ICT-AGRI Call 2017 for transnational projects

Farm Management Systems for Precision Farming

Information for Applicants

7 December 2016

1 Introduction

The overall objective of the ICT-AGRI Call 2017 is to contribute to the development of an eco-efficient, resource-efficient and competitive agriculture through an enhanced and improved use of ICT and robotics. Precision Farming involves a number of digital technologies, including the Internet of Things and automated agricultural machinery, and is recognised having significant potential for the sustainable intensification of primary food production.

Farm Management Systems (FMS) are (in accordance with the *ICT-AGRI Strategic Research Agenda* of December 2012) considered to be ICT platforms for farmers, meaning that an FMS enables the integration of software and data so as to be readily and easily available for the farmer. The recent and possibly disruptive trend, which has emerged over the last few years, is that software and data are managed as services on the Internet. While there is a growing collection of agricultural applications available, most such applications are stand-alone apps and not integrated into an FMS. The challenges are both to develop such properly integrated applications and to ensure sufficiently high quality. In addition to developing suitable technical solutions, we need propose corresponding business models for using such services on the Internet specifically for the agricultural context.

2 Purpose and scope

The specific purpose of the ICT-AGRI Call 2017 is to improve the support provided by Farm Management Systems to Precision Farming in two areas. The first concerns the use of agricultural know-how in decision support systems, particularly the integration of different models (e.g., animal, crop, soil, irrigation and meteorology) in agricultural decision making. The second concerns the development of interoperability interfaces (using standards and Application Program Interfaces - APIs) for integration with existing farm management systems. A major focus of Precision Farming is to acquire detailed data on a farm's fields, crops and wider environment from sensors (both local and remote). This data, together with models of environment, plants and animals and domain-specific algorithms can be used to provide specific recommendations to farmers, which in turn enables the precise control of automated agricultural machinery. In this process, the sensor data needs to be analysed to provide evidence about the state of the farm, animals and crops, and from this a suitable set of actions need to be selected. The effective use of scientific models of agricultural knowledge for automated and semi-automated decision support is necessary for the development of cost-benefit analyses of Precision Farming solutions and, therefore, for the trust of farmers to invest in new technologies. The ICT-AGRI Call 2017 will support projects predominantly addressing agricultural research for the use of data and the development of decision support systems.

A current trend in the implementation and adoption of ICT is towards dedicated applications that can be used through the Internet. An application may help collect data, e.g. field conditions or dairy animal status; may receive data from sensors; and may provide actionable decision support. In the ICT-AGRI Call 2017, Farm Management Systems are considered to be ICT platforms for farmers using a number of dedicated applications, some of which will have been produced by the developers of the FMS platform, and some

applications will have been developed by third party providers but are accessed via the FMS. The ICT-AGRI Call 2017 will support projects developing dedicated applications as well as cases of integration of third-party applications into an FMS.

3 Topics

Proposals to the ICT-AGRI Call 2017 must be within one or more of three topics defined below.

Proposals may concern primary production within any agricultural domain.

3.1 Agricultural research on use of sensor data for decision support

The expected outcome of work within this topic is rules and algorithms for the analysis of sensor data and the output of actionable recommendations, plans or trajectories for automated machinery.

Rules and algorithms should involve research in at least three countries, with outputs appropriately adapted to different local geographic, climatic and farming conditions.

3.2 Development of applications for Precision Farming

The expected outcome of work within this topic is one or more applications. Development can include validation in a relevant environment. Applications should allow for import of data from sensors, rules or algorithms for analysis of data and planning of actions, as well as mechanisms, where relevant, for export of planned trajectories to automated machinery. Applications should furthermore include a standards-based API for integration with an FMS. Finally, the proposal should describe the envisaged business model, and how data ownership and privacy are addressed.

A dedicated ICT application may, but does not need to, consist of several integrated applications, which together provide the full functionality.

Applications should involve at least three countries, with outputs appropriately adapted to different local geographic, climatic and farming conditions.

3.3 Cases of integration of third-party applications with Farm Management Systems

Projects in this topic concern the concrete integration of a third-party application in a Farm Management System. The work may include necessary adaptation to enable interoperability between the application and the FMS. The expected outcome is a combined system tested and proven in an operational environment of the FMS. The proposal should describe the envisaged business model, and how data ownership and privacy are addressed.

A mandatory output is a public deliverable which reports on the experiences of integrating the application in the Farm Management System.

The minimum criteria for proposal consortia are one application provider partner and one FMS partner from different countries or regions.

4 Elements of applications – a framework for describing projects

The intention of the three topics in the call is not to force proposals to be strictly within one topic. On the contrary, proposals spanning Topics 1 + 2 or Topics 2 + 3 are welcome. The elements of ICT applications as defined in this section are intended as a common framework for describing any proposal.

The elements are in a logical order. This means that proposals focussing on a *later* element in the sequence should provide an account of how earlier elements (e.g., sensor data acquisition) are handled (possibly using existing applications or previous work).

