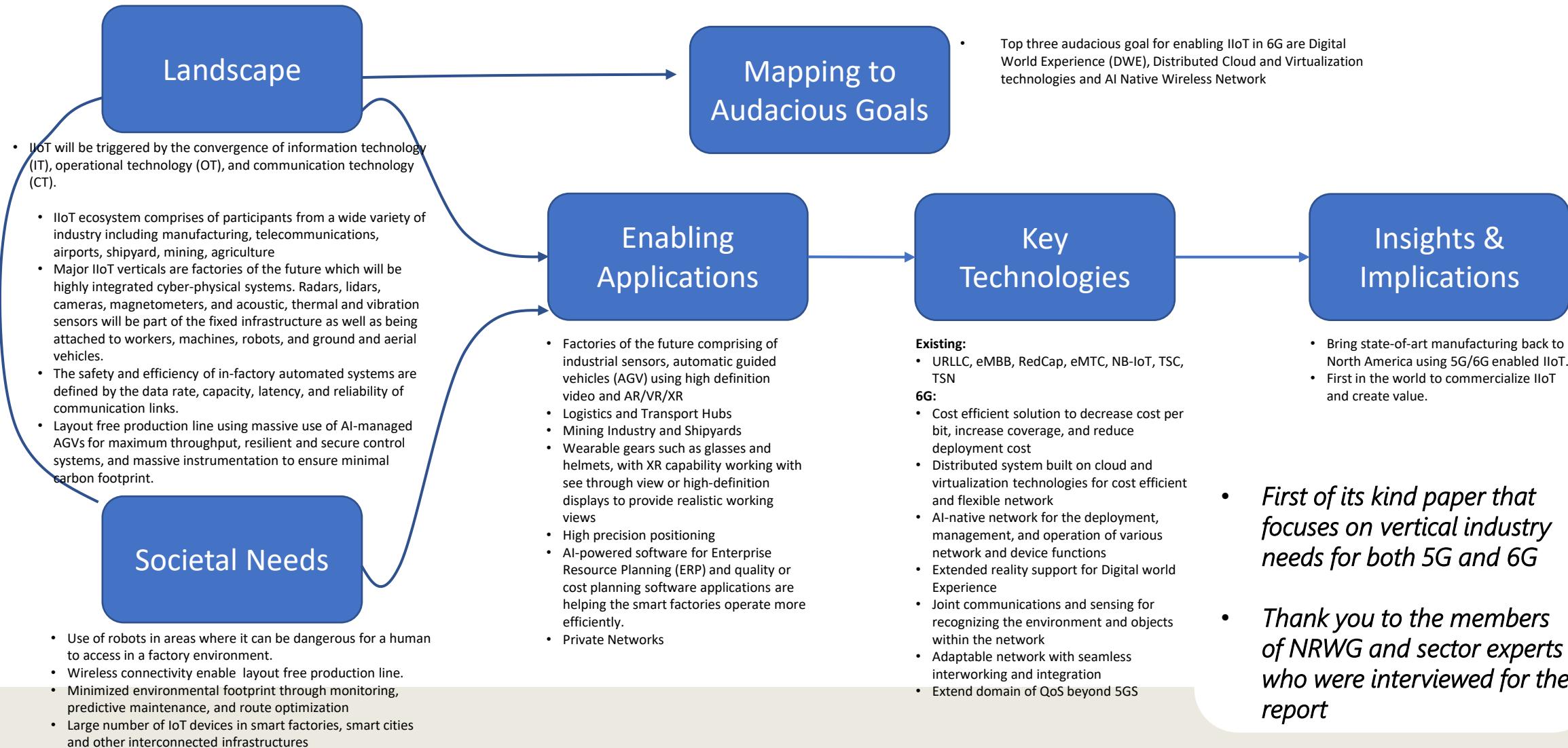
Public Safety



Smart Cities

- ✓ Change how we live and work
- ✓ Translate North American needs to technology outcomes
- ✓ Target shared investments in 6G PoCs and testbeds
- ✓ Connect North American 6G needs to marketplace

