

#IntelloT

How to Co-Create with IntelloT



Funded by
the European Union

IntelloT

www.intelliot.eu

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Colors UG

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Open Call & Exploitation



About IntelloT



IntelloT



Funded by
the European Union

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IntelloT

IntelloT

- **IntelloT** = Intelligent, distributed, human-centered and trustworthy IoT environments
- Project duration: 01.10.2020 - 31.01.2024 (Horizon2020, ICT 56)
- 14 Partners based in 10 countries involved
- Funding Volume of 8.9 Million Euro
- 890,000 Euro is shared in Open Calls

SIEMENS
Ingenuity for life

EURECOM
SUPERIOR ANTICIPATION

AALBORG UNIVERSITET

UNIVERSITY OF GULB

TTControl
HYDAC INTERNATIONAL

TSI

PHILIPS

Sphynx Analytics

Universität St.Gallen

HOLO-LIGHT

AVL

Startup Colors

UNIVERSITÄT SPAZIO

Main Tech Challenge

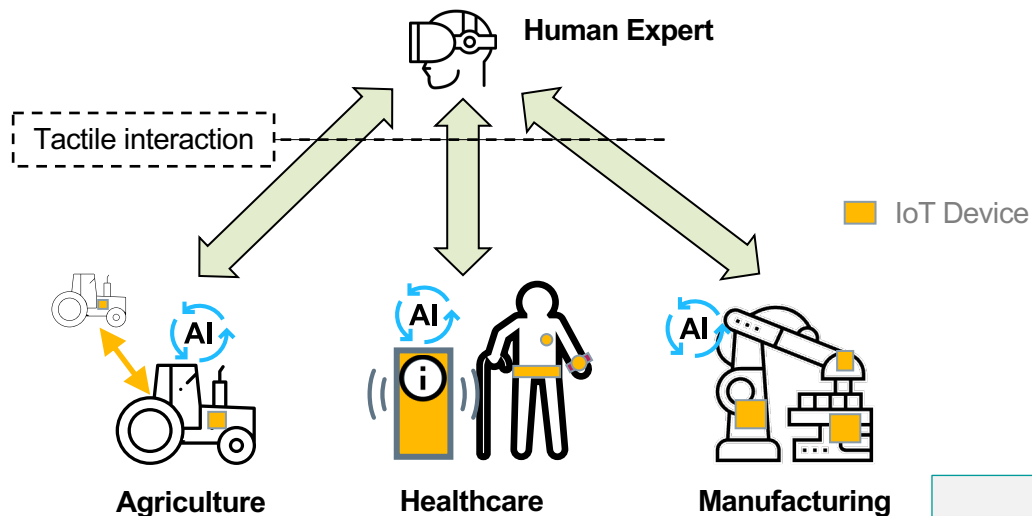
Today, **IoT cloud platforms** are central points of data collection and processing.

This **cloud-centric IoT** model however **has limitations**:

- **unreliable cloud connectivity** impedes dependable end-to-end applications,
- **limited bandwidth** restricts the amount of data that can be processed,
- **high round-trip times** prevent real-time operation,
- **high cost of data transport and intake**, and
- **privacy and trust concerns**.
- **lacking self-awareness of individual subsystems** hinder use cases with dynamically changing context due.



Main Technical Challenge



Enable **collaborative IoT** environments to execute **de-centralised AI**-driven applications interacting with the **human-in-the-loop**.

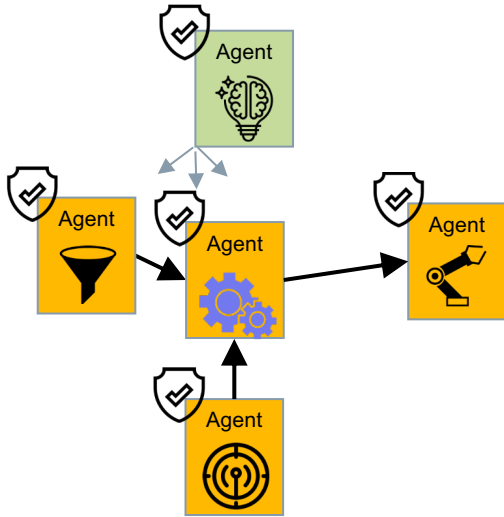
The IntelloT Framework

An architectural framework to enable IoT environments for **semi-autonomous applications** endowed with **intelligence**, built-in **security and trust**, and evolving with the **human-in-the-loop**.



