

ZTE



Challenges and Trials towards 6G

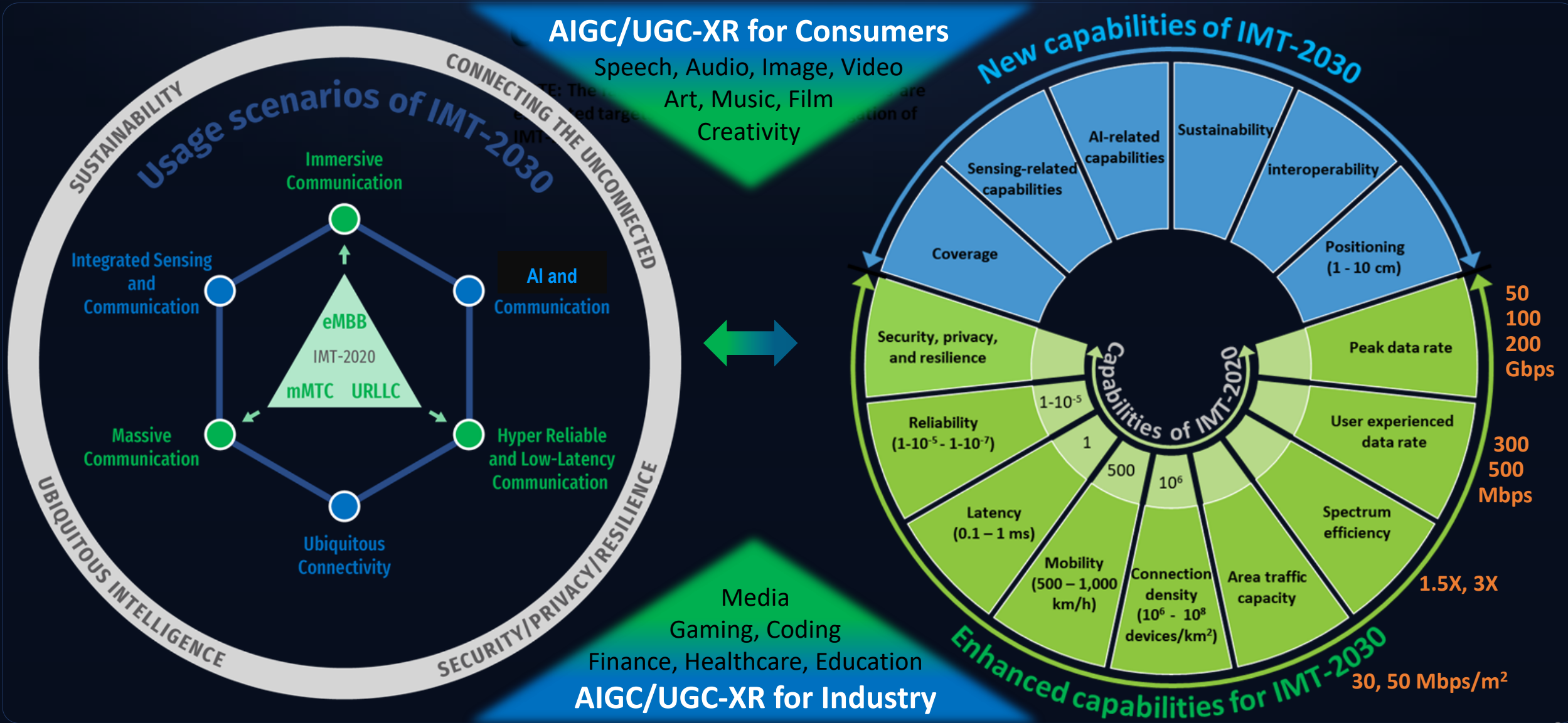
Dr. FANG Min, Chief 6G Planning

Feb 2024

