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## Dissemination report and updated dissemination plan

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| <b>Deliverable number</b>  | <i>D6.3.3</i>   |
| <b>Dissemination level</b> | <i>Public</i>   |
| <b>Delivery date</b>       | <i>16 May 2014</i>  |
| <b>Status</b>              | <i>Final</i>  |
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*This project is supported by the European Commission under the Information and Communication Technologies (ICT) Theme of the 7th Framework Programme for Research and Technological Development.*

*Grant Agreement Number: 318068*

## Abstract

This deliverable reports on the dissemination that has taken place in the first 18 months of the VISCERAL project, and updates the dissemination plan for the final 12 months of the project. It is an update of Deliverable D6.3.2. The dissemination is aimed at four communities: scientific community, business community, medical community and general public. Furthermore, the strategy for encouraging participation in the remaining VISCERAL Benchmarks is presented.

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## 1 Introduction

This deliverable updates D6.3.2 by updating the dissemination plan for the final 12 months of the VISCERAL project and including a report on dissemination that has already taken place in the first 18 months of the project. This document does not deal with the exploitation strategy, which will be presented in D6.4. The table below summarises the evolution of this deliverable.

| Deliverable Number     | Delivery date (project month) | Time span of focus (project months) |
|------------------------|-------------------------------|-------------------------------------|
| D6.3.1                 | 3                             | 3–12                                |
| D6.3.2                 | 9                             | 10–21                               |
| D6.3.3 (this document) | 18                            | 19–30                               |

Four main groups have been identified to be targeted for VISCERAL dissemination:

- **Scientific community**, including researchers and students in computer science, primarily in the areas of medical image processing and medical informatics; as well as research infrastructures;
- **Business community**, primarily SMEs and large companies developing PACS systems, or medical imaging hardware;
- **Medical community**, primarily radiologists;
- **General public**.

The activities targeting these groups are covered in Sections 3 to 6, where both a report on past dissemination activities and a plan for future activities are included. The VISCERAL website (<http://visceral.eu>) serves as a central platform for dissemination of information to all groups. It also serves as an up-to-date source of information for the research groups participating in the benchmarks. An open mailing list for VISCERAL information has also been set up, and can be subscribed to via the VISCERAL website. A VISCERAL LinkedIn group and Twitter account has been set up, and serve as sources of information primarily for the participants in the benchmarks.

In order to reduce confusion among participants, the benchmarks have been renamed during the second project year. We are organising an additional round of the first benchmark, and have decided to split the retrieval benchmark into two separate tasks. The project internal names, which correspond to the project Description of Work, and the corresponding participant-friendly names of the benchmarks are given in the table below. We will use the participant-friendly names in this report.

| Project internal name | Participant-friendly name |
|-----------------------|---------------------------|
| Benchmark 1           | VISCERAL Anatomy1         |
| Benchmark 1b          | VISCERAL Anatomy2         |
| Benchmark 2a          | VISCERAL Retrieval        |
| Benchmark 2b          | VISCERAL Detection        |

Section 2 covers the encouragement of participation in the benchmarks. Sections 3 to 6 cover the dissemination that has already taken place since the beginning of the project, and presents the plans for the remaining 12 months. Section 3 covers the dissemination to the scientific community. The dissemination to the business community is in Section 4. Section 5 covers dissemination to the medical community, while Section 6 covers the general public.

## 2 Encouraging participation in the Benchmarks

### 2.1 VISCERAL Anatomy2 (Benchmark 1b)

We are following the same strategy as for the VISCERAL Anatomy1 Benchmark. E-mails have been sent out on mailing lists to raise awareness, and research groups with a potential interest to participate (see list in D6.3.2) have been contacted directly about the Benchmark. Furthermore, a workshop was held at the International Symposium on Biomedical Imaging (ISBI) 2014. Participants were able to submit interim results and get feedback on them at the workshop, and the awareness of the Benchmark was raised by the event (See Section 3.1.1 for a more detailed report on this event).

