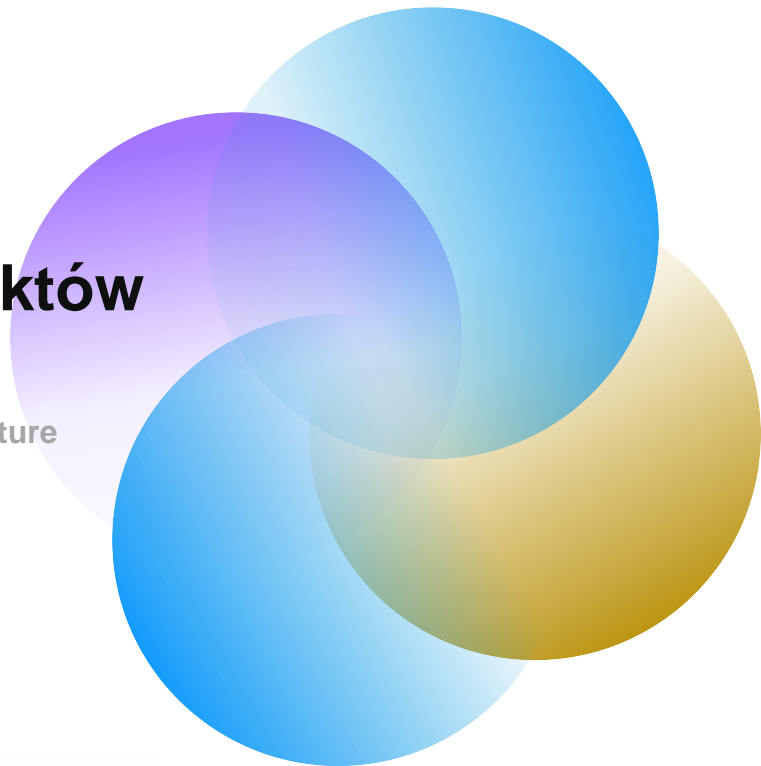


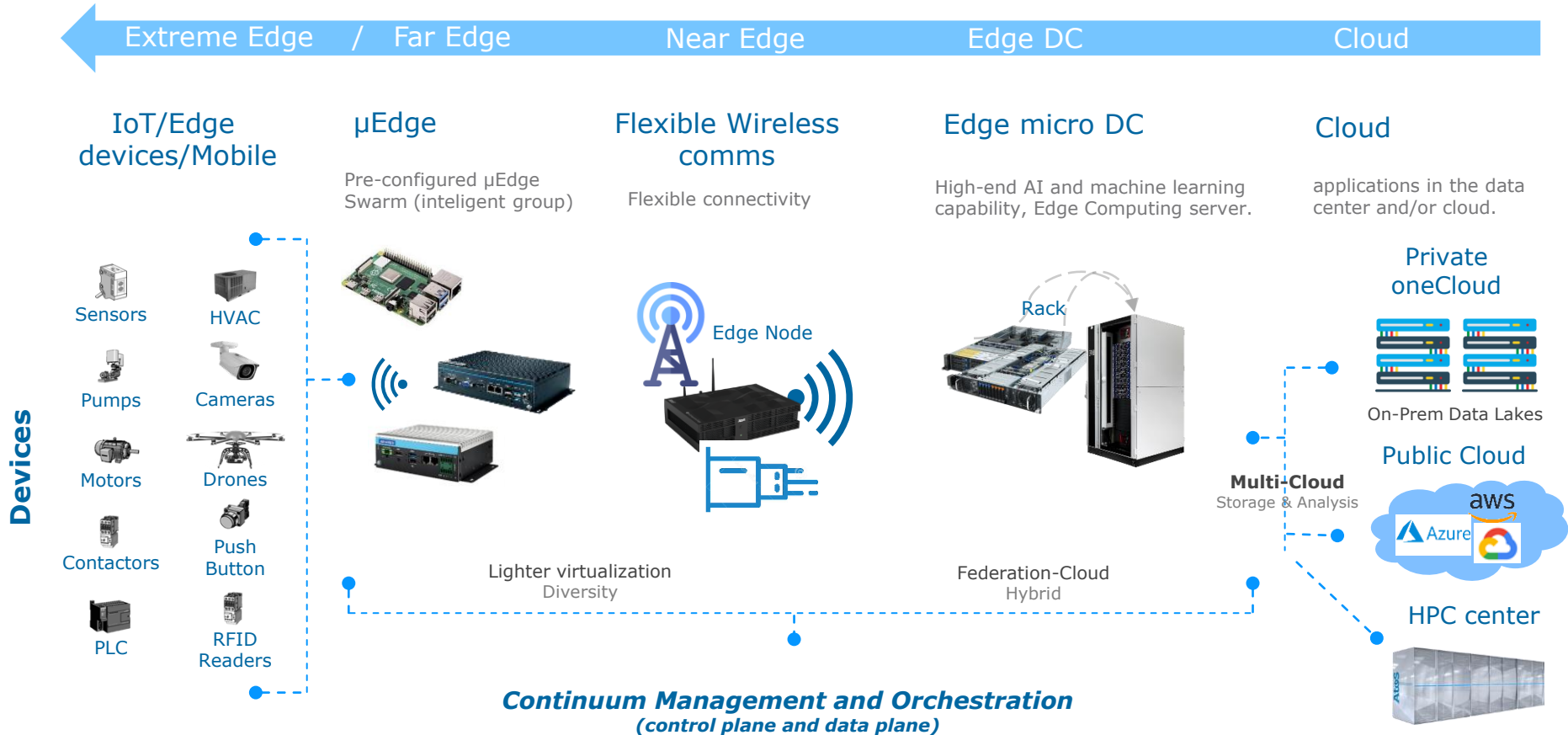
Nowe wyzwania w realizacji projektów cyfrowych w rolnictwie

