



## D10.1: Quantity of access offered

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## Document history

<i>Date</i>	<i>Activity</i>	<i>Contributors</i>
30 <sup>th</sup> July 2016	Writing first draft of the Deliverable	CNR
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## 1 Executive Summary

This deliverable presents the activity developed in the framework of Work Package 10 “3D Documentation of Fieldwork and Artefacts”, aimed at providing training and assistance on the technologies and methodologies for 3D/2D data acquisition and dataset/repository management of archaeological findings. The report presents the three iterations of the TNA, held in 2014, 2015 and 2016, which allowed CNR to host and support 26 visitors. We present in the report all these participants, providing a synthetic information on personal data, their submitted project and their personal evaluation of the TNA experience. The report concludes with some final remarks on the overall evaluation of this experience.

## 2 Introduction

This document presents the activity developed in the framework of Work Package 10 (WP10).

The goal of WP10 is to provide training and assistance on the technologies and methodologies for 3D/2D data acquisition and dataset/repository management of archaeological findings. The Visual Computing Lab at ISTI-CNR is a leading organization on this domain. The facilities offered include state-of-the-art data capture equipment, such as cameras, several 3D scanning devices based on different technologies (laser, structured light, time of flight) and the necessary hardware/software post-processing instruments (most notably MeshLab, an Open Source software developed at VC Lab with hundred thousands of users in the world) and storage resources. VC Lab offers also expertise on managing ‘big’ data models and advanced viewing and browsing software.

We have hosted a total of **26 visitors** in three editions of the TNA, held in 2014, 2015 and 2016. All of these participants have been selected with a formal process (submission of a proposal, evaluation of the proposal by a pool of external experts, selection of the awardees).

The content presented in the following sections is a synthetic presentation of the participants, including personal information, submitted project and of their personal evaluation of the training/support received. To compile this short presentation we started from the information contained in the participants’ applications and in the user feedback submitted by participants.

This Deliverable is organized as follows: Section 2 presents the goals and organization of the TNA; Section 3 presents the participants to the 2014 TNA; Section 4 presents the participants to the 2015 TNA; Section 5 presents the participants to the 2016 TNA; finally, Section 6 presents the results of the evaluation and some concluding remarks.

### 3 Goals and organization of the TNA on “2D/3D Documentation for Archaeology”

The Trans-National Access (TNA) event on “2D/3D Documentation for Archaeology” has been organized three times in the framework of the ARIADNE project:

- First edition: June 23rd-27th, 2014
- Second edition: June 22nd-26th, 2015
- Third edition: June 20th-24th, 2016

All of them were week-long events, organized by CNR-ISTI in Pisa, Italy.

The goal of these events was to provide participants with both a structured course on visual media technologies and practical, hands-on sessions to test and experiment with the technologies being presented. Individual work is a primary component of the experience. Students have been asked to submit the research projects or tasks to be accomplished during the school, in order to start or advance their knowledge, with the help, expertise and advice contributed by the TNA tutors, so that practice with the technologies is made through the case studies brought by the students.

Concerning the course lessons, we have introduced: (a) the technologies for producing 2D and 3D documentation for archaeological purposes, considering both the small scale (artworks, finds) and the large scale (monuments, sites); and (b) the methodologies for providing visual access to the data gathered (considering both desktop and web-based visualization).

Participants were selected after participation in an open call by a committee of experts. For each year we accepted:

- 2014: 9 participants with fellowships (from EU countries) and 2 externals (from Italy).
- 2015: 7 participants with fellowships (from EU countries)
- 2016: 9 participants with fellowships (from EU countries) and 3 externals (from Italy and Cyprus).

We report in the following the data and the feedback related to the participants with fellowship.

## 4 2014 TNA on “2D/3D Documentation for Archaeology”

From June 23<sup>rd</sup> to 27<sup>th</sup>, 2014, CNR-ISTI hosted in Pisa the Summer School on "2D/3D Documentation for Archaeology", as part of the ARIADNE Transnational Access (TNA) activities.

The main goal of the school was to enable scholars and professionals to endorse and implement modern approaches for the visual multimedia documentation of artworks and archaeological sites (i.e. fieldworks and artefacts), including several innovative approaches to digitize and document our heritage using 3D and enhanced 2D media.

The scope of the TNA and of the summer school was to pair a classical program based on frontal lessons with a more practical activity where hands-on experience on the technologies presented (both hardware and software) was considered a main component of the school experience. Moreover, we have solicited participants to submit specific problems and test cases they are working with; this test beds were an important criterion in the selection of the participants (the evaluation of the participants was based on the CV and on the quality and interest of the test case proposed). Consequently, the program of the school was designed to dedicate sufficient time to advise the student on the practical hands-on experience and in developing their proposed case study with the help of the technologies presented in the course.

