EUREKA PROJECT E!598 - EUROCARE REFRAN

1. General description

Project	E! 598 - EUROCARE REFRAN	**Status**	Finished - 22-APR-1997
Title	**Automatic Surveillance System, In A Computerised Management System For Pre-Classification Of Historical/Artistic Assets**		
Class	Sub-Umbrella	**Technological area**	Environment
Start date	24-MAY-1992	**End date**	24-JAN-1996
Duration	44 months	**Total cost**	1.9 Meuro
Partner sought	No		
Summary	Development Of A "Iconometric Model" Integrated Into A Computerised Management System For Photographic, Graphic And A1 Numerical Data		

Budget and duration

Phase	Budget(Meuro)	Duration (Months)
Definition phase	0	1
Development stage	0	10
Initial Exploitation	0	10
Research stage	0	23
Total	**1.9**	**44**

Member contribution

Member	Contribution	Position	Since
Italy	**50.00%**	**Notified Finished**	**22-APR-1997**
Switzerland	20.00%	Notified Finished	22-APR-1997
Germany	30.00%	Notified Finished	22-APR-1997

Participants

Company	Country	Type	Role
Leica Ag Heerbrugg	Switzerland	Research Institute	Partner
Istituto Centrale Per Il Restauro	Italy	Governm./Nat. Admin.	Partner
Leica Geosystems S.P.A.	Italy	Large company	Partner
Leica Sensortechnik Gmbh	Germany	Large company	Partner

2. Project outline

Project description

The need to develop this project originally arose in the field of the Italian Cultural Estate which is under the direction of the MINISTRY FOR CULTURAL AND ENVIRONMENTAL ASSETS (which does not prevent it from also finding a large application in other fields - see point 15). As far as the main stated purpose is concerned, it is well known that one of the emerging fundamental imperatives for the preservation and restoration of the huge Italian artistic/ cultural heritage consists in its knowledge acquired through systematic documentation and classification work.
The State organisations responsible for this within the MINISTRY FOR CULTURAL AND ENVIRONMENTAL ASSETS are: L' ISTITUTO CENTRALE PER IL CATALOGO E LA DOCUMENTAZIONE (I.C.C.D) as regards the reconnaissance of the historical and artistic aspects of the cultural heritage, and the ISTITUTO CENTRALE DEL RESTAURO (I.C.R.) as far as acertaining their state of preservation is concerned.
The catalographic activity of both institutes is seen in the drawing up of suitable cards, allowing the survey and the informatic recording of the relevant graphic and alphanumeric data. One of the main difficulties which may arise during graphic data survey consists, in most cases, in the lack of availability of existing and reliable surveys and graphic representations. This means that the surveys have to be carried out on an individual basis involving a remarkable waste of time and a steep increase in catalographic costs.
Moreover, the photogrammetric equipment is also expensive and cannot be proposed for an extensive application if it is understood that the historical/artistic real estate to be card-indexed is estimated in hundreds of thousands of units. There is, therefore, a need to project and execute procedures and instruments to put at the cataloguists' disposal in order to simplify and standardize some surveying operations. These should have the necessary requirements of cheapness and low operating costs as well as ease of handling and of high capacity and operating speed.
The proposed 'Iconometric Model' is considered capable of satisfying such requirements. It will consist of a semi-metric photographic camera i.e. equipped with marks inside the camera body which detect a cartesian coordinate system. After being inserted, this will enable an image to be printed which can be reconstructed geometrically and dimensionally. The camera will also be equipped with electronic data management (EDM) which, via simple software, detects the graphic scale of the image obtained. It will then be able to treat this image, inserted by a scanner in the screen, to obtain a scale drawing by means of a CAD system.
On the drawing it will be possible to produce any type of different graphic themes in order to point out the degree of deterioration of the materials and building components. Such a system may be useful to survey the facades of historical buildings and of decorative details, sculptural groups and moving artistic objects, enabling these operations to be carried out with remarkable speed and an

acceptable degree of accuracy.
The accuracy degree and the image resolution capacity have been studied in order to be used in future cartographic campaigns envisaged by Law Nx.84 dated 19.4.90 which finances (130 milliards of lire) a programme of interventions for the classification and drawing up of an inventory of the cultural and environmental assets as well as of a cognitive up-to-date map of the risk situation of cultural heritage.
In particular, as regards the risk map of the Italian cultural heritage, the illustrated system corresponds to what is requested by the technical specification enclosed with the instructions for the card-indexing of the deterioration of the architectural heritage, which were proposed by the ISTITUTO CENTRALE DEL RESTAURO.
In conclusion, the 'Iconometric Model' represents an efficient and technologically advanced answer to the need for a graphic documentation system which cannot be satisfied by traditional manual surveying systems.