# Outline: 6G Roadmap for Vertical Industries



# Automotive

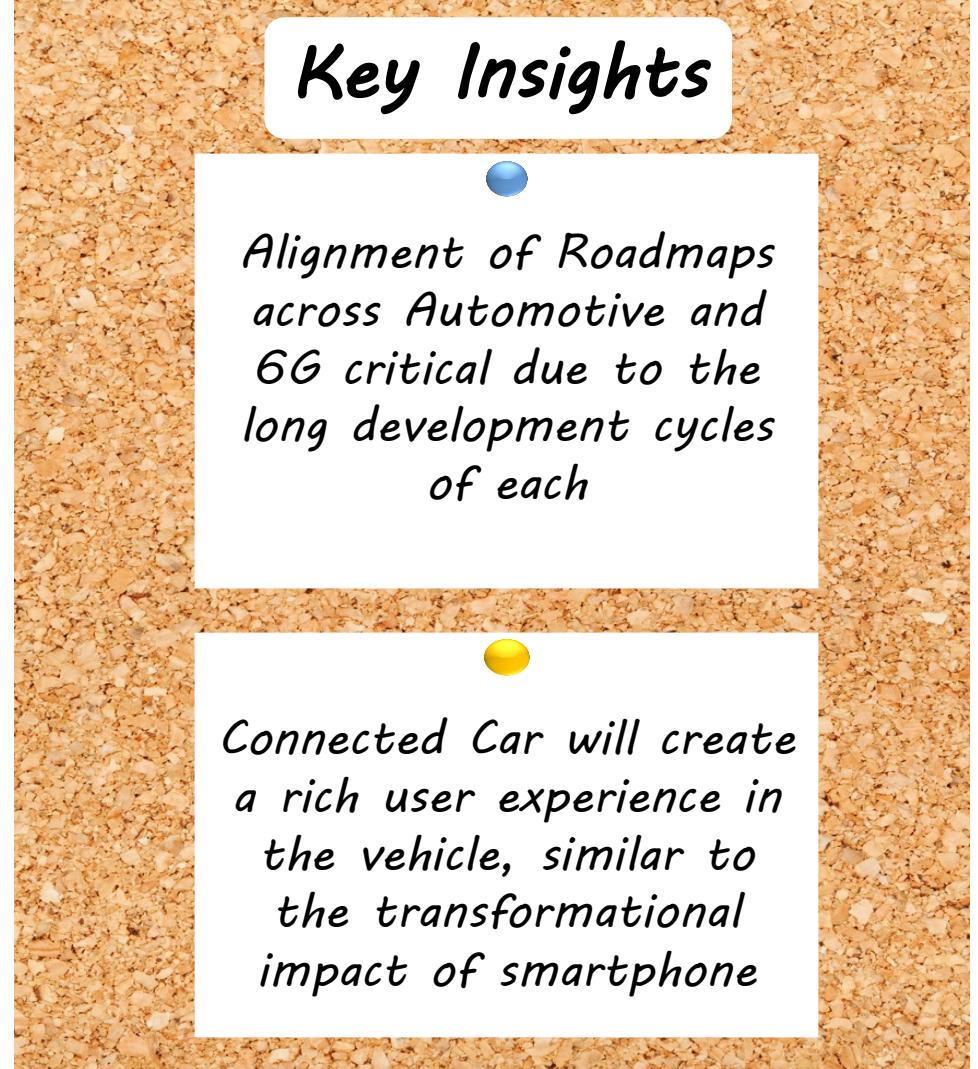


## Needs and Applications

- > V2V and V2P safety improvement and awareness
- > Autonomous, coordinated and remote driving
- > Real-time 360° situational awareness

## Key Technologies

- > Joint Communications and Sensing
- > Distributed Compute and Communications
- > Heterogeneous Networks (NTN, Mesh, etc.)



**Key Insights**

- Alignment of Roadmaps across Automotive and 6G critical due to the long development cycles of each
- Connected Car will create a rich user experience in the vehicle, similar to the transformational impact of smartphone

# Education, Gaming, Entertainment



## Needs and Applications

- > Leveraging EGE innovation for education
- > Metaverse experiences
- > Immersive knowledge and learning
- > Hologram receivers

## Key Technologies

- > Open standards and open source are critical to enable metaverse inter-operability
- > Distributed Compute and Communications is critical to offload processing from resource constrained HMDs

### Key Insights

*MNO involvement is critical to align use cases and engage with the industry players conducting R&D*

*Testbeds are needed to enable interoperability of metaverse*

# eHealth



## Needs and Applications

- > Home-based patient care
- > Remote surgery and scanning
- > AI-enabled patient digital twin
- > Ambient assisted living

