RESEARCH IMPACT

HIGHLIGHTS

ICT-AGRI ERA-NET
Projects 2010-2018

Highlights of projects funded by
the ICT-AGRI ERA-NET (2009-2014)
and ICT-AGRI-2 ERA-NET (2014-2018)

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under agreements 235460 [ICT-AGRI] and 618123 [ICT-AGRI-2].

Compiled and edited by Dr Evelyn Zuniga-Soto (Teagasc).

Welcome to ICT-AGRI

ICT-AGRI is funded by the European Commission's ERA-NET scheme under the 7th Framework Programme for Research. The objective of an ERA-NET scheme is to develop and strengthen the European Research Area by facilitating practical initiatives to co-ordinate regional, national and European research programmes in specific fields.

ICT-AGRI-1 began on May 1, 2009, and ran for 65 months until September 30, 2014. The follow-up project – ICT-AGRI-2 – started on January 1, 2014, and ended on December 31, 2018.
The overall goal of ICT-AGRI has been to strengthen European research within the diverse area of precision farming and develop a common European research agenda concerning information and communications technology (ICT) and robotics in agriculture, and to follow up with calls based on funds from the participating countries' national research programmes. The purpose has been to pool fragmented human and financial resources, in order to improve both the efficiency and the effectiveness of Europe's research efforts.

More specifically, the objectives of the ERA-NET ICT-AGRI have been:

- **mapping and analysis of existing research and future needs;**
- **development of instruments and procedures for transnational funding activities;**
- **development of a strategic transnational research agenda and programmes; and,**
- **establishing and maintaining international collaborations and networks.**

ICT-AGRI-1

The ICT-AGRI-1 Project Consortium comprised 18 partners and 12 observer organisations covering 20 countries. The underlying rationale of ICT-AGRI-1 was that modern agricultural engineering tools (e.g., precision crop and livestock farming tools) are necessary to enable agriculture to meet the global challenges.
During ICT-AGRI-1, three transnational calls were conducted in 2010, 2012 and 2014 (in collaboration with SmartAgriFood2 and supported by the EU project Future Internet PPP). In total, 24 projects were approved for funding.

ICT-AGRI-2

The ICT-AGRI-2 Project Consortium had 23 partners and four observer organisations covering 17 countries. The principal objective of ICT-AGRI-2 has been to contribute to the development of an eco-efficient, resource-efficient and competitive agriculture through an enhanced and improved use of ICT and robotics. ICT-AGRI-2 has pursued this objective through own calls and within the framework of related European initiatives including Horizon 2020, EIP-AGRI, Joint Programming Initiatives and other ERA-NETs. ICT-AGRI conducted calls in 2015, 2017 and 2018. The 2018 call was a joint call with two other bio-economy ERA-NETs (ERA-GAS and SusAn).
Probably no other innovation is spreading so fast and through all aspects of agriculture as digitisation. Digital agriculture is considered to have great potential to achieve sustainable development goals (SDGs), by seeking more efficient and ecologically viable ways to produce food, e.g., improving soil quality and reducing waste.

I welcome you to this compilation of projects that have been funded by the ICT-AGRI ERA-NET.

Niels Gøtke,
Head of Division,
Danish Agency for Science and Higher Education
Co-ordinator of ICT-AGRI ERA-NET

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About ICT-AGRI

TRANSNATIONAL CALLS – A VITAL INSTRUMENT FOR ICT-AGRI

Calls for transnational research, development and innovation projects are a vital instrument for ICT-AGRI. These calls are funded by ICT-AGRI partners and associated national funding agencies, who add funding to a so-called virtual common pot, meaning that funding is restricted to consortium partners from the same country as the country of funding agency. Consortium partners from any other countries, who pay their participation with own funding, are always very welcome.

2010 – INTEGRATED ICT AND AUTOMATION FOR SUSTAINABLE AGRICULTURAL PRODUCTION

The aim of this joint call was to enable joint transnational research projects based on complementarities and sharing of expertise within information and communications technology (ICT) and robotics in agriculture. Projects are expected to apply a systems approach addressing farm-level integration of information technology, communications technology, automation and robotics. These projects have a clear European added value by being carried out on a transnational level.
Seven projects were funded in this call.

2012 – ICT AND AUTOMATION FOR A GREENER AGRICULTURE

This call aimed to utilise information and communications technology (ICT) and automation in primary agriculture for sustainable use of natural resources, reduction of agriculture's environmental footprint, and mitigation of climate change while securing farm economy and good working conditions, food supply, quality and security, and animal welfare.
Eight projects were funded in this call.

2014 – SERVICES AND APPLICATIONS FOR SMART AGRICULTURE

This call is in collaboration with the Future Internet Accelerator project SmartAgrifood. The objective for SmartAgriFood is to accelerate the use of FIWARE internet technologies for smart services and applications, while the purpose of the ICT-AGRI engagement is to contribute with agricultural knowledge and experience. Fifty projects were funded in this call, of which eight were co-funded by ICT-AGRI.

2015 – ENABLING PRECISION FARMING

Precision farming is a key element in sustainable intensification, i.e., increasing food production with smaller environmental footprints. Although precision farming has been studied and developed for more than two decades, adoption of the technology in primary agriculture is still behind expectations. There is, therefore, a need for research, development and innovation concerning the adoption of precision farming in primary agriculture.
Eight projects were funded in this call.

2017 – FARM MANAGEMENT SYSTEMS FOR PRECISION FARMING

The overall objective of this call is to contribute to the development of an eco-efficient, resource-efficient and competitive agriculture through an enhanced and improved use of information and communications technology (ICT) and robotics. Precision farming involves a number of digital technologies, including the internet of things (IoT) and automated agricultural machinery; these tools have significant potential for the sustainable intensification of primary food production.
Five projects were funded in this call.

Contact details and updates to the project information can be obtained from the ICT-AGRI website – www.ict-agri.eu.

2010

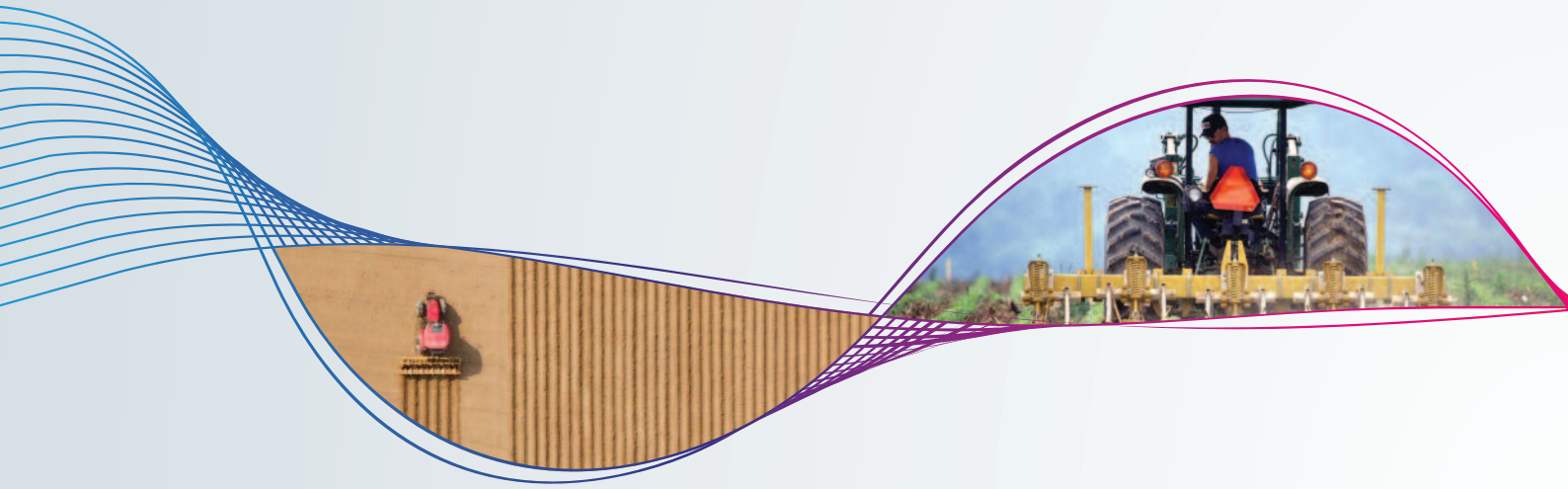
Integrated ICT and automation for sustainable agricultural production

The aim of this joint call was to enable joint transnational research projects based on complementarities and sharing of expertise within information and communications technology (ICT) and robotics in agriculture. Projects are expected to apply a systems approach addressing farm-level integration of information technology, communications technology, automation and robotics. These projects have a clear European added value by being carried out on a transnational level.

SEVEN PROJECTS WERE FUNDED IN THIS CALL:

1. STRATOS
2. ROBOFARM
3. PIGWISE
4. PredICTor
5. GeoWebAgri
6. QUAD-AV
7. 3D-Mosaic

1. Open System for TRAcTOr's autonomouS Operations (STRATOS)



IMPACT: STRATOS demonstrated the application of information and communications technology (ICT), in particular ISOBUS and wireless communication technologies, to agricultural applications by developing an open System for TRAcTOrs' autonomous OperationS. STRATOS developed a wireless sensor that transmits a data stream containing information in a digital coding through a wireless sensor network (WSN). The STRATOS infrastructure is designed to gather information on soil and cultivation using self-powered wireless sensors. The tractor is equipped with five sensors: humidity; temperature; soil pH; barometric pressure; and, acceleration. All of these solutions offer substantial value for farmers in their efforts to optimise production by improving operations management. From the industry development point of view, part of the technological achievements developed in STRATOS (ISOBUS stack protocol) have been implemented and used by the company E.S.T.E.srl, founded in 2013, which has its main focus on agricultural electronics and engineering. Additionally, the STRATOS project contributed to the formation of multiple BSc, MSc and PhD students at Riga Technical University (RTU) in the area of wireless applied technology.

www.ict-agri.eu/node/34850

PROJECT NAME:
Open System for TRAcTOr's autonomouS Operations (STRATOS)

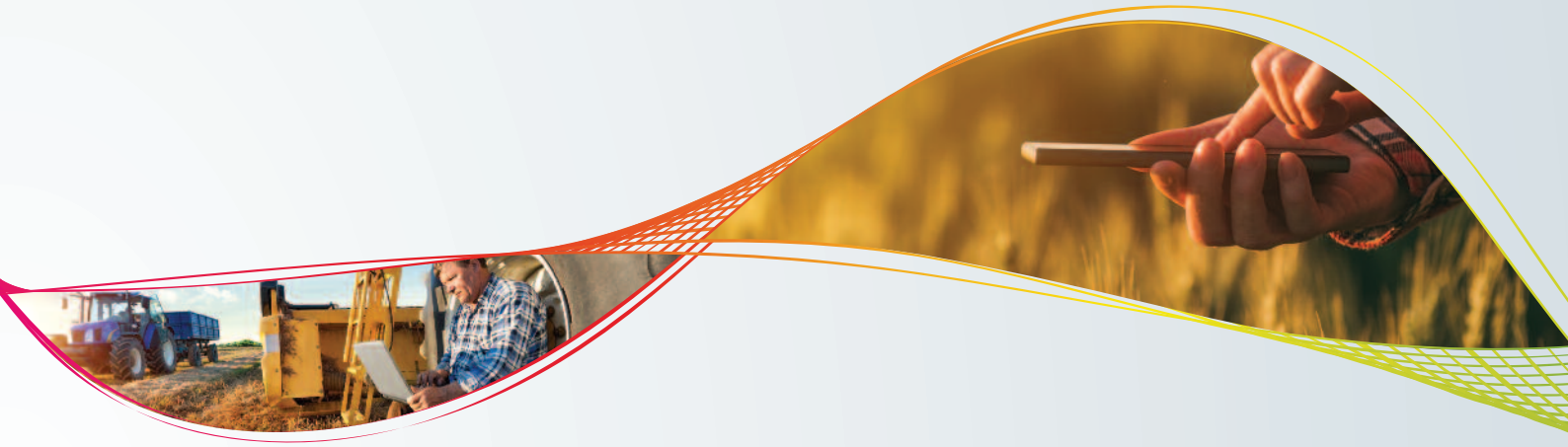
PROJECT NUMBER:
34703

PROJECT DATES:
April 1, 2011, to March 31, 2013

CO-ORDINATOR:
Cesare Fantuzzi, University of Modena and Reggio Emilia (Italy)

COLLABORATING INSTITUTIONS:
Valerijs Zagurskis, Riga Technical University (Latvia)
Dmitrijs Bliznuk, Riga Technical University (Latvia)
Massimiliano Ruggeri, Istituto per le Macchine Agricole e Movimento Terra CNR (Italy)
Marko Boving, E.I.A. Electronics (Belgium)
Maria Giovanna Sami, ALaRI Institute (Switzerland)
Umberto Bondi, Università Svizzera Italiana (Italy)
Per-Olof Gutman, Technion – Israel Institute of Technology (Israel)

2. Integrated robotic and software platform as a support system for farm level business decisions (ROBOFARM)



IMPACT: Farm management information systems (FMIS) in agriculture have evolved from simple farm record keeping into sophisticated and complex systems to support production management. The purpose of the FMIS developed in the ROBOFARM project is to meet the increased demands to reduce production costs, comply with agricultural standards, and maintain high product quality and safety. The study focuses on open-field crop production and centres on farm managers as the primary users and decision makers. ROBOFARM developed a technology platform that integrates and harmonises software and hardware technologies, making use of sensors and active vision systems mounted on a mobile device to automatically collect data. Along with agronomical, environmental and food safety information, the system prototype dashboard shows the impact of general costs on the different crops, allocating them on the basis of production cycle complexity. It includes a report section directly linked to the database, which provides crop balance sheets and simulations in terms of 'what-if' analyses. The system allows farm managers to: (i) analyse deviations between budgeted and actual costs; (ii) compare crop balance sheets across different years; and, (iii) perform sensitivity analyses. The software allows farmers to effectively manage information on and off their farms to improve economic viability and to reduce environmental impact.

www.ict-agri.eu/node/34851

PROJECT NAME:
Integrated robotic and software platform as a support system for farm level business decisions (ROBOFARM)