The IntelloT Concept

Collaborative IoT Applications



- Multi-Agent System
- W3C Web of Things

Deployment

Expertise

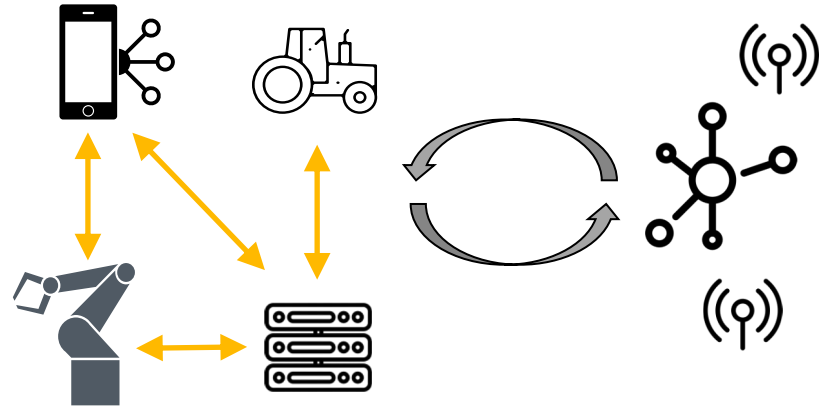
Trust

Human-in-the-Loop



- AR/VR/MR
- AI re-training

Computation & Communication Infrastructure

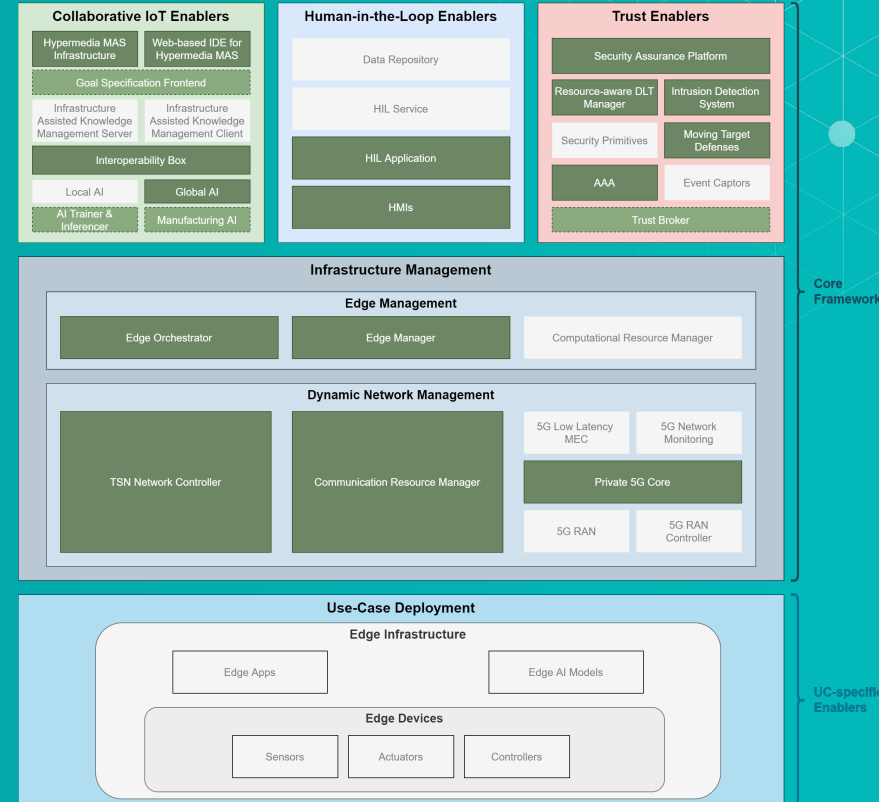


- Edge Computing
- Distributed AI
- Distributed Ledger

- 5G
- TSN

Framework Architecture

- 30 Components available
- Based on **localised** IoT environments comprised of **heterogeneous** devices (e.g., edge computers as well as resource-constrained devices) that can **collaboratively** execute highly automated IoT applications – which include functions for sensing, actuating, reasoning, and control.

