PRESIOUS

Predictive digitization, restoration and degradation assessment of cultural heritage objects

D5.6 – Third differential scan data of degrading surfaces

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1. THE DATA CAPTURE PROCEDURE

A breuckmann Scanner smartSCAN HE 8 megapixel white light scanning system was used for both scanning campaigns in Elefsis, Greece, and Trondheim, Norway, that took place in December 2015.

In Elfesis a more than 2.2 m tall column drum with a diameter of approximately 1.2 m was scanned (Fig 1.). While only a small area is of interest for the successive erosion scans, the complete column was captured to provide a reference frame for future scans. Overview scans around the column were taken with a large FOV of 950 mm yielding an x,y-resolution of 0.230 mm and a z-resolution (along the viewing direction of the scanner) of 0.038 mm. In total 50 scans were taken and aligned to cover the whole column in this resolution. The part that was already scanned in 2010 and will be evaluated in detail to study erosion within the PRESIOUS project, was captured by 15 additional scans with a FOV of 450 mm yielding a nominal z-resolution of 0.018 mm. All scans were aligned using edge alignment with automatic alignment activated. The resulting model of the complete column represents a very large data set at highest resolution. The data is also available at different levels of detail. The analysis takes place on subsets of the data in order to increase the speed of analysis, viewing and processing. Scans were taken after sunset to ensure optimum contrast of the projected pattern required for white light and stereo-metric scanning.

Figure 1. Visualisation of the 3D scanning results from Elefsis in OPTOCAT software (left, image from 2015 campaign). Data acquisition with a breuckmann Scanner (right, 2013 campaign).

Several smaller areas were scanned at the Nidaros Dome in Trondheim. The number of scans per area varied between 12 and 29 scans. Different FOV were installed to adjust working distance or amount of detail captured – FOV of 250, 350 and 450 mm were used with nominal z-resolution of 0.010, 0.014, and 0.018 mm, respectively. Scanning was partly done outdoors at temperatures close to freezing.

Figure 2. Scanning outside of the north entrance of Nidaros cathedral (left). The result from monochrome texture mapping (lower right image) using sensor imagery provides an added value for documentation and visualisation. (Images from 2013 campaign).

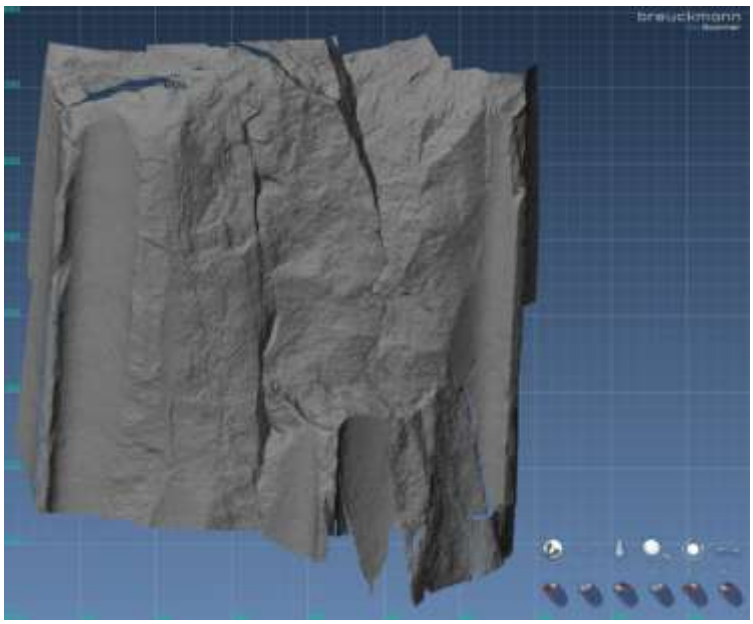
The scanned areas spans approximately 1 by 0.9 m² and shows stones affected by erosion. The resolution in x, y is approximately 0.1 mm with z-resolution of 0.007 mm. Please also note the two mason marks engraved in the rocks (top right image). Such details are hardly visible in the textured image.

