

# The survey of the Temple of Augustus and Goddess Roma in Ankara

Paula BOTTERI\*, Gabriele FANGI\*\*, Eva Savina MALINVERNI\*\*, Beatrice PINNA CABONI\*\*\*

\*Department of Classics, University of Trieste, Italy

\*\*Department ARDUS, University of Ancona, Italy

\*\*\* Monuments Superintendency of Rome, Italy

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Caesar Augustus, the first roman Emperor, conquered the Galatia (Asia Minor) in 25 BC. Then a marble temple was built in Ancyra, today Ankara. The shrine was consecrated to the Emperor and to Rome. After the death of Augustus, the text of his last will, written by himself, was engraved in front of his mausoleum in Rome. A copy of this document was also carved on the walls of the temple in Ankara both in Latin and Greek. The text is the most important historical inscription of the ancient world, bearing the high deeds of Augustus, the so-called *Res Gestae Divi Augusti*. In 1997 the University of Trieste (Italy) started a research on the temple of Augustus for surveying and studying the inscriptions and the whole monument. The photogrammetric survey of the inscriptions and of the temple have been already accomplished. 3D model have been set up, for Virtual Reality, both passive and active. A Digital Surface Model (DSM) of the entrance door of the temple has been derived. There are little hopes to save the monument, mainly for the amount of the expenses for its restoration. A dedicated web site has been prepared; the surveys works have been made to allow historians and archaeologists studying the inscriptions and the temple. We hope to attract the attention of the World Cultural Heritage people for this monument. We carried out also a coarse and fast photogrammetric survey of Hadrianic temple of Zeus in Aizanoi (or Aezanoi), in central Anatolia, given that it has broad similarities with the *Augusteum* (temple of Augustus) in Ankara. It is necessary to do a more complete shape, allowing more accurate comparisons, for a better knowledge, to be done. Quick and fast photogrammetric techniques, although not enough accurate for restoration, are suitable for geometric modeling and for animation. We are making an attempt to save at least the memory of Augustus in Ankara!

Keywords: Epigraph, Archaeology, Photogrammetry, Survey, Restoration, Digital Surface Model, VRML, Virtual Reality, Visualisation

## 1. THE SO-CALLED MONUMENTUM ANCYRANUM

The pronaos only and the side walls of the cella remain of the original majestic temple called *Augusteum*. The temple (measuring 36x55m) faces west like several Hellenistic sanctuaries (from the model of the architect Hermogenes, third/second century B.C.). Inside the pronaos the Augustan inscription is carved on the stones of the wall, while the Greek translation has been engraved outside on the southwest wall of the cella.

The building bearing the exceptional Augustan document is dramatically deteriorating. The words of the text engraved marble remind the historical transition from the Republican Age to Principate. These unequalled inscriptions, cultural heritage of mankind, are undergoing irreversible deterioration caused by pollution, seismic disaster and climatic factors as well as man-made damage.

## 2. THE ANCYRA PROJECT

The programme, named Ancyra Project (from the Roman name of Ankara) started in 1977 in the Department of Classics in the Faculty of Humanities at the University of Trieste.

The main scientific objective of the project was a close examination of the epigraphic content of the monument in view of the publication of a new critical edition of the Greek text of the *Res gestae Divi Augusti*, and a metrical and photogrammetric survey of the epigraphs and all the remains of the temple.





Figures 1-2 - The temple Augustus – Details of the southern wall and of the entrance gate engaged in scaffoldings

The last known measurements have been published in Berlin by M. Schede and D. Krencker, in 1936 (*Der Tempel in Ankara*).

We carried out the photogrammetric survey of all the engraved walls, covering an area of approximately 40 square meters. A photographic documentation of the monument complex have been also produced with regard especially for the architectural features of the building to publish a much-needed new interpretation of the complex (archaeologist B. Pinna Caboni).

The virtual cast of the complex, obtained by non-aggressive and non-intrusive techniques is already available to historians and researchers. (Botteri et al., 1997, 1999, 2000, 2002, 2003).

