

**Education interdisciplinary Reform
in Tourism management and
Applied Geoinformation curricula
(Heritag)**



Geodesical Measurements via 3D Scanning and UAV for Cultural Heritages

Chair of Engineering Geodesy (NUACA)

Students: Adana Mirzoyan, Mane Smbatyan

Professor: Suren Tovmasyan

Cultural heritages in Republic of Armenia



More than 24000 heritages on 29 thousand square kilometers.

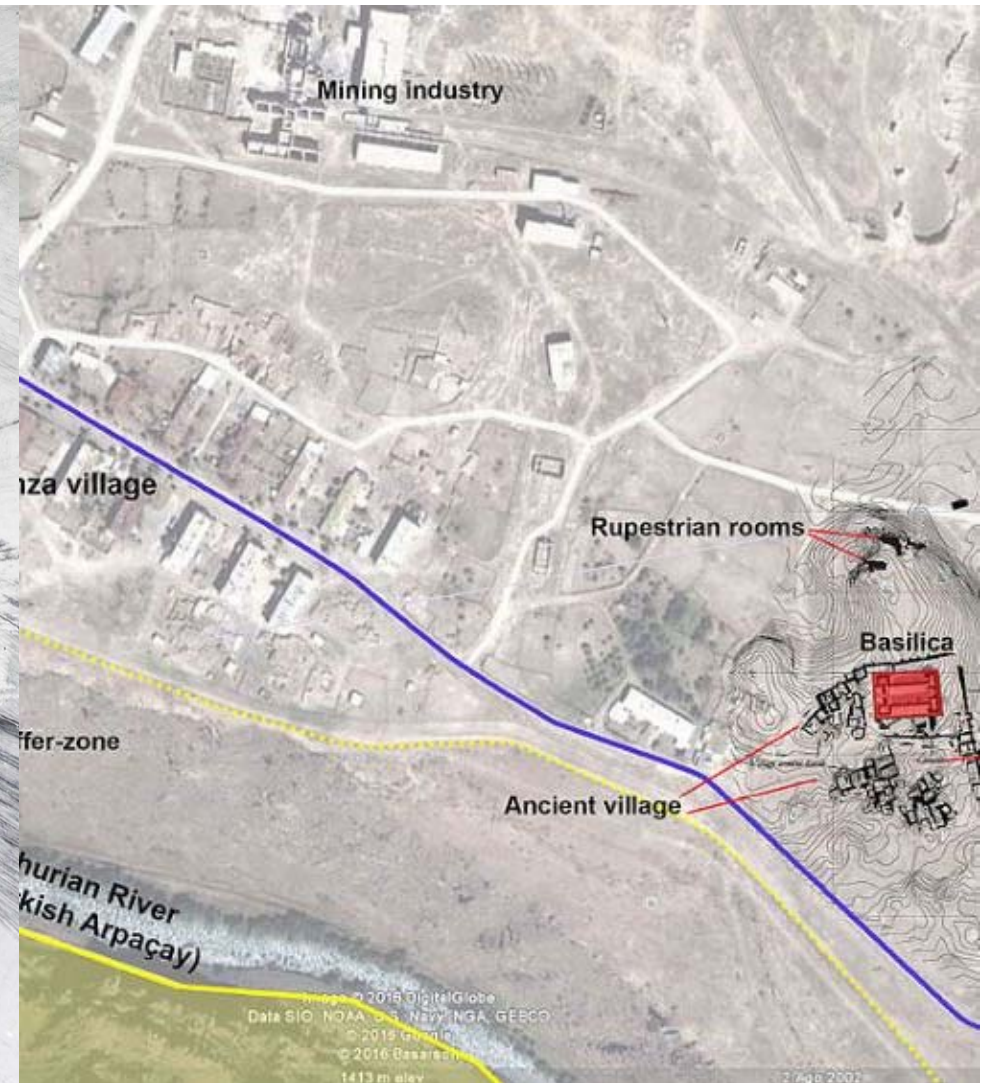
1. Fortresses
2. Churches, temples, mosques
3. Crosstones, etc.