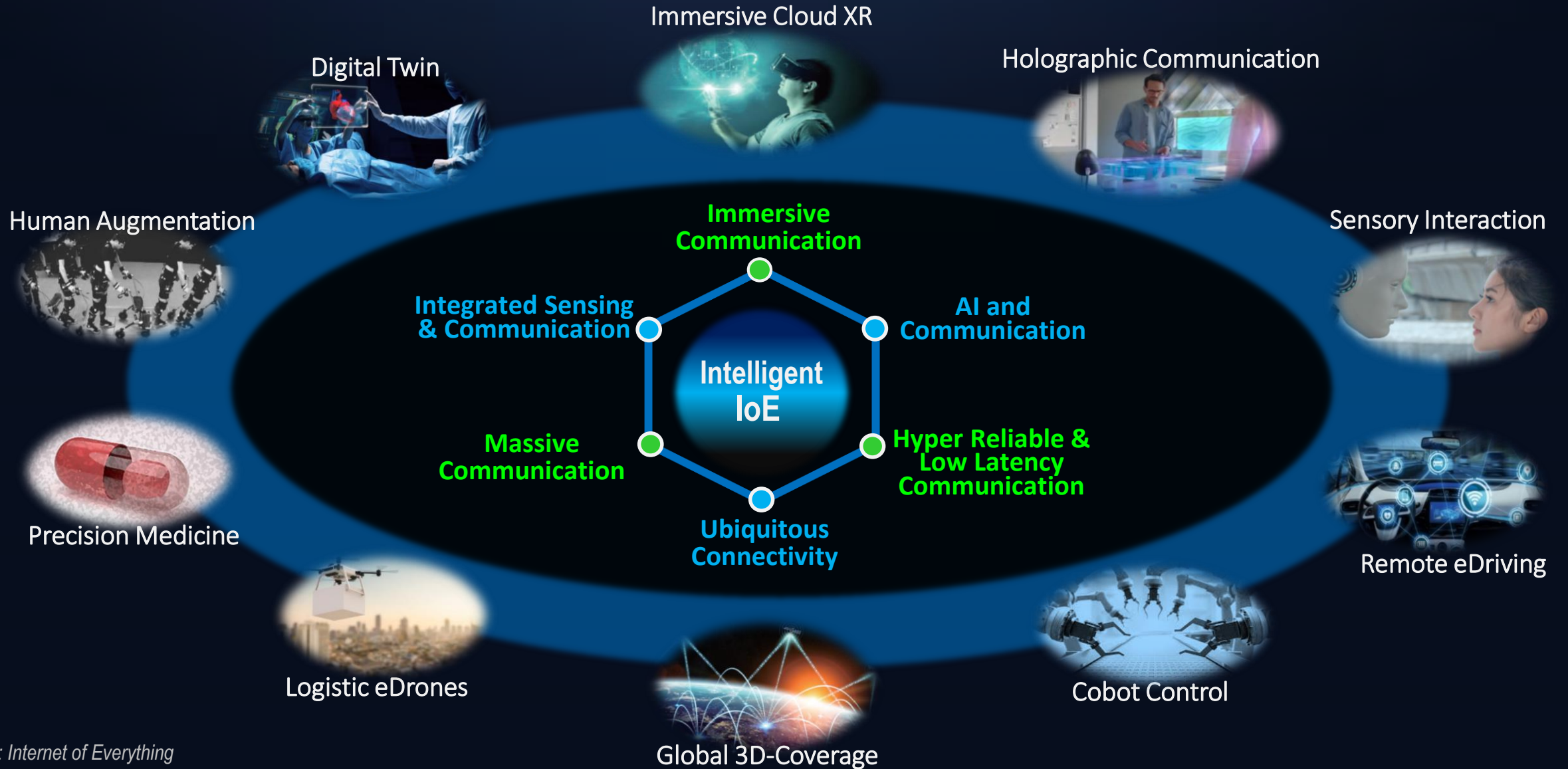
CONTENT

- ① **6G Scenarios and Roadmap**
- ② **6G Technical Challenges**
- ③ **Initial Trials towards Sensing and 6G**

