D3.3 – Second differential scan data of degrading surfaces

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1. THE DATA CAPTURE PROCEDURE

The procedure followed closely the procedure of the first differential scan data of degrading surfaces performed for deliverable D3.2.

A Breuckmann smartSCAN ^{3D} –HE 4 megapixel white light scanning system was used for both scanning campaigns in Elefsis, Greece, and Trondheim, Norway, that took place in October and September 2014, respectively.

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 850 mm yielding an x,y-resolution of 0.300 mm and a z-resolution (along the viewing direction of the scanner) of 0.016 mm. In total 64 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 20 additional scans with a FOV of 400 mm yielding a nominal z-resolution of 0.007 mm. All scans were aligned using edge alignment. 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). Data acquisition with a Breuckmann white light scanning system (right).

Several smaller areas were scanned at the Nidaros Dome in Trondheim. The number of scans per area varied between 10 and 33 scans. Different FOV were installed to adjust working distance or amount of detail captured – FOV of 125, 250 and 400 mm were used with nominal z-resolution of 0.002, 0.004, and 0.007 mm, respectively. Scanning was partly done outdoors.

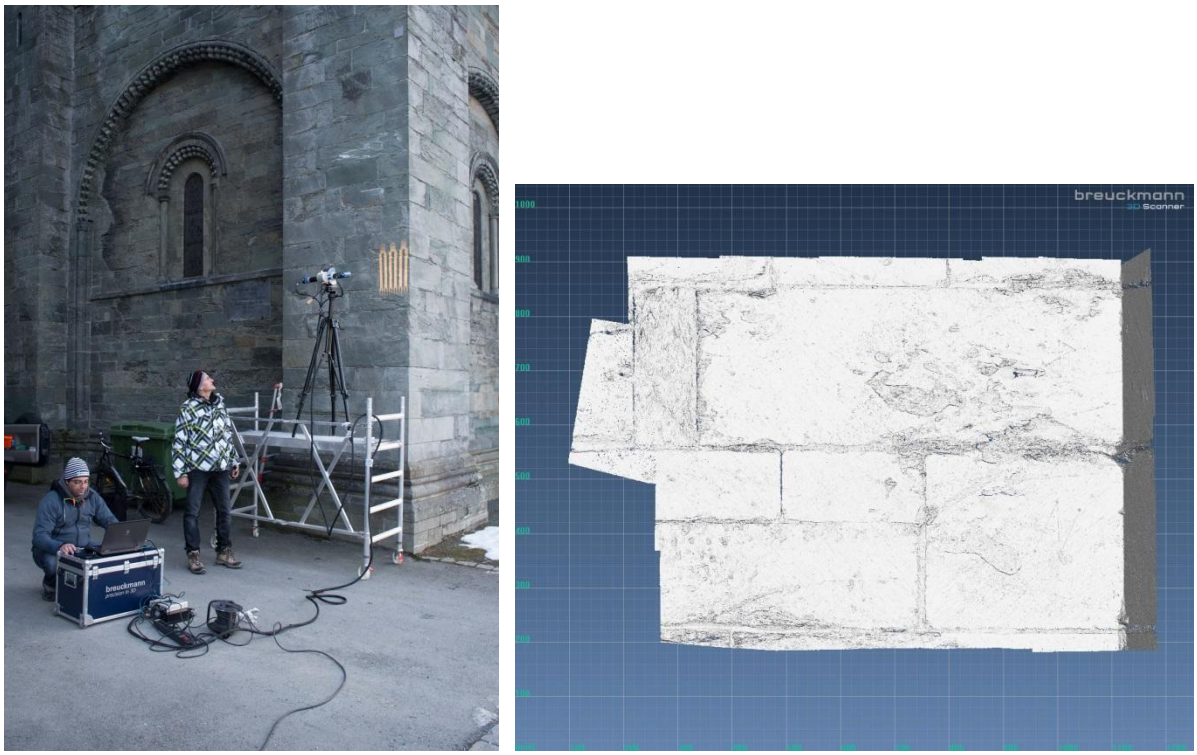


Figure 2. Scanning outside of the north entrance of Nidaros cathedral (left). The result from monochrome texture mapping (lower right image) using sensor imagery provides an added value for documentation and visualisation.

