

STEPS OF REALIZING A 3D MAP OF THE CAMPUS OF THE POLYTECHNIC UNIVERSITY OF TIMISOARA USING THE ARCGIS ONLINE SOFTWARE

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Abstract

3D maps offer much more than analogic maps. While on a classic map we look at a city and just imagine what that city looks like, 3D maps give us the opportunity to see this. 3D maps are currently the best solution to visit the major cities of the world if you can not afford to do it in the true sense of the word. The purpose of the paper is to create a 3D digital map of the campus of the Polytechnic University of Timisoara and for that was used the ArcGIS Online software which is a GIS mapping platform developed by ESRI in order to accomplish this work.

Keywords: ArcGIS Online, ESRI Software, 3d Digital Map

INTRODUCTION

With the passage of time the maps evolved as much as possible. Since its inception the maps have had the role they have today, more precisely to help people to orient themselves, but the maps also had the role of delimiting hunting and agricultural areas. From the old paper maps we came to 3D maps today (Herbei and Nemes, 2012).

The 3D perspective of maps is provided by many GPS applications such as Google Maps and Google Earth, which is one of the viewing modes that these applications provide us.

When we say the word map, we think of a paper with countries, reliefs, roads and much more (Grecea and Moscovici, 2014).

3D maps are not the same because they offer much more than normal maps. While on a classic map we look at a city and just imagine what that city looks like, 3D maps give us the opportunity the hole city in digital way.

Basically, this type of map view allows us to travel virtually and visit a lot of cities around the world (Herban et al., 2012).

Typically, 3D map mode can be accessed using the Street View feature that allows you to visit a city using your mouse. But Street View is just one of the 3D ways you can walk around the world's big cities (Herbei, 2015).

So 3D maps are currently the best solution to visit the big cities of the world if you do not afford it to do it in the true sense of the word.

MATERIALS AND METHODS

The ArcGIS Online application is made by ESRI and represents a GIS mapping platform that is stored in the cloud services and allows the user to create a map contained in a GIS web application that includes layer analysis and spatial data (Barliba et al., 2017).

Developing the GIS web application is made using specialized software, such as HTML5 web protocol and JavaScript, that are linked directly to the ArcGis Online platform, without which the program can not work correctly (Herbei et al., 2010).

RESULTS AND DISCUSSIONS

To complete the interactive map and the ESRI ArcGIS Online application, the following steps were taken:

1) The first step is to obtain on the ground the geographic coordinates of the targets using specific devices and create a spatial database containing multiple Microsoft Excel files, each file having the name, description, latitude, longitude, website with the 3D image link loaded on the www.flickr.com, as well as attributes. In this paper, the campus map was embedded in 3 CSV files (Accommodation, Faculties and Administrative Buildings) (Barliba et al., 2018).

Denumire	Descriere	Latitudine	Longitudine
Caminal 19C	Caminele sunt de tip apartament cu camere de 5 locuri. Un apartament este compo	45,747914	21,238204
Caminal 20C	Caminele sunt de tip apartament cu camere de 5 locuri. Un apartament este compo	45,747594	21,237533
Caminal 21C	Caminele sunt de tip apartament cu camere de 5 locuri. Un apartament este compo	45,747328	21,236883
Caminal 22C	Caminele sunt de tip apartament cu camere de 5 locuri. Un apartament este compo	45,747101	21,236064
Caminal 1C	Camine cu camere de 5 locuri. Fiecare nivel beneficiaza de grup sanitar comun si o	45,747156	21,23961
Caminal 2C	Camine cu camere de 5 locuri. Fiecare nivel beneficiaza de grup sanitar comun si o	45,747798	21,238876
Caminal 4C	Camine cu camere de 5 locuri. Fiecare nivel beneficiaza de grup sanitar comun si o	45,747331	21,237682
Caminal 7C	Camine cu camere de 5 locuri. Fiecare nivel beneficiaza de grup sanitar comun si o	45,746745	21,235792
Caminal 1MV	Camine cu camere de 5 locuri (caminal 1 MV beneficiaza si de camere cu 2 si 3 locu	45,745154	21,226738
Caminal 2MV	Camine cu camere de 5 locuri (caminal 1 MV beneficiaza si de camere cu 2 si 3 locu	45,745061	21,228903
Caminal 23G	Caminal 23G este amplasa in Complexul Studentesc din Timisoara, Str. Alexandru V	45,749589	21,240477
Caminal 25G	Aurelianus, nr. 25G (se afla in vecinatatea sediului BRD Groupe Societe Generale).	45,749809	21,239889
Caminal 8C	Complexul Studentesc din Timisoara, Aleea Studentilor nr. 8C - 14Acces: de pe str	45,749278	21,241019
Caminal 9C	Complexul Studentesc din Timisoara, Aleea Studentilor nr. 8C - 14Acces: de pe str	45,749521	21,241526
Caminal 11C	Complexul Studentesc din Timisoara, Aleea Studentilor nr. 8C - 14Acces: de pe str	45,749949	21,242518
Caminal 14C	Complexul Studentesc din Timisoara, Aleea Studentilor nr. 8C - 14Acces: de pe str	45,750114	21,242062

Figure1. ArcGIS Ribbon



Figure 2. ArcGIS Ribbon

Step 2: After authenticating on the ArcGIS online platform (Figure 3) and opening a new map, CSV (Comma Delimited) files were loaded as a theme layer (Figure 4).



