THE USE OF 3D TECHNOLOGIES TO SURVEY AND DOCUMENT ARCHAEOLOGICAL BUILDINGS AND SITE

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Kivonat

A háromdimenziós felmérés és dokumentálás terén ma a legmodernebb technológiát képviselő lézeres térszkennelés terén már Magyarországon sem beszélhetünk teljesen kísérleti korszakról. A technológia alkalmazására számos hazai példát lehet már felhozni. Az eljárás természetesen folyamatosan fejlődik, de már a mostani állapotával is az a gond, hogy többet kínál, mint amit a szakemberek be- és elfogadni képesek. Az eljárás egyértelműen a jövő hétköznapi felmérési és dokumentálási technikája, ám alkalmazásának széles körben való elterjedéséhez, az általa kínált lehetőségek komolyabb kihasználásához a felhasználói közeg gondolkodásának megváltozása szükséges. Ugyanakkor a váltás egyedi és egyszeri lehetőséget kínál, hogy egy egységes európai dokumentálási standard kerüljön megfogalmazásra és bevezetésre, amihez azonban széleskörű együttműködés szükséges.

KEYWORDS: ARCHAEOLOGY, CULTURAL HERITAGE, DOCUMENTATION, 3D, LASER TECHNOLOGY, INNOVATION, VIRTUAL REALITY

KULCSSZAVAK: RÉGÉSZET, KULTURÁLOS ÖRÖKSÉG, DOKUMENTÁCIÓ, 3D, LASER TECHNOLÓGIA, INNOVÁCIÓ, VIRTUÁLIS VALÓSÁG

Introduction

The present article is the summary of a presentation held at the conference "The use of 3D technologies to survey and document archaeological buildings and sites" in the Hungarian National Museum on 16 December 2005. Since we have expected other speakers to talk about concrete examples, we decided to analyse a general, but very basic background problem. About the technology, its methodology, the experimental results, practical application and future possibilities, see BELÉNYESY - VIRÁGOS (2004).

The laser technology doubtless represents the new generation of 3D documentation technologies. We cannot talk about experimental methods any more. Based on the surveys executed on sites – now also in Hungary – it is clear that the fundamental phase of the technical innovation arrived to its end. Concerning technology, a wide range of methods and instruments are available:

- geodesic measuring systems: total station, GPR systems

- geophysical measuring systems: soil radar, sonar, structural radar, etc.

- laser technology: 2D and 3D laser scanning

- GIS systems, etc.

Archaeology is interested in features both under and above surface, and 2D and 3D documentation systems are available for both. The most recently developed research methods are fast and provide spectacular results: there are only few specialists in heritage management, who are not convinced by the first insight. Basically, an industrial technology is transformed: the technology is developed, the field for experimental use is given, the first results provide technological feedback – everything seems to be ready for further use. However, the user side in cultural heritage management is not prepared to support the further innovation, to show direction for the development.

To sum up this introduction, the technology is given, although the development has just started. Therefore, we see the primary goal at this moment is not the separated (l'art pour l'art) technological innovation, but rather to concentrate on the side of receiver.