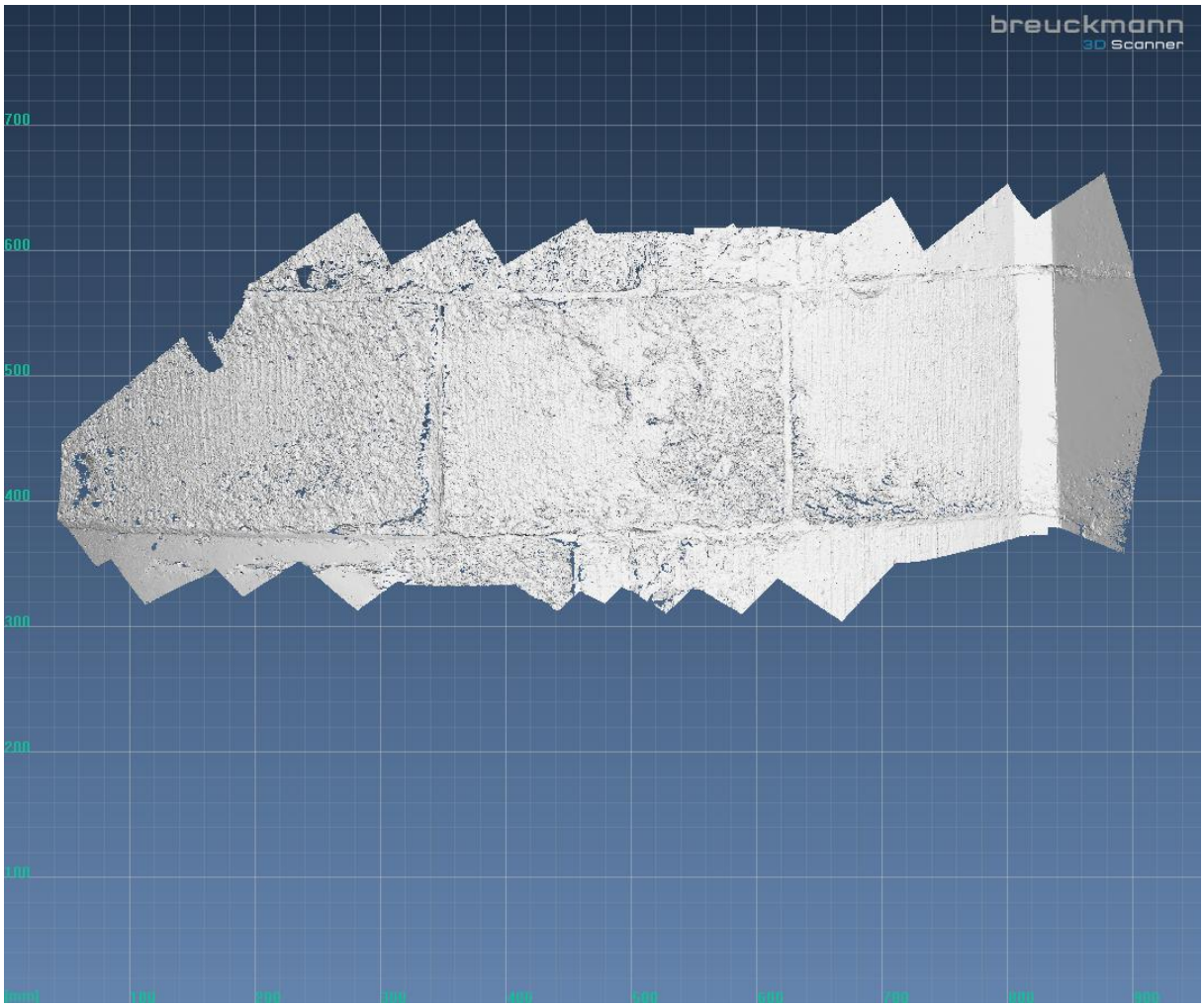
The scanned areas spans approximately 1 by 0.9 m² and shows stones affected by erosion. The resolution in x, y is approximately 0.1 mm with z-resolution of 0.007 mm. Please also note the two mason marks engraved in the rocks (top right image). Such details are hardly visible in the textured image.

For all areas scanned in Greece and Norway the scans were aligned using OPTOCAT 2014 software. The resulting STL 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 STL, PLY or OBJ files, are available online.