For all areas scanned in Greece and Norway the scans were aligned using OPTOCAT software. The resulting PLY files were saved with different compression rates keeping full resolution data as well as data that is easier to handle. The resulting model, merged in single PLY are available online from the PRESIOUS homepage.

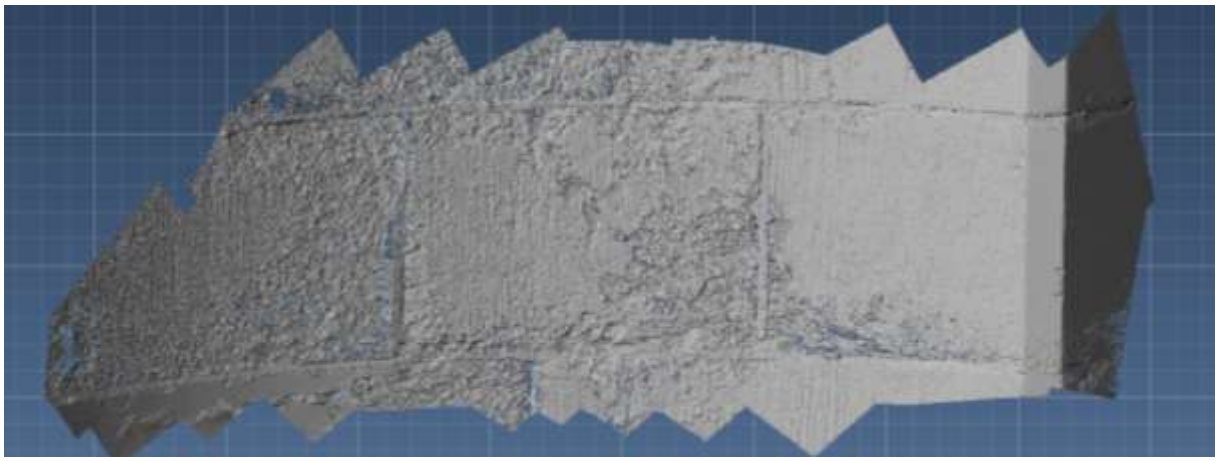
2. LIST OF FILES

Five scans were taken that are referenced as follows:

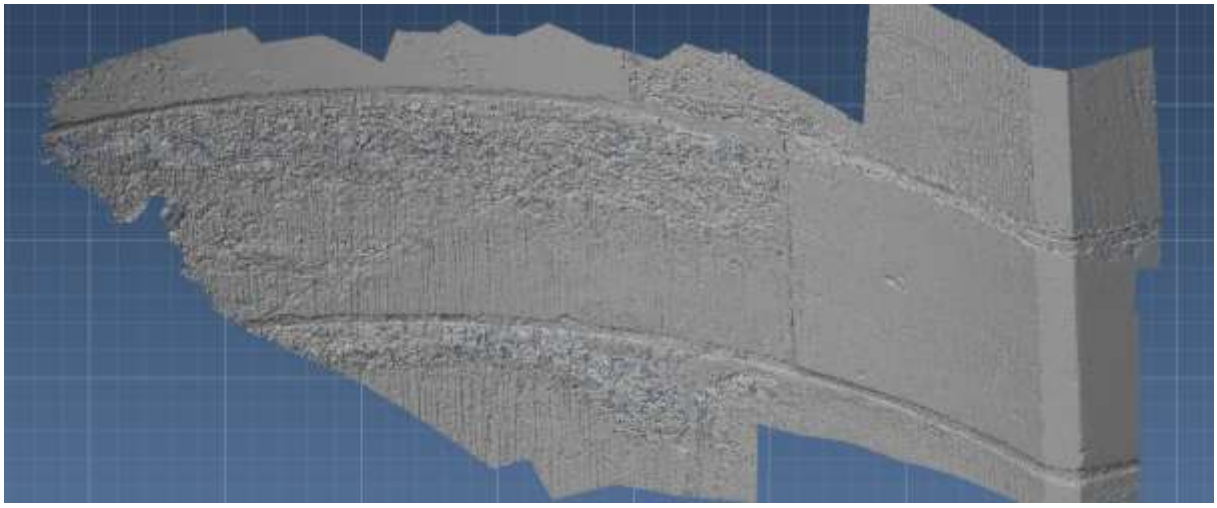
*Greece, Elefsis, **pillar**, acquired 03.12.2015.*