These activities have been very successful in raising the profile of the Benchmark, as 51 groups have registered in the registration system to receive the participation agreement. Of these 51, 18 submitted a signed participation agreement and have been assigned Virtual Machines.

### 2.2 VISCERAL Retrieval (Benchmark 2a)

The VISCERAL Retrieval Benchmark focuses on retrieval of relevant 3D medical images. A Call for Participation in the second benchmark has been created (Deliverable 5.2). Information about the Benchmark will be sent around on e-mailing lists aimed at research communities working in the areas of medical image processing, computer vision, machine learning, and image and information retrieval. As this benchmark focuses on medical image retrieval, the ImageCLEF mailing list will be particularly important in this dissemination. Flyers that are more specific will also be distributed at conferences, in particular the CLEF conference and the MICCAI Conference, both in September 2014. This activity aims to generally raise awareness of the benchmark, and potentially encourage research groups beyond those on the targeted dissemination list (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**) to participate in the benchmark.

Furthermore, groups working in medical image retrieval and hence having the potential to participate will be directly contacted (see list in D6.3.2).

### 2.3 VISCERAL Detection (Benchmark 2b)

The VISCERAL Detection Benchmark focuses on the detection of lesions in 3D medical images. This Benchmark has a large overlap with the participants of the VISCERAL Anatomy2 Benchmark, so the established communication channels will be used here. In particular, flyers describing this Benchmark in detail will be distributed at the MICCAI 2013 and the MICCAI Medical Computer Vision Workshop. Research groups working in lesion detection will be identified and directly contacted about participation.

## 3 Dissemination to the scientific community

VISCERAL is producing results of interest in two areas:

- Medical imaging: the benchmarks and their results are of interest to research groups working in the medical imaging area;
- Evaluation infrastructure: the cloud-based evaluation infrastructure is of interest to research groups working, amongst others, in the areas of Big Data analysis, eScience and Information Retrieval.

Section 3.1 presents the strategy for the publication of results in these areas, while Section 3.3 presents the cooperation with other projects.

## 3.1 Dissemination Report

### 3.1.1 Medical Imaging

An interim VISCERAL Anatomy2 workshop, framed as the VISCERAL Organ Segmentation and Landmark Detection Challenge, was held at 2014 IEEE International Symposium on Biomedical Imaging on May 1<sup>st</sup>, 2014 in Beijing, China. The session was chaired by Orcun Goksel and Bjoern Menze representing the VISCERAL Consortium. Two months prior to the challenge workshop, the participants were able to sign up for our Anatomy benchmark series and, subsequently, gain access to virtual machines on the cloud. Five groups submitted results (annotations) for the challenge. Submitted annotations were then evaluated by us, and results were reported back to the groups two weeks before the challenge workshop. The groups have all prepared a 2-to-7 page paper contribution, in a template provided by us in the CEUR workshop proceedings format (<http://www.ceur-ws.org>), and have submitted them online before the challenge day. These contributions describe the methodology they followed, the relevance of their results, and discussion on their comparison to others. All submitting groups were assigned a 15 minute (12 minutes + 3 minutes for questions) presentation slot at the event. We, the organizers, also gave two presentations, one at the beginning introducing our benchmark series and the dataset used for the challenge and one at the end summarizing the evaluation results and promoting our upcoming benchmarks and challenges.

In summary, the goal of our ISBI challenge session was three-fold: i) the submitting groups presenting their techniques, ii) reporting the results of the evaluation, iii) publicizing our benchmark series widely. With over 50 participants, the challenge session was a success; and we have received very positive feedback from participants both at the session and afterwards via email. The submitted written contributions will be published in May as online CEUR proceedings. The following photo shows session attendees.



