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# META-OPERATING SYSTEMS PROJECTS KEY SOLUTIONS, OPEN CALLS AND USE CASES

APRIL 2023



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## Disclaimer

The information provided in this booklet is intended for informational purposes only and may not necessarily be complete or up-to-date. While we have made every effort to ensure the accuracy of the information presented, we encourage readers to visit the each project's website for the latest information and to verify any information presented in this booklet. We assume no responsibility or liability for any errors or omissions in the information provided, or for any actions taken in reliance on the information contained in this booklet.

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# THE EUROPEAN CLOUD, EDGE AND IOT CONTINUUM

The **European Cloud, Edge & IoT Continuum (EUCloudEdgeIoT.eu)** aims to realise a pathway for the understanding and development of the Cloud-Edge-IoT (CEI) Continuum by promoting cooperation between a wide range of research projects, developers and suppliers, business users and potential adopters of this new technological paradigm.

To achieve these goals, the EUCloudEdgeIoT initiative coordinates a diverse portfolio of project clusters with different specialisations. These are:

Cloud  
Computing

Next Generation  
Internet of  
Things

Meta  
Operating  
Systems

Cognitive  
Cloud

Swarm  
Computing

Open Source

Software  
Technologies

This booklet focuses specifically on the **MetaOS portfolio**, providing insights on relevant use cases under development and open call opportunities. For more information on the wider initiative, or on other portfolios, **please see our Research Community Booklet.**

# RESEARCH AND INNOVATION ACTIONS IN THE METAOS PORTFOLIO

The **MetaOS portfolio** was launched in **September 2022** and includes the following six projects



An intelligent and reliable operating system focused on delivering common virtualised services to facilitate orchestration, and virtual communication and enable the distribution of intelligence and computation – including AI, ML, and Big Data analytics, and the creation of distributed data-driven applications based on Frugal AI. [aeros-project.eu](http://aeros-project.eu)



A fluid, dynamic, scalable, and trustable computing continuum that spans across devices, and unifies edge and cloud in an energy-efficient manner. The MetaOS will provide a new, enriched layer enacting resource and service sharing through advertisement/agreement procedures, and hierarchical aggregation of nodes, inspired by Inter-domain routing on the networks. [www.fluidos.eu](http://www.fluidos.eu)



It aims to design, develop, and validate a meta-operating system by addressing the challenges of device volatility and heterogeneity, continuum infrastructure virtualisation and diverse network connectivity, optimised and scalable service execution and performance, as well as resources consumptions and costs. [www.icos-project.eu](http://www.icos-project.eu)



It will introduce advanced methods to enable secure and optimal application provisioning, resource adaptation and reconfiguration. It exploits edge and fog nodes, in conjunction with multi-cloud resources, to cope with requirements posed by low-latency applications. [www.nebulouscloud.eu](http://www.nebulouscloud.eu)



It is an open-source, modular and cyber secure meta-operating system in the AIoT-edge-cloud continuum bringing intelligence closer to the data and make AI-as-a-Service an integral part of network self-organisation and micro-services execution orchestration. [meta-os.eu](http://meta-os.eu)



It enables the efficient, reliable and secure end-to-end orchestration of hyper-distributed applications over programmable infrastructure that spans across the compute continuum, removing existing openness and interoperability barriers and introducing automation and decentralised intelligence mechanisms powered by 5G and distributed AI technologies. [nephele-project.eu](http://nephele-project.eu)



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## OVERVIEW OF SELECTED USE CASES



