**Using 802.15.4 based communications in vehicular applications: The Rally Portugal Histórico case study**

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The Rally Portugal Histórico is a competition with classical cars held every year in Portugal and considered the best rally of the world in this class.
In this contest, the classification depends on the regularity of the driving. The drivers have special sessions (called special stages) where the passage time in unknown places is determined and compared with the ideal time if the pre-determined speed was kept without deviation.
The measuring places are decided by the organization and are usually in the middle of nowhere, that is in mountains with forests and deep valleys and other places where often it is impossible to have access to a cellular network or to GPS satellites.
Micro I/O has designed in 2008 a system that uses RF technology to determine the passage times of the vehicles. It uses OBUs – On-Board Units and portable RSUs – Road Side Units and other stations to collect data. The RF technology adopted is based on the IEEE802.1.5.4 standard and has proved to be effective. After the initial tests where signals were obtained up to 140Km/h, in 2009 a 0 error result in the thousands of times recorded was obtained.
In this paper the system architecture is presented, and some results of the initial tests are also shown. Some details about the competition are also described in order to show the technical complexity of the solution implemented.