



## Building survey of the UPU Headquarters

**PRELIMINARY INVESTIGATION**

**TECHNICAL SPECIFICATION**

**UPU**  
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SUISSE

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## 1. DESCRIPTION OF WORK

The project focuses on the renovation of the Universal Postal Union (UPU) headquarters, a prominent nine-story building located in Bern, Switzerland.



The headquarters encompasses a total area of approximately 25,000 square meters, distributed across its floors. The scope of the renovation includes the building's external surroundings, as outlined in the provided documentation. Additionally, the facility includes an underground parking area that is integral to the site. Certain sections of the building, currently occupied or in active use, may not be included in the internal survey.

Below is a non-exhaustive list of specific items to be surveyed within the designated area:

1. Existing buildings within the lot (position, outline, height, and distance from significant nearby structures).
2. Significant points of external buildings relevant to urban parameters, such as distances, heights, 60° verification, etc. (e.g., ground outline for sides facing the lot, ridge height, eave line of the roof, window heights on the top floor, etc.).
3. Existing perimeter roads, including curbs, level changes, flowerbed edges, driveways, pavement changes, etc.

4. Above-ground obstacles such as poles, utility cabinets (e.g., electricity, gas), and signage poles.
5. Fixed furnishings (e.g., benches, bollards, protective arches).
6. Overhead lines, if any (e.g., electrical cables).
7. Manholes and drains in the perimeter area (sidewalks and roads up to at least the road median), with the identification of position, elevation, and the relevant network (everything on the ground).
8. Terrain altimetry, including surveying of underground utilities within and around the lot (sidewalks and roads up to at least the road median), with positioning and elevation of all detected infrastructures using georadar (to be quoted separately from the above points).
9. Identification of all trees within the lot (position, trunk diameter at 50 cm height, canopy height, tree species, hedges) and significant shrubs.
10. Identification and marking of any reference points or public survey benchmarks on the perimeter of the area.
11. Identification and marking of an internal building benchmark with coordinates derived from the external public benchmark.
12. Indication of true north.
13. Corrections to the survey as needed and identification of new points.
14. Interior surveys of buildings (offices, common areas, shops), including dimensions of rooms, access openings, windows, thickness of perimeter and partition walls, room heights, pillars, beams, and identification of structural components integrated into walls, panels, or service passageways.
15. Identification of systems (e.g., water, electrical, air ducts, exhausts, etc.), both external and internal.
16. Facade elements, decorations, and moldings.
17. Photographic survey: overall and external areas, with a sufficient number of images for creating photographic support materials for graphic representation. The photographic report must include plans with marked photo capture points, presented via a free web interface or other free systems for navigating the 360° panoramic tour.

## 2. REQUIRED SERVICES

The requested services include:

- 1. SCANNING of existing paper-format drawings to create PDF files organized by CFC.**
- 2. Creation of AS-BUILT DRAWINGS in DWG format based on scanned data and additional surveys.**
- 3. Development of a BIM model using the laser scan point cloud data.**

- **Topographic survey:** Planimetric and altimetric survey as a basis for laser scanning, including GPS coordinates for benchmarks near the intervention area.
- **Laser scanning:** On-site 3D laser scanning and traditional topographic framing with georeferencing (MN95).
- **Deliverables:**
  - Compilation and verification of the 3D model from individual scans.
  - Calculation and adjustment of the topographic survey.
  - Creation of 2D drawings (plans, elevations, and key sections: at least one longitudinal and four transverse) in DWG format, scale 1:50.
  - Delivery of the 3D **Revit 2024 ENG** model according to UPU standards, with a free software viewer for scan navigation and interrogation (to be quoted separately). UPU standards will be provided after the contract is awarded.
  - Contour lines (1m interval) modeled as a Digital Terrain Model (DTM), delivered as a point cloud in RCP/RCS format for Autodesk and indicated in the 2D plan.

### 3. ACCURACY AND DETAIL LEVELS

Given the scope of the survey, a measurement density of 6mm at 10 meters is required, with point cloud data to be provided in both full and reduced density versions.

For accuracy requirements, the following tolerances must be adhered to:

- **Maximum error between permanent stations:**  $\pm 5\text{mm}$
- **Altimetric accuracy of levels LOA40** (ref. USIBD Level of Accuracy, see the table below):

<i>Level</i>	<i>Upper Range</i>	<i>Lower Range</i>
<b>LOA10</b>	User defined	5cm *
<b>LOA20</b>	5cm *	15mm *
<b>LOA30</b>	15mm *	5mm *
<b>LOA40</b>	5mm *	1mm *
<b>LOA50</b>	1mm *	0 *

*Note: Specified at the 95 percent confidence level.*

**Maximum uncertainty between two fiducial points** (both altimetrically and planimetrically):  $\pm 5\text{mm}$ . The UPU recommends static scanning; however, it is the responsibility of the offerer to propose the most suitable solution.

