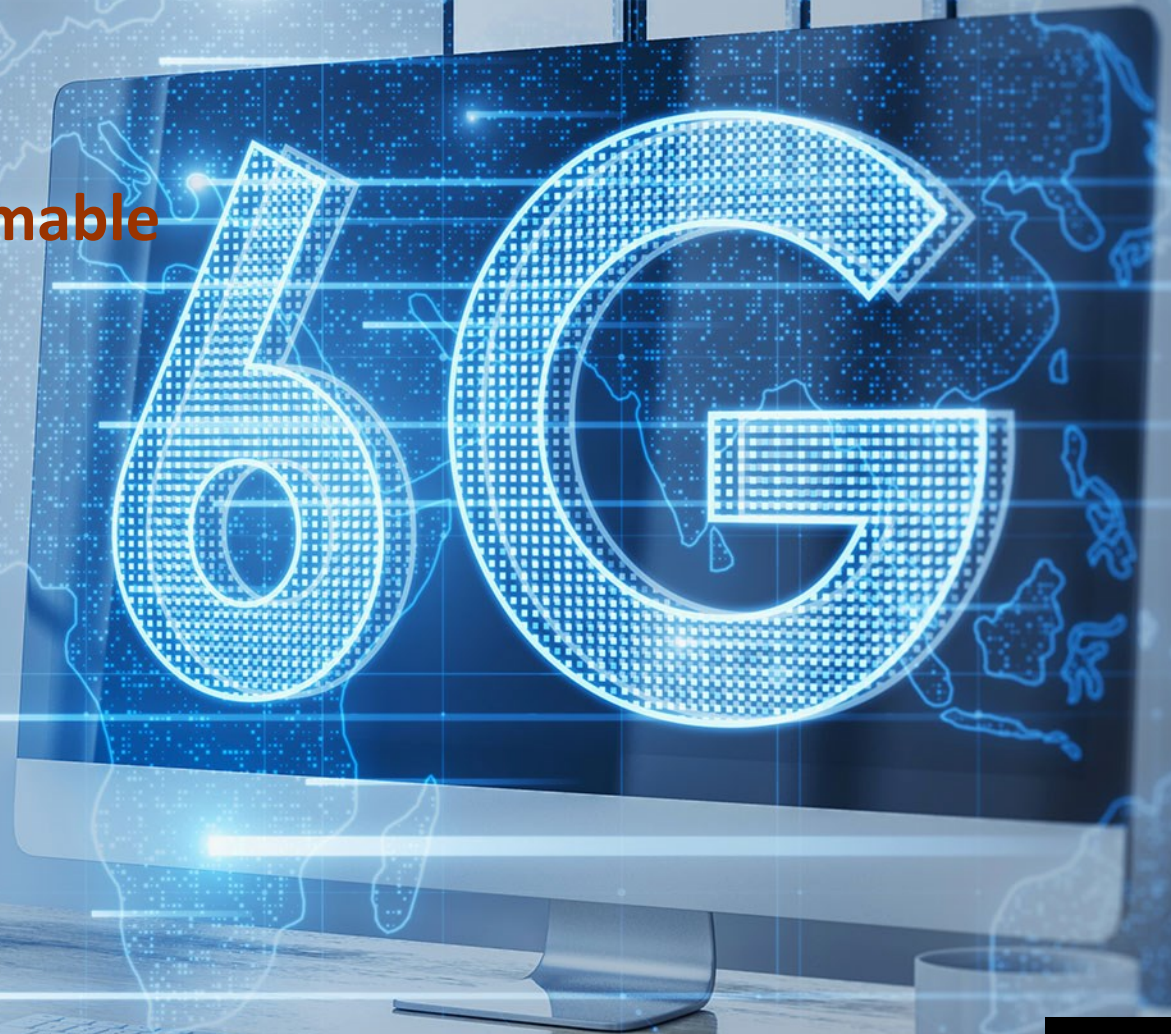


# ADROIT6G: Distributed Artificial Intelligence-driven open and programmable architecture for 6G networks

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6G SNS

01

**Overview**

02

**Objective**

03

**Architecture**

04

**Innovations**

05

**Proof-of-Concept**

05

**Standardization**

# Overall Concept

**ADROIT6G proposes disruptive innovations in the architecture of emerging 6G mobile networks** that will make fundamental changes to the way networks are designed, implemented, operated, and maintained.