Yererouk church

1. Location of Basilica
2. Etymology and history
3. The Basilica
4. Equipments of Trimble
5. Softwares
6. Presentation of data

Location of Basilica

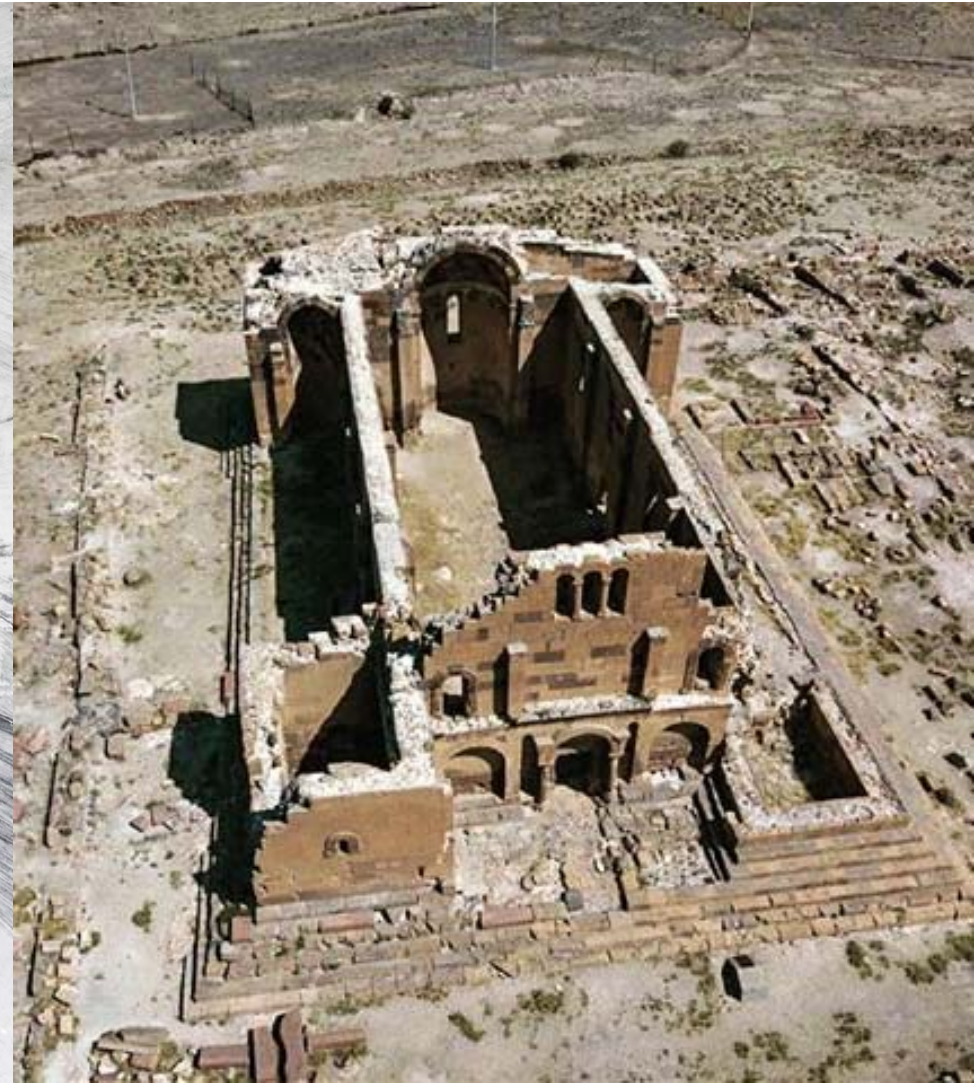
- Yererouk, also known Yereruyk or Ererouk, is an archeological site characterized by the presence of an ancient Armenian church near Anipemza village, Shirak Province, Armenia.