Some examples just to show that experimental utilisation also started in East-Central Europe (**Figs. 1-5**). Although we write about a topic with significant special literature (especially accessible on the internet), this article is a non-traditional presentation of the background problem. Therefore, the presented material is really only to illustrate what we are talking about.
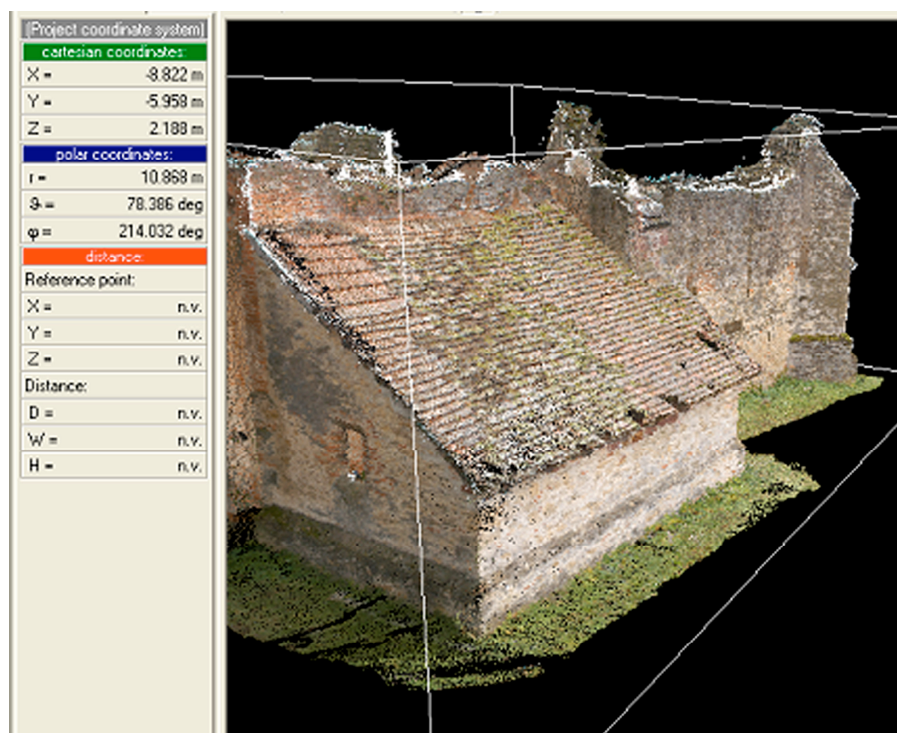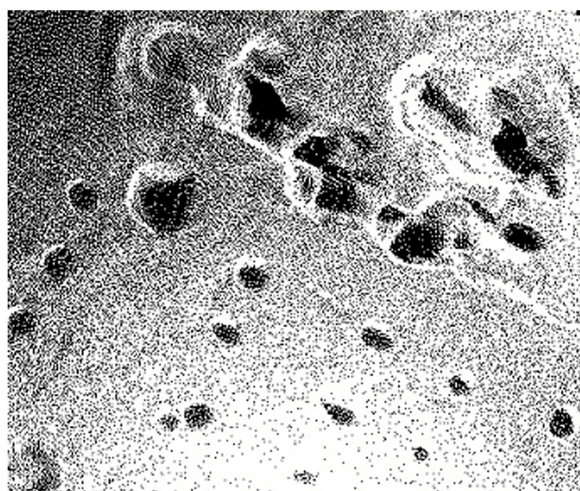
Figure 3.

The medieval castle of Rezi: air view – a half-day project on site with two days of post-processing
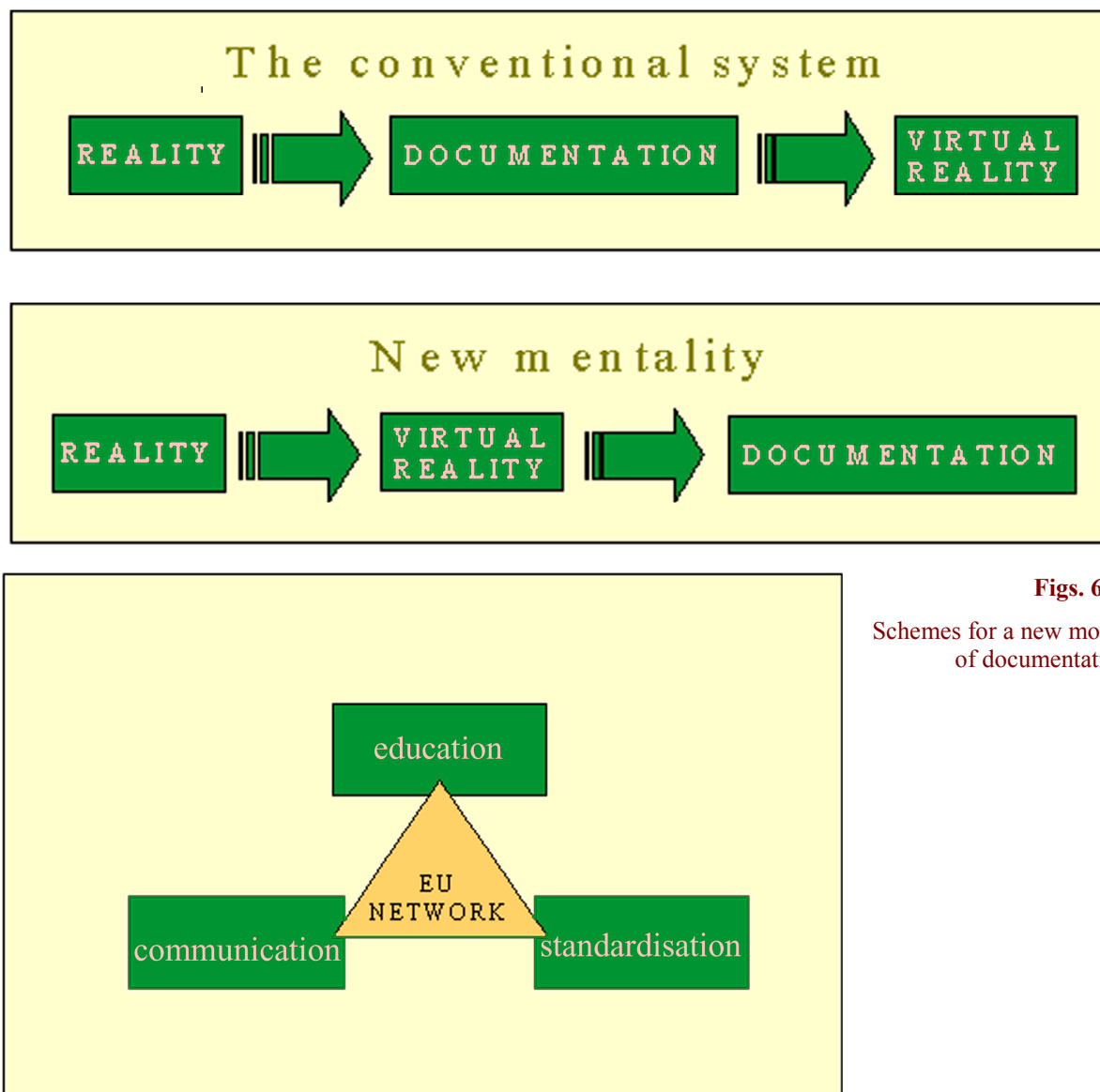