Elements of ICT applications

1	Sensor data	A description of the planned physical sensors used or other sources of data. Description can include references to the data provider and to documented standards. The proposal should make clear how data that is required for the application will be obtained
2	Production Models	Models concerning environment, plants and animals which reflect the growth and production parameters.
3	Decision Algorithms	A description of the development, testing and validation of the planned decision algorithms using the sensor data and the production models.
4	Interoperability of data	A description of the planned data exchange mechanisms including data format. The use of existing widely accepted standards is recommended.
5	Export of data to automated machinery	A description of the data exchange mechanisms including data format of planned actions or trajectories for automated machinery. The use of existing widely accepted standards is recommended.
6	Application Programming Interface (API)	A description of the planned API of the application which is used to interact with the Farm Management System. The use of existing widely accepted standards is recommended.
7	Business model	A description of possible commercial or non-profit business models for the provision of the application
8	Data ownership and privacy	A description of how the farmer's ownership and privacy of the data used by the application is respected. Details should be provided concerning planned data control structures and monetisation mechanisms.
9	Integration with an FMS	A description of how the integration of the application with a Farm Management System is prepared, tested and verified.

5 Funding

Project partners in the ICT-AGRI Call 2017 are funded by a funding agency determined by the national or regional location of the partner. There is no funding from the European Union.

The national and regional funding agencies impose individual eligibility conditions for funding. Conditions may regard the amount of funding, types of organisations, types of work in the project, rate of own contribution, supplementary information, and in some cases deadline for submission of proposals. The funding agency's funding contribution and conditions are published on the ICT-AGRI website.

Funding agency conditions apply to the proposal partners seeking funding from that funding agency. A proposal may include elements which are eligible for funding by other funding agencies.

Any partner may participate with their own funding upon proof of the availability of the funding.

At least three countries or regions must be represented in the proposal consortium, except for proposals addressing predominantly topic 3 which may have only two countries or regions represented.

Proposals may include partners, who have already received national or regional funding for a similar project, when these partners are contributing to internationalisation of the national/regional project.

Projects should have a maximum duration of 3 years.

6 Call procedures

6.1 Preparation and submission of proposals

Proposals are prepared and submitted by dedicated tools on the ICT-AGRI website, which also provides tools for searching for potential partners. A Guideline for Applicants is provided on the website as is further information concerning the call.

6.2 Screening for validity

The validity of proposals is screened by the call office. Validity concerns completeness of proposals and on time submission of proposals.

6.3 Screening for eligibility

The eligibility of consortium partners (i.e. adherence to funding agency conditions) is screened by the funding agencies involved in individual proposals. Conditions are available at the ICT-AGRI website.

6.4 Peer review by international experts

Proposals are peer reviewed by international experts. After an online review of each proposal by 3 to 4 experts, the review panel will meet and develop a common commented ranking of proposals. All reviews are accessible on the ICT-AGRI website for the funding agencies. Proposers have access to the reviews of their proposals upon completion of the evaluation process. Proposals are ranked on the following equally weighted criteria:

Excellence *The following aspects will be taken into account, to the extent that the proposed work corresponds to the topic description:*	**Impact** *The following aspects will be taken into account:*	**Quality and efficiency of the implementation** *The following aspects will be taken into account*:*
Clarity and pertinence of the objectives; Soundness of the concept, and credibility of the proposed methodology; Extent that the proposed work is beyond the state of the art, and demonstrates innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models) Appropriate consideration of interdisciplinary approaches and, where relevant, use of stakeholder knowledge.	The extent to which the outputs of the project would contribute to the ICT-AGRI objective of developing an eco-efficient, resource-efficient and competitive agriculture through an enhanced and improved use of ICT and robotics. Any substantial impacts outside of that mentioned above, that would enhance innovation capacity, create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society; Quality of the proposed measures to: • Exploit and disseminate the project results (including management of IPR), and to manage research data where relevant. • Communicate the project activities to different target audiences	Quality and effectiveness of the work plan, including extent to which the resources assigned to work packages are in line with their objectives and deliverables; Appropriateness of the management structures and procedures, including risk and innovation management; Complementarity of the participants and extent to which the consortium as whole brings together the necessary expertise; Appropriateness of the allocation of tasks, ensuring that all participants have a valid role and adequate resources in the project to fulfil that role.

6.5 Selection by funding agencies

The final selection of projects for funding is completed at a meeting of the funding agencies. **The final funding decisions are at the sole and exclusive discretion** the funding agencies. Funding agencies may approve projects but award budgets which are lower than those requested. Funding agencies may also suggest reorganisation of project consortia and amalgamation of proposals.

6.6 Negotiation of contracts

The partners in the selected projects have to negotiate contracts with the relevant funding agencies. When all contracts are in place the projects can start.

7 Expected dates

Call launch	January 2017
Application close	April 2017
Review close	May 2017
Selection	July 2017
Grant negotiations completed	October 2017
Projects starting	From December 2017

Exact dates will be published in the ICT-AGRI website.

8 Follow-up and monitoring of projects

ICT-AGRI organises regular summits with funded projects with the purpose to stimulate collaboration and interaction among the projects. It is expected to have a summit in autumn 2017 with projects funded in the calls in 2015 and 2017.

The monitoring includes reporting to the relevant funding agencies and mid-term and final reports to ICT-AGRI.