# Use case overview: ENERGY

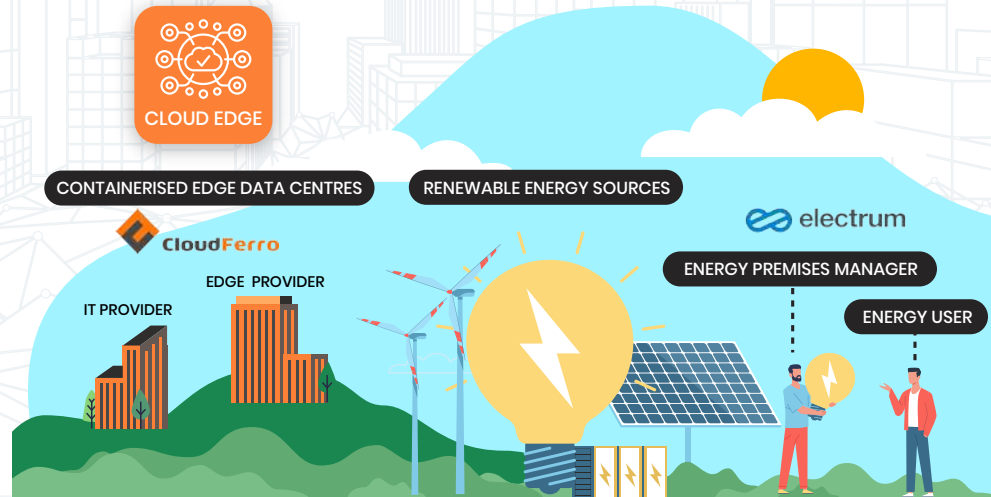
## CONTAINERISED EDGE COMPUTING NEAR RENEWABLE ENERGY SOURCES

### Objective

Increase in energy supply cybersecurity through localization of data processing; Resource optimisation through analytical task automation; Increased system operability and stability through node pooling and adjustment failsafes.

### Methodology

Integration of Cloud-Edge processing with renewable energy sources and sensor data, monitoring of performance changes in shifting from Cloud-based to Edge-based processing, real-time adjustments of energy production activity based on analytical benchmarks.



# Use case overview: AGRICULTURE

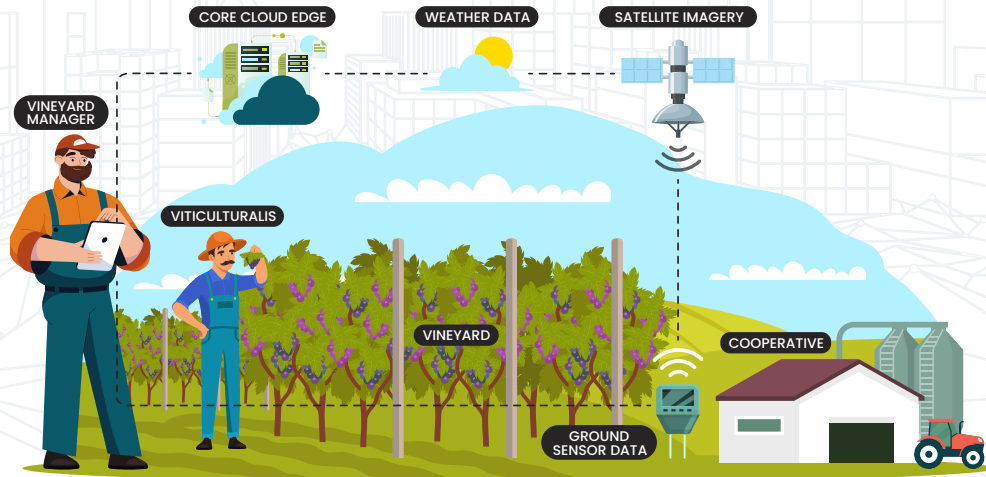
## SMART VITICULTURE

### Objective

Critical decisions on the ground using intelligence from various sources, automatised data and analytics with connected reports, automatic alert response system, increased efficiency of workforce, improved health of crops and reduced loss of vines, decreased use of chemicals.

### Methodology

Enabling smart farming for viticulturalist using Terraview's climate SaaS platform bringing data from multiple sources with proprietary AI/ML pipelines to help create intelligence for the practitioners on the ground, to make better decisions and make better wines in a climate-sustainable way.



Agriculture





# Use case overview: TRANSPORT & LOGISTICS

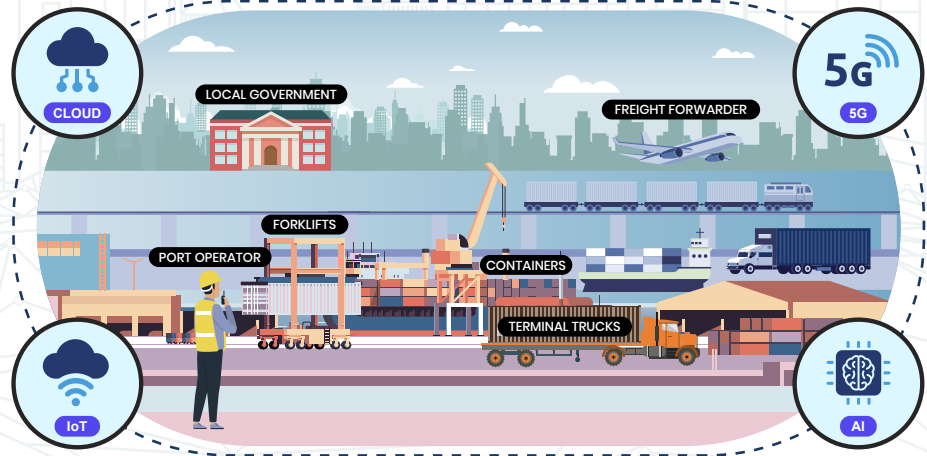
## SMART PORT

### Objective

Resource optimisation through decentralised decision-making; Increase in system flexibility, stability, and portability through continuum harmonisation; Increased coordination capabilities with different networks (road, railway) through predictive decision-making.

