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UAV PHOTOGRAMMETRY IN REMOTE AREAS – 3D MODELING OF DRAPHAM DZONG BHUTAN

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Abstract. The Buddhist fortress Drapham Dzong is located in the Bumthang District in central Bhutan on a mountain ridge at approximately 2930 m altitude. A surveying mission was carried out with the goal to produce a textured 3D model of the site, together with a conventional 2D map and an orthophoto. The remote and exposed location of the site makes traditional surveying, including terrestrial laser-scanning a tedious undertaking. Aerial images of reasonable quality are not available in Bhutan. Satellite images, even of very high resolution (50 cm footprint) do not show sufficient detail for the modelling of the man-made structures. Therefore this project leads itself very well to the use of an appropriate UAV. This paper describes briefly the raw data acquisition by UAV and terrestrial images, and then focuses on the procedures for data processing. The 3D model of the man-made objects is embedded into a large area model of the environment, generated from a GeoEye-1 stereo model. Overall, the project is a typical example of a multi-image concept, making use of imagery of quite different resolutions (satellite, UAV, terrestrial). Given a textured accurate 3D model, 2D maps and orthoimages are nothing but derivatives of this general product. The project also shows how lightweight equipment can be used in remote and not easily accessible areas for surveying and 3D modelling purposes.

[Conference Paper](#) (PDF, 681 KB)

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