



# Newsletter Issue 1

*September – November 2022*



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

## INSIDE THIS ISSUE

1. Issue Highlights
2. Project Use Cases
3. Project Pilots
4. Consortium
5. Communication & Dissemination activities
6. Deliverables
7. Upcoming Deliverables
8. Kick-off Meeting



## ISSUE HIGHLIGHTS

The first issue of aerOS newsletter presents the project activities during the first period September 2022 - November 2022. This specific issue focuses on the initial communication and dissemination activities, the project deliverables (recent and upcoming), the Kick Off Meeting, while it briefly provides a project overview and introduces aerOS pilots.

aerOS trimester activities in numbers:

- aerOS overview
- aerOS Use Cases
- aerOS consortium
- 7 Presentations
- 1 Video
- 1 Article
- 1 Period Deliverable
- 1 Upcoming Deliverable
- Kick-off Meeting



## *Project Overview*

**Autonomous, scalable, trustworthy, intelligent European meta Operating System for the IoT edge-cloud continuum**

**aerOS is a European research project (Horizon Europe CL4-2021-DATA-01-05) running for 3 years which aims at transparently utilising the resources on the edge-to-cloud computing continuum for enabling applications in an effective manner while incorporating multiple services. The overarching goal of aerOS is to design and build a virtualized, platform-agnostic meta operating system for the IoT edge-cloud continuum.**

## *aerOS Use Cases*

### *Use Case 1: DATA-DRIVEN COGNITIVE PRODUCTION LINES*

The use case aims to deploy and validate MAL4 cognitive production processes in 4 public-private Pilot Lines (PL)

#### *Objectives and Expected Benefits*

This use case aims to be the (1) first worldwide autonomous production line (Level 4) introducing an open modular edge orchestration approach/OS building on IoT, Big Data & ROS2 communities. To offer (2) quality, circularity, zero footprint and AI testing and validation. To provide (3) effective data distribution and sharing closer to the source ensuring data integrity and security. Also, to offer (4) Safe human/machine collaboration. (5) Finally, to provide dynamic intralogistics adaptation and autonomous production scheduling.

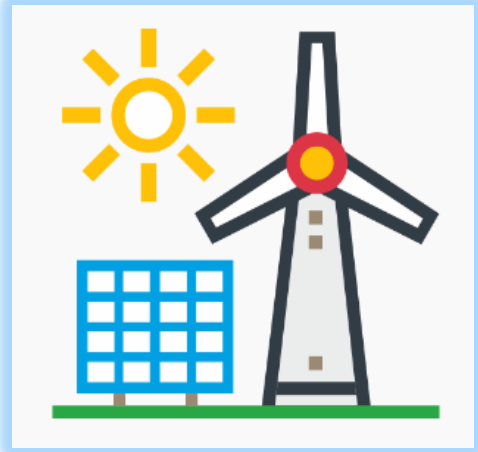


## ***Use Case 2: CONTAINERISED EDGE COMPUTING NEAR RENEWABLE ENERGY SOURCES***

Use case will be driven by partners CF and ELECT. It will allow management of containerised edge data centres developed by CF and located directly at energy sources, connected to the smart infrastructure and providing cloud continuity.

### ***Objectives and Expected Benefits***

Use case will proof applicability of aerOS for managing small, edge nodes located directly at energy producing locations, gathering information and events from the deployed smart devices. The edge nodes will have connectivity to the private cloud infrastructure of CF. The objectives of the use case: (1) aerOS will be used for distributing, monitoring and relaying tasks of stateless processing – allowing execution of batch or FaaS-like activities – among a pool of near and far-edge nodes located at ELECT renewable energy premises (e.g., wind/photovoltaic farms, hydro energy or high capacity batteries); (2) use of heterogeneous information in the orchestration and scheduling model (master DB and registry will be needed along the task collector and distributor), boosting the energy and resource optimisation; (3) proposed application shall also result in lower capital intensity of the system, allowing the operator to abandon redundancy at a node level and assuring it on system wide level, as tasks of a failing node can be transferred to an operational one.