The list of participants to this TNA is as follows:

Mercedes Morita	Centro de Investigaciones Opticas and Universidad Nacional de La Plata	Argentina	3D	<a href="mailto:mercedesmorita@yahoo.com">mercedesmorita@yahoo.com</a>
Andres Uueni	<a href="#">State conservation centre, Kanut</a>	Estonia	3D	<a href="mailto:anz@smail.ee">anz@smail.ee</a>
Laura Stelson	University of Bonn	Germany	3D	<a href="mailto:laura.stelson@gmail.com">laura.stelson@gmail.com</a>
Erika Cappelletto	Heidelberg University	Germany	3D	<a href="mailto:caps0783@gmail.com">caps0783@gmail.com</a>
Georgios Ionnakis	Democritus University of Thrace	Greece	3D	<a href="mailto:gioannakis@gmail.com">gioannakis@gmail.com</a>
Tom Trienen	Groningen Archaeological Institute	Netherlands	3D	<a href="mailto:tomtrienen@gmail.com">tomtrienen@gmail.com</a>
Yuan Yuan	Göteborg University	Sweden	3D	<a href="mailto:yuankina@gmail.com">yuankina@gmail.com</a>
Freya Horsfield	University of Birmingham	Great Britain	3D	<a href="mailto:fxh269@birmingham.ac.uk">fxh269@birmingham.ac.uk</a>
Dries Nollet	Visual Dimension bvba	Belgium	3D	<a href="mailto:dries_no@hotmail.com">dries_no@hotmail.com</a>

The selected eleven participants (9 were assigned an ARIADNE fellowships and 2 come at their expenses) were from several different countries (Argentina, Belgium, Estonia, Germany, Greece,

Italy, Netherlands, UK) and had a mixed background (in the majority a human science background, only a few holding an engineering degree).

The instructors were a selection of the researchers of the Visual Computing Lab (<http://vcg.isti.cnr.it/>) at CNR-ISTI: Matteo Dellepiane, Marco Callieri, Gianpaolo Palma, Marco Potenziani and Roberto Scopigno.

The school started with a self-presentation of the students and of the projects/case studies each of them has proposed. After this introductory step we have planned a first lesson to build up a common language and a common background on basic ICT and visual technology concepts. Then the work was organized with a single day dedicated to each specific sub-topic (active 3D scanning and data processing, image-based approaches for 3D digitization, colour acquisition and mapping on 3D models, RTI images). Other topics, like the issues and technologies enabling the publication and visualization of 3D/2D models on the web, the advanced manipulation of 3D models, and the use of 3D in Cultural Heritage projects were touched different times throughout the five days. All the topics have been firstly presented theoretically, and then practically with some hands-on on real datasets.

The schedule of each day was arranged such that some time was left at the end of the day for the students to experiment the presented topics on their own data (or on test dataset we provided), and for individual question-answer sessions with the instructors.

The last day, beside finishing some still open topics, was dedicated to the completion of the test cases proposed by the students, to the presentation of the results obtained and to a final discussion and wrap up.

The course has witnessed a fruitful cooperation between instructors and students, providing benefits to all participants: the students had the opportunity to be instructed on the CNR tools directly by the authors, in a structured context that included also practical hands-on experiences; the instructors had the chance to witness a number of interesting test cases, extremely helpful to better understand the needs of the CH community and to assess the usability of the more recent tools and technologies.

The detailed program was as follows:

