4th ICOS Newsletter

18.02.2025

Welcome

Welcome to the ICOS project, we are really proud of sharing with you our fourth Newsletter. In this fourth edition of the Newsletter, we focus on the 2nd Open Call of ICOS uptake projects: technology providers (SME/midcap) developing services/ products in the sectors of the ICOS PILOT use cases and the use cases proposed by the projects from the 1st Open Call.

Stay tuned to our website, https://www.icos-project.eu/, Linkedin[1] *@EU Project ICOS* and Twitter/X[2] *@icos-project* for periodic releases of the ICOS Newsletter and our blog posts throughout the life of the project, intended to disseminate key project results and achievements.

Objective of ICOS 2nd Open call

The main objective of the project ICOS is to design, develop and validate a meta operating system for a continuum, by addressing the challenges of: i) devices volatility and heterogeneity, continuum infrastructure virtualization and diverse network connectivity; ii) optimized and scalable service execution and performance, as well as resources consumptions, including power consumption; iii) guaranteed trust, security and privacy, and; iv) reduction of integration costs and effective mitigation of cloud provider lock-in effects, in a data-driven system built upon the principles of openness, adaptability, data sharing and a future edge market scenario for services and data. In order to achieve its goals ICOS project is looking for:

1. Solutions development projects (1st Open Call): consortia of 2 organizations (SME/midcap; technology provider, and an end-user to validate the developed project) to partner for the project to develop a use case within a specific sector, through ICOS technology.

2. ICOS uptake projects (2nd Open Call) : technology providers (mainly SME/midcap) working as service providers in the sectors of the ICOS pilot use cases and the projects from the 1st Open Call (submissions in 2024).

They will test their applications and services through the ICOS infrastructure to improve them. The ICOS pilot use cases play an important role in the project: they will provide functional and non-functional requirements for the ICOS System and they will be early adopters of the system providing essential feedback on how to improve it. At the same time, the adoption of ICOS will enhance the pilot cases with unique application deployment and runtime management features implemented by ICOS.

Evaluation Public Summary Report of ICOS 2nd Open Call

Call information

Project ICOS, co-funded by the European Union's Horizon Europe research and innovation programme under grant agreement No 101070177, launched its 2nd Open Call for recipients of financial support. The call closed on 30th September 2024. The call was published on project ICOS's website [3] and on the Horizon Europe Participants Portal [4] Full call details were published on the

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[1] https://www.linkedin.com/company/icos-project/
[2] https://twitter.com/icos_project

[3] https://www.icos-project.eu/second-open-call
[4] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/competitive-calls-cs/7321?order=DESC&pageNumber=1&pageSize=50&sortBy=startDate&isExactMatch=true&type=8&status=31094503&frameworkProgramme=43108390&deadlineDate=1722463200000,1730329200000

Open Call landing page: [5] The following channels were also used to promote the Open call:

Webinars

- The Open Call was presented in an online informative session on September 25 about: "Cascade Financing, the European Commission's mechanism" for the IRIS Navarra DIH with 47 attendees.

Info Sessions

Two meetings were held to support the applicants via Zoom Events, with 58 attendees, as follows:

- An online Info Day (31st July 2024, 10.00-11.00 Brussels time)

- A Q&A session (2nd September 2024, 11.00-12.00 Brussels time))

Partners Media & IoT-Edge-Cloud ecosystems

The content strategy included a comprehensive Open Call Dissemination Toolkit to facilitate the work of partners in the dissemination of the Open Call.

The Open Call was included in:

- The Cloud-Edge-IoT website. [6]

- The Opportunities page at the FundingBox OnePass Portal [7].

Newsletters

- The Open Call was promoted in the FundingBox Funding Opportunities Newsletter 3 different times, with more than 25.000 subscribers. It was also published in the EUCEI newsletter.

FundingBox Social Media Channels

- The Q&A session was uploaded to FundingBox´s YouTube Channel6 with 203 views and 29 hours of watch time.

