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OSMIA

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1 Introduction

The OSMIA project proposal targeted three levels of dissemination:

- **consortium** (sharing of information amongst project partners);
- **user group** (dissemination to parties with direct interest in the project and its outcomes);
- **universal** (external promotion and dissemination of all other forms).

This report details for each level the dissemination activities carried out during the OSMIA project and documents the plans for ongoing dissemination under the banner of the OSMIA Foundation, established as a result of this project.

Within the scope of the OSMIA project the purpose of dissemination was to publicise the project and the resources being made available through it, and thereby attract a small group of new expert users and contributors to the OSMIA repositories. Widespread open dissemination could not begin in earnest before delivery of D2.5 (Open source distribution of OSMIA) and D4.5 (Documentation for software) at the end of the project, because only then would the repositories be ready for open access and contain sufficient documentation to provide guidance for non-expert users and contributors. For these reasons, active dissemination during the project was initially limited but expanded as the project progressed and will continue through the activities of the OSMIA Foundation and its supporting mechanisms and documentation.

2 Dissemination during the OSMIA project

2.1 Consortium

Dissemination within the OSMIA consortium established and maintained the project knowledge of all partners. It began with tutorial-style TINA workshops and progressed via regular project management meetings, face-to-face collaborative technical workshops and regular exchange of e-mails and project-related documents. The OSMIA developer web-site and mailing list were also used for this purpose. This process kept the project partners up-to-date with changes and advances and allowed them to assess the implications of such developments from their own perspectives and respond to them. The face-to-face workshop sessions allowed project partners to jointly tackle difficult technical issues and so arrive at mutually beneficial solutions.

All consortium-level dissemination activities are detailed in the following list.

1 ISBE workshop for consortium partners from DCU and UoWO

Date April 2002 **Location** ISBE, Manchester, UK

Aims

Consortium members had presentations and demonstration with the aim of:

- o receiving a detailed overview of the facilities TINA provides;
- o understanding the practicalities of working with the TINA environment;
- o providing feedback on how TINA may be improved.

Format

Day 1: Lectures and demonstrations by ISBE staff.

Day 2: Hands on work with TINA and discussions on possible improvements.

Results

Project partners fully understood and were trained in using the TINA environment.

2 Secondment of Voxar representative to ISBE

Date May 2002 **Location** ISBE, Manchester, UK

Aims

Give Voxar sufficient understanding of TINA to specify the interface (WP3).
Let ISBE access Voxar's extensive commercial software engineering experience to help drive the TINA code update (WP2).

Format

Informal 3 day visit, including demonstrations of TINA and discussions on its use, its construction and the technologies it utilises.

Results

Voxar fully understood and were trained in using the TINA environment.
ISBE received software engineering input for the TINA code update.

3 Secondment of ISBE representatives to Voxar

Date June 2002 **Location** Voxar, Edinburgh, UK

Aims

Give ISBE sufficient understanding of Plug N View 3D to specify the interface (WP3).
Plan the design and implementation of the TINA/ Plug'n'View 3D interface.

Format

Informal visit, including demonstrations of Plug'n'View 3D and discussions its use, its construction and the technologies it utilises.

Results

ISBE understood the Plug'n'View 3D environment and the issues with interfacing to TINA.
Decision was made to alter the original project plan to better address the issues raised.

4 Technical sessions at project management meetings

Dates Coincident with PM meetings **Location** As PM meeting

Aims

Give practical updates to consortium members on TINA's evolving technology.
Address and resolve significant technical issues in a timely and co-operative manner.

Format

Short, face-to-face, hands-on sessions to resolve specific technical problems brought up at or prior to the project management meetings.

Results

Minor but potentially time-consuming technical issues were resolved co-operatively.
More significant technical issues were resolved as in Item 5, below.

5 Technical workshop meetings

Dates Arranged as required **Location** ISBE

Aims

Resolve significant technical issues or problems as they arose.

Format

Face-to-face, hands-on sessions, two to three days long were arranged as required to resolve specific technical problems identified as the project progressed.