**O1: Propose a novel 6G system architecture that integrates a distributed AI framework for combined communication, computation and control and empowers the convergence of networks and IT systems to enable new future digital services.**

**O2: Create an AI-driven Management & Orchestration and control framework for 6G Networks.**

**O3: Architect a distributed and secure CrowdSourcing**

**O4: Develop energy-aware models for multimodal Representation Learning**

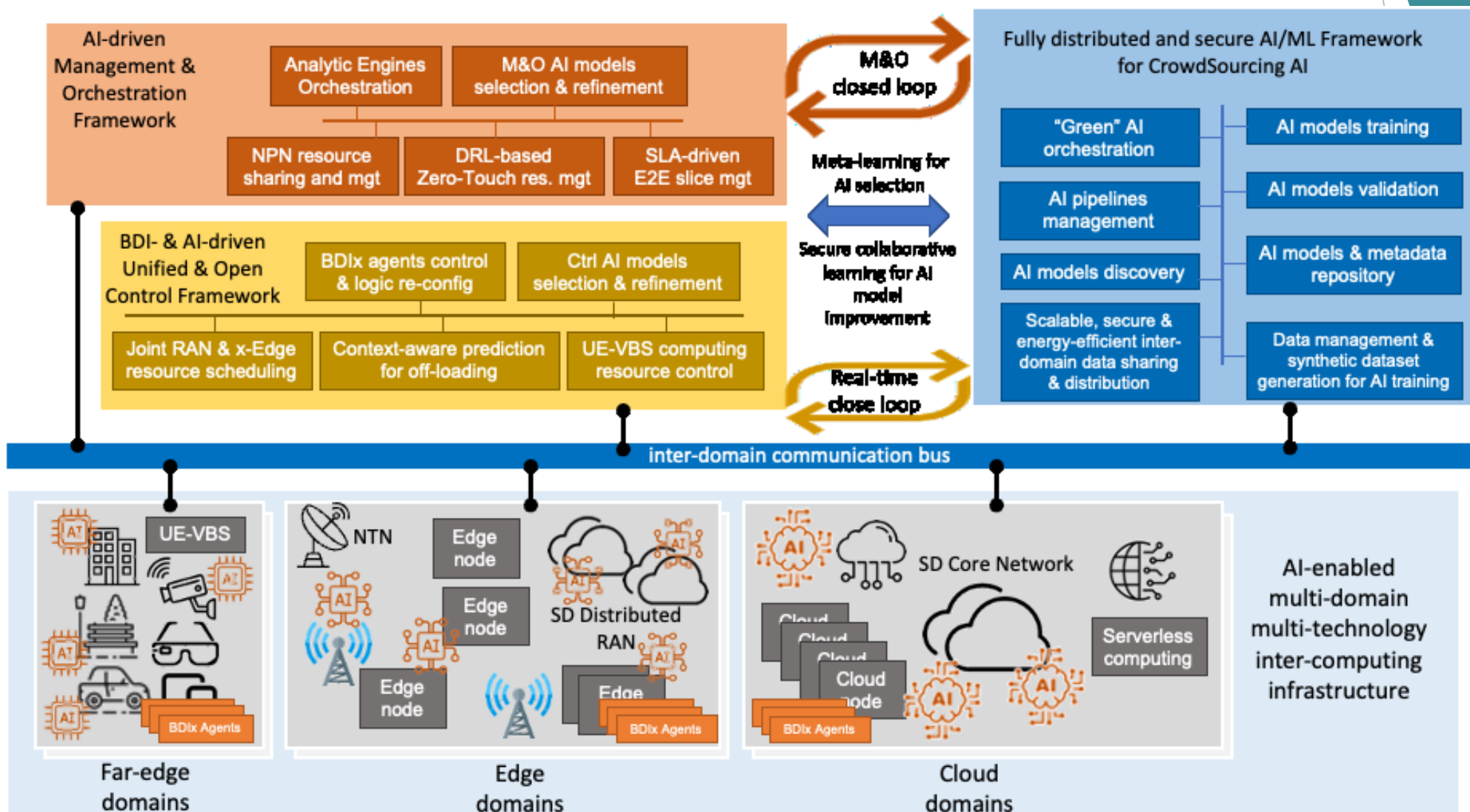
**O5: Evolve the cellular infrastructure to allow the true integration of deep-edge devices in communication and computation functions**

