CONTRIBUTION OF SIMPLE TEACHING TOOLS TO THE RecorDIM-INITIATIVE

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Working Group I

ABSTRACT:

The main emphasis of the RecorDIM (Recording, Documentation and Information Management) Initiative, based on the work of the Getty Conservation Institute (GCI), the International Council on Monuments and Sites (ICOMOS) and "The ICOMOS / ISPRS Committee for Documentation of Cultural Heritage (CIPA), is "Bridging the Gap" between Information Users and Information Providers in the field of Heritage Documentation. One of the gaps encountered is the users insufficient knowledge of the technologies and on the other side the required quality of results. The Getty Conservation Institute in Los Angeles funded a five-month scholarship for Albert Wiedemann to develop teaching materials on "Simple Geodetic and Photogrammetric Tools for Conservation Purposes". The prepared material makes state-of-art techniques more accessible to conservation specialists by explaining them in plain language. The teaching material ranges from equipment descriptions, a glossary, movie clips to a manual for architectural survey and easy to use software tools for rectification. Most of the materials are simple digital hypertext documents, which are available on the Internet.

1. MOTIVATION

1.1 Introduction

Conservation specialists, architects, architectural historians and conservators need high quality documentation. This is a corner stone for scientific foundation and high quality work on historic monuments. Documentation specialists from geodesy, photogrammetry and laser scanning could provide this data. But there are many obstacles in communication and mutual understanding between both groups. The objective of the RecorDIM (Recording, Documentation and Information Management) initiative developed by the Getty Conservation Institute (GCI), the International Council on Monuments and Sites (ICOMOS) and "The ICOMOS / ISPRS Committee for Documentation of Cultural Heritage" (CIPA). is to "Bridge the gap" between these people.

1.2 The RecorDIM-Initiative

The RecorDIM initiative was presented during the CIPA-Symposium in Potsdam, Germany in September 2001 (Letellier 2002). During the first RecorDIM round table in March 2002 four working groups compiled lists of gaps (Letellier & Gray 2002). They have been summarized in six groups:

1. Communication, terminology, definitions and mutual knowledge.
2. Training and education on both sides: manuals, handbooks, courses, etc.
3. Processes, working styles, resources and environment
4. Tools for processing, data management and archiving, guidelines, comprehensive list of tools
5. Resources, personal and financial. Awareness about the value and benefits of heritage recording is required.
6. Professional Accreditation

Based on this list of gaps the participants of this meeting derived a list of needs to define a range of solutions to bridge the gaps:

2. SIMPLE TOOLS AND TEACHING MATERIALS

2.1 Getting Started

The Getty Conservation Institute is a sustaining pillar of the RecorDIM initiative. Motivated by an oral presentation at the Potsdam Symposium (LeBlanc & Gray 2002) Albert Wiedemann applied for a five month Conservation Guest Scholarship at the GCI in autumn and winter 2002/2003 with a proposal titled "*Simple Geodetic and Photogrammetric Tools for Conservation Purposes*". This proposal was funded by the GCI to develop teaching materials. The objective was to make state-of-art techniques more accessible to conservation specialists by explaining them in plain language under usage of modern communication techniques. The teaching material ranges from equipment description, a glossary, movie clips to a manual for architectural survey and easy-to-use software tools for rectification. The idea was to contribute the results of this scholarship to the RecorDIM initiative and distribute this material to the interested public, primarily via the Internet.

This scholarship could contribute to bridge, or at least to downsize, the gaps in the fields of communication, by integrating an information provider in a typical user institution and by presenting tools and options to information users. The

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main contribution is in the field of training and education, where simple tools and teaching material can be used without additional costs, and where a knowledge multiplication can be assumed.

2.2 Digital Presentations

The teaching material should become widely available in the near future. The material has been compiled with Microsoft® PowerPoint and converted to hypertext documents, which can be made available on the Internet. All the data is available in widely distributed formats, such as JPG and GIF for images and MPEG for movie clips. All vector graphics have been transformed to raster images due to the lack of a standard vector data format.

