應用 UAV 影像建置現地堰塞壩三維模型

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摘　要　台灣地區地震、颱風、豪雨不斷，921 地震後山區土質鬆動，復以連年颱風豪雨侵蝕，導致每逢颱風季節，邊坡滑動崩落而形成堰塞湖。而堰塞湖之潰絕造成土石流與洪水災害往往成為山區洪災之重要成因。因此發展迅速且有效之堰塞湖監測技術，實為刻不容緩的重要課題。

本研究使用無人載具飛行器 (Unmanned Aerial Vehicle, UAV)，配合潰壩實驗前所預先佈設之地面控制點，並定點飛行拍照，再以演算法重構出三維場景模型，可符合現階段防災工程之測繪工程中快速及成本低之要求。研究所得結果單尺度轉換之誤差為 1.4963 公尺，而雙尺度轉換三維模型精度大為提升，平面誤差為 0.8760 公尺、高程誤差為 0.2563 公尺。而現地測量所得壩體穩定度(DBI)為 5.13，尺度轉換所得壩體穩定度為 5.12，皆顯示此塞壩呈現不穩定狀態。

關鍵詞：UAV、IBM、三維模型、壩體穩定度。

Establishment of a 3D On-Site Model of Landslide Dam using UAV Images

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ABSTRACT Landslide and debris flows due to heavy rains or earthquakes may block river flow and create landslide dam naturally. This research applied unmanned aerial vehicles (UAVs) to do the aerial survey. This research acquired few specific distances between special ground points. Those distances could apply for researchers to find out a suitable scale between real world and 3D reconstruction model. The error of one scale transformation is 1.4963m, and the errors of two scale transformation on XY and Z dimensions are 0.8760m and 0.2563m, respectively. The DBI value of this landslide dam is 5.13 by field surveying and 5.12 by scale transformations, which all shows the landslide dam in an unstable situation.

Key Words : UAV, IBM, 3D-model, Dimensionless Blockage Index..

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