The following presentations focussing on medical imaging have been held:

- 1 May 2014, IEEE International Symposium on Biomedical Imaging, presentation multi-structure segmentation and the VISCERAL dataset, Beijing, China (Oscar Jimenez)
- 27 June 2013, VRVis Research Centre, invited talk on Search in Medical Texts and Images, Vienna, Austria (Allan Hanbury)
- 7 June 2013, presentation of eHealth projects of the HES-SO, among them VISCERAL, eHealth day, Sierre, Switzerland (Henning Müller)
- 11 May 2013, 3D object retrieval workshop in Girona Spain, invited talk on Medical 3D data retrieval (Henning Müller)

## 3.1.2 Evaluation Infrastructure

The following publications focussing on the evaluation infrastructure have appeared:

- A. Hanbury, H. Müller, G. Langs and B. H. Menze, *Cloud-based Evaluation Framework for Big Data*, The Future Internet - Future Internet Assembly 2013: Validated Results and New Horizons, Springer LNCS 7858, pages 104–114, 2013.
- A. Hanbury, H. Müller, G. Langs, M. Weber, B. H. Menze and T. Salas Fernandez, *Bringing the Algorithms to the Data: Cloud-based Benchmarking for Medical Image Analysis*, In Proc. of the CLEF Conference, 2012, Springer LNCS 7488, pages 24–29, Rome, Italy.
- G. Langs, H. Müller, B. H. Menze and A. Hanbury, *VISCERAL: towards large data in medical imaging - challenges and directions*. Proc. MICCAI 2012 Workshop on Medical Content-based Retrieval for Clinical Decision Support (MCBR-CDS), 2012, Springer LNCS 7723, pages 92–98, Nice, France.

The following presentations have been held:

- 8 April 2014, Big Data Innovators Gathering (BIG) 2014, talk on A Cloud-based Framework for Evaluation on Big Data, Seoul, Korea (Allan Hanbury)
- 6 June 2013, COST Multilingual and Multifaceted Interactive information Access (MUMIA) meeting, presentation of the VISCERAL evaluation architecture, Tallinn, Estonia (Allan Hanbury)
- 14 May 2013, Latin American eScience Workshop, A Cloud-based Evaluation Infrastructure for Medical Image Analysis and Search, Sao Paulo, Brazil (Allan Hanbury)
- 10 April 2013, European Data Forum, Algorithm any good? A Cloud-based Infrastructure for Evaluation on Big Data, Dublin, Ireland (Allan Hanbury)
- 24 March 2013, Workshop on Integrating IR/MT technologies for Professional Search (with the European Conference on Information Retrieval 2013), Toward a Cloud-Based Integration of IR Tools, Moscow, Russia (Allan Hanbury)

## 3.2 Dissemination Plan

### 3.2.1 Medical Imaging

The results of the ISBI challenge and papers submitted to the ISBI workshop will be published in the CEUR Workshop Proceedings in May 2014.

The VISCERAL Anatomy2 results will be presented and discussed at the MICCAI 2014 Workshop on Medical Computer Vision (<https://sites.google.com/site/miccaimcv2014>) with a special session



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focussed on VISCERAL, in which the VISCERAL results are presented and selected participants present their approaches. Participants will also have the possibility to display posters in the poster session of the workshop. The papers submitted to this workshop will be published in Springer LNCS. An overview journal paper for the Anatomy2 benchmark will be submitted to a journal (to be chosen from the list below) in January 2015.

For the VISCERAL Detection Benchmark, a journal paper on the results will be submitted in December 2014 to a journal chosen from the list below.

For the VISCERAL Retrieval Benchmark, a workshop proposal will be submitted to the European Conference on Information Retrieval (ECIR) to be held in Vienna in March 2015. The proceedings of this workshop will be published in the CEUR Workshop Proceedings. A journal paper describing the results will be submitted to a journal chosen from the list below after the workshop.

Further venues of interest for the publication of VISCERAL medical imaging results or for organising tutorials or workshops related to VISCERAL results are:

#### Journals:

- Methods of Information in Medicine
- Computerized Medical Imaging and Graphics
- IEEE Transactions on Information Technology in Biomedicine
- International Journal of Medical Informatics
- Journal of the American Medical Informatics Association
- International Journal of Computer Vision
- Medical Image Analysis
- IEEE Transaction on Medical Imaging
- IEEE Transactions on Biomedical Engineering
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Image Processing
- Radiographics
- Radiology