Results

Major technical issues requiring more time or effort than could be expended at project management meetings were addressed in a timely and co-operative manner.

6 Project website

Aims

Maintain up-to-date details of project deliverables.
Provide a mechanism for the exchange of documents and publicity material.
Act as a notice board for news and project information.

Format

The OSMIA web-site (<http://developer.tina-vision.net/index.php>).

Results

Project details and relevant materials were held in a format and location easily accessible to all project collaborators.

The issues raised by these items and their consequences for the OSMIA project are discussed more fully in the Project Review Report (D1.2).

Note: This consortium-level communication structure worked very well and helped drive the OSMIA project in the most practical direction. Through the discussions held at Items 1 to 3 above, it became clear that the low-level core functionality in the TINA libraries was of sufficient interest to make direct access to low level functions desirable. In contrast, the original proposal had envisioned higher-level access to a TINA API based on functions implementing complete algorithms. Adopting the low-level approach would have the benefit of making TINA a cohesive set of library functions, and allowing users access to both low-level and high-level functionality. We therefore chose to follow the low-level approach. (See also D3.4, Section 1).

However, it was also clear from these discussions that such low-level access was not well-supported by the alpha TINA libraries, which required extensive restructuring to meet this purpose. This restructuring was incorporated into the beta TINA 5.0 release, which was brought forward to allow the project partners as much time as possible to use the new library structure.

This did not meet the subsidiary aim of raising TINA's visibility to non-expert users. We therefore decided to develop the OSMIA web analysis server to provide high level access to complete TINA algorithms in a user-friendly manner. The OSMIA project has therefore provided two new interfaces to TINA: the low-level API suitable for expert users and software developers, and the high-level web interface showcasing TINA functionality for the benefit of both expert and non-expert users.

2.2 User Group and IST Programme

The OSMIA proposal foresaw the establishment of a user group including representatives of clinical, academic and commercial end users, as well as other parties with a technical interest in the project. The group was to play an active part in the project, with responsibilities to review and comment on documentation and deliverables, advise on issues regarding the open source license and comment on the usability of the developed systems.

In practice it proved impossible to fulfil all of the functions of the proposed user group, because as the project progressed it became clear that performing these tasks on a large volume of code and documentation would have required a much greater effort than can realistically be expected of unfunded third parties. Nevertheless, the following list of pre-existing and new TINA users were prepared to invest time and effort to give valuable feedback on issues of software structure, documentation and usability. For completeness, the User Group list includes the consortium members.

OSMIA project Consortium:

- Paul Whelan, Ovidiu Ghita, Dublin City University;
- John Barron, University of Western Ontario, London, Ontario;
- Ian Poole, Voxar Ltd, Edinburgh;
- Neil Thacker, Tony Lacey, Gio Buonaccorsi, University of Manchester.

Contributors outwith the OSMIA project;

- Gareth Rees, Principal Scientist, Advanced Technology Centre, BAe Systems Ltd;
- Adrian Clark, Reader, Dept of Electronic Systems Engineering, University of Essex;
- Stephen Johnston, Research Officer, School of Psychology, University of Wales Bangor;
- David Williamson, Research Associate, ISBE, University of Manchester;
- Steve Sangwine, Senior Lecturer, Dept of Electronic Systems Engineering, University of Essex.

It was also possible, via contacts made through the OSMIA developer website and mailing list, to assemble the following list of interested parties who have made unsolicited enquiries about TINA, and whom we are keeping informed on the progress of OSMIA and the establishment of the OSMIA Foundation (see Section 3). Based on their eventual contributions to OSMIA, we may in future be able to welcome them as members of the Foundation.

