

NEW WIRELESS NETWORK COMMUNICATION TECHNOLOGIES (802.11 & 802.20) IN SIGNALING SYSTEMS IN THE RAILWAY INDUSTRY

Marina Aguado, Eduardo Jacob, Purificación Sáiz, Juan José Unzilla, M^a Victoria Higuero, Jon Matías

Abstract

Unfortunately, railway incidents are still often. Some of these incidents are due to: human failure; signaling systems failures or failure of the system to capture the human failure. With the increment of passenger railway traffic, especially in high speed lines, improvements in railway transportation safety become imperative. A key issue for the railway transportation is the centralized control of the railway lines. Therefore, the operation control center must have precise and necessary information to detect and take action whenever risky situations arise. Until not long ago, railway signaling systems were based upon transmitting, in a reliable way, train position to the control center, and from there, back to the train, the route, the speed limit, and the necessary stops. In order to transmit all this critical information, telecommunication systems at low speeds and low frequencies were used. Step by step new trends have taken place aiming to reduce, in a safe way, the time interval between trains, thus increasing line capacity. Nowadays, the European Standard ERMTS has become the standard to implement traffic control systems. The integration of new wireless communication technologies will provide train – control centers communication systems with larger bandwidth. This will enable the use of new services and functions, and so increasing safety in the overall system, as well as line capacity. Images transmission of undesired or risky situations; transmission of a great amount of data generating time history and making possible to identify risky tendencies; the “golden run” (the optimal operation for a given line); etc... are examples of some of these services. In order to meet these new demands: mobile, low latency and broadband applications, new communication technologies must be used. Benefits and disadvantages of the application of these 802.11 and 802.20 wireless technologies are presented. There is some commercial equipment already meeting these requirements. The proposed architecture must follow the safety related European standard for communication, signaling and processing systems in railway applications.