Texts are short and are available both in English and in German at this time, but could easily be translated into other languages. We will do this on demand if a qualified person commits to do the translations. In the future it is planned that the number of presentations available will be increased. However, at present there are the following five presentations:

Basic Surveying Equipment: Basic Geodetic Equipment is explained, especially theodolites, total stations and accessories. An example sheet from the presentation is showed in Fig. 1,
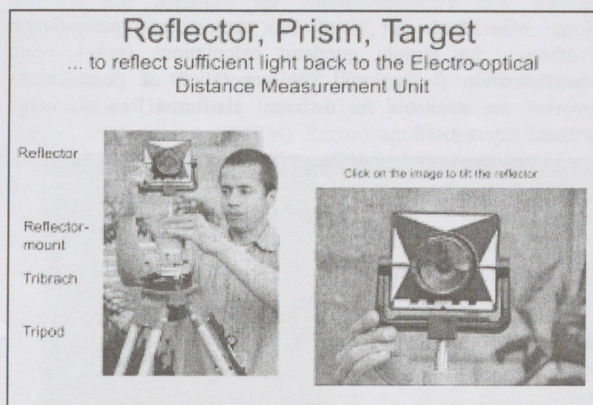

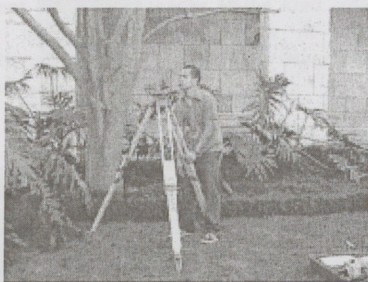Figure 1. A slide from the presentation "Basic Surveying Instruments"

Figure 2. A slide from the presentation "Setup of Surveying Instruments"

Setup of Surveying Instruments: This presentation shows the step by step setting up of a geodetic instrument horizontally and precisely over a ground point. Short movie sequences help to visualize manual procedures, that are difficult to explain in words (Fig. 2).

Traverse: This presentation shows the principle of a traverse, how it has to be computed and why this concept is recommended for different applications. The different types of traverses are compared. This topic is usual difficult to explain to people without a geodetic background. The fact that the graphics and the calculations are shown side by side on one screen help people with a visual oriented perception to comprehend the concept, theory and praxis.
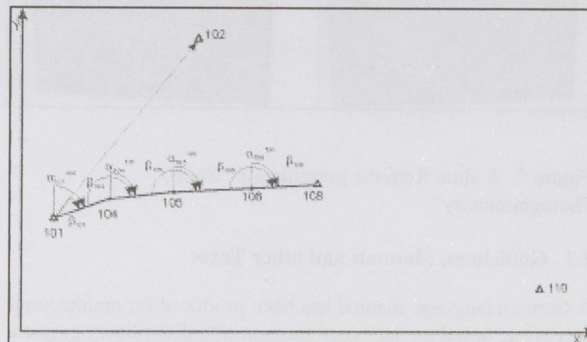

Figure 3. A figure from the presentation "Traverse"

Design of a Geodetic Control Point Network: This presentation shows a hierarchical approach to control point network design for the indoor and outdoor survey of a site containing two buildings. The net is consolidated step by step by traverses and polar measurements. The concepts of increased reliability and accuracy are explained during the network design process.
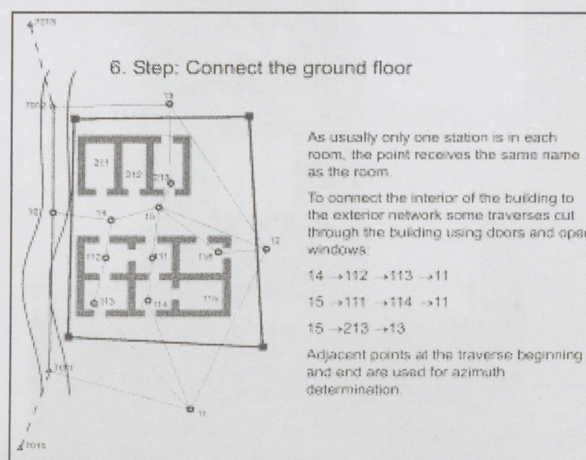