- Several posts promoting the Info Day, online events, physical events, and the Open Call were published on LinkedIn and the community.

[5] https://icos2.fundingbox.com/
[6] https://eucloudedgeiot.eu/open-calls/
[7] https://getonepass.eu/opportunities/c/
2nd-open-call-for-icos-uptake-projects-1/

Number of ICOS proposals received and selected for financial support

The proposal evaluation and selection were completed on December 6, 2024. All candidates have been informed about the evaluation results. In particular, a total of 82 submitted proposals were received for this call:

- 80 Eligible proposals

- 69 In scope after In/Out Scope Screening

After the expert evaluation:

- 44 proposals above threshold

- 15 proposals were selected for the ICOS 2nd Support Programme

- 5 proposals are placed on the reserve list

List of selected proposals

Company Name	Country	Funding Awarded
Tovarna idej d.o.o.	Slovenia	60,000 EUR
Conclurer GmbH	Germany	60,000 EUR
Fav innovation and technologies COOP.V.	Spain	60,000 EUR
Ylisense p.c.	Greece	60,000 EUR
CISC Semiconductor GmbH	Austria	60,000 EUR
V-lab Ltd	United Kingdom	60,000 EUR
Dotsoft s.a.	Greece	60,000 EUR
VERTLINER I.K.E.	Greece	60,000 EUR
Canonical Robots SL	Spain	60,000 EUR
Plegma labs SA technologikes lyseis	Greece	60,000 EUR
Artio.tech I.K.E	Greece	60,000 EUR
Parity platform p.c.	Greece	60,000 EUR
Transmission Dynamics Poland sp. Z o. O.	Poland	60,000 EUR
Latitudo 40 S.r.l	Italy	60,000 EUR
Astrakode S.r.l.	Italy	60,000 EUR

We will now briefly introduce each of the winning projects to provide an overview on how ICOS will be validated through a variety of new use cases.

ICOS 2nd Open Call winning projects

WaterGuard360

Smart, real-time water damage detection and prevention

WaterGuard360 (WG360) is an advanced Structural Health Monitoring (SHM) solution that detects and prevents water damage in industrial halls, cellars, and other vulnerable areas. Moisture sensors, placed in high-risk areas, communicate via LoRaWAN networks, sending real-time data to a cloud platform where predictive algorithms analyze the data, providing early warnings for timely intervention.

WG360 combines IoT sensors with cloud-edge technology for continuous moisture monitoring and predictive analytics. This approach helps facility managers make data-driven decisions, reducing maintenance costs and extending the lifespan of structures.

Environmental Factor-Based Decision System for Smart Cities

Empowering smart cities to make data-driven decisions by integrating environmental analysis with AI-powered infrastructure simulations

This project aims to enable predictive scenario analysis (what-if analysis) based on real-time environmental data in the context of smart cities. The solution will empower cities to simulate and compare potential infrastructure decisions by analyzing live environmental factors such as CO_2 emissions, noise pollution, and traffic patterns. By providing AI-driven insights, cities can proactively optimize their infrastructure to improve sustainability and efficiency, allowing them to make data-driven decisions before implementing changes.

In terms of IoT interoperability, the project focuses primarily on Cloud-to-Cloud and Edge-to-Cloud interoperability. Environmental data is collected from various edge devices (sensors) and integrated into the cloud for real-time analysis and predictive modeling. We ensure seamless connectivity between edge devices and the cloud, which is essential for transmitting data and executing analytics.

SECURIFY

An occupational safety management platform to enhance situational awareness and support decision-making throughout the construction process

SECURIFY revolutionizes occupational safety in construction by integrating BIM with the ICOS edge-to-cloud continuum. Building on the MANTRA platform (sMart App to preveNT woRkers hArm), which enhances safety visualization through BIM, SECURIFY adds real-time risk management with a network of IoT sensors.

