The Flavian Forum of Conimbriga was built between the years 75 and 80 AD by the municipality during the reign of Flavius Vespasianus, dedicated to the Imperial Cult.

Three monuments composed the Flavian Forum of Conimbriga: the temple, the porches of the temple and the porches of the Forum (the square). The temple of the imperial cult was raised on the highest point of the city, precisely in the middle of a sacred area. This location and its characteristics confer impressive dimensions, as was originally desired. This entire sacred area was surrounded by a porch whose function was essentially architectural. The square was the

**Figure 1 Image of the Flavian Forum of Conimbriga**
The gradual development of the project. Its characteristics and potentialities, where part of the responsible items for the final results.

[3] Historical accuracy

In these types of historical reconstructions, the question of scientific veracity of the architectural model to use is always argued and a motive for profound analysis. There are situations where the lack of consensus between investigators causes the presentation of more than one proposal for the model of the space or area to be recreated. In the case of the Flavian Forum of Conimbriga that did not happen. The excavations, concluded in 1971, culminated with the attainment of trustworthy blueprints of the near total of the architecture structure of the Forum.

This way, the blueprints elaborated during that period and gently yielded by the head of the Monographic Museum of Conimbriga, were our work base for "rebuilding" the Flavian Forum. The implementation of this work was, consequently, made solely with these blueprints, with the observation of the Forum ruins and the access to some of the removed fragments of its original construction.

We would like to refer that this work would not have been possible, without the direct contribution of the Monographic Museum of Conimbriga and mainly its Director, Dr. Virgilio Correia.

Main Characteristics

Here are some of the main characteristics of this work:

[1] Realistic model and up to scale

It has already been said that the modelling of the Forum would be true to the original building and would be materialized to the real scale, which allows for:

- The possibility to visit the Flavian Forum of Conimbriga in the perspective of an inhabitant of that period, and thus have a real perception of the colours and forms of the architecture of the ancient Roman Empire;
- Simultaneously, and from that same perspective (about 1.70m high), give the visitor the real magnitude and impressive surrounding area of the Forum: the high and imperial temple with its colossal columns; the beauty and symmetry of the porches of the temple, whose sections we can now visit, unlike many of the local inhabitants (Alarcão et al. 1994); and finally the enormous square of cult and knowledge, where the members of that society met for their discussions.

The realism of our construction, compared to the 1st century building was approved by the experts, especially by the Director of the Monographic Museum of Conimbriga.

[2] Interactivity

Another main characteristic of this work is related to its interactivity. We intended to create a virtual space where the visi-
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tor (the user) could have complete autonomy of movements in the area of the Forum, which means he can go where ever he wants, following the path he chose, by using an interaction device (keyboard or mouse).

[3] Guided Tour

Besides the total liberty of movements, we also created a version with a guided tour that shows all the monuments that constitute the Flavian Forum of Conimbriga, for eventual low levels of agility and dexterity when handling the devices that permit to simulate the movements in the three-dimensional space.

[4] Easy to use

Whoever decides to visit the virtual space of the Forum will be presented with another feature of the virtual worlds elaborated in VRML: it is very easy to use. A simple touch of the directional keyboard keys or a click and drag with the mouse, and any layperson in the matter will be able to move himself in the virtual space without any difficulty. All the movements are made in order to give the visitor a realistic perception of what would physically be happening to him, such as the notion of climbing stairs or falling off a high place.


This was, without a doubt, one of the main achievements of this work. Due to the optimisation techniques used in the elaboration of the project, we were able to obtain a very small dimension of the files needed to generate all the visualization. For example, the main, and only, VRML file has approximately 22Kb. It is possible to store many copies of this work in a small and almost obsolete floppy disk, and practically without losing any of the realism obtained.

[6] Performance

Still, due to the optimisations made in the elaboration of this work, and because this is a problematical item in the viewing of three-dimensional spaces in a low end Personal Computer (PC), the performance of this virtual space is fully satisfactory in any current domestic PC.

[7] Accessibility

The access to some of the projects, namely the ones that involve the use of Virtual Reality techniques, is normally restricted and limited because of the specificities used in its development and/or its visualization, which, in general, unable the presenting of these kinds of projects to the wide public, for example over the Internet. Our work tries to differ from that tendency.

The two last points presented in this paper ([5] and [6]) have contributed much to this fact. Due to the language used, the VRML, and the results of the optimisations made, all the care placed in the search of a good balance between realism, performance and files dimensions, resulted in a final file of reduced dimensions, easy to download and with a good performance in any recent computer. Therefore, any person using the Internet can easily access it. This work can be seen in: http://lsm.dei.uc.pt/forum/.

[8] Cost of the project

This type of work is not very expensive, financially speaking, in contrast to others with similar objectives, namely the time required to implement it or the tools to make it possible (in VRML), where, for instance, all the applications needed for visualization are available for free.

Even after its conclusion, it is possible to make improvements to the realism of the recreated space, without any alteration in the VRML file. For this, a simple improvement of the textures used in the scene, automatically updates the visualization.

CONCLUSION

The last years have confirmed an increasing concern, mainly of great institutions such as UNESCO or the European Union, with the preservation, interpretation and spreading of the historical and cultural legacy of our ancestors. Such fact originated a new wave, where the use of new technologies, namely of Virtual Reality, acquires a larger role in the achievement of such intentions.

The Flavian Forum of Conimbriga supported the work presented in this paper, which aimed to recreate with accuracy, in a virtual way, this impressive but disappeared monument. The interactive three-dimensional representation enables a deeper contact, better than any drawing or written description. The work has, thus, a double function: pedagogical and social. Therefore it enables the
"reading" of the past to some levels and it assures the transmission of culture to future generations. And since anyone, with no exception, can access it, this work contributes to a true democratisation of knowledge.

Thus, and for the accomplishment of this design, all the area belonging to the Flavian Forum was modelled three-dimensionally (with exception of the interior of the temple) to the real scale and always with special care to preserve its geometric characteristics, so that the historical precision, always essential in these situations, is unquestioned.

This work also intends to contribute, even if modestly, to the spreading, preservation - by preservation we also refer to the "reconstructions" by scale models, drawings or virtual representations of spaces forever lost - and better knowledge of a past, which is important for both the historical interest and the values that the Flavian Forum of Conimbriga represents.

REFERENCES