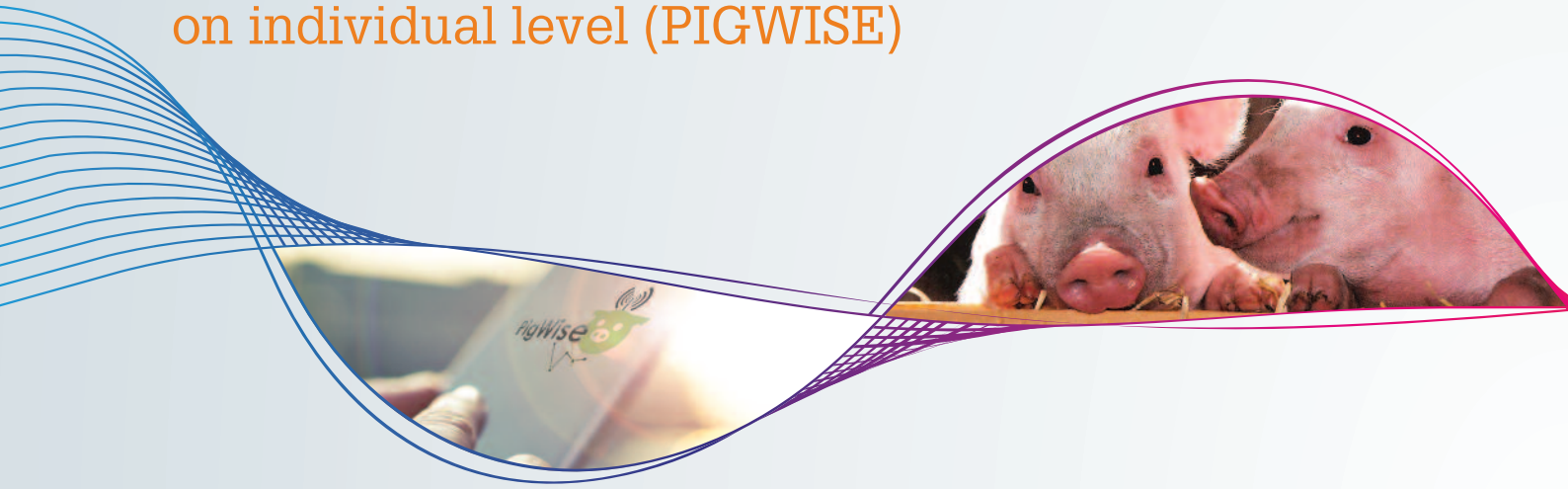
PROJECT NUMBER:
34754

PROJECT DATES:
September 1, 2011, to August 31, 2013

CO-ORDINATOR:
Maurizio Canavari, Alma Mater Studiorum, University of Bologna (Italy)

COLLABORATING INSTITUTIONS:
Simon Blackmore, Harper Adams University (UK)
Arif Behiç Tekin, Ege University (Turkey)
Ismail Bogrekci, Adnan Menderes University (Turkey)
Spyros Fountas, Centre for Research and Technology Hellas (Greece)

3. Optimising performance and welfare of fattening pigs using high frequent radio frequency identification (HF RFID) and synergistic control on individual level (PIGWISE)



IMPACT: This project has developed a tool to monitor the performance, growth and welfare of pigs at the individual level. The tool allows detection of problems at an early stage, providing monitoring and decision support, thereby preventing financial loss. This innovative approach combines an individual online monitoring system with camera vision technology and software. Accurate, advanced computer-aided analysis of individual animal data enables treatment of each animal as a production unit (instead of the pen or the herd), definition of animal-based threshold values, and hence development of early warning systems for potential drops in performance or potential health (and consequently performance and welfare) problems. For example, a pig displaying a reduced number and duration of feed visits, or excessively long gaps between visits, will be signalled and the pig farmer can intervene quickly. Also, sudden changes in activity rates caused by lameness or agonistic behaviours like tail biting can alert the farmer to separate animals that need special attention. In this way, negative influences on animal health and economic damage can be prevented. The technology developed in the PIGWISE project is currently being used in IOF2020, which is an EU project on the use of internet of things (IoT) technology in agriculture.

www.ict-agri.eu/node/34852

www.youtube.com/watch?v=VLe39tf164k

PROJECT NAME:
Optimising performance and welfare of fattening pigs using high frequent radio frequency identification (HF RFID) and synergistic control on individual level (PIGWISE)

PROJECT NUMBER:
34767

PROJECT DATES:
October 1, 2011, to September 30, 2013

CO-ORDINATOR:
Engel Hessel, University of Göttingen (Germany)

COLLABORATING INSTITUTIONS:
Torben Gregersen, Aarhus University (Denmark)
Paolo Brizzi, Istituto Superiore Mario Boella (Italy)
Kristof Mertens, Porphyrio NV (Belgium)
Wouter Saeys, KU Leuven (Belgium)
Annelies Van Nuffel, Flanders Research Institute for Agricultural and Fisheries Research–ILVO (Belgium)
Jarissa Maselyne, Flanders Research Institute for Agricultural and Fisheries Research–ILVO (Belgium)

4. Preparing for the EU Soil Framework Directive by optimal use of information and communications technology across Europe (PredICTor)

IMPACT: Soil quality is threatened by traffic with modern agricultural machinery. The PredICTor project had as its main deliverable an online decision support tool for assessing the risk of compaction for an intended field traffic situation (Terranimo®). Terranimo® is a web-based computer model primarily designed for farmers, agricultural contractors, consultants, and enforcement authorities, but has scientific applications as well. Terranimo® can help in optimising the use of agricultural machinery in the field and in preventing damage to the soil structure by indicating conditions under which there is a high risk of harmful compaction. The tool exists in two versions that can be accessed at www.terranimo.dk and www.terranimo.ch, respectively. The former version can be run in eight languages and provides access to six national sub-versions with their respective typical default soil types (Denmark, Norway, United Kingdom, France, Belgium-Flanders and Finland). In addition, a sub-version provides typical FAO-defined soil types. Since the summer of 2013, the latter version of Terranimo® has been the official tool in Switzerland for evaluating the soil compaction risk in the scope of the "Soil Protection in Agriculture" implementation guidance of the Federal Office for Agriculture (FOAG) and of the Federal Office for the Environment (FOEN). The potential use of Terranimo® in policy options to mitigate the soil compaction threat was mentioned in a policy brief recently produced at the conclusion of the EU project RECARE (https://www.ecologic.eu/sites/files/publication/2018/2730_recare_subsoil-compaction_web.pdf). The Terranimo® websites have been visited by more than 15,000 users in 2018 (~6,500 and ~9,000 for the .dk and .ch versions, respectively).

www.terranimo.dk/

www.ecologic.eu/sites/files/publication/2018/2730_recare_subsoil-compaction_web.pdf

PROJECT NAME:
Preparing for the EU Soil Framework Directive by optimal use of information and communications technology across Europe (PredICTor)

PROJECT NUMBER:
34780

PROJECT DATES:
March 22, 2011, to March 21, 2013

CO-ORDINATOR:
Per Schjønning, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Jørgen Pedersen, AgroTech A/S (Denmark)
Thomas Keller, Agroscope Reckenholz-Taenikon Research Station (Switzerland)
Matthias Stettler, Institute for Agricultural and Fisheries Research-ILVO (Belgium)
Laura Alakukku, University of Helsinki (Finland)
Harri Lilja, VTT Technical Research Centre of Finland (Finland)
Jan J.H. van den Akker, Wageningen University and Research Centre (Netherlands)
Henrik Breuning-Madsen, University of Copenhagen (Denmark)
Olaf Christen, University Halle (Germany)

5. Geospatial ICT infrastructure for agricultural machines and FMIS in planning and operation of precision farming (GeoWebAgri)

IMPACT: Geospatial information plays an important role in precision farming. Current data exchange between different systems at farm level is insufficient for specification of an information structure for precision farming management. GeoWebAgri has proposed to collect the diversified systems into a spatial data infrastructure (SDI) for agricultural machines and use farm management information systems (FMIS) to support its planning and operation in precision agriculture. GeoWebAgri demonstrates the implementation of standard web feature services (WFS) defined by the ISO 19100 series. Novel communication interoperability, web client electronic central unit (ECU) and a commercial FMIS have been established based on real farm data exchange. Agricultural machinery supporting a web client platform can potentially use several services simultaneously. For instance, such machinery platforms can be prepared for several services and when the services are available locally, value is added to the agricultural machine automatically. GeoWebAgri has demonstrated the future perspectives of integrating spatial information by building the FMIS on open geographic information systems (GIS) standards; this has impacted significantly on the ease of implementation of current and future spatial information in precision farming.

www.ict-agri.eu/node/34854

www.cropmanager.dk/

PROJECT NAME:
Geospatial ICT infrastructure for agricultural machines and FMIS in planning and operation of precision farming (GeoWebAgri)

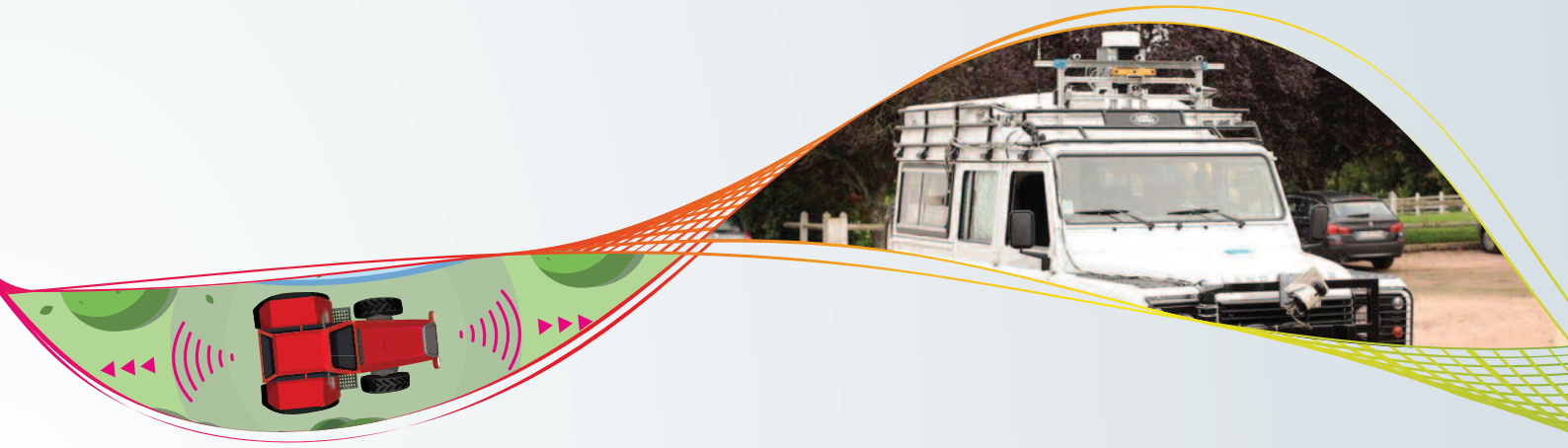
PROJECT NUMBER:
34800

PROJECT DATES:
March 1, 2011, to February 28, 2013

CO-ORDINATOR:
Ilkka Seilonen, Aalto University (Finland)

COLLABORATING INSTITUTIONS:
Ralf Bill, Rostock University (Germany)
Sirpa Thessler, MTT Agrifood Research Finland (Finland)
Claus Grøn Sørensen, Aarhus University (Denmark)
Jens Bligaard, Knowledge Centre for Agriculture (Denmark)
Roland Gerhards, University Hohenheim (Germany)
Jesper Riber Nielsen, SEGES (Denmark)

6. Ambient Awareness for Autonomous Agricultural Vehicles (QUAD-AV)



IMPACT: Autonomous vehicles are being increasingly adopted in agriculture to improve productivity and efficiency. For an autonomous agricultural vehicle to operate safely, environment perception and interpretation capabilities are fundamental requirements. The Ambient Awareness for Autonomous Agricultural Vehicles (QUAD-AV) project provided a multisensory approach in an autonomous agricultural vehicle with such ambient awareness. The vehicle is mounted with a multisensory array of devices combining different sensor modalities and multi-algorithm approaches that detect the various kinds of obstacles and build an obstacle database that can be used for vehicle control. This project investigated the potential of four technologies: vision/stereovision; light detection and ranging (lidar); thermography; and, microwave radar. A vehicle was developed that is capable of recognising obstacles such as humans, animals, inanimate objects, etc. The use of ambient awareness vehicles will provide additional safety features in agricultural landscapes where humans, machines and other obstacles might be present. The cognitive ability to perceive the environment is, in many cases, a matter of guaranteeing the safety of people and animals, and avoiding risking expensive machines or causing yield damage.

www.issia.cnr.it/wp/portfolio/quad-av-ambient-awareness-for-autonomous-agricultural-vehicles/

www.youtube.com/watch?v=-ig4_TvGJYU

PROJECT NAME:
Ambient Awareness for Autonomous Agricultural Vehicles (QUAD-AV)

PROJECT NUMBER:
34836

PROJECT DATES:
July 1, 2011, to December 31, 2013

CO-ORDINATOR:
Michael Nielsen, Danish Technological Institute (Denmark)

COLLABORATING INSTITUTIONS:
Raphael Rouveure, National Research Institute of Science and Technology for Environment and Agriculture (France)
Rainer Worst, Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS) (Germany)
Giulio Reina, University of Salento (Italy)
CLAAS (Germany)

7. Advanced Monitoring of Tree Crops for Optimised Management (3D-Mosaic)

IMPACT: The target of 3D-Mosaic is to support the precision management of orchards by means of a concept for a decision support system (DSS) aiming to optimise efficiency of inputs, including water, and to diminish the environmental footprint of fruit production. The concept has been demonstrated with stakeholders for a spatially resolved approach in orchards bringing together robotics, sensors, geo statistics, plant physiologists, and horticulturists. 3D-MOSAIC cross-fertilised the work on precise irrigation, capturing: (i) robotic and sensor groups; and, (ii) plant physiologists and application groups. It opened minds for precision horticulture in the scientific community, as well as in practice when integrating companies in the last phase of the project. The enthusiastic and critical discussions with the often-synergistic technical and social background certainly had a high impact on future research projects. The integration of companies from the beginning of the project resulted in new applications of existing sensors (DA-meter) and development of new sensors (time-resolved and frequency-based sensors). The effects may last, since senior scientists, postdocs, and several young researchers in different stages of their careers participated in the project. Finally, a comment from the external project advisor: "The level of enthusiasm, of cross-disciplinary conversations and comprehension between the participants was infectious".