The platform utilizes a comprehensive suite of IoT devices, including cameras, thermal sensors, and detectors for noise, pollution, and gases. These sensors continuously monitor the work environment, capturing critical data on potential hazards. This information is processed at the edge using AI algorithms capable of identifying different risks. By processing data locally, SECURIFY ensures rapid detection and response, significantly reducing latency and enabling immediate alerts to be sent to workers' mobile devices.

SHARC

Structural Health Analytics for Resilient Civil Infrastructure

SHARC enhances structural health monitoring (SHM) for bridges by deploying advanced IoT solutions at the far edge, leveraging the ICOS Meta Operating System. By integrating lightweight AI for real-time anomaly detection on low-powered devices like Jetson Nano and microcontrollers, SHARC distributes processing in the IoT-edge-cloud (IEC) continuum, significantly reducing energy use, operational costs, and increasing system efficiency.

SHARC's smart data approach, reduces data transfers by processing critical data at the edge, while local communication is implemented through robust wireless communication protocols BLE, LORA, Wifi, DigiMesh etc. Additional types of sensors, such as piezoelectric and accelerometers, are introduced for precise structural monitoring, improving real-time detection of cracks and deflections. SHARC integrates weather and traffic data for comprehensive anomaly correlation, utilizing explainable AI (XAI) to provide contextual insights into detected anomalies. Data storage and handling will be based on JSON, CSV, and time-series databases.

SHARC will also demonstrate virtual sensing capabilities for flexible, real-time monitoring, using AI agents to synthesize data from multiple points, ensuring robustness and completeness even in challenging operational conditions.

This overall approach significantly contributes to the European Green Deal by reducing CO_2 emissions associated with traditional manual inspections and repairs, promoting sustainability and public safety.

VoltICOS

EdgeAI for Virtual Distributed Powerplant Optimization

A project created by CISC. CISC is an internationally oriented and highly awarded company that provides competitive and innovative products and technology for design and verification of heterogeneous networked embedded microelectronic systems. CISC delivers worldwide both products and engineering services to our customers being represented in the Semiconductor, Automotive, Wireless Communication and RFID industry. CISC was founded in 1999 and is 100% privately owned SME with currently a staff of 21 people. The headquarters office is based in Klagenfurt, Austria, since 2007 a R&D office in Graz, Austria, is in place. In 2012 CISC founded its 100% subsidiary CISC Semiconductor Corp.in Mountain View (CA), USA for sales and product support of US based customers.

CISC has a strong background in embedded systems development and RF communication technologies with a particular focus on RFID/NFC including security aspects and standardization. CISC is currently working on new IoT solutions in domains such as Smart Mobility, Smart Production and Smart Home where safety, security and especially privacy play a key role for future user acceptance. New gateway devices from CISC will pave the way for future applications where IoT devices (phones, wearables) are closely interacting with (critical) infrastructure and the environment, always connected to the cloud. This is leveraged by providing innovative payment solutions integrated in a complete IoT ecosystem, supporting wireless connectivity (BLE/NFC) and state of the art security. CISC is also deeply involved in international standardization - being active for ISO, IEC, ETSI and IEEE standardization bodies. This background gives CISC a strong position in the development of new ICT concepts for networked embedded systems.

ICOS-THERCOM

Optimising home comfort through smart grid integration and intelligent energy consumption

The ICOS-THERCOM project aims to enhance energy management within smart grids by leveraging advanced IoT interoperability. By integrating the THERCOM thermal comfort controller (thercom.net) with the ICOS meta-operating system, we offer a SaaS-based solution targeting energy service providers and utilities. This platform provides tools to optimise energy usage, reduce costs, and improve grid stability, delivered through a scalable, subscription-based model.

ICOS-THERCOM supports various levels of IoT interoperability: Device and Protocol Interoperability, Semantic Interoperability, Cloud-to-Cloud and Edge-to-Cloud Interoperability.

Device and Protocol Interoperability: Our project connects diverse IoT devices such as smart meters and sensors using standard protocols like MQTT, CoAP, and HTTP, ensuring consistent communication across different manufacturers.

