**Entry:** L1-25 **category:** Rail

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RA7 **Transport Infrastructure**

**Keywords:** Railway technology • Axle box acceleration measurements • Ultra-low cost smartphones • Railway track • Quality • Train ride comfort • H2020 project •

# Monitoring and smart technology solutions for the NeTIRail-INFRA case study lines: Axle box acceleration and ultra-low cost smartphones

**Two methodologies for estimating track and ride quality are investigated: axle box acceleration measurements and ultra-low cost smartphones. Both methodologies are based on accelerometers mounted either at the axle box, or in the train vehicle.**

Both required coordination with other signals such as GPS, for positioning. The information collected from both systems contains useful information for the infrastructure managers. With ABA, it is possible (among other applications) to rank the quality of the welds and also of different defects. With the smartphone technology it is possible to map over the network the ride comfort, which is important for the users and for the safety. The collected data can be used for modelling, analysis, for supporting decision making of maintenance, but following a paradigm different from other traditional/old systems. From the theoretical and practical points of view, use of railway infrastructure information is challenging because it is multidimensional, spatially and temporally distributed, multi-scale, and it comes from heterogeneous data sources.

With adaptive and intelligent signal processing methods, it is possible to extract the key information needed for the decision-making process to anticipate the impact of degradation and determine the control measures needed to correct the problems in the infrastructure. Part of the further research is the generation of meaningful maintenance rules for the decision making of infrastructure managers using the collected track and quality information •