

Terrestrial laser scanning for the digital preservation of a Croatian historical village “Dobranje”



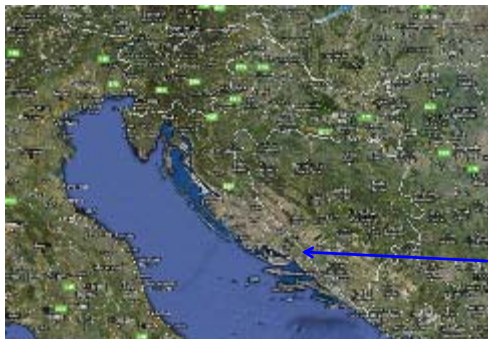
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Croatian historical village “Dobranje”

- ▶ Dobranje is situated in the southern part of Croatia near the town of Imotski (near the border with Bosnia and Hercegovina)



Croatian historical village “Dobranje”

- ▶ The first official mention of Dobranje can be found in the records dating from 1585 AD
- ▶ Dobranje was habituated even before.
- ▶ Proof of that can be found in Iliric burial stone knolls
- ▶ The ministry of Culture of Republic of Croatia - Patronage for the purpose of protection and preservation
- ▶ For the purpose of protection recording of the objects is necessary (Faculty of Geodesy)



Terrestrial laser scanner



- ▶ For the purpose of recording TLS Trimble GX 200 was used
- ▶ Light detection and ranging (LIDAR) technology
- ▶ Contactless
- ▶ Direct way to 3D georeferenced data
- ▶ On the spot inspection and quality evaluation



Object analysis

Devastated over time

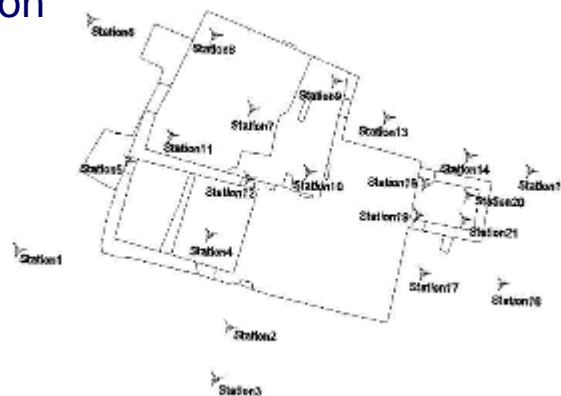


Preserved



The survey

- ▶ A total of 21 station and over 16 million points acquired during a 13 hour scanning session



Point cloud

- ▶ Cleaned
- ▶ Merged
- ▶ Sampled
- ▶ Georeferenced
- ▶ Colorization using SLR camera



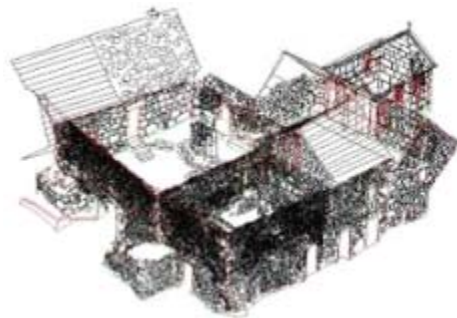
Preparation for contour mapping

- ▶ Cutting the point cloud
- ▶ Meshing
- ▶ Easier manipulation and detail detection
- ▶ Unobscured view



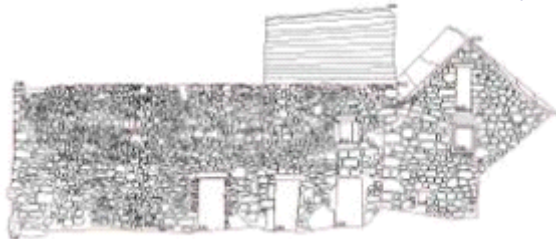
3D wireframe model

- ▶ Time consuming
- ▶ CAD models can be used without any kind of cloud or mesh manipulation software



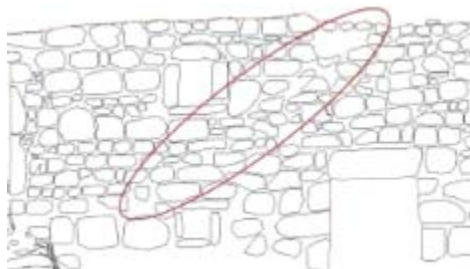
Elevations

- ▶ Elevation is a side-view of a 3D object from its front, back, left, or right
- ▶ Building facades are often shown as elevations
- ▶ Used in field inspection and analysis



Analysis

- ▶ The shapes, sizes and positions of the stones allow architects and archeologist to determine the time period the object was built in
- ▶ The shapes of the openings allow them to determine the use of those openings (if there were beams supporting the roof or if there were openings for armored sentries and so on)
- ▶ Positions of the stones can also be used to determine were there any modifications to the original object (changes to the original object can be tracked and various assumptions can be confirmed or rejected)



Conclusion

- ▶ Laser scanning proved to be a valuable asset in cultural heritage preservation
- ▶ Accurate 3D documentation is used for protection, conservation and valorization
- ▶ Such data and models can be used for the analysis of the structures and for reconstruction in case of any devastation and village Dobranje represents a perfect example
- ▶ TLS provides a huge asset to all kinds of cultural heritage preservation projects

