AMBITIOUS
Digital solutions for the 5G era

ERDF Interregional Innovation Investments Instrument (I3)

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Boosting Digitalization Across European Regions

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Infocom World
14th December 2023

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ERDF Interregional Innovation Investments Instrument (I3)

Call:	**I3-2021-INV1**
Type of action:	**I3-PJG**
Proposal number:	**101115116**
Proposal acronym:	**AMBITIOUS**
Duration (months):	**36**
Title:	***Advanced CoMputing Continuum Solutions for Boosting DigITalization across European RegionS***
Activity:	**I3-2021-INV1**

AMBITIOUS' main goal:

Provision of a fundamental technological infrastructure, which will offer:

- ***advanced data aggregation and clean-up,***
- ***analytics,***
- ***AI-enabled forecasting and***
- ***secure information exchange mechanisms,***

via a transparent computing continuum infrastructure,

to be integrated with existing, mature services (of at least TRL6) of the relevant stakeholders (SMEs),

- ***unleashing for them yet unforeseen functionalities and***
- ***opening up new pathways of commercial exploitation.***

- **The envisaged fundamental infrastructure will be provided via the deployment of technological pillars, *which will interact with existing services* *towards supporting the envisioned functionalities.***

- **The purpose of a "pillar" is to provide the same generic functionalities to diverse services (demonstrated by a diverse set of specific use-cases) as a concrete processing chain, *aiming at avoiding unnecessary redundancy of resources and budget.***

- **New participants (third parties) can easily join *via the open calls the project will organize.***

AMBITIOUS' background and views:

- ***AMBITIOUS project aims to "address" a number of the challenges that are important to European companies to be competitive on the world market.***

- ***By advancing their expertise in areas such as data analytics, AI, 5G, computing continuum and IoT, the European SMEs can "address" challenges both within Europe but also grow and become more competitive in the global market sector.***

AMBITIOUS is focused on:

- **safety** (surveillance & monitoring)
- **smart water management**
- **precise agriculture** and
- **innovative digital health** and **well-being services**,

while, simultaneously, it aims at improving competence and attractiveness in European SMEs.

AMBITIOUS' background and views (cont'd):

The core of the project is focused on scaling-up

- **digital innovations** ***(currently at minimum TRL 6),***
- **demonstrators of state-of-the-art technologies** ***such as data analytics, AI-enabled prediction mechanisms, 5G, computing continuum and IoT sensing capabilities,***
- **plus contributions to the overall of the digital value chain,**

by supporting collaboration between different EU member states, SMEs and the academia and, in particular, via facilitating market uptake and scaling-up of innovative R&D results.

At the core of the AMBITIOUS project are activities and tasks to stimulate:

- **inter-region collaboration,**
- **technology transfer, and**
- **development of novel digital solutions.**

AMBITIOUS' background and views (cont'd):

AMBITIOUS involves 4 different countries & several regions across Europe.

AMBITIOUS will:

- **create links between public authorities (regions, authorities), industry stakeholders (SMEs, larger enterprises), academic institutions and citizens, and;**
- **promote both the interregional exchange of technological know-how and the deployment of novel business models, not only for the participating SMEs, but also for third-party SMEs that will be attracted by related calls and project's success stories.**

By providing several test beds in Sweden, Finland, Italy and Greece, *the participating SMEs will have first class access to multiple sites to:*

- **perform early technology tests and, *most importantly,***
- **complete trials of digital products/services they intend to offer in the market.**

AMBITIOUS' background and views (cont'd):

To "meet" the requirements of the respective European call,
AMBITIOUS is divided in two essential technological pillars, *providing a virtual backbend of raw data aggregation, management and analytics, generic AI-enabled forecasting mechanisms, and data communication and exchange platforms,*

all residing at a transparent computing-continuum infrastructure (that blends Cloud, Edge and IoT resources).

All these fundamental technologies will be exploited by properly designed use-cases, *which will integrate their own specialized mature services with advanced data analytics, prediction, and secure communication capabilities.*

These use-cases will be evaluated "in-situ" at appropriate regional / inter-regional demonstration sites *that will act as our "success stories" and which will attract new stakeholders (SMEs) willing to exploit the proposed machinery for the sake of their own services and business plans.*

AMBITIOUS' aims (collective view):

- Advanced data aggregation/clean-up
- analytics
- AI-enabled forecasting
- Secure information exchange

Technological Pillar:
Provision of the same generic functionalities to diverse services

Transparent computing continuum infrastructure

- **AIDA Pillar:** *AI-enabled Data analytics and forecasting*
- **AGORA pillar:** *Cooperation and Data Security in Health & Wellbeing*

- ***Several Use-cases to demonstrate the added-value***
- ***Easy involvement of 3rd parties***

AIDA pillar: AI-enabled Data analytics & forecAsting

Rationale:	• Real-time monitoring & surveillance application • Gather measurements, clean-up noise, visualize analytics • Allow human to make decisions to improve utilization
AIDA role:	• Computing-continuum technologies (resources & functionalities) • Sophisticated data analytics engine • AI-enabled event forecasting module (part of Decision Support System - DSS)
Scenarios:	1. "Social capital" (pre-trained data) @ cloud, disseminated to several edge devices, providing advanced classification or forecasting tasks 2. AI-enabled forecasting services @ cloud which will feed all interested applications with real-time streams of predictions and emergency alerts