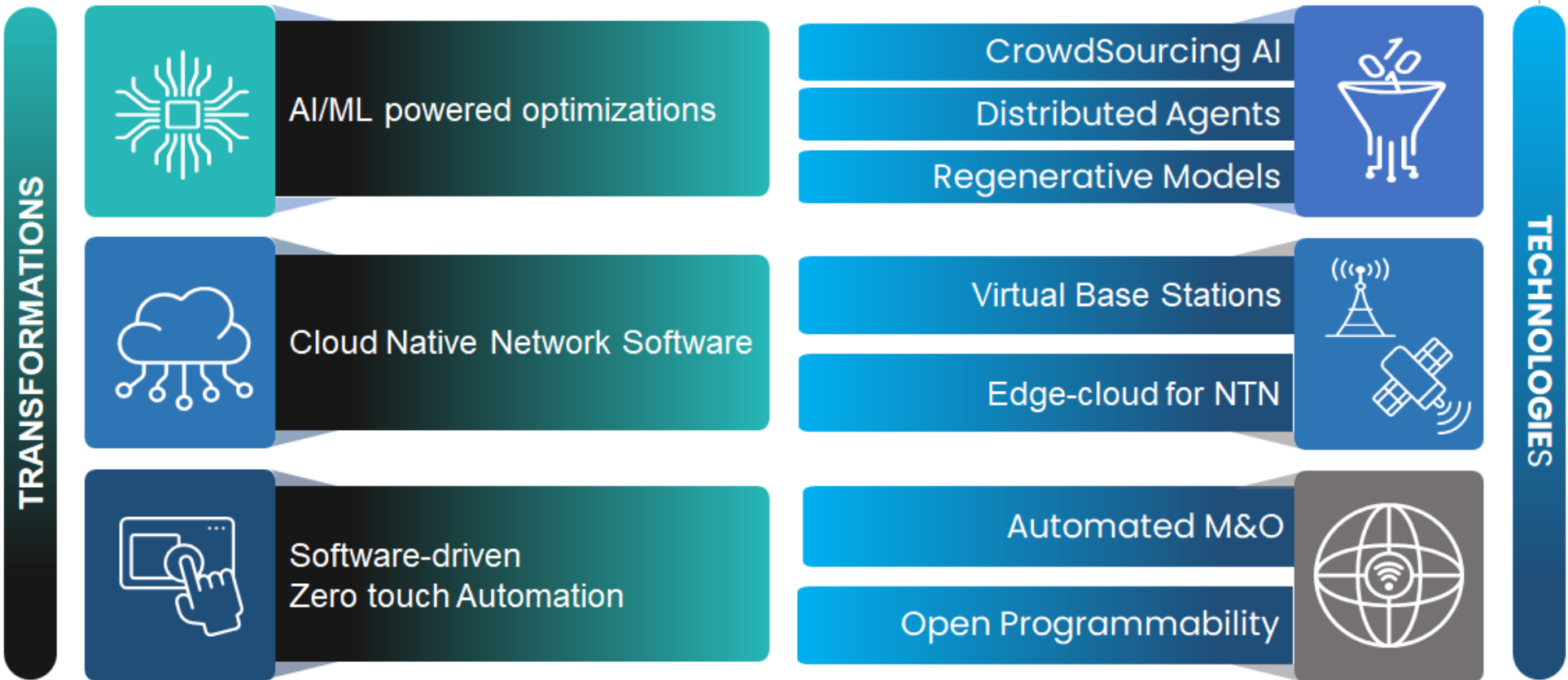
**O6: Enable Non-Terrestrial Networks connectivity for highly reliable Industrial IoT Services**