### Methodology

Integration of Cloud-Edge processing with port logistics tools, deployment of sensors for container and vehicle movements, implementation of machine-learning processes for problem-solving and risk avoidance.



Transportation  
and Logistics



# Use case overview: OTHER

## SMART XR VALIDATION

### Objective

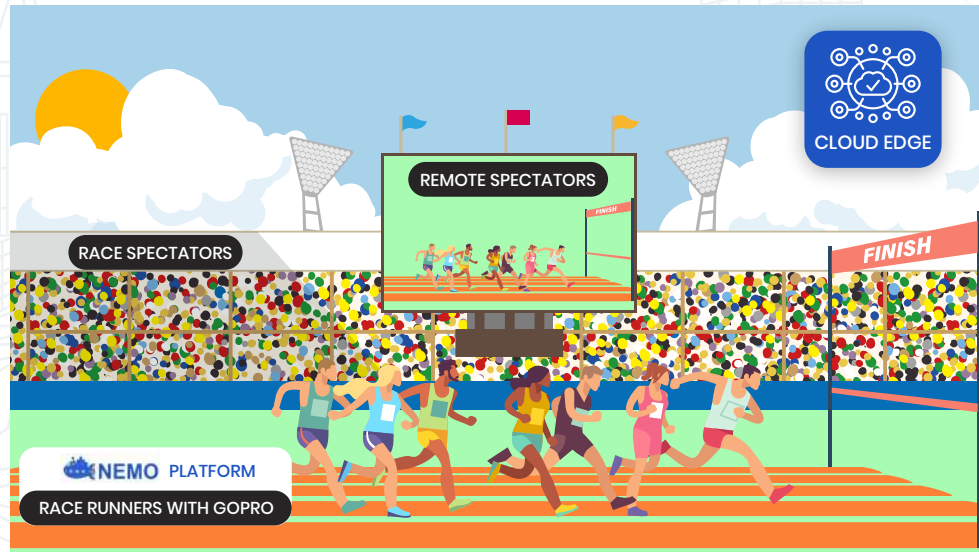
Creation of a customisable and dynamic video transmission for events through real-time connection between multiple devices; Creation of a new immersive media experience through the use of localised processing and sensorial transmissions.

### Methodology

Establishment of a Cloud-Edge continuum for flexible media tools, deployment of high-quality sensorial devices, expansion of the continuum to include personal devices.



Tech and Entertainment





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## OVERVIEW OF META-OS PROJECTS





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**AEROS** - AUTONOMOUS, SCALABLE, TRUSTWORTHY,  
INTELLIGENT EUROPEAN META OPERATING SYSTEM FOR  
THE IOT EDGE-CLOUD CONTINUUM (101069732)

→ [aeros-project.eu](https://aeros-project.eu)



# GET INVOLVED!

## OPEN CALL OPPORTUNITIES

2 open calls: 15 participants

Budget: €900k

1<sup>st</sup> call: validation of aerOS in selected verticals (Jan 24)

2<sup>nd</sup> call: demonstrate domain agnosticism (Aug 24)



Read more about [aerOS available open calls](#)

### Main goals of the project

- » Design and build a virtualised, platform-agnostic, zero-touch orchestration (of resources & services) Meta Operating System for the IoT edge-cloud continuum.
- » Achieve optimal orchestration through flexible containerised edge nodes and open APIs for quality, stability, and security.
- » Use a holistic approach supporting data autonomy strategies and the development of industrial IoT communication networks.
- » Maximise impact through global and cross-sectorial presence, considering individual use case scenarios and long-term market and sustainability trends.

### Main outputs of the project

- » Virtualised and platform-agnostic Meta Operating System.
- » Methodology, standardisation, and protocols usable across the continuum for legacy and novel technologies.
- » Data autonomy strategy for the CEI continuum.
- » Infrastructural services and features for cybersecurity, trustworthiness and manageability.
- » Open APIs.

