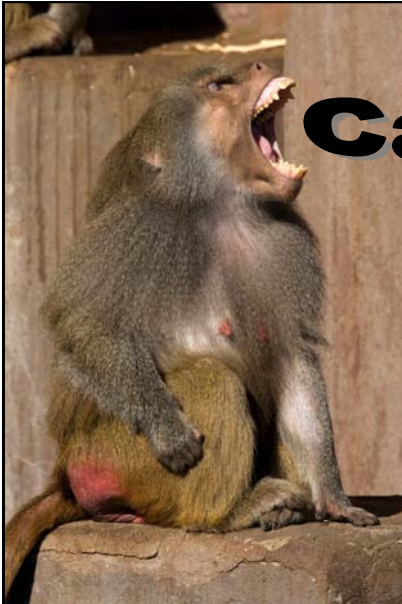


Call for Projects



ICT-AGRI: Call Pre-announcement

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EU:
Large-scale
EU Projects
on Robotics
in Agriculture



Malta:
Robot
picks
Mushrooms

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DEAR PARTNERS, FRIENDS
AND COLLEAGUES

THANK YOU VERY MUCH FOR ALL
YOUR HARD WORK DURING 2011

**Wishes for a joyful holiday season
and a Happy New Year**

FROM

Niels, Juer and Per



ICT-AGRI is funded by the European
Commission's 7th Framework Pro-
gramme, Contract no. 235460

ICT-AGRI 2nd Call Pre-announcement

Iver Thysen, Danish Agency for Science, Technology and Innovation, ivth@fi.dk

New ICT-AGRI CALL: ICT and Automation for a Greener Agriculture

The ICT-AGRI 2nd call for trans-national projects aims at improving the utilization of ICT and automation for a sustainable use of natural resources, reduction of agriculture's environmental footprints, adaptation to and mitigation of climate change, while securing food supply, quality and safety, farm economy, working conditions, and animal welfare.

Scope of the call

The call takes its offset in agriculture's grand challenges as expressed in the 3rd SCAR Foresight Exercise*. According to the foresight, a radical change in food consumption and production in Europe is unavoidable.

ICT-AGRI considers ICT and automation to have a crucial enabling role of for accomplishing radical changes in primary agricultural production.

The call is therefore focused on innovations in the use of ICT and automation in primary agriculture. Projects are expected to develop and demonstrate feasible solutions for farming with proven positive effects towards a greener European agriculture.

Funding

Funding in this call is provided by national funding agencies in a virtual common pot, meaning that funding is restricted to be used within the respective funding countries. Expected total funding amounts to € 4- 5 million. Funding conditions and amounts vary between countries.

Call Process

The call is using a two-step selection process. Pre-proposals are reviewed by the funding agencies for eligibility and relevance according to call topics, added-value of cross-border collaboration and national priorities. Consortia behind successful pre-proposals are invited to submit a full proposal, which will go through a peer-review before the final selection and funding decision by the funding agencies

Call Objectives and Topics

The overall objective is to create progress in the adoption of ICT and automation in farming practice with a proven effect on sustainable use of natural resources, reduction of agriculture's environmental footprints, adaptation to and mitigation of climate changes, and agricultural efficiency.

Projects can include a combination of pre-competitive research, development and demonstration activities:

Research and Development may be technologies for integrating sensors, robotic machines, decision support systems and farm management systems; business models for sharing data and software in open farm management systems; accommodation of farming practices and production systems to farming based on ICT and robotic machines.

Applied research may be adaptation of decision support systems and robotic machines to other biological, climatic, environmental and farming conditions than in the original version; retrieval of knowledge from agriculture based on empirical data from real world farming.

Demonstrations may be test of ICT solutions including decision support systems and robotic machines under real farming circumstances in different countries; interactions between farmers and public services based on ICT and automation aiming at improved environmental regulation and monitoring as well as less administrative burdens for farmers.

Important eligibility criteria

Projects must include partners from at least three funding countries.

Partners from non-funding countries can participate by funding their own involvement.

Projects must be of duration up to 36 months.