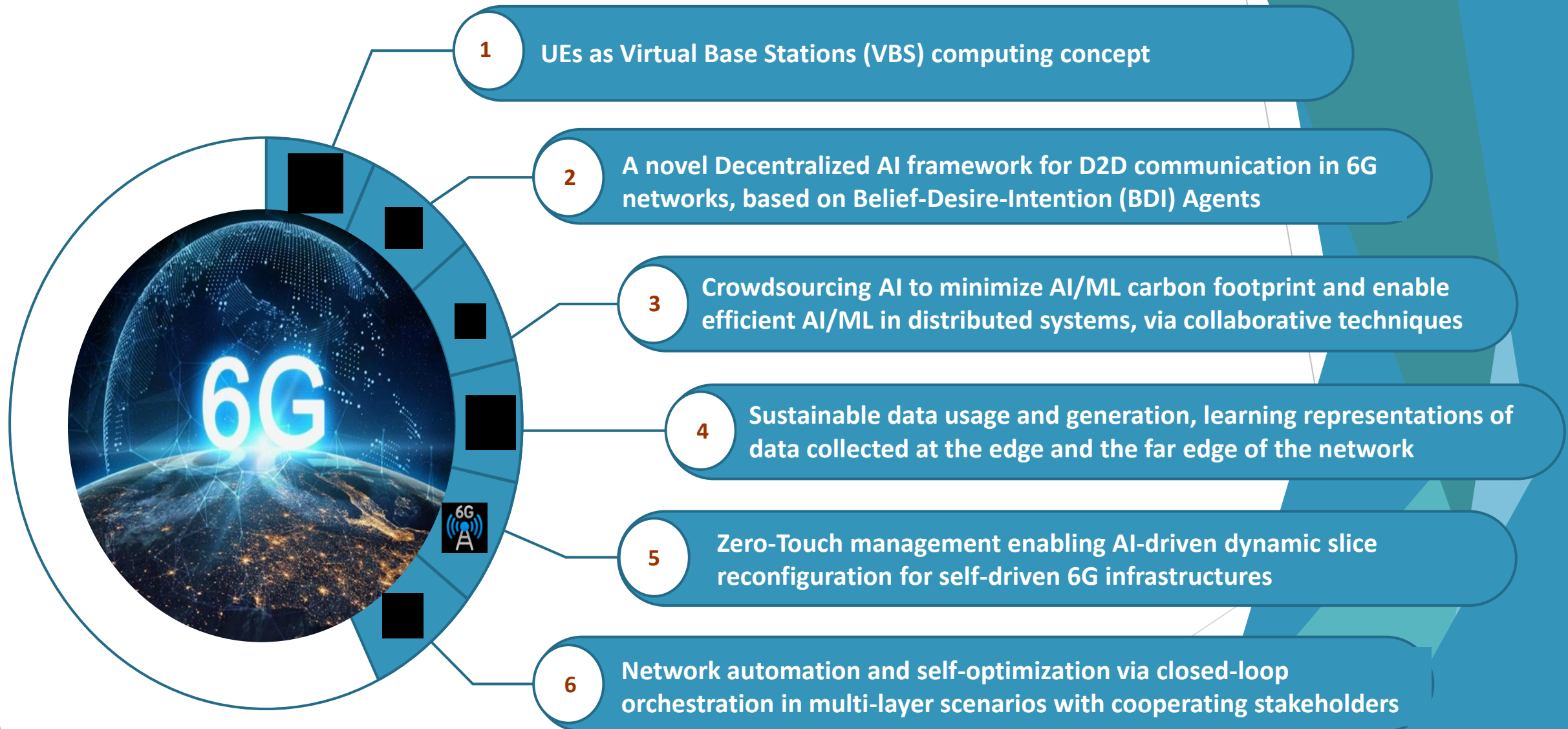
**O7: Extend and demonstrate the use of decentralized AI for Device-to-Device communications**

