Hexa-X

Exploring 6G enablers

hexa-x.eu

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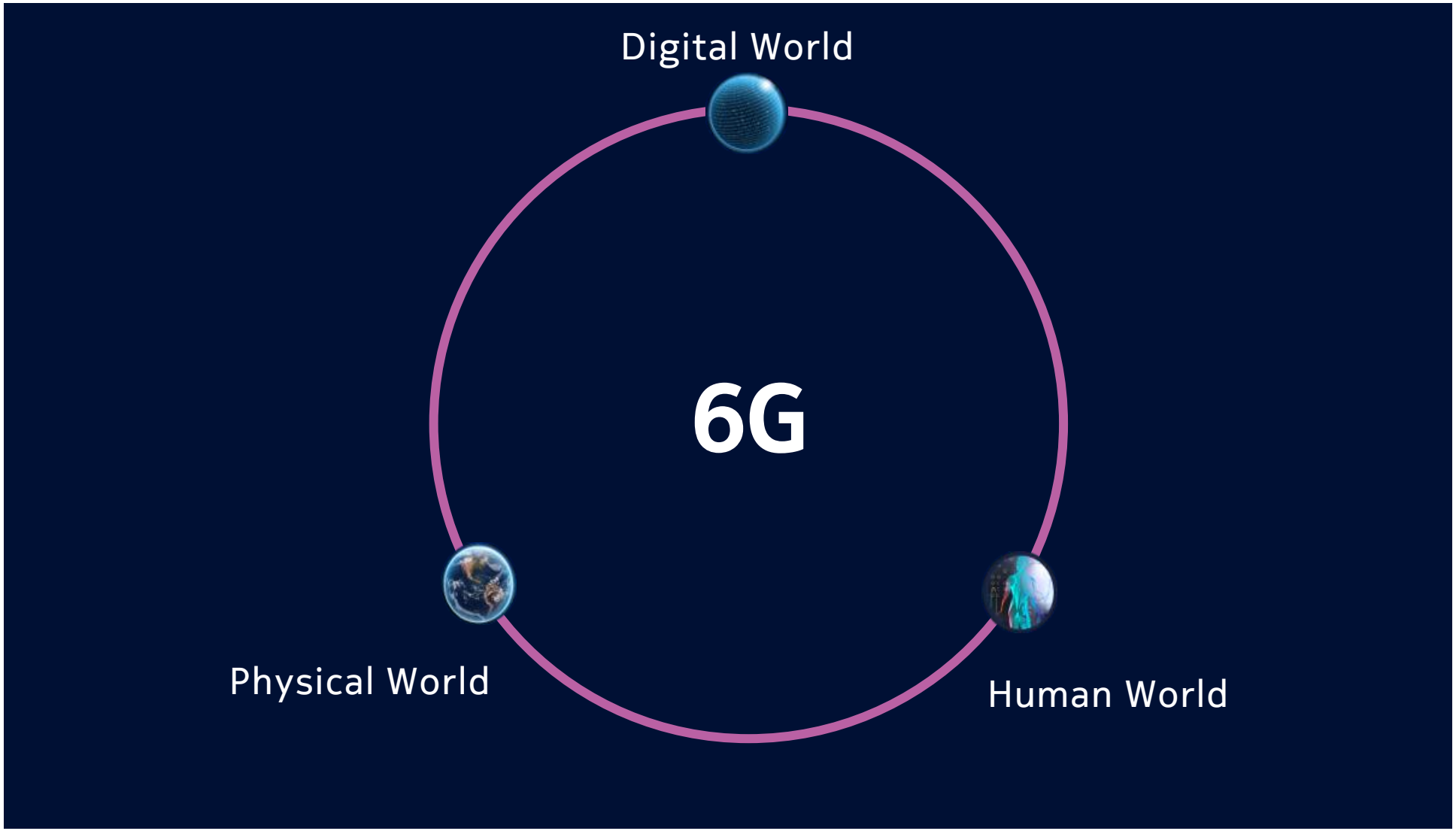
Hexa-X Vision



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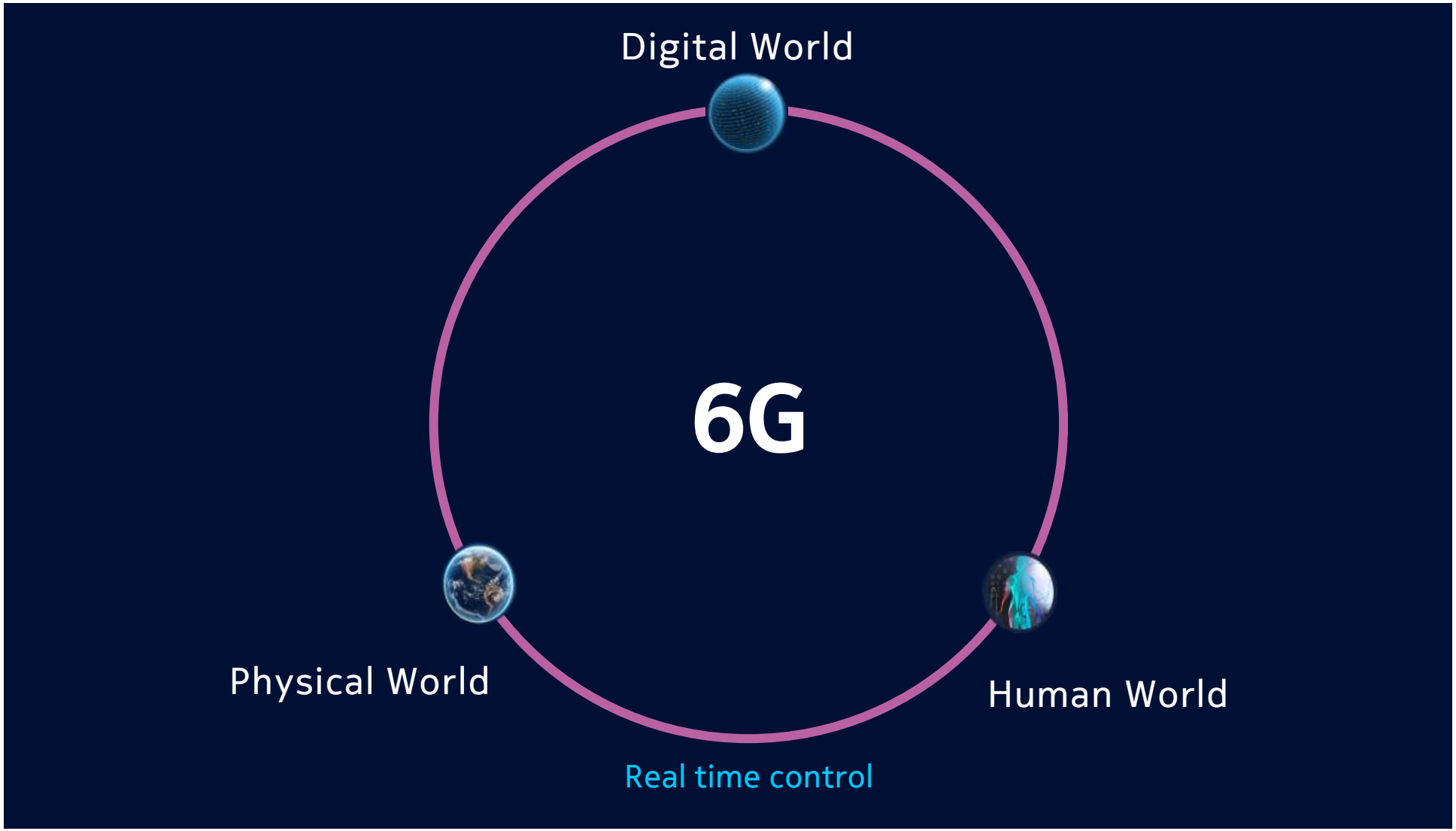

