

MODERN MAPPING

16 UAV TOPOGRAPHICAL SURVEYS

What used to take weeks now takes days with even more detail & the same level of accuracy

26 RESTORING FRANK LLOYD WRIGHT

Laser scanning of the master architect's Unity Temple for historical renovation documentation

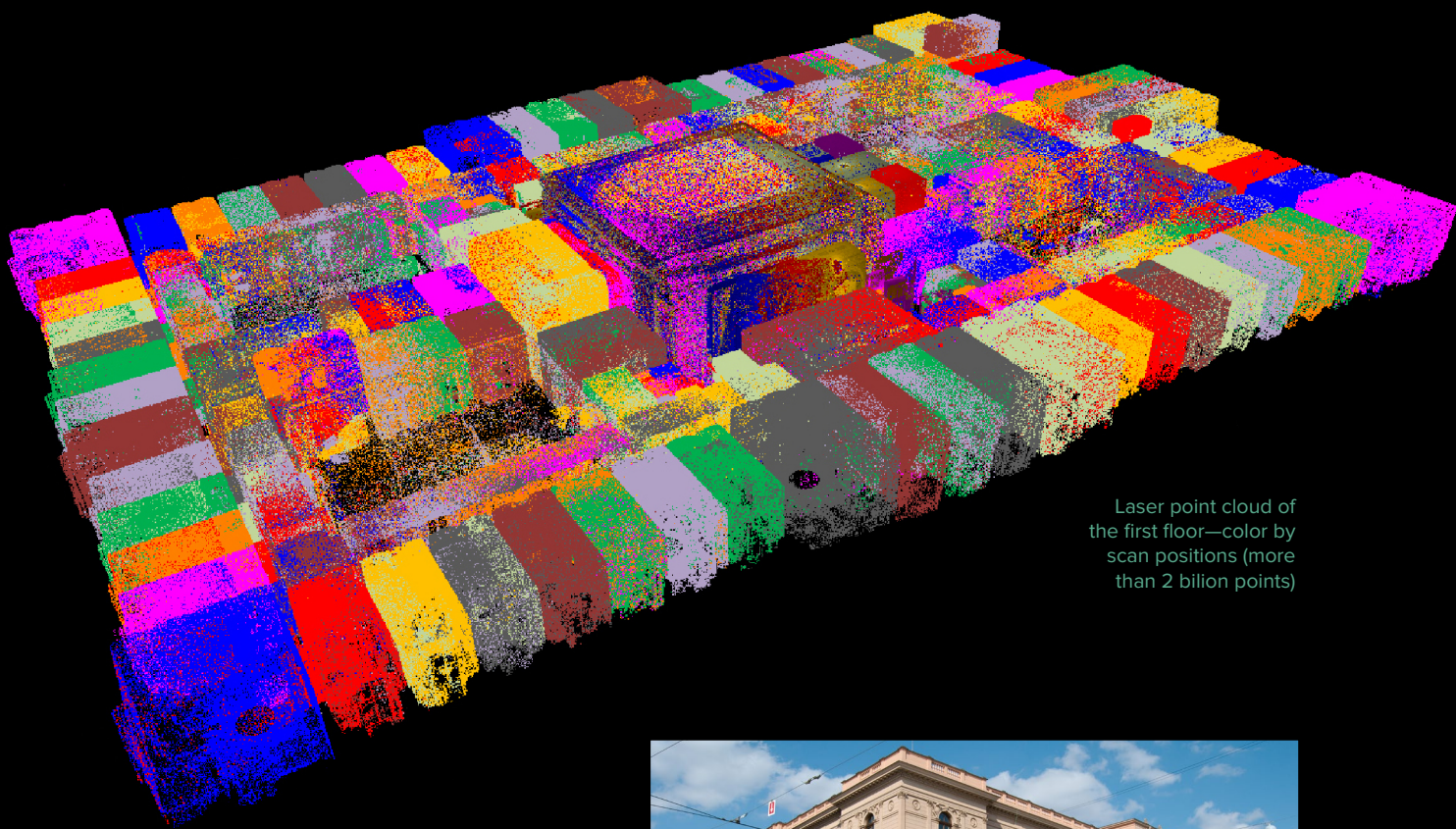
41 LIDAR & POSITIVE TRAIN CONTROL

Merrick & Co. is working with Maser Cons. & Xorail to provide hybrid LIDAR and Imagery data for PTC



CONSTITUTIONAL COURT OF CZECH REPUBLIC

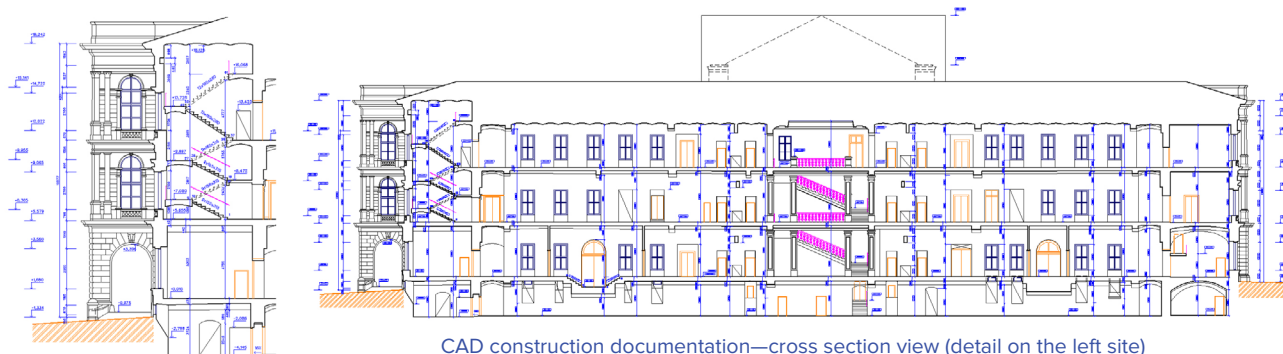
As-built Documentation



Laser point cloud of
the first floor—color by
scan positions (more
than 2 billion points)



