



[Volume XXXIX-B1](#)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B1, 447-451, 2012  
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXIX-B1/447/2012/  
doi: 10.5194/isprsarchives-XXXIX-B1-447-2012  
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## LAND SURVEY FROM UNMANED AERIAL VEICHLE

V. Peterman and M. Mesarič  
University of Ljubljana, Faculty of civil and geodetic engineering, Ljubljana, Slovenia

Keywords: Low altitude, Three-Dimensional, Non-metric camera, UAVs, Point Cloud

**Abstract.** In this paper we present, how we use a quadcopter unmanned aerial vehicle with a camera attached to it, to do low altitude photogrammetric land survey. We use the quadcopter to take highly overlapping photos of the area of interest. A " structure from motion" algorithm is implemented to get parameters of camera orientations and to generate a sparse point cloud representation of objects in photos. Than a patch based multi view stereo algorithm is applied to generate a dense point cloud. Ground control points are used to georeference the data. Further processing is applied to generate digital orthophoto maps, digital surface models, digital terrain models and assess volumes of various types of material. Practical examples of land survey from a UAV are presented in the paper. We explain how we used our system to monitor the reconstruction of commercial building, then how our UAV was used to assess the volume of coal supply for Ljubljana heating plant. Further example shows the usefulness of low altitude photogrammetry for documentation of archaeological excavations. In the final example we present how we used our UAV to prepare an underlay map for natural gas pipeline' s route planning. In the final analysis we conclude that low altitude photogrammetry can help bridge the gap between laser scanning and classic tachymetric survey, since it offers advantages of both techniques.

[Conference Paper](#) (PDF, 686 KB)

Citation: Peterman, V. and Mesarič, M.: LAND SURVEY FROM UNMANED AERIAL VEICHLE, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B1, 447-451, doi: 10.5194/isprsarchives-XXXIX-B1-447-2012, 2012.

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