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Geohazard assessment of mass movements along railroad corridors with UAV LiDAR

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Railroad corridors in northern Idaho are subject to landslides, debris flows, and rock fall. These geologic hazards have the potential to severely impact railroad assets, profitability, and public safety, particularly when hazardous materials are transported. Recent slope instability and mass movement in these railroad corridors have affected rail operations and emphasized the need for a detailed understanding of geologic hazards and slope dynamics in this region. Idaho Geological Survey (IGS) and Idaho State University (ISU) conducted a series of Unmanned Aircraft Systems (UAS) missions equipped with LiDAR to survey selected landslides. This pilot project acquired high-resolution data at two sites along steep canyon slopes of the Kootenay River and one site along the Moyie River. The selected sites represent a diversity of terrain conditions, coverage area, forest canopy, and mass movement activity. In addition to collecting bare earth models of the landslide areas, this pilot project assessed resolution requirements, canopy penetration, and deployment complexity to provide a baseline for repeat surveys. Best practices for data collection and point cloud alignment for geohazard assessment are highlighted based on variations in terrain cover and slope.