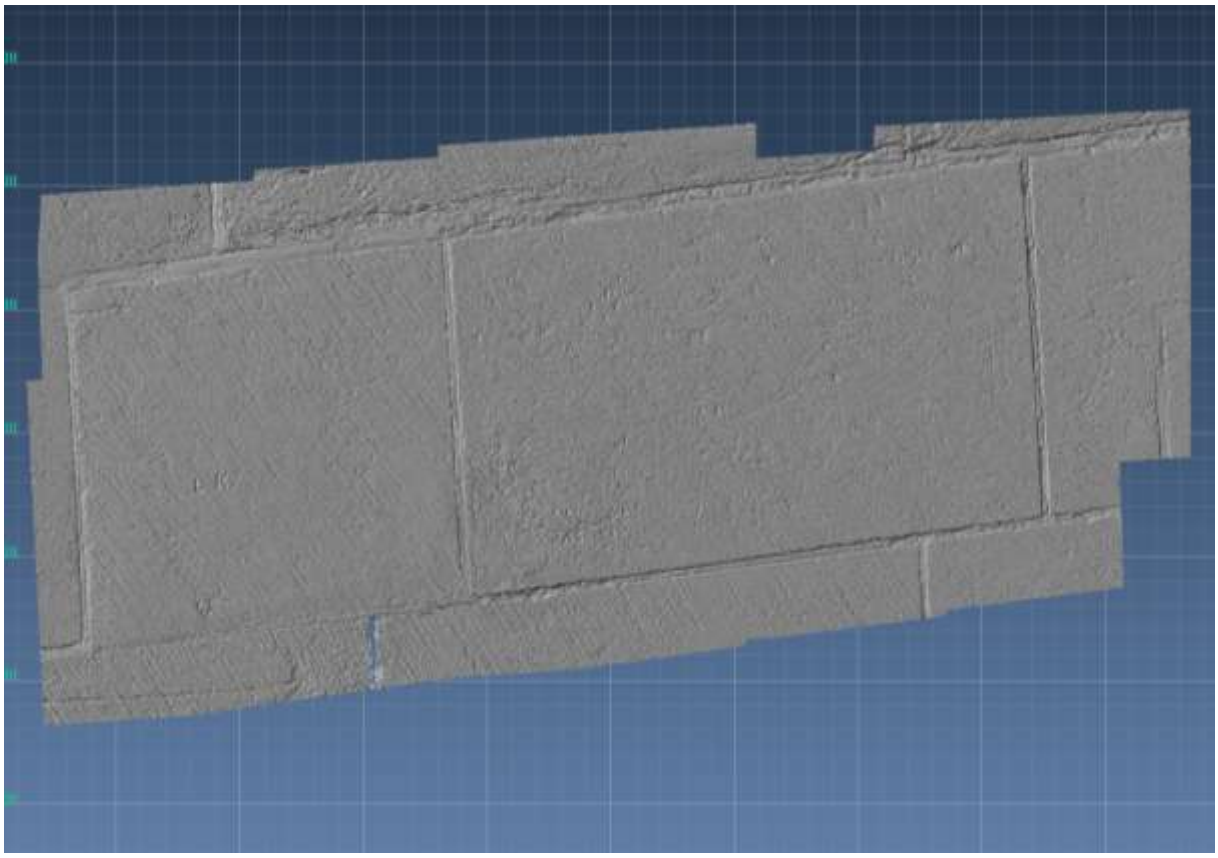
*Greece, Elefsis, **pillar-detail**, acquired 03.12.2015.*



