

# Partnering Opportunity

Profile status : Archived

## Technology Offer

### Procedure for the association of imaging information obtained following non-destructive, non-invasive investigations conducted with photonic techniques

#### Summary

*A team of Romanian researchers has developed a visualization technology for the investigation of data obtained on the surfaces of the work of arts. This technology delivers a series of visual data, in digital format, associated with a 3D replica of the investigated surface; the data is presented as textured images on the surface of the 3D model. The Romanian research team is looking for SMEs, universities and research institutions for services and/ or research cooperation agreement.*

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#### Details

#### Description

A group of Romanian researchers active in the field of fundamental and applied research in optoelectronics has developed an unified complex digital model. The digital package of data visualization of complementary investigations is actually a 3D online interactive graphic interface based on a procedure for the association of imaging information obtained following non-destructive, non-invasive investigations conducted with photonic techniques. Currently, there are methods and algorithms for obtaining 3D digital representations by using stereoscopic

photographs as well as methods for overlaying 2D digital images with 3D digital models used in texturing 3D graphics in the multimedia industry. But there was no unitary model of simultaneous viewing, on a digital replica of a 3D surface, of the multi-layer imaging information provided by several photon investigation techniques. The Romanian team solved this technical problem by developing an unified complex digital model; thus, the digital support of the 3D replica of the object or surface studied allows the hidden details of the paintings to be found on any kind of support and detachments or "hidden" defects under the layers of paint or even plaster. Plus, the digital replica can also be studied in detail in other locations outside the site or museum (e.g. in laboratory or classrooms) and there is no need to have a team of experts on site. In conclusion, the invention relates to a procedure for the association of imaging information generated by non-invasive and non-contact photon techniques of investigating the quality of multi-layer surfaces of art objects.

The investigation and diagnosis techniques contained in the present visualization technology are: 3D laser scanning, LIF Scanning (Lase Induced Fluorescence Spectroscopy), LDV scans (Laser Doppler Vibrometry), multispectral & hyperspectral imaging, thermal imaging, colorimetry and microscopy.

The investigation devices deliver data as images representing specific characteristics of the investigated surface.

Having such a collection of different data types from different devices may be confusing for some investigators.

Therefore, instead of looking at several distinct data images and a digital 3D model of an investigated area, the digital model contains all the available data of the studied surface. In this respect, the researchers have developed a method of correlating all the imagistic data results on the surface of a work of art with its 3D digital representation. The resulted models are accessible via the Internet in a virtual interactive environment that allows the viewer to study the investigated surface with all the needed data overlapped on the areas where they were collected.

The overtone of the results with the 3D model is made based on the matrices of the investigated areas, by associating every pixel of the 2D recorded images as intensity distribution maps with the vertex group corresponding top that pixel, from the 3D digital model of the scanned area. Based on data correlations, the 3D model of the area will be created and it will be glued to the other areas so as to create the final 3D digital replica of the object.

The Romanian team is looking for SMEs, university or R&D centres etc. for collaboration based on services or research cooperation agreement.

Via services agreement the Romanian researchers are offering professional services related to the digital model to universities, museums, local authorities, SMEs, R&D institutes etc. that are seeking for a specific partner able to perform the complex procedures of the visualization technology.

The results that the Romanian team expects to achieve via research cooperation are the improvement of the digital model capacities and further development of ideas associated to this visualization technology by cross-disciplinary approach. Thus, the research cooperation has the potential to discover new openings in the area of optoelectronics & related fields.

## Advantages and innovations

A first advantage of this procedure is that it uses high-precision non-contact and non-destructive photon techniques to record information on the quality and condition of the surface preservation and hidden layers of an artifact, which may be fragile to mechanical contacts of any kind.

A direct benefit of the Romanian unified complex digital model thus obtained is the fact that it offers specialists in the field of preservation and restoration of art works, historians, insurers, curators, extremely useful information about the following aspects:

- the integrity, quality and relief of the surface of the investigated object, at a high level of precision;
- the conservation status and possible biological attacks, with the mapping of their intensity distribution on the investigated area;
- the differences between pigment compositions that may belong to subsequent interventions;
- the history of the restoration of the work of art, by highlighting any retouches or even detachments in the hidden substrates

This information is available simultaneously, without the need of the specialist in the field, being able to access and view the digital model in the laboratory or at home, requiring only a personal computer and, more

importantly, without involving the physical manipulation of the object.