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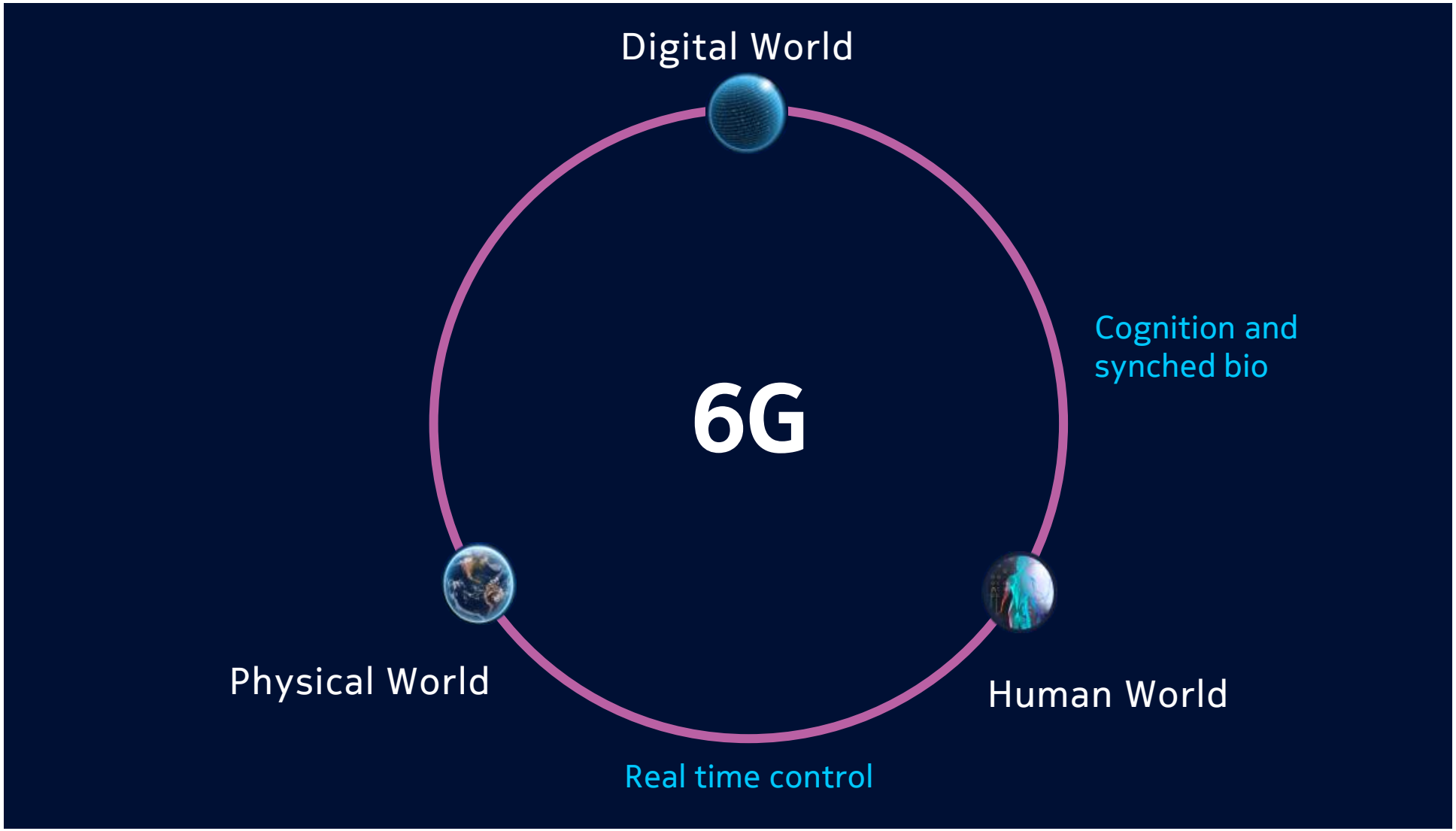