Etymology and history

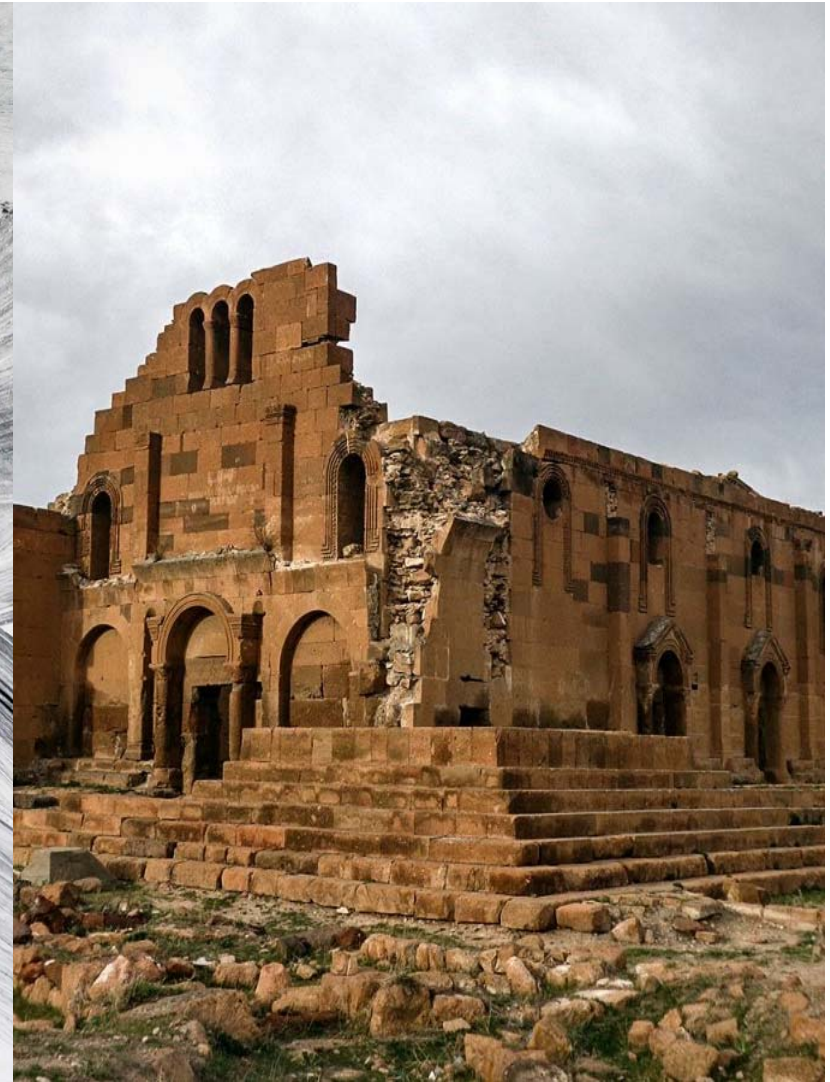
History of monument

1. Yererouk dates back to the 4th and 5th centuries. Not much is known about the founders of the basilica. It was renovated during the 11th century.



The Basilica

- The building is structured with thick lateral walls. It has three aisles and is one of the biggest Armenian churches of that period with arcades on the northern, western and southern sides, two little chapels near the altar and two apsidal niches at the end of the lateral arcades.



Equipments of Trimble

UAV and 3D scanner

1. For capturing and scanning we used Trimble ZX5 and TX8.
2. We collected all data in one platform.
3. Prepared 3D and 2D drawings.



The aim of this project

- 3D modeling and visualization will enable us to recreate individual buildings, complexes which are architectural heritages.
- The created 3D models will be subsequently used in reserve-museums, national parks and other project works.
- The surveyor-students participating in the three-dimensional studies of heritage will have the opportunity to learn the principles of sustainable development of heritage and the architectural intact transfer processes.

Collecting photos by Trimble ZX5

All images normally have to be overlapped on 80%

During capturing the distance between the object and UAV has to be the same for good quality.

We have done 4 flights each for 15 min.



