MINISTRY OF EDUCATION

NATIONAL INSTITUTE OF RESEARCH DEVELOPMENT FOR MACHINES AND INSTALLATION DESIGNED TO AGRICULTURE AND FOOD INDUSTRY
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LETTER OF INTENT

1. BACKGROUND:

1.1. Short presentation of INMA

The National Institute of Research-Development for Machines and Installations designed to Agriculture and Food Industry-INMA, from Bucharest/Romania has an experience of about 80 years and it is the unique Romanian institute in the field. The main activities performed within the institute are *research-development* and *scientific services*.

The research-development activities comprise in elaboration of diagnoses, prognoses and strategies in the domain of technologies and technical equipment designed to agriculture and food industry, research and development of the processes, technologies and technical equipment for agriculture and food industry, performing of experimental models and prototypes, testing in laboratory and operating conditions of the machines and installations designed for agriculture and food industry in compliance with the UE procedures, norms and directives, standardization in the domain of technical equipment and activities of professional training, specialization and staff certification in the domain of mechanization technologies.

The scientific services comprise in testing of technical equipment, certificating the product conformity, performing technical inspections for tractors, lorries, trailers and cars, technological transfer and innovative business through the accredited incubator INMA-ITA.

The main Research Directions are:

- Fundamental research of interaction phenomena of biological, soil and technological factors on the technical equipment in the processes of mechanization and automation of works in agriculture;
- Scientific substantiation of the processes in agriculture, food industry and creating of new innovative technologies, instruments and technical equipment designed to soil works, establishing, maintaining and harvesting agricultural crops, horticultural cultures, as well as, agricultural and livestock and agro-forestry works; in compliance with environment preserving and fighting against draught phenomena and desertification;
- Renewable power sources: biomass, bio-fuels, biogas (from animal dejections and vegetal wastes), technologies and technical equipment for their use in conditions of efficiency, life, health and environment protection;
- Rural development and raising of life quality by technological transfer and demonstrations of the research results performed by the Institute;
- Strengthening the research basis (human resources, logistics, research equipment) and performing some partnerships for connecting to ERA, including the integration within the technological platforms at the European level;
- Substantiating and achieving new mechanizing and automating technologies designed to agricultural and food industry processes, such as: conditioning, processing, stocking and storing primary agricultural products, non-agricultural products and aquaculture in conditions of efficiency, security and safety.

1.2. INMA achievements

Production of biomass is a resource of renewable energy and a significant opportunity for the sustainable rural development, to achieve independence from fossil fuels on farms and to reduce the greenhouse effect.

INMA Bucharest has developed three research projects focused on promoting in Romania the energetic plants Miscanthus and Salix Viminalis as renewable sources. Within the research projects, we have designed and developed technologies for setting-up, maintaining and harvesting Miscanthus

and Salix cultures in accordance with the pedoclimatic conditions in Romania. In order to mechanize all the works within these technologies we have developed and tested five new experimental models: a Miscanthus rhizomes planting machine, a harvesting equipment for dry stems, a technical equipment for harvesting Miscanthus rhizomes, a planting machine for Salix seedlings and a harvesting machine for Salix stems.

Within these technologies there were established the requirements of the plants towards the climate, soil, temperature and humidity, the farming calendar and agro-technical requirements imposed on agricultural machines used for mechanization. In order to specify the optimal period to perform specific agro technical works, INMA has established and completed the farming calendar which include the applying activities for organic fertilizers, applying herbicides for perennial weed control, applying chemical fertilizers, etc.

INMA has a good knowledge of production and processing technologies of agricultural and forestry solid biomass (drying, grinding, sorting) in order to obtain woodchips, pellets and agro-pellets. Also we have results in the field of other bio-products such as crude oil obtained from various oil crops. Its experience is proved by the research projects conducted in this area.

1.3. INMA infrastructure

In terms of recognition of technical and scientific capabilities by accreditation, the research infrastructure of INMA consists in research, testing and experimenting laboratories, accredited in accordance with the rules and directives of EU, which verifies the technical and scientific competence of certain ideas, solutions, equipment and new products having a state-of-the art technical endowment and high qualified personnel.

The institute has a Testing Department for Tractors and Technical machinery for agriculture and food industry which has in subordinate 2 equipped laboratories performing similar to EU laboratories level, accredited in accordance with standard SR EN ISO / IEC 17025: 2005:

- DITRMA - Testing Laboratory for Tractors and Technical Equipments for Agriculture and Food Industry;
- LIMS – Testing Laboratory for Spraying Machines;

2. DIRECTION AND OBJECTIVES OF RESEARCH:

Project title: Methods of evaluation of soil managing interactions according to climate conditions, rocks and relief type and their impact on physical, chemical and biological properties of fields on agricultural farms.

Main objective of project consists in development of informational computerized instruments which be interactive and very affordable , designed to control the "health state" of agricultural farm fields.

A. INMA Bucharest partner current competences

- System of processing soil electro-conductivity data designed to analyze the crop maps: models of agricultural conductivity maps based on electro-conductivity data(EC) obtained by means of a mobile platform VERIS 3150, as a result of tests performed;
- Research, substantiation and achieving an informational and control system via satellite aiming to research and process the agricultural soil physico-chemical parameters in order to enhance agricultural production and preserve the environment: method of mapping agricultural surfaces soil and representing geospatial maps including soil features based on spectrophotometry;
- Researches regarding intelligent methods and equipment for soil and agricultural products testing: algorithms of processing experimental data, software for utilization of reference index file, experiments of photometric spectra in soil samples and other types of biological material (vegetal material), chemical analyses in pure soils (gathered in the field) and plants subject to spectral analysis, data bases (reference index file).

B. Partners required competences

- Studies of bonitation and mapping the soil in order to classify and evaluate soil resources in a certain geographical space;
- Management of data and geospatial technologies or data gathered on the spot, in the field and management of additional data generating information on field use;
- Integration of teledetection data within a GIS aimed to assure the sustainable management of agricultural soils.

3. COLLABORATION PROPOSAL:
H2020-SFS-2014-2
Sub call of: H2020-SFS-2014-2015
Topic: Soil quality and function SFS-04-2014

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