

ARCHIVIO DI STATO DI MANTOVA: THE USE OF HTML TO ACCESS VIA NETWORK THE TOPOGRAPHIC AND PHOTOGRAMMETRIC SURVEY

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ABSTRACT

The diffusion of new multimedia technologies is often limited to publishing and scientific sectors. In surveying and photogrammetric standard applications we have still few experiences on the use of hypertext to present and storage the results of a survey. This paper describes the University of Brescia approach to the presentation of the results of the Archivio di Stato di Mantova survey.

1. INTRODUCTION

We are used to present the results of an architectural survey as a large amount of volumes containing the prints of the numeric results of the work accompanied by sections, plants and photogrammetric obtained vector files of the fronts. The only digital form used consists on some floppy disks containing CAD files. The use of this often large amount of data isn't user friendly and the bad maintenance of the volumes and of the magnetic disks can produce lost of data. The data consultation is also difficult due to the high number of volumes, papers that must be carried with.

A different approach can consists on creating an information system containing all the information well organised in a "ad hoc" database. In the architectural GIS all the data related to the building surveyed can be stored, starting form the survey itself. At the moment very few real-working examples of this approach can be observed, even if various authors have planned and worked on projects related to architectural GIS. The solution here described doesn't want to be an alternative to these rigorous approaches to the problem of storage the architectural related data. This is just a quick, low cost and well affordable solution to the problem of presenting the results of an architectural survey. The data surveyed must be easily consulted, also during the restoration phases, by all the different technicians, by the engineers and architects non expert on GIS or computer based systems. The HTML structure allows to reach these results providing an easy to access and to build system.

2. THE SURVEY OF THE ARCHIVIO DI STATO DI MANTOVA

As a first step to plane the restoration works it was decided to make a survey of the Archivio. As basic support for this, it was asked to the University of Brescia, Department of Civil Engineering, to project and measure a three dimensional high precision topographic network.

The topographic network has the task to support the survey works. The survey, carried on with an up to date approach, must permit an upgrade during the time. Elements not surveyed in a first time, could be surveyed later, when the knowledge of their geometry becomes necessary. New sections and photogrammetric survey can also become necessary. To permit the organic use of all the new and old surveys in only one global one, it is necessary to be able to reference all the elements to the same co-ordinate system. The use of an high precision 3D topographic network, gives this possibility. The points of this network will be later used as a basis for the survey of the Archivio, including the measures of the control points necessary for the photogrammetric takens. The topographic network was measured using a first order theodolite and adjusted using a least squares adjustment approach. The network was composed by 56 net points with 172 measures of distance, 170 of vertical angle, 177 of horizontal direction. The points co-ordinates were evaluated with an accuracy of the order of 1-2 mm (for more detail see [7]).

The photogrammetric was carried out by Geogrà (Sermide) on several fronts of the Archivio (for more details see [7]).

4. HTML STRUCTURE

The huge amount of data both in numerical and drawing format, has suggested to think about a 'new format' to present the results of the work. The use of HTML format was adopted to create an hypertext where all the data are linked in a very friendly way such that the access to the data is easy and is possible from everywhere via Internet. The need to collect all the data in an efficient way such that they

could be read depending on any specific demands without passing through a huge amount of paper has suggested to create a flexible structure. The HTML format was adopted to create an hypertext with many links. The data to be collected are related to the least square adjustment of the high precision network within the Archivio di Stato (numerical format) and the representations, in a graphic way, of the network with its links to the net points and their description and to the photogrammetric drawings.

Firstly was designed a flow-chart (Fig. 1) to fill in with the data. The HOME PAGE contains all the links to 'navigate' within the work done for the Archivio di Stato. The main links are as follows:

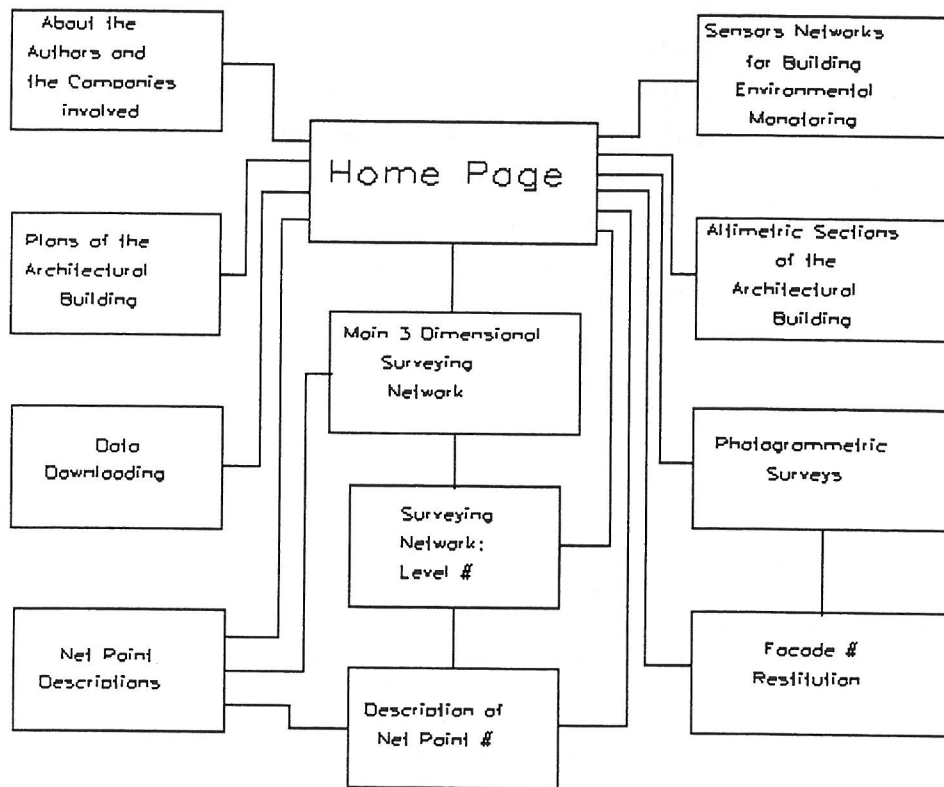


Fig.1 Flow chart of HTML structure

The flow chart shows the simple structure of the hypertext. From an HOME PAGE (Fig.2) it is possible to move inside the survey, visiting the

vertical sections, the plans and the topographic network.

