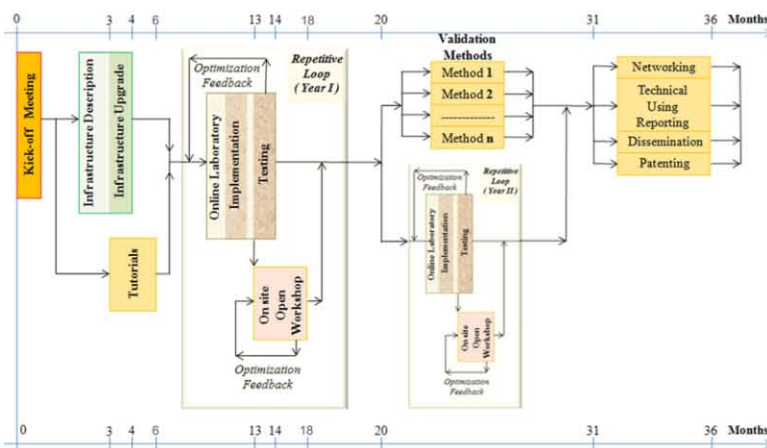




## Project description

The project is aiming to develop real access to advanced research capacity. It is a very specific example of e-Infrastructure for Cultural Heritage, which aims to exploit top specialized infrastructure to the development of new cultural and educational services, and to establish a joint experiments of research priorities with universities, stakeholders, curators, supervisors, authorities from cultural heritage sector for research practice implementation to educational practice for vocational professions.

## Project Leadership



## Phase One

This first phase has two stages and will run for 6 months. The first stage will run for the first 4 months of the project and in its second part of it, when the instrumentation structure and justification are decided, a testing infrastructure will be done. For time saving and rational use of the human resources, once the infrastructure structure is selected, the second stage relating elaboration of the tutorials and support documents will start.

## Announcement

We'd like to remember everybody the upcoming two major events we are organizing this autumn in Bucharest. On 5th-7th September, "DeSE12 - Fifth International Conference on Developments in eSystems Engineering" and on 29th-30th October 2012 the "Third Balkan Symposium on Archaeometry".

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## Phase 1 Project Timeline

### Stage 1

- infrastructure testing
- structure justification



### Stage 2

- tutorials
- support documents



### Expected results

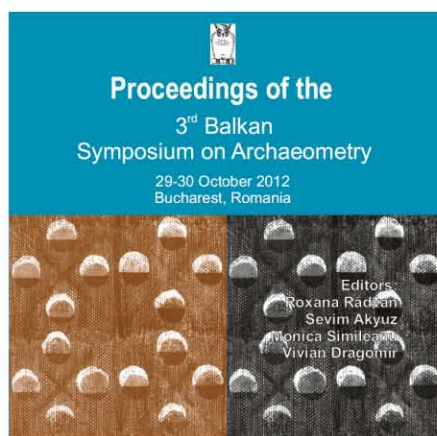
- partnerships
- website
- innovation patent
- scientific papers
- reports



## Phase 1 completed

During these 6 months, as a consortium, we managed to accomplish all the proposed objectives. We managed to realize very important partnerships and end-user clusters with important institutions from Egypt, Austria, Bulgaria and Romania that helped us test our infrastructure for education purposes and not only.

We'd like to remember the successful introductory online course held for the Faculty of Archaeology of Fayoum University in Fayoum, Egypt. The online video transmission had almost two hours of presentation and



dialogue using three lab-mounted IP cameras and a webcam. We've also registered an innovation patent at O.S.I.M. for a method and device in the field of photonics applied in Conservation-Restoration. A collection of papers on scientific and informational infrastructure were published in an proceedings volume of a international symposium organized within this project phase.

The project website was also launched, waiting for the next year development of the online platform.

## Next step

As this first stage has come to an end we are eagerly looking forward to start the second phase of the project, next year.