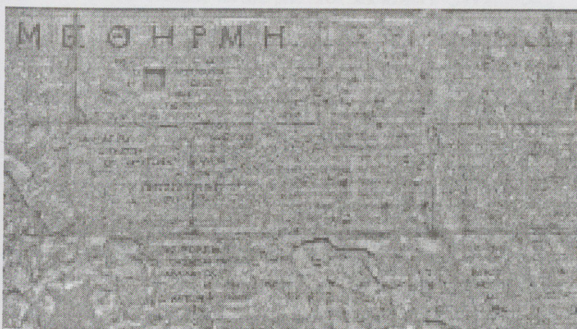


Figure 3. A sample of the plotting of the epigraph. The deterioration of the surface is clearly visible

A complete topographic and photogrammetric survey of the whole complex was performed in 2000. In figure 5 the plotting of both sides of the walls (46 models).

The updated plan was then derived, the 3D line plotting of the walls, a wire-frame model of the monument has already been set up, figures 5, 6, 7, 8 (Botteri et al. 2002 a, b), allowing technical static knowledge: for instance the left lateral wall is out of vertical by more than half of the width of the wall.

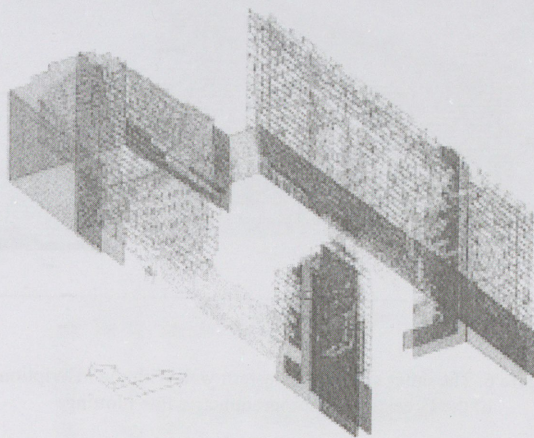


Figure 4. The 3d plotting of the walls of the temple

The rectified photomosaic of the walls has been added as texture to the plotted walls for a complete knowledge of the monument regarding the deterioration map in view of the restoration of the inscriptions. The animated visualisation of the temple gives a better understanding for researchers and for the possible restoration project (Fangi et al 2002); the WRML interactive virtual tour displays a related GIS for the complete knowledge of the monument (Malinverni et al. 2002).

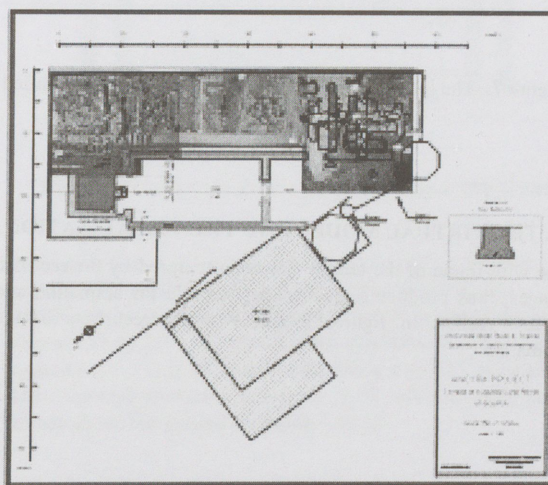


Figure 5. The plan of the temple



Temporary, a vertical protective barrier has been placed close to the inscriptions, protecting against rain and snow, both in light-absorbent and temperature-insulating material. A restoration project by Sergio Pratali has also been designed.

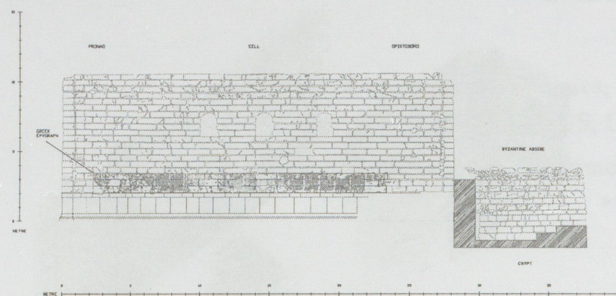


Figure 6. The outer side of the eastern wall with the inscription of the Greek text. Photogrammetric line plotting