### Partners

Discover the consortium here:

<https://aeros-project.eu/consortium/>

### Use Cases



Agriculture

Smart Tractors



Transportation and Logistics

Port Continuum



Manufacturing

Data-Driven  
Cognitive Production  
Lines



Environment



Energy and Utilities

Renewable Energy  
Sources



Smart City

Sustainable Smart  
Buildings

More info about the  
Use Cases available  
in the Appendix



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**FLUIDOS** – FLEXIBLE, SCALABLE AND SECURE  
DECENTRALISED OPERATION (101070473)

→ [fluidos.eu](https://fluidos.eu)





# GET INVOLVED!

## OPEN CALL OPPORTUNITIES

Read more about [FLUIDOS available open calls](#)



### Main goals of the project

- » Develop a Meta OS that allows interoperability between different layers of the continuum with different devices from various manufacturers.
- » Advance measuring and predictive capabilities related to energy consumption and availability.
- » Develop a reliable zero-trust paradigm in order to securely manage the heterogeneous distribution of data and resources.

### Main outputs of the project

- » Consolidated operating system unifying edge and cloud systems that is user friendly and easy to integrate
- » AI based optimisation
- » Orchestration solution
- » Zero-trust paradigm
- » Resource sharing
- » Base step for further development of specialised technological solutions
- » Protocols and standards

### Partners

Discover the consortium here:  
<https://www.fluidos.eu/the-consortium/>

### Use Cases



Agriculture

Smart Viticulture



Manufacturing

Factory Robots



Energy and Utilities

Energy Grid Resilience

More info about the Use Cases available in the Appendix



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**ICOS - TOWARDS A FUNCTIONAL CONTINUUM  
OPERATING SYSTEM (101070177)**

→ [icos-project.eu](https://icos-project.eu)



# GET INVOLVED!

## OPEN CALL OPPORTUNITIES

2 open calls: up to 20 participants

budget: up to €1.9m

1<sup>st</sup> call: develop & test applications using a preliminary delivery of the ICOS framework

2<sup>nd</sup> call: validation across various domains



Read more about [ICOS available open calls](#)

### Main goals of the project

- » Design an open, platform-and-technology-agnostic MetaOS for the CEI continuum that provides a stable, secure, and green service.
- » Employ new data analytics and advanced resources management strategies to facilitate continuum operations, ensure securitisation of the open systems, apply the continuum's capabilities to solving key issues in the EU market strategy in scalable models.
- » Create the groundwork for the long-term building of an evolving innovation environment for CEI projects and applications.

### Main outputs of the project

- » MetaOS ICOS - in a data-driven system built upon the principles of openness, efficiency, adaptability, and data sharing, which consists of three main layers and two modules:
  - » Meta-Kernel, Intelligence and Security layers.
  - » ICOS Shell and Data Management Modules.
- » Novel AI-assisted orchestration strategies optimised to face resources heterogeneity and dynamicity.
- » Predictive mechanisms toward proactive CEI orchestration
- » Highly decentralised and modular architecture to accommodate different systems and user needs as well as extremely large contexts (devices, data, etc.).
- » Open solution (Open APIs) leveraging off-the-shelf technology to facilitate wide adoption.

### Partners

Discover the consortium here:

<https://www.icos-project.eu/consortium>

### Use Cases



Agriculture

Agricultural  
Operational Robotic  
Platform



Transportation  
and Logistics

Railway Structural  
Alert Monitoring  
System



Energy and Utilities

Energy Management  
and Decision  
Support Systems



Tech and  
Entertainment

In-car  
Infotainment and  
Multimedia

More info about the  
Use Cases available  
in the Appendix



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**NebulOuS** – A META OPERATING SYSTEM FOR BROKERING  
HYPER-DISTRIBUTED APPLICATIONS ON CLOUD COMPUTING  
CONTINUUMS (101070516)

→ [nebulouscloud.eu](http://nebulouscloud.eu)



NebulOuS

# GET INVOLVED!

## OPEN CALL OPPORTUNITIES

2 Open Calls: 9 participants

Budget: €1.35M

1<sup>st</sup> call: Validation of basic aspects of the platform (Feb 24)

2<sup>nd</sup> call: Validation of extended aspects of the platform (Sep 24)



NebulOuS

Read more about [NebulOuS available open calls](#)

### Main goals of the project

- » Develop a Meta Operating System and a platform that enables transient fog brokerage ecosystems that can seamlessly exploit edge and fog nodes with multi-cloud resources while coping with low-latency applications.
- » Manage the CEI continuum layers with a focus on efficiency and decentralised processing, with the development of interoperability capabilities and security guarantees necessary for the ecosystem.
- » Use AI to strengthen its brokerage and orchestration processes, delivering a self-healing and self-managing continuum with the flexibility and stability to adapt to virtually any scenario or malfunction.

