

Leveraging AI and Cutting-Edge Research: Enhancing Networks through innovative practices

DR EMMANOUIL KAFETZAKIS
Co-Founder, 8BELLs Ltd
MKAFETZ@8BELLSRESEARCH.COM

EIGHT BELLS today

- ❑ EIGHT BELLS Ltd is an independent high technology company providing innovative solutions, based in Nicosia, Cyprus and Athens, Greece.
- ❑ We specialize in selected parts of Information and Communication Technologies (ICT) in the fields of Telecommunications, Cybersecurity, Defense, Security, Space, eHealth and Environmental Protection, with disruptive IT solutions.
- ❑ Our technical capabilities include Systems & Networks Engineering, Cloud Computing, Privacy, Security & Data Protection and Software development.
- ❑ Our solutions and products are designed according to the following principles: High quality – High Efficiency – Low Power – Low Cost.
- ❑ Our values and policies combine Quality, Corporate Social Responsibility, Security, Human Rights, Ethics and Environmental Protection.
- ❑ EIGHT BELLS, following a specific development plan, invests in high value-added staff by creating new job positions.

EU and National Projects

CYPRUS NATIONAL



EDIDP 2020



EDF 2021



HORIZON EUROPE

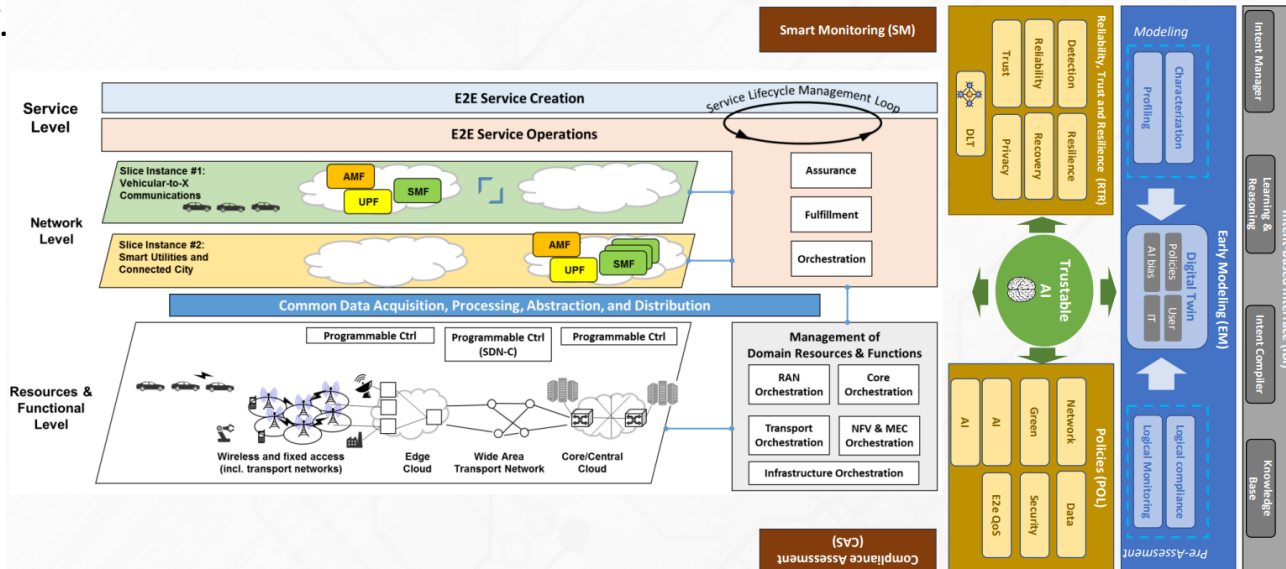


HORIZON 2020





- ❑ Comprehensive analysis of foreseeable 6G scenarios.
- ❑ Designing the necessary end-to-end security solutions.
- ❑ Development of a human-centric, holistic, omnipresent, and resilient smart services management and operation programmable platform.
- ❑ Deploying AI technologies driving a completely predictive approach to security management, fully addressing high services, systems, risks, and threats dynamicity.
- ❑ Characterize the user profile and the 6G system as a digital twin, to feed the AI distributed decision processes.
- ❑ Designing the system interface to be intent-based to implement the role of the “Human-In-The-Loop”.



5G INDUCE

Vision & Goal:

- Provide an end-to-end 5G platform for applications.
- Validate 5G tech in smart industrial services.