### **Monday 23<sup>rd</sup> June**

09.30 – 10.30 Presentation of the course

10.30 – 13.00 Presentation of the participants, preliminary discussion

13.00 – 14.00 Lunch

14.00 – 15.30 Introduction on 3D graphics

15.30 – 18.00 Introduction to MeshLab + basic

### **Tuesday 24<sup>th</sup> June**

09.00 – 10.30 3D scanning: theory

10.30 – 13.00 3D scanning: practice, data processing

13.00 – 14.00 Lunch

14.00 – 16.00 MeshLab advanced processing

16.00 – 18.00 Work on data

### **Wednesday 25<sup>th</sup> June**

09.00 – 10.30 Multi-view stereo matching: theory

10.30 – 13.00 Multi-view stereo matching: practice, data processing

13.00 – 14.00 Lunch

14.00 – 16.00 Publishing 3D contents on the Web, using 3DHop

16.00 – 19.00 Work on data

### **Thursday 26<sup>th</sup> June**

09.00 – 10.30 Color projection on 3D models

10.30 – 11.45 RTI Imaging: theory

11.45 – 13.00 RTI Imaging: practice

13.00 – 14.00 Lunch

14.00 – 15.00 RTI images processing and publishing on the Web

15.00 – 16.00 Wrap up

16.00 – 19.00 Work on data

20.30 Social dinner

### **Friday 27<sup>th</sup> June**

09.00 – 11.00 Closing up with theory, examples

11.00 – 13.00 Students presentations and feedback

13.00 – 14.00 Lunch

14.00 – 16.00 Students presentations and feedback

16.00 – 17.30 Wrap up and conclusions



## 5 2015 TNA on “2D/3D Documentation for Archaeology”

The list of participants to this TNA is as follows:

Name	Institution	Country of Inst	Nationality	School	Email
Orla-Peach Power	University College Cork	Ireland	Irish	3D	orlapeach.power@gmail.com
Adela Kovaks	National Museum of Eastern Carpathians	Romania	Romanian	3D	adelina_ab@yahoo.com
Michael Ann Bevivino	Discovery Programme	Ireland	USA	3D	michael_ann@discoveryprogramme.ie
Jugoslav Pendic	University of Belgrade	Serbia	Serbian	3D	vincabear@hotmail.com
Martin Duffy	University College Dublin	Ireland	Irish	3D	martin.duffy@ucdconnect.ie
Rens de Hond	Spatial Information Laboratory (SPINlab)   VU University Amsterdam	Netherlands	Dutch	3D	<a href="mailto:rensdehond@hotmail.com">rensdehond@hotmail.com</a>
Oscar Martinez Rubi	Netherlands eScience Center	Netherlands	Spanish	3D	o.rubi@esciencecenter.nl
Stefan Verhoeven	Netherlands eScience Center	Netherlands	Dutch	3D	s.verhoeven@esciencecenter.nl

The program of the school was as follows:

### Monday 22<sup>nd</sup> June

09.30 – 10.30 Presentation of the course

10.30 – 10:45 Break

10.45 – 13.00 Presentation of the participants, preliminary discussion

13.00 – 14.00 Lunch

14.00 – 15.30 Introduction on 3D graphics

15.30 – 18.00 Introduction to MeshLab + basic

### **Tuesday 23<sup>rd</sup> June**

09.00 – 10.30 3D scanning: theory

10.30 – 10:45 Break

10.45 – 13.00 3D scanning: practice, data processing

13.00 – 14.00 Lunch

14.00 – 16.00 MeshLab advanced processing

16.00 – 18.00 Work on data

### **Wednesday 24<sup>h</sup> June**

09.00 – 10.30 Multi-view stereo matching: theory

10.30 – 10:45 Break

10.45 – 12.00 Multi-view stereo matching: practice, data processing

12.00 – 13.00 Publishing 3D contents on the Web, introduction

13.00 – 14.00 Lunch

14.00 – 16.00 Publishing 3D contents on the Web using 3DHop

16.00 – 19.00 Work on data

### **Thursday 25<sup>th</sup> June**

09.00 – 10.30 Color projection on sampled 3D models

10.30 – 10:45 Break

10.45 – 11.45 RTI Imaging: theory & practice

11.45 – 13.00 RTI Imaging: processing and publishing on the Web

13.00 – 14.00 Lunch

14.00 – 16.00 3D fabrication technologies and uses for CH

15.00 – 16.00 Wrap up

16.00 – 19.00 Work on data

20.30            Social dinner

**Friday 25<sup>th</sup> June**

09.00 – 10.45 Closing up with theory, examples

10.45 – 11:00 Break

11.00 – 13.00 Students presentations and feedback

13.00 – 14.00 Lunch

14.00 – 16.00 Students presentations and feedback

16.00 – 17.30 Wrap up and conclusions

## 6 2016 TNA on “2D/3D Documentation for Archaeology”

The INFRA project “ARIADNE” (<http://www.ariadne-infrastructure.eu/>) organized the third edition of the Trans-National Access (TNA) event on “2D/3D Documentation for Archaeology”. This one-week event was organized by CNR-ISTI in Pisa on June 20th-24th, 2016.

The goal of this event is to provide participants with both a structured course on visual media technologies and practical hands-on sessions to test and experiment with the technologies being presented. Individual work is a primary component of the experience. Students have been asked to suggest research projects or tasks to be accomplished during the school by means of the expertise and advice contributed by the TNA tutors, so that practice with the technologies is made through the case studies brought by the students.