Figure 4. A slide from the presentation "Design of a Geodetic Control Point Network"

Stereo Photogrammetry: This presentation shows the principles of a stereo photogammetric survey. The concept and the data acquisition is explained, also the connection to human vision. An example highlights the steps of image orientation

(relative and absolute), the stereo restitution, the results and products derived from the graphical restitution protocol and CAD processing.
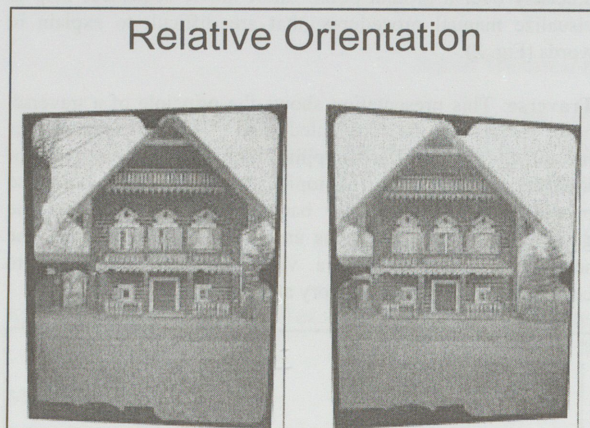

Figure 5. A slide from the presentation "Stereo Photogrammetry"

2.3 Guidelines, Manuals and other Texts

A German language manual has been produced for architectural surveying, based on the experiences in interdisciplinary projects and teaching of graduate students in conservation. Further textual contributions to the RecorDIM initiative is the core of a glossary, at the moment in English, German, French and Spanish which should allow people participating in international projects to communicate in an appropriate manner. On the Internet the glossary is combined with illustrations.

2.4 Software

Apart from the presentations and the manual, the main emphasis was put on a program called IMDIS, providing a simple and easy to use rectification tool. It is an excerpt of the commercial software package Archimedes3D (Wiedemann et al., 2003). The rectification can be made to selected points on a vertical plane from a cloud of 3D control points or on a simple planar rectangle. Results can be achieved rapidly in the field if a digital camera is used. The flexibility of the software has been reduced to simplify the user interface and prevent the user from decisions (like the applied re-sampling mode) with subordinate importance in the vast majority of situations. The rectification plane is defined as the adjusted vertical plane through the group of points, which have been measured in the image.

The software works only with a Microsoft Windows® operating system and is therefore not available on other platforms. The version for small images (results smaller than 1000×1000 pixels) is free of charge available on the Internet at www.archimedes3.com. Unlimited versions with the same or a wider functionality are available at the FPK Ingenieur GmbH, Berlin, Germany (see www.fpk.de).