Project Focus:

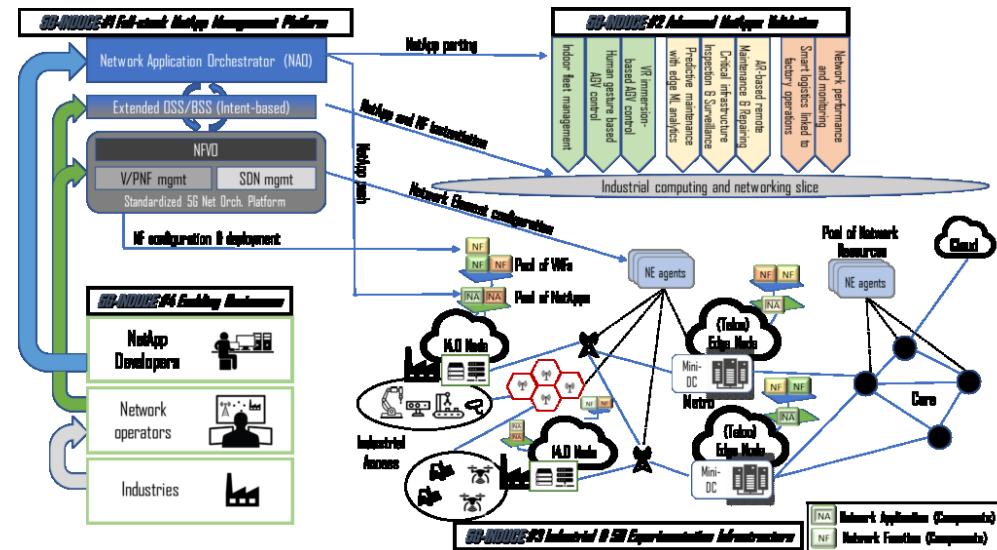
- Open 5G platforms for SME-developed apps.
- Merging research with industry infrastructures.

Key Objectives:

- Realistic facilities for app deployment.
- Advance Network Apps to TRL 7 pre-commercialization.

Architecture:

- NAO & NFVO frameworks.
- Intelligent OSS for app-network translation.



Augment the quality of monitoring with AR+5G

VR immersion and AGV control

Combine VR and 5G capabilities to provide live immersive view of the AGVs

Simplify human-machine interaction with AI+5G

Smart operation based on human gesture recognition

Control industrial operations of AGVs through human movements without using any type of special equipment.

Unify connectivity for Indoor+Outdoor with 5G

Industry 4.0 5G Modem

Indoor+Outdoor AGV fleet coordination

Manage a fleet of Indoors & Outdoors AGVs with simultaneous localization and mapping (SLAM) navigation, leveraging 5G, AI and Edge



A Secure and Reusable Artificial Intelligence Platform for Edge Computing in Beyond 5G Networks

Project Focus:

- AI@EDGE prioritizes network optimization, aiming to automate and secure edge and cloud compute infrastructures.
- Objective: Minimize manual intervention for efficient management of diverse MEC resources.

Key Optimization Features:

- Leverages serverless computing to streamline the deployment of distributed applications, enhancing scalability.
- Harnesses native hardware acceleration (e.g., GPU and FPGA) for accelerated data processing and network responsiveness.
- Employs cross-layer, multi-connectivity radio access to maximize network resource utilization.

Supporting Systems for Optimization:

- Develops innovative architecture and methods to efficiently manage heterogeneous MEC resources, reducing bottlenecks.
- Creates low-overhead communication schemes, improving the efficiency of distributed algorithms at scale.
- Ensures security measures, including service isolation and data protection, to maintain network integrity and optimize data sharing.

Optimization Goals:

- AI@EDGE strives to optimize networks through:
 - Reusable, secure, and trustworthy AI-driven network automation.
 - Demonstrable Use Cases showcasing concrete benefits in industrial applications.
 - Assessment of societal impact and integration of optimization lessons into the final solution.

AI4DEF Project Overview:

- ❑ AI4DEF introduces a revolutionary LabStore component, a virtual European platform integrating AI techniques.
- ❑ Purpose: Offer an online gateway to diverse AI tools, resources, and research materials.

LabStore Features:

- ❑ A dynamic online platform accessible via websites or dedicated software applications.
- ❑ Hosts an extensive array of AI technologies, including machine learning algorithms, natural language processing models, computer vision systems, and more.
- ❑ Provides access to valuable data sets, research papers, and materials pertinent to the AI domain.

User-Centric Network Optimization:

- ❑ Managed by a team of expert researchers and scientists, ensuring up-to-date and curated AI resources.
- ❑ Targeted at AI professionals and enthusiasts to foster learning and practical engagement with AI technologies.

AI4DEF LabStore aims to:

- ❑ Elevate the field of AI through accessible tools and resources.
- ❑ Facilitate knowledge exchange and resource sharing among AI researchers and practitioners.

VERTIGO Overview:

- ❑ VERTIGO is a cutting-edge platform specializing in mission planning for UAVs in ISR (Intelligence, Surveillance, and Reconnaissance) missions.
- ❑ Core Focus: Utilizing AI components to optimize mission planning and network resources.

VERTIGO's Network Optimization Capabilities:

- ❑ Employs advanced AI algorithms to enhance UAV mission planning.
- ❑ Optimizes network resources during ISR missions for efficient data transmission and processing.

