



## Sensor-Level Real-Time Support for XBee-Based Wireless Communication

Mihai V. Micea, Valentin Stangaciu, Cristina Stangaciu and Constantin Filote

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### *Abstract*

The ZigBee standard is focused on low-cost, low-power, wireless mesh networking, having a wide applicability mainly in the field of wireless sensor networks. A growing number of such applications require real-time behavior, both at the wireless communication and at the sensor levels. This paper proposes a solution to the problem of providing sensor-level real-time support for wireless platforms using ZigBee-based devices such as the XBee module. The discussion of the experimental results proves the predictable behavior of the XBee sensor platform used as a case study.

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**Abstract.** The ZigBee standard is focused on low-cost, low-power, wireless mesh networking, having a wide applicability mainly in the field of wireless sensor networks. A growing number of such applications require real-time behavior, both at the wireless communication and at the sensor levels. This paper proposes a solution to the problem of providing sensor-level real-time support for wireless platforms using ZigBee-based devices such as the XBee module. The discussion of the experimental results proves the predictable behavior of the XBee sensor platform used as a case study.

## 1 Introduction

Intelligent wired and wireless sensor networks play a key role in a large number of systems and applications currently developed. Many applications require timely response of the sensors and their network, as outdated information could induce control or decision errors with a high potential to harm people or the environment. Real-time sensor networks are used in space, avionics, automotive, security and fire monitoring applications, among many other examples.

A significant amount of research has been recently focused on providing real-time behavior to wireless sensor networks (WSNs) operation. In [1], a scheduling mechanism based on guaranteed time slots (GTSs) is proposed, to provide timing guarantees for message exchange within ZigBee and IEEE 802.15.4 wireless

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