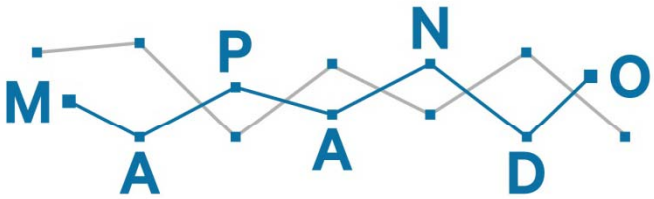


Laser Scanner and tool application for open mines and quarry

MAPANDO® **by Gaspari Alfredo**
www.mapando.it

THE METHOD

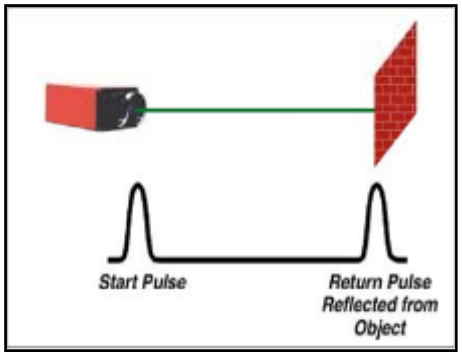
Laser scanner with high range >1km, drone UAV, total station, GPS

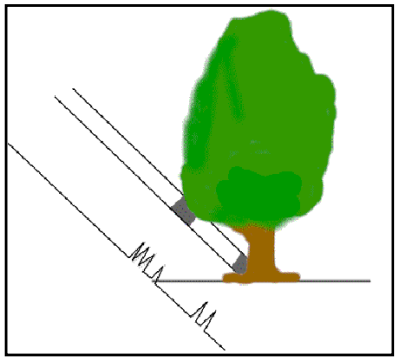
<u>Vertical angles and horrizontal</u>

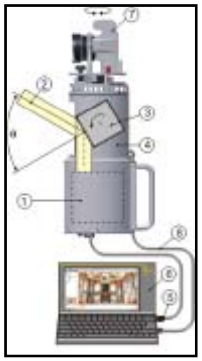
From the angular measurement of a mirror which directs the laser beam

<u>Distance</u>

From the measurement of the laser time to travel distance up to the target and return







TECHNICAL SPECIFICATION OF LASER SCANNER

Model: RIEGL LMS-Z420i

Eye safety class according to EC60825-1:2001: Laser Class 1

Measurement range: for natural targets, r ³ 80% up to 800 m
for natural targets, r ³ 10% up to 250 m

Minimum range: 2 m

Measurement accuracy: typ. ± 10 mm (single shot)
typ. ± 5 mm (averaged) Measurement resolution5 mm

Measurement rateup: to 12000 pts/sec @ low scanning rate (oscillating mirror)
up to 8000 pts/sec @ high scanning rate (rotating mirror)

Laser wavelengthnear infraredBeam divergence: 0.25 mrad

<u>Scanner Performance</u>:

Vertical (line) scan: Scanning range 0° to 80°Scanning mechanism rotating / oscillating

Minimum angle stepwidth 0.01°

Horizontal (frame) scan:Scanning range 0° to 360°Scanning mechanism rotating

Minimum angle stepwidth 0.01°

Max resolutions: 20400 punti/m2 @ 100 m

Main dimensions: 463 x 210 mm (Length x Diameter)Weightapprox. 14,5

SERVICES

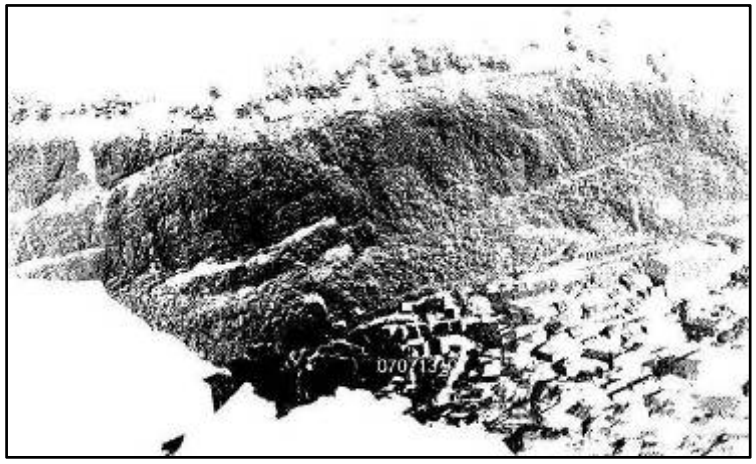
DATA PROCESSING SERVICES AND SUPPORT ON QUARRY

- **Cloud points, Georeferencing, DTM, DSM**
- **Planimetric view, sections, elevations**
- **Identification of discontinuity systems**
- **Volumetric calculation of quarry**
- **Calculation of potentially unstable volumes on slope**

