Project title:	**INTELLIGENT IRRIGATION SYSTEMS**
Project Acronym:	**INTELIRIG**
Co-ordinator:	**Technical University "Gh. Asachi" of Iasi**
Contact person:	**Assoc.Prof. Marinel Temneanu** , mtemnean@ee.tuiasi.ro
	Lecturer Cristina Temneanu , ctemneanu@ee.tuiasi.ro
Full duration of project:	**24-28 months**

General context of the project:

During the last few years a new notion appeared referring to the agricultural practicability, called "precision agriculture" one of its constituents being "the precision irrigation". This new approach supposes the implementation of new multidisciplinary technologies on the classical structures, such as the satellite geographical localization, distributed measurements and transmissions, micro informatics, broadening the view that in the maintenance and exploitation works of the agricultural crops the heterogeneity of the working plot of land could be taken into account. Precision agriculture has as purpose a modular administration of incomes (seeds, irrigation water, fertilisers, fungicides, herbicides, insecticides) by adapting the works of the soil, sowing, and fertilisers to the heterogeneity characteristics of the plot.

Brief technical description:

The project will propose the realization of measurement and control modules of distributed data transmission that can be implemented on automatic irrigation systems so that it may lead to obtaining of an intelligent system of irrigation combined with automatic nutrients injection, relying on the sensory investigation of the environment and soil parameters conditions. The decisional algorithm of the control center prescribes combined irrigation recipes according to the exploited crop and to its development specificity, and the investigation is carried out at irrigation cell level, modularly. Data flux communication has as a physical support the existent infrastructure of power supply of the automatic irrigation systems and is developed through the Power Line Communications technique (PLC). The system architecture is so conceived that it should allow its implementation on the automatic irrigation systems of both circular movement (central pivot), and linear movement.

In order to insure a modular administration of incomes in terms of the plot heterogenic characteristics, the project proposes the introduction of a sensory modules network to entail a division of the farming field into characterization.

The intelligent irrigation system architecture is structured on five main levels, as follows:

- the irrigation modules level, which join the automatic irrigation systems on angular or linear movement and which have as main function the controlled command of the electro valves for the admission of the water-nutrients mixture, in accordance with the recipes prescribed by the control;

- the sensors modules level, which are fixed and placed at the ground, having as main purpose the sampling through sensors of the surrounding cell characterization data and their transmission towards the control centre;

- the nutrients injection batteries level, with the role of injecting nutrients into the irrigation water, in terms of the concentration prescribed by the control centre;

- the data flux transmission through PLC level, has as physical support the network of the power supply of the engines operating on the automatic irrigation systems and water pumps and realizes the data transfer between the control centre on the one hand and the irrigation module and the nutrients injection batteries on the other;

- the decisional level, based on the data resulted from the sensors modules level and those extracted from its own data basis, of combine irrigation recipe, delivers the execution commands to the injection batteries regarding the irrigation output and the characterization cell geographical localization.