New challenges in the implementation of digital projects in agriculture

Łukasz Łowinski, Iman Esfandiyar
09.02.2023



Edge ecosystem



Devices

The Extreme / Far Edge characteristics challenges

- High heterogeneity of devices.
- Uncontrolled and asynchronous environment.
- Volatile and random behaviour.
- Diversity of supporting hardware technologies.
- Massive in scale digital ecosystem.
- Small virtualisation footprint.

- ... and security, network config., slicing, ad-hoc groups, etc
- ... and battery / energy consumption.



ICOS

TOWARDS A FUNCTIONAL CONTINUUM OPERATING SYSTEM

Objective: design, develop and validate a meta operating system for a continuum

Challenges:

- Volatility and heterogeneity, virtualization and diverse connectivity;
- Optimized and scalable, resources consumptions;
- Guaranteed trust, security and privacy;
- Reduction of integration costs and effective mitigation of cloud provider lock-in effects.

Score 14/15 (treshold 10)

Duration: 1.09.2022 – 31.08.2025

Overall budget: 10 997 675 EUR



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

1. Modeling strategy for proactive continuum management
2. Decentralized AI-assisted approach
3. Dynamic and flexible data federation
4. Open and unified programming model
5. Transparent deployment on top of native OSs
6. Layered architecture managing the whole continuum (IoT to cloud)

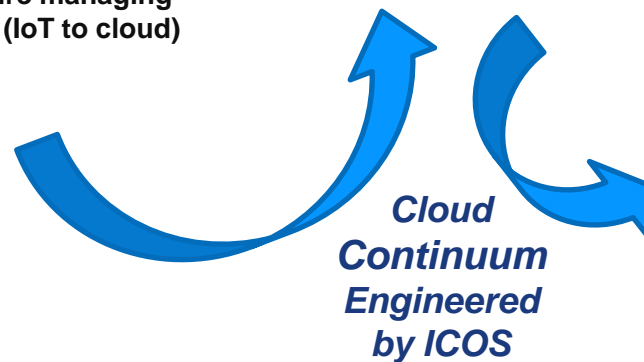
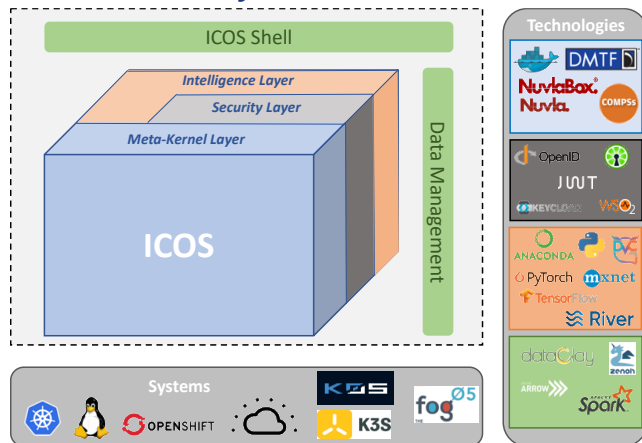
Technical Impact