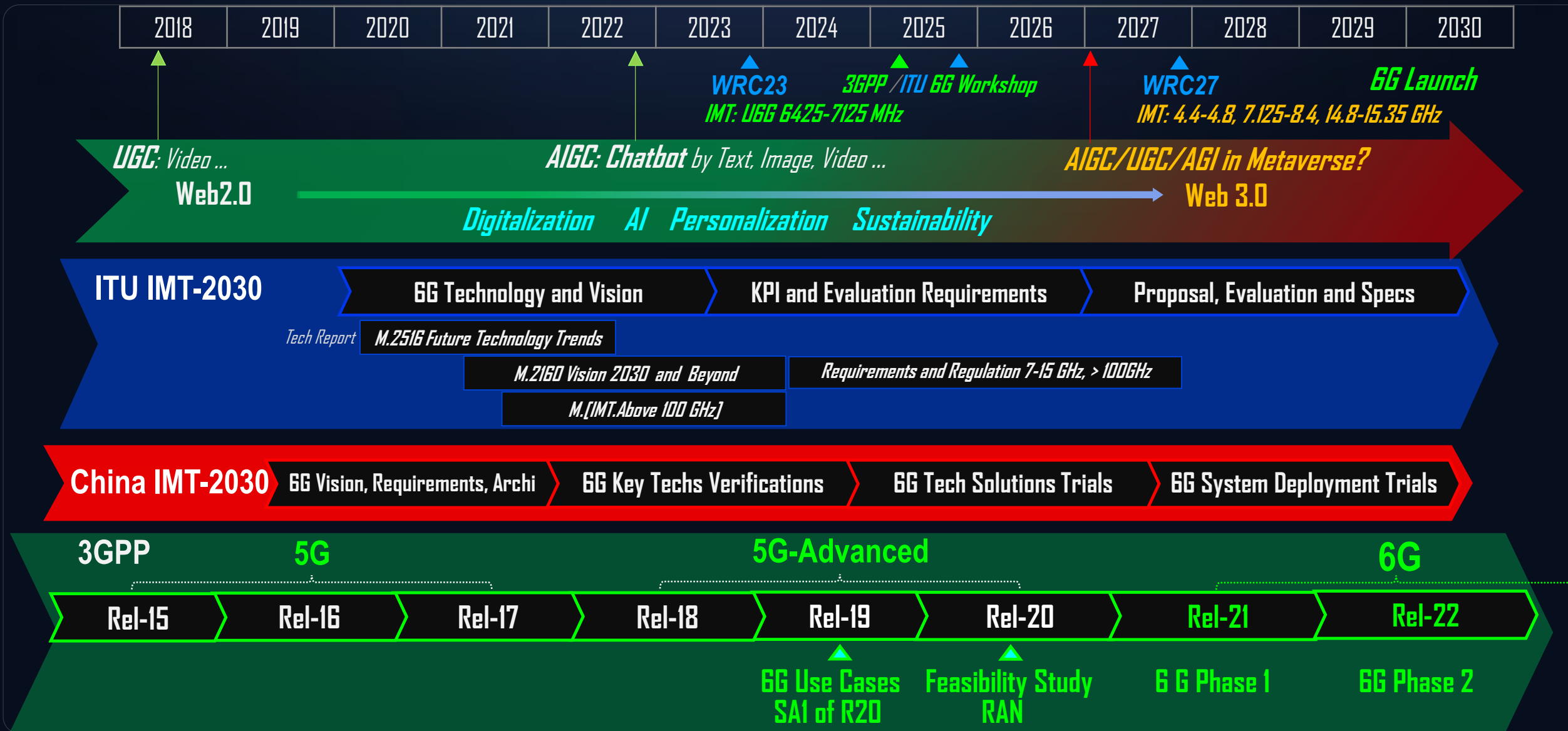
6G Network Scenarios and Capability Requirements



Some Examples of 6G Use Cases



6G Development Roadmap



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- ② 6G Technical Challenges
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6G Technical Challenges

Intent-driven, Cellular AI-API, Distributed Topology, Device-Site-Cloud Computing, Customized Sharing, Digital Twin