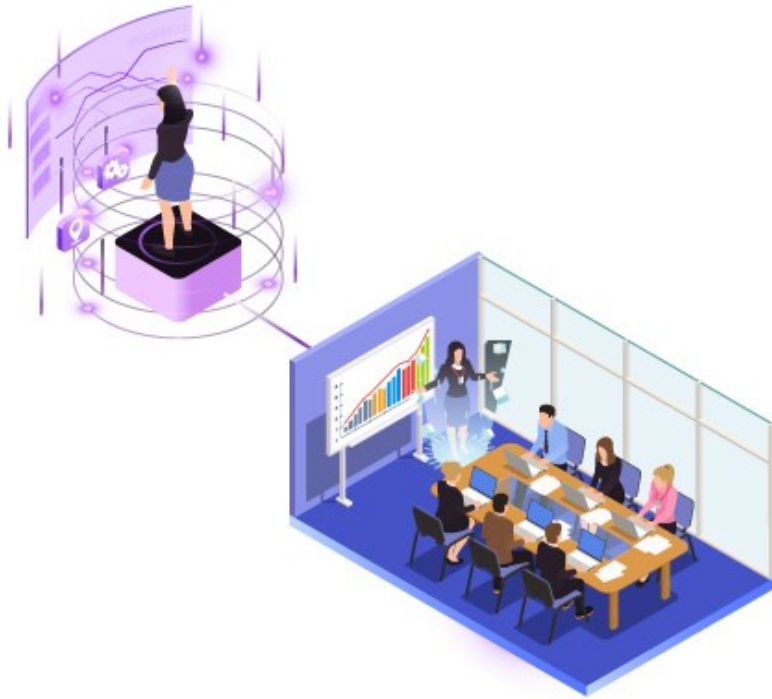
**O8: Support data plane acceleration**

**O9: Integrate and demonstrate the potential and user value of ADROIT6G through relevant experimentation, testing, and validation of its innovations in PoCs in lab settings**



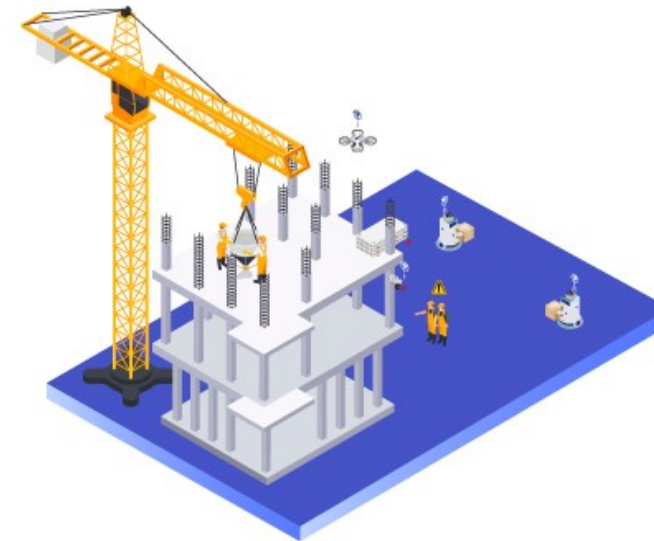






## Immersive XR - Holographic Teaching

A teacher provides the lecture at home/office, while the students attending physically the class, can watch the teacher's holographic entity delivering the lesson



## Collaborative robots (cobots) in construction

Robots and drones that need to coordinate actions with each other in a construction site. Coordination will be conducted in three dimensions, to avoid collision and enable collaboration of robots in the air (drones).





## Terrestrial 6G IIoT

In a production line of an **automotive manufacturing process** sensors and actuators (i.e., IIoT devices) communicate with each other, and taking actions in sub-millisecond time intervals, within a confined area, executing different robotic functionalities.