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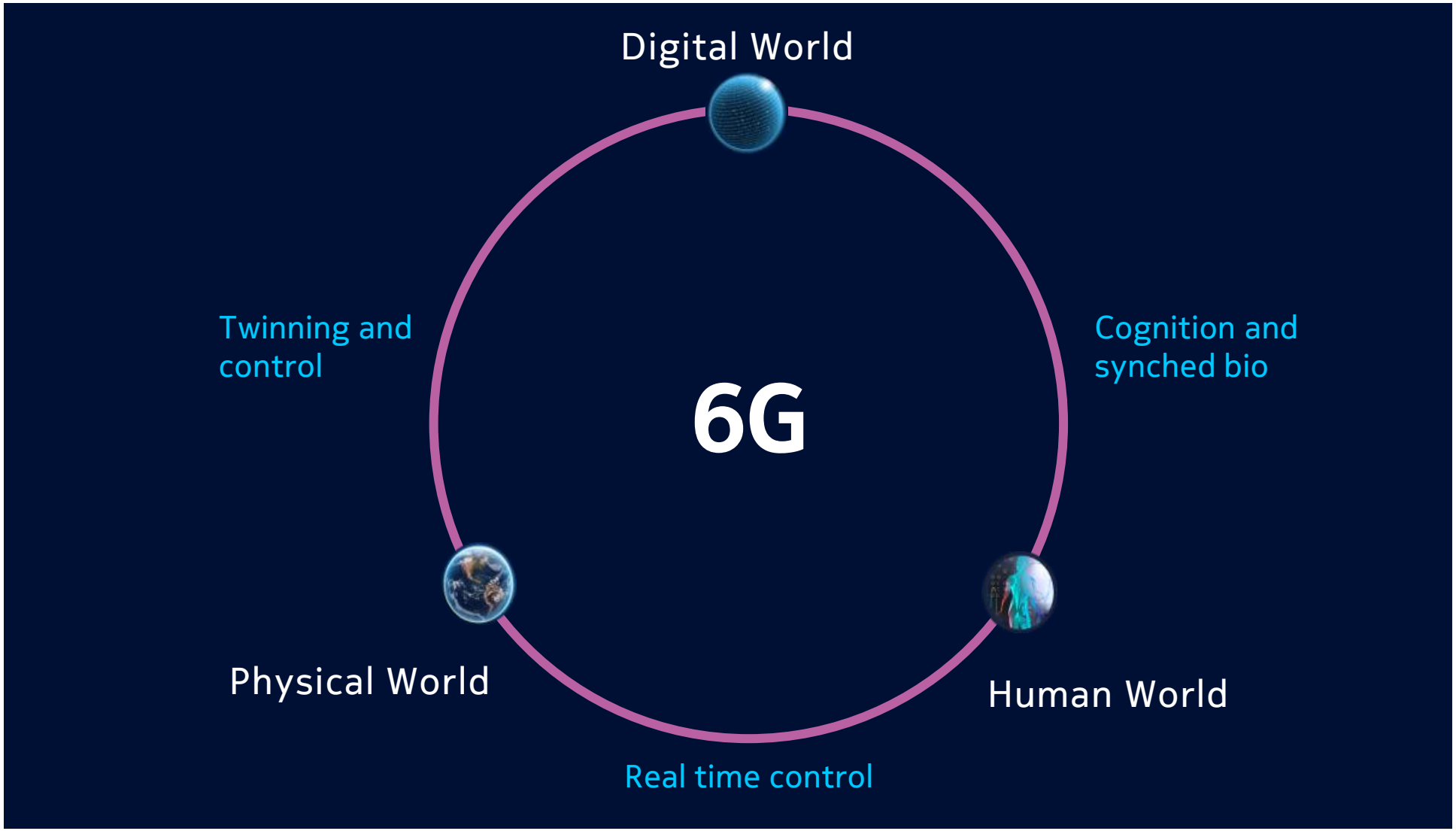
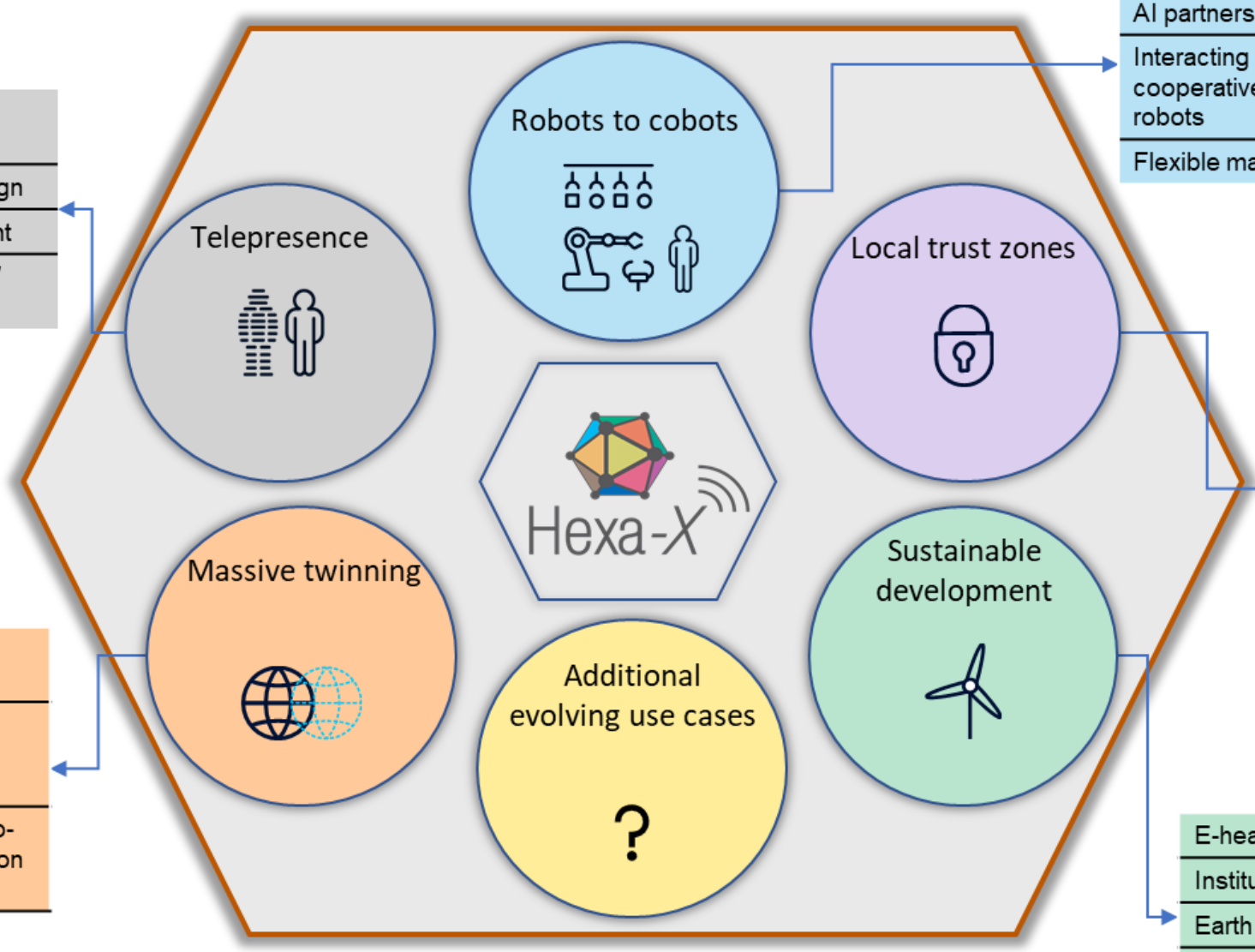