Design of an innovative, beyond SOTA ICOS ecosystem, providing a secure (common standards), smart (AI-assisted), efficient (green) and integrated (modular) platform for managing applications lifecycle across the continuum

Economic Impact

Feasibility demonstrated through the ICOS micro analysis, according to UCs KPIs and open call winners' specifications

Key Innovation



EU Competitiveness

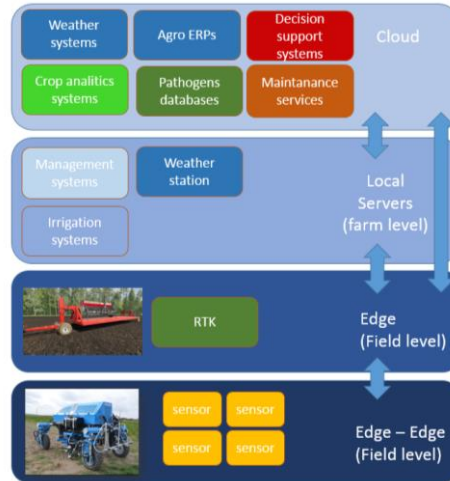
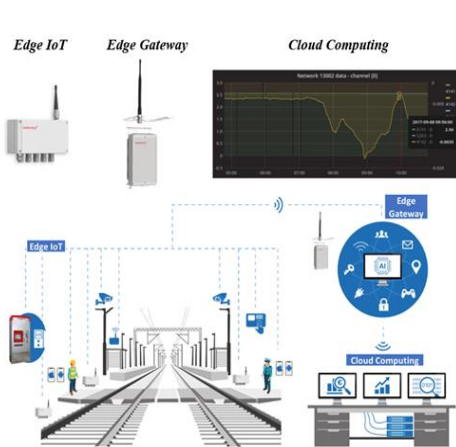
The ICOS ecosystem will contribute to the creation of a globally attractive, secure and dynamic data-agile economy, supporting the market to move beyond a simple send-data-to-the-cloud, offering new opportunities to European actors to establish market and services increasing EU's autonomy and performance in the data economy.

- 21 (18+1+2) organisation
- 11 countries
- 14 companies (some SMEs)
- 7 Univ. / Research
- 4 validation scenarios
- A new partner will be included to the consortium to replace AWS (discussion in place with the PO).