Projects are required to state quantified and measurable expectations of the sustainable use of natural resources, reduction of agriculture's environmental footprints and adaptation to and mitigation of climate changes.

Projects are required to seek compatible, transferable and scalable methods and technologies.

Projects must demonstrate a clear added-value of being carried out trans-nationally.

Call Opening

The electronic submission system is expected to open in March 2012 with a deadline for submitting pre-proposals by the end of April 2012.

Further Information

The full Guide for Applicants including national funding and national regulations is available at the time of call opening. The ICT-AGRI partners representing the funding agencies are available for more information. For information and contact, visit our homepage ict-agri.eu

Online search for partners

A dedicated tool for suggesting proposals and searching for partners is available from January 2012 in ICT-AGRI Meta Knowledge Base db-ictagri.eu

* ec.europa.eu/research/agriculture/scar/

ICT-AGRI funded project QUAD-AV

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Collaborative experiment to improve AGV safety procedures

Manual labour will be replaced by auto-guided vehicles in future European agriculture. Safety issues with such vehicles have to be matured before this can happen. This is the goal of ERA-NET funded project Ambient Awareness for Autonomous Agricultural Vehicles (QUAD-AV). In ultimo September the project brought together leading researchers from Denmark, Germany, Italy and France. Each brought a top-notch sensor which can improve the awareness of the surroundings of a vehicle. CLAAS provided a tractor for this experiment where the goal was to collect data for mapping the sensors and development of algorithms.



QUAD-AV Team

A team of researchers from Cemagref, France, University of Salento, Italy, Fraunhofer, Germany, and Danish Technological Institute, Denmark, gathered at Esrumgård in Denmark for a week in late September to mount each of their sensors on a tractor from CLAAS.

The purpose of this endeavour was to collect a common dataset for the ICT-AGRI ERA-NET project *Ambient Awareness for Autonomous Agricultural Vehicles (QUAD-AV)*. Its goal is to investigate application of state of the art sensors to solve safety issues with autonomous agricultural vehicles. Each such sensor has its

strengths and weaknesses, but together they may form a reliable safety system.

The second day all sensors were mounted on the CLAAS Axiom 840 which then was ready for a test drive and calibration. The following two days about 500 GB of data

was recorded capturing typical agricultural settings with lakes, trees, steep hills, poles, vehicles, people and animals, and ditches; and last but not least, safe driving in the vast empty fields. The weather was mostly sunny, with periods of overcast or mist, giving a variety of conditions to work on.

The sensors used in the experiment were:

RADAR with gyro and odometer for mapping the surroundings independently of GPS data. Once per second a measurement can aid the vehicle on seeing obstacles 360 degrees around it.

LIDARs rotating to produce a full 3D map of the front of the vehicle, which can detect the presence of obstacles and the inclination of the ground.

Stereo cameras which can produce fast estimates of ground inclination and obstacles in front of the vehicle. Also, with High Dynamic Range imagery the obstacle shapes and colours can be analysed and classified.

Thermographic vision for detecting hidden people and animals, vehicles, concrete and large stones, and poles in low light conditions.

Naturally, the experiment relying on four computers each with a nest of cables on a moving tractor was not without problems. Every sensor had its downtime in turn during the recordings, but then again, a safety

system that would crash if one sensor fails is not that safe in the real world.

For more information visit the project website: www.quad-av.eu.



The tractor with RADAR and odometer, rotating LIDARs, stereo cameras and thermographic camera.



A person is hiding inside the maize, which is impossible to see on the High dynamic range stereo cameras.



Same view as B from the thermographic camera, where the hidden person is clearly visible.

agriXchange network for data exchange in agriculture

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A common data exchange system for agricultural systems - Integrated Framework and aXTool as its implementation

In the knowledge-based bio-economy, information sharing becomes more important. ICT plays an enabling key role. Information sharing in agri-food is complex, because of many aspects and dimensions involved. There is an existing base of information systems that lacks standardization and has inefficient exchange of information. This leads to inefficient business processes and hampers adoption of new knowledge and technology. There is a need for an integrative framework and network for coordination.

