

# TOPOGRAPHIC WORKS FOR THE ACHIEVEMENT OF A 3D SURVEY

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## Abstract

*First priority to the realization of the survey, a topographic elevation is required, which aims to place the study object in STEREO coordinates 1970. The object of the study is located in Timisoara, within the campus of the University of Agricultural Sciences and Veterinary Medicine of Banat, "King Mihai I of Romania". The concept of 3D SURVEY is the way to be able to relate and expose a measurement of a building made in the first phase on a pencil paper, in a 3D model with exact dimensions and a stackable scale from the beginning. To achieve this model, you must follow certain steps that are in line with the legislation in force and the technical way of achieving them, as provided in the cadastral documentation. The purpose of this 3D review is first and foremost the accurate and accurate understanding of the architectural style in the area where the study was made. The work was needed to update the USAMVBT heritage to make a real inventory of all campus buildings. The present paper presents only a section of a larger work, which includes, besides the rectorship building, the buildings of all the faculties, the canteen and the other utilities on the campus.*

**Key words:** 3D survey, Autocad, Archicad, Romania, STEREO coordinates 1970.

## INTRODUCTION

The concept of 3D surveying is an easy way, but with a strong character to create a first-contact, empirical, with the architectural object. The surveying shouldn't be just a drawing exercise, a mechanical reproduction of the architectural object, but also an instrument allowing its understanding, both physical and structural parts (Bârliba et al., 2006; Bârliba et al., 2005).

By definition, the survey is a representation, obtained by measuring and drawing on a scale, in plan, sections and views, of a set of buildings, of a building and / or a sub-assembly thereof (building elements, decoration, fixed furniture, technical equipments).

### Surveys goal:

- Making technical documentation as accurate and complete as possible.
- Modeling / remodeling of an architectural object.
- Creating a virtual tour of each object.

## MATERIALS AND METHODS

In order to achieve a survey, we need to go through two stages:

- Realization of topographic elevation.
- Drawing and measuring the object, if it exists.
- Transpose the sketch and measurements to a certain scale in electronic format.

Design information systems are computer systems capable of holding a database (structural elements, mechanical elements, mechanical and hydraulic elements) being enough to select them from the toolbar and apply them to the workspace.

In this work were used the computer systems of design AutoCAD 2013, respectively ArchiCAD 2018 (Bârliba et al., 2010; Bârliba et al., 2016).

A total Leica TS02 station (Figure 1) was used to perform the measurements, a Leica GPS1200 + GPS (Figure 3) and a distofrom ,Leica DISTO D2 (Figure 2).



Figure 1. Leica FlexLine TS02 Total Station



Figure 2. Leica DISTO D2 Laser Distance Measure



Figure 3. Leica GPS1200+

## RESULTS AND DISCUSSIONS

For the realization of this project measurements have been made with the consent of the management, within the campus of the University of Agricultural Sciences and Veterinary Medicine of Banat, Timisoara (Figure 4).

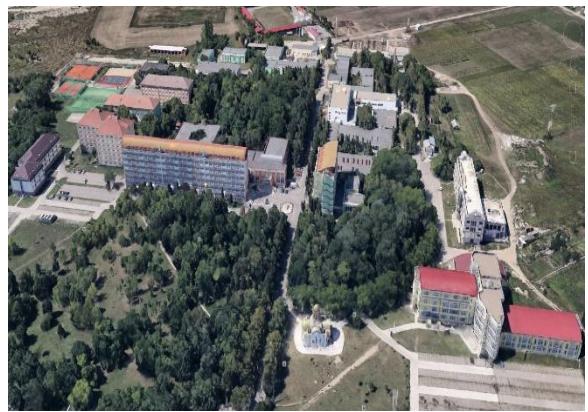


Figure 4. University of Agricultural Sciences and Veterinary Medicine of Banat, Timisoara

The following steps detail how to make a 3D surveying using the above mentioned devices and programs.

- ⊕ Step 1. Choosing / Selection of study object.

The headquarters of the University of Agricultural Sciences and Veterinary Medicine of Banat, in Timisoara, was chosen, namely the rectorship

- ⊕ Step 2. Making topographical lift

For the coordinate location of the subject in STEREO 1970, the surveying is done, which was performed by determination of the two GPS dots, a Leica GPS1200 +, and the actual measurement was performed with a Leica total station TS02 (Figure5) (Boş et al., 2015; Calinovici and Bârliba, 2003; Teresneu and Ionescu, 2014; Leu. et al., 2003; Neuner, 2001).



Figure 5. Topographic elevation

With the topographic lifting and its downloading into the AUTOCAD design software, the contour of the building is determined and a coordinate table (Table1) can be made by which anyone can locate the building.

Table 1. Coordinate table

X	Y
482909.1905	205984.5440
482914.7438	206017.3273
482917.7394	206016.8623
482919.2192	206025.3919
482879.5809	206031.9955
482878.8058	206027.3081
482873.8425	206028.2874
482871.0712	206011.6524
482894.4397	206007.7592
482891.0318	205987.3422

⊕ Step 3. Studying the structure and architectural style of the construction

It is a building with a modern architectural style with height regime P + 1E (ground floor + one floor) and basement. The walls are made of masonry, inside a semi-circular staircase that connects the three levels. Upstairs the end of the corridor ends with a bridge that connects with the Faculty of Agriculture. From the rectorship building there is also a "Aula Magna" type hall for the projects sustained within the University.