Flexible Spectrum Utilization

FSU

Beyond MIMO Degree of Freedom

DoF

Higher Band Extension

THz

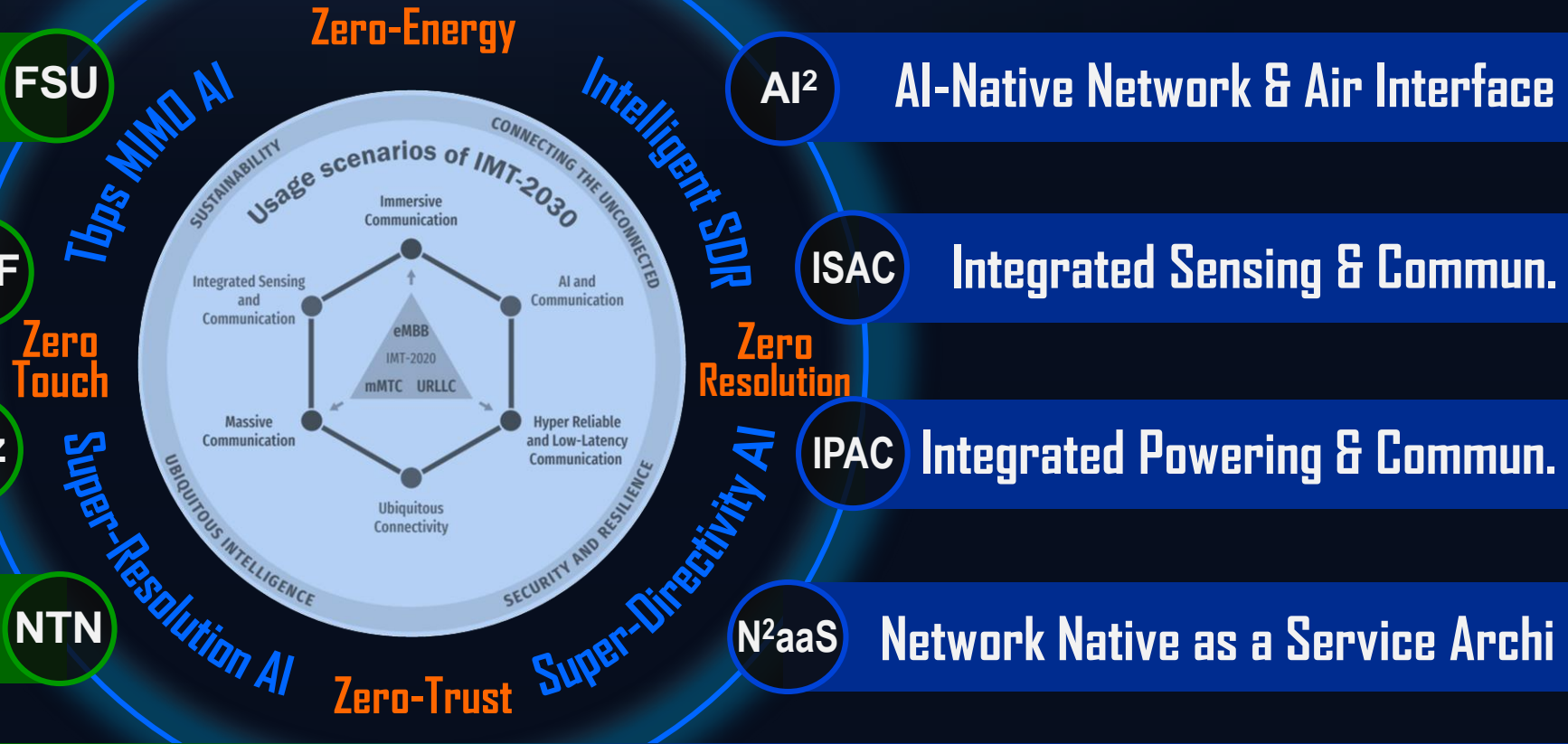