DATA ACQUISITION ON SITE

Surveying area

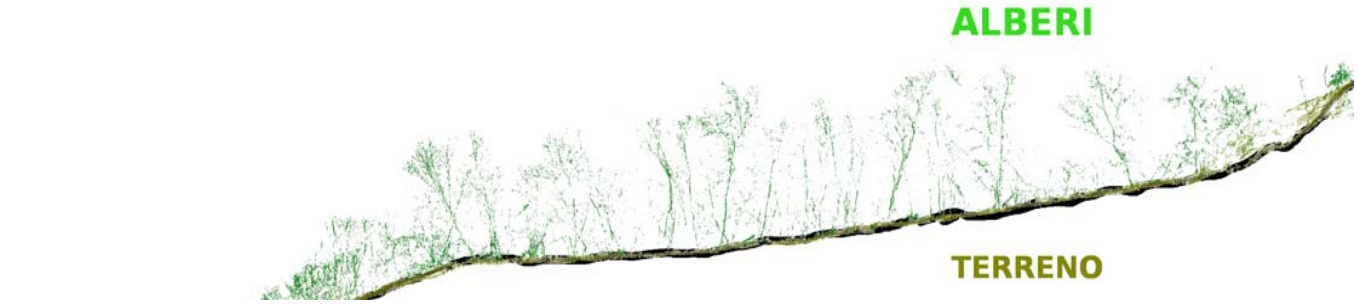
Laser-scanner working

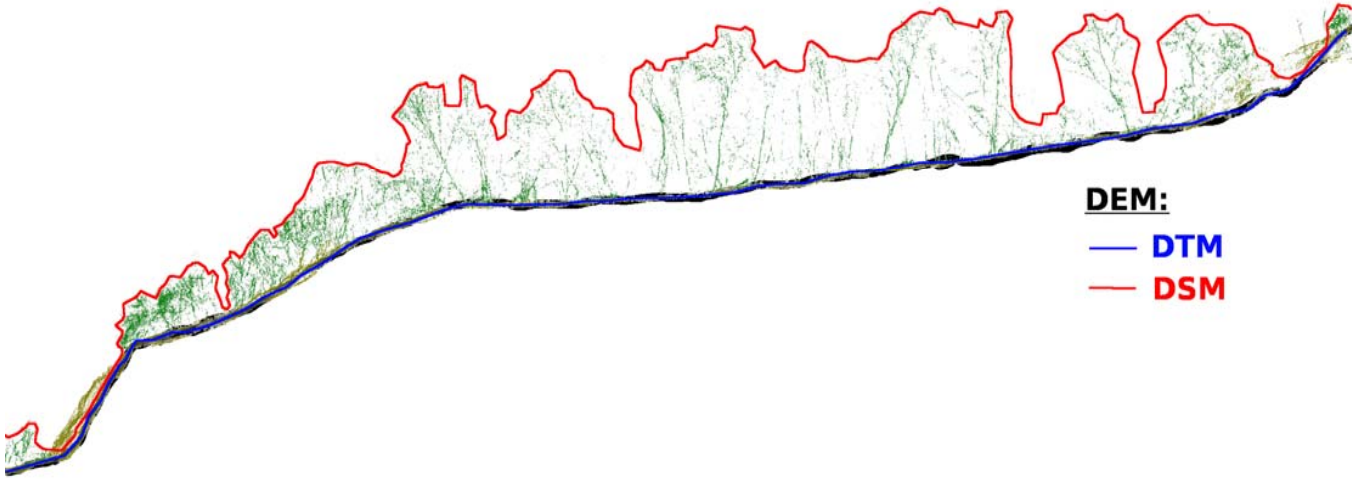


Cloud of point

DATA ELABORATION:

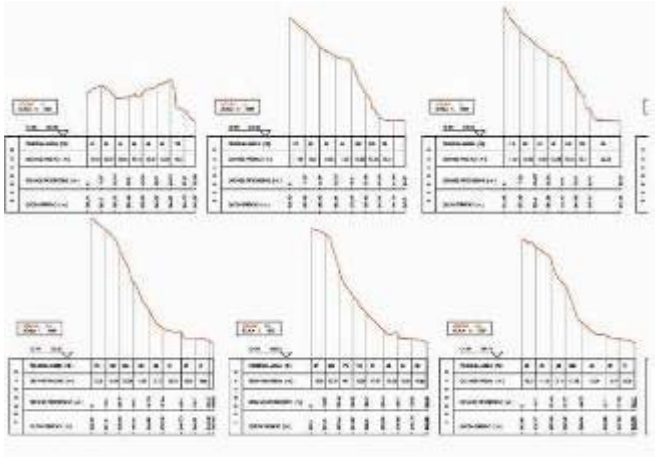
Cloud points, Georeferencing, DTM, DSM



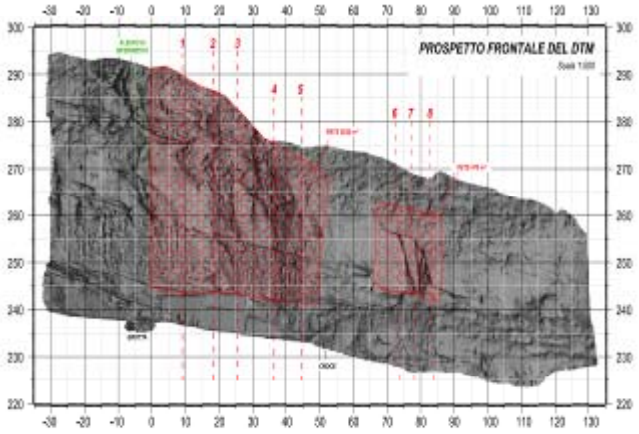


ELABORATION DATA: Planimetric view, sections, elevations

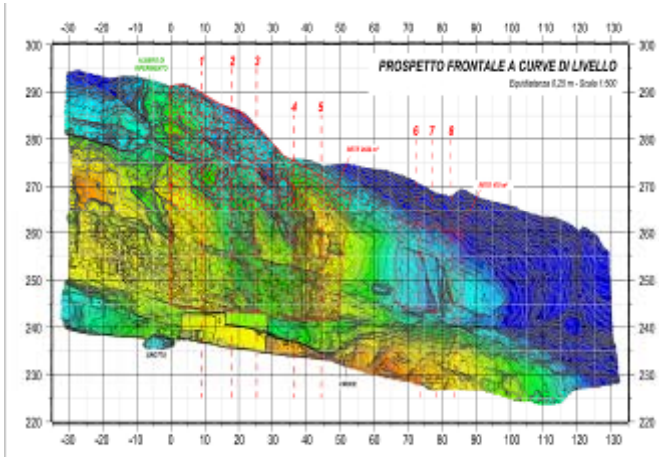
PLANIMETRIC VIEW OF ROCKFALL SLOPE



SECTION OF SLOPE

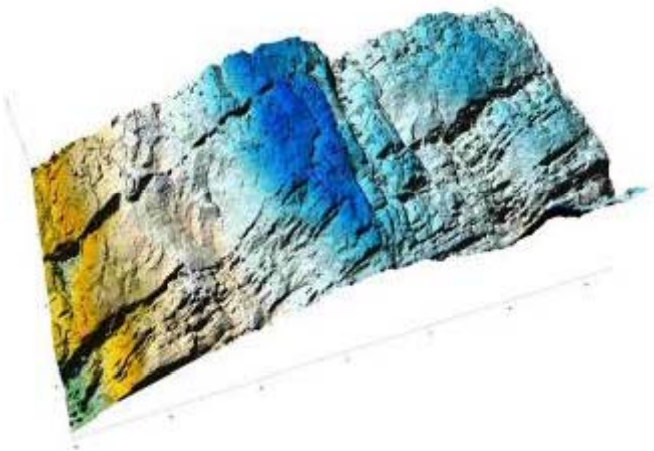


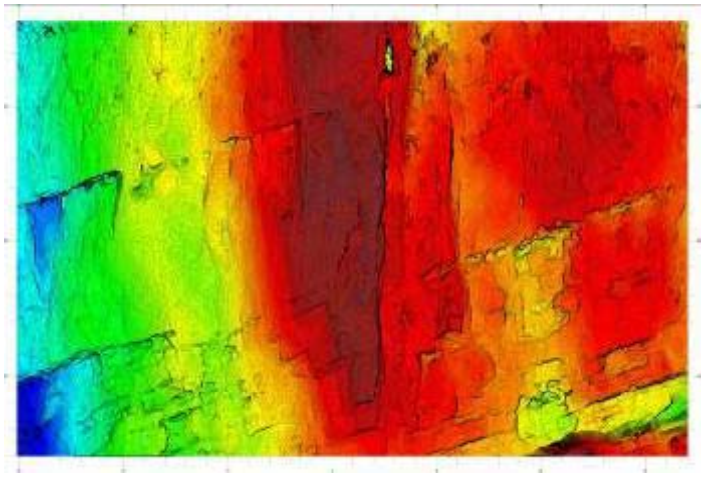
FRONTAL VIEW OF SLOPES (SHADY MODEL)



