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[Volume XL-5](#)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-5, 29-34, 2014
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-5/29/2014/
doi: 10.5194/isprsarchives-XL-5-29-2014

Smartphones Based Mobile Mapping Systems

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Keywords: Closed Range Photogrammetry, Mobile Mapping System, Smartphones, MEMS, Epipolar Geometry, Bundle Adjustment

Abstract. The past 20 years have witnessed an explosive growth in the demand for geo-spatial data. This demand has numerous sources and takes many forms; however, the net effect is an ever-increasing thirst for data that is more accurate, has higher density, is produced more rapidly, and is acquired less expensively. For mapping and Geographic Information Systems (GIS) projects, this has been achieved through the major development of Mobile Mapping Systems (MMS). MMS integrate various navigation and remote sensing technologies which allow mapping from moving platforms (e.g. cars, airplanes, boats, etc.) to obtain the 3D coordinates of the points of interest. Such systems obtain accuracies that are suitable for all but the most demanding mapping and engineering applications. However, this accuracy doesn't come cheaply. As a consequence of the platform and navigation and mapping technologies used, even an "inexpensive" system costs well over 200 000 USD. Today's mobile phones are getting ever more sophisticated. Phone makers are determined to reduce the gap between computers and mobile phones. Smartphones, in addition to becoming status symbols, are increasingly being equipped with extended Global Positioning System (GPS) capabilities, Micro Electro Mechanical System (MEMS) inertial sensors, extremely powerful computing power and very high resolution cameras. Using all of these components, smartphones have the potential to replace the traditional land MMS and portable GPS/GIS equipment. This paper introduces an innovative application of smartphones as a very low cost portable MMS for mapping and GIS applications.

[Conference Paper](#) (PDF, 811 KB)

Citation: Al-Hamad, A. and El-Sheimy, N.: Smartphones Based Mobile Mapping Systems, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-5, 29-34, doi: 10.5194/isprsarchives-XL-5-29-2014, 2014.

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