Integrated NTN and TN

NTN

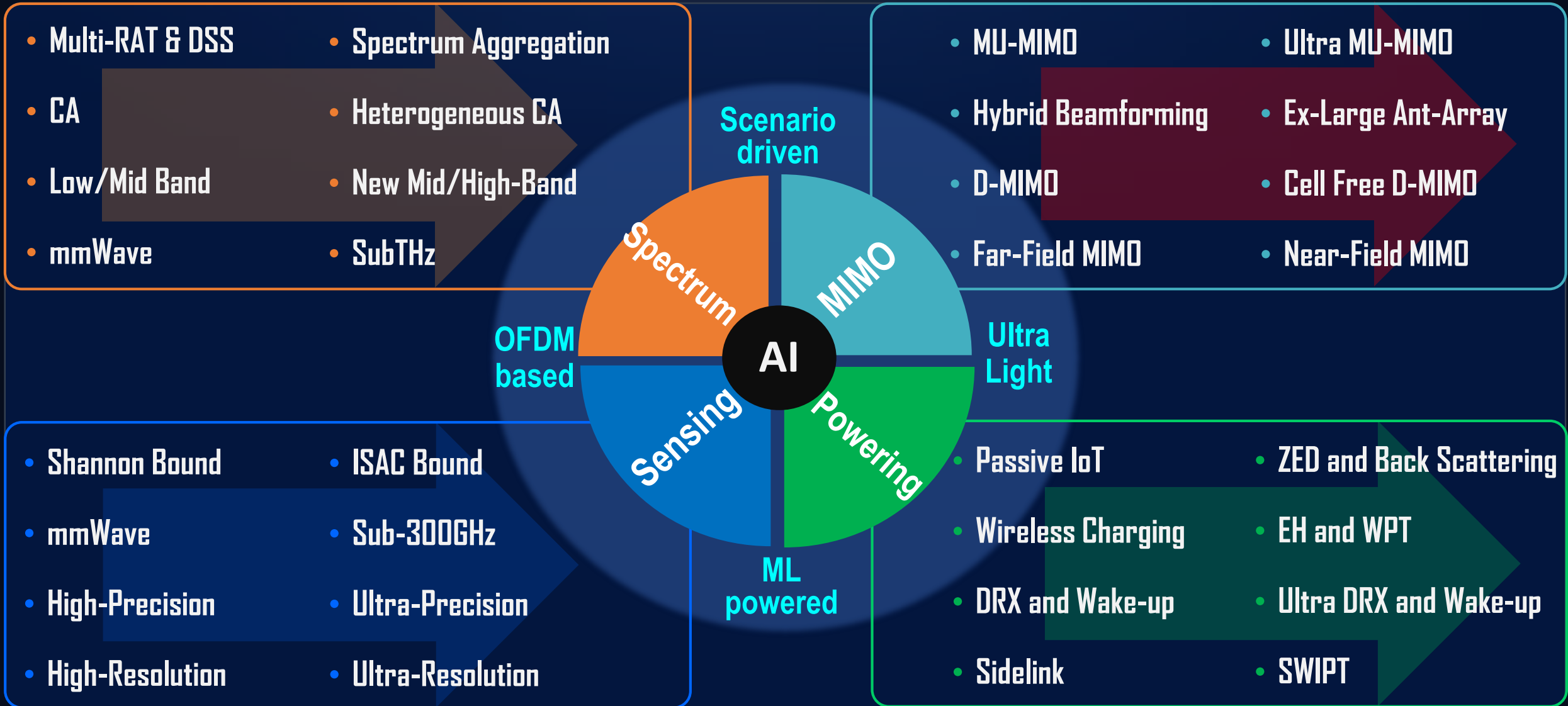
Advanced Modulation, Channel Coding, Waveform