FRONTAL VIEW WITH LEVAL CURVES AND COLOURS GRADIENTS FROM A REFRENCES PLANE

DATA ELABORATION: Ortophoto and solid model





DATA ELABORATION: Identification of discontinuity systems

1. **Data collection >> position (x, y, z) + slope + immersion**

2. **Aggregation of data collected in areas with homogeneous geological features**

3. **Identification of the main families of discontinuities >> Polar diagram**

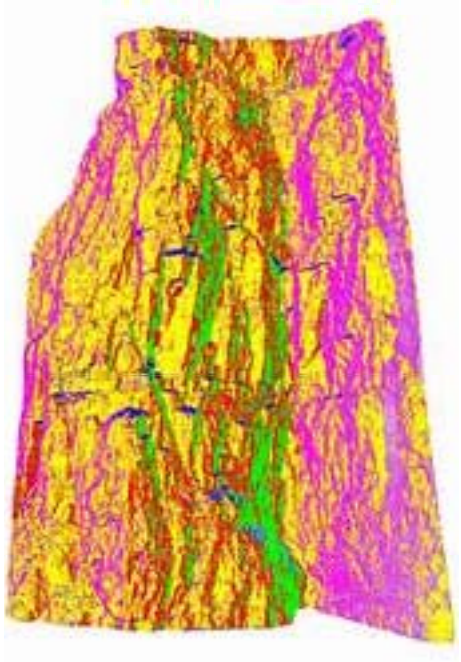
4. **Statistical calculation of the spacing of the main families >> VRU**

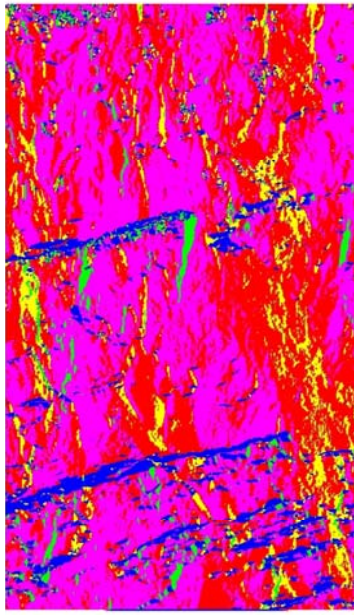
DATA ELABORATION: Identification of discontinuity systems

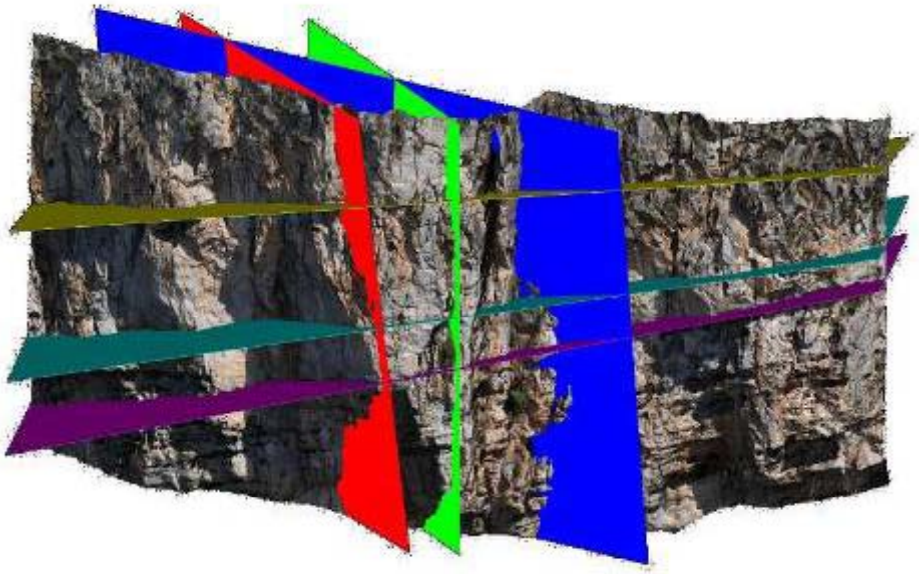
Data collection >> position (x, y, z) + slope + immersion