- Ruud Schramp, Royal KPN N.V, Den Haag, The Netherlands;
- Leif Bergman, Programmer, Center for Biotechnology, Department of Biosciences at Novum, Karolinska Institutet, Stockholm, Sweden;
- Andreas Steingoetter, Biophysics (MR), University of Zurich, Switzerland;
- Katharine Striedinger, Dept of Neuroanatomy, Ruhr University Bochum, Germany;
- Darryl N Davis, Neural, Emergent and Agent Technologies Research Group, Department of Computer Science, University of Hull;
- Cindy Starr, Computer Engineer, Scientific Visualisation Studio, NASA Goddard Space Flight Centre, Greenbelt MD 20771;
- Joe Maisog, Center for the Study of Learning, Georgetown University Medical Center, Washington DC and Sensor Systems Inc, Sterling, Virginia 20164-4423;
- Leland Pierce, Dept of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor MI48109-2122 ;
- John J. Donovan, Research Assistant, Center for Advanced Materials Characterization in Oregon, University of Oregon, Eugene OR 97403-1272;

- Randall Larsen, Researcher, Communication and Information Sciences (CIS) Doctoral Program, University of Hawaii.

In terms of potential users, a particular success of the OSMIA project has been to give TINA access to the established user base for NeatVision, the Java based image analysis and software development environment developed and maintained by the Vision Systems Group at Dublin City University. The OSMIA project has allowed the latest release of NeatVision to interface to TINA 5.0, and so raised its visibility to include this user base. NeatVision has on average 12-15 new users registering every week. and it was the image analysis development environment of choice in the 4th Summer School on Image and Robotics, Universidad de las Amricas, Puebla, Mexico, July 7 - July 18, 2003. Neatvision has also been used for an online course in Germany.

2.3 Universal

Universal dissemination includes external promotion and dissemination of all other forms, outwith the select groups defined above. Programmed activities were divided into three areas:

- web-based material;
- direct promotion;
- software distribution.

2.3.1 Web based material

The OSMIA website (<http://developer.tina-vision.net/index.php>) provides high visibility material with regard to all aspects of the software. A link to this website is also provided on the VSL web-site at DCU (<http://www.eeng.dcu.ie/~whelanp/osmia/>). To maximise visibility, and to achieve a high ranking for the web-site with the major search engines, we are in the process of registering with the following list of scientific sites, major medical imaging resources and machine and computer vision reference sites.

TINA link registered:

- Scientific Applications on Linux <http://sal.kachinatech.com/> (Old link to TINA registered)
- CMU Computer Vision Homepage <http://www-2.cs.cmu.edu/~cil/vision.html> (Old link to TINA registered)
- Pilot European Image Processing Archive <http://peipa.essex.ac.uk/> (Old link to TINA registered)

Registration requested:

- RSNA link <http://www.rsna.org/edu/internet/launchpad.html>
- CoMIR <http://www.comp.leeds.ac.uk/comir/resources/links.html>
- CV online <http://www.dai.ed.ac.uk/CVonline/>
- CMU Computer Vision Homepage <http://www-2.cs.cmu.edu/~cil/vision.html>
- WWW Virtual Library <http://src.doc.ic.ac.uk/bySubject/Computing/Overview.html>
- Robotics Internet Resource Page <http://www-robotics.cs.umass.edu/robotics.html>

Also, a public version of the image analysis server has been added to the website. This allows interested parties to remotely try out the system. This server will be updated with new functionality as and when it becomes available.

2.3.2 Direct promotion

The OSMIA project has been directly promoted by all consortium partners at relevant technical and clinical events. The dissemination activities carried out during the project are detailed in the following list.

1 British Machine Vision Conference 2-5 Sep 2002 Cardiff, UK

OSMIA Attendee ISBE

Meeting Organiser

The British Machine Vision Association and Society for Pattern Recognition.

Meeting Description

The annual meeting of the BMVA, the premier event in the field in the UK.)

Meeting Audience

Individuals and organisations (academic and commercial) involved in machine vision, image processing, and pattern recognition - from the UK and from abroad.

Dissemination Activities

Demonstrations of the TINA environment;
Verbal promotion of OSMIA and distribution of OSMIA leaflets.

2 Opto-Ireland 2002: Optical Metrology, Imaging, and Machine Vision 5-6 Sep 2002 Galway, Ireland

OSMIA Attendee DCU

Meeting Organiser

Society of Photo-optical Instrumentation Engineers.

Meeting Description

Scientific meeting to present current research from leaders in the field.