Hexa-X use cases



- Consumer robots
- AI partners
- Interacting and cooperative mobile robots
- Flexible manufacturing

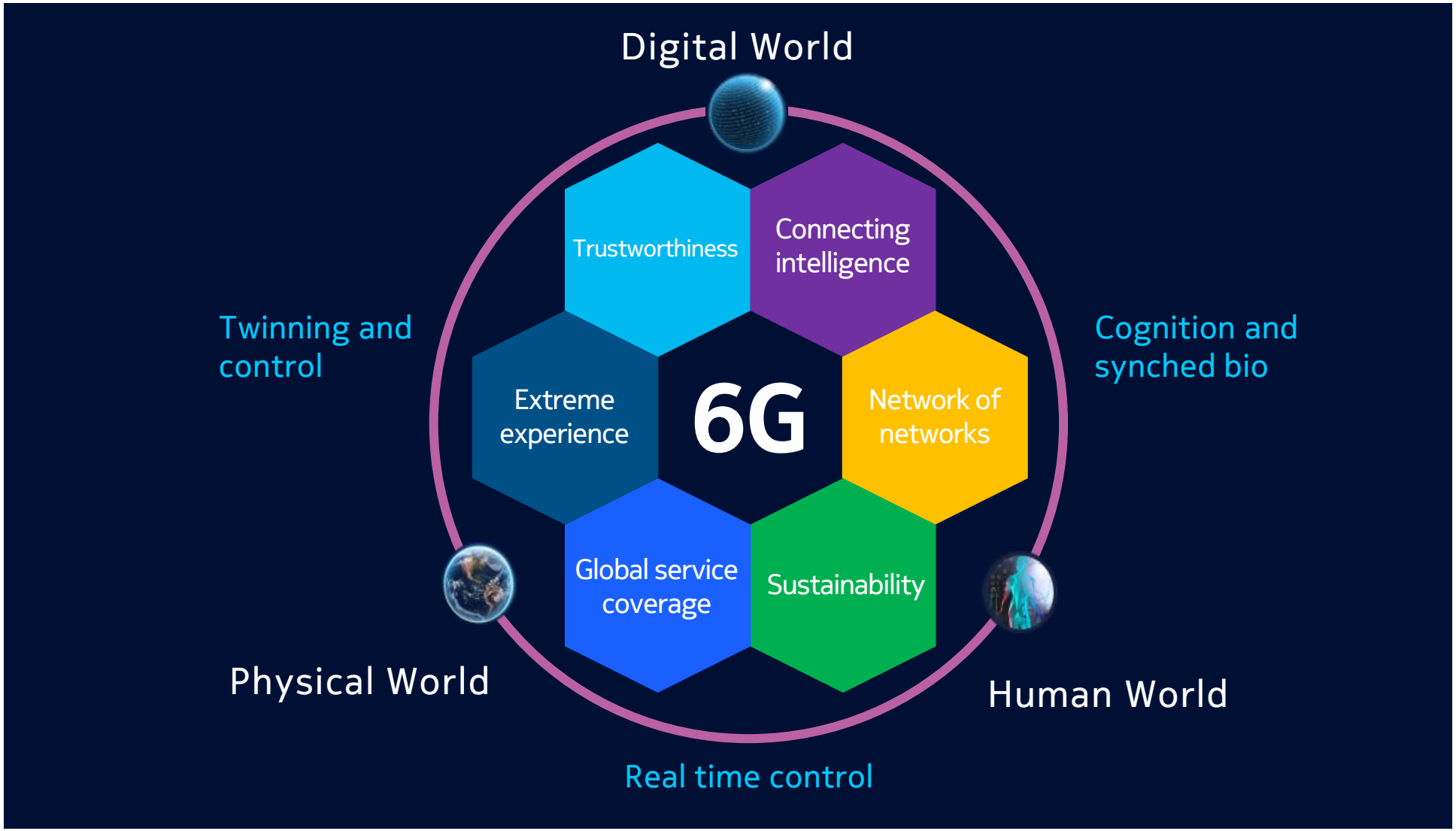
- Fully merged cyber-physical worlds
- Mixed reality co-design
- Immersive sport event
- Merged reality game/ work

- Enabling precision healthcare and personalized medical treatment
- Sensor infrastructure web
- 6G IoT micro-networks for smart cities
- Infrastructure-less network extensions and embedded networks
- Local coverage for temporary usage
- Small coverage, low power micro-network in networks for production & manufacturing
- Automatic security