## Key Technologies

- > In-facility and remote connectivity
- > 3D devices, systems and imaging
- > Cognitive systems supporting DWE
- > Trustworthy AI
- > Micro-networks surrounding patient

## Key Insights

The intersection of health care needs with 6G applications will create new opportunities for both the health care industry and North American society, including health care partnerships with the communications and technology sector

- Advancing a healthy quality of life
  - Remote monitoring and home-based care
  - Remote treatment and disaster recovery
  - Improving clinician training and modes of delivery

# Smart Cities



## Needs and Applications

- > Urbanization density and access to resources
- > Zero energy IoT devices
- > AI-driven data decision-making
- > Government-provided playing fields for 6G innovation

## Key Technologies

- > Sensing technologies utilizing ML to analyze and predict
- > AI-driven decisions to allocate resources
- > Resilient networks to assure privacy and security
- > Massive connectivity of IoT devices

## Key Insights

An important feature for a smart city is the variety and interdependency of architectures involved in supplying energy, transportation, water, public health, and other services

- Growing interdependency of municipal resources
  - Increasing urbanization
- Broad range of stakeholders sharing of smart city data

# Industrial IoT

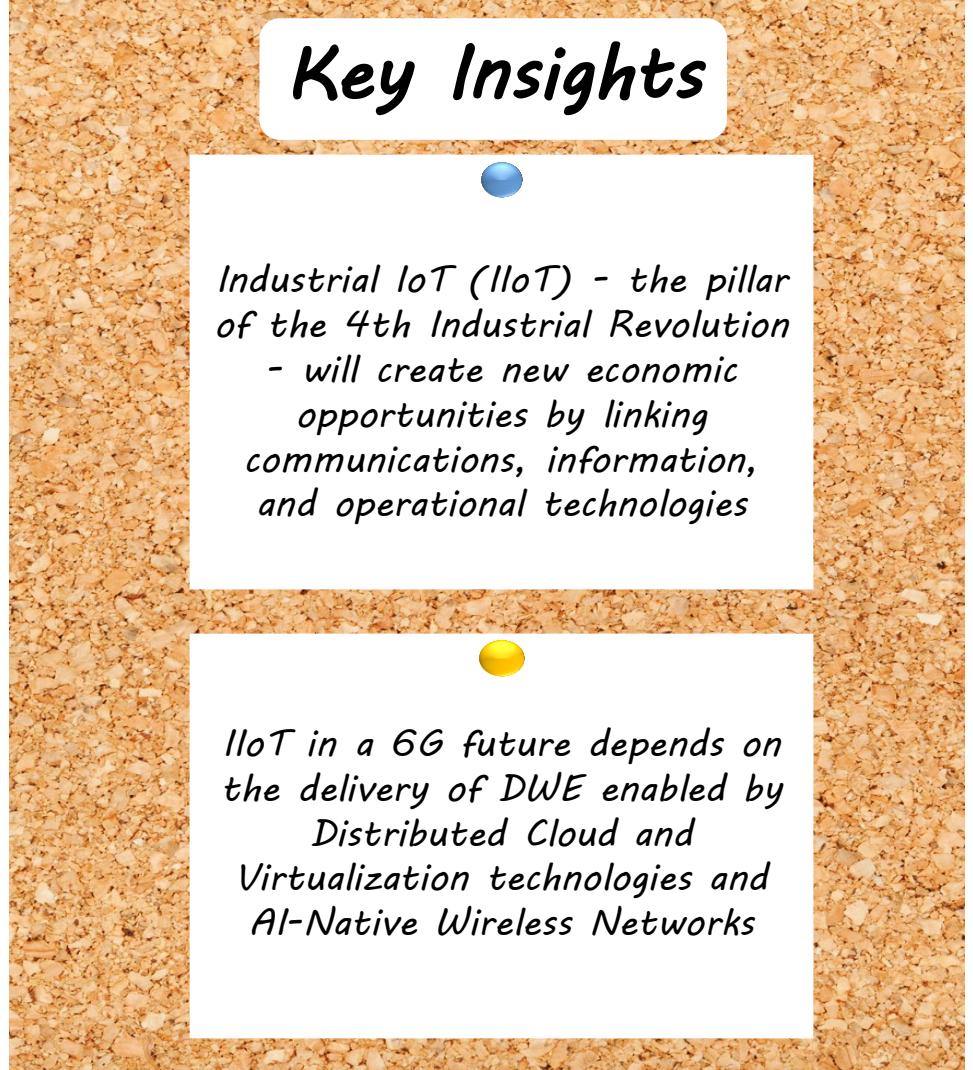


## Needs and Applications

- > Factories of the future
- > AI-managed automatic guided vehicles
- > Massive sensors to manage environment and resources

