Doctoral Thesis Title: Integration of GNSS, photogrammetric and remote sensing solutions using RPAS for slope monitoring.

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Abstract: Mass movements in Ecuador, particularly landslides or their reactivation, are very recurrent over time due to the physiographic condition and type of soil that the terrain presents, in addition to the climatological, seismic and anthropogenic factors. Many of the populated centers are located on areas susceptible to the occurrence of these, as is the case of the localities located in the Imbabura geopark; the agricultural areas of the mentioned zones are being affected by the reactivation of old landslides, leaving the land unsuitable for developing this activity, in the same way there are characteristics of reactivation of these generated near the urban area (Vivanco & Gómez, 2016).

The methods for measuring slope movements and subsidence are intended to determine the extent of the affected area, the displacement or settlement velocities, the mechanisms that govern the phenomenon, the critical moments of rupture or acceleration, as well as to evaluate the effectiveness of the correction measures that may have been adopted. The aim is to exhaustively develop the different deformation measurement techniques, to list their main characteristics and limitations, as well as their most common advantages and disadvantages when applied to the study of subsidence phenomena and slope movements (R. Tomás, 2005). (R. Tomás, 2005).

There are several research works in which different landslide monitoring techniques have been applied; several of them have included in their methodology the use of data obtained by GNSS devices; although there are several methods that use images obtained by RPAS, satellite images, as well as traditional topographic methods using specific equipment such as total stations (Ricardo Rodas, 2022). (Ricardo Rodas, 2022).

The Doctoral Thesis project aims to integrate different methods of geospatial data acquisition: GNSS, photogrammetric, multispectral and multitemporal from RPAS accurately and at a detailed scale in order to monitor susceptible areas that have been affected by subsidence and mass movements in the Imbabura Geopark - Ecuador.

Available Means: Photogrammetric, remote sensing and modeling hardware and software available at the Department of Cartographic Engineering, Geodesy and Photogrammetry of the UPV. Yachay Tech University's own equipment, RPAS multirotors, Parrot Sequoia multispectral camera, differential GNSS equipment.

References:

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