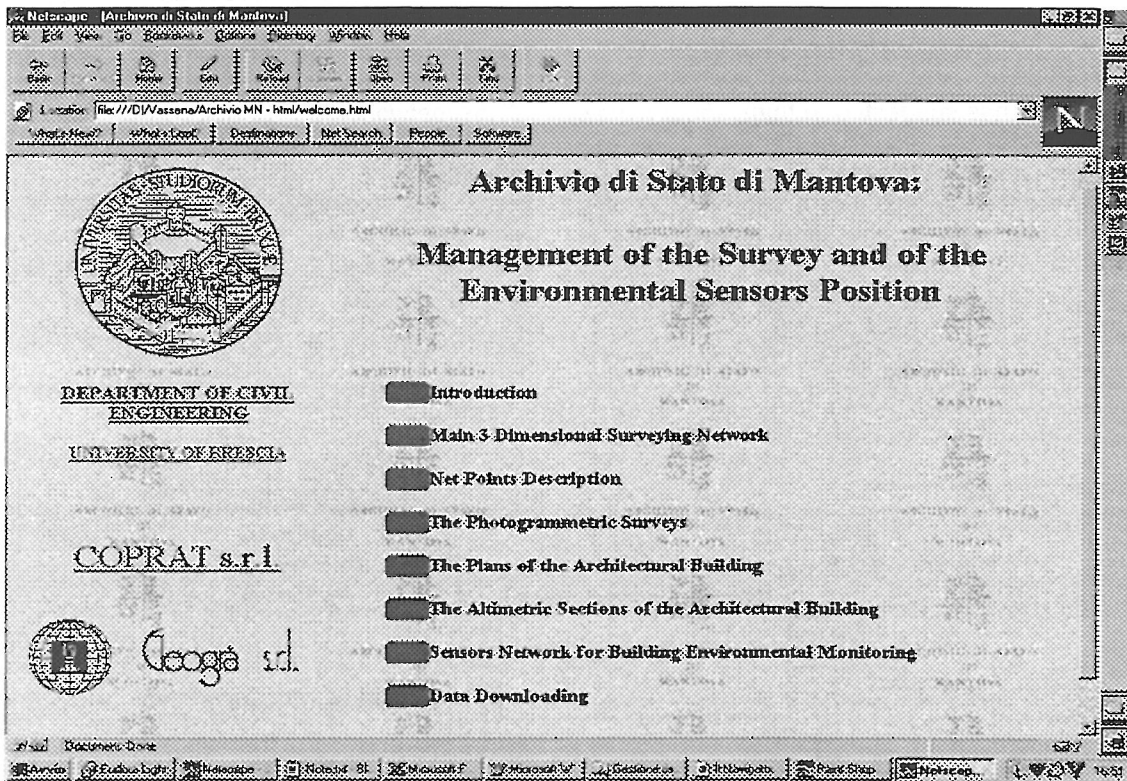


Fig.2 The HTML "Home page"

The first page presents the authors of the HOME PAGE (University of Brescia – Dept. of Civil Engineering) and the firms that have been working on the Archivio di Stato survey. It is possible a direct link to the e-mail address of the authors (Fig. 3). The first page regarding directly the survey deals with the three dimensional topographic network. Net points and the measures are shown in three different plans, depending on the high level of the points. The topographic net is in fact structured in three different levels (the Archivio ground, first and second floor). Selecting one vertex on the plants (Fig. 4) it is possible to look at the page describing the point. A picture, the geometric position, the three dimensional co-ordinates and the r.m.s. are here provided (Fig.5). With the hypertext stored in a CD-ROM the end user will be able to research in real time the point and its co-ordinates necessary for different topographic purposes. It is possible also to

research the point by name, using the "ad hoc" page. The pictures and the drawings contained in the point description pages are in .GIF format. Moving from the strictly topographic section, it is possible to move to the photogrammetric one. Always from the HOME PAGE it is possible to observe, from a top view of the Archivio, the fronts photogrammetrically surveyed (Fig. 6). Selecting, with the mouse, one front, it is possible to load the image of the photogrammetric drawing (Fig. 7). If more data are required, such as the .DWG files of the photogrammetric drawings, the prints of the point description pages, the results of the least squares adjustment of the network, it is just necessary to move in the DATA DOWNLOADING page (Fig. 8).