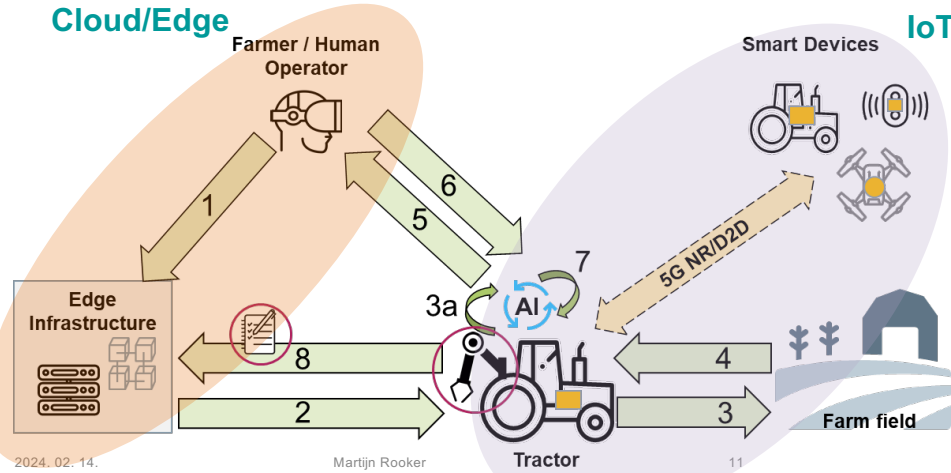


Example UC Agriculture



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Scenarios and Key Scenes



2024.02.14.

Martijn Rooker

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1. Define goal
2. Functionality deployment
3. Environment perception
- 3a. Autonomous operation
4. Unknown situation