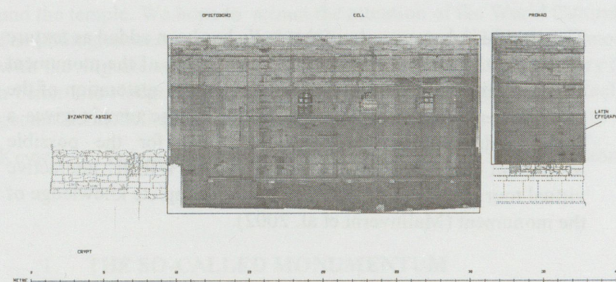


Figure 7. The interior side of the eastern wall with the rectified photomosaic

### 3. THE VIRTUAL MODEL AND THE VISUALIZATION

The wire-frame of the temple has been textured by the rectified images, thus producing a 3d model suitable for animation and Virtual reality. In figures 8 and 9 two screenshots of the animation.

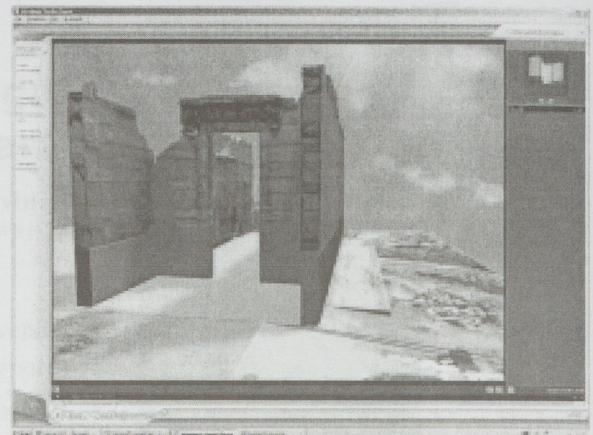


Figure 8 – A screenshot of the temple. The pronaos is visible where is carved the latin text.

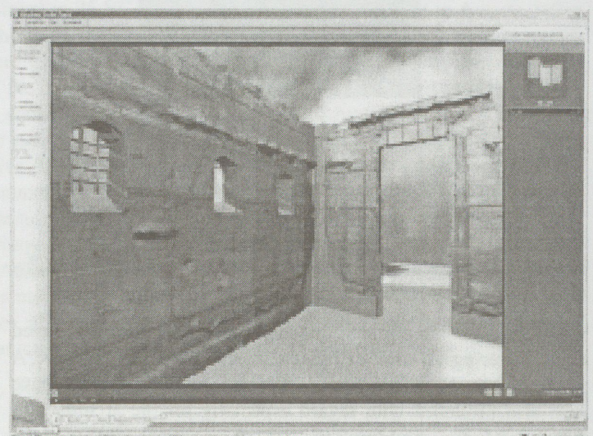


Figure 9 – A screenshot of interior of the cella. The windows were done in VI century, when the temple was transformed in church.

### 4. THE TEMPLE OF ZEUS IN AIZANOI

About fifty km far from Kütahya, lies Cavdarhisar, the site of the ancient Aizanoi. There remains one of the best preserved Roman temples in Anatolia, the well known temple Hadriatic temple of Jupiter or Zeus. It dates to the second century AD. The close similarity between the temple of Augustus at Ankara and the temple of Zeus at Aizanoi (latter in good conditions) is very important for us. We can do some useful comparisons for the knowledge of the architectural buildings, the quality of the workmanship, etc.

Aizanoi was discovered and studied by European travellers in the 1830s and '40s. M. Schede and D. Kreckler started excavations, in 1926. After several years R. Naumann began to study the temple. The surveys are not yet accomplished nowadays.