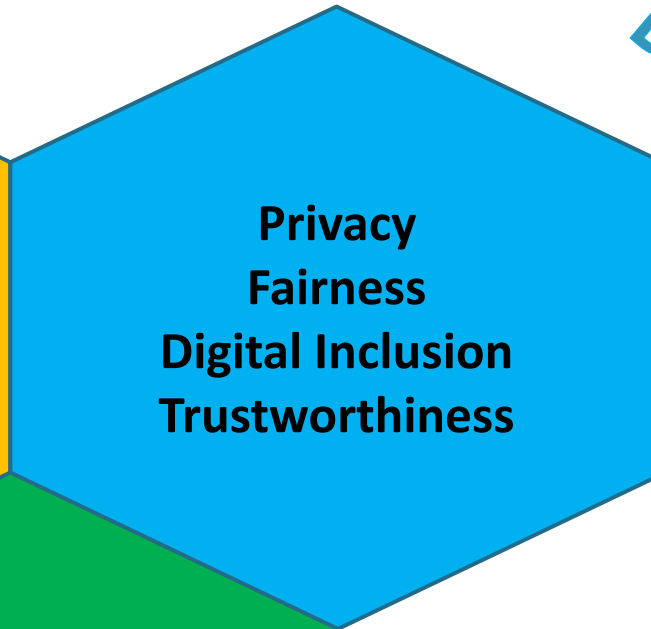


## NTN for low-bitrate IIoT

Trackside IIoT devices and **on-train terminals**, that send data to a remote cloud. Edge Cloud components on the devices, in satellites and in the remote data centre pre-process and route data and perform control depending on the application logic and in case of issues in the communication path.

Service class focus	All service classes	PoC 1	PoC 2	PoC 3
		Extreme eMBB	Extreme mMTC + NTN	Extreme URLLC + Extreme mMTC
Network-level KPIs	5G KPIs (baseline)	6G KPIs	6G KPIs	6G KPIs
Peak throughput (Gbps)	<20	>1000	Not critical	Not critical
Experienced upload throughput (Gbps)	<0.1	<1	Not critical	Not critical
Experienced download throughput (Gbps)	<0.2	<2	Not critical	Not critical
Maximum bandwidth (GHz)	<1	<100	Not critical	Not critical
Application latency (ms)	<10	<1	Not critical	<0.1
Jitter ( $\mu$ s)	N/A	<100	<100	<1
Energy efficiency (Tb/J)	N/A	nominal	high	nominal
Device density (devices/m <sup>2</sup> )	<1	Not critical	<10	<10
Reliability (packet error rate)	10 <sup>-5</sup>	10 <sup>-7</sup>	10 <sup>-6</sup>	10 <sup>-9</sup>
Positioning accuracy (cm)	<50 in 2D	Not critical	<100	<1 in 3D
Visualised user experience	50Mbps, 2D	10Gbps, 3D	Not critical	Not critical
QoE (MOS)	N/A	>4.3	>4.3	>4.3

*Innovation*



*Democracy*



*Ecosystem*

▶ **Contributions to the ETSI ENI WG**

- ▶ Crowdsourcing AI solution to minimize AI/ML carbon footprint and enable efficient AI/ML training and inference in distributed systems.

▶ **Contributions to the ETSI ZSM and ETSI MEC WG**

- ▶ Distributed closed loop automation in AI-driven Management & Orchestration frameworks for multi-stakeholder ecosystems.

