Session 1

- 6G Visions
  - Chairman: Colin Wilcock
  - Panelists:
    - 6G-BRAINS: *Yue Zhang*
    - AI@EDGE: *Roberto Riggio*
    - DAEMON: *Marco Fiore*
    - DEDICAT 6G: *Vera Stavroulaki*
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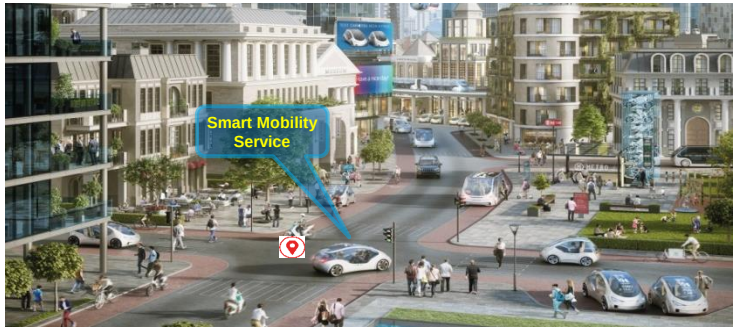
6G BRAINS (Bring Reinforcement-learning Into Radio Light Network for Massive Connections): Vision

OWC
THz duplex
mmWave
Sub 6 GHz
Optical link
Location Awareness
AI Engine



Project Vision & Approach

VISION: Artificial Intelligent is irreversibly set on the evolutionary path of every object and service we humans will interact with in the near future

APPROACH: Leverage the concept of **reusable, secure, and trustworthy** AI for network automation in multi-stakeholders environments

GOAL: Achieve EU-wide impact on industry-relevant aspects of the **AI-for-networks** and **Networks-for-AI** paradigms in B5G and 6G systems

AI/ML has key role in converging connectivity and computing: better automation, increased performance, decreased TTM of new features, greener operations.

Virtual validation of vehicle cooperative perception

Secure and resilient orchestration of (I)IoT networks

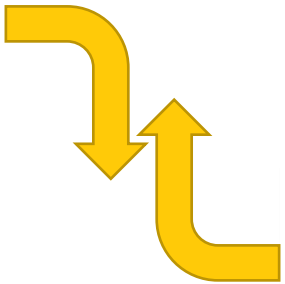
Edge assisted monitoring of linear infrastructures

Content curation for in-flight media services

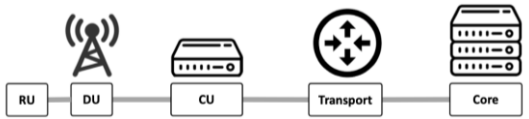
Making Network Intelligence (NI) practical

- ***6G will be zero-touch***, and its success will largely depend on the quality of the NI that will de-facto manage the network infrastructure
- ***Design gaps*** need to be filled for a proper NI integration
  - The limits of trendy black-box AI models must be understood via critical analyses
  - NI algorithms must account for network specifications by-design (e.g., latency)
  - NI does not operate in a vacuum in each controller, orchestrator, or domain, which calls for a global coordination of NI instances deployed in the network
- ***DAEMON*** addresses these gaps from two complementary perspectives

Re-thinking AI for NI
Tailoring (hybrid) AI, statistical, analytical, optimization models to the KPIs and computational requirements of network management



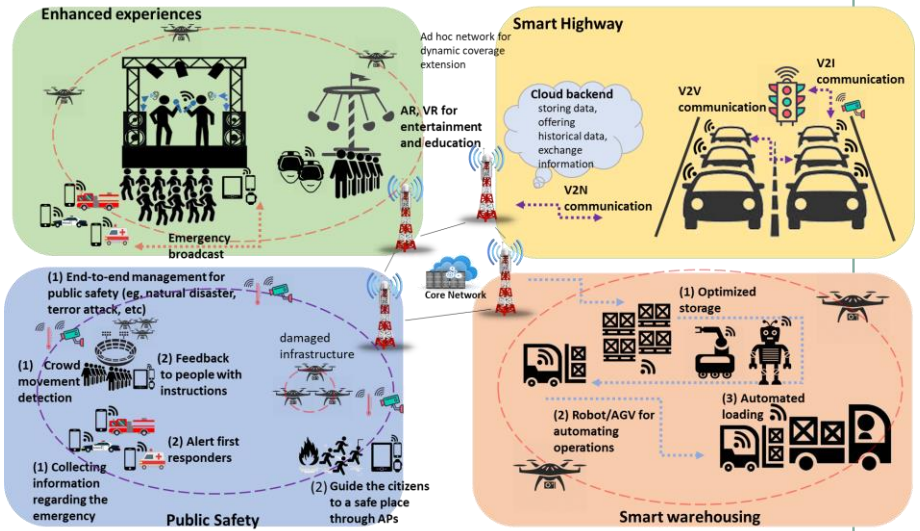
Re-thinking network architectures for NI
Building on SDO current trends, update the mobile network architecture so that it natively (and best) supports NI operations