## ***Use Case 3: HIGH PERFORMANCE COMPUTING PLATFORM FOR CONNECTED & COOPERATIVE AGRICULTURAL MOBILE MACHINERY***

Use case 3 will be driven by partners John Deere and TTControl targeting to develop a High-Performance Computing Platform (HPCP) for Connected and Cooperative Mobile Machinery which has the potential to reduce the CO2 footprint in areas like agriculture, construction, or forestry. The HPCP use case will be deployed and validated in John Deere's European Technology Innovation Center in Kaiserslautern.



### ***Objectives and Expected Benefits***

The main objective of the HPCP use case is to develop a proof-of-concept of a High-Performance Computing Platform providing a machine-to-machine connectivity from everywhere for a large-scale agricultural production system on one side, but also delivering certain real-time performance still navigating the overall system remotely and controlling (i.e. supervising)

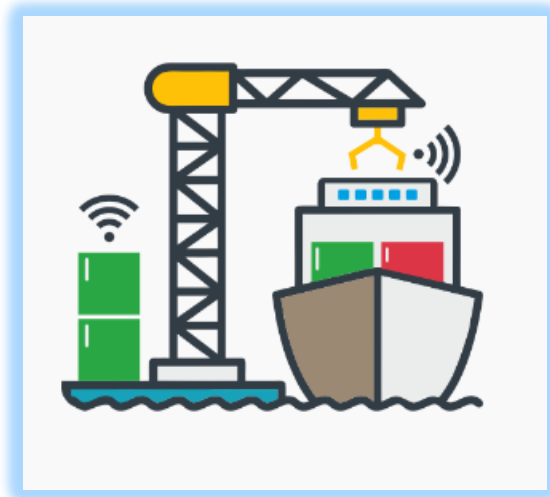
execution of the agricultural work process. The solution will bring higher performance and connectivity capabilities vs. existing solutions brought to the mobile machinery. Using IoT services also edge computing is foreseen for more critical tasks like e.g. field borders in the overall system to e.g. to enable real-time control.

### ***Use Case 4: SMART EDGE SERVICES FOR THE PORT CONTINUUM***

The logistics pilot will be driven by the Industrial partner EUROGATE and the scenarios will be deployed and validated in the container terminal located in the Port of Limassol (EGCTL), which is the largest port in Cyprus. EGCTL amalgamates the activities of container handling, reefer services and industrial storage and it is a critical node of the European sea-logistics supply chain. Since 2017 EUROGATE has invested more than 30 M€ in the CHE of the terminal improving the QoS while reducing both arrival/departure idle times and cargo delivery time.

#### ***Objectives and Expected Benefits***

Since physical expansion of terminals is difficult or impossible the only way to improve the operational performance is by following the Industry 4.0 (I4.0) digitalisation paradigm, which will allow to take better decisions by improving the availability of the information and the way it is presented to the staff. Whilst better computer vision and accurate predictive maintenance services directly deployed in the edge are not possible through the first generation of IoT architectures, aerOS will allow to orchestrate smart services in the edge, allowing maritime companies to react faster without the need of a high-performance processing in the cloud. The expected benefits of this pilot are: (1) ensure that the data generated in the sources of the information are manipulated at the edge; (2) enough computing performance in the edge elements in compliance with the smart orchestration approach of aerOS, and (3) new AI and abstraction cloud methodologies application that will allow sophisticated cognitive services validation.



### ***Use Case 5: ENERGY EFFICIENT, HEALTH SAFE & SUSTAINABLE SMART BUILDINGS***

Use case will be driven by partners COSM, NCSR, FOGUS, INF and UPV. It will demonstrate gains of the aerOS architecture in an edge deployment for energy efficient, sustainable, flexible and health-safe smart buildings. The use case will be deployed and validated in an office enterprise building of COSMOTE (Athens, Greece).