## Project Leadership

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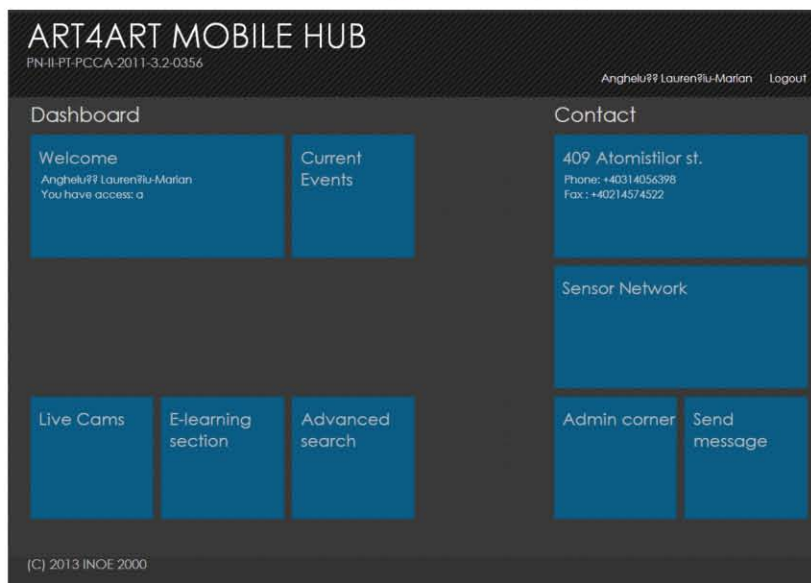
- partnerships
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## Online laboratory is now available

The online platform is accessible using the credentials given by the administrator. It can be directly accessed using its address <http://auto.inoe.ro>, or by logging in from the project website, in the courses page or platform page: <http://certo.inoe.ro/platform.html>. In the courses page you will first be prompted to read and accept the platform terms and conditions, that is also giving an insight of what to expect and how to use the online platform and its database. It is due to be tested in the next months during a field campaign.



The online platform will be used for direct access of the results and past or ongoing experiments, e-Learning content like live webinars and offline documentation for students. Target groups are the research teams involved in the ART4ART mobile laboratory field or in-lab campaign; the students coming from restoration/conservation, archaeology, engineering or chemistry/physics schools; researchers, experts and specialists who want to participate remotely to the ongoing experiments or just need a good tool to get informed before taking an important decision regarding similar situations with those already recorded in the database.

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## Online platform concept

### Database

- result management
- experiment details
- fast and easy access



### Web GUI

- secure access
- html, css, php, mysql
- metro style GUI
- IP cameras access



### Online platform

- access to past results
- powerful decisional tool
- live video feedback
- teleoperation access
- detailed scientific reports

# WWW<sub>w</sub>ATCH

## World Wide Open Workshop with Advanced Techniques for Cultural Heritage Project Newsletter



### Phase 2 completed

This year we managed not only to finish the developing of the online platform but we also have elaborated several scientific papers and e-Learning content for webinars. The platform was successfully tested in a three weeks working field campaign at the Martyrs' Monument from Moisei in Maramures county. During almost three weeks we collaborated in a restoration project of the monument. Our ART4ART mobile laboratory was present with two cleaning lasers, a wireless microclimate sensor network and colorimetry and digital microscopy technologies. An IP camera was also used in order to test the online video transmission of the operations. The platform was successfully



tested and the experience offered a great feedback that was used to improve the platform's capabilities and accessibility.

The concept behind the online platform was presented at two international conferences (Evora-Portugal and Lodz-Poland) and the respective papers being selected for publication in the proceedings of the conferences. Another scientific paper, that describes the experience and conclusions of is currently under evaluation by an ISI indexed journal. Another paper was published in an ISI indexed journal, describing in-lab LIBS experiments realized in collaboration with professors from Universities of Cairo and Fayoum, Egypt.

Thirty six laboratory works, covering a wide range of methods and problems encountered in the conservation/restoration, were developed specially for the e-Learning section of the online platform, along with three main lectures for real-time online classes. Two such lectures were held this year at the Institute for Physics Chemistry in Vienna, Austria.

### Project Leadership

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### Phase two conclusions

#### Scientific papers

- 2 oral presentations
- 2 papers in proceedings
- 2 lectures
- 2 papers in ISI indexed journals

#### E-learning content

- 36 lab works
- 3 lectures
- website access and guide

#### Online platform

- secure access
- consistent database
- friendly GUI
- always online





## University of Vienna collaborator's visit

At the end of March, this year, we have received the visit of Prof. Wolfgang Kautek and Ulrich Pacher from the University of Vienna, department of Physics-Chemistry and Valentina Lubic from the Museum of Technology in Vienna. During the few days of meetings and discussions there was elaborated a full schedule for teleoperation tests and tutorials, detailed below, and the first drafts of scientific papers proposals. Mr. Ulrich Pacher attended a LIF teleoperation tutorial in order to further instruct and supervise a group of students from the University of Vienna regarding the future online tests. The elaborated teleoperation schedule was:

- ≈ 31.03-01.04.2015 - meeting and planning
- ≈ 01.04.2014 - in lab tutorial and tests
- ≈ 02.04.2014 - connectivity test with the University of Vienna
- ≈ 03.04.2014 - test and tutorial with students from the University of Vienna
- ≈ 04.04.2014 - second session of experiments, scans and results discussion
- ≈ 30.06-13.07.2014 - Start of the Tismana Monastery field campaign