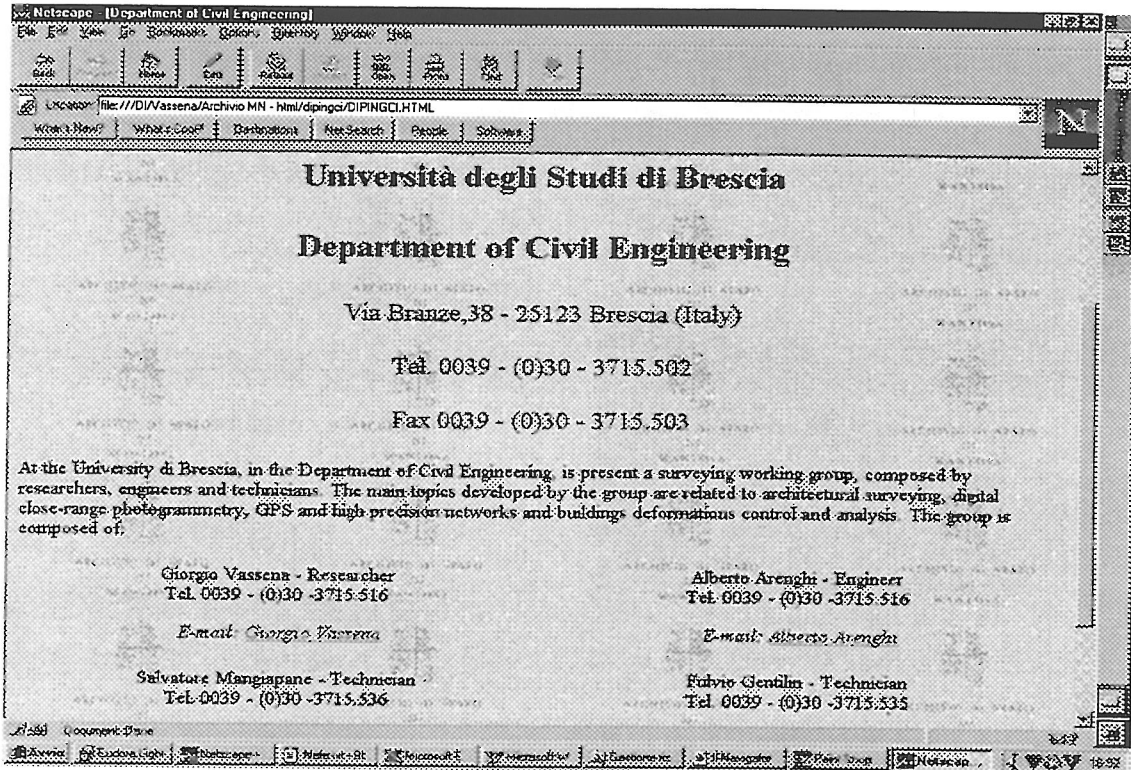


Fig.3 The page presenting the people from University of Brescia involved in the project. Selecting the name the personal e-mail is automatically recalled.

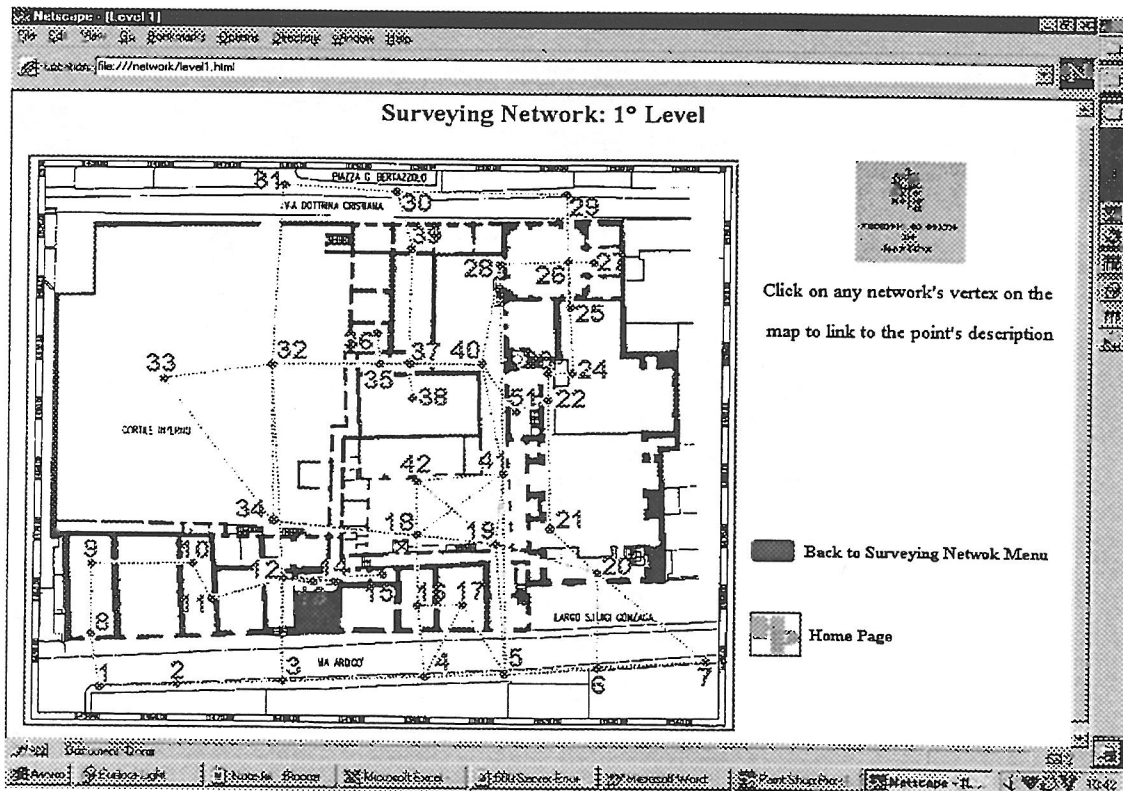


Fig.4 The first level of the topographic network. Selecting the point name it is possible to load the vertex description