#### ***Objectives and Expected Benefits***

Use case aims to demonstrate the aerOS architecture: (1) applied in Smart Buildings market to optimise efficiency and safety of enterprises based on process and data autonomy and self-

orchestrated IoT ecosystems, (2) energy efficiency of the large buildings using real-time processing and (frugal) AI, (3) use 5G and smart network components of the infrastructure like NFV and NetApps to extend aerOS capabilities. Expected benefits will be derived from **aerOS** nodes intelligence, addressing distinctive infrastructure characteristics of buildings, through autonomous and decentralised decision-making at the edge. Moreover, the **aerOS** unique abstraction approach will offer an adaptable solution that can bridge heterogeneity (data and platforms), so that sensors, systems, and analytics could be orchestrated in the IoT edge-cloud continuum, and new IE or federating with new elements added.



## *aerOS Consortium*

The comprehensiveness of aerOS objectives requires collaboration of a European expert Consortium in every area of the industry, SMEs, end-users, academia and public authorities. The Consortium has been judiciously composed to ensure quality of envisioned solution with an adequate level of manageability. The 27 aerOS partners, from 11 European countries are a well-balanced mixture between stakeholder's RTOs industry SMEs and telecom operators. Consortium combines expertise required to create, evaluate and promote innovative, transferable and sustainable results). aerOS is coordinated by UPV that is highly experienced in administrative and financial management of large research, EU-funded projects, and related dissemination activities. More information available at aerOS website: <https://aeros-project.eu/consortium/>





## Communication & Dissemination activities

### *Presentations*

**Some of these presentations took place before the official start of the project**

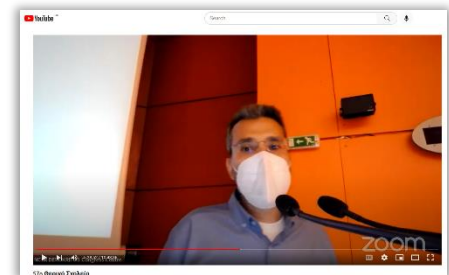
Ignacio Lacalle from UPV presented aerOS project in “Future European platforms for the Edge: Meta Operating Systems” session of IoT-Week 2022 (June).



Dr. Harilaos Koumaras from NCSR “DEMOKRITOS”, aerOS technical manager, took part and presented some insights about our project earlier this summer at the 12th Infocom Mobile Connected World event (June 2022).



Dr. Harilaos Koumaras (NCSR), aerOS technical manager, participated at the NCSR "DEMOKRITOS" 57th Summer School (July 2022), discussing and presenting 5G Programability aspects and presenting the new HE research project aerOS. You may access the presentation here: <https://www.youtube.com/watch?v=NPqdrntuLQA>



Carlos E. Palau Salvador, from Universitat Politècnica de València, aerOS Project coordinator, presented on October 11th at IEEE ICUMT 2022 conference the NGIoT approach developed in the aerOS Project. More information available here: <https://icumt.info/2022/keynotes>



## ***Presentations***

Ignacio Lacalle Úbeda from Universitat Politècnica de València UPV took part and presented the basic insights of our newly started project during ETSI IoT Week 2022, earlier today. The meeting took place on Sophia Antipolis. You may learn more about the event here: <https://www.etsi.org/events/2060-etsi-iot-week-2022>

The aerOS Project was presented during NEXUS Event in BALUARTE Palacio de Congresos y Auditorio by NASERTIC partner! You may learn more about the event here: <https://www.aditechcorp.com/aditech-organiza-el-evento-nexus-para-potenciar-los-proyectos-europeos-en-navarra>

Ignacio Lacalle from Universitat Politècnica de València UPV presented aerOS project in the TRA 2022 at the stand of the European Commission on 14th of November. The 2022 TRA version took place in Lisbon, Portugal. You may learn more about the event here: <https://traconference.eu/>