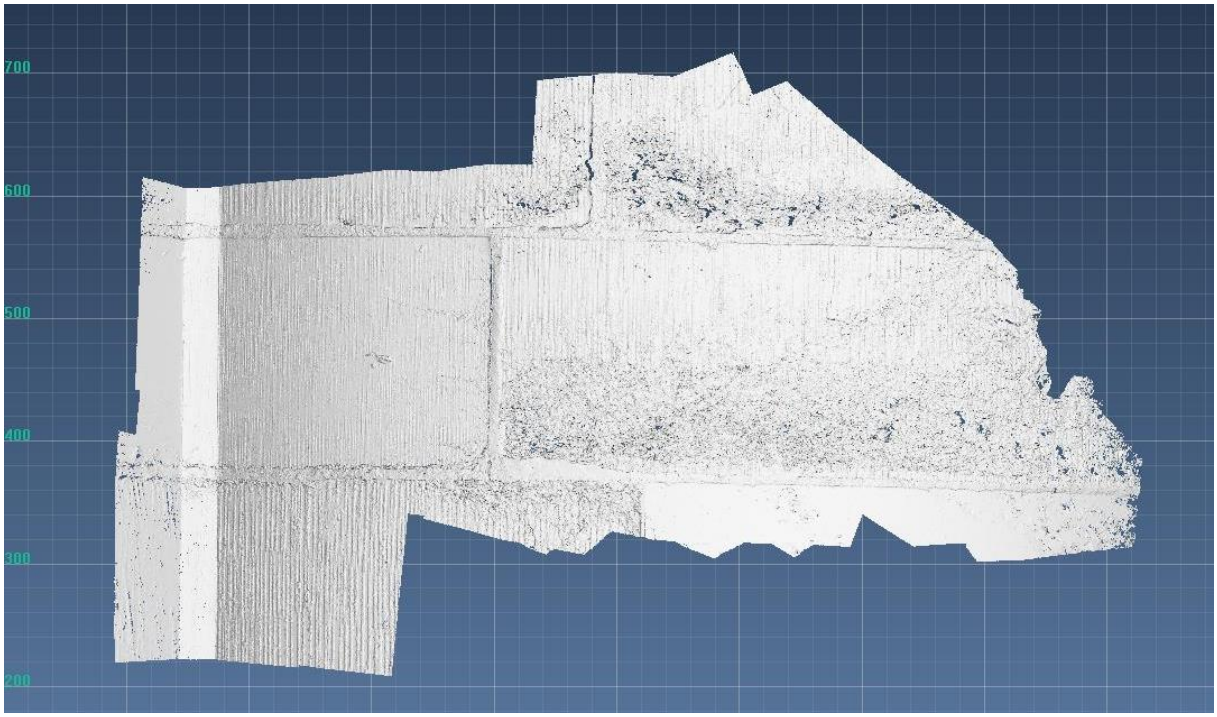
2. LIST OF FILES

Five scans were taken that are referenced as follows:

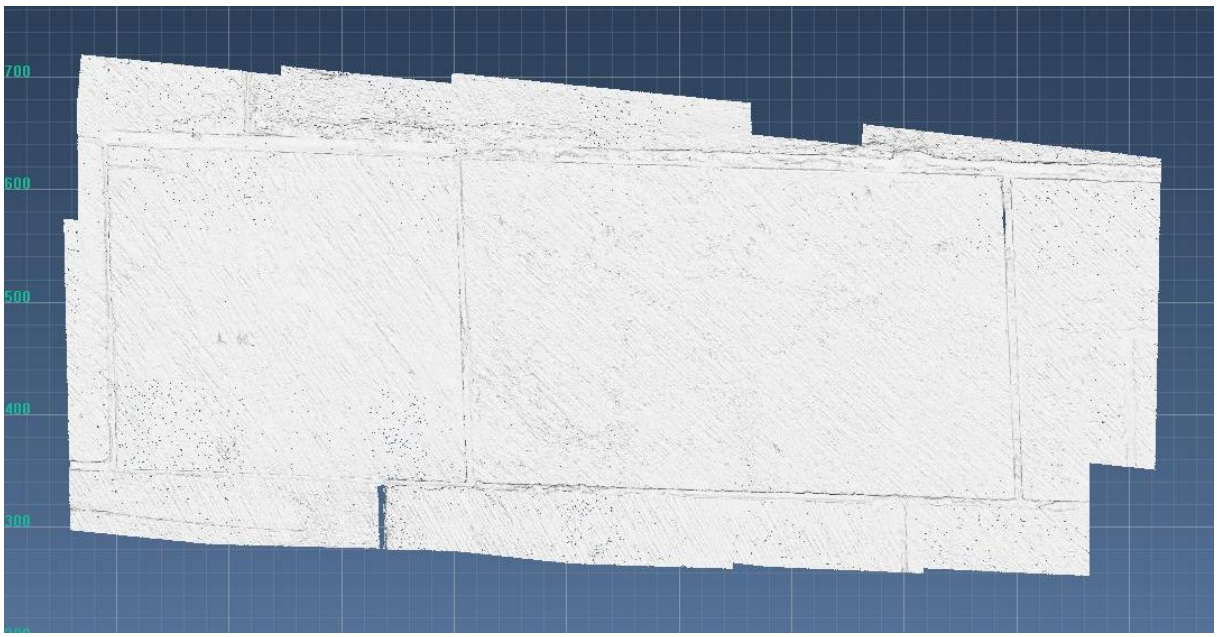
*Greece, Elefsis, **pillar**, acquired 14.10.2014.Overview scan (left) and detail scan (right).*



