

DETAILED DOCUMENTATION OF SYNAGOGUES IN PRAGUE USING COMBINATION OF TACHYMETRY, LASER SCANNING AND CLOSE-RANGE PHOTOGRAMMETRY

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Abstract:

Many of synagogues in administration of Jewish Museum in Prague are situated in the part of Prague named Josefov. Four Jewish synagogues were documented in this year – The Maisel Synagogue, The Spanish Synagogue, The Klausen Synagogue and The Ceremonial Hall. For documentation were used combination of classical geodetical methods (tachymetry with reflectorless total station), close-range photogrammetry and laser scanning. Results are in 2D digital drawings forms with the detailed view of the interior including Aron. Jewish museum decided to create a complex documentation some of their objects, for which the sufficient technical documentation of the actual state of the buildings is not available in spring 2011. The requirements for documentation were also to create the documentation which will be also possible to use for the future 3D modeling of the buildings and the interiors for touristic use.

1. PRAGUE SYNAGOGUES

Maisel Synagogue was built between 1590 - 1592 Primate of the Jewish Town, Mordechai Maisel, who founded the extensive Renaissance reconstruction of the ghetto. The builders of this synagogue were Josef Wahl and Juda Goldsmied de Herz. The original building suffered a fire in 1689 and was then renovated in the Baroque style. Its Baroque appearance suppressed Gothic major reconstruction project by prof. A Grotto in 1893 - 1905. The original layout was preserved Renaissance three-aisled nave floor plan with bunk women galleries. The Maisel Synagogue is currently used as an exhibition venue and depository Museum.

The site of the oldest Prague Jewish house of prayer called "Old School" was built in 1868 the Spanish synagogue in Moorish style, designed by Vojtěch Josef Ignac Ullmann and Josef Niklas. The synagogue has a square plan with a dome over the central space. On three sides there are galleries on metal structures open to the nave. And stucco arabesque of stylized Islamic motifs which are repeated on the walls and carved decoration of doors, railings and gallery. Stained glass windows and interior decoration designed by architects A. Baum and B. Münzbergera were completed in 1893. From 1836 to 1845 still in the old school, he served as organist Franz Skroup, composer of the Czech national anthem.



Figure 1: Spanish and Klausen synagogues and Ceremonial Hall

The Klausen Synagogue is located in the vicinity of the Old Jewish Cemetery. Its name is derived from the German word "Klaus" meaning "little house", which originated from the Latin "claustrum". The original synagogue was Tříklausová complex of three buildings - two synagogues and a yeshiva - built in the late 16th century by Mordechaj Maisel. The present building Klausen Synagogue was established after the destructive fire in the ghetto in 1689 and was completed 1694. Another reconstruction Klausen Synagogue falls within the eighties of the 19th century. Klausen Synagogue was the largest ghetto's synagogue.

The building of the former mortuary and ceremonial hall the Old Jewish Cemetery was built in pseudo-Romanesque style in the years 1911 - 1912 by the architect J. Gerstl. The Jewish Museum, the Ceremonial Hall of the Prague Burial Society - Chevra Kaddishah (founded in 1564) became an exhibition space.



Figure 2: Measurement with reflectorless total station in exterior of Ceremonial Hall

2. THE METHODS OF SURVEYING

The results of the geodetic measurement are the detailed plans of the buildings, which is possible to use for the future 3D model creating. For that reason and for the efficient solving of all the procedures the combination of the three different measurement technologies was chosen [1]. The using of three different technologies decreased the time and financial demands.

The first method was the classical tachymetry measured by reflector-less total station Pentax W823-NX. It is the very precise machine. Only one person can make the measuring. The measuring and the targeting is with visible track of range-finder very fast particularly in small spaces and steep intentions. The measured network connected the interior and the exterior part was made around each of the buildings and the set of observations in the geodetic network was adjusted with application GAMA [3]. The adjustment of

measurement gets the high precision of points and minimalizes the differences in the measurement from two observations. It is very important, mainly if you combine more technologies.