Sustainable Air Itf

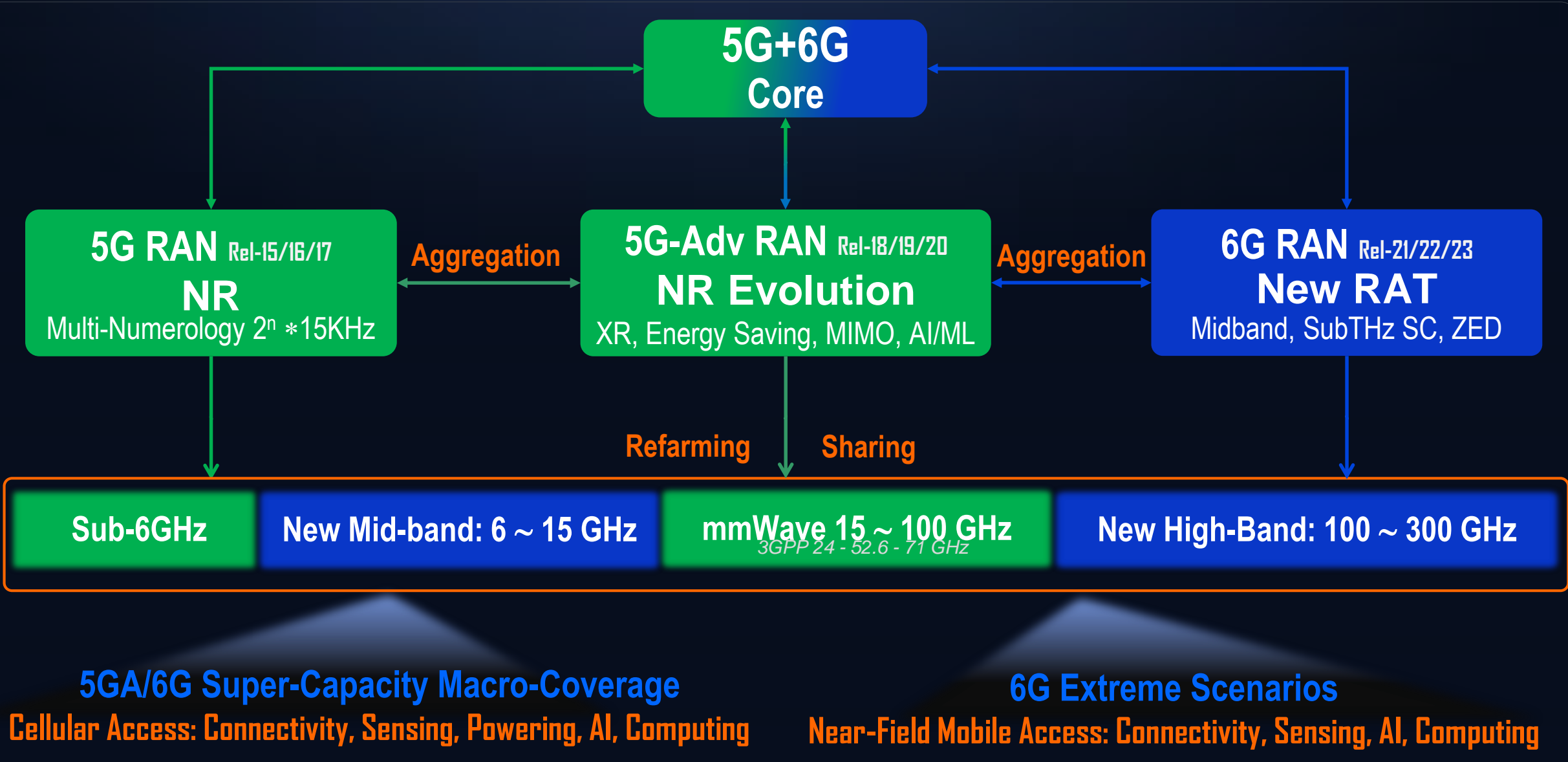
Multiplex Access, Duplex, Antenna, Optical Wireless



6G Air Interface (AI) Technology Roadmap



5G and 6G Harmonized Air Interface



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Multi-node collaborated ISAC Requirements and Challenges

Multi-node ISAC Requirements

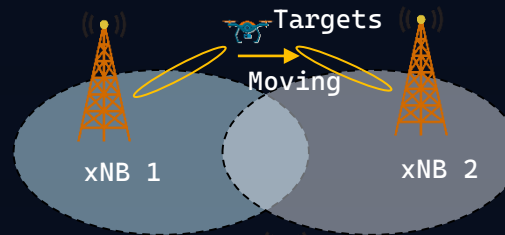
Overcoming Sensing Obstacles

- Low sensing accuracy based on NLOS path
- Sensing mainly depends on LOS path
- LOS path is not always present



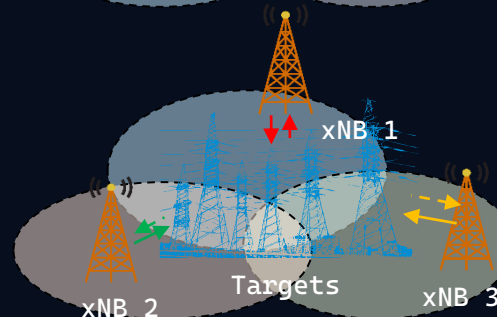
Ensuring Seamless Sensing

- Sensing range of single station is limited
- Sensing target moving across areas
- Seamless tracking of sensing targets