BY TOMAS **SLEZIAK**



CAD construction documentation—cross section view (detail on the left site)

The Constitutional Court of Czech Republic, which is located in Brno, stands alone and creates a whole block (approx. 97 x 57 m). The block includes four courtyards, rounded by a main corridor with four stairways—one in each wing. The offices border the outer side to the outer side of corridor, while the inner part of block contains assembly hall with galleries. This central part includes arcades—one of the most typical features of 19th century central-european architecture.

Project Realization

The project task was to create a complete technical documentation of the building's current state—survey of all 4 floors (except for roof construction) using laser scanning method, documentation according to valid norms and laws and also a data set for CRAB (Central Registry of Administrative Buildings) information system.

FARO FOCUS 3D laser scanner was used for acquisition of data required for technical dimensional documentation. The basic output of laser scanning is a set of points with 3D coordinates, called a point cloud. One scanner set-up produces one point cloud. The interior

survey was carried out in such way that floors, walls and ceilings were covered by point cloud with density of 1pt/cm² in the standard office areas, corridors and cellar. In historically valuable rooms, the required density of the point cloud was 1pt/0.5 cm². Relative accuracy of 2mm was also stated in the contract.

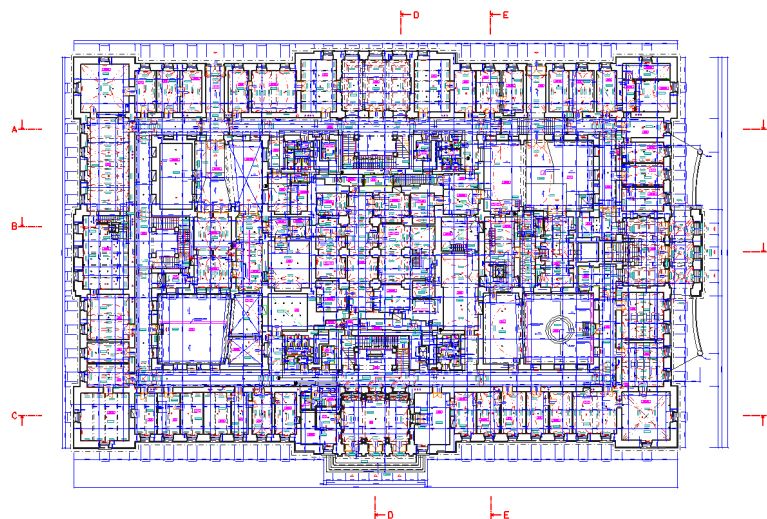
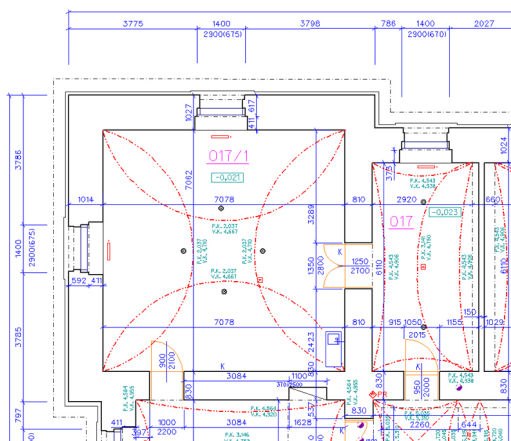
In total, it took 1117 scan positions to acquire data in the whole interior of the building (15,000 m²). Scanned data from all setups were processed in FARO

SCENE 5.3. The whole point cloud was merged using reference spheres or targets and this whole point cloud was then transformed into national coordinate system JTSK / Bpv using control points with geodetically surveyed coordinates. The final positional accuracy was below 7mm. Point cloud covering one floor contains in average over 2 billion points.

Detailed up to date drawings had to be produced as part of the documentation, in accordance with specific norms.



The Chamber of Deputies—point cloud



CAD construction documentation—detailed plan of the first floor (detail on the left site)



Photo of The Chamber of Deputies with FARO scanner and reference spheres

fire fighting equipment) were included in the processing—localized at point cloud and re-drawn into actual CAD documentation. All the above mentioned information were used as input data for building information system.

Conclusion

Laser scanning represents a complex modern technology based on non-selective spatial data collection. The main advantages are data acquisition speed, data density and quality with minimum disturbance to the subject's everyday work. ¹

For more information about GEODROM, visit www.geodrom.cz or email geodrom@geodrom.cz

Tables with room IDs, floor area, wall and ceiling area as well as surface materials were produced.

Microstation BENTLEY Descartes V8i SW was used for processing the 3D

drawings. Required outputs contained among others 4 plan views and 5 cross-sections in the scale 1:100. Important building equipment devices (CCTV cameras, gas valves, water supply valve,

Tomas Sleziak is a leader of laser scanning at GEODROM (Czech Republic). He is expert in 3D data analysis, acquisition and modeling from laser points with 11 years of experience with LiDAR technology.