

Partnering Opportunity

Profile status : Archived

Technology Offer

Mobile laboratory for investigation, diagnosis, monitoring and restoration of heritage components

Summary

A group of Romanian researchers has developed a mobile laboratory for the investigation, diagnosis, monitoring and restoration of heritage components, which performs in a short period of time a set of measurements and analyses on movable or immovable art objects, historical buildings, archaeological sites and other heritage objects. The Romanian team is looking for interested SMEs, universities and research centers for cooperation based on services and/ or research cooperation agreement.

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Details

Description

Active in the field of fundamental and applied research in optoelectronics, a group of Romanian researchers has developed a mobile laboratory for the investigation, diagnosis, monitoring and restoration of heritage components, which performs, in a short period of time, a set of measurements and analyses on movable or immovable art objects, historical buildings, heritage objects etc. Usually the deterioration of the external heritage components is due to urban pollutants, emissions and anthropogenic factors. Regarding the art objects located inside the buildings, the damages are equally determined by particles in the air, contaminants and anthropogenic factors. In both cases, the investigation, diagnosis and

restoration of heritage components are carried out in specialized laboratories, but often the transportation of these heritage components to the restoration centres produces delayed intervention and, in many situations, irreversible damages. Thus, the technical problem created by the disadvantages of moving heritage objects in fixed labs is solved by the Romanian invention, because the mobile laboratory has all the necessary equipment in order to perform, in a short period of time, the entire set of measurements and analyses on movable or immovable art objects, historical buildings, archaeological objectives and other heritage objects.

The Romanian invention relates to the development of a mobile laboratory, adapted on a freight minibus chassis, which is composed of two cabins: the minibus cabin, equipped with driver's and companion seats, and the laboratory cabin.

The laboratory cabin is equipped with shelves, supports and work table on the side walls and the control cabin separating panel, in which the optoelectronic equipment and accessories used for monitoring, investigation, diagnosis and restoration are stored and insured during the transportation. The cabin designed for laboratory purposes is melamine faced and has a sliding door on the right side and two folding doors (180 degree) in the back.

The mobile laboratory uses mainly non-contact, non-invasive or micro-invasive optoelectronic techniques, without sampling and at very high technical level.

The optoelectronic techniques that can be applied using the equipment and accessories installed within the mobile laboratory are the following:

- monitoring of the microclimate, air quality and exposure to light;
- thermal imaging, to quickly detect anomalies and damage;
- 3D laser scanning & photogrammetry of large scale heritage components;
- non-invasive and non-contact investigation for qualitative assessment of materials through laser-induced fluorescence (LIF);
- non-contact and micro-invasive investigation for qualitative evaluation of materials via laser induced breakdown spectroscopy (LIBS);
- pH metry;
- Ground Penetrating Radar (GPR) investigations and mapping of archaeological sites and monuments
- vibrometry;
- high-resolution multispectral and hyperspectral investigation;
- colorimetry;
- laser cleaning etc.

The technology is tested and validated as a complex array of advanced optoelectronic methods for investigation-diagnosis and evaluation of the conservation state of the specific materials for different types of tangible heritage, as well as corroboration of the research methods and means to improve decisions and make efficient the current or exceptional interventions.

All the techniques were tested in laboratory, cases were validated and the mobile laboratory that incorporates all the latest techniques is available for demonstration.

The Romanian research team is looking for interested SMEs, universities and research centres for technological services and/ or research cooperation agreement for future development of the mobile laboratory.

Advantages and innovations

The mobile laboratory ensures complex investigations, analysis and documentations/mappings for any object or monument, in maximum security conditions even without moving the object from his exhibition/storing/conservation environment.

The main advantages of mobile laboratory are as follows:

- no sampling is required for laboratory processing;
- investigations, analyzes and diagnosis are performed in a short period of time, as compared to the succession of classical operations;
- possibility of non-contact, non-invasive or micro-invasive measurements, which is very useful in the case of heritage components with a high level of deterioration.

Due to its flexible design, the mobile laboratory can answer the needs of several categories of users, such as

restorers, historical archaeologists, documentaries, etc.

Stage of development

Available for demonstration

Comments Regarding Stage of Development

The mobile laboratory for investigation, diagnosis, monitoring and restoration of heritage components is available for demonstration to potential partners or even to direct customers in order to convince them of the viability of the chosen approach.

The Romanian research team is ready to showcase the possible applications, feasibility and performances of their innovation, the goal of such a demonstration being to introduce potential partners/ customers to the mobile laboratory in hopes of offering them professional services or for mobile laboratory's further development.

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

Keywords

Technology

01003002	Archivistics/Documentation/Technical Documentation
01003012	Imaging, Image Processing, Pattern Recognition
01005001	Cultural Heritage
01005006	Visualisation, Virtual Reality

Market

07005006	Other consumer services (including photo processing)
09003001	Engineering services
09003007	Other services (not elsewhere classified)
09007004	Engineering and consulting services related to construction

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**

Dissemination

Relevant sector groups

Tourism and Cultural Heritage

Client

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

Experience

The optoelectronic equipment and accessories installed within the Romanian mobile laboratory are the following (attachment - Figure 1):

- 1- supports for screens, protective screens;
- 2- vibrometer;
- 3- portable pH meter;
- 4- UV lamp;
- 5- Portable colorimeter;
- 6- IR vision thermal camera
- 7- YAG laser: Nd Q-switched for cleaning operations (Neodymium-doped Yttrium Aluminum Garnet);
- 8- 3D laser scanner;
- 9- multi-spectral camera;
- 10- LIBS (laser induced breakdown spectroscopy) device;
- 11- GPR (Ground Penetrating Radar) device;
- 12- LIF (laser-induced fluorescence) device;
- 13- network of at least 8 sensors for temperature, relative humidity and emissions;
- 14- laptop for 3D scanning, LIBS and LIF techniques;
- 15- laser power supply cables;
- 16- niche with working table with 12 and 220 V sockets;
- 17- portable digital microscope;
- 18- central computing unit;
- 19- portable electric generator;
- 20- UPS (Uninterruptible Power Supply);
- 21- tripods.

Partner Sought

Type and Role of Partner Sought

The partner sought could be among SMEs active in the cultural heritage, imaging, documentation or other related sectors, as well as university or R&D centres interested in the onsite technological services offered via the Romanian mobile laboratory; the specific services should be provided on the basis of a long-term services agreement.

R&D collaboration to further develop the complex mobile laboratory dedicated to Heritage Science is also envisaged if any international university or R&D institutions from the specialty optoelectronics and/ or related fields is interested in working together with the Romanian partner for finding or developing new solutions related to the investigation, diagnosis, monitoring and restoration of heritage components to be applied via the mobile laboratory.

Type and Size of Partner Sought

SME 11-50, University, R&D Institution

Type of Partnership Considered

Services agreement
Research cooperation agreement

Attachments

Figure 1. Mobile laboratory

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