Meeting Audience

Individuals and organisations involved in machine vision, image processing, and pattern recognition - from Ireland and from abroad.

Dissemination Activities

Verbal promotion of OSMIA.

3 Medical Applications of Signal Processing 7 Oct 2002 London, UK

OSMIA Attendee DCU

Meeting Organiser

IEE Signal Processing Professional Network.

Meeting Description

Seminar/workshop organised to present current research and to constitute a forum for open discussions and free exchange of ideas.

Meeting Audience

Medical physicists and healthcare and signal processing professionals.

Dissemination Activities

Verbal promotion of OSMIA.

4 RSNA 88th Scientific Assembly and Annual Meeting Dec 1-6, 2002 Chicago, USA

OSMIA Attendee DCU and Voxar

Meeting Organiser

Radiological Society of North America.

Meeting Description

The annual RSNA meeting. Involves clinical and scientific presentations as well as hardware and software demonstrations from all leading clinical academic groups and commercial exhibitors in the field.

Meeting Audience

Radiology professionals from the clinical, scientific and commercial sectors.
(The average delegate attendance is 7000 over the 5 days.)

Dissemination Activities

Verbal promotion of OSMIA and presentation of OSMIA-related poster (DCU).

5 Volumetric Analysis of MR Images 20 Nov 2002 London, UK

OSMIA Attendee DCU

Meeting Organiser

Institute of Physics and Engineering in Medicine.

Meeting Description

Seminar/workshop organised to present current research and to constitute a forum for open discussions and free exchange of ideas.

Meeting Audience

Medical physicists and healthcare professionals.

Dissemination Activities

Verbal promotion of OSMIA.

6 13th Scandinavian Conference on Image analysis 29 Jun - 2 Jul 2003 Goteborg, Sweden

OSMIA Attendee DCU

Meeting Organiser

Swedish Society of Image Analysis and the Nordic chapters of the International Association for Pattern Recognition.

Meeting Description

Scientific meeting to present current research from leaders in the field, reflecting the state-of-the-art of the discipline.

Meeting Audience

Individuals and organisations (academic and commercial) involved in image processing
- from Scandinavia and from abroad.

Dissemination Activities

Verbal promotion of OSMIA.

7 2nd Intl. Workshop on Functional Imaging and Modeling of the Heart 5-6 June 2003 Lyon, France

OSMIA Attendee DCU

Meeting Organiser

The e-Heart Excellence Network.

Meeting Description

Scientific meeting/workshop to bring together presentations from leading researchers in the discipline.

Meeting Audience

Academic and clinical researchers involved in functional imaging and modelling of the heart.

Dissemination Activities

Verbal promotion of OSMIA.

8 9th Annual Meeting of the British Chapter of the ISMRM 2-3 Sep 2003 London, UK

OSMIA Attendee ISBE**Meeting Organiser**

British Chapter of the International Society for Magnetic Resonance in Medicine.

Meeting Description

Scientific meeting to present current research from leaders in the field.

Meeting Audience

Individuals and organisations (clinical, academic and commercial) involved in MR imaging and research - from UK and from abroad.

Dissemination Activities

Verbal promotion of OSMIA and distribution of OSMIA leaflets.

9 Irish Machine Vision and Image Processing Conference 3-5 Sep 2003 Coleraine, NI

OSMIA Attendee DCU**Meeting Organiser**

Irish Machine Vision and Image Processing .

Meeting Description

Scientific meeting to present current research from leaders in the field.

Meeting Audience

Individuals and organisations involved in machine vision, image processing, and pattern recognition - from Ireland and from abroad.

Dissemination Activities

Verbal promotion of OSMIA.

10 BA Festival of Science 8-12 Sep 2003 Salford, UK

OSMIA Attendee ISBE**Meeting Organiser**

British Association for the Advancement of Science.

Meeting Description

Scientific meeting at which leading scientists present the latest developments in research to a general audience.

Meeting Audience

Members of the public and members of the British Association for the Advancement of Science.

Dissemination Activities

Oral presentation on the OSMIA project and demonstration of the OSMIA web server.