Collecting photos by Trimble ZX5

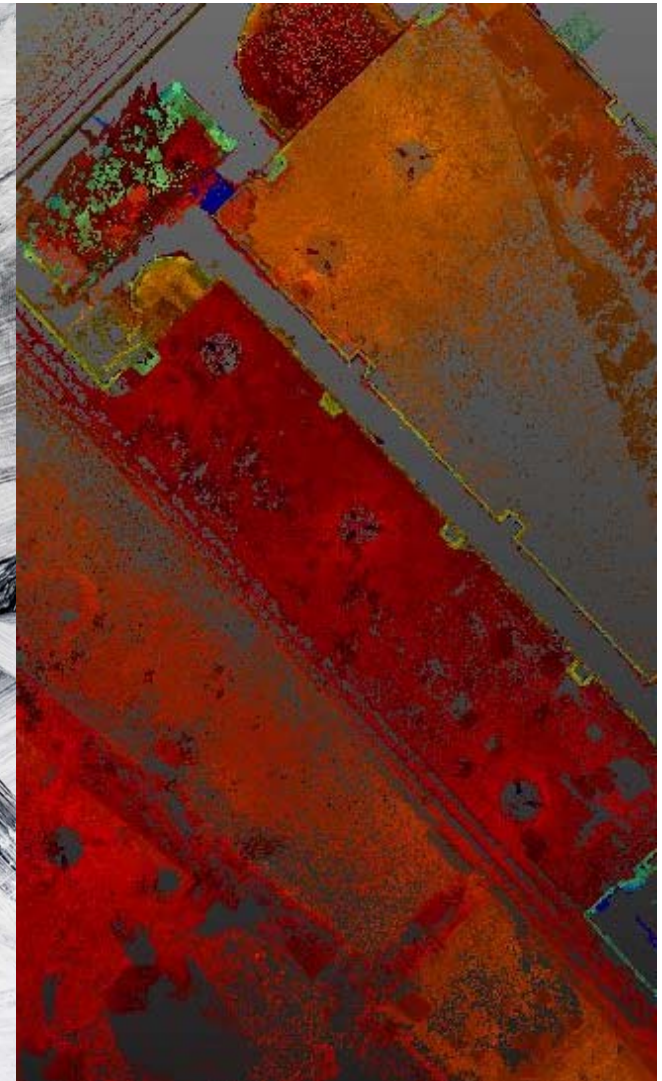
- We collected more than 1500 photos.
- For Image processing we used three softwares.
- After aligning photos we got a point cloud.