Technological development envisaged

This project, consisting of the development of hardware and software to execute pre-classification procedures in the field of cultural heritage, meets a need which has arisen following 10 years' experience gained by competent institutions responsible for the preservation and protection of monuments, experiences which are mentioned in recent publications.
The "Iconometric Model" solves all the above problems (being an alternative method to traditional architectural photogrammetry) which is expensive both in terms of cost and complexity of the necessary equipment. The "Iconometric Model" in no way precludes the application of already acquired experiences and technologies for photogrammetric surveys and appropriates some of their characteristics, optimizing its resources through the development of a photographic camera prototype which, while retaining some of the current metric camera's characteristics, is compact and easy to handle (like an amateur's camera). In addition, the optics employed do not lower the degree of quality definition and brightness of the photographic copy.
This result can be obtained by starting from existing technologies for the semi-metric camera, partly by exploiting their accuracy qualities and partly by employing other economic resources for the purpose of inserting in the camera, suitable technologies to record the largest possible spectrum of information on the photogram itself.
The processing of the photogram, through suitably developed hardware and software, will enable the operator to have clear, direct access to the information. The operator, without having particular photogrammetric knowledge, will be able to extract data from the same enlarged photogram as well as from the processed copies.
The main technologies employed can be subdivided into 3 main sectors:
- Precision Optics and Mechanics
- Optic-Laser Distance metres
- Miniaturization of Electronic Components.

Such a project aims directly to speed the progress of

technological review, derived from years of experience in the field. The production of the traditional photogrammetric camera, given its high cost, has been practically halted and replaced by the so-called semi-metric camera, now widespread, the bypassing of which is proposed by the present technology.
However, the as yet unsolved difficulty, namely executing a systematic survey of artistic works could be overcome for cost and re-activation of sectors now static in the documentation field and classification of cultural heritage. This equipment makes the present system more versatile for the documentation of cultural heritage, with a tendency to uniformize the precision characteristics with regard to the different ideologies of the documentary survey and programmation, both during the phototaking and the classification (filing), thereby substantially reducing to two the requested analytical informative levels, independently of the typology of the heritage plus the development of the photogram at high resolution.
Note on timescale:
Estimated time for the development:
9 months from the beginning of the production of 5 prototypes + 1 prototype of the software system.
The following production of 20 systems is envisaged every three months during the commercialisation phase.

Markets application and exploitation

The potential users of the system can be located among:
- public and private organisations (responsible for the classification of historical/artistic heritage to be protected and preserved, as well as for the environmental and State properties of town and land planning)
- professional engineering and architectural offices (for all documentation and architectural object surveys and topographical applications)
- historiographers and art scholars, publishers, public or private companies of scientific and amateur antiquarians, audiovisual or televisual circulation of art reproductions.
- For all photographic reproduction uses containing information on the size of artistic works and zonal discretization; for the scientific attributions for remote documentation without using scaffolding or forklift trucks.
- Insurance companies (for the drawing of immediate documents, even probate, of typical situations of accident survey)
- Scientific research and Industrial Planning (for the topographical location of geographical points and vehicles at long distance or for the testing of micro-devices and other engineering applications).
The produced instrument can also be offered as a first worldwide prototype in the field of completely automated recording on photographic images with metric content, even probate, documentation.
It will increase productivity because it will reduce the competitiveness of instruments on the world market (HASSELBLAD, PENTAX, etc.), which, being aimed excessively at just one application, even if highly accurate, limit the application fields and polyfunctional average, which, for that level of accuracy, this instrument is able to attain, for a generalized use of technologies and materials

and for building simplifications.
The resulting product is addressed initially and directly connected to the programmes of the central and peripheral organs of the MINISTRY OF CULTURAL AND ENVIRONMENTAL ESTATE, also on the occasion of the first accomplishment of the above-mentioned Law Nr.84/90.

Project codes

BSI

BA/BK	measurement
LH/LJ	information
LP/LS	photography
LQB	cameras
MYM	computer-assisted management
ZO	history
ZV/ZY	culture

NACE

3. Main participant

Company

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Contact

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Organisation type
Participant role

Contribution to project

Expertise

4. Partner

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Organisation type Research Institute
Participant role Partner

Contribution to project

Manufacture of photographic cameras.

Expertise

4. Partner

Company

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Organisation type Governm./Nat. Admin.
Participant role Partner

Contribution to project

Experimentation and sampling.

Expertise

4. Partner

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Organisation type Large company
Participant role Partner

Contribution to project

Lit. 950,000,000. Experimentation and sampling.

Expertise

4. Partner

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Organisation type	Large company
Participant role	Partner

Contribution to project

Lit 800,000,000 Manufacture of photographic cameras.

Expertise