

BSR Open AgRicultural Data Infrastructure Next Generation (BOARDING)

Interreg Baltic Sea Region Programme, call topic "Research and Innovation infrastructures"

Summary

Project BOARDING aims to build a network of existing and planned smart farming research infrastructures in the Baltic Sea Region to enhance digitalization in agriculture, especially adoption of smart farming practices, and global competitiveness of agrotechnology and ICT industry in the region. Smart farming is about utilising ICT, automation, robotics, positioning techniques, etc. to improve process efficiency and user and environment friendliness in farming and used technologies. The BOARDING network will establish a fluent data exchange between the infrastructures, enabling agricultural innovators, especially research and SMEs, to access efficiently agricultural data originating from diverse environments. It will also provide connection points for new products and prototypes to join and connect to physical agricultural infrastructures to test their quality, compatibility and interoperability. The network will enhance easy and cost-efficient localization and adaptation of innovations to new market areas in the region, notably to SMEs. The BOARDING network also provides individual infrastructures with facilities to educate the end-users about innovations and their functionalities and benefits.

Objectives and approach

The basic idea of the project is to establish a network of research infrastructures to support smart farming innovations and their market uptake.

The aimed network enables:

- Fluent (real-time) data sharing
- Offering of a diversity of authentic environments, specific testbeds and laboratories
- Awareness among stakeholders; ICT and AgEng companies, farmers, advisors, sales personnel and research
- Promotion of business related to Smart Farming

Infrastructures are all different both from their purpose/focus and from their technical solutions point of views. The idea is to utilize the concept of Industrial internet (or Industry 4.0) to achieve our aims and at the same time interpret the concept to agriculture – to form a common view and comprehension together with stakeholders. The project applies existing standards and gives input to the further development of them. The project utilizes semantic technologies in implementing data exchange, and defines a network specific ontology to realize efficient data flows.

The key efforts are to establish data flows between the infrastructures and to provide innovators with local interfaces to different research infrastructures and the BOARDING network to develop, test and demonstrate their products in real environments.

Specific technological objectives of BOARDING are:

- Common Service Bus to connect infrastructures and their databases
- Common agreement of interfaces, how a customer's products can join a specific infrastructure and the network => Interpreting the concept of *Industrial Internet* to agriculture.
- Common ontology
- Common user interface
- Common technology concept on visualizing and demonstrating the functionalities and benefits of the smart farming innovations to the audience (locally and via internet)

Aimed demonstrations of BOARDING are:

- Field demonstrations (research, testing and education)
- Open Hackathon event for start-ups where data from the BOARDING network will be utilized

Benefits of BOARDING network

- Infrastructure owner's point of view:

- Existing and emerging research infrastructures are in efficient use among innovators of Precision Agriculture and Smart Farming through the established research infrastructure network.
- The network provides its users an easy access to a diversity of physical innovation environments and data.

- Innovators' point of view:

- Innovators have large, diverse, reliable and neutral testing and promoting facilities easily available
- Shorter time-to-market for new innovations in different market areas in BSR through common testing and promoting network
- Time- and cost-efficient testing and promoting of new innovations in several test sites through agreed common data communication interfaces between new product and local research infrastructure
- Common dashboard platform for each research infrastructure aimed at easily visualize testing and demonstrations to end-users and wider audience
- End-users have increased up-to-date knowledge about new innovations, their functionalities and benefits in BSR, which fastens the adoption of new innovations to practise.
- More new and enhanced applications in the market

- Socio-economical point of view:

- Increased adoption of Precision farming and Smart Farming technologies among farmers in BSR, which provide the conditions and quantitative input to smart and sustainable intensification of agriculture in the region
- BSR is on the pathway towards an important smart farming locus
- The created research infrastructure network concept is applicable to other research infrastructures in the emerging bioeconomy, however, requiring expanding the ontology respectively.

Partnership of the project

The core of the consortium is formed by research institutes a) owning research agricultural infrastructures (domain) and b) having expertise in ICT and automation. To establish a neutral and reliable innovation environment to all stakeholders, the partnership is formed only by research institutes. Representatives of e.g. larger research networks, SMEs associations, policy makers and other stakeholders will participate as associated organisations, having roles in giving input and gaining awareness in all phases (WPs) of the project.