## Key Technologies

- > Distributed cloud and virtualization
- > Flexible compute resources
- > Physical sensors updating digital twins, JCAS
- > Trustworthy networks and systems



**Key Insights**

- Industrial IoT (IIoT) - the pillar of the 4th Industrial Revolution
  - will create new economic opportunities by linking communications, information, and operational technologies
- IIoT in a 6G future depends on the delivery of DWE enabled by Distributed Cloud and Virtualization technologies and AI-Native Wireless Networks

# Agriculture



## Needs and Applications

- > Movement between farming and road infrastructure
- > High precision irrigation and fertilizer treatments
- > Massive sensing and remote actuation
- > Communications across mobile and NTN

## Key Technologies

- > Connectivity on demand
- > Data collection via low energy sensors
- > Peer-to-peer communications
- > Scalable latency

A corkboard background with a white rectangular callout box in the center. The box contains the following text:

**Key Insights**

6G for agriculture has the promise of leveraging advanced computing technologies (big data, the cloud, edge computing) and energy-efficient wireless IoT sensors to improve sustainability, increase efficiency, and streamline logistic operations

The callout box is divided into two sections by a horizontal line. The top section contains a blue circular icon and the text above. The bottom section contains a yellow circular icon and the following bulleted list:

- Agronomics
- Autonomous machine movement
- Cooperative machine tasks
  - Data-driven logistics
  - Situational awareness

# Public Safety



## Needs and Applications

- > Next Gen mission critical communication
- > AR headsets and glasses
- > Networked robots and UAVs
- > Connected ambulances

## Key Technologies

- > Coverage technologies for limitless connectivity
- > Ultra 3D positioning AR/XR and video feeds
- > AI/ML based situational awareness
- > Highly reliable and secure communications

A corkboard background featuring a white callout box. The box contains the word "Key Insights" in a large, bold, black font. Below it is a blue circular bullet point followed by text about 3GPP's continued work on public safety standardization. Another blue circular bullet point is located below the text, followed by a list of bullet points about public safety enablement on wireless networks, beyond voice communications, improved coverage, and the Internet of Life Changing Things.

*3GPP continues to advance public safety standardization, working toward new and enhanced public safety features, architecture, and interoperability to address evolutionary mission-critical requirements*

- Public safety enablement on wireless networks
- Beyond voice communications
  - Improved coverage (multi-network)
  - Internet of Life Changing Things

# Mining



## Needs and Applications

- > Extreme connectivity
- > Tele-operation for hazardous environments
- > Use of digital twin replicas
- > High precision accuracy and tracking