DEDICAT 6G vision

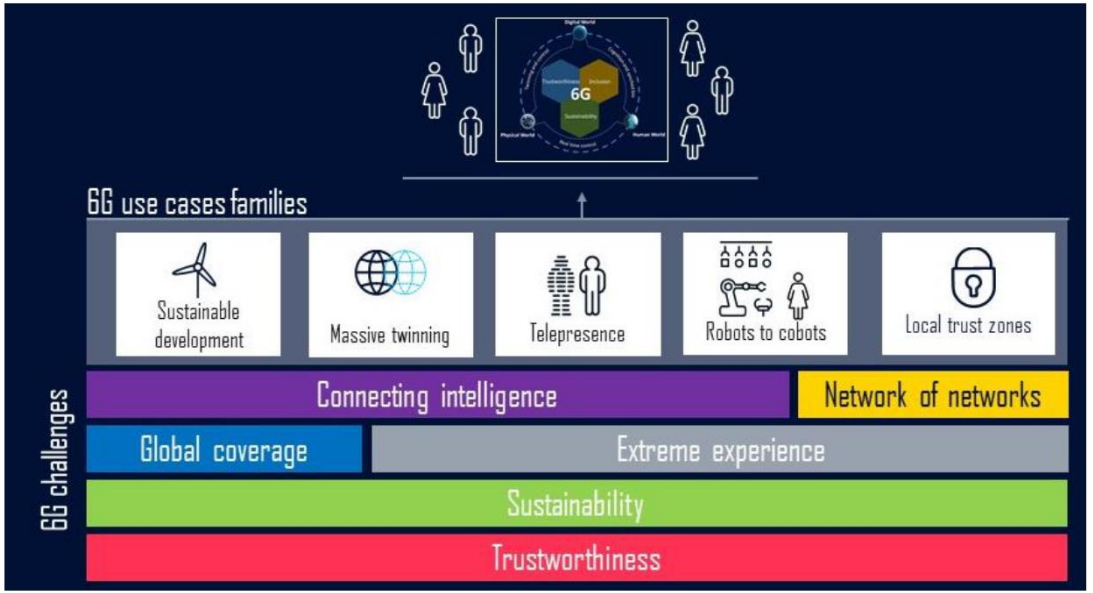
Transform Beyond 5G networks into a smart connectivity platform that is dependable/resilient, highly adaptive, ultra-fast, green for supporting securely innovative, human-centric applications.

- **Reduced energy and resource consumption** (communication, computation, storage)
- **Digital inclusion** through improved availability and coverage to
  - *enhance access to work and education*
  - *enable the widespread use of products, services and applications in the Digital Single Market*
  - *boost the integration of SMEs into global value chains thus, enhancing their competitiveness and innovation capacity*
  - *support service continuity also in more "remote" areas*
- **Enhanced security, privacy and trust**
- **Human in the loop**
  - *"A human-centric digitalisation directly aligned with the social and ethical values Europe is promoting: openness, inclusion, security, trust, participation and privacy protection"**