For the BIM Model

In Switzerland, the Swiss Society of Engineers and Architects (SIA) has adopted the concept of Level of Development (LOD) in Building Information Modeling (BIM) to define the precision and reliability of information within BIM models. This framework aligns with international standards and is tailored to Swiss construction practices.

Understanding LOD in the Swiss Context:

The LOD framework specifies the extent of detail and information in BIM elements at various stages of a project. Each LOD level indicates the maturity of the model elements, guiding stakeholders on the usability and limitations of the data provided.

**LOD 100 (Conceptual Design):** Represents the overall massing and basic form of the building with approximate dimensions and locations. Elements are symbolic and not detailed.

**LOD 200 (Schematic Design):** Elements are modeled with generalized systems or assemblies with approximate quantities, size, shape, location, and orientation. This level is suitable for initial design studies and feasibility analyses.

**LOD 300 (Detailed Design):** Elements are defined with precise geometry and accurate dimensions, locations, and orientations. This level supports coordination among disciplines and detailed design development.

**LOD 350 (Construction Documentation):** Includes detailed information about interfaces between building elements, such as connections and supports. This level is used for preparing comprehensive construction documents.

**LOD 400 (Fabrication and Assembly):** Elements are modeled with sufficient detail for fabrication and assembly, including specific detailing, fabrication tolerances, and installation information.

**LOD 500 (As-Built):** Represents the actual constructed conditions, reflecting any changes made during construction. This level is used for operations and maintenance purposes.

**For this survey, a deliverable at LOD 350 is required.**

## 4. FILE DIMENSIONS

The point cloud must be delivered in **.rcp/.rcs format**, both in its full version, with the resulting file size as it is, and in a decimated version with reduced resolution. The reduced version should include the entire lot but must have a file size not exceeding **300MB**.

## 5. EXECUTION METHODOLOGY

The laser scanner survey must be performed and completed, with the point clouds delivered to UPU, within **30 calendar days** from the signing of the contract.

The graphic deliverables (plans, elevations, and sections) in DWG format must be finalized and submitted to UPU no later than **90 calendar days** from the signing of the contract.

To optimize the workflow, the delivery must be phased according to the following priorities:

<i>Priority</i>	<i>Description</i>
1	Perimeter of the building - pillars - beams - stairs - trees (planimetric position)
2	Internal walls
3	Colonnade / Basement
4	Facade / Curtain wall
5	Exteriors (including elements listed in point 2, Chapter 1)

Starting from the **30<sup>th</sup> calendar day** after the signing of the contract, UPU must receive drawings of all levels every week based on the priorities below:

- Day 30: Priority 1
- Day 30: Priority 1 + 2
- Day 50: Priority 1 + 2 + 3
- Day 60: Priority 1 + 2 + 3 + 4
- Day 90: Priority 1 + 2 + 3 + 5

## 6. GUARANTEES

The provider is responsible for all the activities mentioned above and commits to ensuring the following for the UPU:

- Accuracy of the content;
- Local storage of all data within the UPU installation or in Switzerland;
- Compliance with applicable regulations;

- Adherence to timelines, including both the delivery dates explicitly stated in the contract and those requested by UPU during the intermediate stages of the project;
- Experience with a similar project for an international organization and or other relevant projects.

## 7. DRAFTING AND DELIVERY OF DOCUMENTS

The documents and drawings will be prepared in **English only**.

The DWG files must be organized by layers to make the various objects easily identifiable and filterable. The layers must have names that clearly identify the graphical elements contained within them

Generic layers are not permitted.

The files must be transmitted to UPU via the UPU **cloud platform** or another secured cloud in Switzerland, depending on UPU's wish, and should include a clear description of their content and the revision date in their filenames.

## 8. COSTS

The following are included in the scope of the assignment:

- The cost of submitting the deliverables for intermediate verification during preparation and prior to final delivery.
- The cost of making modifications or additions required as a result of checks conducted before final delivery.
- Expenses for graphic supports, preparation of graphic deliverables, working and final copies of all project documents.
- Corrections of errors and omissions.
- Use and rental of equipment and tools necessary for the activity.
- Insurance.
- Social contributions.
- Reimbursement of any kind of expenses.
- Unforeseen events of any nature related to the execution of the activities.



## 9. VERIFICATIONS

UPU reserves the right to conduct verifications to check both the progress of the work and to ensure that your technical manager performs the necessary checks for compliance with regulations, completeness, accuracy, and quality.

UPU also reserves the right, without this becoming a reason for economic claims or justification for delays, to make observations on the project aimed at optimizing it from a technical or economic perspective, to define detailed technical system philosophies (which cannot be determined at the start of the design), and to provide observations intended to correct any deficiencies or errors that may be identified.