Reference framework to enhance interoperability

One of the aims in agriXchange project is to set up a reference framework to support and enhance harmonizing of data exchange in agriculture. The question is, what are the key elements needed to trigger harmonizing? We concluded that the starting point is to increase awareness about people working with this challenge in their every day life, awareness about existing and reusable solutions, existing standards, and connect them all.

So, the key functions in harmonizing work is to share the existing solutions within the community, discuss them and give feedback and evaluations based on practical experience. The quality maintenance requires that contributing the solutions must take place by detailed instructions and rules, and with contributor's name and contact information. Furthermore, evaluations of contributed solutions may take place only by members who have implemented the solutions of other contributors in another environment e.g. in LivingLabs.

Community members

The agriXchange community is open for everyone. Members are typically software or hardware developers, information modelers, or business users like advisors, researchers, companies, etc. The developer's scope of interest is usually narrow like single data sharing interfaces, while business user's scope of interest is wider, capturing several solutions of e.g. use cases, data exchange interfaces, standards, etc.

Shared information

The shared information can be wide scope use cases and/or narrow scope data exchange or data sharing interfaces. The wide scope use case description covers a whole domain specific procedure fulfilling a certain user need, e.g. fertilizing from planning to execution. The use case description includes typically a diagram illustrating a chain of processes, actors and data transactions, and an information model listing the information items included in the data exchange interfaces.

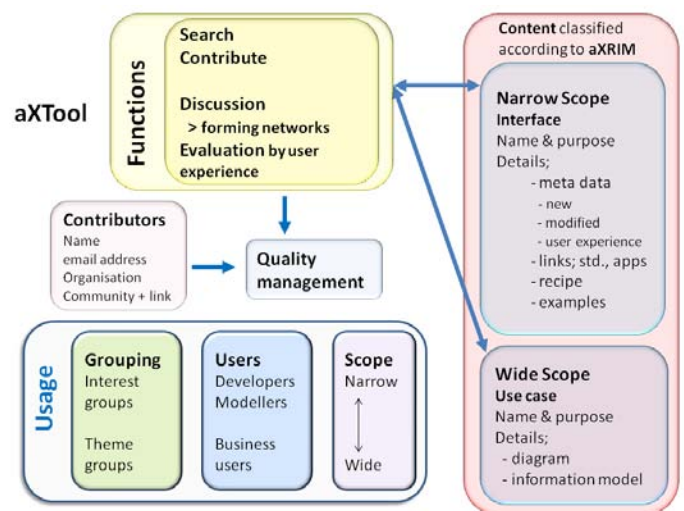
The narrow scope covers only a single data exchange interface between two actors.

The description includes metadata of the purpose of the interface, technical requirements/environment, whether the solution is new or modified, and comments on user experience. The description has also links to available APIs, standards and possibly a recipe for building the interface.

aXRIM for finding information

Contributed interface solutions are classified according to the agriXchange Reference Information Model (aXRIM). aXRIM consists of structured classes and attributes of key factors relevant to data exchange in the agri-food sector. The main classes are Process, Actors, Communication protocol and Data. The aXRIM classifica-

tion of the contributed interface solutions assists the search function of the Reference Framework to act efficiently and to provide users with relevant search results. The agriXchange Reference Framework can be presented as a diagram shown below, and its implementation in the agriXchange platform is called aXTool.



aXTool

The main functionalities of the aXTool are already implemented and available in the agriXchange platform. aXTool is still under construction and constant improvement work in order to serve the users in a best possible way. Feel free to try it and give your user opinion, how to improve further.

Project info

The project runs from 2009 to 2012 and is funded with 1 M€ by EU. The consortium has 15 partners from 11 countries. Coordinator is Sjaak Wolfert, Wageningen UR, The Netherlands. Liisa Pesonen is a WP leader responsible of the reference framework development.

More info: agriXchange.eu

Agricultural Engineering Technology

Iver Thysen, Danish Agency for Science, Technology and Innovation, ivth@fi.dk



Good news for EU research in agricultural technology Opportunities like never before!

This optimistic message is the headline in a press release from Manufuture AET, the Working Group on Agricultural Engineering Technology within the European Technological Platform Manufuture.