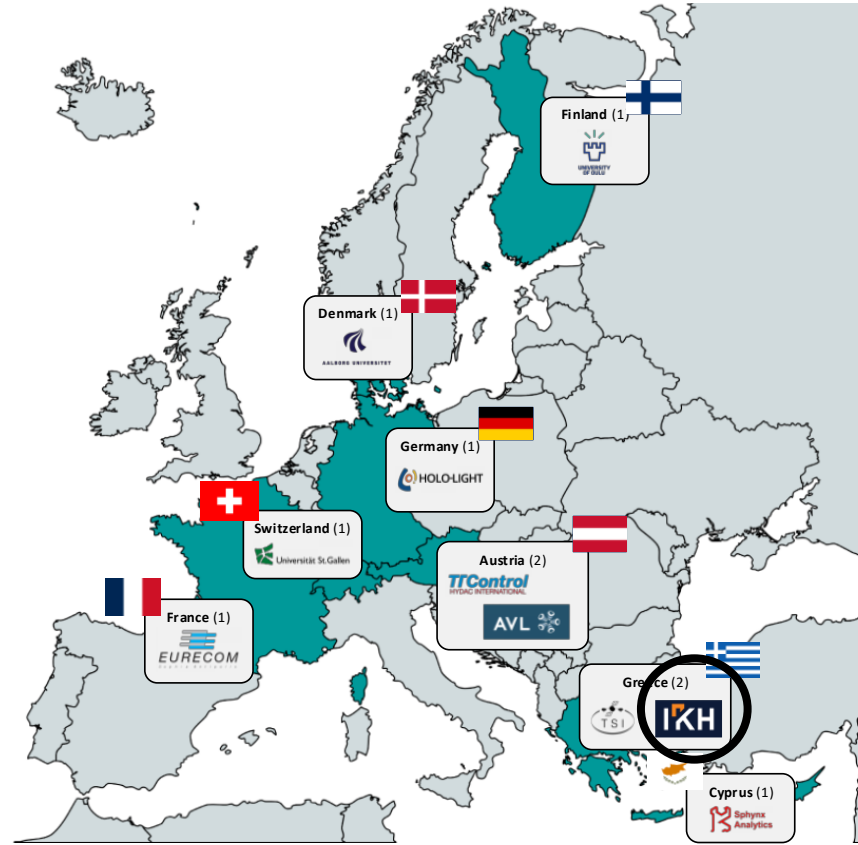


5. Request take over
6. Remote control of vehicle / manipulator
7. Update AI model
8. DLT/Logbook access

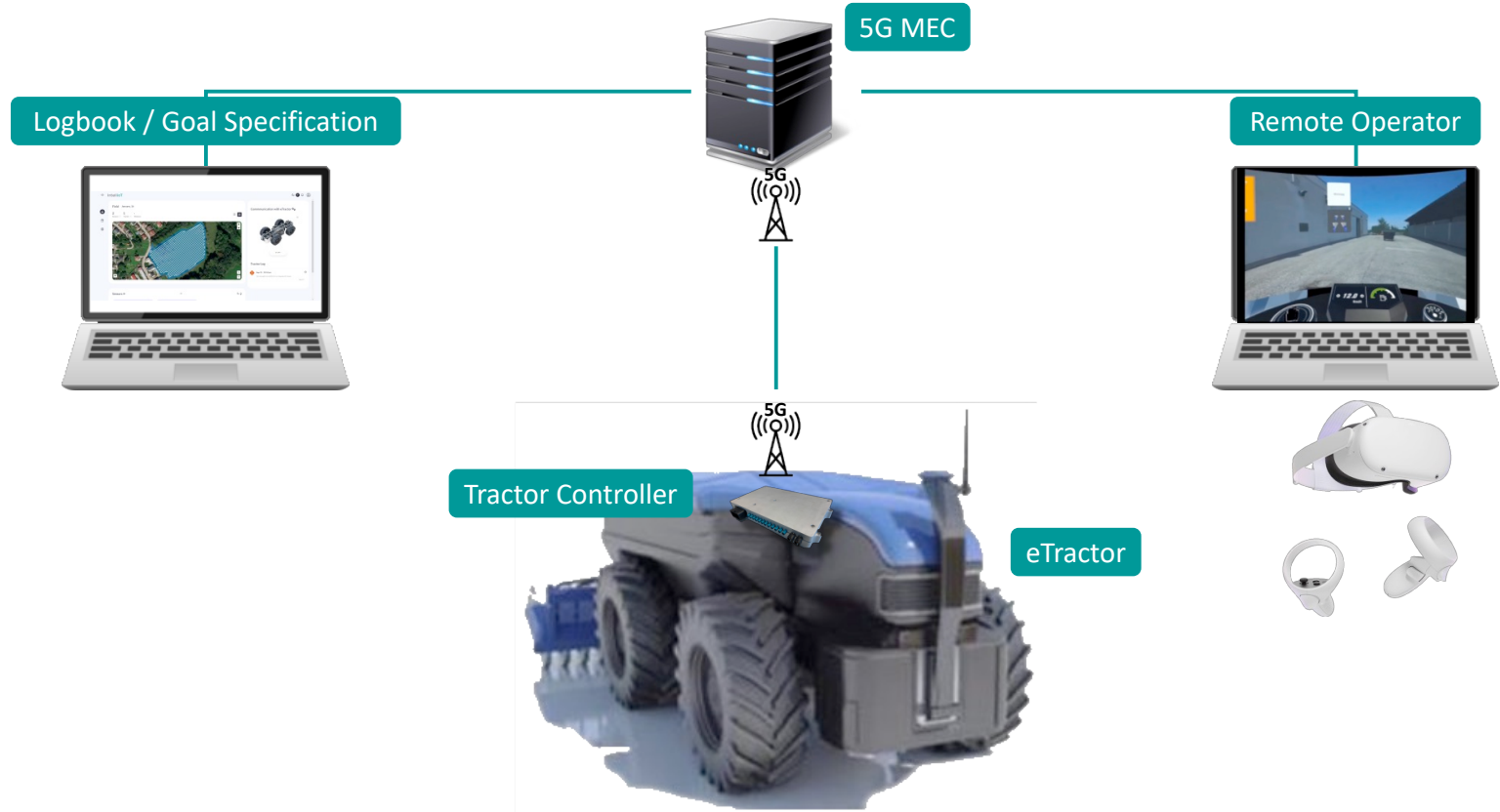
- Farmer defines the goal
- HyperMAS identifies available resources
- Tractor performs assigned activities
- AI is used to overcome unknown situations
- Tractor interacts w other entities in the field
- Human is brought into the loop, where AI is not confident enough
- Human operates tractor remotely
- AI learns from interaction for future situations
- 5G ensures communication with guaranteed QoS for vehicles and humans

