Structure from motion applicata allo studio ed alla caratterizzazione dei fenomeni franosi

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LANDSLIDES INVESTIGATION WORKFLOW

Ormea rock falls prone area

Mean resolution 5 mm/pixel
Ormea rock falls prone area
Ormea rock falls prone area

BEDDING + JOINTS
Ormea rock fall prone area

ROCK FACE 1: Width: 30 m  
Height: 60 m  
192 joints + bedding measures
Ormea rock fall prone area

Full area

Width: 100 m
Height: 80 m

908 joints/bedding measures

The use of solid images is useful for a correct identification and interpretation of joints.
During the snow melting, a reactivation of Champlas du Col landslide interrupted the road that connects Sestriere (an important ski area of the NW Italy) with the bottom of the valley.
Structure from motion applications

- Historical Aerial Images
- Remotely Piloted Aerial Vehicles
- Terrestrial Images
Structure from motion applications

HISTORICAL AERIAL IMAGES

multi-temporal geomorphological analysis of slope evolution
Structure from motion applications

REMOTELY PILOTED AERIAL VEHICLES

High-resolution map of actual active landslide
Structure from motion applications

Identification of main geomorphological elements and measurement of displacement

TERRESTRIAL IMAGES
The Champlas du Col slope is characterized by the presence of a deep seated gravitational slope deformation. The actual landslide is the last reactivation of a complex sequence of events occurred in this area.
The high-resolution images of the slope allow the identification of main geomorphological elements of the landslide and the identification of several springs.

The hydrogeological setting of the slope is a crucial element for the comprehension of the landslide dynamic.
Using terrestrial and RPAS images we also measured the total occurred displacement of the slope instability.
Coupling all acquired data with the inclinometer measurements we also define the possible structure of the active landslide that is characterized by the presence of several shear surfaces.
Conclusion

As usual, when a new system is introduced in the market, it seems to be the best solution for everything.

UAV can be considered a good solution when we need a low cost system able to acquire ultra high resolution images of a limited area whenever you want.

Commercial systems allow obtaining ‘typical’ structure from motion results (DSM and orthophoto). These results are enough for our purposes?
Conclusion

Structure from motion results are just the **beginning** of our research and not the end.

Up to now, the research has been mainly focused on standard results of structure from motion but now it is important to start to define possible methodologies for the use of RPAS to support landslide characterization and monitoring.

The development of a good methodology for our purposes may represent the real add value to the use of these systems.
Thank you for your attention