

# 661. Influence of photogrammetric dynamic movements of non-metric camera on the accuracy results in digital images processing

J. Sužiedelytė-Visockienė<sup>1</sup>, A. Pranskevičiūtė<sup>2</sup>

Vilnius Gediminas Technical University

Department of Geodesy and Cadastre

Saulėtekio av. 11, LT-10223 Vilnius-40, Lithuania

E-mail: <sup>1</sup>j\_visockiene@hotmail.com, <sup>2</sup>p.ausrai@gmail.com

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**Abstract.** Real-time photogrammetry is used for the registration and control of object structure and deformations, registration of dynamic processes, particularly, in the architectural heritage objects. The main product of the photogrammetry is a three-dimensional (3D) data – real world vision at the time the images are acquired with fixed viewing angles. In order to achieve this result a lot of digital photogrammetric workstations (DPW) were designed. A wide range of digital imagery such as scanned aerial film frames, images from digital aerial cameras as well as images from various satellite sensors could be processed using DPW. The requirements of processing, the algorithms of the photogrammetric software systems for the dynamic line-by-line acquisition processing of digital images in the photogrammetric way differ according to the applications. Therefore, it is important to test the capabilities and data accuracy of more than one digital photogrammetric system. The images of the research object were taken by a digital non-metric camera *Canon EOS 1D Mark III*. The quality of images depends on the camera optical system errors (calibration parameters) and camera stability - dynamic movements during images exposure. Thus, it is necessary to test calibration results and camera positions during the image exposure time. In this case, the camera was recalibrated and the new calibration parameters were checked during the images processing. Values that define camera stability and dynamics were determined. Close-range digital images were processed – the triangulation procedure was accomplished by using digital photogrammetric software *PhotoMod* and *Inpho* as well as DPW system *Bluh*. The accuracy of triangulation has been tested and compared with the manufacturer's software.

**Keywords:** digital camera, calibration parameters, triangulation, standard deviation, dynamic processes.

## 1. Introduction

Photogrammetric software system is developed in such a way that the measurements of the image coordinates can be used as the input for the bundle block adjustment, the measurement of digital stereo pairs, the Digital Elevation Model (*DEM*) generation by automatic image matching, the filtering of elements not belonging to *DEM*, the orthophoto generation, including the mosaics of orthophoto and the processing of *DEM*. The processing of *DEM* includes the computation of break lines, 3D representation and more. The whole program system is computer-based and easy to handle. Thus, today when using very little effort, the whole world of photogrammetry is available on standard PCs [1]. The basic requirement of the photogrammetric software systems for the processing of digital data is application-dependent. In this article the test of digital images processing was performed by using digital photogrammetric systems (*PhotoMod* and *Inpho*), which are suitable for aerial photogrammetry works and with the bundle triangulation program *Bluh*. The images were taken with a digital non-metric calibrated camera. Digital camera calibration procedure and comparison between the old calibration results and between the new one are provided in this article. The digital camera is on the move during the images exposure time. The camera movement is a photogrammetric dynamic process, which