Results of experimental tests for the evaluation of the signal-to-noise ratio, short-term stability, linearity in the time axis, and long-term stability of the GPR signal - according to COST Action TU1208 guidelines

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Ground Penetrating Radar (GPR) systems need to be calibrated on a recurrent basis and their performance shall be periodically verified, in accordance with manufacturer recommendations and specifications. Nevertheless, most GPR owners in Europe employ their radar units and antennas for years without ever having them verified by manufacturers, unless major flaws or issues become evident. In this framework, Members of COST Action TU1208 have recently carried out a critical analysis of the few existing procedures for the calibration and performance verification of GPR systems; and, they have proposed four improved experimental tests to evaluate the signal-to-noise ratio, short-term stability, linearity in the time axis, and long-term stability of the GPR signal [1]. In this work, we present the results of the tests executed in Novi Sad, Serbia, on a GSSI SIR 3000 control unit equipped with GSSI ground-coupled antennas having central frequencies of 400 MHz and 900 MHz. We have experienced that the execution of the tests helps to attain stronger awareness about the behaviour and limits of owned GPR equipment. It is also interesting to check how the results of the tests change over time and in different environmental conditions, to analyze the performance evolution of the equipment. Main aim of this abstract is to spread the voice and encourage GPR owners and manufacturers to execute the tests. If a wide variety of control units and antennas are tested, of older and more recent conception, with different numbers of working hours, reliable thresholds for the tests can be established and the proposed procedures can be further refined and upgraded. Moreover, the results of the tests can be translated into accuracy levels of measured physical and geometrical quantities, to get some awareness about the uncertainty of results of a GPR survey (e.g., achieved accuracy levels in the estimation of layer thicknesses).