#### Conferences:

- SPIE Medical Imaging
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- Medical Informatics Europe (MIE)
- World congress of Medical Informatics (Medinfo)
- International Conference on Computer Vision (ICCV)
- European Conference on Computer Vision (ECCV)
- International Conference on Pattern Recognition (ICPR)
- International Symposium on Biomedical Imaging (ISBI)
- Information Processing in Medical Imaging (IPMI)
- European Congress of Radiology (ECR)

- Radiological Society of North America Congress (RSNA)

### 3.2.2 Evaluation infrastructure

Journal papers about various aspects of the work done on metrics are currently under preparation or have been submitted. They cover the efficient algorithms developed, the metric calculation software and the optimal metric selection approach.

The following are venues for publication of articles on the cloud-based infrastructure for evaluation or for organising tutorials or workshops related to this topic:

Journals:

- Information Retrieval
- Information Processing and Management
- ACM Transactions on Information Systems
- Computing in Science & Engineering
- Future Generation Computer Systems

Conferences:

- Cross-Language Evaluation Forum (CLEF)
- IEEE International Conference on Big Data
- European Conference on Information Retrieval (ECIR)
- ACM Special Interest Group on Information Retrieval Conference (SIGIR)
- ACM International Conference on Information and Knowledge Management (CIKM)
- Healthcare informatics, imaging and systems biology conference (HISB)

### 3.2.3 Overall project results

It is planned to have an edited book on the VISCERAL benchmarks, for which we will approach Springer toward the middle of 2014. The book will include methodology papers by the organisers covering the evaluation approaches and infrastructure, and papers by the participants describing their approaches used in the benchmarks.

At the end of the project, we will aim to submit a summary of the findings of the project to a high-impact journal such as Science or the British Medical Journal. This will potentially be done in collaboration with the BioASQ project (with which a Memorandum of Understanding has been signed), to focus on the advances that benchmarks can bring to both medical image and text mining.

## 3.3 Cooperation with projects

VISCERAL has started a cooperation with the BioASQ project (<http://www.bioasq.org/>), and has signed a Memorandum of Understanding with this project. Allan Hanbury is on the Advisory Board of BioASQ, and will hence ensure transfer of knowledge and experience between the projects.

As both VISCERAL and the PROMISE NoE are working with evaluation infrastructures, a cooperation took place. The VISCERAL ideas have already been presented at the CLEF conference in 2012, and a poster on VISCERAL was presented at the PROMISE Winter School in February 2013.



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Through having three common partners, exchange of knowledge with the Khresmoi project is guaranteed. Technology developed in Khresmoi will be evaluated in the VISCERAL benchmarks. A joint talk between the Khresmoi and VISCERAL projects has already been given at the Medical Content-based Retrieval for Clinical Decision Support (MCBR-CDS 2012) workshop at the MICCAI 2012.

As vice-chair of the Working Group 2 on *Processing Infrastructures for IR and MT* of the COST Action on *Multilingual and Multifaceted Information Access* (MUMIA - <http://www.mumia-network.eu/>), Allan Hanbury will ensure that infrastructure knowledge and experience from VISCERAL is transferred to the MUMIA partners. A talk on the VISCERAL infrastructure has already been given at the MUMIA working group meeting in June 2013.

Further cooperation with projects as listed on page 43 of part B of the VISCERAL Description of Work will be undertaken.

## 4 Dissemination to the business community

Dissemination to the business community will have two principal aims:

1. Encourage SMEs and large companies, in particular those developing PACS software, medical imaging hardware, or medical imaging software to take up and exploit results of VISCERAL,
2. Encourage cloud service providers to provide the VISCERAL evaluation infrastructure as a research service on their cloud infrastructures.

Note that dissemination to the research departments of companies does not fall into this category of dissemination to the business community, and we are in contact with various commercial research departments to encourage participation in the benchmarks (see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

For the first aim, as VISCERAL is not developing medical processing algorithms within the project, the main asset to disseminate are the results of the benchmarks. We will concentrate on disseminating results to the decision makers in the large companies developing PACS software, medical imaging hardware or medical imaging software, such as Siemens, Agfa, GE and Philips. Strategies that will be adopted include:

1. Reaching the decision makers through our contacts in the research departments of these companies,
2. Presenting VISCERAL results at booths at radiology congresses, attended by both the medical and the business community (see the list in Section 5).