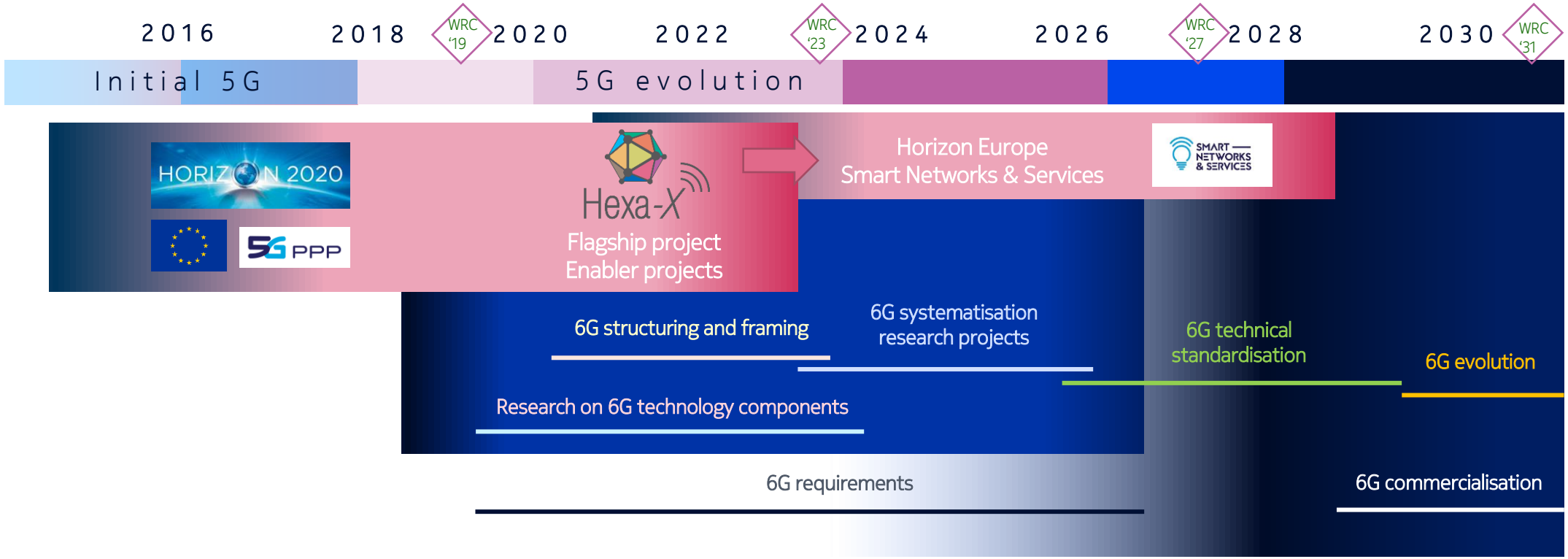
- Digital Twin for manufacturing
- Management of city flows to optimize the Liveability
- Digital Twins for zero-hunger and production sustainability

- E-health for all
- Institutional coverage
- Earth monitor
- Autonomous supply chains

Hexa-X Vision

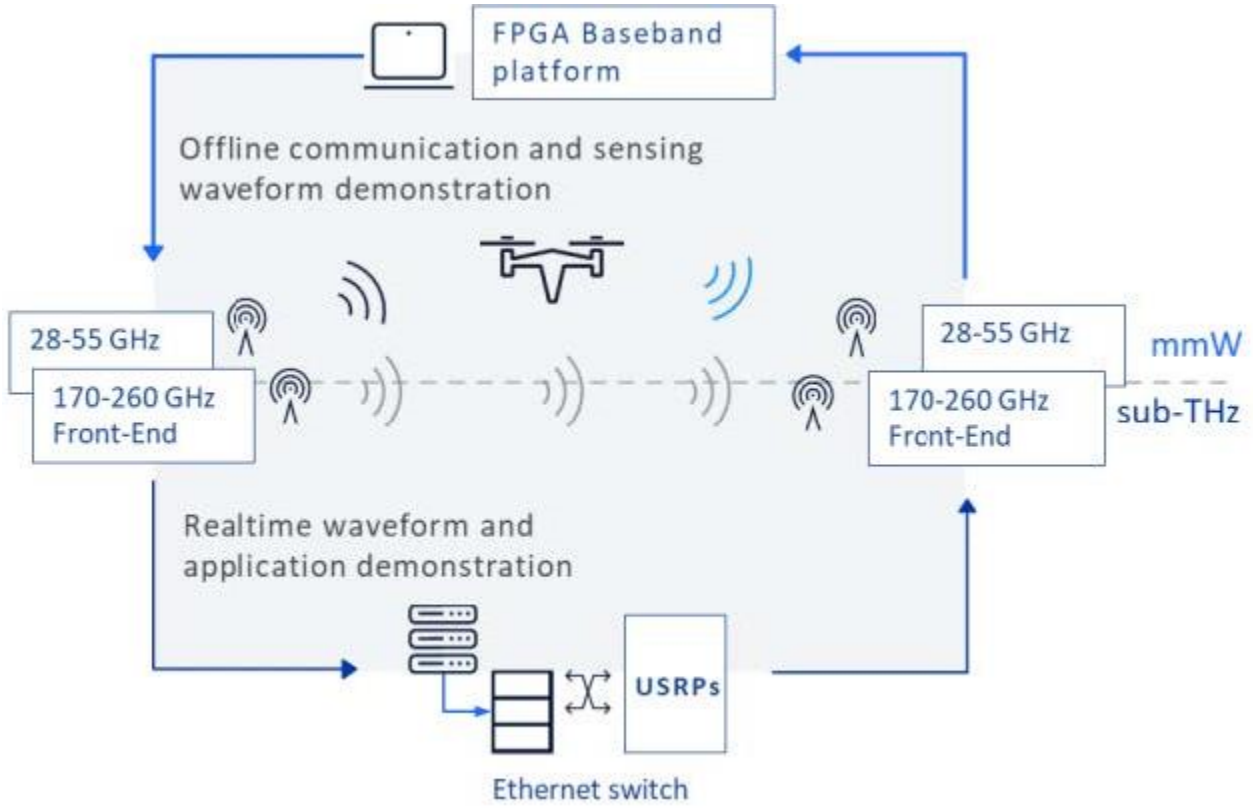


Timeline


2016
2018
WRC '19
2020
2022
WRC '23
2024
2026
WRC '27
2028
2030
WRC '31
Initial 5G
5G evolution
HORIZON 2020
PPP
Hexa-X
Flagship project
Enabler projects
Horizon Europe
Smart Networks & Services
SMART NETWORKS & SERVICES
6G structuring and framing
6G systematisation research projects
6G technical standardisation
6G evolution
Research on 6G technology components
6G requirements
6G commercialisation