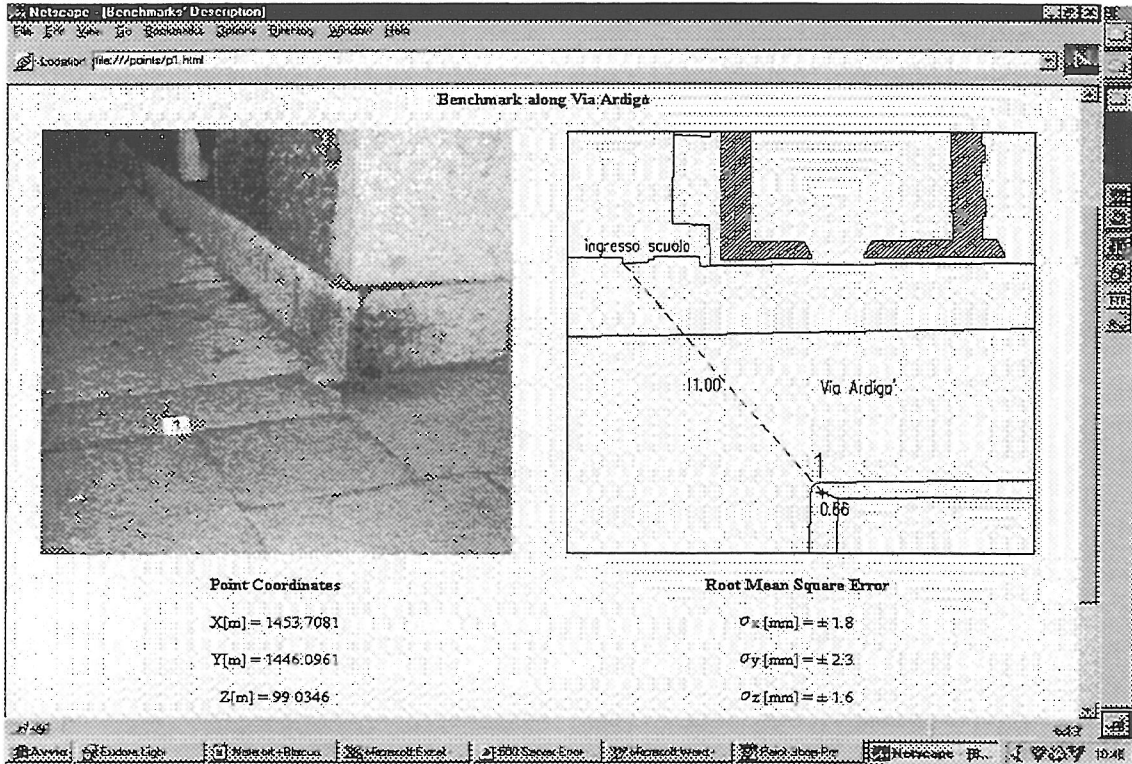


Fig.5 Vertex description

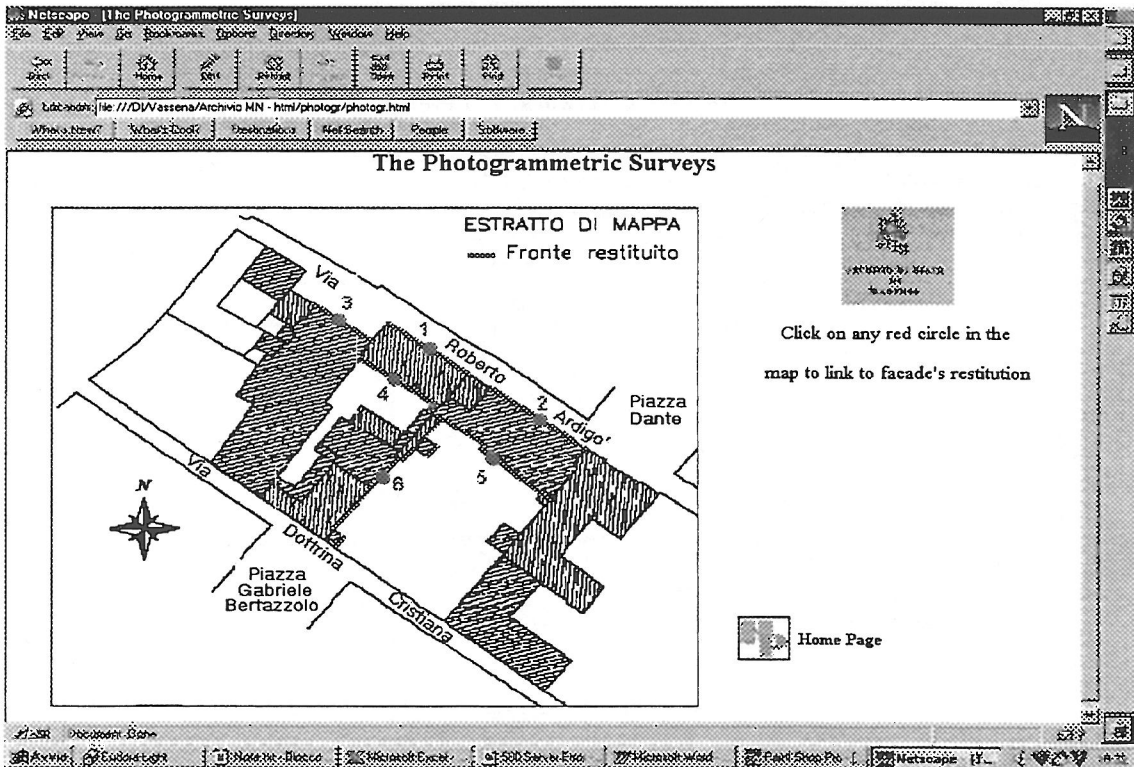


Fig.6 A plan view of the Archivio. The fronts photogrammetrically surveyed are highlighted with a red line and with a number.