11 20th Annual Scientific Meeting of the ESMRMB 18-22 Sep 2003 Rotterdam, Netherlands

OSMIA Attendee ISBE**Meeting Organiser**

European Society for Magnetic Resonance in Medicine and Biology.

Meeting Description

Scientific meeting to present current research from leaders in the field.

Meeting Audience

Individuals and organisations (clinical, academic and commercial) involved in MR imaging and research - from UK and from abroad.

Dissemination Activities

Verbal promotion of OSMIA and distribution of OSMIA leaflets.

2.3.3 Software distribution

All development versions of the software were made available from the OSMIA:

- developer website (<http://developer.tina-vision.net>);
- CVS repository (`username@cvs.tina-vision.net:/home/tina/dsk1/cvs`).

“Release” versions of the software were frozen at the alpha, beta and “final” stages as described in workpackage WP2.

On establishment of the Foundation, ISBE will approach Linux distributors to have TINA and the OSMIA analysis server included on distributions, making it easier for potentially interested parties to make use of the software.

3 Dissemination to follow the OSMIA project: the OSMIA Foundation

The primary aim of this project was to establish OSMIA as the environment of choice for researchers into medical image analysis (OSMIA Proposal, IST-2001-34512 , Section 1.4). To achieve this aim it is not enough to simply furnish the required OSMIA resources, it is also necessary to put in place a self-sustaining infrastructure to actively promote and support these resources and the growing OSMIA community. We propose to do so by establishing the OSMIA Foundation, which we describe in this section.

The Foundation framework must meet several potentially conflicting aims. In particular, it must provide:

- academic access to published algorithms at the source code level;
- a mechanism for the contribution of software from independent academics without infringing their rights to commercial exploitation;
- a route for potential commercialisation of contributed software;
- a mechanism and potential revenue stream for future support of the software.

The suggestion is to establish a Foundation of expert users who can help maintain and extend the software library data base and provide consultancy to external user groups. The problem to address is therefore how to organise such a panel of experts and distribute the software so that the above aims are met. The critical issues are those of copyright and intellectual property.

An additional benefit of the Foundation is that the open source development can be guided by the Foundation Board. In this way we intend to address the issues raised in D3.5 with regard to the unsuitability of the current TINA libraries for direct inclusion into a commercial product, which we estimate may take more than 5 man-years to implement. (Note that while this is a notable conclusion of the OSMIA project, it must be stressed that achieving this state was never the aim of the project).

3.1 General scope of the foundation

The OSMIA Foundation will be a not-for-profit organization supporting OSMIA and its growing user base. The Foundation will provide the software repository service for TINA and for other projects undertaken by Contributing Members. Its broad aim will be to provide as much relevant material as possible to the medical imaging community as *freely*¹ as possible. It will be led by a group of expert users who will contribute to the repositories and otherwise support the activities of the Foundation.

3.2 Aims of the OSMIA Foundation

The main aim of the Foundation will be to provide organisational and financial support for the OSMIA software projects, and so build on the groundwork established during the OSMIA project. To this end, the Foundation will pursue the following specific aims.

- Support the continuing development of TINA and other open source image analysis software included in the OSMIA Foundation Software Repository.
- Incubate and support projects undertaken by Foundation members that fall within the remit of the Foundation, including the provision of repository services, without infringing the rights of the originating members to commercial exploitation.
- Educate parties wishing to use image analysis techniques within the medical field, through the distribution of open-source software, the dissemination of related documentation and by running courses and workshops at regular intervals or on request.
- Provide a contact point for parties interested in the analysis techniques, including expert consultancy in the use of the techniques within the Foundation's expertise.
- Disseminate and educate, in academic and commercial contexts, on the development and application of the analysis techniques available through the OSMIA Foundation.

¹here the term *freely* relates to without restrictions and usage impediments

- Provide access to the OSMIA Repository software in the capacity of reference implementations of analysis techniques and thereby support the evaluation of third-party implementations of these techniques.
- Promote the use of open-source licenses within the field of medical image analysis as a mechanism for scientific dissemination and to encourage the contribution of valuable software to the OSMIA Repository.
- Support these activities by generating a revenue stream.