Use Case Partners / Contributions

- Semi-autonomous eTractor
- Edge computing
- 5G communication infrastructure
- DLT
- Agent-based control system
- Virtual Reality based remote operation
- Obstacle bypassing AI
- Trustworthiness



Use Case Architecture



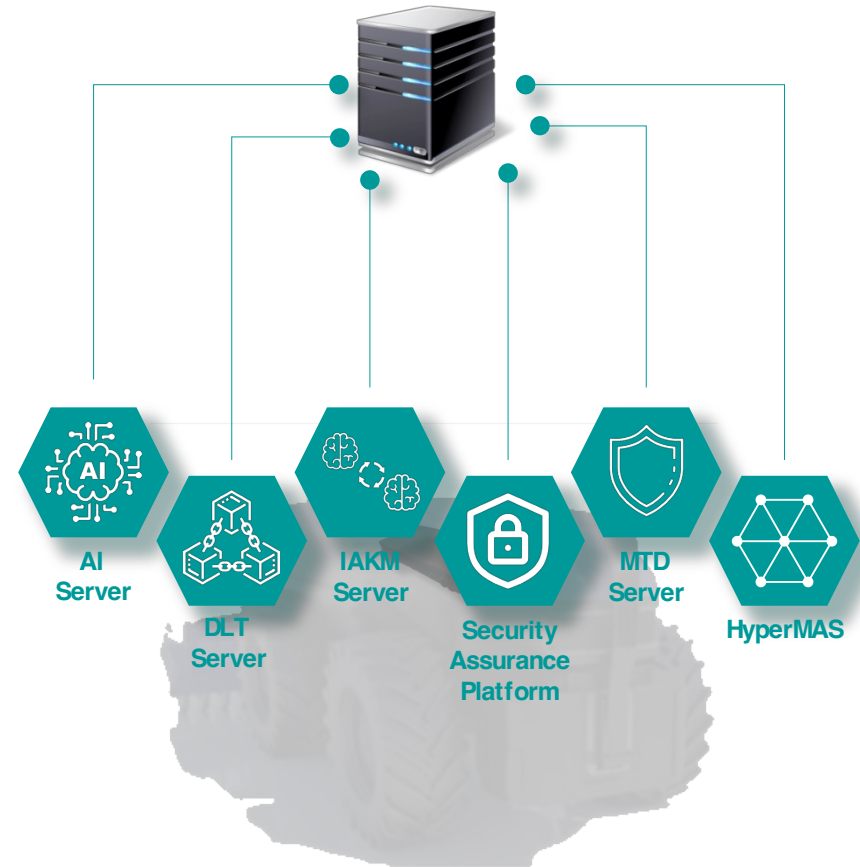
Applications on Tractor

- Local AI Model
- Human operator
- Capability to exchange models between entities
- Trustworthiness / Detection of intrusion
- 5G communication capabilities

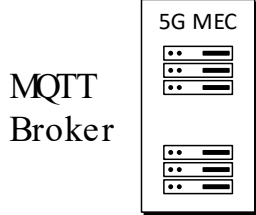


Applications on 5G MEC

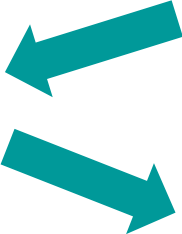
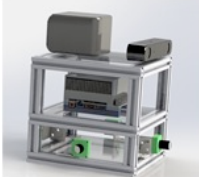
- AI Server
- DLT Server
- Security Server
- Agent environment for controlling different entities
- 5G communication base