www2.atb-potsdam.de/3d-mosaic/Project.aspx

www.youtube.com/watch?v=2eogq_x_xIA

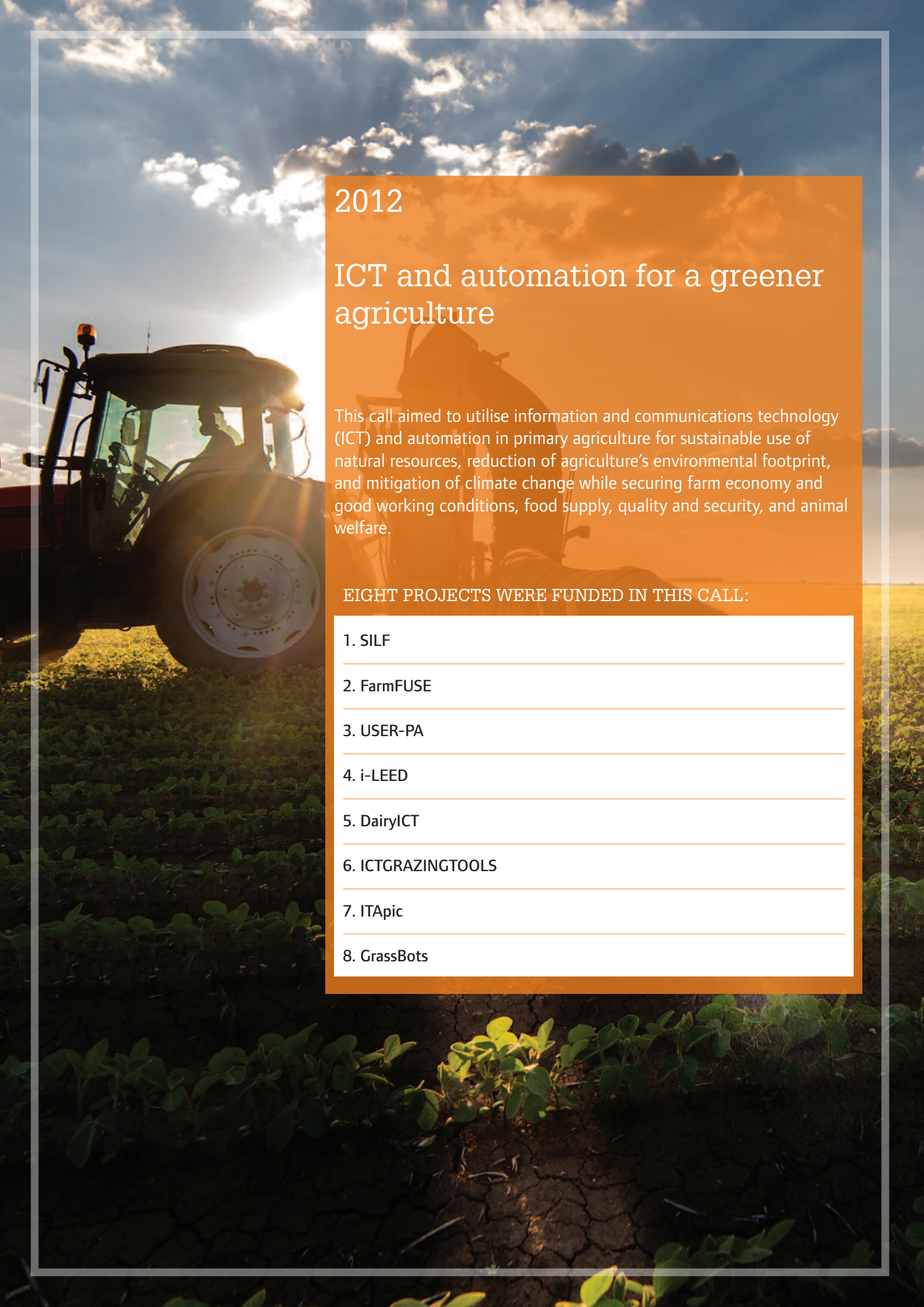
PROJECT NAME:
Advanced Monitoring of Tree Crops for Optimised Management (3D-Mosaic)

PROJECT NUMBER:
34814

PROJECT DATES:
May 1, 2011, to April 30, 2013

CO-ORDINATOR:
Manuela Zude, Leibniz Institute for Agricultural Engineering, ATB (Germany)

COLLABORATING INSTITUTIONS:
Alon Ben-Gal, Gilat Research Center (Israel)
Riza Kanber, University Cucurova (Turkey)
Alessandro Torricelli, Politecnico di Milano (Italy)
Dejan Seatovic, Zurich University of Applied Sciences ZHAW (Switzerland)
Paolo Rozzi, Sinteleia srl (Italy)
Thomas Anken, Agroscope (Switzerland)
Oliver Hensel, University of Kassel (Germany)
Jose Espinosa, Versas (Spain)
Hans W. Griepentrog, University of Hohenheim (Germany)



2012

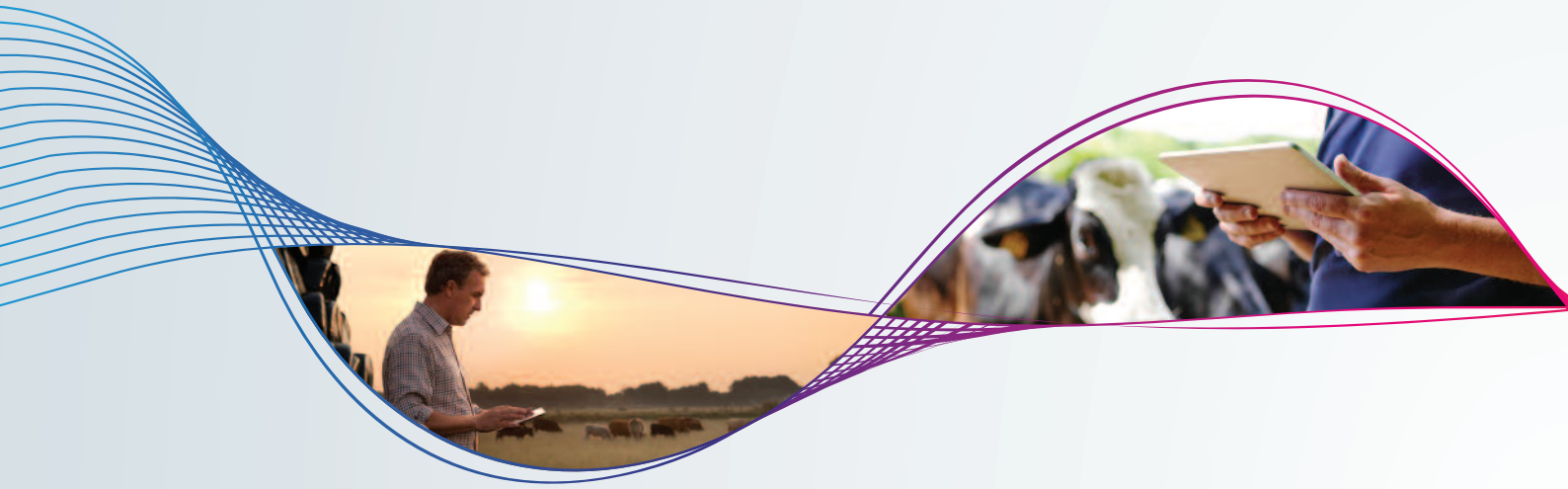
ICT and automation for a greener agriculture

This call aimed to utilise information and communications technology (ICT) and automation in primary agriculture for sustainable use of natural resources, reduction of agriculture's environmental footprint, and mitigation of climate change while securing farm economy and good working conditions, food supply, quality and security, and animal welfare.

EIGHT PROJECTS WERE FUNDED IN THIS CALL:

1. SILF
2. FarmFUSE
3. USER-PA
4. i-LEED
5. DairyICT
6. ICTGRAZINGTOOLS
7. ITApic
8. GrassBots

1. Smart Integrated Livestock Farming (SILF): integrating user centric and ICT-based decision support platform



IMPACT: Available databases of relevance for the development of an internet of things (IoT) data management platform for livestock farming were identified through a survey in the five partner countries. Experiments with accelerometers were carried out to identify parameters and classifiers of lameness. A list of key environmental indicators was identified. The indicators include categories within energy, nutrient use, soil/land issues, biodiversity, water, carbon footprint and economy. The indicators form the basis for a farm-based life cycle assessment (LCA) where economic drivers are integrated. System analysis has been performed by indicating the identified stakeholders. A web platform representing the mutual relations between different actors was developed and prepared for continuous updating of economic consequences of lameness. Available databases with data on animal health form the basis for farmers and advisors to compare and benchmark different production systems and methods in terms of sustainability, including indicators within energy, nutrient use, soil/land issues, biodiversity, water, carbon footprint and economy. Specifically, the guidelines for the use of accelerometers for lameness detection were outlined. Based on the results, good dairy farming practices were developed within animal health, milk hygiene, feeding, animal welfare, environmental impact and socioeconomic benefits as guidelines for advisors and farmers. Also, these results are useable for researchers in their pursuit of further designing and implementing information management systems in precision livestock.

www.ict-agri.eu/node/36988

PROJECT NAME:
Smart Integrated Livestock Farming (SILF): integrating user centric and ICT-based decision support platform

PROJECT NUMBER:
14302

PROJECT DATES:
March 1, 2013 to February 29, 2016

CO-ORDINATOR:
Claus Grøn Sørensen, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Thomas Bartzanas, Centre for Research and Technology Hellas (Greece)
Nicholas Holden, University College Dublin (Ireland)
Annelies Van Nuffel, Institute for Agricultural and Fisheries Research–ILVO (Belgium)
Kristof Mertens, Porphyrio NV (Belgium)
Mikko Jarvinen, MTT Agrifood Research (Finland)
Ole Green, Agro Intelligence ApS (Denmark)

2. Fusion of multi-source and multi-sensor information on soil and crop for optimised crop production system (FarmFUSE)

IMPACT: Ignoring the inherent spatial variation in soil properties with traditional sampling methods has led through the years to poor crop management, yield loss and excess use of inputs. FarmFUSE addresses these issues by fusing a set of data on soil and crops with auxiliary data on topography and weather to delineate management zones for variable rate of nitrogen (VRN) fertilisation. Once the integrated concept is applied by a large number of farmers, a reduction in nitrate leaching into groundwater is foreseen, which supports the EU Water Framework Directive, Nitrates Directive and Integrated Pollution Prevention and Control Directive. It will also reduce fertiliser use and, hence, reduce greenhouse gas emissions and global warming potential. The project's specific impacts are measured as: (i) contribution to the creation of a new precision farming service provider named FarmingTruth Ltd in the UK; (ii) contribution to the development of a new visible and near infrared spectrometer produced commercially by tec5; and, (iii) contribution to the creation of a new product for VRN fertilisation, which was proven to increase farmer net income by increasing yield at reduced input cost and environmental impact.

www.farmfuse.eu/

https://business.esa.int/projects/farmingtruth

PROJECT NAME:
Fusion of multi-source and multi-sensor information on soil and crop for optimised crop production system (FarmFUSE)

PROJECT NUMBER:
14303

PROJECT DATES:
March 1, 2013 to February 29, 2016

CO-ORDINATOR:
Abdul Mouazen, Ghent University (Belgium)

COLLABORATING INSTITUTIONS:
Dimitrios Moshou, Aristotle University of Thessaloniki (Greece)
Ralf Bill, Rostock University (Germany)
Yucel Tekin, Uludag University (Turkey)
Steffen Piecha, tec5 AG (Germany)

3. USability of Environmentally sound and Reliable techniques in Precision Agriculture (USER-PA)

IMPACT: The USER-PA project implements a technological architecture for precision agriculture (precision fruticulture and viticulture). Plant data is acquired from crown and fruit sensors that run by means of autonomous platforms and are connected by wireless sensor networks (WSNs). The acquisition of information is done in a spatially resolved farm management information system (FMIS). Economic evaluation was integrated into the project from the beginning. The expected outcome of an integrated system that incorporates a number of sensing techniques and a web-based FMIS that enables farmers to manage their crop was achieved with demonstration of the canopy–fruit sensor and FMIS. USER-PA showed the potential of providing farmers with quantitative information to decide upon optimal harvest timing and irrigation, while fruit quality and production remained effective. Partners' comprehensive collaboration during field campaigns acted as a project inter-workshop and led to integration and assimilation of sensor data into the FMIS. The robot prototype developed by the USER-PA project is the only autonomous tractor in the UK that meets all current health and safety standards and complies with the new ISO standards. The website developed can take data from the tractor into the cloud in real time (http://pa-fmis.com/).

www.pa-fmis.com/

www.changins.ch/user-pa.html

PROJECT NAME:
USability of Environmentally sound and Reliable techniques in Precision Agriculture (USER-PA)

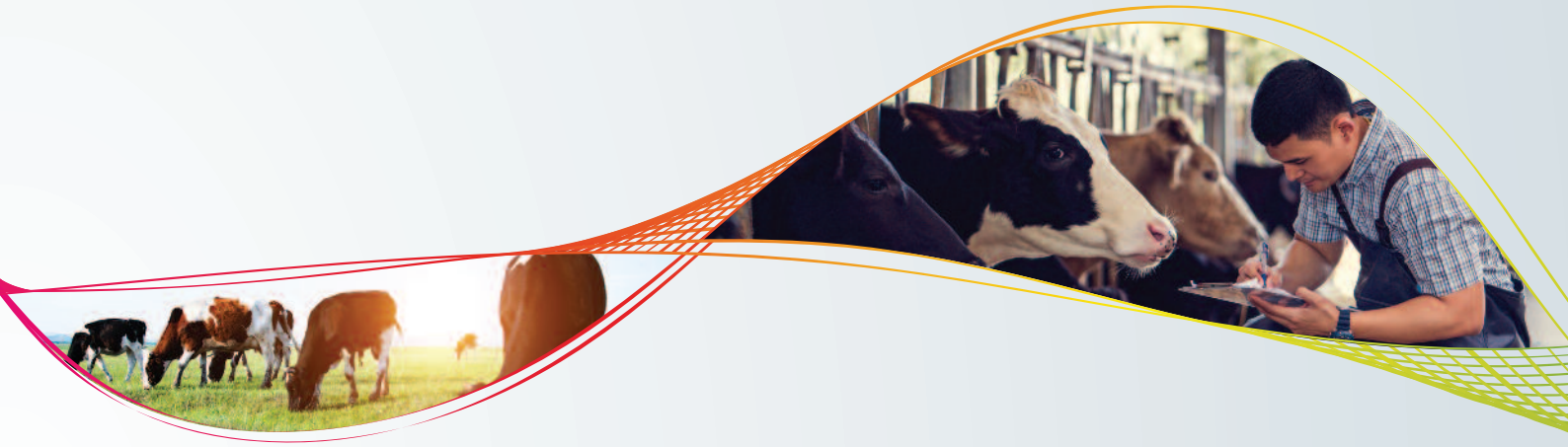
PROJECT NUMBER:
14302

PROJECT DATES:
March 1, 2013 to February 28, 2015

CO-ORDINATOR:
Victor Alchanatis, The Volcani Center (Israel)

COLLABORATING INSTITUTIONS:
Manuela Zude, Leibniz Institute for Agricultural Engineering (Germany)
Ismail Bogrekci, Adnan Menderes University (Turkey)
Dominique Fleury, University of Applied Sciences: Western Switzerland (Switzerland)
Spyros Fountas, Center for Research and Technology, Thessaly (Greece)
Simon Blackmore, Harper Adams University College (United Kingdom)
Alessandro Torricelli, Politecnico di Milano (Italy)
Soren Marcus Pedersen, University of Copenhagen (Denmark)
Bernd Sumpf, Leibniz Institut fuer Hoechstfrequenztechnik (Germany)