Improving Sensing Accuracy

- Low SINR of sensing targets at cell edge
- Enhance sensing information integrity
- RF sensing beyond diffraction limit



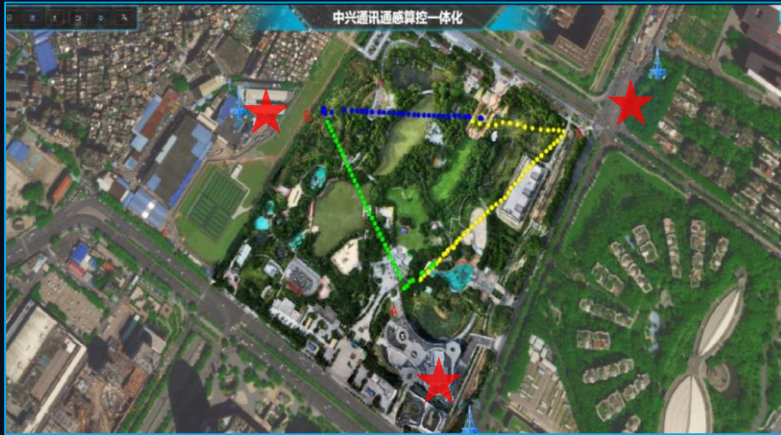
Multi-node ISAC Challenges

- Multi-Node Synchronization
- ISAC Radio Resource Allocation
- ISAC Sensing Data Fusion
- Interference Suppression



Industry-Pioneering Trial on ISAC Multi-Station Networking in Guangzhou

Triangular trajectory of a single drone



Rectangular trajectory of a single drone



Trajectory of two drones



Test Scenarios

- **Test Environment:**
The Children's Park in Guangzhou city (300,000m²)
- **Test Equipment:**
Frequency band: mmWave (26GHz)
Bandwidth: 100MHz
Networking: three sites deployed in the red-star point
Sensing mode: **Monostatic**

Test Results

- **Sensing Range**
Seamless sensing within 300,000m²
- **Sensing Accuracy (Cartesian coordinates):**
< 1 meter
- **Sensing Target**
Simultaneous sensing of **multiple targets**

Sub6G ISAC Multi-Station Networking Trials

Sensing of drone flight trajectory



0.2m

Distance Accuracy

~1m/s

Speed Accuracy

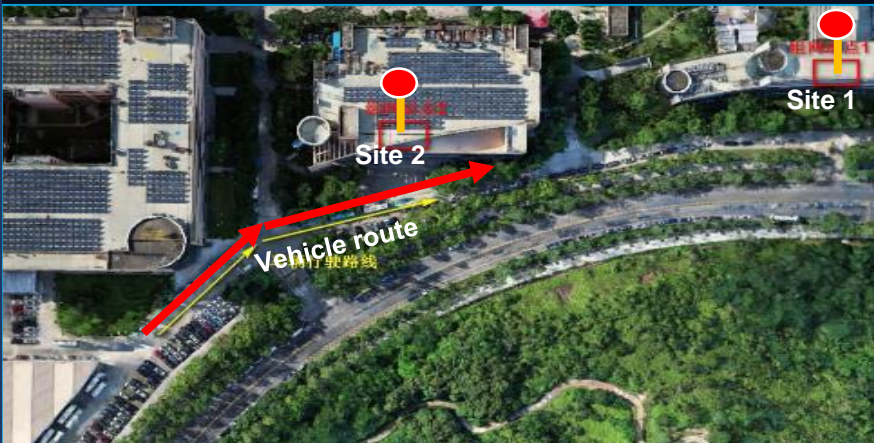
0.3°

Angle Accuracy

Test Scenarios

- Frequency Band: 4.9 GHz
- Bandwidth: 100 MHz
- Sensing mode: Monostatic
- Networking: two sites deployed on the route