## Online courses testing

In collaboration with Hamada Sadek from Fayoum University of Cairo, Egypt, we have elaborated a testing schedule for the first real-time online course presentations. In two sessions during last half of February, this year, three courses covering important issues in the modern practices in Conservation-Restoration, were presented from the INOE 2000 laboratory to the University of Fayoum, via the Internet. The tests regarded the connection quality (video and sound lags) and the 'in-progress' content of the courses; all these were satisfactory. On 7th of April 2014, an oral presentation entitled "Online Access to Advanced Infrastructure for Cultural Heritage" was held at "The First International Conference in Faculty of Archaeology: Recent Trends in Archaeology Sciences" in Cairo, Egypt. This presentation promoted the project and the current achievements so far.



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## First semester of 2014 recap

### Main events

- Online course live transmission via the Internet
- Schedule for teleoperation testing and on field campaign planning
- Teleoperation in-lab tutorial
- Teleoperation online tutorial and experiments (Vienna, Austria)
- Oral presentation of the project concept and present achievements





## Workshop at the 4th BSA, Nessebar, Bulgaria

September 27-30 last year was organized at Nessebar, Bulgaria **The Fourth Balkan Symposium on Archaeometry**, organized by Institute of Solid State Physics and the National Institute of Archaeology with Museum of the Bulgarian Academy of Sciences. We were invited as co-organizers for a workshop and demonstration on field, in the St. Stephen



Church in old town of Nessebar. The mobile laboratory infrastructure was presented during the conference followed by demonstrations with different techniques on selected areas in the church.

## Anoxia treatment of wooden artefacts

In preparation for the 2015 Campaign at Tismana, several artworks (wooden painted religious artefacts) had to be treated with anoxia method in order to disinfect the wood from woodworms. The remaining wooden objects will be completed in situ during March planned campaign at Tismana Monastery, taking into consideration tailoring an enclosure around the immovable wooden altar structure, within reason.



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## Main events scheduled for 2015

### Main events

- Baia de Aramă
- Târgu Jiu
- Several courses and trainings for students
- Online course with Seville



## International access to infrastructure & know-how

21.01.2015 Course with students from Faculty of Architecture - Bucharest Romania

02.04.2015 Course with Centre for Professional Training in Culture of Min. of Culture from Romania

04.05.2015 Live Online course with Fayoum University students, Egypt

18.05.2015 Course with Centre for Professional Training in Culture of Min. of Culture from Romania

07.07.2015 Live Online course with Catedra "Área de Cristalografía y Mineralogía", Dpt.Sistemas Físicos, Químicos y Naturales, Univ.Pablo de Olavide, Sevilla, España

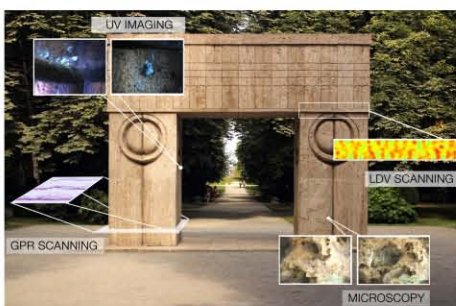
Next:

24.11.2015 Course with Centre for Professional Training in Culture of Min. of Culture from Romania

## The first campaign to Targu Jiu

Based on the agreement between the Center of Research, Documentation and Promotion "Constantin Brâncuși" and National Institute for Research and Development in Optoelectronics INOE 2000, the Brâncuși artworks on Calea Eroilor will be monitored until 2019 by a team of specialists.

**Agreement available until 2019** - The services delivered by the NIRD in Optoelectronics INOE 2000 will be executed free of charge, following that the next monitoring session of the artworks to be in this year's autumn. The case study is part of the advanced research of INOE group and will lead to the implementation of high quality practice, will reduce any possible risks or errors in the following restoration projects. Thanks to the WATCH project, the data will be acquired using complex research instrumentation available for this kind of campaign - the ART4ART mobile laboratory, all the data being transmitted during the campaign to INOE labs or other interested collaborators, thus increasing the working capacity.