3D scanning

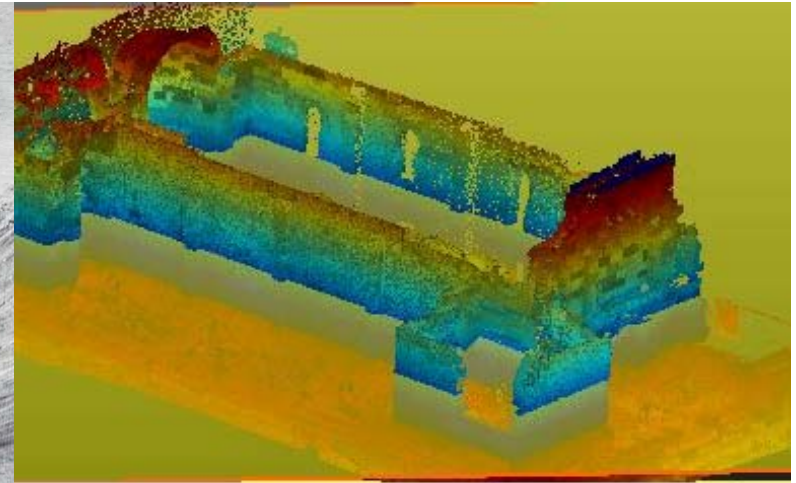
Processing of the point cloud in TRW

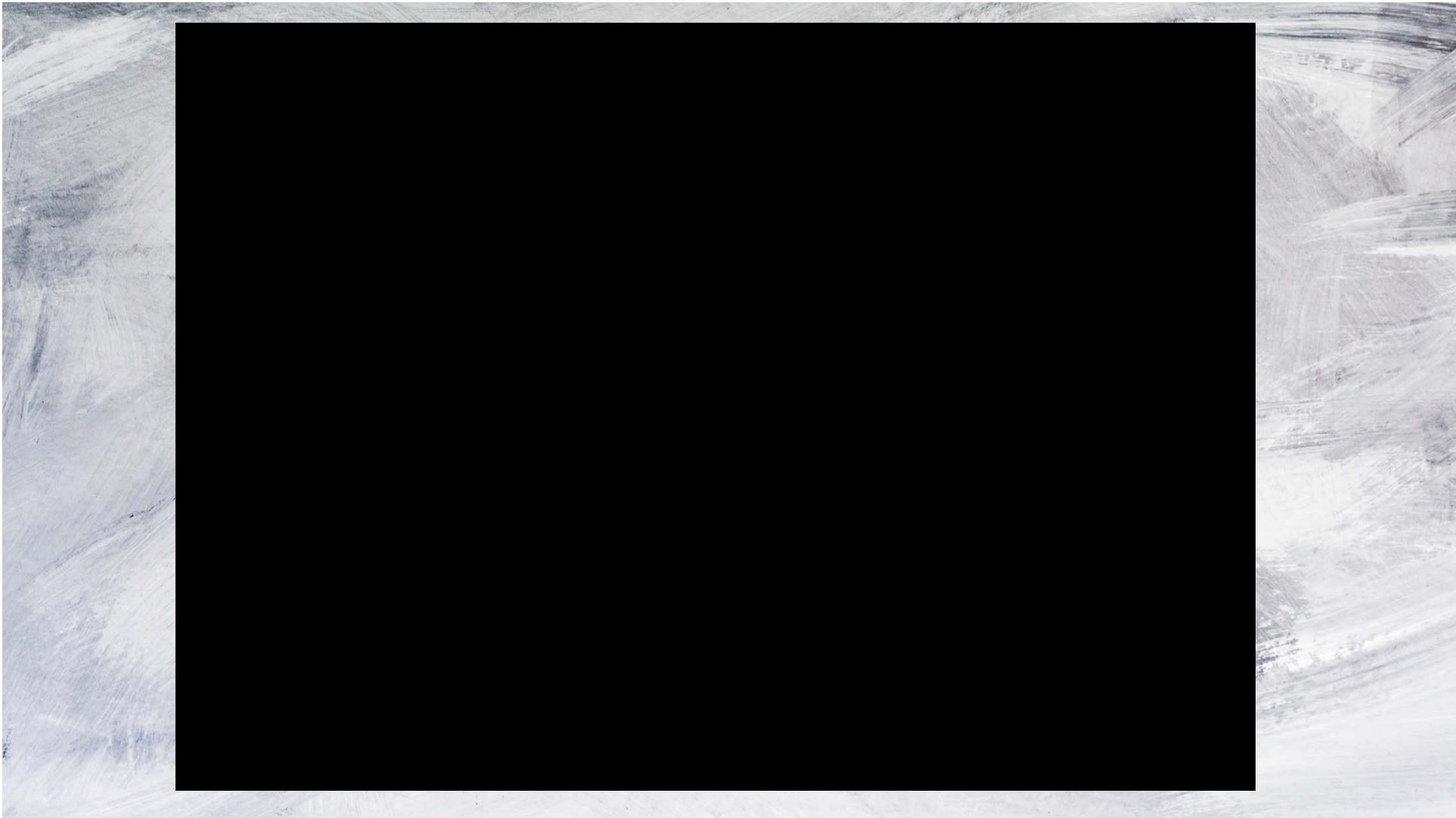
- During scanning 24 scan stations were done.
- After data collection all the scans were registered in TRW.
- Both point clouds were imported into TBC in one coordinate system.



Creation of Plans and Cross Sections

- For further work 2D drawings were created.
- The project was presented in Ministry of Culture of Republic of Armenia, in Armenian Apostolic Church, in Municipality of Yerevan and at National University of Architecture and Construction of Armenia.





The background of the image is an abstract composition of numerous overlapping brushstrokes in various shades of grey and white. The strokes are mostly horizontal and diagonal, creating a textured, layered effect. The colors range from light, almost white, to dark charcoal grey. The overall appearance is that of a hand-painted or heavily textured surface.

Thank You! 😊