Figure 4-5.

 Detail of a Neolithic settlement at Balatonszárszó: air photo and the 3D laser scanning picture (to eliminate shadow would be a very time consuming, and therefore very expensive process).

The use

E-documentation systems are now used for both documenting excavations (objects, stratigraphy, surface, etc.) and for archaeological topography (air photo, GPS, etc.). Using, however, the 3D laser technology started as an innovation. Therefore, it is looking for a market. Fast, Precise, Economical, Up to 30% quicker, Simplifies processing - the usual words in selling a product. However, from the side of the users, it would be more desirable to see the process as a new perspective of possibilities.

The conventional system

REALITY → DOCUMENTATION → VIRTUAL REALITY

New mentality

REALITY → VIRTUAL REALITY → DOCUMENTATION

education

EU NETWORK

communication   standardisation

Figs. 6-8.

Schemes for a new model
of documentation

The concept of documenting cultural heritage must be changed to fully understand the significance of the new methods. Scholars have to leave the conventional methodology to arrive to a new way of thinking. In the first case, we do our best (with drawings, photos, descriptions, etc.) to document what is there, to be able to reproduce it later.

In the other case, we can simply reproduce the reality, creating any kind of documentation later (i.e. only what is needed). Still, the expected growing in the numbers of the surveys is late. Today, both the developers and the users are looking for a market, but they often have to face uninspected difficulties.

The antipathy or aversion, which hinders the wide spread of this new documentation technology, is based on simple, but real reasons. The infrastructure of the traditional manual system is

very strong, it obviously tries to withstand any of the new methods, which intend - or at least seems to intend - to change fundamentally the practise, organisation, or system of it. Therefore, accepting the new methodology is not simply a matter of fulfilling a technological prerequisite.

The major question is, whether a new attitude will emerge from the side of the heritage people to accept a new approach, a brand new way of thinking: do we want to and will we be able to apply, use, and exploit that surplus value, which is offered by the use of 3D laser technologies.

The future:

At this moment, we are facing the beginning of a revolution in the survey and documentation of standing monuments and archaeological sites. It will equally hit the technological developers and

the users. To our mind it is out of question that the digital survey, data-processing, and modelling is superior to the manual versions, but the acceptance of this digital material will be decisive: what shall we do with the surplus information. This is the moment, when the users should pick up the line drawn by the technological innovation, because recently the overwhelming majority of people working on property management or in scientific research is unable to surmount this surplus information. These are just the outsiders - the so called laymen - who are obviously winning with the change, because now they are able to understand the first hand data: an easy picture to digest without almost any additional explanation.

The innovation goes on in several research centres and by several companies. Still, the possibility is given to work on a new documentation standard - and this is now or never. If the users will set up systems of documentation separate from each other, there want ever be a common, comparable, and compatible system in heritage management. The fight for an international integration of the data and data-processing requires an international network (shall we think in the EU, or wider?) and the introduction of the new technologies and the new mentality in the special education. The education and research centres should be connected in a common EU network to avoid falling into the trap that the technological development - simply because of its characteristics - was not able to escape from: to be separated and l'art pour l'art. This is not simply the objective for the future, but a real and urgent demand from both sides.

References

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