

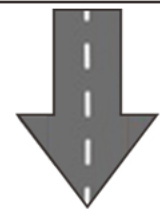


1. Introduction

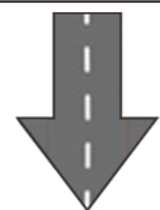
Pavement asset management is essential for road operational efficiency in landslide areas. The quantitative and objective damage detection contributes to the development of predictive models for road pavement deterioration. This work is part of an ongoing project about the impact of landslides on roads.

2. Method

Survey of the provincial road SP 14 in Laino (northern Italy) with a Phantom 4 drone

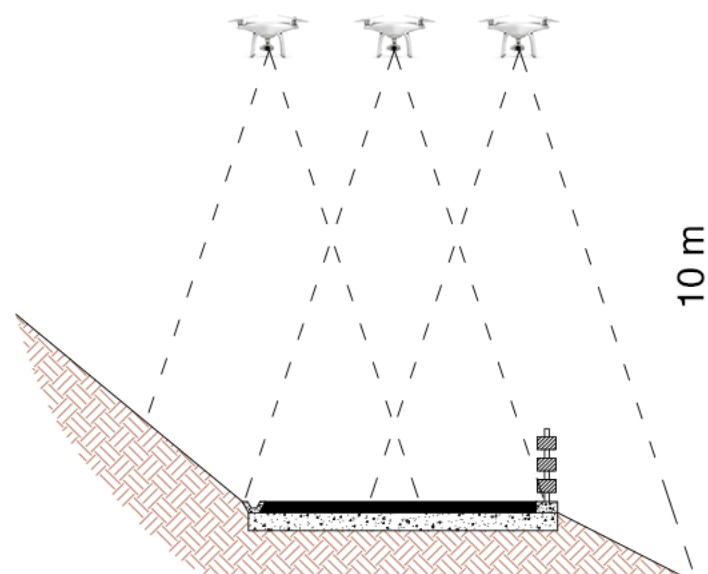
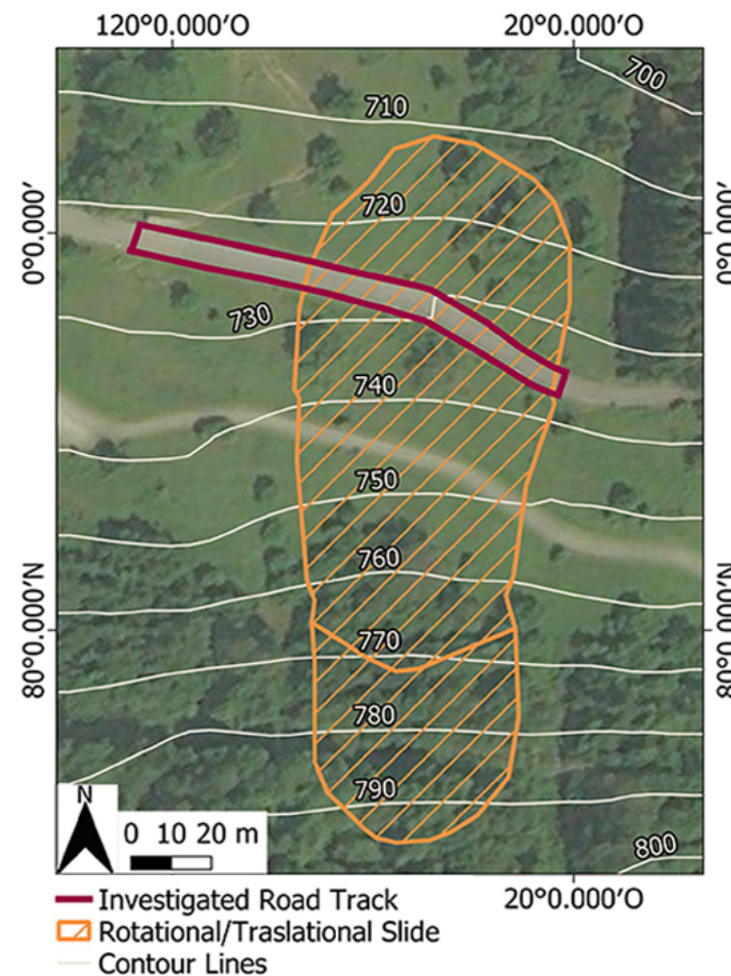


Photogrammetric 3D model reconstruction via Pix4D and point cloud processing via CloudCompare