The dissemination of these results should allow the companies to identify promising algorithms submitted to the VISCERAL benchmarks, and to get into contact with the research groups developing these promising algorithms. This should provide benefits to participants in the VISCERAL benchmarks. However, as part of the dissemination, the approach of open benchmarks by which the results are obtained will be emphasized, with the aim of encouraging these companies to organise benchmarks or benchmarks based on their own challenges, using the VISCERAL infrastructure.

For the second aim, the VISCERAL project has begun collaboration with Microsoft Research Connections. Microsoft Research Connections is sponsoring the VISCERAL project by providing cloud services on their Azure cloud to the consortium and participants. The VISCERAL framework was presented in an invited talk at the Microsoft Faculty Summit (Latin American eScience Workshop) in São Paulo in May 2013. Discussions on cooperating with Microsoft Research Connections in their project on the creation of an open source medical imaging evaluation framework have taken place, and the VISCERAL metrics calculation software has been integrated into this

framework. Further cloud service providers (e.g. Amazon) will also be approached with respect to providing the VISCERAL evaluation infrastructure as a service.

Discussions have also taken place with Zebra Medical Vision (<http://www.zebra-med.com>), a startup company planning to work with radiology images on the cloud.

## 5 Dissemination to the medical community

The following publications have appeared:

- H. Müller, *Semantik und Bilddaten: wie Terminologien in der Radiologie helfen könnten*, Deutscher Roentgenkongress, Hamburg, Germany, 2013.

The following presentations have been held:

- 30 May 2013, presentation on semantics in radiology, including VISCERAL, Deutscher Röntgenkongress, Hamburg, Germany (Henning Müller)

The main target in the medical community for VISCERAL dissemination is the radiology community, although dissemination to a wider community will be considered where possible.

A paper describing the VISCERAL dataset and its manual annotations will be submitted to a journal from the list below (most likely the European Journal of Radiology). A further paper on the silver corpus is planned for one of these journals, to be submitted to one of the journals listed below once the silver corpus is complete.

The following are scientific journals read by radiologists:

- American Journal of Roentgenology
- European Journal of Radiology
- European Radiology
- Investigative Radiology
- NMR in Biomedicine
- Radiology
- RadioGraphics
- RöFo – Fortschritte auf dem Gebiet de Röntgenstrahlen und der bildgebenden Verfahren

The following are channels aimed at the medical community in general:

- Medizin&Technik (Germany)
- Ärzte Zeitung (Germany)
- Deutsches Ärzteblatt (Germany)
- Österreichische Ärztezeitung (Austria)
- doktor in wien (Austria)
- Ärztemagazin (Austria)
- Medical Tribune (Austria)
- e-health-suisse.ch (Switzerland)
- Diario Médico (Spain)

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- Hospital Digital (Spain)
- Ingeniería Hospitalaria (Spain)
- Sanitaria 2000 (Spain)

VISCERAL information and results will be presented at the following congresses aimed at radiologists, presented at the stands organised by Khresmoi partners. An aim of these presences will be to encourage voluntary manual annotation work by radiologists.

- ECR (European Congress of Radiology)
- RSNA (Radiological Society of North America)
- Deutscher Röntgenkongress (Annual Meeting of the German and Austrian Radiological Societies)

## 6 Dissemination to the general public

The dissemination to the general public will be via the project website and via press releases. Partners will coordinate press releases with their institution press offices to get the optimum distribution and timing of VISCERAL information and results.

## 7 Conclusion

This document describes the dissemination activities in the first 18 months of the VISCERAL project, as well as the plans for the final year of the project. As the results of the benchmarks now start to become available, a number of high impact publications in journals are planned in the final project year. In addition to this, workshop proceedings and an edited book about the VISCERAL infrastructure and evaluation approaches, as well as about the approaches submitted by selected participants, are planned.