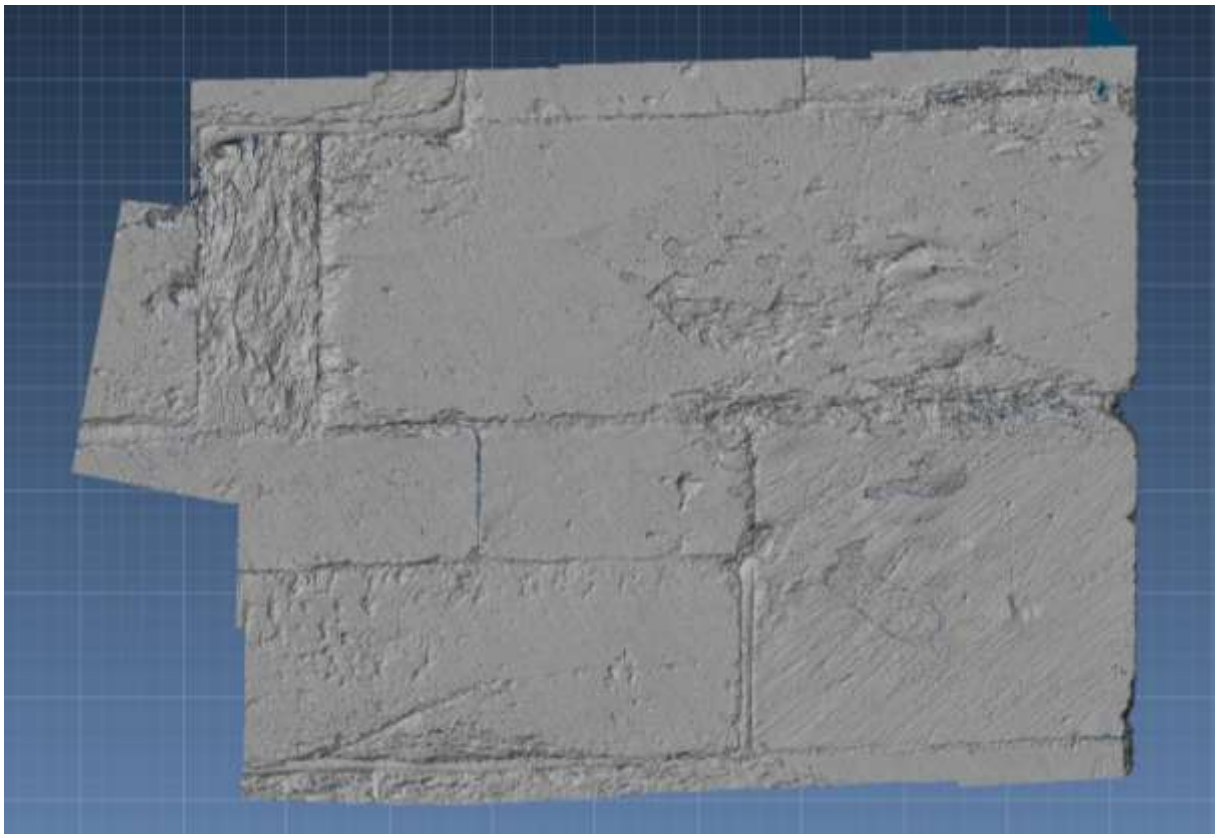
*Norway, Trondheim, **tower south**, acquired 08.12.2015.*



*Norway, Trondheim, **tower north**, acquired 08.12.2015.*



*Norway, Trondheim, **outdoors North 1**, acquired 08.12.2015.*



*Norway, Trondheim, **outdoors North 2**, acquired 08.12.2015.*