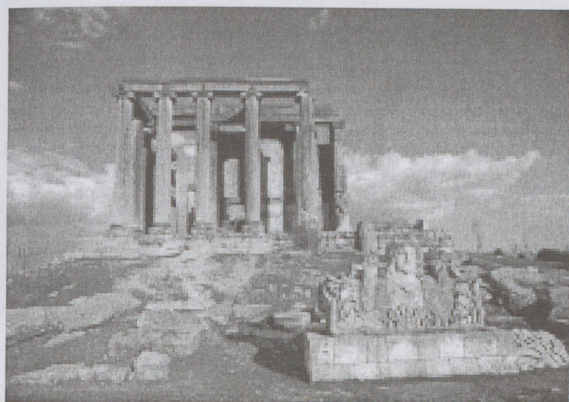


Figure 10. – The temple of Zeus in Aizanoi

The Hellenistic temple of Asia Minor has a pseudo-dipteral Ionic plan, with eight columns on the front side and 15 on the long side. Under the podium there is a large vaulted hall, which has been interpreted as an architectural representation of the cave where Jupiter was born. A pediment on the ground brings a sculpture of a woman (Figure 10).



Figure 11 - One of the pictures used for the evaluation

For the photogrammetric survey we used a pre-calibrated 35 mm camera, equipped with a 20 mm lens. Following the 3x3 rules, we formed the so-called photographic ring, composed by 16 images taken all around the temple. Figure 10 and 11 are two examples of these images. The time spent in the survey was really very short. We took a distance in the basement with a tape for dimensioning. The evaluation was performed by Photomodeler. Obviously the expected accuracy cannot be very high, but we could get some results, almost free. Figure 12 shows the 3d wire frame model of the whole temple. The underground hall is visible, with the six windows for lighting, and the stairs connecting lower and upper ground.

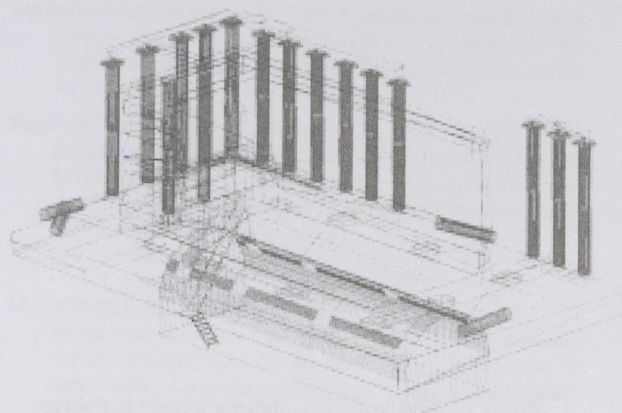


Figure 12 - Wire-frame of the temple derived from the evaluation made by Photomodeler

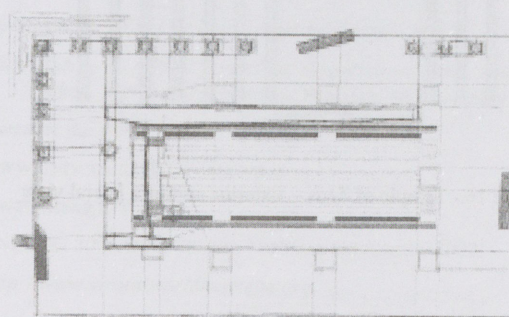


Figure 13 - Plan of the temple of Zeus – In transparency the vaulted underground hall

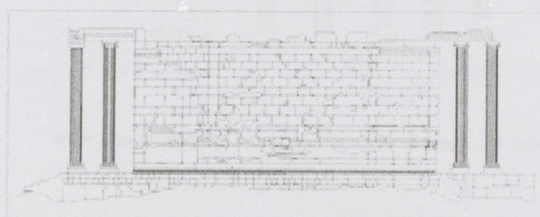


Figure 14. Temple of Zeus – Interior northern lateral view

In Figures from 14 to 17 the lateral and frontal views of the temple. The temple is built on a podium whose original dimensions were originally 53 meters by 35 meters while now they are 43 by 25m. The average distance from two adjacent columns is 2.9 m in the lateral side, while it is 3.25 in the front side. The high above the podium is 12.70, while the podium stands above the ground elevation 1.50 m.