### Stage of development

Field tested/evaluated

### IPR Status

Patents granted

### Comment Regarding IPR status

Patent granted by the Romanian State Office for Inventions and Trademarks.

### Profile Origin

National or Regional R&D programme

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### Keywords

#### Technology

|           |  |
|-----------|--|
| 005006003 | Laser Technology                                   |
| 01005001  | Cultural Heritage                                  |
| 05003002  | Optics   |
| 11005     | Infrastructures for social sciences and humanities |

#### Market

|          |  |
|----------|--|
| 07005006 | Other consumer services (including photo processing) |
| 09003001 | Engineering services                                 |
| 09003006 | Media related services                               |
| 09003007 | Other services (not elsewhere classified)            |

#### NACE

|          |   |
|----------|---|
| M.72.1.9 | Other research and experimental development on natural sciences and engin |
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### Network Contact

#### Issuing Partner

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**Open for EOI:**      **No**

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**Dissemination**

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**Relevant sector groups**

Tourism and Cultural Heritage

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**Client**

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**Type and Size of Organisation Behind the Profile**

R&D Institution

**Year Established**

1992

**Turnover**

<1M

**Already Engaged in Trans-National Cooperation**

Yes

**Certifications Standards**

ISO 9001

**Languages Spoken**

English

**Client Country**

Romania

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**Partner Sought**

**Type and Role of Partner Sought**

The digital model can be necessary in carrying out the activities within universities, museums, local authorities, SMEs, R&D institutes etc.; thus, there is a wide range of potential partners who could be interested in the professional services offered by the group of Romanian researchers.

As the use of the visualization technology for the investigation of data obtained on the surfaces of the work of arts requires a high level of expertise and technical ability, the partner sought should be interested in contracting these services for a mid to long term partnering services (on the basis of a services agreement). The particular aspects of the visualization technology services are to be agreed between the Romanian researchers and the potential partner, depending on the specific requirements of the latter.

Research cooperation agreement is also envisaged with international SMEs, university or R&D institutions active in the same or a related field of activity, which could be interested in working together with the Romanian researchers for the future development of the digital model.

Furthermore, by combining different fields of research, the research co-operation can lead to innovative solutions related to the association of imaging information, which will then be available for use in different fields of business and public organizations.

The potential future development should be directly discussed with the Romanian partner based on foreign new ideas.

**Type of Partnership Considered**

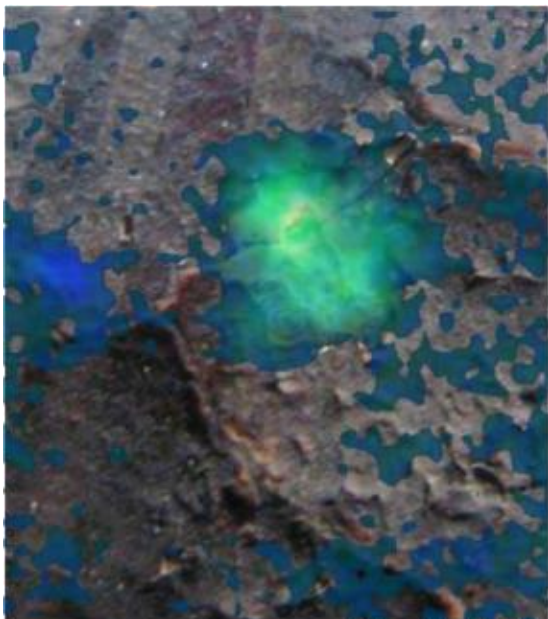
Services agreement

Research cooperation agreement

## Attachments



Photo overlay in visible with the intensity distribution map for laser-induced fluorescence scanning



Association of a sub-zone of a 3D replica with the image in the visible mode