



AGREUS

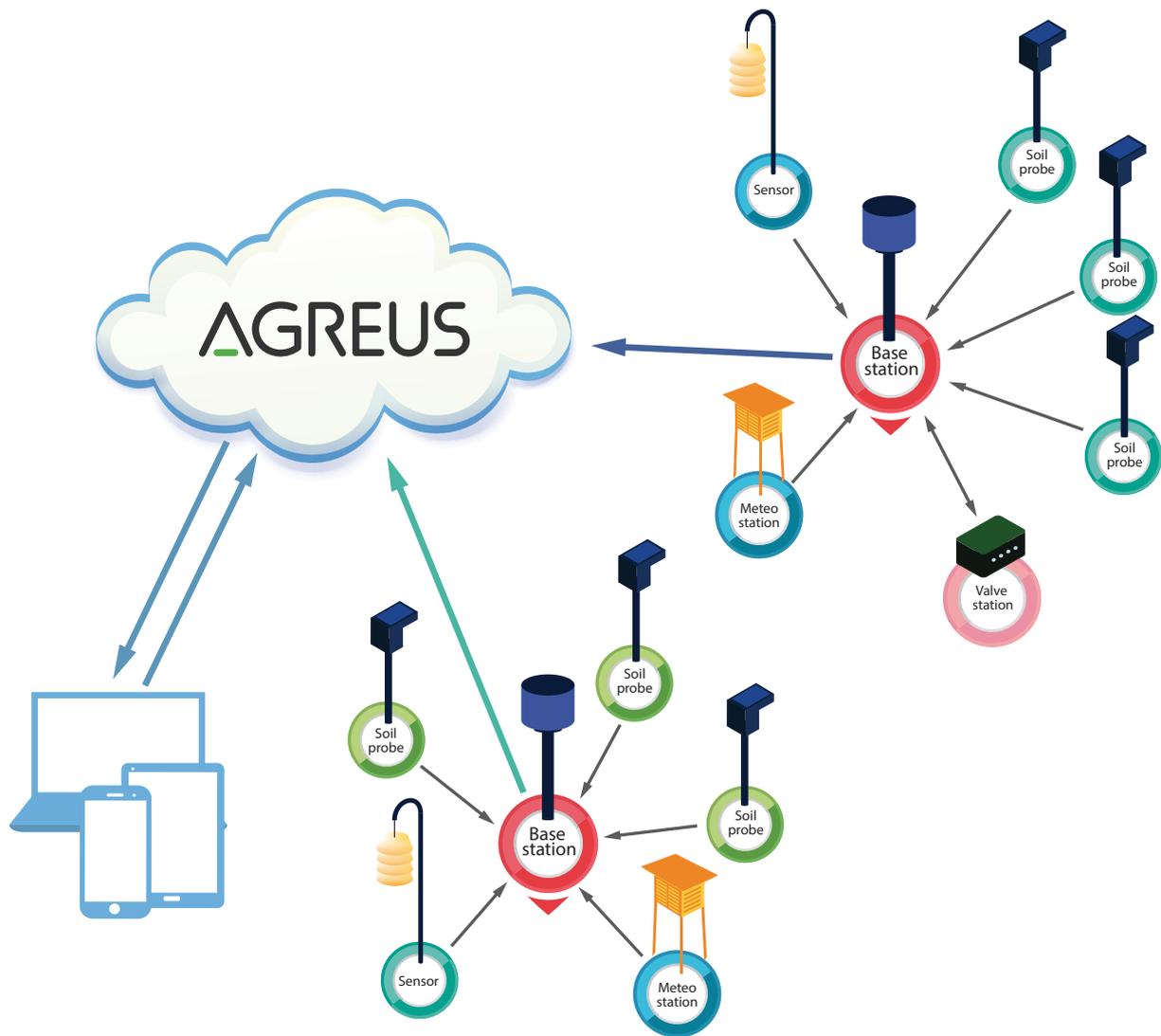
Agriculture 4.0,
or IIoT in horticultural and agricultural practice



Technologies, which we conventionally call „Agriculture 4.0”, do not have to concern only large-area agricultural crops. There are technical measures allowing the economic and simultaneously the precise determination of the climatic and soil conditions in smaller farms. This is possible due to the emergence of technologies in the field of Industrial Internet of Things (IIoT), allowing the long-term operation of wireless communicating, battery or solar-powered sensors. Distributed sensors measuring soil, climate, and other parameters can become a source of data for support systems of agrotechnical decisions in metered areas.

