

## Probabilistic Use of LiDAR Data to Detect and Characterize Landslides

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Landslide (e.g., Figures 1-2) hazard and its consequences in the transportation network are well-understood, yet current methods of identifying and assessing landslide conditions are inefficient, as they are mostly based on labor-intensive field surveys. Light Detection And Ranging (LiDAR) technology has seen phenomenal developments in the past ten years, and both airborne and terrestrial LiDAR can directly provide accurate surface models. Therefore, this technology is a prime consideration for landslide detection and monitoring, as it is relatively easily available, efficient and can achieve the accuracy needed for detecting surface changes in the cm-level range.



Figure 1. Rotational slide (CSHS, 2011)



Figure 2. Translational slide (Highland and Bobrowsky, 2008)

This research is conducted as a feasibility study, where the potential of airborne LiDAR data for landslide detection is investigated. The primary objective of this pilot study is to develop, implement and validate computer models for automatic detection and assessment of landslides using time-series of airborne LiDAR data. The successful completion of this project will provide a low-cost method for the automatic detection and assessment of landslides that may potentially threaten state highways. This technique is expected to save cost and provide more complete detection coverage than the current method of relying on observations and communications from field personnel and maintenance crews. The method is also expected to indirectly save on costs of remediation, since earlier landslide detection and assessment will often require less expensive remediation.