4. Advanced cattle feeding on pasture through innovative pasture management (i-LEED)



IMPACT: Contemporary agricultural production is facing new challenges. The dairy industry is anticipated to be one of the fastest growing sectors in the coming years, increasing demand on agricultural resources. The main goal of the i-LEED project was to optimise the feeding strategy for grazing cattle by improving pasture management methods. The pasture robot developed was based on a redesigned existing robotic platform, which focused on stable movements under difficult terrain conditions. The 2D-sensor technology (laser scanner and near infrared sensor) provides information on grass biomass, quality and quantity (pre and post grazing) as well as detection of cowpats, undesired plants or areas without vegetation. In this way, optimisation of areas for grazing can be implemented through adequate definition of trajectories. In summary, the method developed based on an appropriate sensor and software technology will encourage the acceptance of grazing as an economically effective alternative for pasture management. Partners from i-LEED are currently on the search for industry partners seeking the commercialisation of the robot. International co-operation between young researchers and entrepreneurs was achieved in the frame of this project.

www.lfl.bayern.de/ilt/i-leed/en/

www.topagrar.com/technik/news/roboter-i-leed-fuers-gruenland-9380794.html

PROJECT NAME:
Advanced cattle feeding on pasture through innovative pasture management (i-LEED)

PROJECT NUMBER:
14305

PROJECT DATES:
June 1, 2013 to December 31, 2016

CO-ORDINATOR:
Zoltan Gobor, Bayerische Landesanstalt für Landwirtschaft (Germany)

COLLABORATING INSTITUTIONS:
Christophe Cariou, Irstea (France)
Werner Feucker, dsp-Agrosoft GmbH (Germany)
Cedric Tessier, Effidence (France)
Arif Behiç Tekin, Ege University (Turkey)
Roland Lenain, Irstea (France)
Michel Berducat, Irstea (France)
Markus Demmel, Bayerische Landesanstalt für Landwirtschaft (Germany)
Stefan Thurner, Bayerische Landesanstalt für Landwirtschaft (Germany)

5. ICT in large and small dairy systems (DairyICT)

IMPACT: Partially derived from the outputs obtained from the DairyICT project, the start-up company Silent Herdsman from the University of Strathclyde, Glasgow, was created. Silent Herdsman is an internet of things (IoT)-inspired decision support platform that supports the optimisation of animal husbandry within dairy farms and in turn maximises productivity (milk production, milk quality, health) and welfare. Silent Herdsman developed a tracking system consisting of a neck-mounted collar, which is very accurate, and highly scalable. In 2016, the company Afimilk Ltd (a global leader in farm management software and milk analysis tools for dairy operations in 50 countries) acquired the neck collar developed by Silent Herdsman. The collar allows the tracking of each cow individually and provides alerts related to changes associated with the onset of heat and/or the health of the animal in real time. By analysing the time spent eating and ruminating behaviour patterns for individual animals, Silent Herdsman also provides early indications of illness. The deployment of the collars has proven to decrease the calving index (CI) from 40 days (for poorly performing farms) to 20 days (for high-performing farms). For example, on a UK farm, collar deployment has yielded a 40-day improvement in the CI for a 500-cow herd, which translates to >£100k additional revenue and represents a return on investment within seven months.

www.afimilk.com/silentherdsman

www.ict-agri.eu/node/34668

www.dairycareaction.org/

PROJECT NAME:
ICT in large and small dairy systems (DairyICT)

PROJECT NUMBER:
14306

PROJECT DATES:
April 1, 2013 to March 31, 2016

CO-ORDINATOR:
Chris Knight, University of Copenhagen (Denmark)

COLLABORATING INSTITUTIONS:
Klaus L. Ingvartsen, Aarhus University (Denmark)
Rupert Bruckmaier, University of Bern (Switzerland)
Ilias Kyriazakis, Newcastle University (United Kingdom)
Ivan Andonovic, Craig Michie, Michael Gilroy, University of Strathclyde (United Kingdom)
Nicolas Friggens, INRA (France)
Paolo Berzaghi, University of Padua (Italy)
David Roberts, Scotland's Rural College (United Kingdom)
Riona Sayers, Teagasc – Agriculture and Food Development Authority (Ireland)

6. Use of ICT tools to capture grass data and optimise grazing management (ICTGRAZINGTOOLS)

IMPACT: Profitability on grass-based systems is driven by degree of grass utilisation. This is influenced by increased growth and optimum management of that growth. Frequent measurement of grass parameters, e.g., herbage yield, height and density, will facilitate increased herbage production and utilisation. The project ICTGRAZINGTOOLS developed a grass measurement system known as Grasshopper. It incorporates a rising plate meter, an ultrasonic sensor and a data analysis/management system that can also map land areas. The technology measures compressed grass height precisely and transfers that information with GPS co-ordinates to a smart device. Herbage yield in the paddock is calculated and this data is then used to automatically define the appropriate area of the mapped paddock to allocate the cow herd. The data can also be uploaded automatically to the decision support tool PastureBase Ireland. The ICT tool Grasshopper is commercially available and used for grass measurement on up to 500 farms, and it has been adopted in several countries including Ireland, UK, France, Germany, Switzerland, Belgium, the Netherlands, Luxembourg, Italy, New Zealand, and Denmark. It has contributed significantly to the promotion of the decision support tool (DST) PastureBase Ireland (used for decision making on grassland and grazing management). Grasshopper uploads to any database and current users can upload to several databases, extending its utility to European and worldwide markets. Through its ease of use and automated elements, Grasshopper has increased the number of farmers conducting grassland measurement at farm level.

https://support.pasturebase.teagasc.ie/support/solutions/articles/19000063399-grasshopper-tutorial-1-unboxing-assembling-the-grasshopper

PROJECT NAME:
Use of ICT tools to capture grass data and optimise grazing management (ICTGRAZINGTOOLS)

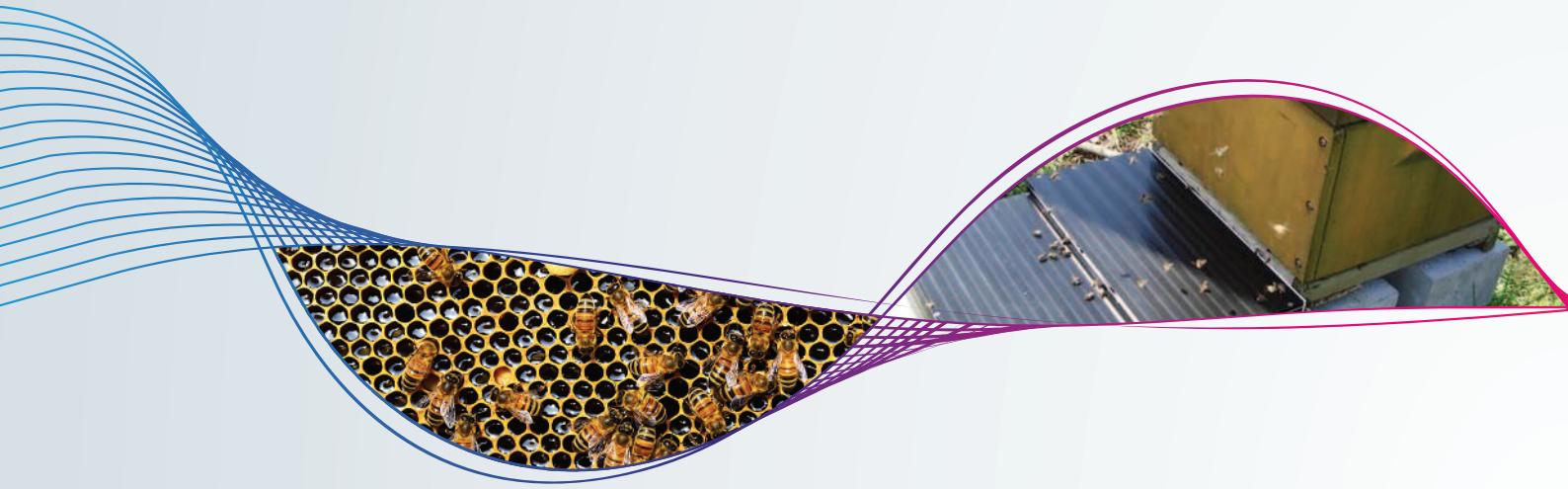
PROJECT NUMBER:
14307

PROJECT DATES:
June 1, 2013 to May 31, 2016

CO-ORDINATOR:
Bernadette O'Brien, Teagasc – Agriculture and Food Development Authority (Ireland)

COLLABORATING INSTITUTIONS:
Christina Umstatter, Scotland's Rural College (United Kingdom)
Patrick Halton, Forcefield Active Technologies Ltd. (Ireland)
Valérie Brocard, Institut de l'Elevage (France)

7. Application of information technologies in precision apiculture (ITApic)



IMPACT: Within the ITApic project, several bee colony-monitoring systems were developed and tested. It has been observed that monitoring beehives by physically opening them puts a great level of stress on bee colonies. Thus, bee colony health can be increased by minimising the number of beehive openings. The ITApic project developed solutions that help to monitor bee colonies remotely, minimising the necessity for onsite colony visits. The device can recognise various colony states (normal, swarming or colony death), as well as illnesses like nosema (caused by a parasite). This approach brings an economic impact for the beekeepers because it is not always economically feasible to travel for hundreds of kilometres just to check the state of the hive. Additional losses for beehives are caused by environmental conditions (abrupt temperature changes). ITApic evaluated this phenomenon and concluded that wintering buildings are extremely beneficial for the health of the bee colony. Overall, the project approach facilitates optimisation of operational beekeeping costs and minimises colony losses by increasing the profitability and stability of beekeeping.

www.itapic.eu

www.sams-project.eu

PROJECT NAME:
Application of information technologies in precision apiculture (ITApic)

PROJECT NUMBER:
14301

PROJECT DATES:
August 1, 2013 to July 29, 2016

CO-ORDINATOR:
Aleksejs Zacepins, Latvian University of Agriculture (Latvia)

COLLABORATING INSTITUTIONS:
Saban Tekin, Gaziosmanpasa University (Turkey)
Oliver Hensel, University of Kassel (Germany)
Uwe Richter, University of Kassel (Germany)
Peter Ahrendt, Aarhus University (Denmark)

8. User-centric adoption of sustainable farming operation involving ICT and robotics (GrassBots)

IMPACT: GrassBots implements the adaptation and operation of planning tools for robots in agriculture. The Danish GrassBot machine has been adapted into a prototype version of an autonomous workable grass-cutting machine. The retrofitted GrassBot has received much interest for the whole autonomous concept. A key obstacle for its further commercialisation is the price, but negotiations between the company Lynex and potential investors are expected. Based on the robotics hardware and auto-steering and positioning software for GrassBot, Conpleks has continued to further develop a generic original equipment manufacturer (OEM) robotics software package, which is ready to be integrated on agricultural robots, e.g., for grass cutting and other agricultural applications. Co-operation with multiple domestic and international companies is pending. Commercialisation activities for Kongskilde (AGROINTELLI), in connection with the GrassBot project, include the development of a 'next-version' of a biomass mower to cut plant/grass material in wild areas while minimising damage to the natural landscape. The development of robotic architecture and a tablet user interface will continue to be developed in other R&D projects and is expected to be sold.

www.youtube.com/watch?v=q8I8CYioNZE

www.ict-agri.eu/node/36989

PROJECT NAME:
User-centric adoption of sustainable farming operation involving ICT and robotics (GrassBots)

PROJECT NUMBER:
14304

PROJECT DATES:
March 1, 2013 to February 28, 2015

CO-ORDINATOR:
Claus Grøn Sørensen, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Kjeld Jensen, University of Southern Denmark (Denmark)
Richard Green, Harper Adams University College (United Kingdom)
Timo Oksanen, Aalto University (Finland)
Claus Mortensen, Agro Business Park (Denmark)
Ole Green, Agro Intelligence ApS (Denmark)
Tom Simonsen, Conpleks Innovation ApS (Denmark)
Jens Hansen, Lynex (Denmark)
Antti Suokannas, MTT Agrifood Research Finland (Finland)

2014

Services and Applications for Smart Agriculture

This call is in collaboration with the Future Internet Accelerator project SmartAgrifood. The objective for SmartAgriFood is to accelerate the use of FIWARE internet technologies for smart services and applications, while the purpose of the ICT-AGRI engagement is to contribute with agricultural knowledge and experience. Fifty projects were funded in this call, of which eight were co-funded by ICT-AGRI.

EIGHT PROJECTS WERE FUNDED IN THIS CALL:

1. ifarma-ffa
2. HappyCow
3. Agroptima
4. HappyGoats
5. FI-ORAMA
6. OrganicAgriWare
7. S-GAP
8. FERIA

1. Services and Applications for Smart Agriculture Farm Financial Analysis App (ifarma-ffa)

IMPACT: Farmers lack the tools to make informed decisions related to financial management of their business, taking into account cost and profit margins and profitability analysis. While there are a number of farm management solutions on the market today, these are targeted towards the big farm enterprises and are not suitable or affordable for use by many individual or family farms. Farm Financial Analysis app is a FIWARE application that uses Agrostis' ifarma to provide a simple and affordable financial management and analysis solution that can be used to identify critical factors to minimise costs and maximise productivity. The application has been designed for simplicity and ease of use, and it works even with minimum data entry. ifarma was tested on four pilot farms in Greece and two pilot farms in Germany, where the ICT-AGRI partner University of Hohenheim co-ordinated the study. A variety of farm sizes and different crops (wheat, maize, vines, apples and olive trees) were evaluated in the pilot studies. The user feedback was very positive, indicating that the app was straightforward to use. It provides the farmers with the necessary information for their financial records. ifarma is commercially available and currently has more than 2,500 users (farmers, producer organisations, and farming enterprises).

www.ffa.agrostis.gr/

PROJECT NAME:
Services and Applications for Smart Agriculture Farm Financial Analysis App (ifarma-ffa)

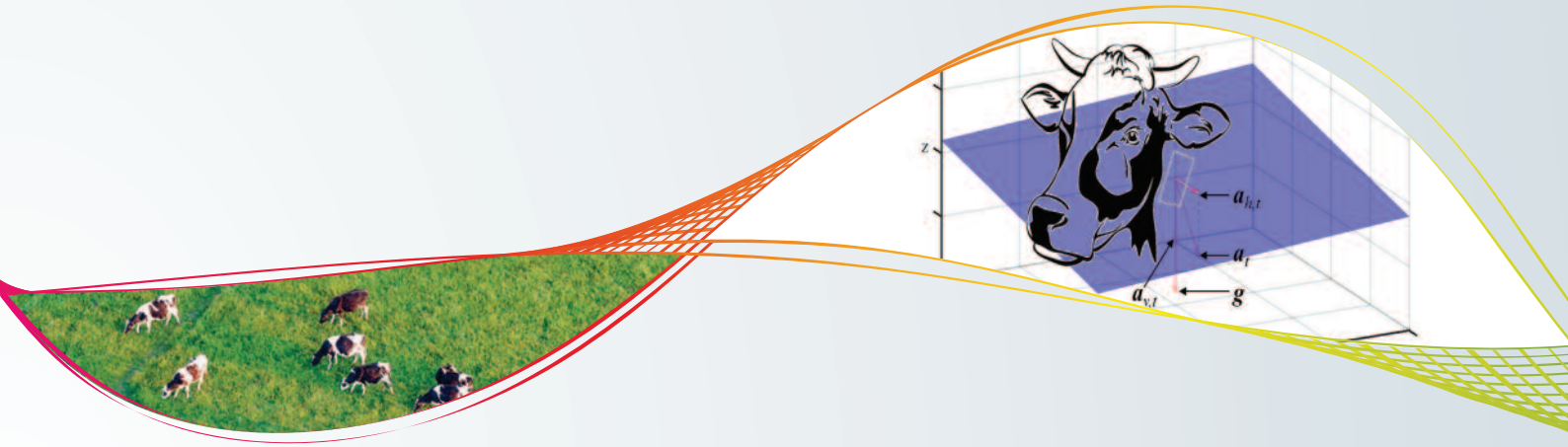
PROJECT NUMBER:
14591

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
Vangelis Vassiliadis, Agrostis Ltd (Greece)

COLLABORATING INSTITUTIONS:
Dimitris S. Paraforos, University of Hohenheim (Germany)

2. Connecterra: Project Happy Cow (HappyCow)



IMPACT: Connecterra is an Amsterdam-based data science company that has developed Ida – an AI that uses a combination of hardware and software for a cloud-based oestrus detection system for dairy farms. In order to detect oestrus and animal behaviour, the technology uses sensors mounted on cows and connected to a cloud service platform. This provides a unique approach to oestrus detection, leveraging deep learning, lifetime data storage and FIWARE integration to enable new services based on sensor networks. The HappyCow project is a use-case that aims to encourage technology uptake in dairy farming by combining advanced big data analysis with machine learning technologies. This will allow farmers to better understand their animals' behaviour, detect issues at an early stage and get suggestions on potential solutions, thus increasing the farm's productivity. There is a web-based application created by Ida, available for end users (i.e., primarily dairy farmers) to get insights regarding their cows. This application can be used on desktop computers and mobile devices like smartphones and tablets.