## Key Technologies

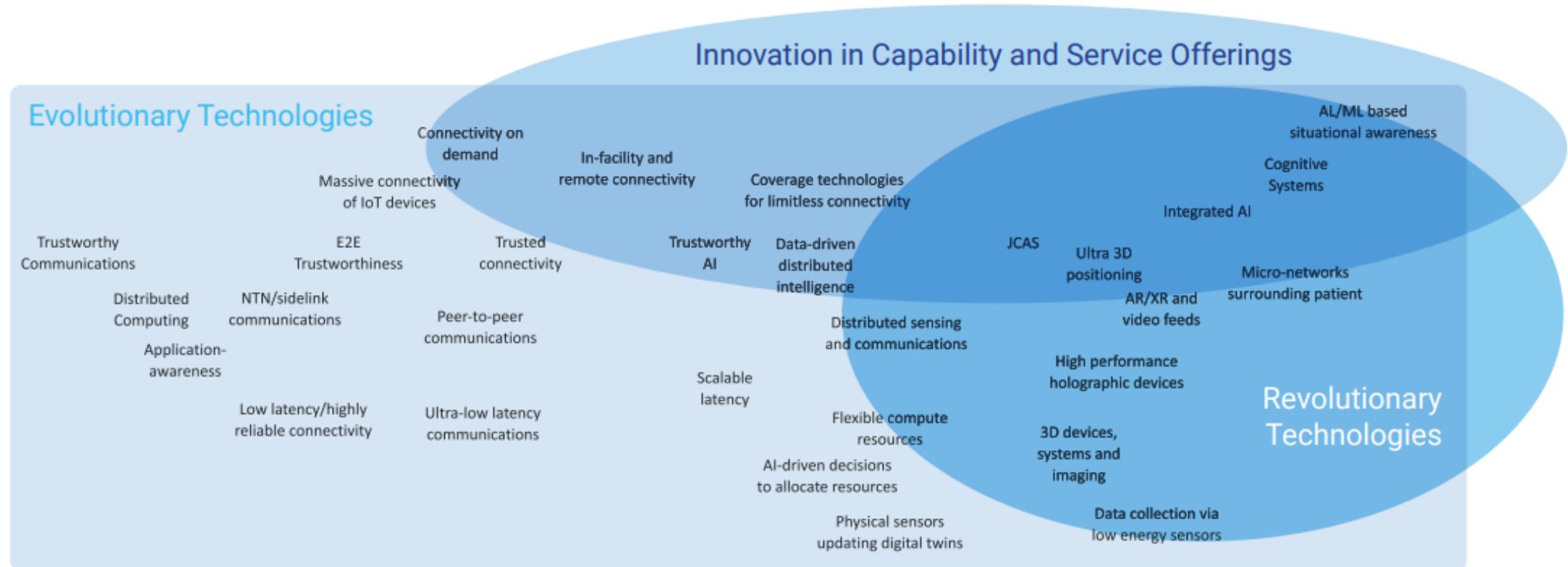
- > Trusted connectivity
- > JCAS
- > Integrated AI
- > Distributed sensing and communications
- > Data-driven distributed intelligence
- > Energy efficiency and environmental sustainability technologies

## Key Insights

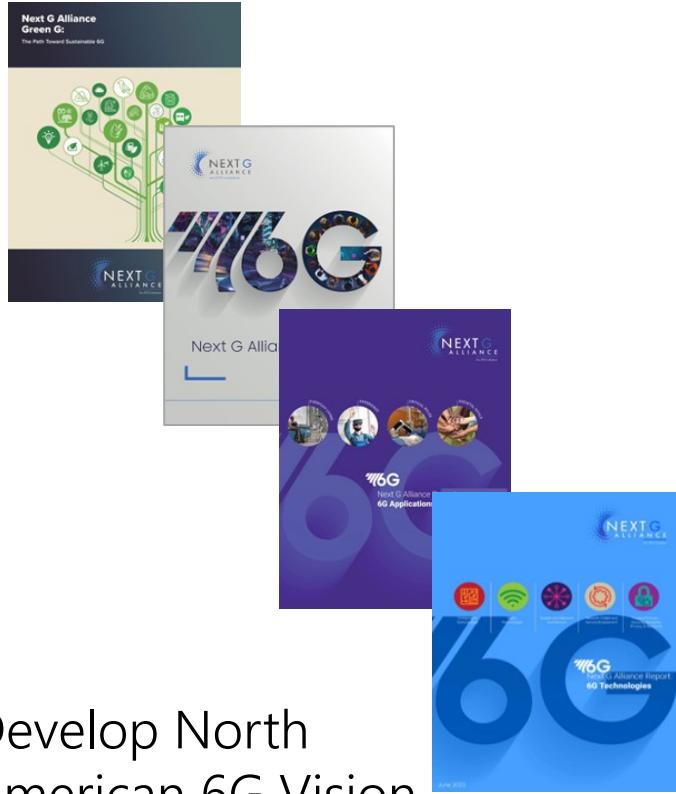
Mining sector is already evolving to leverage data insights, digitalization, and robotics to address productivity, efficiency, environmental and safety requirements

Digitization and robotics  
Communications and operational challenges  
Linkage to sustainability  
Contributor to national and global economies  
Improving energy efficiency

# 6G Technology Enablers for Verticals



# The Journey to 6G



Develop North American 6G Vision

<https://www.nextgalliance.org/6g-library/>

<https://www.nextgalliance.org/research-priorities/>

Align on a collective set of 6G Research Priorities



*Create 6G Public Private Partnership for Next Frontier of Innovation and Investment focusing on Vertical Industries*



Building the foundation  
for North American  
leadership in 6G and beyond