### Main outputs of the project

- » NebulOuS Meta-OS platform.
- » Semantic models for fog brokerage.
- » Multi-Criteria Decision Making (MCDM) based cloud & fog service brokerage.
- » Optimised application lifecycle Management.
- » Autonomous and secure reconfiguration support.
- » Distributed Event Management System (EMS) with automatic anomaly detection.

### Partners

Discover the consortium here:

<https://www.nebulouscloud.eu/the-consortium/>

### Use Cases



Agriculture

Precision Agriculture



Transportation and Logistics

Supply of Fresh Food to a City



Energy and Utilities

Windmill Maintenance



Environment

Crisis Management



Smart City

Computer Vision for City Maintenance

More info about the Use Cases available in the Appendix



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**NEMO** – NEXT GENERATION META OPERATING SYSTEM  
(101070118)

→ [meta-os.eu](https://meta-os.eu)





# GET INVOLVED!

## OPEN CALL OPPORTUNITIES

2 open Calls: 10 participants

Budget: €1.8M

1<sup>st</sup> call: Extend NEMO scope and technology (Sep 23)

2<sup>nd</sup> call: Validate user acceptance and boost NEMO massive adoption and sustainability (Jun 24)



Read more about [NEMO available open calls](#)

### Main goals of the project

- » Develop a Meta Operating System and a platform that enables transient fog brokerage ecosystems that can seamlessly exploit edge and fog nodes with multi-cloud resources while coping with low-latency applications.
- » Manage the CEI continuum layers with a focus on efficiency and decentralised processing, with the development of interoperability capabilities and security guarantees necessary for the ecosystem.
- » Use AI to strengthen its brokerage and orchestration processes, delivering a self-healing and self-managing continuum with the flexibility and stability to adapt to virtually any scenario or malfunction.

### Main outputs of the project

- » NebulOUS Meta-OS platform.
- » Semantic models for fog brokerage.
- » Multi-Criteria Decision Making (MCDM) based cloud & fog service brokerage.
- » Optimised application lifecycle Management.
- » Autonomous and secure reconfiguration support.
- » Distributed Event Management System (EMS) with automatic anomaly detection.

### Partners

Discover the consortium here:

<https://www.nebulouscloud.eu/the-consortium/>

### Use Cases



Agriculture

Smart Farming



Manufacturing

Smart Manufacturing and Industry



Energy and Utilities

Smart Energy and Smart Mobility



Tech and Entertainment

Smart Media

More info about the Use Cases available in the Appendix



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**NEPHELE** - A LIGHTWEIGHT SOFTWARE STACK AND SYNERGETIC  
META-ORCHESTRATION FRAMEWORK FOR THE NEXT  
GENERATION COMPUTING CONTINUUM (101070487)



→ [nephele-project.eu](https://nephele-project.eu)

# GET INVOLVED!

## OPEN CALL OPPORTUNITIES

2 open calls: up to 16 participants

Budget: up to €1.5m

1<sup>st</sup> call: develop further functionalities of vo

2<sup>nd</sup> call: develop distributed apps with integrated vo and validation of synergetic orchestration framework



Read more about [Nephele available open calls](#)

### Main goals of the project

- » Design and build a virtual object that will tackle interoperability and convergence challenges in the compute continuum and develop synergetic orchestration mechanisms that can manage distributed applications in the continuum.
- » Create an open reference infrastructure for the development and growth of CEI continuum ecosystems.
- » Develop a multi-layered lightware software stack for the optimisation of convergence and interoperability functionalities as well as decentralised orchestration.
- » Develop and support a hyper-distributed applications development ecosystem for the purpose of application optimisation, reusability, and distribution.

### Main outputs of the project

- » Virtual Object Stack (VOStack) as an IoT and edge computing software stack for leveraging virtualization of IoT devices.
- » Synergetic meta-orchestration framework for managing the synergy between cloud and edge computing platforms.
- » Development of a set of Virtual Objects (VOs) for specific types of IoT Devices.
- » Development of a set of IoT enablers and a set of virtualized IoT-specific functions.

