



GNSS assisted UAS based Monitoring of Ambaroba Landslide, Canakkale, NW Turkey

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Unmanned Aerial Systems (UAS) recently is becoming more beneficial to solve engineering problems in many applications. For monitoring and analyzing of changes in the topography and surface characteristics of active landslides between different epochs, UAS based remote sensing has been employed for many years. We can easily derive current digital surface models of landslide area using UAV based remote sensing. Finally, the displacement amounts and rates are obtained by the comparison of digital surface models for different two epochs. Moreover, the high accurate three dimensional models present the opportunity to study displacing and sliding materials and fractures of landslide. The aim of this study is to produce the most current three dimensional model using UAV images for Ambaroba Landslide. The landslide is with an average of 21° slope. The Ambaroba Landslide is one of the most active landslides in Canakkale and the current activity was occurred since 2006. To do it, a low-cost monitoring approach based on UAS and calibrated digital cameras are used. This approach clearly provides high-resolution and high-accurate landslide modeling. The concept of manual controlled octo-rotor helicopters is studied for remote sensing applications. For field works, we took significant numbers of aerial photographs of the Ambaroba Landslide (Canakkale, NW Turkey) including RTK-GNSS control points from unmanned aerial vehicle. We combined these photographs to ortho-mosaic using plane image rectification methods. Through this methodology, two different digital surface models of the Ambaroba Landslide are obtained by merging aerial photographs to a digital surface model by using plane rectifications: the entire landslide and the active region. Finally, the entire model covered sliding area of the Ambaroba Landslide is successfully generated with a resolution in level of cm. According to the results, the density of point of our model changes from 0 to 75 points per m². The density of point of the digital surface model of the entire landslide is shown in the prepared thematic maps. We strongly propose to use the GNSS assisted UAS based remote sensing for monitoring and analyzing the active landslides.

Acknowledgement. This study was supported by The Scientific and Technological Research Council of Turkey (TUBITAK) (Project no: 112Y336)

Keywords: Landslide, UAV, Photogrammetry, Orthophoto, DTM, 3D model