Figure 3. Sign in menu in ArcGIS Online



Figure 4. ArcGIS Ribbon



Figure 5. Add dedicated layer from the file

After inserting the CSVs (Figure 5), the fields for the coordinate file (latitude, longitude) were selected (Figure 6).



Figure 6. Selection of coordinated fields

In the main menu of this platform, we find a variety of options available for editing data, such as creating labels or changing symbols (Figure 7).

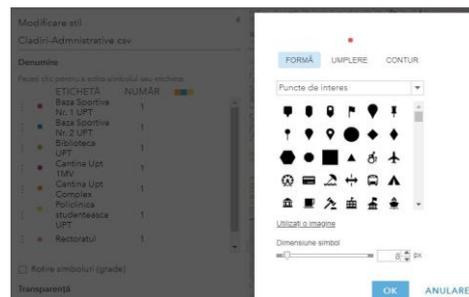


Figure 7. Introduction of symbols

In the two images below it is a comparison of the points of interest marked before (Figure 8) and after (Figure 9) the POIs name.

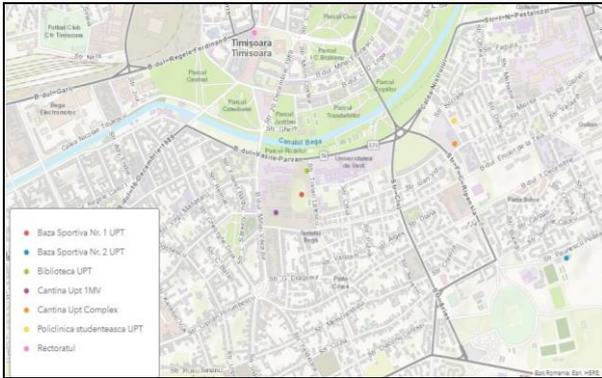


Figure 8. Map before editing POIs



Figure 9. Map after editing POIs

Each POI is based on multiple attributes and can be accessed by users by clicking on the icon.

Thus, the application opens a new window where information, including object description, website, and 3D photo are presented (Figure 10).



Figure 10. POIs information window

The Polytechnic University of Timisoara (UPT) is a higher technical education institution in Timisoara, Romania, founded in 1920. In 2011, it was ranked in the first category in Romania, that of the advanced research universities and the University is a member of the Romanian Alliance of the Technical Universities (ARUT), which includes the most important technical universities in Romania. Polytechnic University of Timisoara is one of the largest technical universities in Central and Eastern Europe. The study programs offered are organized according to the Bologna system in three cycles: Bachelor, Master, PhD. UPT comprises 10 faculties with 15 000 students. The teaching staff consists of approximately 700 teachers working in 25 departments, while administrative and auxiliary staff numbers around 900 staff. **The UPT campus** is located in several areas of Timisoara, including the central area and the student area, and includes 10 faculties and many administrative buildings (university canteens, the library, etc.) and 17 student accommodations (Figure 11).

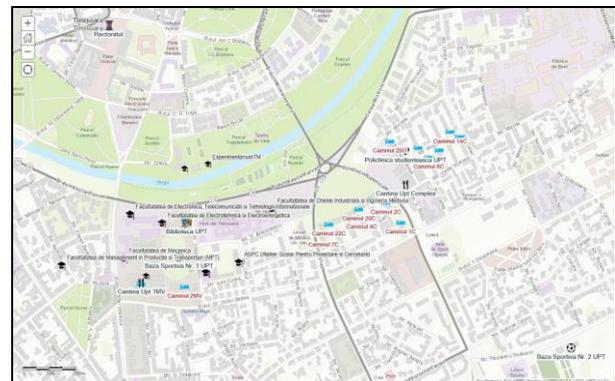


Figure 11. The campus map

UPT Faculties are the following: Faculty of Architecture, Faculty of Automation and Computers, Faculty of Industrial Chemistry and Environmental Engineering, Faculty of Civil Engineering, Faculty of Electronics and Telecommunications, Faculty of Electrotechnics and Power Engineering, Faculty of Production and Transport Management, Faculty of Mechanics, Faculty of Communication Sciences (Figure 12).