### Partners

Discover the consortium here:

<https://nephele-project.eu/>

### Use Cases



Smart City

Energy Management  
in Smart Building /  
Cities



Transportation  
and Logistics

Smart Port



Environment

Emergency/Disaster  
Recovery



Healthcare

Remote  
Healthcare

More info about the  
Use Cases available  
in the Appendix

# THE COORDINATION AND SUPPORT ACTIONS

The **European Cloud, Edge & IoT Continuum** is supported by the effort of two Coordination and Support Actions (CSAs):

## OpenContinuum

OpenContinuum supports the cloud-edge-IoT domain by focusing on the supply side of the computing continuum landscape. Its goal is to foster European strategic autonomy and interoperability through an open ecosystem for the computing continuum, with open source and open standards as two key enablers to be supported and leveraged throughout the community. Such an ecosystem will contain R&I projects in the cloud-edge-IoT portfolio to be coordinated, the diverse community evolved from the current cloud and IoT ones, with the addition of actors, initiatives, and significant alliances. The supply-side nature of OpenContinuum's agenda will orient the themes and focus of project activities but will not limit the scope of community building. The project's active landscaping and engagement work will bring the cloud and IoT communities together and express all points of view with a common understanding. It will then provide guidance to European actors to contribute to and lead open-source projects and standardisation efforts.

## Unlock-CEI

Unlock-CEI's ambition is to unlock the potential for accelerating the deployment of the cloud-edge-IoT (CEI) computing continuum in Europe by focusing on demand-side drivers and challenges to identify technology driven innovation and business opportunities driving demand value chains. The project represents the cloudedge-IoT demand constituency, provides insights and guidance to Horizon Europe R&I projects, and contributes to a proactive dialogue with suppliers to encourage the development of an open European cloud-edge-IoT ecosystem. It focuses on emerging value chains where investment is needed to foster the deployment of the cloud-edge-IoT continuum through forthcoming large-scale pilots, which will ultimately foster European autonomy in the digital economy.



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## APPENDIX- OVERVIEW OF USE CASES

→ [eucloudedgeiot.eu/european-research-and-innovation-projects/](https://eucloudedgeiot.eu/european-research-and-innovation-projects/)

# OVERVIEW OF aerOS USE CASES 1/2



Agriculture

## High Performance Computing Platform for Connected & Cooperative Agricultural Mobile Machinery (Smart Tractors)

**Methodology:** Development of a cooperative, large-scale harvesting system using sensor data, secure cloud-based operating instructions, and a swarm of smart vehicles (tractors).

**Objective:** Optimization of a fully-electric vehicle swarm capable of securely and reactively performing precision farming; latency reduction through the implementation of edge computing; CO2-neutral farming capabilities by integrating frugal AI with CEI continuum.



Manufacturing

## Data-Driven Cognitive Production Lines

**Methodology:** Integration of cloud-edge continuum with production lines, increased remote interaction between monitoring and intelligence tools and physical equipment, monitoring of energy efficiency and machine error.

**Objective:** Real-time error compensation resulting in Zero-Defect Manufacturing; Net-zero energy manufacturing and greater sustainability through production line optimisation; Advanced and secure production automation through integration of safety measures and reconfiguration options in Cloud-Edge IoT.



Transportation and Logistics

## Smart edge services for the Port Continuum

**Methodology:** Integration of Cloud-Edge processing with port logistics chain, application of computer vision algorithms to container / ship / truck management, authentication and control tools localisation and securitisation.

**Objective:** Increased efficiency and reliability of local processes through increased cybersecurity and connectivity; Predictive maintenance and efficient management governed by continuum-based data and inputs; Risk and error prevention through automatic detection and alert-generation.



## OVERVIEW OF aerOS USE CASES 2/2



Environment



Energy and Utilities



Smart City

### Containerised Edge Computing near Renewable Energy Sources

**Methodology:** Integration of Cloud-Edge processing with renewable energy sources and sensor data, monitoring of performance changes in shifting from Cloud-based to Edge-based processing, real-time adjustments of energy production activity based on analytical benchmarks.

**Objective:** Increase in energy supply cybersecurity through localization of data processing; Resource optimisation through analytical task automation; Increased system operability and stability through node pooling and adjustment failsafes.

### Energy Efficient, Health Safe & Sustainable Smart Buildings

**Methodology:** Integration of Cloud-Edge processing with sensors in an office setting (corporate building), application of self-managing systems related to health and efficiency, and implementation of data governance and identification mechanisms.