The product currently offers oestrus detection, and health and feed alerts. As of today, Ida is used by dairy farmers in the Netherlands, Belgium, Denmark, Spain, Kenya, Pakistan and Canada. The commercially available hardware for Ida is designed and assembled in the Netherlands.

www.ict-agri.eu/node/38002

www.connecterra.io/

PROJECT NAME
Connecterra: Project Happy Cow (HappyCow)

PROJECT NUMBER:
14639

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
Yasir Khokhar, Connecterra (Netherlands)

COLLABORATING INSTITUTIONS:
Michael Nørremark, Aarhus University (Denmark)
Kees Lokhorst, Wageningen University and Research Centre (Netherlands)
Kaarle Jaakkola, Technical Research Centre of Finland (Finland)
Frank Oudshoorn, SEGES P/S (Denmark)

3. Agroptima, "The Internet of Fields": mobile farm management software

IMPACT: Agroptima is a simple and modern mobile application and cloud software tool for farmers, designed with farmers. It has a simple interface and farmers can work from the fields without a need for internet connection. Agroptima allows farmers to keep a record of their activities and crops, and to analyse costs, based on real data they gather with their smartphone. Farmers can also access information about which crops are the most profitable and identify loss-making tasks in order to make better decisions and save costs. The start-up has started to work with agrifood companies, including a corn-nuts producer that uses Agroptima to manage its 10,000 hectares of cornfields. Agroptima makes it easy to run a farm in a responsible and cost-effective way. In September 2018, the company rolled out Agroptima Maps, a series of tools that will allow farmers to view their tasks and fields in a much more visual, map-based format within the Agroptima app. Agroptima is currently the largest farm management software platform in Europe with 1.3 million acres under management across 1,700 clients. The company expects to exceed €1 million in turnover in the next 12 months and plans to use the funding for the internationalisation of the company, which is currently mainly focused in southern Europe, and for ongoing technological development. Agroptima has been identified by EU-startups.com as one of 10 EU start-ups leading the green revolution.

www.agroptima.com/en/

PROJECT NAME:
Agroptima, "The Internet of Fields": mobile farm management software

PROJECT NUMBER:
14894

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
Emilia Vila Valls, Agroptima (Spain)

COLLABORATING INSTITUTIONS:
Xavier Bargalló, Agro Igualada SCCL (Spain)
Jussi Nikander, MTT Agrifood Research Finland (Finland)

4. HappyGoats: a Sustainable Small Ruminants Farming Decision Support System (SSRF-DSS)

IMPACT: The European sheep and goat sector faces great challenges, with incomes being among the lowest in the agricultural industry and production costs continuously increasing. At the same time, farmers do not follow an established methodology regarding the management of their enterprises. Taking these issues into consideration, our team designed and developed HappyGoats. HappyGoats is a model-driven decision support web app for sustainable small ruminant farming. With HappyGoats farmers create future 'what-if' scenarios, which take into account all important farm aspects such as flock size, production, feeding, grazing, labour, costs and income. In return, the model estimates critical information such as energy and protein balance calculations, predicted milk production and profitability. All of these are illustrated with simple, easy-to-understand charts and projections, which help farmers to visualise the impact of their choices and make annual management planning decisions. Moreover, HappyGoats offers simple human-readable advice towards optimal milk and meat production and higher profitability, while also eliminating dependence on public subsidies. The app also provides a daily feed calculator, which can help farmers to optimise animal feeding and minimise relevant costs. Finally, HappyGoats can benefit consultants who support sheep and goat farmers by diversifying and deepening their services.

www.ict-agri.eu/node/38287

www.happygoats.eu/

www.sustainable-samothraki.net/project/livestock-monitoring/

PROJECT NAME:
HappyGoats: a Sustainable Small Ruminants Farming Decision Support System (SSRF-DSS)

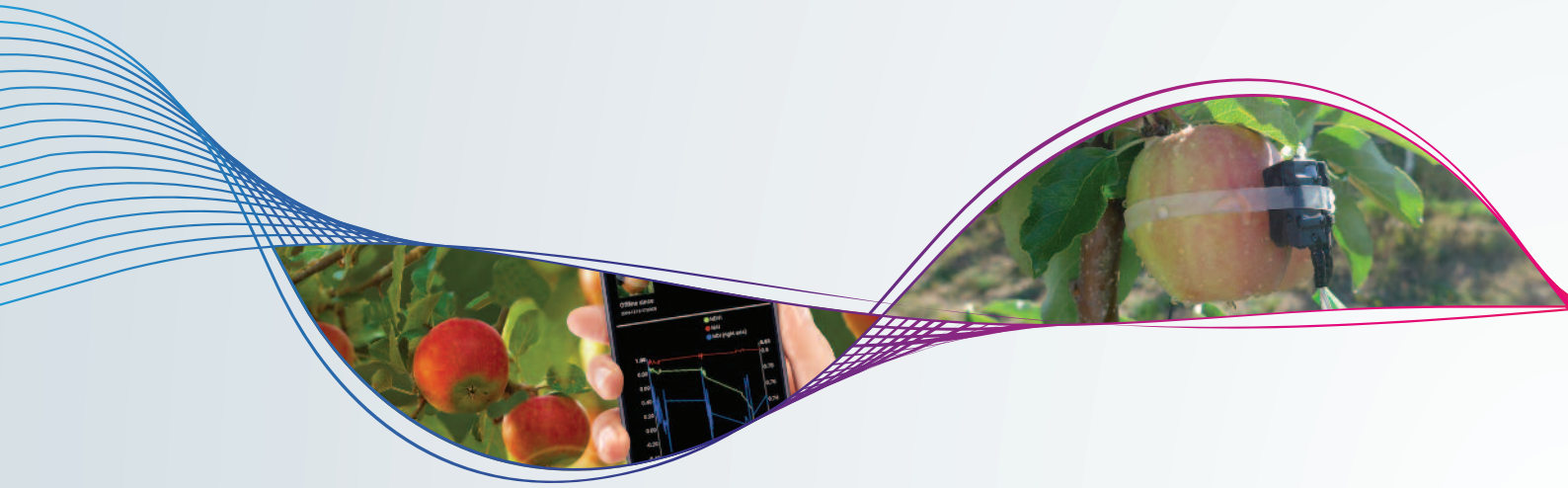
PROJECT NUMBER:
14906

PROJECT DATES:
March 1, 2015, to May 31, 2015

CO-ORDINATOR:
Yannis Skourtis, Integrated Information Technology & Digital Communication (Greece)

COLLABORATING INSTITUTIONS:
Marina Fischer-Kowalski, Alpen Adria Universität (Austria)
Georgios Arsenos, Aristotle University of Thessaloniki (Greece)
Sotiria Vouraki, Aristotle University of Thessaloniki (Greece)
Gus Rose, ZALF-Zentrum für Agrarlandschaftsforschung e.V. (Germany)

5. Future Internet – ORchards Automated MAnagement System (FI-ORAMA)



IMPACT: FI-ORAMA developed a mobile app available at the Google Playstore that visualises fruit development in orchards (apple, orange, olive, etc.), greenhouses (tomato) or post harvest (apple, banana, etc.). The app supports knowledge-based farm management, transferring the concept of precision agriculture to the horticultural industry. Data from soil and fruit sensors are implemented in a farm management system. The Android app is user friendly and robust, potentially providing data from own crop, as well as from research stations. The sensor data contains information on the orange/red pigments of the fruits measured using an index called NAI (Natur-Aktien-Index/Nature-Store-Index), which usually shows increased measurements during fruit development. Also, the sensor provides information on the chlorophyll pool of the fruit using the Normalised Difference Vegetation Index (NDVI). Most climacteric fruits show a decrease of chlorophylls during fruit development. When the climacteric is reached, the degradation rate of chlorophyll becomes faster and, therefore, the measurable NDVI decreases faster. Users can provide their data as open access to other users of the FI-ORAMA app, so farmers/managers can correlate measurements and productivity results with each other. The app was released in 2016 and has more than 100 downloads, with a rating of 4.7.

www.ict-agri.eu/node/37460

PROJECT NAME:
Future Internet – ORchards Automated MAnagement System (FI-ORAMA)

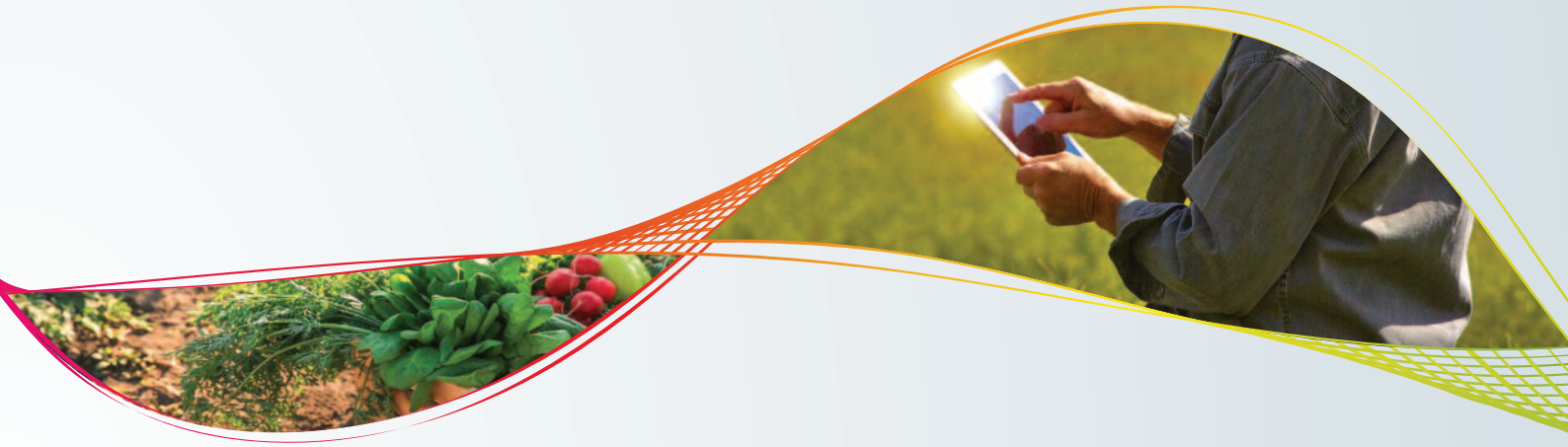
PROJECT NUMBER:
15198

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
Panagiotis Stamatelopoylos, OOB Software LTD (Cyprus)

COLLABORATING INSTITUTIONS:
Claus Grøn Sørensen, Aarhus University (Denmark)
Manuela Zude, Leibniz Institute for Agricultural Engineering (Germany)

6. Organic-AgriWare: an application for the organic agriculture community (Organic-AgriWare)



IMPACT: Organic agriculture stakeholders are faced with practical problems and obstacles. Organic-AgriWare developed a web-based application that provides context-aware access to Organic Eprints publications (provided by the International Centre for Research in Organic Food Systems – ICROFS) for end users (namely organic farmers, agricultural advisors and researchers). It is worth mentioning that the Organic-AgriWare web-based application has been developed based on FIWARE technologies. The Organic-AgriWare application can be used by farmers and advisors when they are searching for information based on scientific publications related to organic agriculture for their operations. The application operates under a freemium revenue model. In this model, its core features are offered free to end users, whereas additional features are offered for a price. More specifically, the basic feature is the ability to search and retrieve publications based on research about organic agriculture. Therefore, end users are provided with advanced search tools in order to access relevant content from research papers hosted in Organic Eprints provided by ICROFS. On the other hand, the premium version offers personalised publications to organic farmers, researchers and agricultural advisors.

www.icrofs.dk/en/research/european-research/organic-agriware/

PROJECT NAME:
Organic-AgriWare: an application for the organic agriculture community (Organic-AgriWare)

PROJECT NUMBER:
15341

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
PMO Department, Agroknow (Greece)

COLLABORATING INSTITUTIONS:
Ilse Rasmussen, ICROFS – International Centre for Research in Organic Food Systems (Denmark)
Tomas Norfelt, Knowledge Centre for Agriculture (Denmark)

7. Smart Good Agricultural Practices (S-GAP)

IMPACT: The S-GAP prototype system includes an automated checklist system for compliance standards. S-GAP provides two applications: (i) the android application, which is mainly used by farmers in the field for checking the various aspects after a completed action; and, (ii) the web application, which provides reporting from the checklist system. Information available in S-GAP was initially tested on sunflower and spring wheat in Turkey. The application supports good agricultural practices (GAP) for organic production in Turkey and Denmark. It can also handle resource allocation profiles depending on the type of production, soil conditions, type of crops grown, etc. Information that allows traceability of good agricultural practices is available. The S-GAP system can be generated more easily and efficiently compared to the current paper-based systems. It carries additional benefits in terms of fault-safe, cross-compliance and environmental EU regulations, etc. The Android application has been implemented at Kirklareli Soil and Water Research Institute in Turkey, and is currently being used in two field trials. The prototype includes an installation guide and user manual available at www.kpadltd.co.uk/sgap/help/.

www.ict-agri.eu/node/34700

www.kpadltd.co.uk/sgap/help/

PROJECT NAME:
Smart Good Agricultural Practices (S-GAP)