Figure 12. The faculties map

The Faculty of Civil Engineering in Timisoara is one of the oldest faculties of the Polytechnic University of Timisoara. It has a rich tradition, being founded in 1941 (Figure 12). It offers students training in the fields of civil engineering, geodesic engineering and installation engineering. There is also in the same building (Figure 14) the Faculty of Architecture (4th-6th floor) and the Faculty of Communication Sciences (3rd floor).

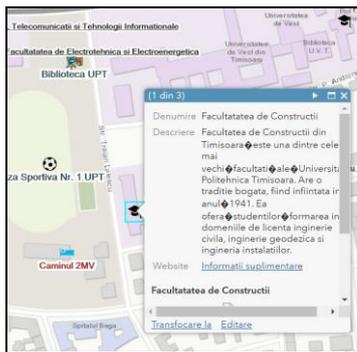


Figure 13. Description of the faculty



Figure 14. 3D image of the building

Faculty of Automation and Computers from Timisoara is one of the newest faculties of the Polytechnic University of Timisoara. It offers students the training as a specialist engineer in automation and computers with various specializations (Figure 15). As specialists for the license we find CTI (Computer and Information Technology) and IS (System Engineering). Also within the Electro building

(Figure 16) are the Faculty of Electronics, Telecommunications and Information Technologies.



Figure 15. Faculty information window



Figure 16. 3D image of the building

The administrative buildings of the UPT are: Rectorate, Central Library, the two sports centers (Sports Center No. 1 and Sports Center No. 2), Polyclinic and the 2 canteens (Canteen 1MV, Central canteen) (Figure 17).

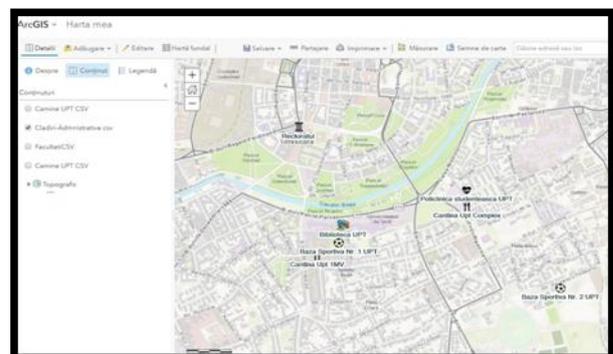


Figure 17. Administrative Buildings

Sports Center No. 2 includes (Figure 19): swimming pools (indoor with sauna and gym equipment and outdoor), sports hall (tennis, basketball, volleyball), tennis courts (bitumen

and tartan), basketball courts, football fields, multifunctional building (Figure 18).



Figure 18. 3D model of sport centre



Figure 19. Sport centre map information

The Central Library of the Polytechnic University is a relatively new building (Figure 20) of the Polytechnic University of Timisoara and includes numerous reading rooms and technical collections of books (Figure 20). During the period 1948-2014 he worked in the ensemble of the Piarist High School. Since it was located in the center of Timisoara, but far from some faculties, the library had specialized branches at the faculties of Chemistry, Electro, Mechanics and Construction.



Figure 20. Library

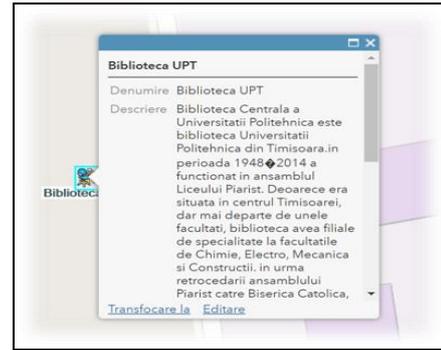


Figure 21. Library map information

The university hostels accommodate approximately 5,500 students in 2000 student rooms from the 16 buildings, all of which are equipped with internet connection, cable TV, refrigerator and new furniture. There are both 5 person accommodation in a room in an apartment module, as well as 2 persons in the room and also studios with en suite facilities (Figure 22).

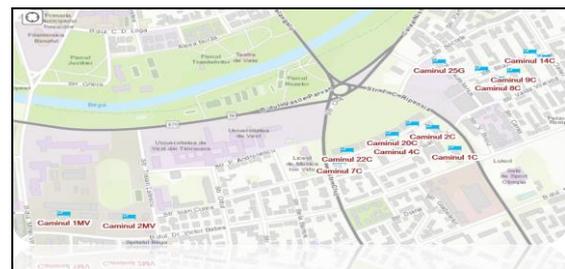


Figure 22. Student accommodation maps

The 8C, 9C, 11C, 14C student accommodation (Figure 23) have double rooms, a shared sanitary group on each level, internet, kitchen and laundry space. They are located in Student Complex in Timisoara, Studentilor Alley no. 8C - 14C with access to the Sportivilor Alley and Aurelian, Alexandru Vaida Voievod or Dalia streets (Figure 24).



Figure 23. Accommodation information