⊕ Step 4. Drawing and measuring itself.

After making a hand drawing of each level with all its structural elements, using the disto we measure each distance (Figure 6).

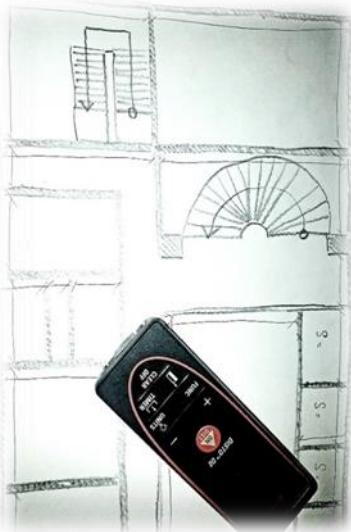


Figure 6. Sketch made by hand at the time of measurement

⊕ Step 5. Creating the 2D surveying in Electronic Format.

Using the AUTOCAD 2013 design system, using a line system, we will create the drawing we made on the field, on a binary scale (Figure 7).

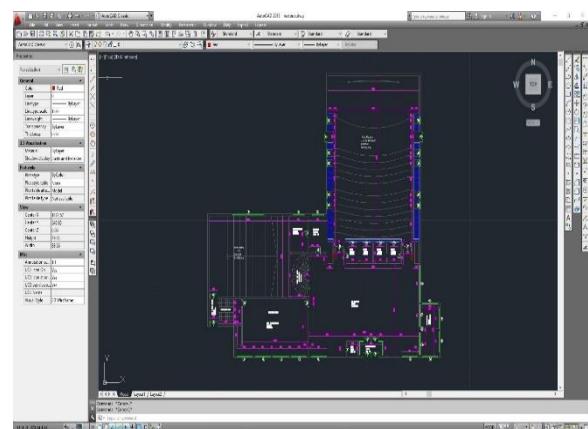


Figure 7. Surveying 2D using AUTOCAD 2013

⊕ Step 6. Creating the actual 3D surveying

Based on the above drawing, we will build the third dimension using the ARCHICAD 2018 design software. (Websites of AutoCAD, Microstation, DK Meters software developers, etc. (ex:www.bossinti.com/ - surfer 7).

We will export the drawing from AUTOCAD in a common format supported by both DXFs, then we will import the file into ARCHICAD and we will start building on existing drawing using toolbar elements (walls, doors, windows, poles, etc.) that we apply to the workspace above the drawing (Figure 8 and Figure 9).

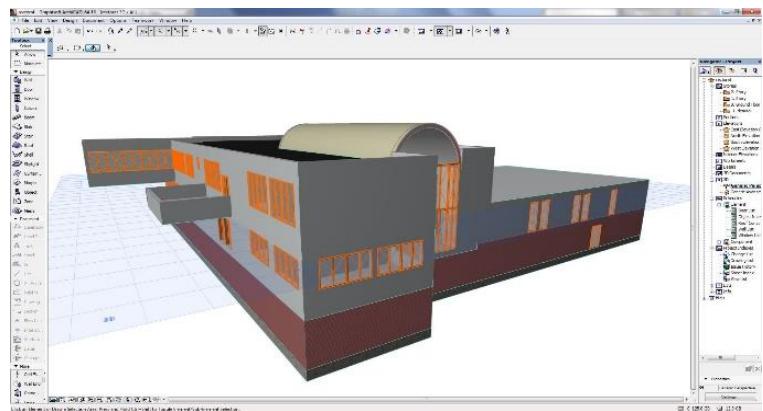


Figure 8. The final result of 3D Revealed in ARCHICAD

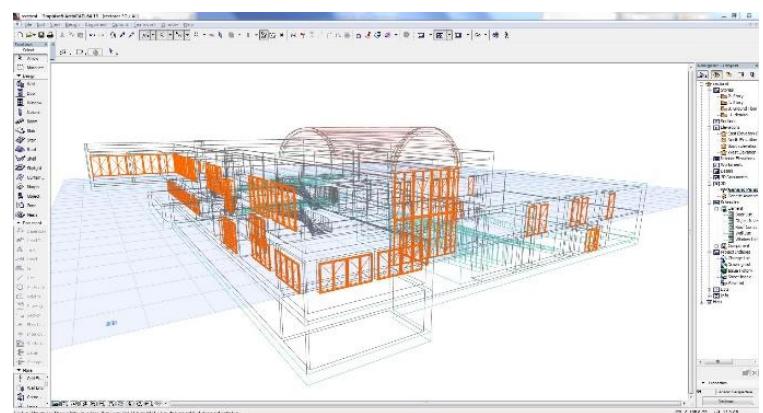


Figure 9. The final result of the 3D Revealed realized in ARCHICAD

## CONCLUSIONS

This project consists in deepening the techniques representation by learning the revelation technique (sketches, measurements, drawing on scale), learning architectural design conventions (representation in plan, section, view), learning the principles of architecture graphics (clarity and coherence of the drawing, pagination, writing).

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