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## Main events scheduled for 2015

### Main events

- National and International access to infrastructure and know-how
- Courses and online demonstrations
- Field campaign at Targu Jiu





## Increase in the laboratory research capacity!

Due to the POSCCE - INOVA OPTIMA Infrastructura Multisite pentru Creșterea Capacității de Cercetare și INOVare în domeniul OPToelectronicii și InstruMentației Analitice – INOVA-OPTIMA”, project co-financed by the European Fund for Regional Development, the research infrastructure presented and exploited in the WATCH project has increased with three new investigation methods:

### UAV - with airborne survey sensors



UAVs allow rapid archaeological prospecting on wide areas, scientific data mapping and relative positioning for ground information with high precision applying optoelectronic techniques. The information is collected by thermal imaging, LIDAR investigations, photogrammetry, digital imaging, that don't disrupt the activity on the ground and they are not influenced by uneven surfaces, inaccessible or hazardous such as ruins or nearby swamps

### X-Ray imaging laboratory

ISOVOLT Mobile 160 is a complex computerized station for radiography which provides non-destructive X-ray inspections in the laboratory and also in the field campaigns even in inaccessible areas. The generator and the X-ray tube can operate at 160 kV, with the maximum



parameters of 1600W and with 10 mA. The emitted energy, current intensity and irradiation time are variable, allowing the investigation of several types of materials. Irradiated digital receptors are scanned in real time to obtain a digital image of radiography. Subsequently, these images are processed to highlight hidden details.

### Hyperspectral camera

SWIR 384 hyperspectral Camera has a SWIR (Short Wave Infrared) sensor ie 950 - 2500 nm. The camera can record a series of 384 vertical pixels, each pixel being assigned to them instead the classic RGB cameras to obtain a color spectrum with 288 bandwidths. Each band has a width of about 5 nm.



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## Main events scheduled for 2015

### Main events

- National and International access to infrastructure and know-how
- Courses and online demonstrations
- Field campaign at Targu Jiu





## Second and third Târgu Jiu campaigns

Between 25-27 January and 04-12 July, within the multiannual collaboration program between the Center of Research, Documentation and Promotion "Constantin Brâncuși" and INOE 2000, took place the first winter campaign and respectively the second summer campaign for data acquisition and monitoring of Monumental Ensemble elements built by Constantin Brancusi in Târgu Jiu.



This year were collected photogrammetric data from Gate of Kiss and Table of Silence and a selected number of chairs from the Chairs Alley, vibrometry and microscopy data of fillings with incipient cracks, along with thermic stress data. A very important aspect of these campaigns is the continuous real-time microclimate data collection of the artworks' environment.

## Upcoming field campaign in Spain - October 2016

We are happily announcing a new international collaboration with "Pablo Olavide" University in Seville, Spain that will be materialized this autumn, in October, through an extended field campaign in Cordoba at Mezquita, Omnium Sanctorum church in Seville and in Morella at Parroquia Arciprestal Basilica Santa Maria. Our mobile laboratory ART4ART will travel there equipped with GPR, 3D digitization methods, microscopy, XRF and FTIR analyzing techniques and with our most recent device the UAV with LIDAR, multispectral and thermic sensors.



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## Main events scheduled for 2016

### Main events

- Winter and summer campaigns at Târgu Jiu
- Courses and online demonstrations
- Field campaign in Spain



## New perspectives

Due to the increased visibility of our national and international field campaigns within the WATCH project, we were invited to Skopje, Macedonia, by the National Conservation Center to present our field research infrastructure regarding a future collaboration. Roxana Radvan made a brief but thorough presentation of our institute and our department services, mostly regarding non-destructive field investigation methods. This meeting laid the groundwork for a prospective campaign in Macedonia in the summer of 2017 and a Balkanic Network and platform for online courses and cultural valorization.



## International online courses

Following the successful collaborations with "Pablo Olavide" University from Seville, Spain (2015 online courses and the field campaign in October 2016) an increased interest of students from the named university but also from other centers from South America has been confirmed. Therefore in November 2016 are scheduled the second online course within the WATCH project.

### 16.11.2016

1. Geophysical method: Ground Penetrating Radar, Alexandru Chelmus
2. Multispectral & Hyperspectral Imaging Analysis for Cultural Heritage,

Lucian Ratoiu

### 23.11.2016

3. Fourier Transform Infrared Spectroscopy. Applications for the conservation and restoration of fine art and historical objects, Ioana Maria Cortea

### 24.11.2016

4. Photogrammetry, Laurentiu Marian Angheluta
5. Laser cleaning and LIBS Laser Induced Breakdown Spectroscopy, Monica

Dinu

### 29.11.2016

6. Teleoperation as a remote investigation and monitoring technique used in artwork Conservation-Restoration, Laurentiu Marian Angheluta

7. Optoelectronics in Cultural Heritage Restoration Projects. Case Study: Multiannual monitoring project for Constantin Brancusi's Ensemble in Romania; Roxana Radvan

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