PROJECT NUMBER:
16174

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
Magda Krokida, KPAD Ltd (United Kingdom)

COLLABORATING INSTITUTIONS:
Bahattin Akdemir, Namik Kemal University (Turkey)
Claus Grøn Sørensen, Aarhus University (Denmark)

8. Field Readiness Indicator System (FERIA)

IMPACT: Field operations require the use of heavy vehicles and equipment on unpaved agricultural fields. When soil conditions are wet, equipment can cause substantial damage, leaving deep furrows. In extreme cases, implements sink and become stuck in the mud, causing considerable delays and expense to extricate the equipment. FERIA serves as a decision support system to decide when and where a certain operation can be scheduled causing minimum soil damage and targeting high productivity at the same time. The tool works together with soil moisture sensors and accurate weather forecasts providing the modelling capability for predicting field readiness based on the input data. Managers and machinery operators can assess the fields before allocating equipment and inputs. Non-supported assessments often cause equipment and material to be dispatched to fields that are not ready for fieldwork, impacting negatively on soil compaction and yield, where economical losses can range from 9-30% annually.

www.smart-akis.com/wp-content/uploads/techhtmpdf/1076.htm

www.ict-agri.eu/node/37280

www.youtube.com/watch?v=Z8b6b2wljR0&t=220s

PROJECT NAME:
Field Readiness Indicator System (FERIA)

PROJECT NUMBER:
16178

PROJECT DATES:
March 1, 2015, to August 31, 2015

CO-ORDINATOR:
Veselin Pizurica, Waylay (Belgium)

COLLABORATING INSTITUTIONS:
Claus Grøn Sørensen, Aarhus University (Denmark)

2015

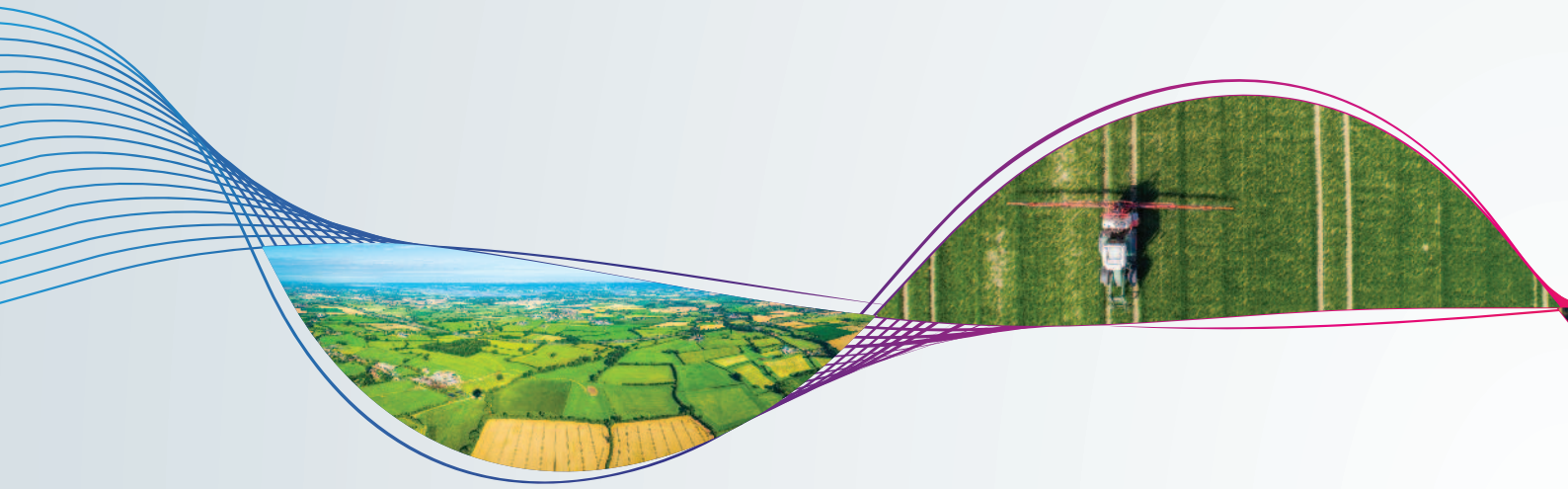
Enabling Precision Farming

Precision farming is a key element in sustainable intensification, i.e., increasing food production with smaller environmental footprints. Although precision farming has been studied and developed for more than two decades, adoption of the technology in primary agriculture is still behind expectations. There is, therefore, a need for research, development and innovation concerning the adoption of precision farming in primary agriculture.

EIGHT PROJECTS WERE FUNDED IN THIS CALL:

1. GeoWebAgri II
2. PAMCoBa
3. S3-CAV
4. Targ_App
5. VAROS
6. DockWeeder
7. CTF-OptiMove
8. GrassQ

1. Geospatial ICT infrastructure for precision farming operations management (GeoWebAgri II)



IMPACT: Field operations relating to arable farming are often very data-intensive tasks. The farm business, farm supply chain and public regulations are tied, and consist of quantitative data about crops, soils, machinery, personnel, water, weather, economics, energy, etc. These activities involve sensing, analysing, and two-way communication of a larger and larger scale of geospatial data streams. The GeoWebAgri II project initially focused on enhancing open geospatial standards derived from the ISO19100. The Agricultural Data Application Programming Toolkit (ADAPT) provides a platform for developing individual vendor plug-in translation between their proprietary data formats, based on a common ADAPT denominator, and the semantic model defined by the equipment manufacturers participating in the ADAPT network (AgGateway). The GeoWebAgri II project demonstrated the use of two tools specifically developed for agricultural machine implement control systems (MICS): first, a tool converting between typical map server files to task files; and second, the demonstration of a two-way communication of data with a fertiliser spreader task controller (TC) in a FMIS tool denominated CropManager. As agriculture is a significant and rapidly evolving domain of large-scale geospatial information exchange, the recommendation based on the GeoWebAgri II project experience and accumulated knowledge, is to support a worldwide forum that represent this domain under, for instance, the Open Geospatial Consortium (OGC) Europe agriculture working group.

www.geowebagri.eu/information.aspx

www.cropmanager.dk/

PROJECT NAME:
Geospatial ICT infrastructure for precision farming operations management (GeoWebAgri II)

PROJECT NUMBER:
29884

PROJECT DATES:
January 1, 2016, to December 31, 2017

CO-ORDINATOR:
Michael Nørremark, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Jere Kaivosoja, LUKE: Natural Resources Institute (Finland)
Ilkka Seilonen, Aalto University (Finland)
Ole Juhl, SEGES (Denmark)
Jens Wiebensohn, Rostock University (Germany)
Markus Jackenkroll, University of Hohenheim (Germany)
Bart De Lathouwer, Open Geospatial Consortium Europe (United Kingdom)

2. Precision Agriculture Methodologies for Cost Benefit Analysis (PAMCoBA)

IMPACT: Precision farming has significant potential to improve agricultural performance, ranging from improved use of crop nutrients, to increased crop quality, reduced overlaps and better production economy. Benefits are mainly gained from reduced overlap, yield improvements or pesticide cost reductions. In this study, a generic web app to assess the costs, benefits and environmental performance of precision farming on different farms was developed. This tool will assist farmers or advisors through a guided process that allows the evaluation and comparison of precision farming technologies with conventional systems. It will convey a specific assessment process in which the farmer is guided through a step-by-step approach. The tool is validated by means of different case studies involving small and medium farms from different rural areas of the participating countries (Denmark, Italy, and Switzerland). To extract and update national and regional data from farms (i.e., farm sizes, input costs), the database is conveniently linked to external databases. The app will allow users to retrieve information regarding independent and combined technologies, as well as its financial and environmental performance at an operational level. The trial version displays information through an interactive interface in the form of tables, charts, maps and reports. This study indicates that precision farming is mainly beneficial to large-scale farms when combined with the integration and application of different tools.

www.ict-agri.eu/node/35751

www.ict-agri.eu/sites/ict-agri.eu/files/deliverables/22-S_M_Pedersen.pdf

PROJECT NAME:
Precision Agriculture Methodologies for Cost Benefit Analysis (PAMCoBA)

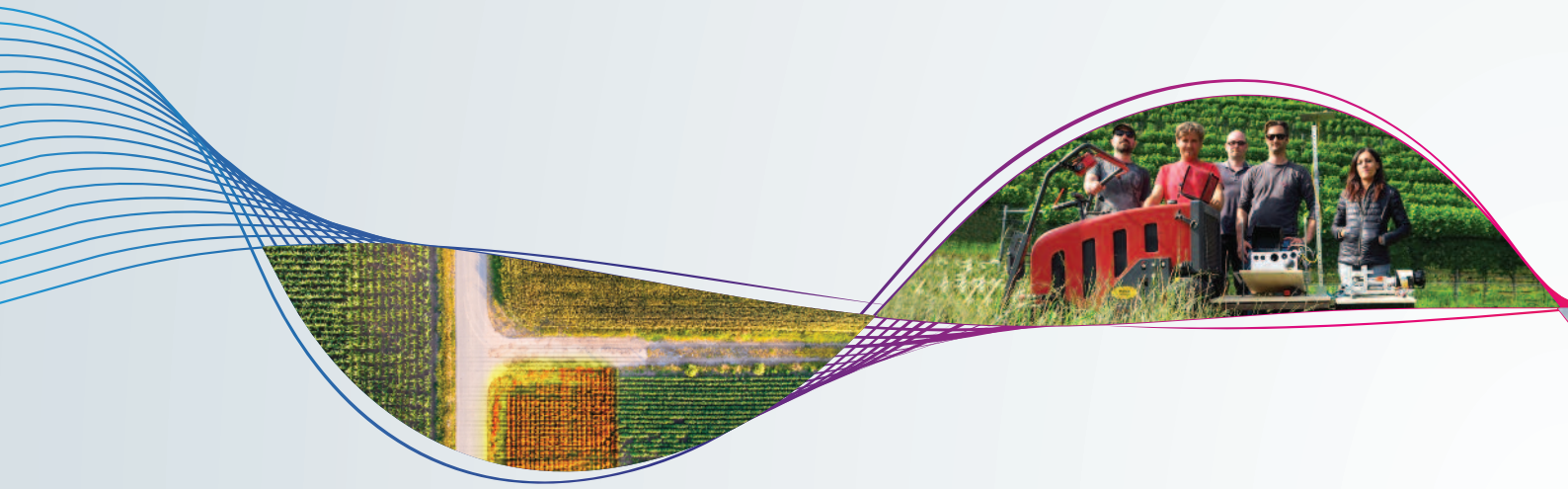
PROJECT NUMBER:
29743

PROJECT DATES:
January 1, 2016, to December 31, 2018

CO-ORDINATOR:
Søren Marcus Pedersen, University of Copenhagen (Denmark)

COLLABORATING INSTITUTIONS:
Martin Holpp, Agroscope (Switzerland)
Maurizio Canavari, University of Bologna (Italy)

3. Simultaneous Safety and Surveying for Collaborative Agricultural Vehicles (S3-CAV)



IMPACT: Accurate soil mapping is critical to allow highly automated agricultural vehicles to successfully accomplish important tasks including seeding, ploughing, fertilising and controlled traffic, with limited human supervision and ensuring high safety standards. S3-CAV gathers data from high-value crops in a 3D format; the system uses a sensor fusion of light detection and ranging (lidar), hyperspectral, thermal and RGB stereovision to identify crop status including plant nutrition, diseases and pest damage. The data is then made accessible to farmers though a farm management system. Additionally, in S3-CAV, terrain modelling and improved steering in vineyards has been performed and evaluated. According to Eurostat, 169,256 tonnes of crop protection products (CPPs; pesticides) were sold in 2016. CPPs have the potential to cause environmental damage. S3-CAV delivered an algorithm for volume-based spraying that reduces CPPs by more than 20%. S3-CAV also delivers new identification algorithms for grape ingredients and wine tree diseases with hyperspectral cameras. This tool will also help to better understand, identify and tackle infection diseases. With this new information it is possible to reduce the application of CPPs in vineyards by 50%, preventing potential environmental damage, as well as health costs for wine growers. The technology could potentially be used to develop all-terrain self-driving systems in agriculture. It is planned to commercialise the S3-CAV sensor box by 2019.

http://s3cav.eu/information/

PROJECT NAME:
Simultaneous Safety and Surveying for Collaborative Agricultural Vehicles (S3-CAV)

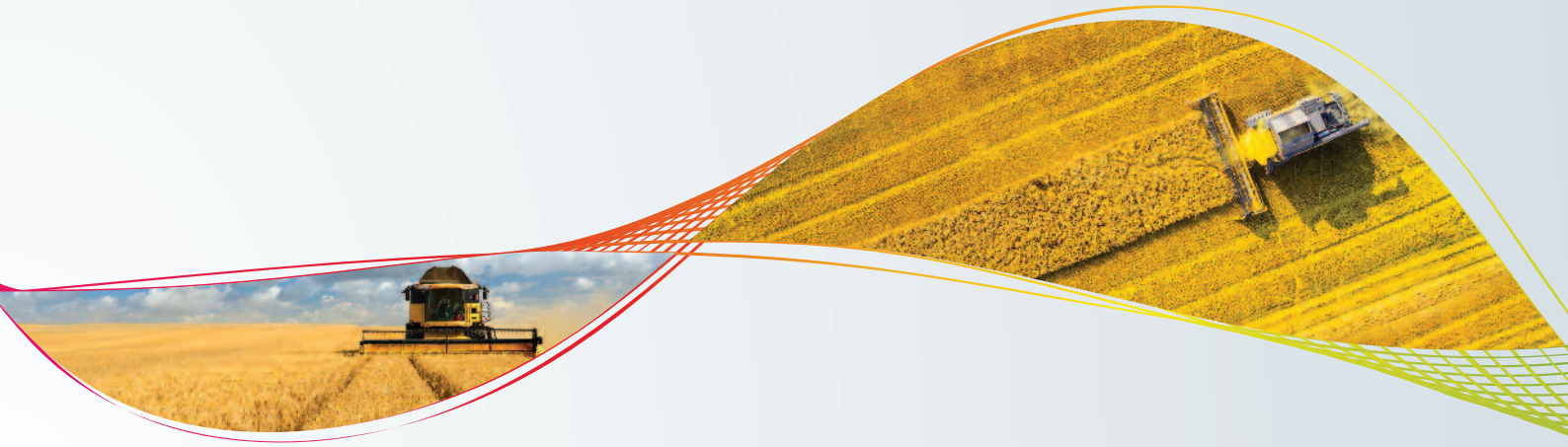
PROJECT NUMBER:
29839

PROJECT DATES:
January 1, 2016, to December 31, 2018

CO-ORDINATOR:
Michael Nielsen, Danish Technological Institute (Denmark)

COLLABORATING INSTITUTIONS:
Giulio Reina, University of Salento (Italy)
Stefan Rilling, Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS) (Germany)
Annalisa Milella, Institute of Intelligent Systems for Automation (Italy)
Peter Fröhlich, AgriCircle AG (Switzerland)