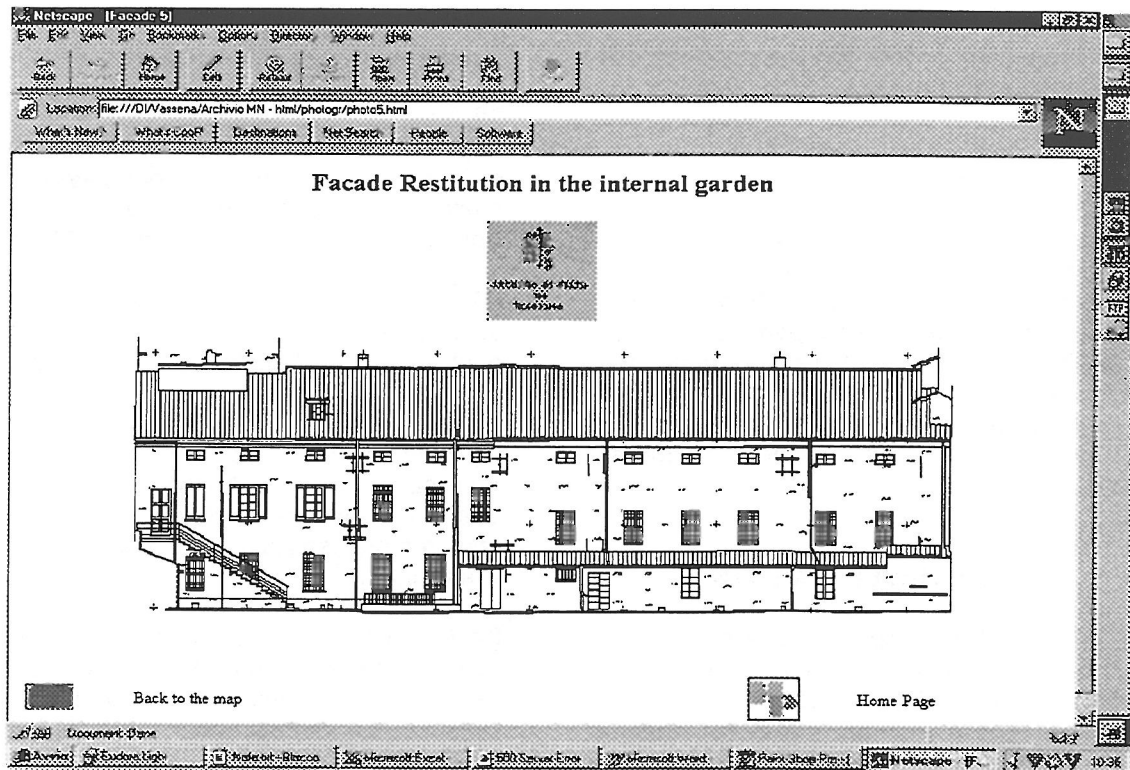


Fig.7 The photogrammetric drawing of an inside front of the Archivio. In the image it is possible to observe also the position of the control points. The .DWG file is obtainable using the DOWNLOAD page.