Automatic analysis of the entire population of plane

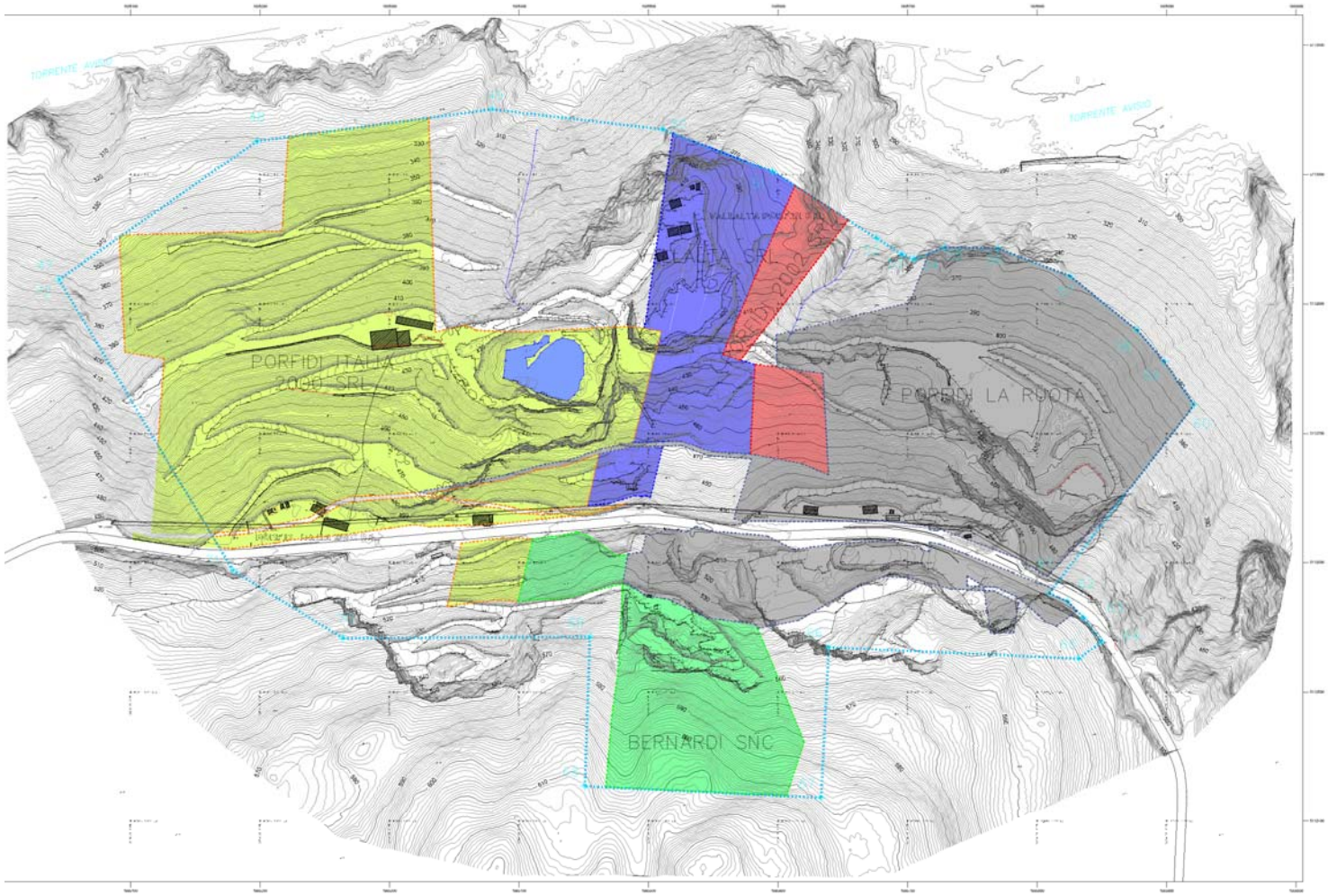
Triangulated model of noiseless detail (vegetation and steel mesh)



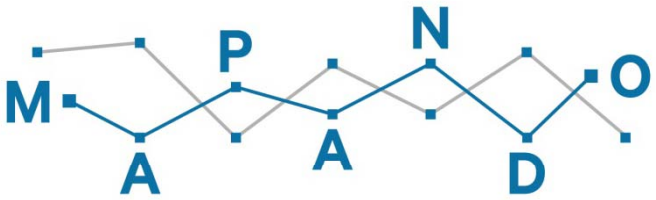




DATA ELABORATION: Calculation of volumes of excavation



PHOTOS:



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