4. Putting sensors to work – Targeted Application of nutrients and pesticides (Targ_App)



IMPACT: One of the critical challenges for the successful adoption of precision farming in Europe is to mainstream the use of the technologies, ensuring their accessibility to farmers. These tools can become an integral part of crop management, supported by advisors/agronomists, where decisions are taken based on cost–benefit analysis. To achieve this, appropriate research-based validation, and comprehensive support to advisors and farmers, is essential. The Targ_App project has supported the adoption of knowledge on variable rate application into the novel web-based farm management and information systems CropManager and CropSAT.dk from SEGES in Denmark, and CropSAT.se and Tool box at precisionsskolan.se by Dataväxt in Sweden. In a research context, the Targ_App project is currently developing a tool to combine crop canopy sensing (on board as well as satellite based), historical yield data (validation statistics) and farmers' field knowledge to allow a precise input of applications such as fertilisers, plant growth regulators and crop protection products. The objective is to structure these developments as a support tool to allow advisors and growers to confidently use sensor and yield monitoring technologies to improve efficiency, sustainability and competitiveness on commercial farms. Survey results indicate that sensor technology is adopted primarily by farmers with a general interest in technology, and those farmers typically adopted GPS several years ago and use, e.g., biomass/yield maps actively in management. Also, farmers indicated that the deficiency in the use of sensor technologies is mainly attributed to a lack of user friendliness, technical problems and inadequate technical support.

www.ict-agri.eu/node/35753

PROJECT NAME:
Putting sensors to work – Targeted Application of nutrients and pesticides (Targ_App)

PROJECT NUMBER:
29924

PROJECT DATES:
January 1, 2016, to December 31, 2018

CO-ORDINATOR:
Kathrine Hauge Madsen, SEGES P/S (Denmark)
Michael Nørremark, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Pertti Rajala, Ekesis Oy (Finland)
Kjell Gustafsson, Agroväst Livsmedel AB (Sweden)
Bo Stenberg, Swedish University of Agricultural Sciences (Sweden)

5. VAriable Rate Operations for OrchardS (VAROS)

IMPACT: VAROS exploits the lack of variable rate application (VRA) systems specifically designed for precision monitoring and application in orchard management. Horticulture and orchard management consistently face a demand to produce and market high-quality products, providing a detailed system for the origin of the product, including treatments and the conditions that were followed during production. The VAROS project developed information and decision models with specific controllers for irrigation, spraying, and fertilisation of orchards. Commercialisation of the system has advanced among the partners who developed the software. Additionally, promotional videos have been presented to potential co-operators. Following the business plan, the spraying controller will be marketed through the established spin-off company. Furthermore, potential users can download demo versions with various technical specifications, documentations, guidelines and demonstration videos. Key findings from the research and adoption of PA technological innovations in orchards will impact current and future developments of VRA technologies in horticulture, particularly for users with a lack of appropriate management guidelines.

www.ict-agri.eu/node/35754

PROJECT NAME:
VAriable Rate Operations for OrchardS (VAROS)

PROJECT NUMBER:
29957

PROJECT DATES:
January 1, 2016, to December 31, 2018

CO-ORDINATOR:
Claus Grøn Sørensen, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Dejan Seatovic, Zurich University of Applied Sciences (Switzerland)
Manuel Pérez Ruiz, AgroSap (Spain)
Maurizio Canavari, University of Bologna (Italy)
Adnan Dogan, Atatürk Central Horticultural Research Institute (Turkey)

6. The DockWeeder robot enables organic dairy farming by controlling grassland weeds (DockWeeder)

IMPACT: Broad-leaved dock (*Rumex obtusifolius L.*) is a common and troublesome weed with a wide geographic distribution. This weed is readily consumed by livestock, but has a reduced nutritive value compared to grass. If this weed is consumed in large doses, the high contents of oxalic acid and oxalates can affect animal health. The project DockWeeder developed a robot capable of exploring a pasture by relying on GPS. It is equipped with an array of sensors capable of detecting weeds; the system is also coupled with a non-chemical method to eliminate them. The robot uses an existing, robust autonomous platform, and combines two-dimensional (2D) and three-dimensional (3D) imaging detection systems. The weeds are eliminated using an environmentally friendly hot water treatment system. Additionally, a system to control the weed through defoliation is currently under development. If the current software can be developed towards the recognition of individual plant types, it could potentially be used for purposes other than weeding. For example, it could also be used to monitor the growth and development of plants, providing information regarding optimum fertilisation and irrigation procedures.

www.ict-agri.eu/node/35755

www.dockweeder.eu/project/

www.youtube.com/watch?v=HhievtMShwc

PROJECT NAME:
The DockWeeder robot enables organic dairy farming by controlling grassland weeds (DockWeeder)

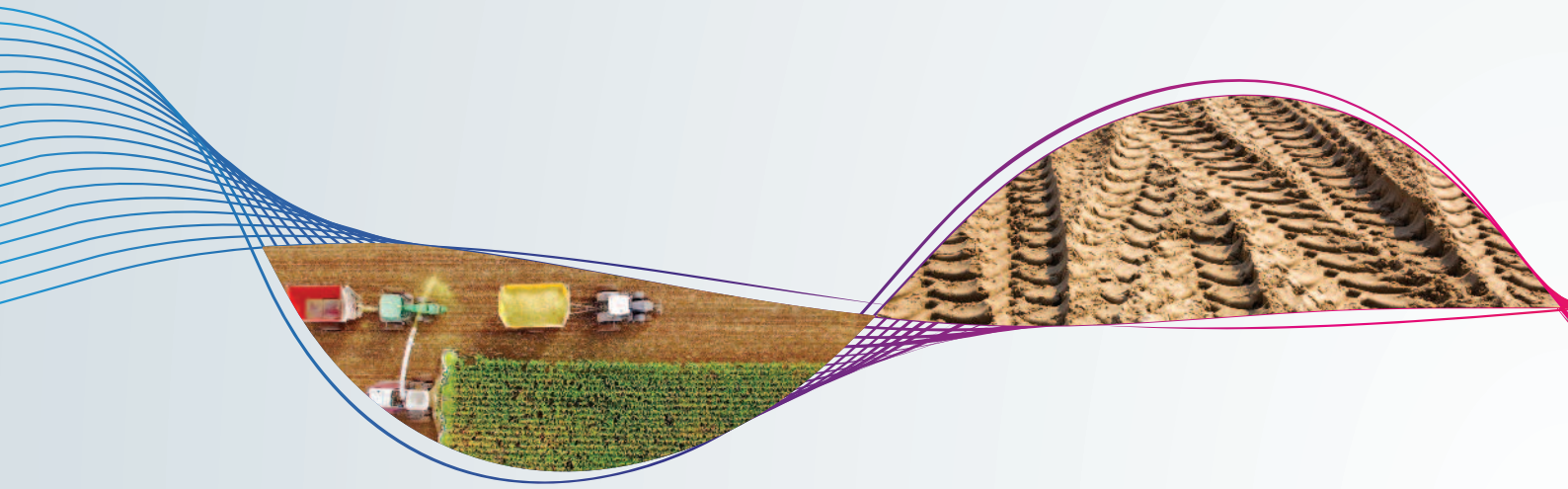
PROJECT NUMBER:
30079

PROJECT DATES:
January 1, 2016, to December 31, 2018

CO-ORDINATOR:
Frits van Evert, Wageningen University and Research Centre (Netherlands)

COLLABORATING INSTITUTIONS:
Hans Bachmann, Bachmann AG (Switzerland)
Anne-Marie Haute (France)
Bertrand Pinel, Terrena Innovation (France)
Dejan Seatovic, Zurich University of Applied Sciences (Switzerland)
Lazaros Nalpantidis, Aalborg University (Denmark)
Thomas Anken, Agroscope (Switzerland)

7. Mainstreaming Controlled Traffic Techniques and Optimization of Movements (CTF-OptiMove)



IMPACT: The CTF-OptiMove project is helping to deliver the promise of improved efficiency and sustainability from controlling traffic in fields. The concept of controlled traffic farming (CTF), where soil compaction caused by wheel traffic is purposely restricted, has existed for many years, but its uptake has been minimal. Why? CTF was perceived as an inflexible system with limited application. This project seeks to address this by: (i) determining the impact of machine traffic on the soil and crop using farmers' opinions in surveys about CTF and related technologies; (ii) developing web-based machinery path optimisation tools; and, (iii) disseminating these concepts to farmers. The path- and route-optimisation tools will allow the planning of efficient paths within fields to guide auto-steer tractors. This research will open growers' minds to the concept of controlling traffic paths within fields to optimise machine and crop performance, and to protect the soil. By exploiting the accurate positioning and semi-autonomous control (auto-steer) systems available on today's tractors, the route/path planning tools will facilitate the implementation of traffic control on a larger number of farms when fully developed. Also, efficiency and sustainability of the land will be greatly improved.

www.ict-agri.eu/node/35836

PROJECT NAME:
Mainstreaming Controlled Traffic Techniques and Optimization of Movements (CTF-OptiMove)

PROJECT NUMBER:
35778

PROJECT DATES:
February 1, 2016, to January 31, 2019

CO-ORDINATOR:
Claus Grøn Sørensen, Aarhus University (Denmark)

COLLABORATING INSTITUTIONS:
Adam Ciecko, University of Warmia and Mazury (Poland)
Dionysis Bochtis, Aarhus University (Denmark)
Sytze de Bruin, Wageningen University and Research Center (Netherlands)
Onno Roosenschoon, Wageningen University and Research Centre (Netherlands)
Jürgen Vangeyte, Institute for Agricultural and Fisheries Research – ILVO (Belgium)
Chaosheng Zhang, National University of Ireland, Galway (Ireland)
Kevin McDonnell, University College Dublin (Ireland)
Dermot Forristal, Agriculture and Food Development Authority – Teagasc (Ireland)
Søren Marcus Pedersen, University of Copenhagen (Denmark)
Jacob Van Den Borne, Van Den Borne Aardappelen (Netherlands)
Jens Ole Pedersen, Gefion (Denmark)

8. Development of ground based and Remote Sensing, automated 'real-time' grass quality measurement techniques to enhance grassland management information platforms (GrassQ)

IMPACT: GrassQ enabled recent sensing and computational technology developments to be brought together in order to research and develop prototype information services to support improved grassland management. Some of the main potential impacts of this project arise from the cloud-based GrassQ portal where satellite, drone and *in situ* data and information tools for operational dairy and beef farms can be easily accessed. The GrassQ portal enables researchers, grassland specialists and farmers alike to use the Discovery Module to access free 10m Copernicus Sentinel-2 data or request drone over-flights. Automated work flows allow these datasets to be integrated with *in situ* data and produce computed estimates of grass metrics such as dry matter (DM) and crude protein (CP). Additional vegetation indices maps can be used to assess the biomass and general vitality of grass growth. Additional tools enable *in situ* data to be uploaded and stored. All of these features are available through an easy-to-use prototype smartphone app. The overall impact of this project is not so much an introduction of yet another website or smartphone app, but the incorporation of these new satellite and drone sensing technologies, coupled with online modules, functions and work flows, into existing national grassland management tools and practices.

www.ict-agri.eu/node/35851

www.grassq.eu/grassq/

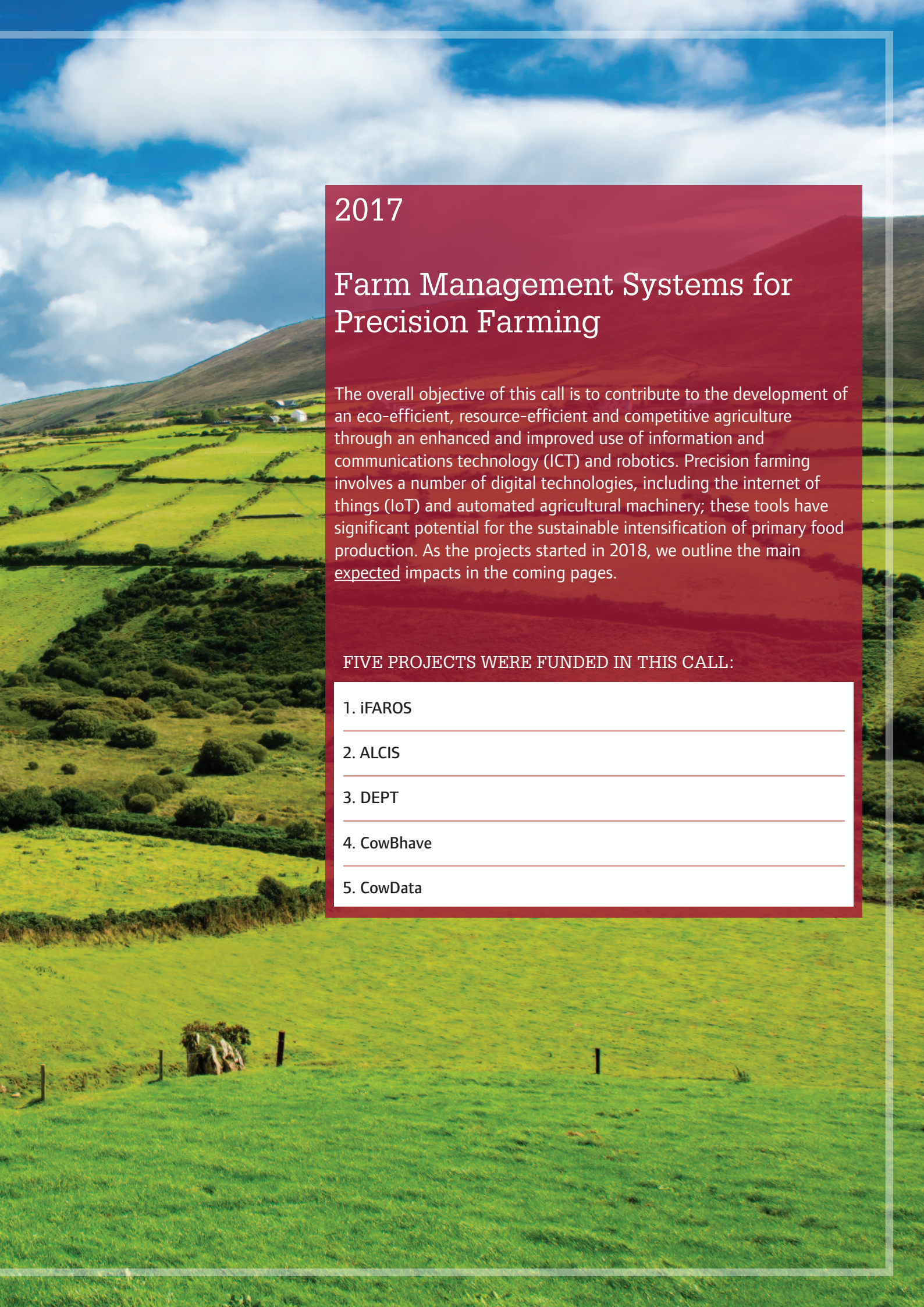
PROJECT NAME:
Development of ground based and Remote Sensing, automated 'real-time' grass quality measurement techniques to enhance grassland management information platforms (GrassQ)

PROJECT NUMBER:
35779

PROJECT DATES:
February 1, 2016, to December 31, 2018

COORDINATOR:
Bernadette O'Brien, Agriculture and Food Development Authority – Teagasc (Ireland)

COLLABORATING INSTITUTIONS:
Frank Oudshoorn, SEGES P/S (Denmark)
Michael Denis Murphy, Cork Institute of Technology (Ireland)
Timothy McCarthy, Maynooth University (Ireland)
Patrick Halton, TrueNorth Technologies (Ireland)
Philipp Trénel, AgroTech A/S (Denmark)
Enda Keane, TreeMetrics Ltd (Ireland)
Eija Honkavaara, Finnish Geospatial Research Institute, National Land Survey (Finland)
Jere Kaivosoja, Green Technology, Natural Resources Institute Finland (LUKE) (Finland)
Christina Umstatter, Work, Buildings and System Evaluation (Switzerland)
Peter Hemmingsen, AscendXYZ (Denmark)



2017

Farm Management Systems for Precision Farming

The overall objective of this call is to contribute to the development of an eco-efficient, resource-efficient and competitive agriculture through an enhanced and improved use of information and communications technology (ICT) and robotics. Precision farming involves a number of digital technologies, including the internet of things (IoT) and automated agricultural machinery; these tools have significant potential for the sustainable intensification of primary food production. As the projects started in 2018, we outline the main expected impacts in the coming pages.