**Objective:** Effective clustering and conditions of employees based on sensor data; Decentralised room management through edge processes; Data privacy and cybersecurity optimisation through authentication and anonymisation mechanisms.

# OVERVIEW OF FLUIDOS USE CASES



Manufacturing

## High Performance Computing Energy and Process Optimisation of the movement of Factory Robots

**Methodology:** Integration of Cloud-Edge processing with factory robots, implementation of machine learning for coordination and orchestration purposes, optimisation of object recognition capabilities in small robots.

**Objective:** Increased individual and collective energy efficiency, capacity-based distribution of energy and computing resources, predictive strategies on future energy demand based on past loads and strategies.



Energy and Utilities

## Energy Grid Resilience

**Methodology:** Integration of Cloud-Edge processing with electric grids, incorporation of sensors in the continuum, network analytics-based issue detection.

**Objective:** Increased cybersecurity through zero-trust paradigm, stability optimisation through issue detection and self-healing, decreased energy consumption thanks to resource optimisation and low-carbon electricity prioritisation.



Agriculture

## Smart Viticulture

**Methodology:** Enabling smart farming for viticulturalist using Terraview's climate SaaS platform bringing data from multiple sources with proprietary AI/ML pipelines to help create intelligence for the practitioners on the ground, to make better decisions and make better wines in a climate-sustainable way.

**Objective:** Critical decisions on the ground using intelligence from various sources, automatised data and analytics with connected reports, automatic alert response system, increased efficiency of workforce, improved health of crops and reduced loss of vines, decreased use of chemicals.



# OVERVIEW OF ICOS USE CASES 1/2



Agriculture

## Agriculture Operational Robotic Platform (AORP)

**Methodology:** Integration of Cloud-Edge processing with agricultural practices, implementation of agro robots (Agbots) as tools and sensors, optimisation of data exchange ecosystems to increase stability and efficiency.

**Objective:** Increased farming efficiency and scalability through continuum processing, product quality stabilisation and protection, resource reduction and optimisation through localised data-collection and self-management.



Transportation and Logistics

## Railway Structural Alert Monitoring system (RSAM)

**Methodology:** Integration of cloud-edge processing with railway systems, implementation of continuous monitoring sensors and data analysis, distribution of data and devices across the digital and physical continuum.

**Objective:** Real-time monitoring of key parameters of the railway system; Increased security and stability through alert generation and self-maintenance; Resource optimisation and energy efficiency through predictive management.



Energy and Utilities

## Energy Management and Decision Support system (EMDS)

**Methodology:** Integration of Cloud-Edge processing in domestic continuum, energy consumption monitoring via smart devices and sensors, energy production management via green energy at the domestic level.

**Objective:** Energy consumption optimisation through flexible self-adjustments; Smart grid support through domestic-systemic harmonisation; Increased energy production via domestic green energy sources.

## OVERVIEW OF ICOS USE CASES 2/2



Tech and  
Entertainment

### **In-car Advanced Infotainment and Multimedia Management system (IAIMM)**

**Methodology:** Integration of Cloud-Edge processing for in-car multimedia systems, deployment of edge nodes for continuum support, systemic vehicle harmonisation for network generation.

**Objective:** Optimisation of multimedia content distribution through network support; High-quality reception stabilisation irrespective of connectivity through localised processing; Enrichment of all multimedia functionalities by preventing interruptions and latency.

# OVERVIEW OF NebulOuS USE CASES 1/2



NebulOuS



Agriculture

## Precision Agriculture

**Methodology:** Integration of Cloud-Edge processing with agricultural machinery and vehicles, re-allocation of data streams to local resources, implementation of sensor-based alert generation.

**Objective:** Optimisation of resource usage and distribution through relevant data collection and processing; Increased micro-management capabilities through platform harmonisation; Data securitisation through local processing and authentication.



Energy and Utilities

## Windmill Maintenance

**Methodology:** Deployment of continuum-integrated survey drones, integration of Cloud-Edge processing with preventative and inspection tools, implementation of AI image recognition software.

**Objective:** Predictive maintenance through alert generation; Inspection optimisation through self-managing drone reconnaissance; Reduction in energy use through edge processing of image/video data.



Transportation and Logistics

## Supply of Fresh Food to a City

**Methodology:** Cloud-Edge continuum harmonisation for transportation processes, delivery and logistics tracking through sensors and smart equipment, decision-making decentralisation and automation (Decision Support System).

