

Analysis of Wireless Sensor Network Performance Embedded in Motorcycle Communication System.

Jose Javier Martinez¹, Peio Lopez-Iturri¹, Erik Aguirre¹, Leire Azpilicueta¹, Constantinos Patsakis², Achilleas Papageorgiou², Agusti Solanas³ and Francisco Falcone^{1*}

¹Electrical and Electronic Engineering Dept., Universidad Pública de Navarra, Spain, <http://esm.unavarra.es>

²Department of Informatics, University of Piraeus, Greece.

³s-Health Research Group, Rovira i Virgili University, Tarragona, Catalonia, Spain

Intelligent Transportation Systems are being widely adopted, within the framework of context aware scenarios, as a fundamental element within Smart Cities. Applications span from passenger comfort, transportation logistics and safety/emergency systems. Within the different transportation systems, motorcycles and motorbikes are of great interest, due to their wide adoption in dense urban environments, their high mobility and requirements in terms of passenger safety. In this work, wireless channel performance is analyzed in the case of wireless sensor transceivers located within a motorcycle as well as in static locations corresponding to infrastructure elements. Results have been obtained with the aid of in-house 3D Ray Launching code, in which specific motorcycle models have been implemented, as well as simplified human body model, depicted in Figure 1. The influence of motorcycle material distribution and shape, the inclusion of human body interaction effects and the presence of the road are obtained depending on transceiver location, providing required information in order to perform radioplanning analysis towards optimal wireless sensor network deployment in terms of quality of service and interference minimization.

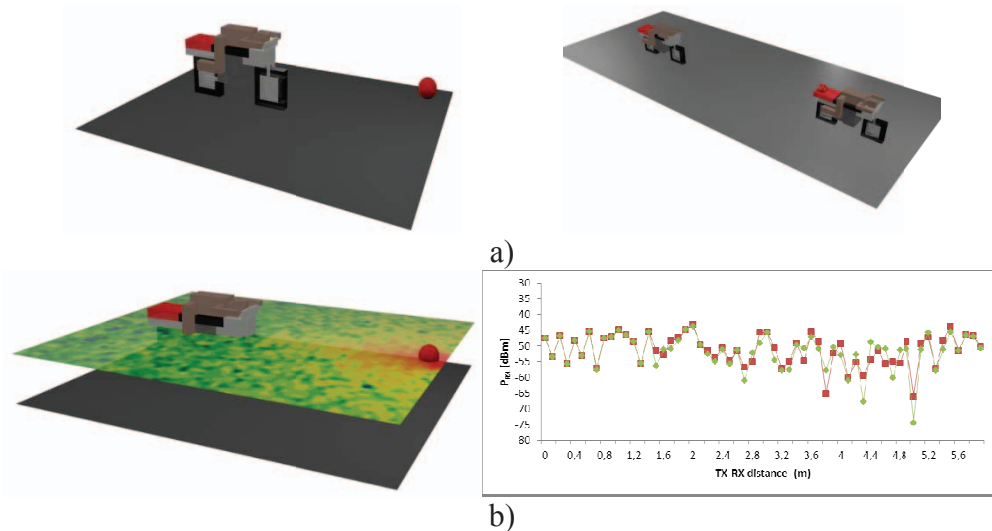


Figure 1. (a) Schematic view of the motorcycle scenarios. (b) Estimation of received power levels in a bi-dimensional cut plane, as well as for the case of presence of a person on the motorbike (rhombic marker) and without person (square marker)