The press release concerns the 5th Workshop of the MANUFUTURE AET-community about Agricultural Engineering Strategies for HORIZON 2020 in Hannover 19 November 2011.

The promising perspectives include that by 2013 – before the end of the Seventh Research Framework Programme – a call for proposals is planned for research projects on the topic "Processing and Control Systems for Sustainable Production in Farms and Forests". In addition, HORIZON 2020 has earmarked a budget in the amount of 4.5 billion Euros for the organic production sector. Additionally, at

the EU policy level, a European Innovation Programme (EIP) which would support the implementation of the common agricultural policy is currently on the bargaining table.

The press release as well as presentations from the workshop is available from the ICT-AGRI website ict-agri.eu.

More information about MANUFUTURE AET is available from manufuture.org

Two large-scale integrating FP7 EU projects

Theme: Nanotechnologies, Materials and new Production Technologies

Call: Automation and robotics for sustainable crop and forestry management.

CROPS "Clever Robots for Crops"

CROPS will develop scientific know-how for a highly configurable, modular and clever carrier platform that includes modular parallel manipulators and intelligent tools (sensors, algorithms, sprayers, grippers) that can be easily installed onto the carrier and are capable of adapting to new tasks and conditions. Several technological demonstrators will be developed for high value crops like greenhouse vegetables, fruits in orchards, and grapes for premium wines.

The CROPS robotic platform will be capable of site-specific spraying (targets spray only towards foliage and selective targets) and selective harvesting of fruit (detects the fruit, determines its ripeness, moves towards the fruit, grasps it and softly detaches it). Another objective of CROPS is to develop techniques for reliable detection and classification of obstacles and other objects to enable successful

autonomous navigation and operation in plantations and forests. The agricultural and forestry applications share many research areas, primarily about sensing and learning capabilities. The project started October 2010 and will run for 48 month with a budget of 10,24 m€. More info: crops-robots.eu/



RHEA is focused on the design, development, and testing of a new generation of automatic and robotic systems for both

chemical and physical – mechanical and thermal – effective weed management focused on both agriculture and forestry, and covering a large variety of European products including agriculture wide row crops (processing tomato, maize, strawberry, sunflower and cotton), close row crops (winter wheat and winter barley) and forestry woody perennials (walnut trees, almond trees, olive groves and multipurpose open woodland).

This consortium joints a number of multidisciplinary, experienced researchers capable of improving individual scientific knowledge, but a large cooperation project is demanded to sum up the individual efforts in a holistic manner. The success of RHEA could bring a new means of applying automatic systems to agriculture and forestry crops with an important impact in improving the economy and environment as well as in maintaining the sustainability of rural areas by launching new technological jobs.

The project started August 2010 and will run for 48 month with a budget of 8,96 m€.

More info: www.rhea-project.eu

New study program and project on robotics in Latvia

Agris Nikitenko, Riga Technical University, agris.nikitenko@rtu.lv

New study program: Intelligent robotic systems

Currently most of the new members of the EU are searching for their exact place in today's economy and industry. Latvia still developing and being heavily hit by the global economical crisis is one of them. It is obvious that regardless of a particular industrial sector being selected it has to be sustainable and competitive to provide means for economical growth in longer perspective. In case of small countries like Latvia it is very important to support and to develop areas with potentially high added value that is based on knowledge and technology.



Following this simple and obvious cognition Riga Technical University (RTU), currently the only multi-sector technical university in Latvia counting more than 16000 students, has set as one of its goals to enter into the robotics community. There is no doubt about robotics potential in the near future in almost every sector of modern industries. However it requires properly educated engineers and scientists. Therefore RTU recently has launched two new study programs called "Intelligent robotic systems" for master and bachelor levels, which are the only ones of its kind in the Baltic countries at the moment.

In contradiction with other EU study programs on robotics, these put the main emphasis on intelligent control rather on automation thus envisioning more intelligent devices in near future. The program goal is to educate people

that could combine artificial intelligence and robotics in order to bring a new and innovative breath into the existing industrial sectors as well as to develop new ones with high added value. The ICT-AGRI initiative is a very good example how the existing industries may use new technologies to ensure competitiveness and growth. While being a developing country Latvia already has new SMEs and initiative groups whose business are robotics and intelligent technologies that requires new specialists in the field.