Smart PPE Compliance for Occupational Safety

MELANIE sMart ppE compLiANce occupatIonal safEty

This project is created by DOTSOFT S.A. Established in 2004, is a leading IT solutions provider based in Thessaloniki, Greece, with offices in Ioannina, Heraklion, and Trikala. The company specializes in smart city platforms, IoT applications, and software development, serving municipalities, regions, and public bodies. DOTSOFT's solutions include waste management (EasyBin), urban mobility (Fleeto), citizen engagement (CityZenApp), and smart city operation centers (ppCity). With over 56 employees and a strong focus on R&D, DOTSOFT manages projects across Greece and the EU, partnering with international agencies and universities.

UAV-InspectX

AI-powered UAV solution for detailed follow-up inspections in areas where sensor systems indicate anomalies enhancing asset defect detection

UAV-InspectX complements the existing sensor system described in the ICOS first Open Call by providing detailed UAV-based follow-up inspections on particular points of the asset. When initial sensors detect potential anomalies in bridge performance, UAV-InspectX conducts targeted, high-resolution inspections of the affected areas, offering AI-powered insights into structural defects such as cracks and rust.

The dataset is fed into the ICOS platform, annotated on the digital twin of the bridge, complementing the existing sensor data and improving the system's ability to make data-driven retrofit recommendations. While the primary focus is on bridges, this approach can also be scaled to railways, tunnels, and other critical infrastructures.

Job Management Adapter

The Job Management Adapter (JMA) is a module that efficiently manages and distributes jobs on the ICOS platform, optimizing resources

JMA is a project created by Canonical Robots, an engineering firm based in Gijón, Asturias, specializing in robotics. Founded in 2017 by Ignacio Secades.

Their core business focuses on providing tailored automation solutions for clients seeking to optimize their production lines and improve efficiency. Additionally, they have a strong R&D component, continuously developing new products based on insights and needs identified during the execution of their projects. These innovations address gaps and challenges within the industrial landscape in which they operate.

fantastICOS

Flexible Ai-driven Nilm-based energy managemenT Application through domeSTIC metaOS integration

To address the need for real-time, efficient, and secure energy management in smart homes, the fantastICOS project introduces an edge residential energy analytics framework.fantastICOS facilitates real-time Non-Intrusive Load Monitoring (NILM), high-granularity energy demand and PV generation forecasting, as well as energy optimization, resulting in real-time decision-making and actuation in smart homes to improve energy efficiency.NILM models can infer individual appliance energy usage by directly analyzing the overall household consumption.

This approach can provide appliance-level insights and analytics to households without appliance-level metering infrastructure, such as energy efficiency scheduling and forecasts.fantastICOS will be offered through a Software as a Service (SaaS) business model, targeting smart home consumers and energy utilities since the proposed solution can significantly increase residential energy savings through AI-enabled real-time energy analytics. fantastICOS's generalized and scalable approach can even transform households without significant metering infrastructure into full-blown smart homes.fantastICOS tackles device, protocol, and edge-to-cloud interoperability by deploying ICOS agents in edge devices (e.g. Raspberry PIs, NVIDIA Jetson Nanos), for real-time data processing of high-granularity residential energy data.

ICOS controllers will be deployed at local edge servers (e.g. IoT gateways), as well as within cloud servers for resource-consuming tasks like AI model retraining.fantastICOS integrates IoT communication protocols like MQTT regarding time-series data in JSON format. Data transformation, encryption, and anonymization between edge devices and the cloud will be handled by the ICOS Data Management Layer.

SENSEI

Empowering Homes with AI for Smarter, Greener Energy Solutions

Sensei is an advanced, end-to-end platform developed by ARTIO, building on the foundation of the PP-BMS system, which was successfully created in prior research projects by the ARTIO team. With a strong background in energy management and IoT solutions, ARTIO leverages its expertise to deliver Sensei, an innovative solution for smart energy management in buildings, utilizing adaptive, data-driven optimization techniques.