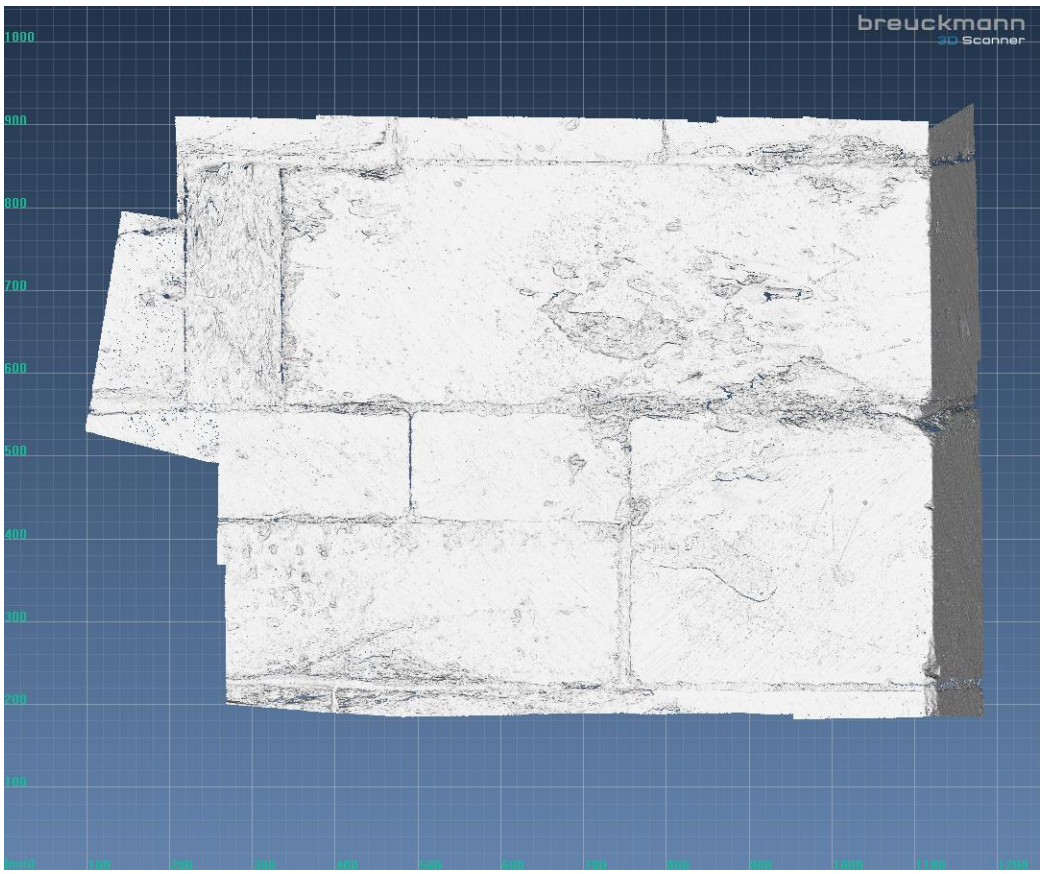
*Norway, Trondheim, **tower south**, acquired 25.09.2014.*



*Norway, Trondheim, **tower north**, acquired 25.09.2014.*



*Norway, Trondheim, **outdoors North 1**, acquired 25.09.2014.*



*Norway, Trondheim, **outdoors North 2**, acquired 24.09.2014.*