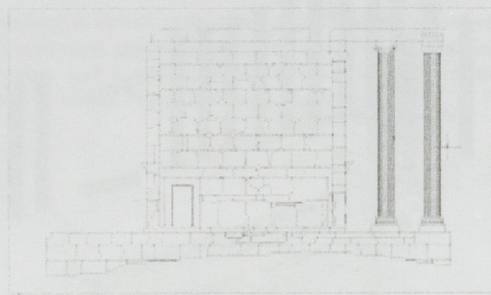


Figure 15. Temple of Zeus – Interior western lateral view

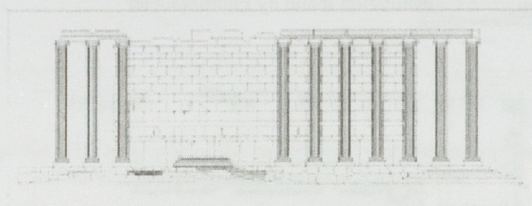


Figure 16.- Temple of Zeus – Exterior northern lateral view

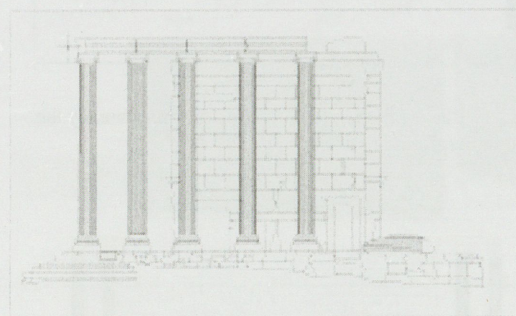


Figure 17- Temple of Zeus – Exterior western lateral view

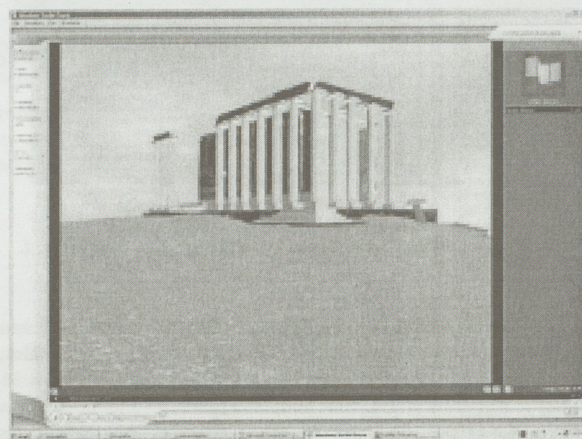
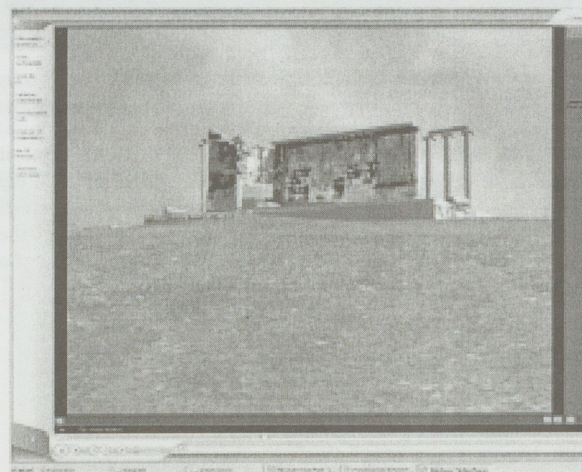
#### THE VRML MODEL AND THE ANIMATION

The wire-frame model has been covered by rectified images as texture and we could finally form a VRML file and an AVI file for a better understanding of the monument for research reasons. In figures 18 and 19 two screenshots of the AVI representation.

The visualisation and virtual reality: are they something similar to video games? Are they only due to fashion? Or are they really useful tools? Are they useful from some sort of advertising of the project? Or better, we are only at the very beginning of a technology produced by the development of computer technology and computer graphic? Will they become of much better quality, with more and more realistic effects, to the point to become a standard?

#### CONCLUSIONS

We used both classical high quality stereoscopic photogrammetry, and draft quick photogrammetry. Quick photogrammetry cannot establish correctness of verticality, horizontality, of lines and planes, but nevertheless we were able to build up a model and make visualisation and animation. It can be regarded as an useful instrument for study and research.



Figures 18, 19 – Two images of the AVI dynamic representation of the Aizanoi temple

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