**Objective:** Delivery optimisation through sensor analytics related to vehicle and road conditions; Increased logistics efficiency through the predictive and recommendation software; Reduction in energy usage through waste and error avoidance.

## OVERVIEW OF NebulOus USE CASES 2/2



Environment

### Crisis Management

**Methodology:** Implementation of edge technology in support of crisis tools, deployment of AI algorithms for data processing and alert generation, incorporation of field sensors in the crisis management continuum.

**Objective:** Preventing communication breakdowns during crises through localised processing; Increasing crisis management's monitoring and response tools by adding them to the continuum; Optimising crisis team responses via alert generation and toolkit expansion.



Smart City

### Computer Vision for City Maintenance

**Methodology:** Integration of Cloud-Edge processing with infrastructure maintenance, deployment of sensor and smart device-based data to the continuum, alert generation for damage detection and other applications.

**Objective:** Public buildings/infrastructure maintenance optimisation through detection of damages; Flexible information verification and inspection through sensor data; Establishment of a platform for future city-wide applications.



NebulOus



# OVERVIEW OF NEMO USE CASES 1/2



Agriculture

## Smart Farming

**Methodology:** Integration of Cloud-Edge processing with farming technology, deployment of sensor-wearing semi-autonomous robots, harmonisation of data processing with real-time video analysis.

**Objective:** Resource optimisation through targeted and precise bio-spraying; Intelligent and efficient decision-making through system-wide, real-time analytics; Delivering a powerful yet simple management system to farmers.



Manufacturing

## Smart Manufacturing & Industry

**Methodology:** Integration of Cloud-Edge processing with factory manufacturing continuum, deployment of video sensors for logistics and safety purposes, implementation of AI decision-making processes for supply chain management.

**Objective:** Creation of a safe environment for workers through collision prevention and self-managed placement; Full automation of material inspection and transferring through AI and sensor processes; Greater harmonisation between human and automation activity through smart devices and systemic management.



Energy and Utilities

## Smart Energy & Smart Mobility

**Methodology:** Integration of Cloud-Edge processing with grid continuum and mobility analytics, harmonisation of monitoring capabilities with additional relevant sensors, implementation of AI-based modeling for data prediction and elaboration.

**Objective:** Optimisation of power generation-consumption balancing through smart grid auto-balancing; Realisation of driver-friendly scenarios through processing of sensor analytics; Overall energy reduction through waste/traffic avoidance.

## OVERVIEW OF NEMO USE CASES 2/2



Tech and  
Entertainment

### Smart Media

**Methodology:** Establishment of a Cloud-Edge continuum for flexible media tools, deployment of high-quality sensorial devices, expansion of the continuum to include personal devices.

**Objective:** Creation of a customisable and dynamic video transmission for events through real-time connection between multiple devices; Creation of a new immersive media experience through the use of localised processing and sensorial transmissions.



Smart City

## Energy Management in Smart Buildings/Cities

**Methodology:** Integration of Cloud-Edge processing with building monitoring and control continuums, harmonisation between existing sensors and smart devices, deployment of management automation processes.

**Objective:** Performance optimisation through latency decrease and computational power increase; Decreased energy consumption through flexible self-management; Increased reliability and well-being of the offered services through continuum self-healing and stabilisation.



Transportation and Logistics

## Smart Port

**Methodology:** Integration of Cloud-Edge processing with port logistics tools, deployment of sensors for container and vehicle movements, implementation of machine-learning processes for problem-solving and risk avoidance.

**Objective:** Resource optimisation through decentralised decision-making; Increase in system flexibility, stability, and portability through continuum harmonisation; Increased coordination capabilities with different networks (road, railway) through predictive decision-making.



Environment

## Emergency/ Disaster Recovery

**Methodology:** Establishment of a Cloud-Edge continuum for emergency initiatives, integration of sensor-carrying robots and smart devices in the continuum, deployment of edge computing for low-reception scenarios.

**Objective:** Increased victim-locating capabilities through the processing of data from the sensors in the continuum; Optimisation of injury assessment and treatment through data gathered by the smart devices; Predictive emergency operations through system-wide analytics.



Healthcare

## Remote Healthcare

**Methodology:** Integration of Cloud-Edge processing with ultrasound medical imaging systems.

**Objective:** Connect, decompose and virtualize ultrasound medical imaging systems into the cloud-edge continuum to lose any barriers due to the hardware capabilities and localization of current physical systems.



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