Sensing of vehicle trajectory



0.3m

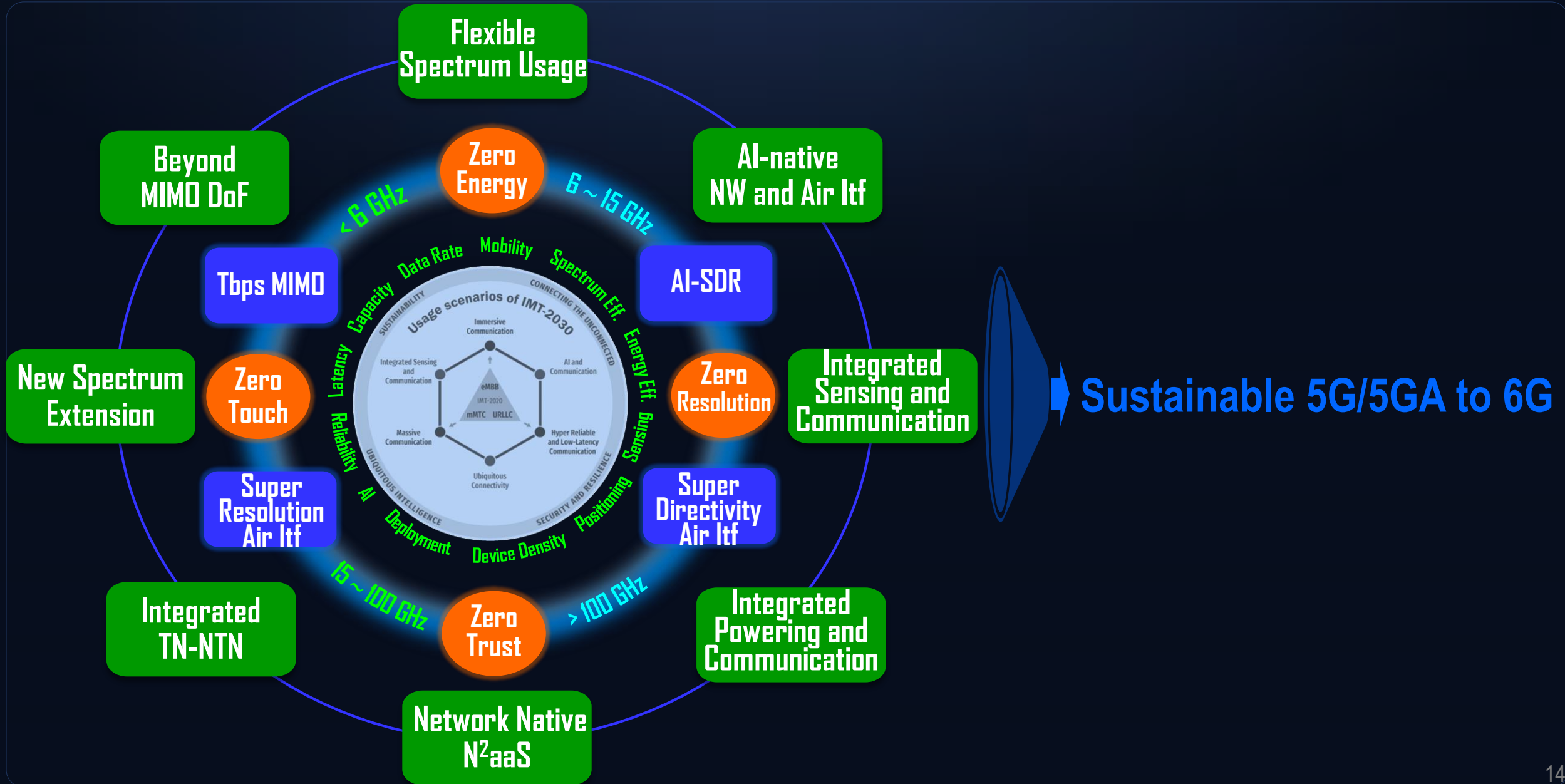
Distance Accuracy

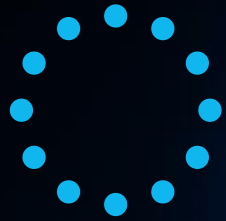
~1m/s

Speed Accuracy

1°

Angle Accuracy





T H A N K S