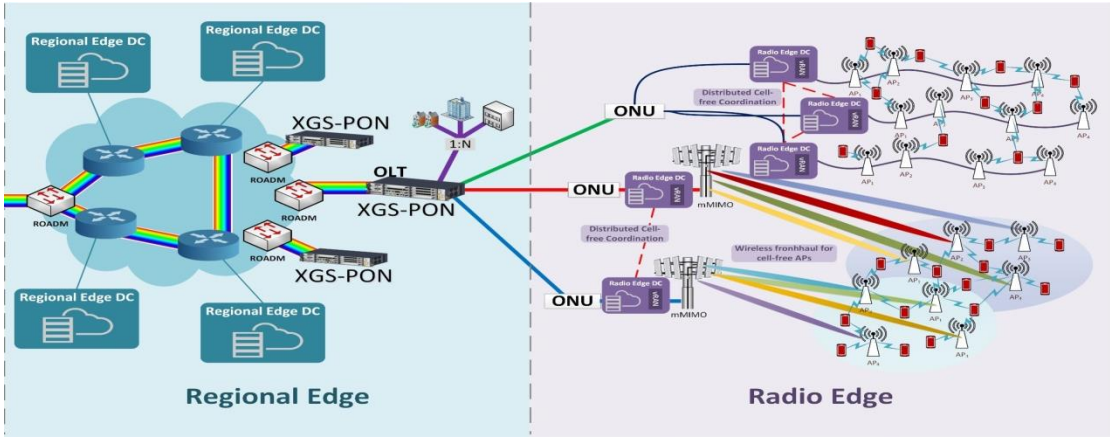
* W. Mohr, "Smart Networks and Services Task Force, Introductory statements," Smart Networks and Services Partnership Stakeholder workshop, October 2, 2019, Dresden, https://www.networld2020.eu/wp-content/uploads/2019/10/werner-mohr_sns-stakeholder-ws-october-2-2019.pdf.

Hexa-X vision on 6G: connect human, physical, and digital worlds with a fabric of 6G key enablers.



6G MARSAL vision

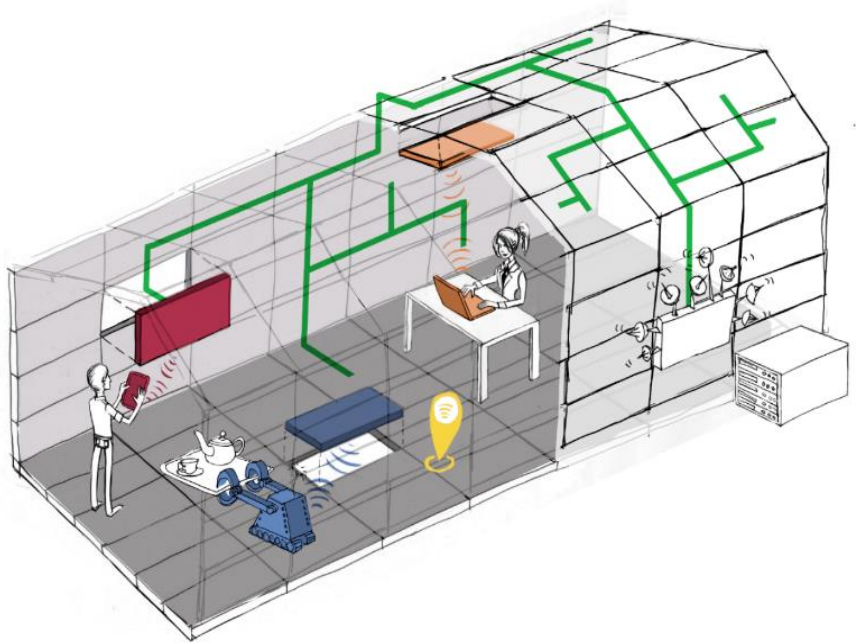
MARSAL proposes a new paradigm of elastic virtual infrastructures that integrate in a transparent manner cell-free, networking, management and security technologies, in order to deliver end-to-end transfer, processing and storage services by using advanced ML techniques.

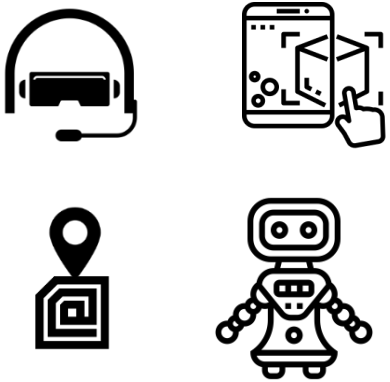


- Dense user-generated content distribution.
- Ultra-dense video traffic delivery.
- Cognitive Assistance and Smart Connectivity for next-generation sightseeing.
- Data security and privacy in multi-tenant infrastructures