Damage detection via automatic Canny edge algorithm and manual method

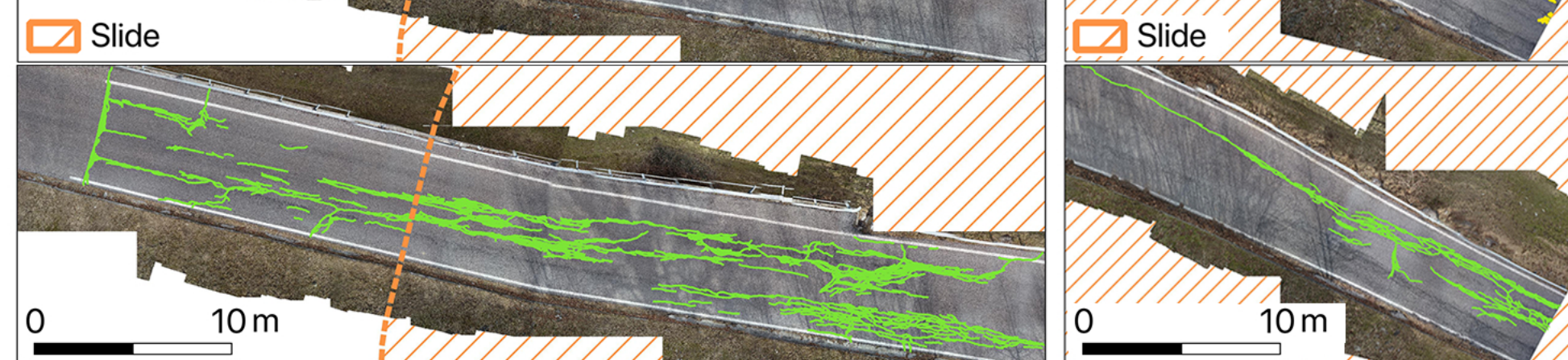
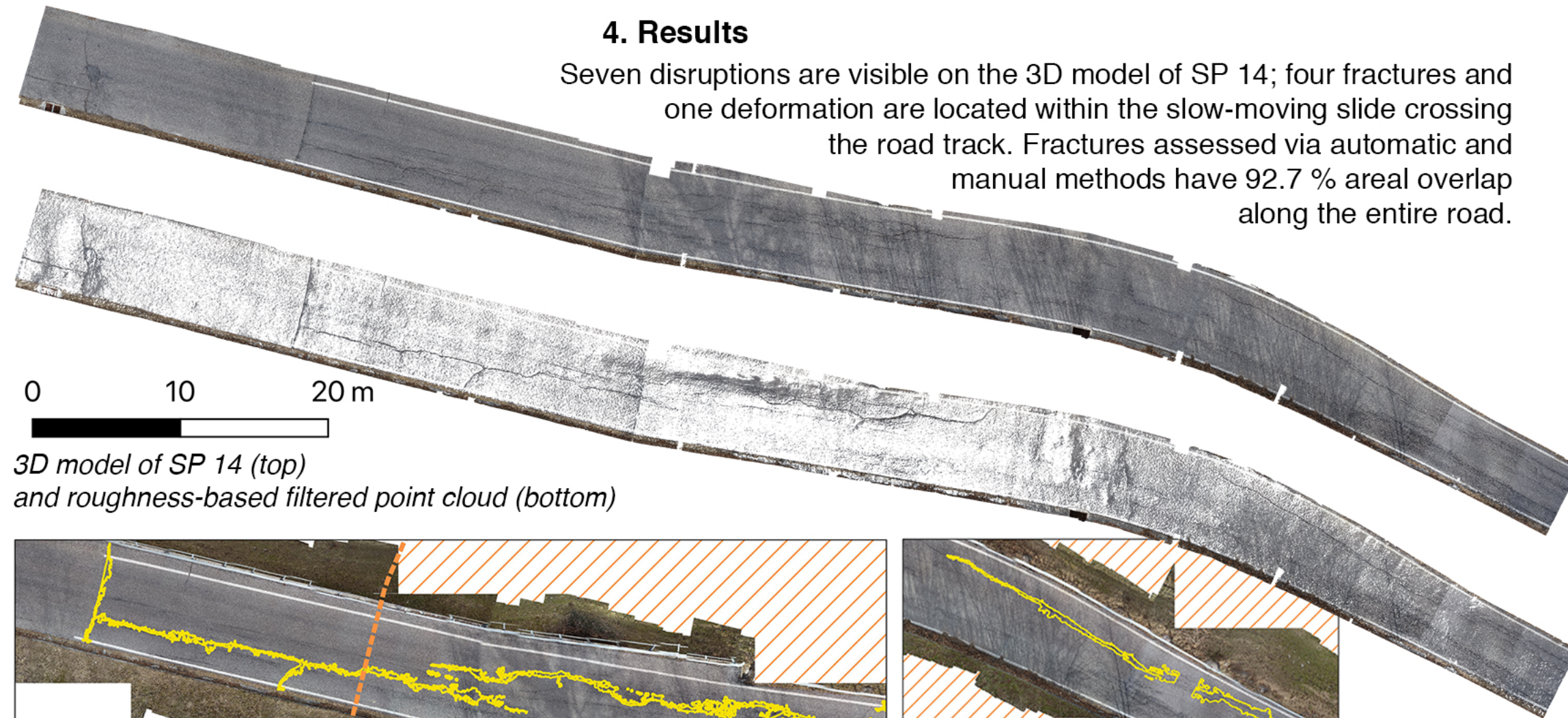
3. Data Acquisition



371 images (5472x3078 resolution) are acquired along 110 m of the SP 14 (top) with drone flying at 10m high (bottom)

4. Results

Seven disruptions are visible on the 3D model of SP 14; four fractures and one deformation are located within the slow-moving slide crossing the road track. Fractures assessed via automatic and manual methods have 92.7 % areal overlap along the entire road.



Comparison between automatic (top) and manual (bottom) methods for damage detection.

5. Conclusions

Fractures wider than 1 cm were detected from a 3D point cloud with 63,160 points per m² density. The procedure allows to automatize the measuring of disruptions on road pavement in landslide areas.

