

Topographic Laser Scanning of Landslide Geomorphology System: Some Practical and Critical Issues

Khamarrul Razak, Rozaimi Che Hasan, Mohd Azwan Abbas, Lau Chong Luh, Zulkepli Majid, Lim Chor Sheng, Rabieahtul Abu Bakar, Suhaimi Jamaludin, Wan Abdul Aziz Wan Mohd Akib (Malaysia)

Key words: Laser scanning; Remote sensing; Natural Disaster, Complex landslides, Laser Scanning-derived products

SUMMARY

Modern surveying technology, notably topographic laser scanning system (TLSS) has been widely used for understanding the geophysical phenomena underlying natural hazards. Advanced and modern TLSS is a promising tool for mapping, monitoring and modeling landslides in the tropics. Understanding this geomorphic processes is an important step forward given the economic losses and fatalities globally. This paper aims at providing better insight into the use of TLSS, captured from airborne- and ground based platform, coupling to advanced point cloud- and image-based processing for a detailed landslide investigation in a mountainous tropical region (Gunung Pass, Perak). This paper deals with some critical issues of laser scanning – from the field to the finish, for collecting landslide topographic data, and outline recommendation mapping practices for a better understanding of geomorphic problem and permutes the operational needs at national, state and local jurisdictions. Notable laser scanning-facilitates products are carefully addressed in the context of tropical landslide geomorphology system. Multi-scale stereoscopic visual analysis of TLSS derived images unveiled much better landslide geomorphology features and activity than that of previously published landslide maps. A series of field investigation explicitly indicated the distinctive morphology, disrupted drainage and vegetation anomalies across the unstable area. We evaluated a series of topographic surveying techniques for explicitly providing spatial pattern of landscape morphology and quantified them in term of time efficiency and its effectiveness. Multisensor laser scanning data enabled identification and classification of complex landslides, but attention is needed to integrate them in a densely forested area. As a conclusion, TLSS can be a very important new data source and mapping tool to characterize landslides even in a complex environment. The increased prevalence of modern TLSS system and advanced point cloud processing has led the ways to improve future landslide maps and subsequently reduce landslide risk. The emergence of TLSS enables the surveyors to more effectively play a vital role in such complex and changing environment.