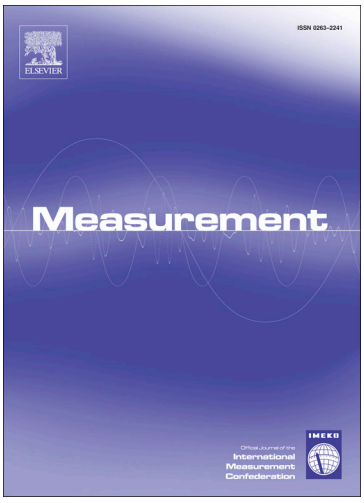

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GPR/GPS/IMU system as buried objects locator

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***Abstract* – In the last years, Ground Penetrating Radar (GPR) technology has been extensively used in several different fields, including archaeology and cultural-heritage diagnostics. The integration of GPR with other positioning devices, such as a Global Positioning System (GPS) and an Inertial Measurement Unit (IMU), can significantly improve the accuracy of buried-object location, by means of an efficient control of GPR route and attitude. This article aims at investigating solutions for an accurate location of buried objects when a GPR is pulled by a terrestrial vehicle or carried by an aerial platform. In particular, a low-cost system is presented, which integrates functionalities of GPS and IMU specifically dedicated to GPR use. The device has been designed, realized and finally its performance was tested in the laboratory.**

Keywords: GPR, GPS, IMU

1. INTRODUCTION

GPR is a non-invasive geophysical method that allows investigating the structure and composition of the subsurface. Since more than two decades to the present day, this technique has been successfully used in several areas, such as architecture and civil engineering [1], sedimentology [2], archaeological investigation [3-5], environmental management [6, 7], mineral prospecting and speleology [8, 9], and more. In particular, GPR technology has been increasingly used in different fields of cultural-heritage investigation and management. The prospecting of archaeological sites [10-11], inspection of historical buildings [12] and state evaluation of ancient artifacts [13] have significantly benefited from the use of GPR. In the realization of stratified maps of archeological sites, the GPR technology offers unparalleled advantages for the detection of buried ruins [14]. GPR can be used for preliminary archaeological investigation, for assuring a more targeted excavation. As an alternative, this non-invasive technique can