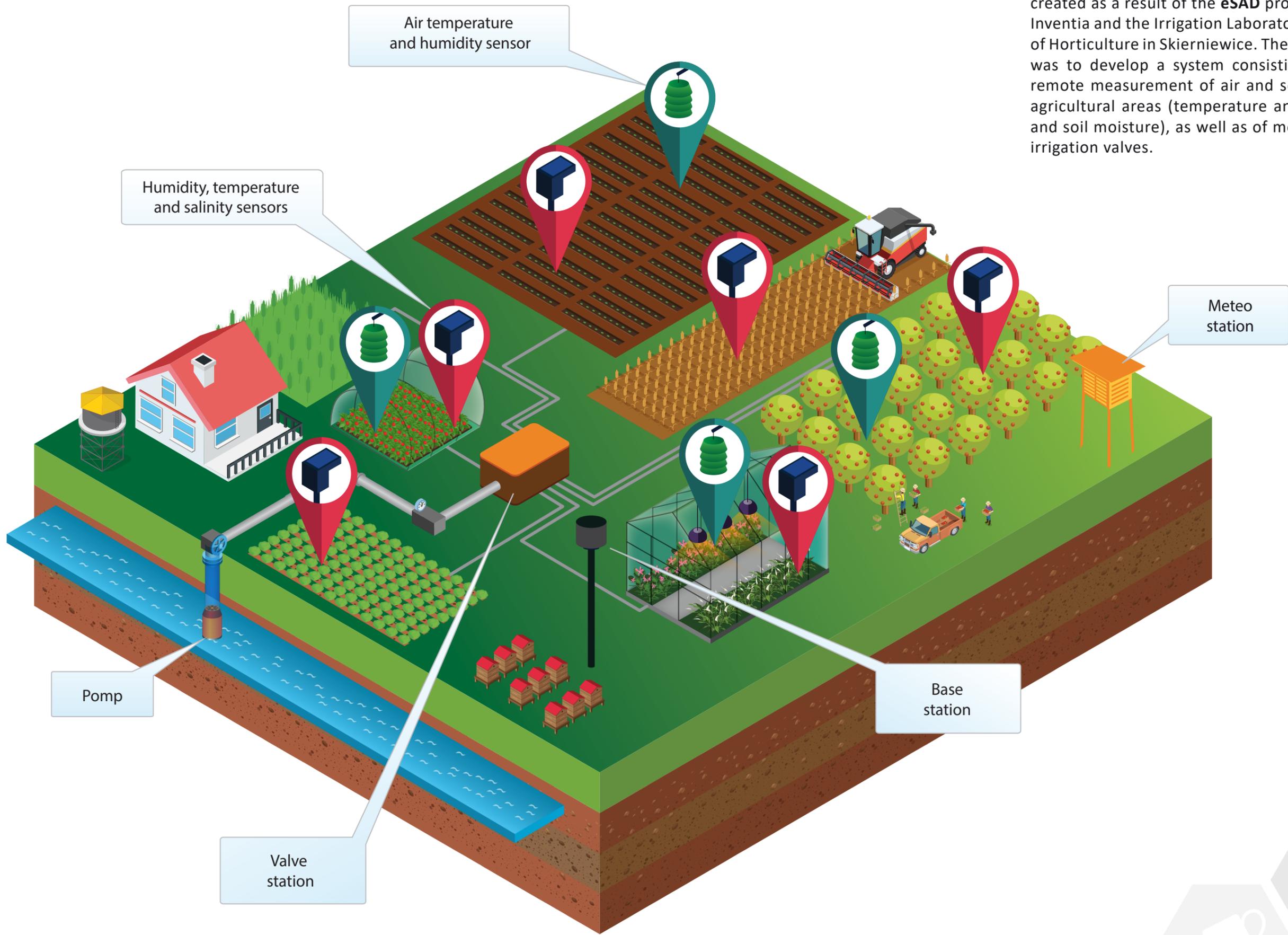


The AGREUS system is used both in field monitoring of crop conditions, as well as conditions in greenhouse and under covers



The **AGREUS** portal enables the management of both terminals connected with it, and users. It enables the creation of personalized user profiles with different levels of access rights within the created account. Automated adding new terminals using NFC and flexibility in the configuration of information screens, allows you to combine current and historical data. This facilitates the management of information collected in the field. The basic usage of the **AGREUS** portal is access from mobile devices, which will certainly facilitate the use of the System. Mobile devices retrieve data from the portal in real-time, and the available information is the basis for making decisions. Portal dashboards (desktops), alarms and reports received via e-mail or SMS are additional features that allow the **AGREUS** portal to be treated like an irreplaceable source of information about the crops being cultivated. The development possibilities of the system are very elastic and their direction will depend on the users' needs.





The first elements of the **AGREUS** system were created as a result of the **eSAD** project run jointly by Inventia and the Irrigation Laboratory of the Institute of Horticulture in Skierniewice. The aim of the project was to develop a system consisting of devices for remote measurement of air and soil parameters on agricultural areas (temperature and humidity of air and soil moisture), as well as of modules controlling irrigation valves.





AGREUS includes many types of environmental and technical sensors that send data to the integrating portal which process them into decision-support information. The monitored temperature and humidity of the air and soil are the basic parameters necessary to determine the water needs of plants in the irrigation process. In addition, data on rainfall, wind speed, and insolation are monitored or collected from third sources, which allows increasing the precision of agrotechnical activities. In addition to environmental measurements, the system has a wide range of remote control options for various types of devices. By assumption, the system should solve many disadvantages of current control systems, e.g. in irrigation, such as the need to run valve control cables and poor opportunities to create irrigation schemes.

*The pictures show the components of the AGREUS system.
Above the soil probe is shown, i.e. humidity, temperature and salinity sensor.
Field temperature and humidity sensor is shown below.*



The heart of the **AGREUS System** is the base station transmitting data from/to dispersed terminals, i.e. creating a network of sensors and measuring and executive modules. The transmission takes place using a long-range wireless radio network - **LoRa**. This technology, depending on the terrain conditions, allows covering with its operation a large area of crops with low energy consumption, which is a critical parameter for battery-powered devices. In addition, the **AGREUS** base station can connect to the Internet using the Wi-Fi of the existing local network, independently via GSM (3G, LTE) or, optionally, via Ethernet cable. The Internet connection allows you to send the collected data to the **AGREUS Portal** running in the cloud. Transmitted data is collected on individual accounts of the System users, becoming the basis for ongoing analyzes and generated reports.



The photo above shows the base station responsible for communication between system elements located in the field and computing cloud. The valve control module and the control panel of the valve station are presented below.





inVentia

Project's Partner:



When developing the project, we use EU subsidies under the Measure RPO WM 1.2. Research and development activities of enterprises, project number RPMA.01.02.00-14-5663 / 16-00: „Development of an innovative system for distributed measuring climate and soil parameters as a tool for irrigation optimization, plant protection, and agrotechnical work”. The Institute of Horticulture is a contractor of research commissioned by Inventia.