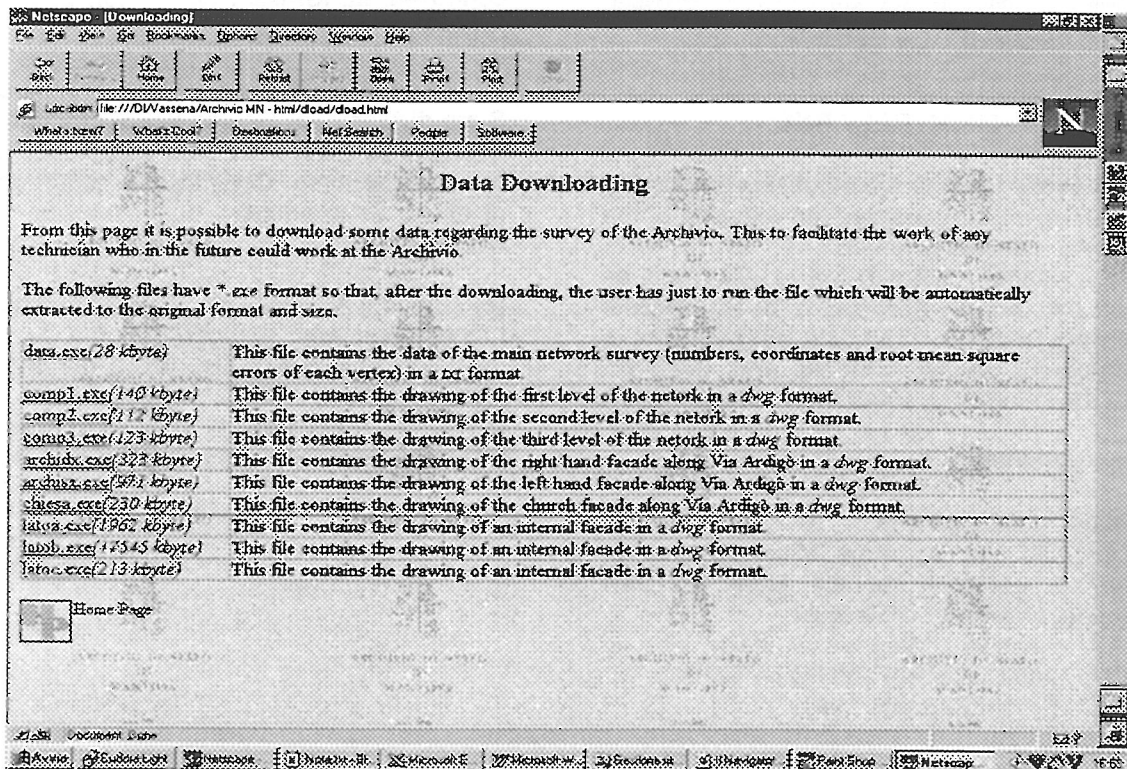


Fig.8 The DOWNLOAD page

Here it is possible to create, on the hard disk, the .DOC or .DWG files. In this way the end user can obtain also the prints on paper of the survey.

5. A NEW STANDARD

This experience of the Archivio di Stato will be used in the future survey works of the University of Brescia, as a standard. Some macro procedures have been developed, and some other will be made in the future, to make the hypertext creation as more automatic as possible. The task is to make the hypertext the standard output of the topographic-photogrammetric surveys.

6. FUTURE DEVELOPMENTS

A great number of developments are possible. In the next future it would be possible to store in the CD-ROM the data collected from the automatic sensors monitoring the environmental parameters, temperature and humidity, inside the Archivio. The CD-ROM could be also used as an high level presentation of the surveying works. In 1998 it will also be possible to visit the pages of Archivio di Stato survey, via network. These pages will be hosted by the University of Brescia, Dept. of Civil Engineering web site.

7. FINAL REMARKS

This experience is an example of how the use of new technologies can improve the diffusion of the results of our surveying works.

The use of these technologies is important as much as the use of new surveying instruments and software packages. The data can be stored in new structures easily readable and that can improve the knowledge about the surveying tools.

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