3.3 Repository

The OSMIA Foundation Repository will contain both software and documentation, and the web-site will make available the other services of the Foundation. Documentation will be held at two levels: *open access* documents including installation instructions and published and promotional materials; and *restricted access* documents including code browsers, tutorials, user guides and full reference manuals as well as detailed expositions on the algorithmic techniques used in the software libraries.

3.4 Licensing

Software made available via the Foundation Repository will be under an open-source license approved by the OSI <http://www.opensource.org>. The choice of the particular license will be left to the contributor, who will therefore retain the opportunity to pursue commercialisation if desired. However, the Foundation will encourage the use of less restrictive licenses where possible.

For example, the Foundation will apply the Free BSD license to the TINA 5.0 core libraries and the Lesser GPL license to the software for algorithm development projects. It will recommend but not insist upon the application of the Lesser GPL license to future software contributions.

The Foundation may also act as a software *escrow*, i.e. hold a version of commercially licensed software together with a *not-for-use* agreement prohibiting some or all use of the software unless specific requirements are met. This will be useful for those with commercial systems or proprietary licenses who would still like their software to act as a reference standard implementation.

3.5 Organisation

The organisational structure of the Foundation will comprise a Board made up of the original consortium members and other experts in the field, and “ordinary” members with three levels (Open, Contributor and Supporting) of membership. Open members will receive access to the software in the Repository, and to open materials such as installation instructions, web content and published and promotional materials. Contributor and Supporting members will receive full access to the resources and services of the Foundation, including full software documentation and additional supporting materials, as well as to the software validation services.

While the Foundation aims to provide free material to the medical imaging community, the financial costs of maintaining its infrastructure must be met - therefore Supporting membership will incur a fee. Contributing Members will make remuneration “in kind”, i.e. in the form of software, expertise, documentation and other resources which help advance the aims of the foundation.

Where possible the foundation will use supporting funds to augment and improve the resources available to the community. For instance, rather than licensing software to a particular third party, the foundation would prefer to levy a Supporting Membership charge to the party to transfer the software to an open-source license. This might incur a lesser charge than direct licensing and may also allow the cost to be spread over several interested parties.

3.6 Activities

The proposed major activities of the Foundation are summarised below:

- repository management;
- education;
- dissemination;
- consultancy;
- commercial exploitation;
- algorithm standardisation and software validation;
- algorithm performance evaluation.

The following Sections provide additional information where it seems necessary to do so.

3.6.1 Education

The Foundation will hold courses and workshops on subject areas within the scope of its remit. Where possible, these will be associated with or held in conjunction with national and international conferences. This will provide a revenue stream additional to the contributions of Supporting Members, to help finance the Foundation and its activities.

3.6.2 Commercial exploitation of algorithms

To help develop algorithms beyond the academic sphere of interest, the Foundation will assist commercial organisations in exploiting the techniques represented by the software in the Repository.

3.6.3 Algorithm standardisation and software validation

The Foundation will provide an algorithm standardisation and software validation service. This will help to promote the use of the Foundation's software as reference implementations of the relevant analysis techniques, and will aid in the development of robust software. The Foundation will provide various levels of support, some of which require additional funding. In general the services available within this activity are as follows.

Activity	Membership Required
- Providing catalogued reference implementations of techniques	Open
- Providing educational material	Open
- Providing a liaison services between the authors of reference implementations and third-party developers	Contributor/Supporting
- Advise/assist/undertake comparative studies between the reference implementations and third-party developers	Contributor/Supporting
- Accredite third-party implementations as valid	Contributor/Supporting

3.6.4 Performance evaluation

The Foundation will provide a performance evaluation service, supported by the dissemination of documents specifying the methodology required for the evaluation of algorithms and software. Expert consultancy in this area may also be provided (for additional funding) to those with Contributor or Supporting levels of membership.

3.6.5 Consultancy

The Foundation will act as a point of contact with experts in the field who will be able to provide consultancy services either within or outside the remit of the foundation.