Currently the study programs have accepted the first students that have rather heavy study load due to the necessity to combine several fundamental study fields. So, it is too early to comment any outcomes yet. However the program development has not been stopped after the student acceptance. A new cooperation project with support of ERDF has been launched in order to develop further the programs for international use. Currently the ongoing activities concentrate on advance the programs in the way to accept student from Tartu University in near future.

The RTU hopes that this program as investment in country's future in combination with other activities in the region will help to bring prosperity to the region via true knowledge based industries like robotics.

Additional resources:

www.rtu.lv – Riga Technical University,

www.uavfactory.com – SME on robotics,

www.balticrobotsumo.org – Robotics competition of Baltic states.



Multi-robot system with possible use in agriculture

Standing confidently on the track of integration in the robotics community, Latvian scientists from Riga Technical University in cooperation with Latvian Academy of Agriculture and iRobot representatives in Latvia have started a research project partially supported by ERDF (ID: 2DP/2.1.1.1.0/10/APIA/VIAA/005).



The research team aims to develop a multi-robot system that uses artificial intelligence methods for robot coordination, job scheduling and monitoring. One of the scientific challenges is to design a robot control module that does not require any infrastructure but wireless communication network such as WiFi. A specialized service oriented server-side software system will monitor the robots and will act as dispatcher that optimizes the system avoiding robot assignment overlaps and miss-coordination.

A significant part of the project is identification of particular application areas of the developed technology and assessment of environmental influence on the robotic system that might be hazardous due to special chemicals being used, temperature and moisture.

The project team plans to build a prototype system for research and demonstration purposes that will include at least 10 robots. Demonstration system will use well known iRobot vacuum cleaners Roomba. The first significant results are expected by end of 2011.

A Maltese Agricultural Success Story

Alexandra Camilleri, Malta Council for Science and Technology, alexandra.camileri@gov.mt

Champi-ON: Fully Automatic System for Picking and Handling Mushrooms for the Fresh Market from Growing Bed to Cooling Storage

The white button mushroom (*Agaricus bisporus*) is the leading mushroom crop worldwide, with a staggering 965 million tonnes been produced in Europe in 2007. That said, maintaining competitiveness in this sector is surprisingly difficult due to the labour costs involved.

The scientific objective of the project is to develop a robotic

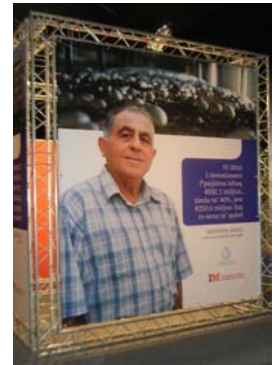


hand mimicking the picking of a human hand, both in applied forces and movements. To this end, a scientific study will be carried out for measuring the margins of forces needed for picking a mushroom without damaging or blemishing the skin; it will be taken into account that, in many cases, blemishes appear few days after picking, which is also unacceptable. In addition, the turning ("unscrewing") movements done by a human hand when picking will be quantified; the unscrewing movement is smooth and of just a few degrees, to separate the mushrooms from the compost layer.

The FP7 Champi-ON project, is the third running project for Chadwick Mushroom Farm

Ltd. under the direction of Mr Saviour Gauci, a farmer from Malta, who is intent on reducing the required labour costs for harvesting and handling fresh mushrooms

by 80%. To achieve this, Mr Gauci has teamed up with a cohort of experts to develop a fully automated system for picking and handling mushrooms for the fresh market. This would allow for the mushrooms to be taken from the growing bed and transferred to the cooling storage piled in trays, without causing any damage or blemish to the white skinned mushroom.



ICT-AGRI Governing Board Meeting in Murcia

Iver Thysen, Danish Agency for Science, Technology and Innovation, ivth@fi.dk

On October 25-26 2011 ICT-AGRI held its fourth Governing Board (GB) meeting. The agenda was packed with important items concerning the progress of the project and the future of ICT-AGRI.