Some other tools for point and vector data manipulation (vdfcopy), for simple geodetic calculations (poly), point transformation (vdftp) and the generation of point marks (marks), are available for different platforms free of charge without any restrictions.
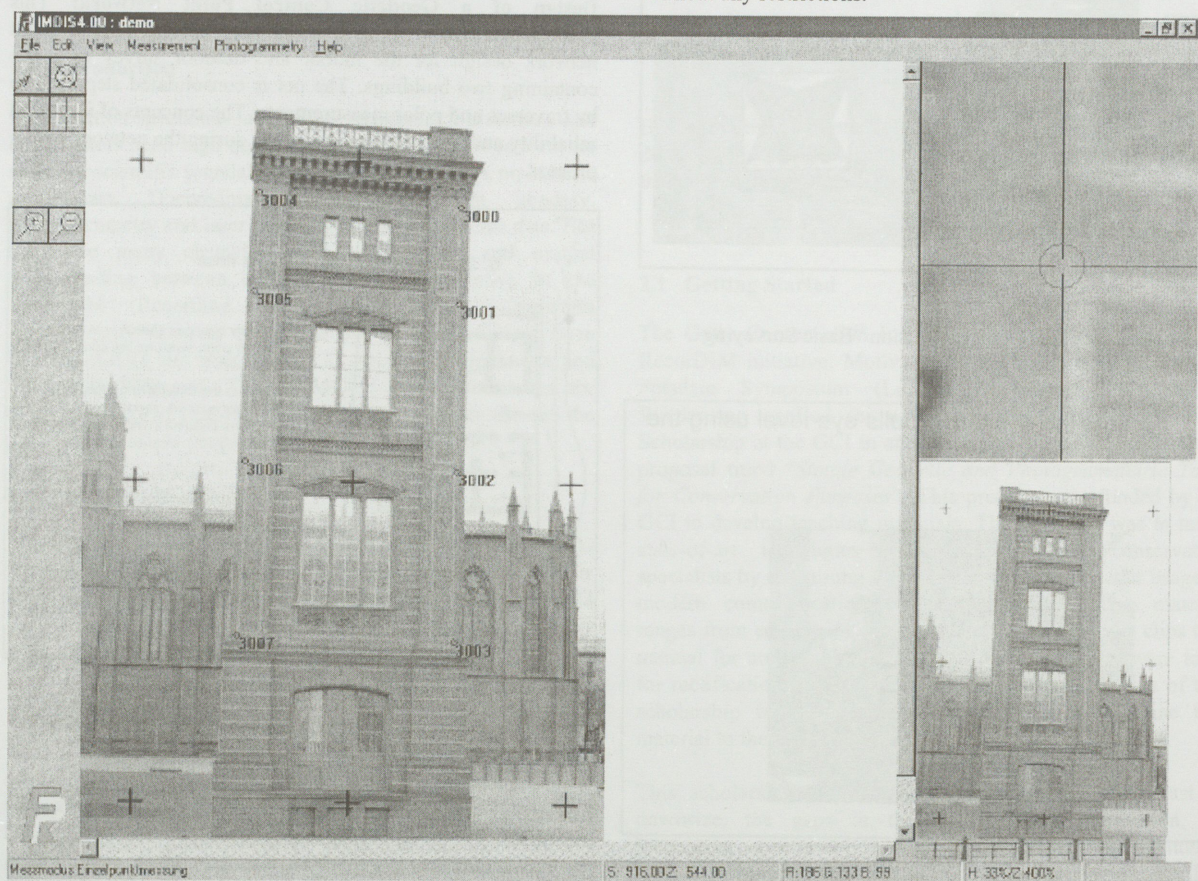

Figure 6: User interface of the IMDIS, the free rectification tool from the Archimedes3D package

3. CONCLUSIONS

During the time of this scholarship some tools have been developed and established to contribute to the RecorDIM initiative to close the gap between information providers and information users. Whether these tools are efficient or not depends on the usage of the materials and software and the feedback we get from the users.

The material can be found at present on the Internet at the URL: www.archpho.al-wie.de. It can be used free of charge exclusively for education and teaching purposes.

4. REFERENCES

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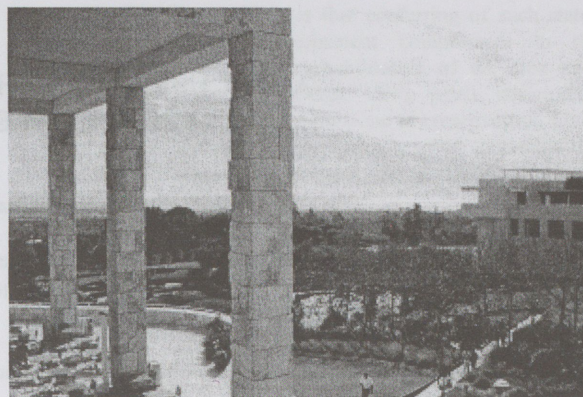
5. ACKNOWLEDGEMENT

Figure 7. View over the Getty gardens towards the Pacific Ocean