



# Agricultural Journals

*Research in*

## **AGRICULTURAL ENGINEERING**

home **page** about **us** contact 

**us**

### **Table of Contents**

**IN PRESS**

**RAE 2014**

**RAE 2013**

**RAE 2012**

**RAE 2011**

**RAE 2010**

**RAE 2009**

**RAE 2008**

**RAE 2007**

**RAE 2006**

**RAE 2005**

**RAE 2004**

**RAE 2003**

**RAE Home**

---

**Editorial**

## For Authors

- **Authors Declaration**
- **Instruction to Authors**
- **Guide for Authors**
- **Copyright Statement**
- **Submission**

## For Reviewers

- **Guide for Reviewers**
- **Reviewers Login**

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## Subscription

# Res. Agr. Eng.

**W. Skierucha, A. M.  
Wilczek, R. T. Walczak**

**Application of smart**

# sensors in the measurement of soil physical parameters

Res. Agr. Eng., 50 (2004): 96-102

The study presents the project and partial implementation of a modern monitoring system for the measurement of soil physical parameters. It is provided with smart sensors equipped with signal conversion electronics, individual identification and communication means decreasing the complexity of the measurement system and also the measurement errors that can appear during analog signal transmission along the cables from the sensors to the measuring unit. The applied wireless communication system operates in the 433MHz ISM (Industrial, Scientific, Medical) licence free frequency band for transmission of commands and data between a remote PC compatible computer (Master unit) and the smart sensors (Slave units) in the distance of several hundred meters. The presented partial implementation of the system measures the temperature at several locations in the soil profile in field conditions and communicates with the host PC computer in wireless way. The developed hardware and software is intended to be adapted to more complex monitoring systems working in compliance with IEEE 1451 smart transducer interface standard and covering large areas as an element of air-borne or satellite remote sensing and serve for ground reference measurements. It is shown that the currently available technical means enable to apply smart sensors and wireless communication in the environmental monitoring in the economically justified way. The small increase of the system price by providing the measuring smart sensors, already equipped some element of control or computation, with radio communication assures the decrease of measurement errors and makes the collection of environmental data convenient for the system operator.

## Keywords:

smart sensor; monitoring; modelling;  
wireless network; agrophysics

[ [fulltext](#) ]

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