The system is driven by model-free control and reinforcement learning, dynamically optimizing energy consumption based on real-time data from a variety of building systems. These include HVAC control, electric vehicle (EV) operations, and renewable energy system (RES) integration, allowing buildings to significantly increase self-consumption and better manage their energy resources.

Sensei is designed to ensure robust IoT interoperability, supporting a wide array of smart devices and communication protocols such as Modbus, Z-Wave, LoRa, Wi-Fi, Bluetooth, and Zigbee. It handles device, protocol, semantic, edge-to-cloud, and cloud-to-cloud interoperability, utilizing data formats like JSON and NGSI-LD to enable seamless communication and integration across diverse systems.

The platform processes data at the edge for real-time control actions, while leveraging cloud-based AI and machine learning for complex analytics and predictive insights. Sensei intelligently manages and optimizes energy consumption across various devices, from smart appliances to renewable energy generation, reducing energy costs while improving sustainability.

With a focus on increased self-consumption of renewable energy and advanced control over energy systems like HVAC and EV charging, Sensei enables smart decision-making, enhancing both efficiency and sustainability in building operations. Offered as a subscription-based SaaS model, Sensei provides scalable solutions for residential, commercial, and industrial applications, backed by ARTIO's strong research foundation.

ELM: Edge Load Management

IoT-Edge-Cloud service to rapidly modulate flexible electrical loads aimed at UC4: Energy Management and Decision Support system (EMDS)

The development team of this project has more than 5 years of experience in using IoT technologies in production for commercial applications. EV Charging station management platform EV Loader (in-house developed by Parity Platform) https://evloader.com/ manages more than 350 EV chargers that are controlled and monitored using WebSocket, HTTP and MQTT protocols. The chargers are securely connected using VPNs, firewalls and authentication mechanisms and are monitored using digital-twin methodologies.

In specific cases Raspberry PIs processors have been configured to enable local authorization of users and monitoring of electricity loads when connection to EV Loader cloud servers is lost. With ELM project Parity Platform seeks to build upon this use case and deploy an interoperable, open-source framework for electrical load management in the edge that is interoperable across different edge devices such as Nvidia Jetson and smartphones. The developer community will be able to adapt ELM's modular components to address other use cases.

trAinLedger

Improving rail safety and efficiency with high-precision train monitoring and secure, immutable blockchain-based data certification

TrAinLedger aims to enhance the precision of train localization through a proprietary Sensor Fusion algorithm, which integrates GPS data with information from additional onboard sensors, such as inertial, odometric, and Lidar systems. This innovation addresses the limitations of current ERTMS systems, particularly in environments with GPS signal degradation, such as tunnels or shadow zones, improving accuracy and operational safety.

Through Computer Vision, the system can identify specific trackside targets and refine position estimates, further increasing localization precision. These targets can be easily installed on existing infrastructure, such as poles or pylons. Additionally, the system incorporates a digital mapping feature, which, combined with the dynamic data, enhances positional accuracy and allows seamless operation across all track sections, including those not covered by centralized control.

A key feature of our solution is the integration of blockchain technology, ensuring immutability and traceability of data regarding train locations, maintenance events, and potential accidents. This guarantees the security and transparency of information, which is essential in legal scenarios and enhances the overall safety of the railway network.

Automatic detection of critical faults in railway catenary

The project develops advanced tech for automatic detection of critical railway traction failures, using on-site data processing via camera systems by Transmission Dynamics Poland.

RAILSAT

Railway Alert and Infrastructure Logging using Sat A project by Latitudo 40, RAILSAT enhances railway safety with real-time structural monitoring using satellite data and AI, providing predictive alerts e2cloud.

More information

The detailed information about the Open Call, the selected proposals and related events can be found on our website at `https://icos-project.eu/files/deliverables/D6.7_Public_Summary_Report_Second_Open_Call_v1.0.pdf`. We hope you enjoyed reading our fourth newsletter and feel free to follow us on the social media channels that we listed on the first page.