Participants have been selected after participation to an open call by a committee of experts. We had a very good response to the call, with many qualified submissions sufficient to fill all the available **nine fellowship** positions. We decided to accept also three more participants (one from Cyprus and two from Italy), which came at their expenses.

The list of participants to this TNA is as follows:

Name	Institution	Country of Inst	Nationality	School	Email
Jugoslav Pendic		Serbia	Serbia	3D	vincabear@hotmail.com
Ricardo Dias	University of Porto - Empatia Arqueologia	Portugal	Portuguese	3D	ricard.jm.dias@gmail.com
Miguel Carrero-Pazos	University of Santiago de Compostela	Spain	Spanish	3D	miguel.carrero.pazos@gmail.com
David Herisson	INRAP	France	French	3D	david.herisson@inrap.fr
Stephen Kehoe	Discovery Programme	Ireland	Irish	3D	stephen.kehoe@discoveryprogramme.ie
Sophie C. Schmidt	University of Cologne	Germany	German	3D	s.c.schmidt@uni-koeln.de
Myrsini Samaroudi	University of Brighton	UK	Greek	3D	M.Samaroudi@brighton.ac.uk
Despina Papacharalambous	Cyprus Institute	CY	Cypriot	3D	d.papacharalambous@cyi.ac.cy
Eleni Moustaka	Ionian University	GR	Greek	3D	eleniaek@gmail.com

Concerning the course lessons, we introduced: (a) the technologies for producing 2D and 3D documentation for archaeological purposes, considering both the small scale (artworks, findings) and the large scale (monuments, sites); and (b) the methodologies for providing visual access to the data gathered (considering both desktop and web-based visualization). Tutors discussed with the students the projects they suggested, concerning large scale acquisition and modelling (castles, architectures), medium scale (megalithic rocks with inscriptions) and small scale findings management (archeological excavation findings, lithic artefacts, ceramics); students received suggestions and advices on how to progress on those projects. Matteo Dellepiane and Marco Callieri were the main CNR-ISTI tutors and instructors in the TNA. Administrative issues and organization were managed by Francesca De Mitry.

The feedback given by the participants at the end of the course was extremely positive. All of them compiled both an internal questionnaire and the usual EC web questionnaire. Students comments have been highly enthusiastic on the quality of training and commitment of the teachers.

The detailed program was as follows:

### **Monday 20<sup>th</sup> June**

09.30 – 10.30 Presentation of the course

10.30 – 10:45 Break

10.45 – 13.00 Presentation of the participants, preliminary discussion of participants' projects/problems

13.00 – 14.00 Lunch

14.00 – 15.30 Introduction to 3D graphics

15.30 – 18.00 Introduction to MeshLab (basic functionalities)

### **Tuesday 21<sup>st</sup> June**

09.00 – 10.30 3D scanning: theory

10.30 – 10:45 Break

10.45 – 13.00 3D scanning: practice, data processing

13.00 – 14.00 Lunch

14.00 – 16.00 MeshLab advanced processing

16.00 – 18.00 Work on data

### **Wednesday 22<sup>nd</sup> June**

09.00 – 10.30 Multi-view stereo matching: theory  
10.30 – 10:45 Break  
10.45 – 12.00 Multi-view stereo matching: practice, data processing  
12.00 – 13.00 Publishing 3D contents on the Web, introduction  
13.00 – 14.00 Lunch  
14.00 – 16.00 Publishing 3D contents on the Web using 3DHop  
16.00 – 19.00 Work on data

**Thursday 23<sup>rd</sup> June**

09.00 – 10.30 Color projection on sampled 3D models  
10.30 – 10:45 Break  
10.45 – 11.45 RTI Imaging: theory & practice  
11.45 – 13.00 RTI Imaging: processing and publishing on the Web  
13.00 – 14.00 Lunch  
14.00 – 16.00 3D fabrication technologies and uses for CH  
15.00 – 16.00 Wrap up  
16.00 – 19.00 Work on data  
20.30 Social dinner

**Friday 24<sup>th</sup> June**

09.00 – 10.45 Closing up with theory, examples  
10.45 – 11:00 Break  
11.00 – 13.00 Students' projects presentations and feedback  
13.00 – 14.00 Lunch  
14.00 – 16.00 Students' projects presentations and feedback  
16.00 – 17.30 Wrap up and conclusions

## 7 Evaluation and concluding remarks

A synthetic presentation of the information provided by the participants in their evaluation reports is presented in the Appendix 1 (Note: this appendix will be removed from the public version of this report since we do not have the permission from participants to publish their reports).