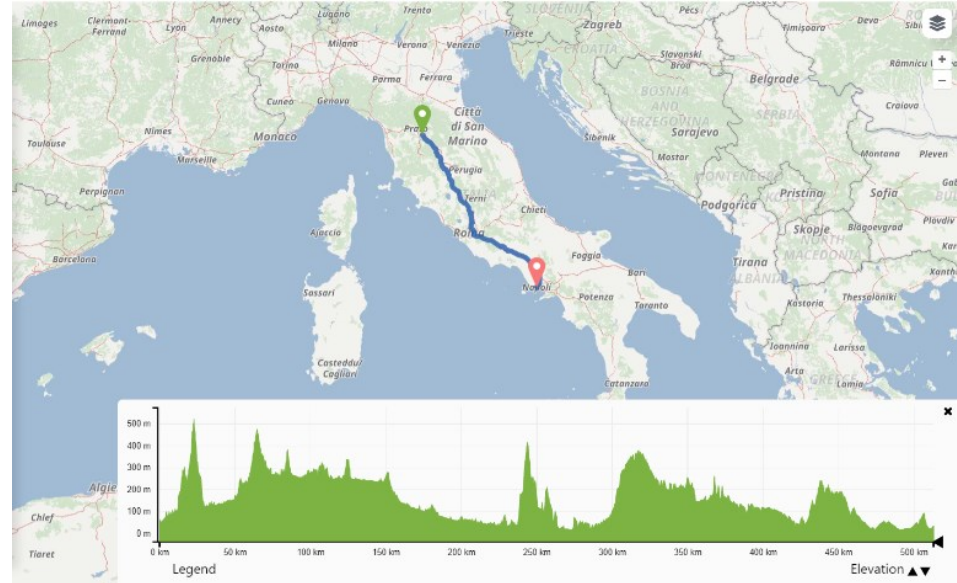
AI-Enhanced Mission Planning:

- ❑ Leverages AI components to:
 - ❑ Optimize flight routes for minimal network latency.
 - ❑ Prioritize data collection and transmission for enhanced situational awareness.

Benefits for Network Optimization:

- ❑ Improves network utilization and bandwidth allocation during UAV ISR missions.
- ❑ Enhances real-time data processing and decision-making capabilities.
- ❑ ***Highlighting VERTIGO's pivotal role in optimizing network resources during UAV ISR missions through AI-driven mission planning.***

- ❑ COMMANDS aims to deliver the European ground forces a System of Systems able to provide a trustable and effective cooperation between different manned and unmanned assets.
- ❑ Eight Bells develops a novel AI-powered military ground mission planning system called GROUND VERTIGO.
- ❑ GROUND VERTIGO system is an advanced, holistic and platform agnostic approach oriented to mission planning of UGVs meant for diverse missions
- ❑ The AI capabilities of GROUND VERTIGO do not only allow the automation of the mission planning process but also take into account situational factors that occur during the mission, offering alternative pathways, through predictive analytics, while always protecting the integrity of UGVs mission



Smart Bins: AI-Driven Litter Bin Management



Smart Bins Product Overview:

- ❑ Smart Bins is a revolutionary solution that combines AI technology and a web app platform to revolutionize city litter bin management.
- ❑ Core Focus: Utilizing AI for efficient network optimization in waste collection and management.

AI-Powered Network Optimization:

- ❑ Employs advanced AI algorithms to optimize the placement and collection scheduling of litter bins across the city.
- ❑ Minimizes operational costs by reducing unnecessary waste collection trips.

Web App Platform for Efficient Management:

- ❑ Provides city officials with a user-friendly web app platform for real-time monitoring and management of litter bins.
- ❑ Enables dynamic adjustments to bin locations and collection schedules based on AI-generated insights.

Benefits for Network Optimization:

- ❑ Maximizes the efficiency of waste collection routes, reducing traffic congestion and emissions.
- ❑ Optimizes network resources by reducing unnecessary trips and improving collection accuracy.

Thermal Cameras

8BMGT – MARITIME GIMBAL THERMAL CAMERA



The 8BMGT, designed and developed by EIGHT BELLS is an advanced gimbal-mounted camera capturing the infrared thermal radiation emitted by objects and humans. It requires no ambient light and operates during day and night under any weather conditions. The 8B THERMAL CAMERA supports **AI-powered** video analytics and can be used for both ground and maritime applications.

8BUGM – UAV GIMBAL MODULAR THERMAL / 8BEODP – ELECTRO-OPTICAL DRONE PAYLOAD

The 8BUGM and 8BEODP, designed and developed by EIGHT BELLS are advanced UAV/drone payloads. 8BUGM is a gimbal-mounted thermal camera capturing the infrared thermal radiation emitted by objects and humans. It requires no ambient light and operates during day and night under any weather conditions. The 8BUGM supports **AI-powered** video analytics and is an ideal solution for UAV-enabled applications.



Thank you for your time!

Any questions?

<https://www.8bellsresearch.com>

