DEVELOPMENT OF A SCADA SYSTEM FOR ACCESS, PROCESSING AND SUPERVISION OF DATA COMING FROM A WIRELESS SENSORS NETWORK IN AGRO-ENVIRONMENTAL APPLICATIONS

LUIS MANUEL NAVAS GRACIA[1], EDUARDO MARTÍN BRAVO[1], GONZALO RUIZ RUIZ[1], ADRIANA CORREA GUIMARAES[1], JAIME GÓMEZ GIL[2], FERNANDO GONZÁLEZ HERRERO[1], FÁTIMA BAPTISTA[3], VASCO FITAS DA CRUZ[2], MIGUEL DE CASTRO NETO[4]

[1] Department of Agricultural and Forestry Engineering, University of Valladolid. Avda. Madrid, 44, 34004 Palencia - SPAIN <lmnavas@iaf.uva.es>
[2] Department of Communications and Signal Theory and Telematics Engineering, University of Valladolid, Camino del Cementerio, s/n, 47011 Valladolid - SPAIN <jgomez@tel.uva.es>
[3] Department of Agricultural Engineering, University of Évora/ICAAM, ZIP 94, 7002-554 Évora – PORTUGAL <fb@uevora.pt>
[4] Instituto Superior de Estatística e Gestão de Informação, New University of Lisboa. Campus de Campolide, 1070-312 Lisbon – PORTUGAL <mneto@isegi.unl.pt>

ABSTRACT. Wireless sensors networks appeared in the 1970's for military and industrial use. They have since undergone a major evolution, particularly since the 90's, thanks to the improvements in wireless communications. These changes have allowed them to participate in a wide variety of applications in different sectors such as agriculture and environment. This paper shows the development of a SCADA application programmed with LabVIEW® 8.6 (National Instruments), which allows management of data received by wireless sensors networks through a friendly interface for users. For the application shown in this paper we have worked with a MEP 510 sensors network (Crossbow). The functionalities implemented are the following: Network configuration; Data storage into database; Statistical processing of historical data with polynomial adjustment and spline interpolation; Visualization by data graphics in real time and historical data; Visualization of 2D intensity diagrams from the spatial distribution of sensors; and Creation of a users registry system that allows, depending on the category assigned, receiving or not access privileges in the application. As a complement we have developed the possibility of remote access. Sensors network implemented and the applications developed have been checked by operational tests for each functionality, as well as sensors joining and leaving the network situations, range of variables and working modes. The results obtained show the robustness of the SCADA application and the limitations of wireless sensors networks operating on field conditions.

Keywords: Wireless sensors network, database, LabVIEW, agro-environmental

INTRODUCTION. Wireless sensors networks have become a point of interest to all productive sectors due to its wide variety of application, having a widespread use and