Two new associated partners joined ICT-AGRI at the meeting, both with an obligation to contribute to the second IC-AGRI call: Department for Environment, Food and Rural Affairs (DEFRA), United Kingdom; and The French National Research Agency (ANR), France.

The work on the Strategic Research Agenda (SRA) is progressing according to plans. The many contributions from the R&D community to the online SRA consultation and during the workshop at the EFITA Conference in Prague had been worked into a new draft. A version ready for discussions with the stakeholders is expected in March 2012.

The GB noted that the seven projects funded by the first ICT-AGRI call have started their work during 2011.

The second ICT-AGRI call was an important issue at the meeting, which provided the basis for the pre-announcement in this Newsletter.

ICT-AGRI is now more than half way towards its planned end in midsummer 2013. The GB decided to start preparations for a continuation after 2013 by con-

sidering possibilities for a second ERA-NET, an ERA-NET+, or perhaps new options available in Horizon 2020.

ICT-AGRI has agreed with EFITA for a concluding event in collaboration with the EFITA Conference in Turin in June 2013.

The GB meeting took place in two lovely cities in the Murcia region, Cartagena and Murcia. The participants enjoyed the pleasant working and leisure environment, as well as the good food, organised by the ICT-AGRI partner INFO Murcia.



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ICT-AGRI Partners & Observers

There are 19 partners, 2 associated partners and 13 observer organisation involved in the ICT-AGRI ERA-NET covering 21 countries.

Partners

1. Ministry of Science, Innovation and Higher Education, Danish Agency for Science, Technology and Innovation (DASTI), Denmark
2. Ministry of the Environment, Danish Environmental Protection Agency (DEPA), Denmark
3. Ministry of Agriculture of the Flemish Community, Institute for Agricultural and Fisheries Research (EV-ILVO), Belgium
4. Ministry of Agriculture and Forestry (MMM), Finland
5. CEMAGREF Technical Centres Development (CEMAGREF), France
6. Federal Agency for Agriculture and Food (BLE), Germany
7. Federal Ministry of Food, Agriculture and Consumer Protection (BMELV), Germany
8. Greek Research and Technology Network (GRNET), Greece
9. Ministry of Agriculture and Rural Development (MARD), Israel
10. Ministry of Agriculture, Food and Forestry Policies (MiPAAF), Italy
11. Latvian Academy of Sciences (LAS), Latvia
12. Malta Council for Science and Technology (MCST), Malta
13. Swiss Federal Office for Agriculture (FOAG), Switzerland
14. Ministry of Agriculture and Rural Affairs, General Directorate of Agricultural Research and Policies (GDAR), Turkey
15. Scientific and Technological Research Council of Turkey (TÜBİTAK), Turkey
16. Netherlands Organisation for Applied Scientific Research (TNO), Netherlands
17. Agriculture and Food Development Authority (TEAGASC), Ireland
18. Region of Murcia Agency of Development (INFO Murcia), Spain
19. Ministry of Food, Agriculture and Fisheries, Danish AgriFish Agency (DAFA), Denmark

Associated partners

1. Department for Environment, Food and Rural Affairs (DEFRA), United Kingdom
2. The French National Research Agency (ANR), France

Observers

1. Leibniz-Institute for Agricultural Engineering Potsdam-Bornim (ATB), Germany
2. National Institute for Agricultural Research (INRA DARESE), France
3. Food and Agricultural Organization of the United Nations (FAO), Italy
4. Region of Lombardia (ROL), Italy
5. Cities on Internet Association (COIA), Poland
6. Romanian Academy of Agricultural and Forestry Sciences (ASA), Romania
7. Soil Science and Conservation Research Institute (SSCRI), Slovakia
8. Instituto Tecnológico Agrario de Castilla Y Leon (ITACYL), Spain
9. LEITAT Technological Center (LEITAT), Spain
10. Swedish Institute of Agricultural and Environmental Engineering (JTI), Sweden
11. Federal Department for Economic Affairs (DEA), Switzerland
12. Agricultural Research Institute, (ARI) Cyprus
13. Wageningen University (WUR), The Netherlands