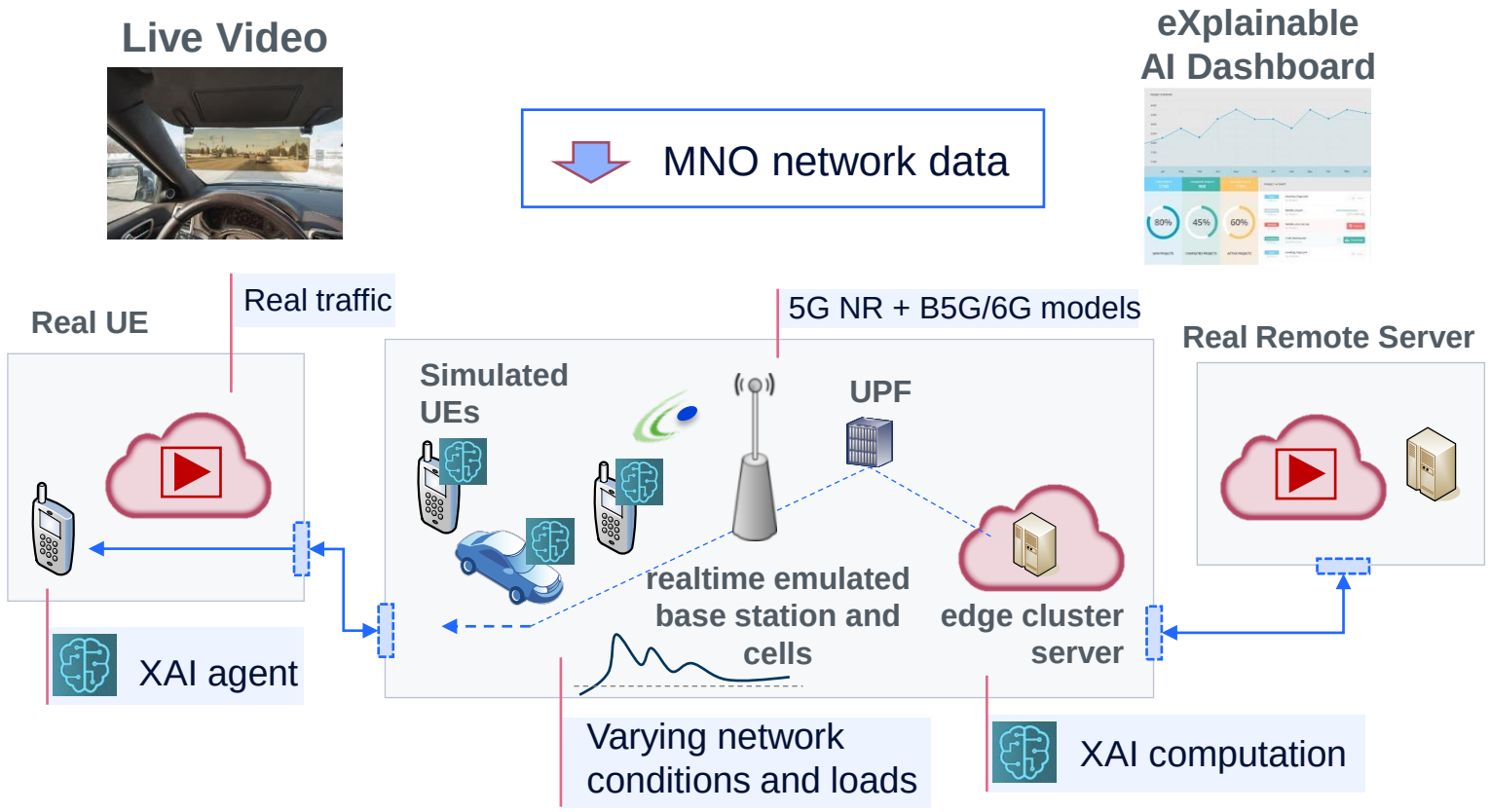
Demo #1 6G OTA -Waveforms in Action

- Evaluate the performance of selected 6G candidate waveforms
  - Non-real time demonstration of radar sensing performance at mmW
  - Non-real time demonstration of communications and sensing performance at 200GHz region
  - Real-time demonstration of communications and sensing performance
- Participants:
  - Qamcom, University of Oulu and TU Dresden



Demo #2 FED-XAI - Federated XAI demo

- Demonstrate federated learning of XAI models, using a real-time network emulator and real terminals
  - End-user agents sense local data and collaboratively train an XAI model to make predictions (e.g., on QoS)
  - The federated model is transferred to other agents, which adapt it locally to perform predictions
  - An edge side-agent, federated with the end-user ones, displays in real time a dashboard, showing the predicted QoS
- Participants
  - University of Pisa, Intel and TIM



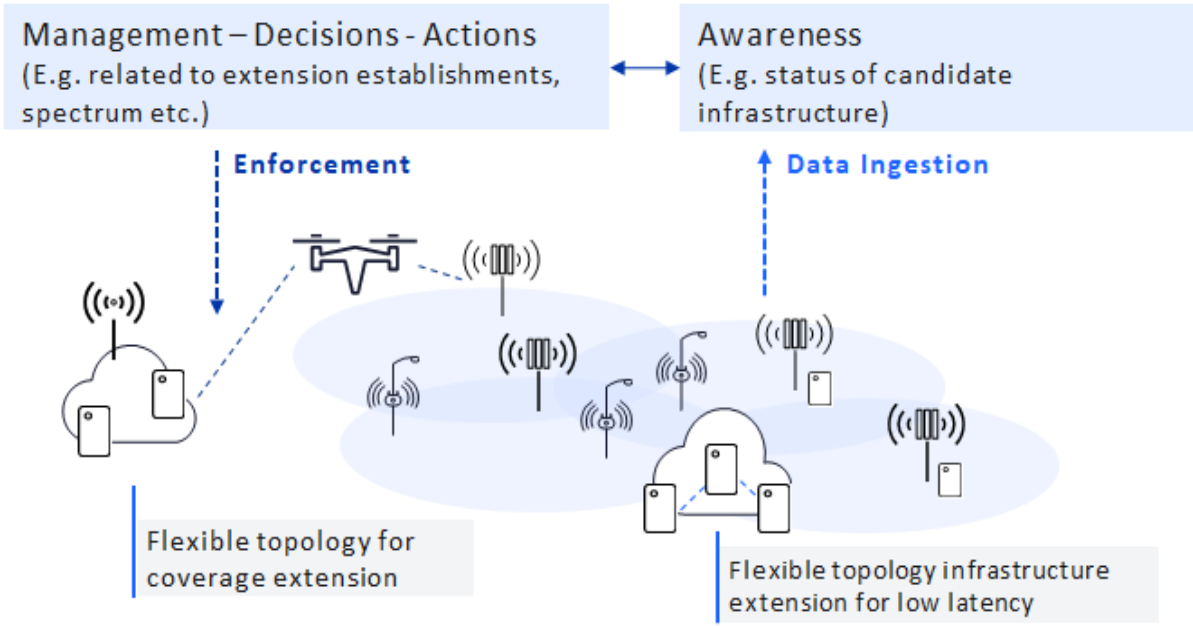
Demo #3 Flexible topologies (FLEX-TOP) for efficient network expansion and complementary means for global coverage, sustainability and trust