- 20% energy savings during light loads
- 50% OPEX because of FMC
- 20% security flows

RadioWeaves-based solutions can support future applications





robust and scalable applications ‘real-time and real-space’ dependable ultra-efficient usage of energy and bandwidth

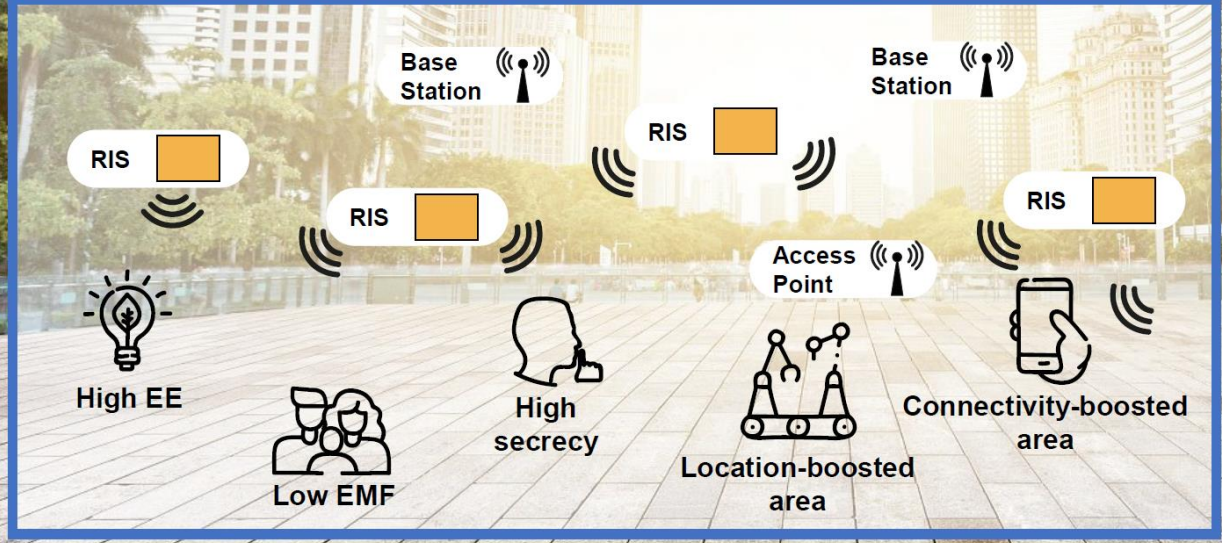
The REINDEER project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101013425.

Wireless Environment as a Service:

RISE-6G H2020 project

Joint MEC and Edge AI base network component optimization / orchestration

Reconfigurable and sustainable wireless propagation environment



Boosted areas concept

Dynamic creation of :

- High connectivity
- High localization precision
- High secrecy
- High EE
- Low EMF

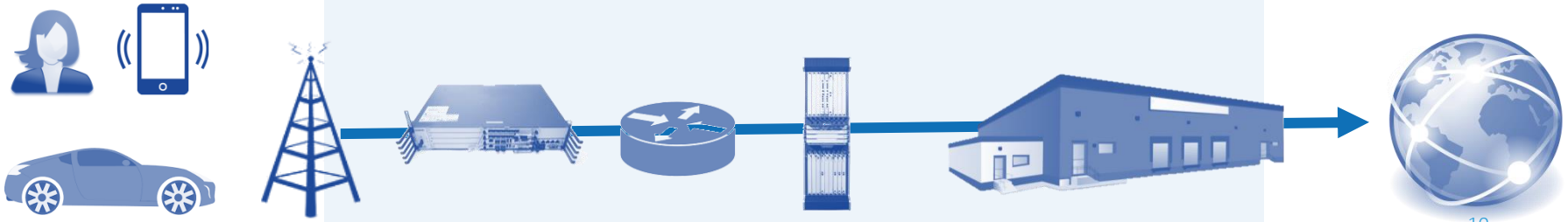
SDN for 6G networks

ACCESS	BACKHAUL			CORE
RAN	EDGE COMPUTING	IP & OPTICAL TRANSPORT	MICROWAVE	AI & MACHINE LEARNING

AUTONOMICITY AND NETWORK/COMPUTE INTEGRATION

ML-BASED CYBERSECURITY

TRUSTED MULTI-TENANCY



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