Remote Operation Architecture



HIL Service



HIL Application

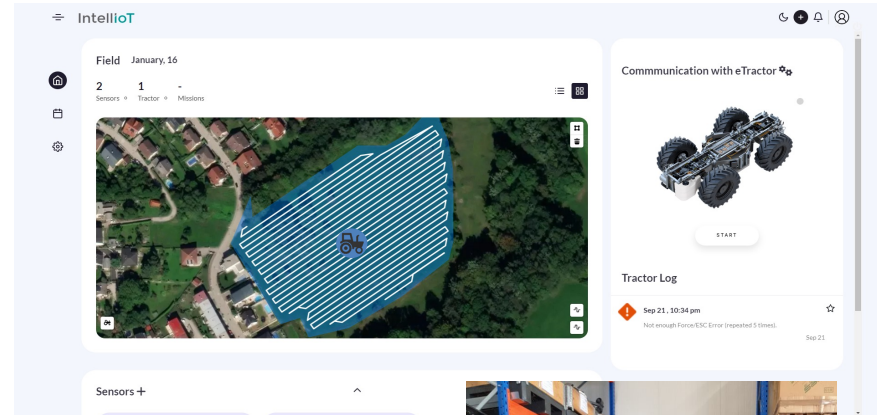


ISAR SDK



Open Call 1 Contribution

- IKnowHow S.A. (Greece)
- Contributions to UC1
 - Remote operation of actuator using VR
 - Logbook using DLT
 - Scalability of concepts
- Inclusion of mobile robot into HyperMAS
- Logbook for defining missions and real-time collection of tractor data
- Integration of 5G data with mobile platform



Co-Creation: Open Calls



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2 Open Calls in 2022 & 2023

Open Call 1

- 100,000 – 150,000 Euro Grant Funding for 6 Months pilot projects to co-develop the framework in IntelloTs 3 core Domains
- 4 selected SMEs

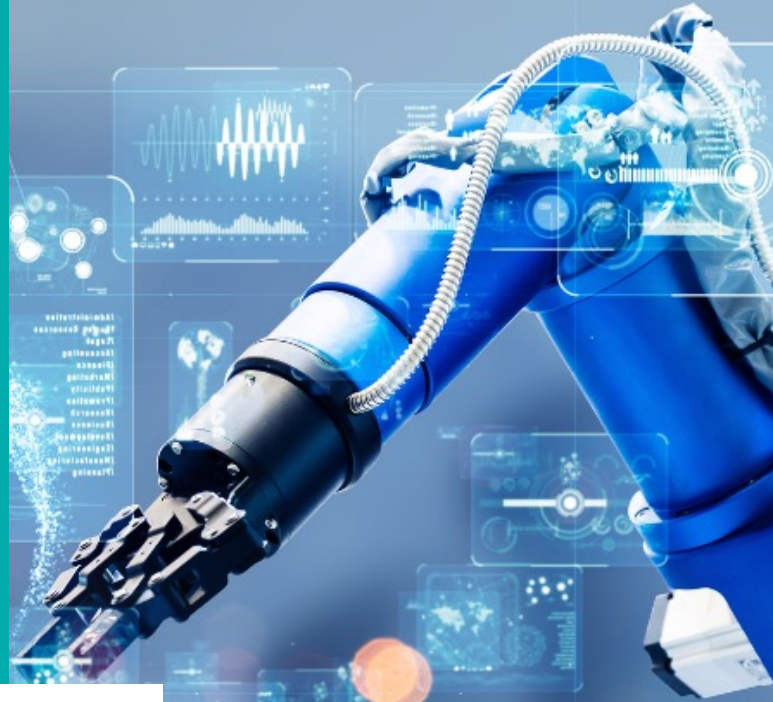
Open Call 2

- 60,000 Euro Grant Funding for 6 Months Pilot to apply the framework in 3 new domains: Energy, Smart City & Construction
- 6 selected SMEs