## ***Video***

aerOS is a European research project (Horizon Europe CL4-2021-DATA-01-05) running for 3 years which aims at transparently utilising the resources on the edge-to-cloud computing continuum for enabling applications in an effective manner while incorporating multiple services. The overarching goal of aerOS is to design and build a virtualized, platform-agnostic meta operating system for the IoT edge-cloud continuum. You may access the introductory video here:

<https://www.youtube.com/watch?v=-XTj1qN0eU>



## Articles

A very interesting article has been published by Universitat Politècnica de València UPV (in Spanish) entitled "The UPV leads a European project for the development of a meta operating system with artificial intelligence and distributed computing" showcasing the fundamental aspects of our project. You may find it online here:

<http://www.upv.es/noticias-upv/noticia-13836-proyecto-aeros-es.html>

This article has also been reproduced by the following websites:

- <https://www.lasprovincias.es/comunitat/lidera-proyecto-aplica-20221107004649-ntvo.html>
- <https://www.elmeridiano.es/la-upv-lidera-un-proyecto-ue-para-el-desarrollo-de-un-meta-sistema-operativo/>
- <http://www.gentedigital.es/valencia/noticia/3498265/la-upv-lidera-un-proyecto-europeo-que-aplica-ia-y-compu%e2%80%a6/>
- <https://www.europapress.es/comunitat-valenciana/innova-00214/noticia-upv-lidera-proyecto-europeo-aplica-ia-%25E2%2580%25A6/>
- <https://www.europapress.es/comunitat-valenciana/noticia-upv-lidera-proyecto-europeo-aplica-ia-computacion-%25E2%2580%25A6/>
- <https://valenciaplaza.com/la-upv-lidera-un-proyecto-europeo-que-aplica-ia-y-computacion-para-energia-y-edifi%E2%80%A6>



### aeroOS project

The UPV leads a European project for the development of a meta operating system with artificial intelligence and distributed computing

[ 11/08/2022 ]



6 noviembre 2022

Autor: Patricia Siles

La UPV lidera un proyecto UE para el desarrollo de un meta sistema operativo





## *aerOS Survey*

During the first 3 months of the project, aerOS partners conducted a survey entitled “aerOS Project – Market Analysis Survey”. The purpose of this survey was to collect feedback on all internal and external factors that may influence the aerOS project during its development and after its conclusion. All experts in edgecloud computing, IoT experts, AI experts, market analysts, Innovation Managers, CTOs, were welcomed. The survey was promoted by aerOS social media channels, website and to external mailing lists of organizations such as 5GPPP. The results were presented during the aerOS T2.1 workshop on November 29<sup>th</sup> 2022 and were also included in D2.1 “State-of-the-Art and market analysis report”.



## *Period Deliverables*

**D2.1 State-of-the-Art and market analysis report [M3]** – Document with main results of SotA review and stakeholders and market analysis comprehensive analysis.

## *Upcoming Deliverables*

**D6.1 Impact activities planning [M6]** – Plan on the specific activities of T6.1, T6.2, T6.3 and T6.4 concerning the actions of communication, dissemination, standardization, IPR, innovation and exploitation.

All public aerOS deliverables are available for downloading at aerOS website: <https://aeros-project.eu/dissemination/deliverables/>



## *aerOS Kick off Meeting*

The aerOS kick off meeting took place at the premises of Universitat Politècnica de València UPV and lasted for two days (21 & 22 September 2022)! Partners had the chance to meet each other for the first time. Partners had also the chance to discuss administrative and technical aspects of our recently started project.



**FOLLOW US!**



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



This project has received funding from Horizon Europe, the EU's key funding programme for research and innovation, under grant agreement No 101069732

Call: WORLD LEADING DATA AND COMPUTING TECHNOLOGIES 2021

Topic: HE-CL4-2021-DATA-01-05

Type of Action: RIA

Duration: 36 Months

Start Date: 1 September 2022