▶ **Contributions of the UE-VBS Computing Continuum concept to 3GPP**

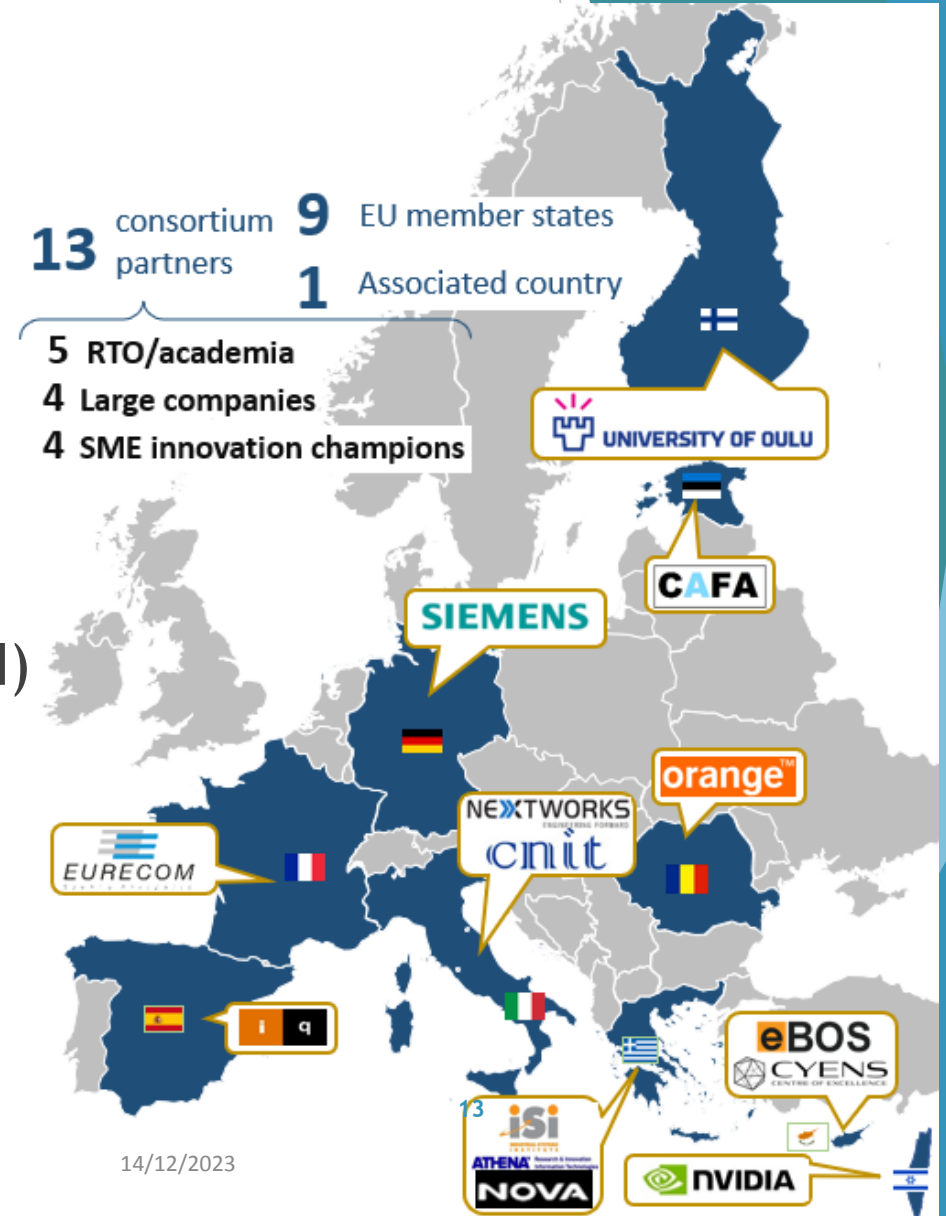
- ▶ Contribute the proposed UE design to the TSG Core Networks and Terminals.
- ▶ Consider standardization of BDI Agents for Self-Organizing UE-VBS.

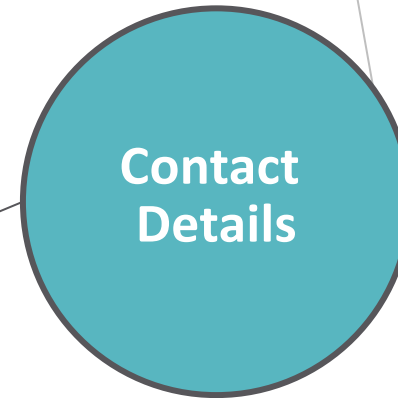
▶ **Contribution to the 3GPP SA2 group**

- ▶ Consider contribution of the NTN / 6G integration solution from Terrestrial 6G IIoT PoC.



- ▶ Project Name: ADROIT6G
- ▶ Stream: B0101
- ▶ Project website: [www.adroit6g.eu](http://www.adroit6g.eu)
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