Open Call 3 = Hackathon

- 4 Micro-SME
- 28,000 Euro
- 1-Months Pilot Programme



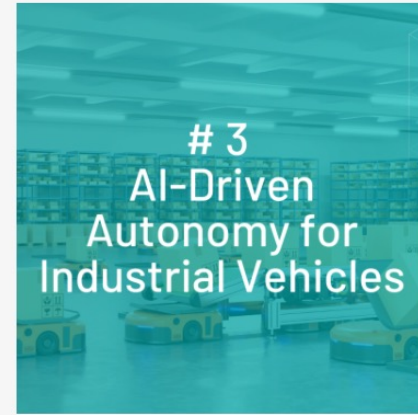
Co-Creation Examples



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Open Call 3: Challenges

- Open specifically for Micro-SME
- Co-Creation via Hackathon and short pilot project
- Goal: Enrichment of existing technologies





ARSOFT



allbesmart



PUMACY
TECHNOLOGIES

Open Call 2: six Winners from six Countries



DOTSOFT
TECHNOLOGY + PROJECTS + SOLUTIONS



WASTELOCKER



lifely

Open Call 2: Dotsoft

By predicting parking availability and guiding drivers to available spots, our INTEL ANN system improves mobility for residents and visitors. This enhances the overall livability of the city. Our system is an example of how IoT devices and systems can be designed to work together seamlessly and can contribute to the development of more human-centric, trustworthy, and standardized smart cities. INTEL ANN is applied in Kalamaria, Thessaloniki.

Anastasios Manos
CEO Dotsoft



Open Call 2: Arsoft

ARSOFT is an expert on extended reality /AR technologies. Within the pilot project Arsoft integrated selected IntelloT components into the ARSOFT platform to facilitate the integration with other IoT systems. The use case to be worked on consists of a sensorised hydraulic plant in an offshore station. Thanks to an easy integration of the companies' IoT platforms with EyeFlow, the station provider is able to monitor the machine with virtual reality and augmented reality technologies.

Santiago González Izard

CEO & CTO ARSOFT



Open Call 2: Wastlocker

The IntelloT components will provide WasteLocker with future-proof security and trustworthiness. The components in combination with all the industry standard best practices that WasteLocker already employs, will give its customers the certainty that their data is guarded to the level of one of the highest possible standards."

Mark Skljarov & Kristjan Variksoo

CEO & CTO Wastelocker



Impact Creation & Exploitation



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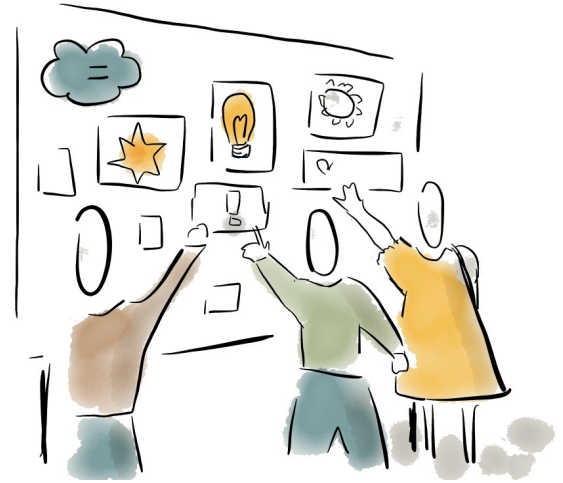
Agriculture – Impact Generation

Key Challenges from End User and Domain Experts

- Adoption of technology by farmer, integration/compatibility with existing technologies, training
- Cost of technology in low-margin business – ROI, high cost
- Getting autonomous machines to the field
- User-friendliness of solutions and easy digestible data insights

Areas of Business Model Innovation

- Autonomy as a Service Model
- Licence Model for specific operation types/services
- Offer "basic" autonomy for free to support adoption, payment for advanced features
- policy based incentives e.g. environmental, sustainable usage of water, chemicals



IntelloT - Created Impact

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Exploitable Results



Framework



Agriculture

3

Exploitation Workshops



Manufacturing



Healthcare

4

End-User Workshops

Assets per Framework Component



Collaborative IoT

10



Human-In-The-Loop

4



Trustworthiness

3



Infrastructure
Management

8

Assets per Exploitation Type



Commercialization

9



Research Project

4



Industrial Deploy

6



Education

3



Contract Research

3

Q & A



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