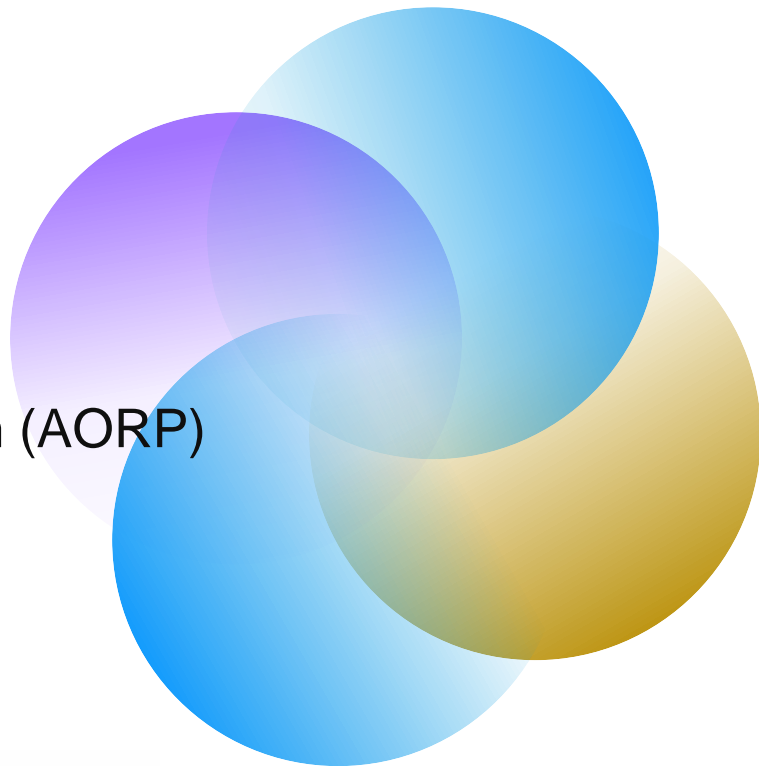
ICOS 4 VALIDATION SCENARIOS

- ✓ UC1: Agriculture Operational Robotic Platform - AORP (L-PIT, PSNC)
- ✓ UC2: Railway Structural Alert Monitoring system - RSAM (FGC, WSE)
- ✓ UC3: In-car Advanced Infotainment and Multimedia Management system - IAImm (CRF, ATOS)
- ✓ UC4: Energy Management and Decision Support system - EMDS (SSEA CEDAR)



UC1:

Agriculture Operational Robotic Platform (AORP)



Funded by
the European Union

Environment:

- Usable space of modern agriculture
- Real time communication
- field robots with various functionalities

Challenges:

- Decision-making system with the participation of distributed data/services
- Delays in access to data
- Connectivity in real conditions and continuous monitoring