Partners and their expert roles in the project are:

Research institutes:

Partner 1. Luke - Natural Resources Institute Finland (FI)

- Contact:* Liisa Pesonen
- Owned research infrastructures to be possibly joined to the BOARDING network:* Research farm infrastructures Cropinfra (arable farming), **CowLab (dairy farm)**, Greenhouse
- Expertise:* GIS, databases, data exchange, automation, Precision Agriculture (PA), Precision Livestock Farming (PLF) and smart machinery

Partner 2. AU - Aarhus University (DK)

- Contact:* Claus Sørensen
- Owned research infrastructures:* Precision and Smart Farming facility (**dairy farm**)
- Expertise:* ICT, PA, PLF and smart machinery

Partner 3. JTI - Swedish Institute of Agricultural and Environmental Engineering (SE)

- Contact:* Anna Rydberg
- Owned research infrastructures:* Mobile biogas testbed, Climate chamber
- Expertise:* PA, PLF, sensor technology

Partner 4. ATB - Leibniz Institute for Agricultural Engineering Potsdam-Bornim (DE)

- Contact:* Christiane von Haselberg and Volker Dworak
- Owned research infrastructures:* Technology Garden, **Dairy barn**
- Expertise:* PA, PLF expert, sensor technology

Partner 5. RTU - Riga Technical University (LV)

- Contact:* Agris Nikitenko
- Owned research infrastructures:* a branch of the BalticGrid/Baltic Cloud

c. Expertise: web and cloud technology expert, autonomous robotics, device and sensors interfaces, ontology based technologies

Partner 6. LUA – Latvia University of Agriculture (LV)

a. Contact: Aleksejs Zacepins

b. Owned research infrastructures: Bee behavior sensor infrastructure and data collection facilities

c. Expertise: sensor technology, ICT, bee keeping

Partner 7. PULS - Poznan University of Life Sciences (PL)

a. Contact: Janina Rudowicz-Nawrocka

b. Owned research infrastructures: planned Precision Farming Laboratory, mobile training laboratory

c. Expertise: ontologies, sensor technology

Partner 8. TUT – Tallinn University of Technology (ES)

a. Contact: Raivo Sell

b. Owned research infrastructures: open

c. Expertise: Internet of Things, "virtual laboratory" technologies

Partner 9. VGTU - Vilnius Gediminas technical university (LT)

a. Contact: Olegas Vasilecas

b. Owned research infrastructures: open

c. Expertise: software engineering, information systems, ontologies, business rules

Partner 10. NATURBRUK- Vocational school (SE) (Dairy farm)

Partner 11. Smart IT Cluster (LT)

Partner 12. The Chamber of Agriculture in Lithuania (LT)

Partner 13. Agroväst/Precisionsodling Sverige (POS) (SE)

Partner 14. Latvian IT Cluster (LV)

Association organizations:

ICT-AGRI2 eranet

Latvian Beekeepers association (LV)

The Association of Innovative Agricultural Engineering ALBATROSS (PL)

The central union of Swedish-speaking agricultural producers in Finland (FI)

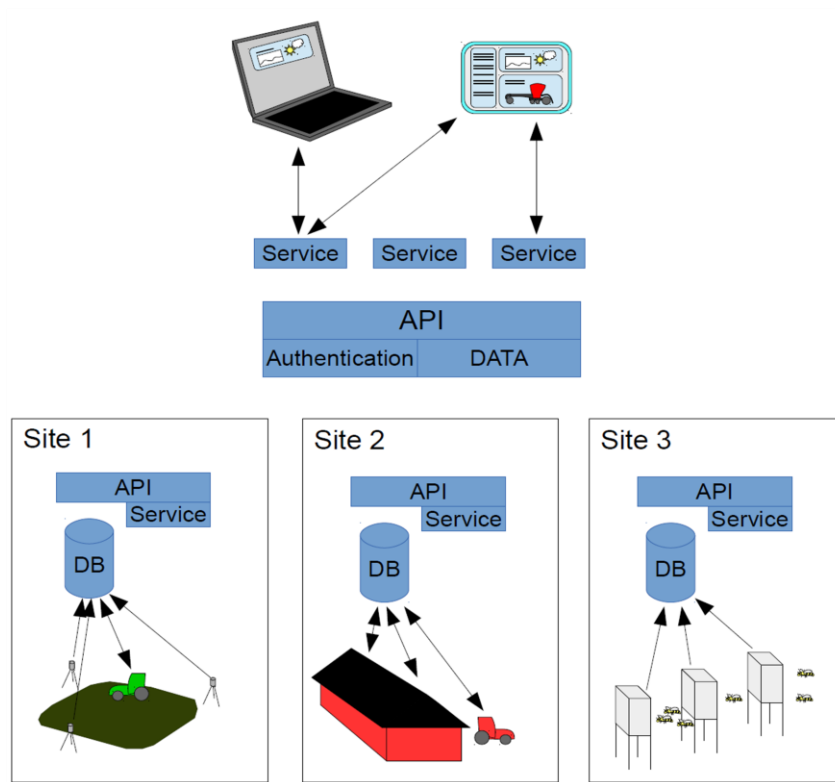
Agro Business Park (DK)

SEGES (DK)

Finnish Association of Automation in Agriculture (FI)

Duration of the project 3 years

Total budget 4,5 M€



Picture: Juha Backman

Fig. 1. An illustration describing the aimed BOARDING network.