Increasing coverage, sustainability and trust

- Key benefits of a flexible topology will be
  - coverage extensions;
  - service provision with lower latencies;
  - security as the engagement is limited to selected devices;
  - lower energy consumption at the infrastructure.

- Management of the flexible topology will leverage on:
  - mesh/ad hoc/device-to-device (D2D) networking;
  - disaggregated devices;
  - usage of ultra-high spectrum also in coordination with the infrastructure.

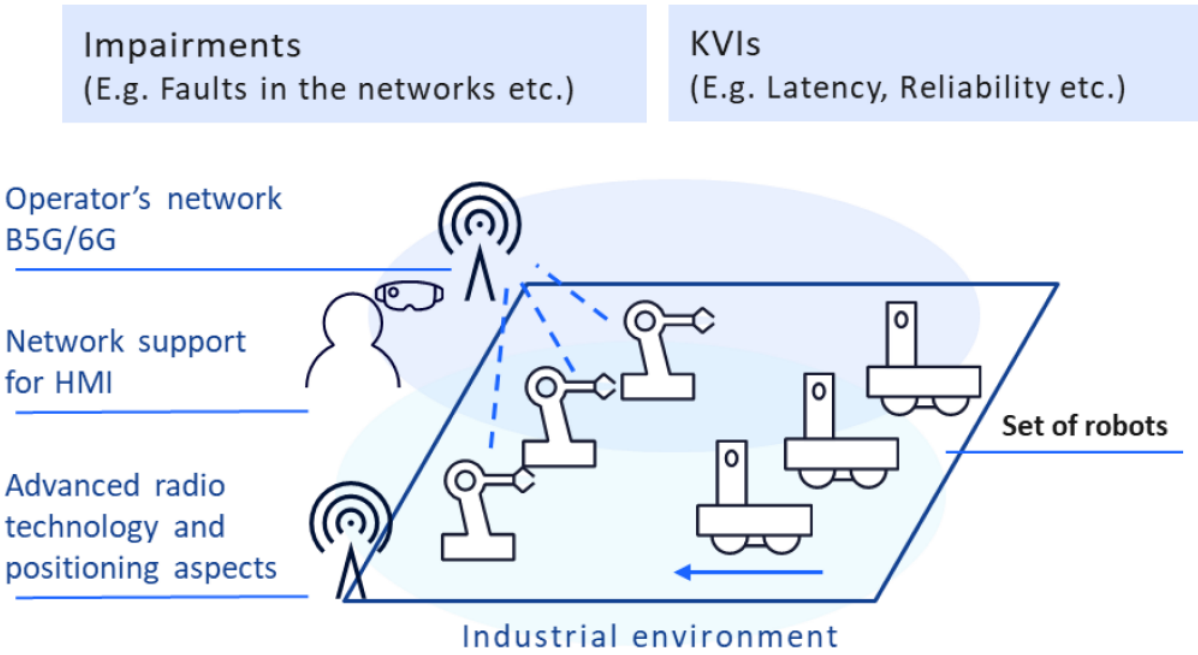
- Demo can lead to cost-effective global service coverage for affordable digital inclusion and global monitoring of system critical environmental indicators.



Demo #4 Extreme performance in handling unexpected situations in industrial contexts

Increasing resilience through 6G enablers

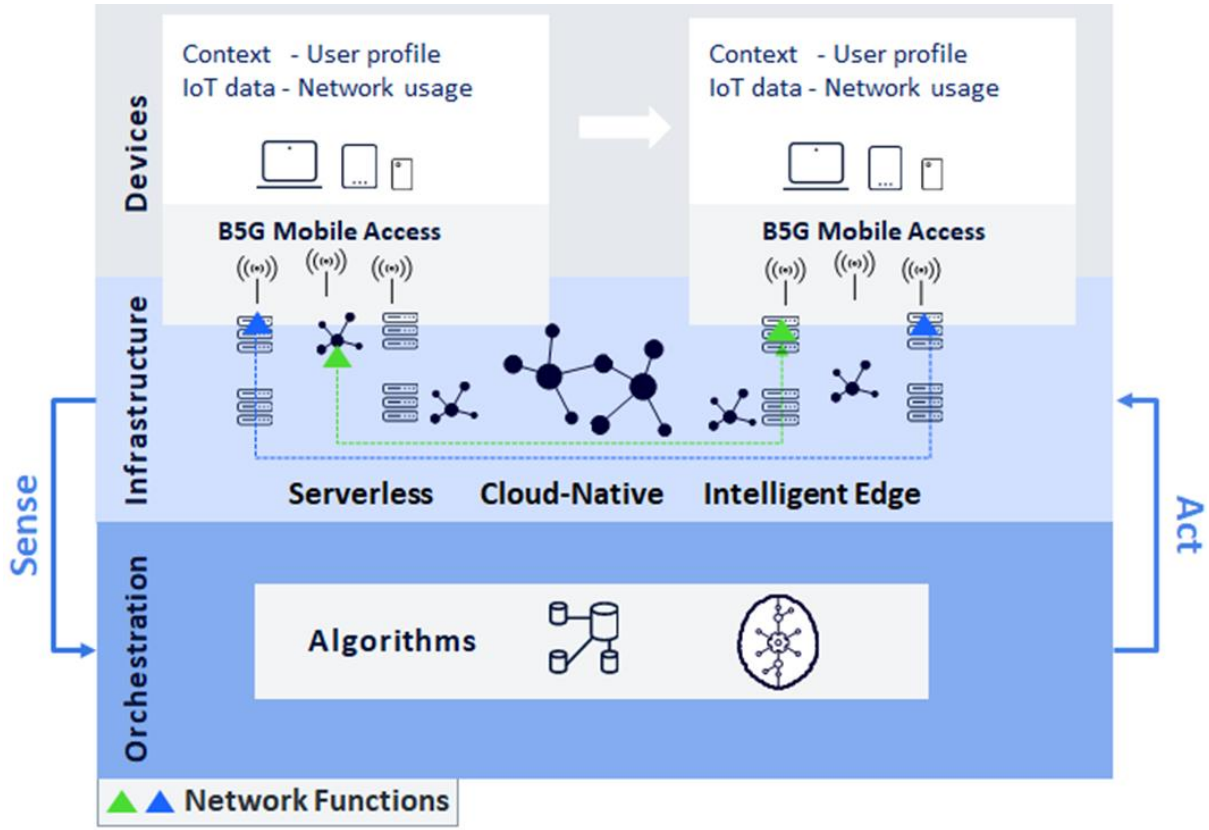
- Demonstrating flexible topologies (3GPP and non-3GPP RATs) and predictive orchestration
  - Identification of network fault and/ or device impairments through diagnostics mechanisms
  - redistribute functionality and roles
  - robot to robot, robot to infrastructure, robot to human
- Delivering high rate, low latency, and dependable HMI, human-in-the-loop, usage of AR for remote monitor/ control of robots
- Utilizing radio and positioning/sensing enablers for intent and impairment detection and validation