The large majority of our TNA attendants were coming from academia (universities or research labs); only a few of them come from industries (SMEs). We had a good mix of students (PhD students or post-master) and professionals (researchers or post-doc).

All students filled in both the online “EC User Group” questionnaire (<https://ec.europa.eu/eusurvey/runner/RIsurveyUSERS>) and the “ARIADNE TNA User Feedback Report”.

The comments (both the written ones and the verbal ones communicated to the instructors during the TNA or in the social events) were very positive.

Most of the participants declared that they would not be able to attend the school without the scholarships granted by the project.

We report here a resume of the comments or the suggestions to improve the format or the content of the TNA contained in the review reports. As it can be evaluated in reading the following comments, the overall feedback given by participants was very positive and the comments listed here are mostly suggestions on small changes or small improvements. We resume and discuss those in the following:

- The content of the TNA (technologies and methodologies touched and experimented in the TNA) might require a longer training period (>5 days). Moreover, a longer training period could provide even stronger knowledge exchange and team co-operation, which can be the base of the new synergy and scientific research. Another opportunity could be to plan a second TNA period, to be used to check the level reached by visitors (after homework) and to advance and deepn some selected topics.

*Discussion: our work plan in ARIADNE included a single TNA per year; the rationale was the more simple process of advertising/collecting application/evaluating applications/running the TNA. The suggestion of a two-phases TNA is clever and could be taken into account in future proposals and related TNA planning.*

- Cost of participation: since summer is costlier than other periods of the year, organizers could evaluate a different period to host the TNA to reduce participation expenses.

*Discussion: This is true, but on the other hand summer is an ideal period for most of the participants (due to closure of teaching in universities or lower didactical assignments for PHD students).*

- Participants really liked to work with their own data, so as to learn to work around any possible issues on real case studies. However, in some cases they selected projects which were too much complex for the short time available at the TNA.

*Discussion: We have reacted to this suggestion (dated 2014). In the subsequent 2015 and 2016 editions we have contacted the participants that have proposed too much complex projects, giving suggestions before the TNA on how to reduce the complexity to a manageable size.*

- Improve the advertisement of the TNA and improve the description of the program.

*Discussion: We did our best to disseminate widely the calls, also using social media.*

- While the availability of bursaries has been highly appreciated by the visitors, some of them expressed concerns on the financial management of the reimburses: some people may not afford to participate since some of the payments (like flight tickets or accommodation booking) must be done long before the actual TNA. For the future, based on the contract, an improvement would be to offer a percentage of the sum in advance. This is important considering the salaries from south-eastern Europe, comparing to other EU states.

*Discussion: due to administrative rules of the organizing partner (CNR), fellowships could only be granted as expenses reimburse, thus we had to wait the delivery of all receipts from the visitors (and the results of a related administrative check) before being able to refund them.*

- Enlarge the topics presented (e.g. basic web design course might provide important skills for practitioners working in digital archaeology, or an in-depth description of Blender would be a valid asset)

*Discussion: this is a demonstration that there is request for training beyond the (already probably too many) topics included in the TNA on visual media documentation. This is a stimulus for the redesign of this type of offer; it should be probably organized by setting up different types of TNA concerning visual media management. One possible policy could be to plan and advertise several TNA opportunities (with different technical content), soliciting registrations/declarations of interest by potential visitors and by activating only the ones that reach a minimal number of registrations.*

- Finally, a few visitors suggested to add some practical on-the-field experience, i.e. going out of the lab with some 3D scanning devices to make some real-case test and experience.

*Discussion: this can be done, but requires some decent amount of time. Having only 5 days available, in our planning we excluded the possibility to make experiments on the field (since this would have consumed at least a single day, so 20% of the available time). Moreover,*

*most of the visitors already had a medium to good experience with 3D sampling devices, so they might consider this activity as redundant with respect to their previous experience.*

In conclusion, we are convinced that the TNA on “3D Documentation of Fieldwork and Artefacts” fulfilled its objectives, by offering the attendees as complete as possible picture of the innovative visual technologies and methodologies that can be endorsed in the documentation of archaeology.

During its offering, the course has been modified (themes and time organization) to adjust to: the comments received in previous editions, the background of the attendees and their planned projects, and finally the evolution of the visual media and 3D digitization.

Attendance has been very good, since we had no problem in finding motivated and qualified visitors. The feedback provided by visitors was very positive.