FIVE PROJECTS WERE FUNDED IN THIS CALL:

1. iFAROS
2. ALCIS
3. DEPT
4. CowBhave
5. CowData

1. Decision Support for Optimized Site-Specific Fertilization based on Multi-source Data and Standardized Tools (iFAROS)

PROJECT: The overarching aim of the iFAROS project is to sustain and increase agronomic productivity and environmental performance for small European farmers by exploiting multi-source data to optimise fertilisation in wheat cultivation. The specific technical objectives of iFAROS are: (i) to develop a novel cloud-based application, acting as an intelligent middleware with data analytics capabilities; (ii) to improve decision support algorithms for farm management and operations; (iii) to develop an advanced FMS for applying and exploiting (i) and (ii) in an easy-to-understand manner, also for small farmers; and, (iv) to apply the produced site-specific management fertiliser application map in an automated way by utilising ISOBUS. All research and development activities shall be grounded in and thoroughly tested under real-world conditions of wheat production. Complementary usage conditions in Germany, Belgium, Switzerland and Spain will ensure the broad applicability of project results.

www.ict-agri.eu/node/38661

PROJECT NAME:
Decision Support for Optimized Site-Specific Fertilization based on Multi-source Data and Standardized Tools (iFAROS)

PROJECT NUMBER:
37592

PROJECT DATES:
January 1, 2018, to December 31, 2020

CO-ORDINATOR:
Dimitris S. Paraforos, University of Hohenheim (Germany)

COLLABORATING INSTITUTIONS:
Manuel Pérez Ruiz, AgroPlanning (Spain)
Dimitrios Argyropoulos, University of Hohenheim (Germany)
Jacob Carballido, Perdum NV (Belgium)
Thomas Anken, Agroscope (Switzerland)
Andreas Abecker, Disy Informationssysteme GmbH (Germany)

2. Agricultural Low Cost Integral System of nodes with communication networks for remote water management with sensors and monitoring of the vegetative state of crops (ALCIS)

PROJECT: The ALCIS project will cover several aspects of crop management during the production phase in the field. ALCIS will be designed as an integral device that will allow farmers to make decisions and control different variables involved in crop management in real time. The main outputs of this device will be: (i) evaluation of crop aspects such as health, irrigation and fertilisation by using camera systems; (ii) optimisation of resource management (water, energy, fertilisers, etc.) including management algorithms; (iii) crop production traceability improvement using 'cloud' systems (data gathering, treatment and storing); (iv) proximal sensing technologies available to farmers with limited resources; (v) robust communication system capable of sending from the field to the office and vice versa; (vi) open system capable of including new tools depending on local scenarios (crop, soil, weather, management, etc.); and, (vii) new models for resource management in agriculture based on real data. The current advances on the project are: field test of a previous communication-sensor-software system (BT, Turkey); a wireless soil moisture low-cost sensor network (UNIPA, Italy); prototype low-cost sensors for soil moisture and sunlight analysis tested for lettuce crop (TN, Spain); and, water management models tested in the field for a variety of crops (ATB, Germany).

www.ict-agri.eu/node/38662

PROJECT NAME:
Agricultural Low Cost Integral System of nodes with communication networks for remote water management with sensors and monitoring of the vegetative state of crops (ALCIS)

PROJECT NUMBER:
37517

PROJECT DATES:
January 1, 2018, to December 31, 2018

CO-ORDINATOR:
Antonio Ruiz Canales, TeleNatura EBT (Spain)

COLLABORATING INSTITUTIONS:
Yunus Emre Aydin, Bilimtek Teknoloji A.S (Turkey)
Roberto Schifano, Dipartimento Scienze della Terra e del Mare University of Palermo (Italy)
Francesco Parello, Dipartimento Scienze della Terra e del Mare University of Palermo (Italy)
Mohammad Zare, Leibniz-Institut für Agrartechnik und Bioökonomie e.V. (ATB) (Germany)

3. Data Ecosystem Product Line (DEPT)

PROJECT: The main innovative aspect of this project lies in interconnection of the main data product line as the cornerstone of a farm software ecosystem, and its interaction and interoperability with the use-cases. Each use-case will develop its own applications (apps) incorporating the different data inputs, such as real-time meteorological data, soil moisture content, tractor fuel consumption, yield data and spectral signatures, as well as manually entered data. The developed apps in the use-cases will be interconnected to the main software product line and will have the capability to be expandable and configurable for various sensor types and data entries. This is an industry-driven project. AVR (co-ordinator) and GEOSYS are eager to develop commercial solutions to market and sell the developed products. In November 2018, AVR was awarded with the ICT Digital Project of the Year by the Flemish magazine *Data News*. The winning project has been developed in the framework of this ICT-AGRI project and is funded in Flanders by the Flemish funding agency VLAIO, and implements sensing technology on the AVR machinery to gather field data, e.g., about the soil or potato size. The project has an economic impact in terms of reduction of production cost and crop yield improvement. Additionally, the potential decrease in inputs and fuel consumption will have a positive environmental impact. The access to relevant data and the adoption of digital technologies by farmers poses an additional knowledge-sharing impact for the agriculture community.

www.ict-agri.eu/node/38663

PROJECT NAME:
Data Ecosystem Product Line (DEPT)

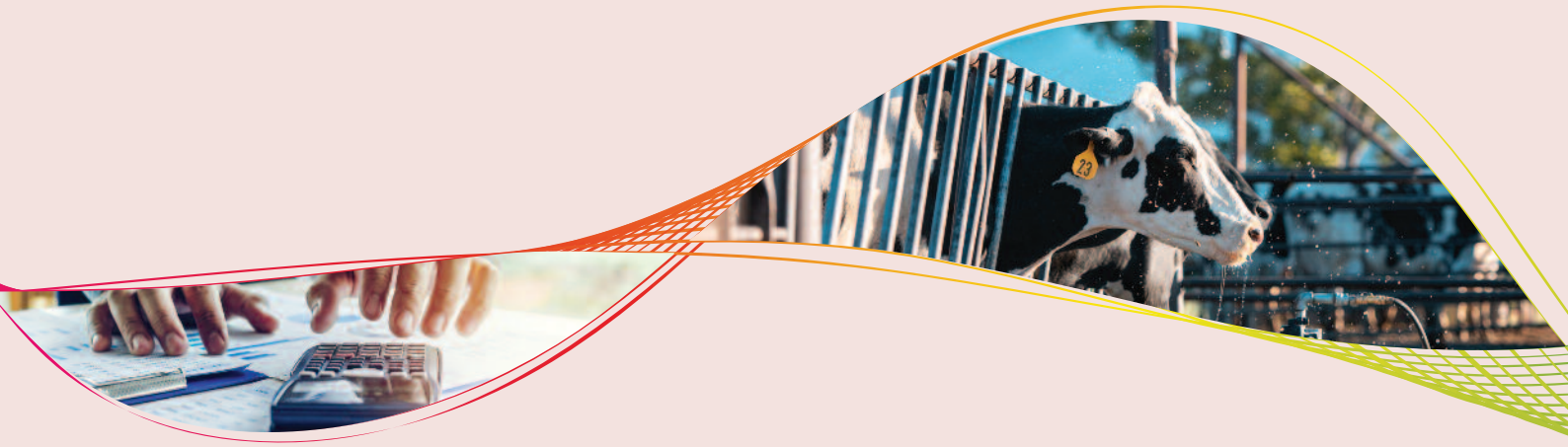
PROJECT NUMBER:
37675

PROJECT DATES:
January 1, 2018, to December 31, 2020

CO-ORDINATOR:
Joke Cambie, AVR (Belgium)

COLLABORATING INSTITUTIONS:
Jürgen Vangeyte, Institute for Agricultural and Fisheries Research – ILVO (Belgium)
Hasan İmge Çelik, GEOSYS GIS Ltd (Turkey)

4. Basic low-cost open-source automated monitoring system for discrimination of dairy cow behavioural activities (CowBhave)



PROJECT: CowBhave is proposed as a novel low-cost open-source automated monitoring system that will be offered as a free support to dairy farmers across Europe to:
(i) allow for building a basic low-cost open-source automated monitoring system for discrimination of dairy cow behavioural activities;
(ii) get information on the system accuracy in relation to visual observation of images acquired by multi-camera video-recording systems considered as the 'gold standard';
(iii) assess the system accuracy in relation to other sensor-based monitoring systems commonly utilised for cow behaviour detection;
(iv) make better decisions based on real data; and,
(v) save time by avoiding the direct observation of the herd, both for large herds due to the modularity of the system, and for small herds for which a costly system would not be economically sustainable.

www.ict-agri.eu/node/38665

PROJECT NAME:
Basic low-cost open-source automated monitoring system for discrimination of dairy cow behavioural activities (CowBhave)

PROJECT NUMBER:
37645

PROJECT DATES:
January 1, 2018, to December 31, 2018

CO-ORDINATOR:
Claudia Arcidiacono, Department of Agriculture, Food and Environment, University of Catania (Italy)

COLLABORATING INSTITUTIONS:
Matti Pastell, Natural Resources Institute Finland (LUKE) (Finland)
Stephanie Vanweyenberg, Institute for Agricultural and Fisheries Research – ILVO (Belgium)

5. Combination of indoor and outdoor data for improved farm management (CowData)

PROJECT: The aim of this project is to demonstrate the advantages of a generic data platform. By means of case studies, CowData will showcase how existing sensor prototypes can be combined with additional on-farm (sensor) data to build new applications and improve decision support systems. The first case study will examine the possibility of using marginal land in LFAs (less favoured areas) for grassland-based production systems. The second case study will focus on behavioural monitoring by evaluating the possibilities of combining different information streams in order to develop algorithms for health and welfare tracking. In addition to demonstrating the advantages of a generic data platform, the project also aims to disseminate the 'success stories' to different stakeholders, and collect their feedback and input.

www.ict-agri.eu/node/38668

PROJECT NAME:
Combination of indoor and outdoor data for improved farm management (CowData)

PROJECT NUMBER:
37729

PROJECT DATES:
January 1, 2018, to December 31, 2020

COORDINATOR:
Marianne Cockburn, Agroscope (Switzerland)

COLLABORATING INSTITUTIONS:
Christina Umstatter, Work, Buildings and System Evaluation (Switzerland)
Stephanie Van Weyenberg, Institute for Agricultural and Fisheries Research – ILVO (Belgium)
Kerstin Barth, Thünen-Institut (Germany)
Kris Demets, Signum Engineering (Belgium)
Edna Hillmann, HU Berlin (Germany)

Glossary of terms

ABBREVIATIONS

CI: Calving Index
CP: Crude protein
CPP: Crop protection products
CTF: Controlled traffic farming
DM: Dry matter
DSS: Decision support system
DST: Decision support tool
ECU: Electronic central unit
FMIS: Farm management information systems
GAP: Good agricultural practices
GHGE: Greenhouse gas emissions
GIS: Geographic information system
GPS: Global positioning system
GWP: Global warming potential
ICT: Information and communications technologies
IoT: Internet of things
IPPC: Integrated pollution and prevention control
IT: Information technologies
LAN: Local area networks
LCA: Life cycle assessment
LFA: Less favoured area
MAN: Metropolitan area networks
MICS: Machine implement control systems
NAI: Natur-Aktien-Index/Nature-Store-Index
NDVI: Normalised Difference Vegetation Index
OEM: Original equipment manufacturer
OGC: Open geospatial consortium
PA: Precision agriculture
RFID: Radio-frequency identification
SDI: Spatial data infrastructure
TC: Task controller
VRA: Variable rate application
VRN: Variable rate of nitrogen
WFS: Web feature services
WSN: Wireless sensor network

GLOSSARY

DA-meter: handheld device that non-destructively measures the difference of absorbance between 670 and 720nm. The IAD value correlates with the chlorophyll content in the mesocarp (flesh) of the fruit, and can be used as a maturity indicator of apples or pears.
Estrus/oestrus: a recurring period of sexual receptivity and fertility in many female mammals; heat.
FISPACE: Future Internet Business Collaboration Networks.
FIWARE: a platform driven by the European Union for the development and global deployment of information and communications technology (ICT).
Horizon 2020: the biggest ever EU research and innovation programme, with nearly €80 billion of funding available over seven years (2014 to 2020).
Hyperspectral imaging: collects and processes information from across the electromagnetic spectrum.
ISO19100: a series of standards for defining, describing and managing geographic information, i.e., information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth.
ISOBUS: international communication protocol that sets the standard for agriculture electronics.
Lameness: abnormal gait or stance of an animal that is the result of dysfunction of the locomotor system.
Lidar/Ladar: surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor.
Microwave radar: measuring instrument in which the echo of a pulse of microwave radiation is used to detect and locate distant objects.
Nosema: small, unicellular parasite recently reclassified as a fungus that mainly affects honeybees.
RGB stereovision: sensor that gives you depth and colour. In most cases, this refers to a Kinect-style camera (or Primesense, Realsense), but a stereo camera could also create coloured point clouds (if one camera is an RGB camera or if you have an additional camera).
Rumex obtusifolius: perennial herbaceous flowering plant that grows to a height of 50-130cm (20-51in). It is easily recognisable by its very large oval leaves with cordate bases and rounded tips, some of the lower leaves having red stems.
Sentinel-2: Earth observation mission developed by the European Space Agency (ESA) as part of the Copernicus Programme to perform terrestrial observations in support of services such as forest monitoring, land cover changes detection, and natural disaster management.
Themography: test that uses an infrared camera to detect heat patterns and blood flow in body tissues.
Transponder: device for receiving a radio signal and automatically transmitting a different signal.

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