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AIDA.UC1: Surveillance/Monitoring of controlled areas

Aim:

- **Integrate a mature IoT platform (SAMMY) with an AI Platform towards AI-enabled forecasting prediction system, for marina surveillance and emergent incidents in real-time.**
- **Extend current services of SAMMY's platform towards semantically enriched information.**

Solutions:

1. **Detection: On-demand image data annotation for enabling accurate object detection.**
2. **Open area surveillance: UAV video streaming transferrable from edge** (on-site edge computing methods improve data processing efficiency) **to cloud** (operation can be visualised and events of interests will be identified).
3. **Berth Allocation Optimization: AI-enabled berth usage prediction model** trained/configured to enable prediction of future requests.

Demo Sites:

- **Patras Mega Yacht Marina:**
  (i) Identification of a boat yacht when entering the Marina & navigational assistance;
  (ii) identification of a pre-occupied berth space;
  (iii) prediction of berth allocation.
- **Egaleo Public Park:** engage a video and photo streaming service provided by UAVs to oversee the park in case of emergence.

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AIDA.UC2: Smart Water Management

Aim:

- **Novel AI operators** for advance analytics: **Descriptive/Diagnostic/Predictive/Prescriptive** analytics.
- **Extend existing PIKEI's solution and implement intelligent management tools** for water supply and distribution networks.

Solutions:

1. **Leakage detection: Detect abnormalities that indicate the presence of water leakage and estimate the location of the leakage.**
2. **Prediction of water and energy needs: Trained to predict the needs for water and energy on a short/mid/long-term period.**
3. **Prediction of potential urban flood: Trained to predict urban floods based on local precipitation and storm water wells' water level.**

Demo Sites:

- **Patras Mega Yacht Marina (GR): Integration to SAMMY platform PIKEI's extended services** to collect water/energy usage statistics and monitor for potential abnormalities.
- **Egaleo Public Park (GR): Monitor the energy consumption of the water pumps** located in Baroutadiko Grove.
- **Savonia UAS Kuopio (FI): Develop an open & interoperable ecosystem** for intelligent water management.

AIDA.UC3: Precision Agriculture

Aim:

- **Boost precision agriculture** towards increased yields and efficiency.
- **Utilize smart devices and sensors in existing PIKEI's platform.**
- **Extend PIKEI's platform** with a sophisticated data analytics engine and an AI-enabled prediction module.

Solutions:

1. **Plant disease detection**: **Use captured images by UAVs** to perform image processing & classification and detect the most common plant diseases.
2. **Crop irrigation optimization**: **Predict water needs** using historical data and current environment conditions.

Demo Sites:

- **Farms in Western Greece**: **Install array of IoT sensors, actuators and cameras for collecting and processing/ analysing data** from monitoring of farming conditions and **for predicting various parameters and required interventions** to enhance precision agriculture.

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AIDA.UC4: Intelligent Living as-a-Service

Aim:

- **Assess the ambient living conditions of the end-users** with respect to a predefined comfort zone.
- **Perform a primary screening of the end-user's health stat**us, without compromising data security and privacy.
- **Extend PIKEI's platform** (collects and stores anonymized data) with a data analytics engine and an AI-enabled prediction module.

Solutions:

1. **Heart malfunction detector**: ECG (Electrocardiogram) signal collected by the edge unit, which performs all the required tasks for a primary screening of heart activity.
2. **Fall detection**: Fall detection algorithms implemented and executed on edge devices based on acceleration data collected from wearables.

Demo Sites:

Install array of IoT devices to collect vital data regarding the living conditions of the space and pinpoint the improvements that need to follow:

- **Elderly Care in Western Greece**: Group of vulnerable people (elderly, disabled) that receive home care by partner FZ.
- **Elderly Care Units in the Municipality of Egaleo**: Residents of the Municipality's Elderly Care Facilities/ Units run by the Social Service Department.

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AIDA.UC5: Innovative Digital Technologies for Real-Time Monitoring

Aim:

- **Holistic solution for supporting real-time data acquisition of high-bandwidth streams** such as logistics, cameras, vibrations and acoustic, and creating of Digital Twins.
- **Integrate real-time data streams with an IoT Cloud solution** for large-scale data processing.
- **Define and implement distributed functionalities** for task allocation and placement at the edge-cloud continuum.

Solutions:

1. **Solutions capable of data handling, device management, security and visualization**
2. **Multitude of communication technologies** (5G, Wi-Fi, Ethernet, UWB, BLE, and Mesh)

Demo Sites:

- **LTU Testbed (SE)**: 5G test bed at LTU.
- **Patras Mega Yacht Marina (GR)**: edge computing testbed for testing interoperability and compliance.

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Questions?

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This Project has received funding from the European Union´s Horizon 2020 research and innovation programme under Grant Agreement No.101115116