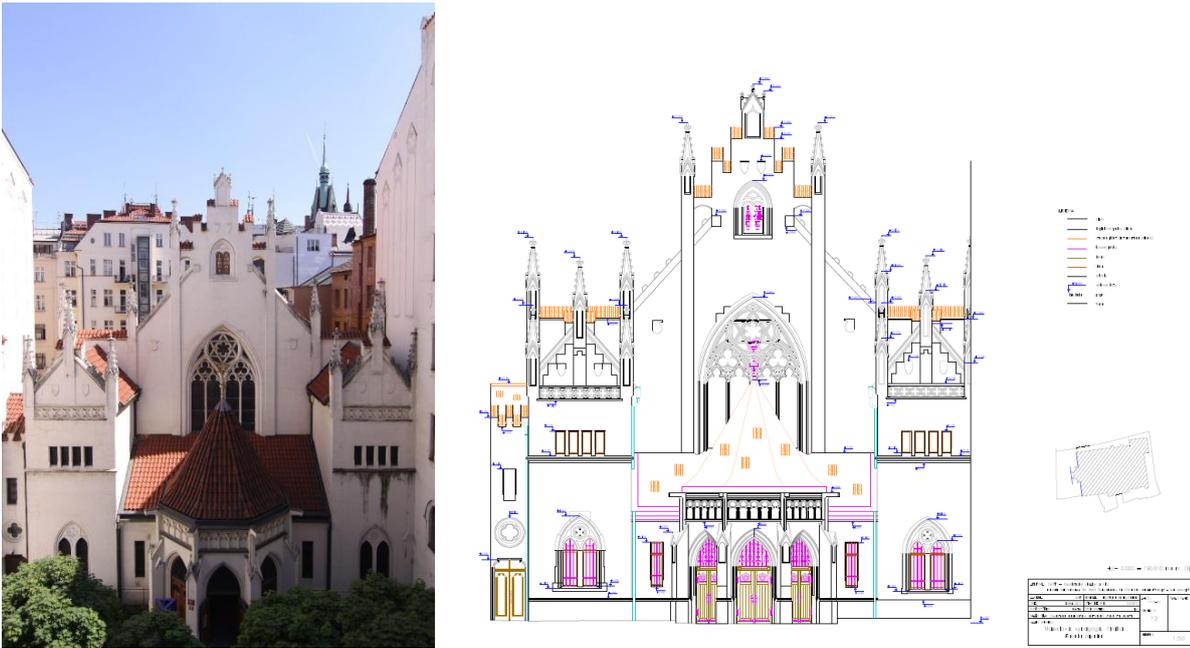
Picture 3: Interior of Spanish synagogue generated from laserscanner data

The second method was the laser scanning, which was used for the parts of the naves and galleries. The choice for the laser scanning was clear – we got quickly a complex model (as the cloud of points), which can be processed in the PC later. Naves and galleries are publicly accessible for visitors and it was the reason why we used the method which minimizes the time of the measuring. We made 6-8 survey stations for laser scanning in each object. The laser scanning was made in the morning when the visitor traffic was minimal. In Spanish Synagogue there was also scanned the space of the main soil including the roof trusses. The density of cloud points (the distance between 2 points) was set to maximum of 20 mm.

The third used method was the photogrammetry, which served as additional method for inaccessible places and for details. In total the measurements acquired more than 5000 photos made with camera Canon 50D and lences Tokina 12-24 mm and Canon 50mm.

3. PROCESSING AND RESULTS

The digital processing and creating of plans are made in CAD systems Autodesk Autocad LT a Bentley PowerMap. Despite the large amount of the laser scanning data was proved that with the proper procedure is possible to use the system PowerMap for the effective processing of the laser scanning data.



Picture 4: West facade of Maissel synagoguge

The results of all the works are detailed construction drawings of the floor plans, the sections and the elevations for facades. They are also prepared drawings of the surrounding situation and interiors.

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4. REFERENCES

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