Participants: Wings, TU Kaiserslautern, Siemens

Demo #5 Data-driven device-edge-cloud continuum management

- To achieve zero perceived latency in 6G networks AI algorithms will predict future states in the end device (extreme edge).
- This demo will show the required actions that will be taken from the orchestration point of view to self-adapt the network to the predicted future state of the device using properly the resources.
- Participants:
  - Atos, Nextworks, Orange, Nokia and Universidad Carlos III Madrid



Thank you!

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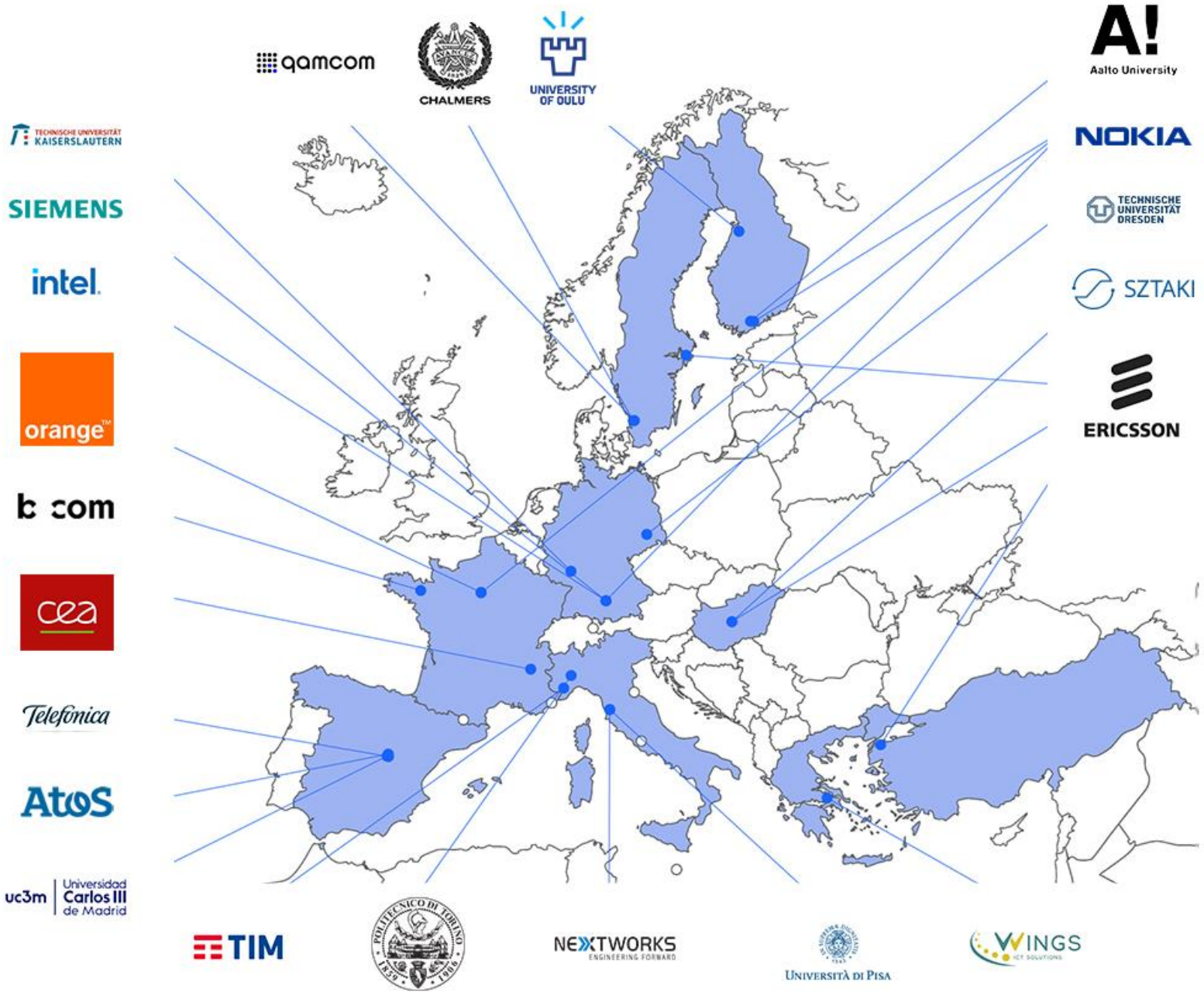
Hexa-X Consortium