Agriculture Operational Robotic Platform UC1 Idea

Robotic platform



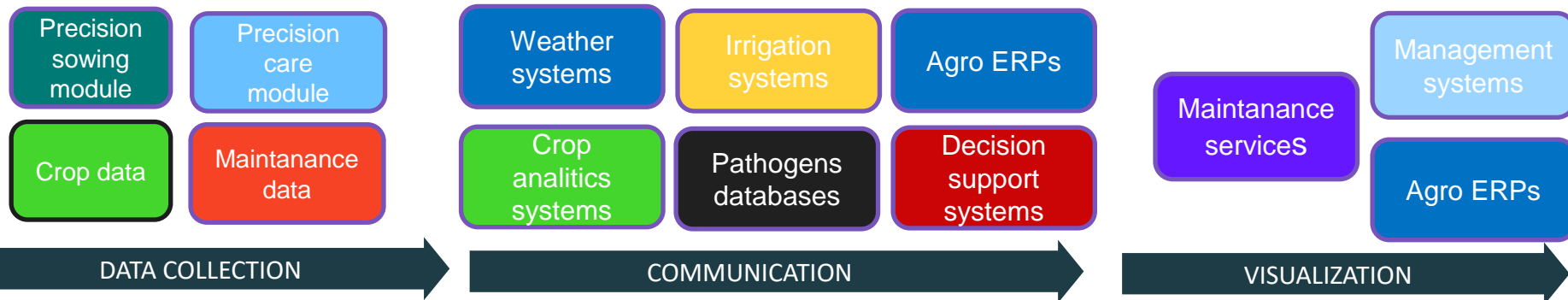
Transport Platform



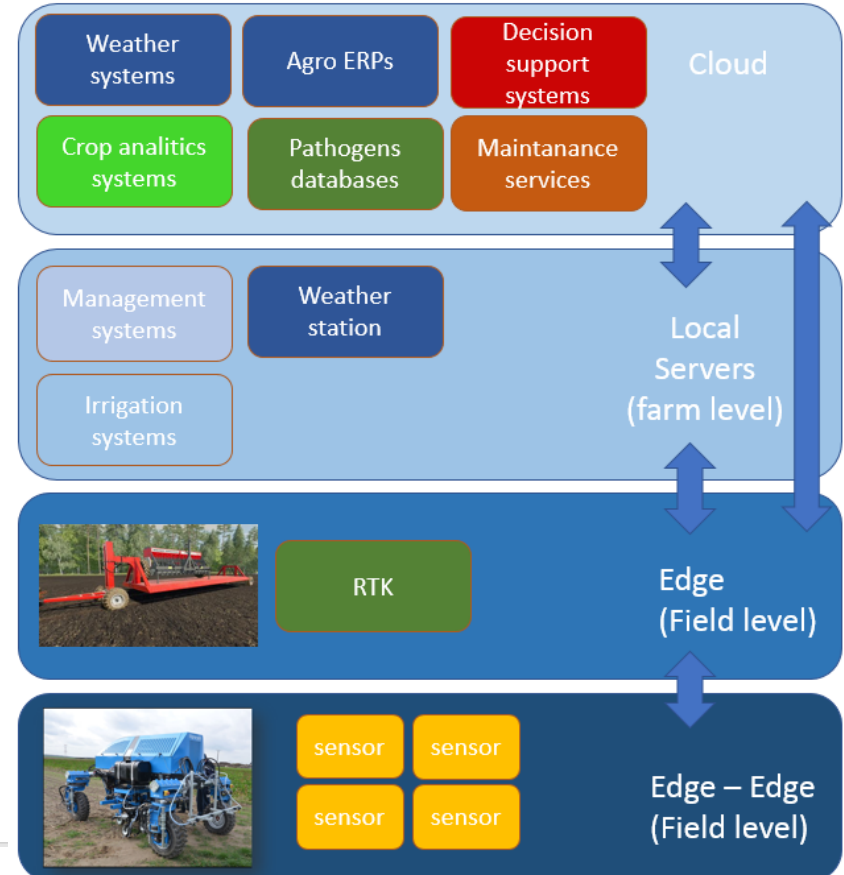
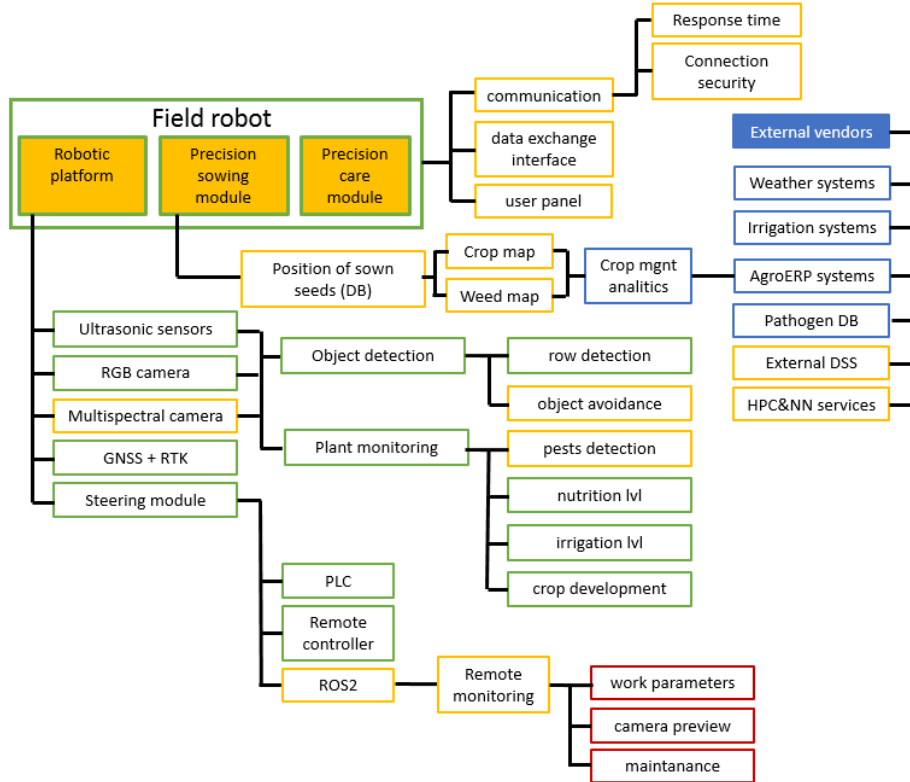
Monitoring



External systems



Agriculture Operational Robotic Platform UC1 Idea



expected solution results:



- Easy field robot maintenance & control (real-time)
- Fast data exchange robot-external data sets/services
- Safe and stable communication
- Optimal mission planning



This Use Case aims to validate the solution in real-world heterogeneous use cases, deployed in public and private application domains, enabling open remote access to third party users for experimentation, benchmarking, and testing.



Project objective	KPI	Target
Validation and mapping of germinated plants (defining statistics on the number of germinated plants and seed quality compared to producer's declaration, etc.)	Detection	90% plant detection
Effectiveness of weeds and diseases detection		60%
Reduction of the amount of liquid fertilizer used in selected plant cultivation (by predicting the need for preventive treatments for a selected crop, etc.)	Efficiency	from 400 to 170 l/ha (-57,5%)
Reduction of amount of plant protection herbicide used (task optimization with liquid herbicide and mechanical care with protection zone preservation)		from 300 to 60 l/ha (-80%)

For more information please contact:
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Marcin Plociennik - marcinp@man.poznan.pl

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**Funded by
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