



Euro-BiImaging
European Research Infrastructure for Imaging Technologies in Biological
and Biomedical Sciences

WP6
Advanced Light Microscopy – General Access

Task 6.1
Coordination

Deliverable 6.2
Assessment of existing efforts for the support and development of ALM facilities in
EU Member States

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1 Report Summary

The support and development of Advanced Light Microscopy (ALM) facilities across Europe has evidently increased in recent years with coordinated activities developing across a number of European countries. The Euro-Biolmaging consultation with national biological imaging coordinators from 18 European countries has demonstrated that significant investment of over €250M has either been committed or requested for the development of bio-imaging facilities. In a number of European countries national networks, which coordinate access to ALM facilities, are already operational whilst in other countries strategic plans for the implementation of national networks are developing. Significant progress has already been made towards the development of infrastructures suited to providing national and transnational access but it is apparent that further investment will need to be secured from local, national and European funders to develop and coordinate open access to ALM infrastructure at a European level.

2 Introduction

The major task of Euro-Biolmaging WP6 is to define a plan for implementation of distributed and coordinated infrastructure for open user access to advanced light microscopy technologies in Euro-Biolmaging. One important pillar of this task is the assessment of existing efforts and strategies for the support and development of ALM facilities in EU Member States.

3 European Initiatives for the Support of ALM

3.1 *European Microscopy Light Initiative - ELMI*

ELMI (<http://www.embl.org/elmi>) was created in 2001 to establish a unique communication network between European scientists working in the field of light microscopy and the manufacturers of ALM equipment. Since its founding, ELMI has evolved into the reference organisation for advanced light microscopy in Europe, and in particular, hosts the most complete, authoritative, annual international meeting on the developments and applications in biological microscopy.

Since its founding, ELMI's major activity has been the organisation of annual meetings of the ELMI community. These follow a regular, quite successful programme. Cutting edge scientific sessions, featuring a diverse range of internationally based invited speakers, report the latest scientific advances in imaging and highlight the latest advances in technology. Daily workshop sessions run by commercial providers highlight the latest advances in imaging technology (e.g. <http://www.rms.org.uk/events/PastRMSevents/2012events/elmi2012>) whilst further sessions address common topics such as facility management and operation, user access and training, maintenance and update. The balance of both the latest

scientific and technical advances keeps the meeting fresh and has meant that the meeting attendance has grown each year. The meetings provide a platform for department heads, managers and staff of biological imaging facilities in Europe to access, test, and discuss the latest developments in imaging technology and thus keep their home facilities at the cutting edge of the field.

In 2011 and 2012, the ELMI meetings included platform presentations from the Euro-Biolmaging Scientific Coordinator for Biological Imaging. The presentations provided a meaningful way to disseminate the progress of Euro-Biolmaging to the European biological imaging community, and receive feedback from key stakeholders across Europe. Moreover, meetings of the National Coordinating Persons (NCPs) for Euro-Biolmaging WP6 and WP7 have been organised alongside the main ELMI meetings, and have been used for focussed strategic discussions on WP6 (Advanced Light Microscopy – General Access) and WP7 (Access to Innovative Technologies – ALM). As an example, the idea and planning for the Euro-Biolmaging Proof-of-Concept Studies was developed at a WP6/WP7 meeting at ELMI 2011, in Alexandroupolis, Greece. There is no other institution or mechanism that provides a similar level of access to the European biological imaging community as a whole.

3.2 *ERA-Instruments*

ERA-Instruments is an initiative that aims at initiating and coordinating a sustainable network of ministries, charities, funding agencies and research councils active in the funding of life science RI. This European platform of relevant stakeholders aims to set up comprehensive tools for adequate treatment of instrumentation related topics enabling conclusions for research policies at both a national and European level. *ERA-Instruments* is an FP7-funded programme with a particular focus on advanced light microscopy and in particular on the increasing significance of core facilities providing coordinated access and expertise in this field.

In its fourth publication on mid-size instrumentation in the life sciences (http://www.era-instruments.eu/downloads/recommendations_4.pdf) which was already published together with Euro-Biolmaging, *ERA-Instruments* focussed on the requirements for delivering ALM technology for European biological sciences. The conclusions from this analysis of ALM in Europe is particularly important for WP6:

“Mature instrumentation should normally be integrated in such core facilities, whereas dedicated or specialized microscopes will still be run by individual expert groups. Development of new technologies is mostly done in the laboratories of physicists or engineers. They can also benefit from links to the core facility that can provide a testing ground for new developments or prototypes and can convey the expectations of the biological user community. The communication between developers and biomedical researchers should be fostered, so that methods

development are accepted as integral part of life science research while the developers should be aware of the biologically relevant questions.”

This conclusion is a manifesto for the delivery of ALM resources in the future, and for the definition of Euro-Biolmaging ALM Nodes.

3.3 National Imaging Communities

Since 2010, the self-organization of biological and medical imaging communities at the national level has started in most European Member States particularly triggered by the desire to participate in Euro-Biolmaging and thereby achieve the pan-European integration of national imaging communities.

Euro-Biolmaging has outlined a process for national community organization to ensure inclusiveness and legitimacy of National Coordinating Persons (NCPs) by the community. In a constituent meeting, the national imaging communities have appointed one or two national coordinating persons who are responsible for communication between their respective community and Euro-Biolmaging (Fig.1).

The following national networks of existing imaging facilities and major infrastructure providers have already formed and in several cases, this has already led to significant national investments (e.g. FR, SE, IT, PL, ES, NO, CZ) or application for national investments (CH, DE, FR, NL, IE, UK, BE, IL – see Deliverable D4.1 *Report on funding sources for the construction and operation of Euro-Biolmaging*):

Biolmaging UK
Cro-Biolmaging Croatia
Czech Biolmaging
Belgian Biolmaging
EuroBiolmaging-NL
Finnish National Imaging Infrastructure Network
France-Biolmaging
German Bioimaging
Greece-Biolmaging
Imaging Platform Ireland NBIP
Italian Bioimaging
(N)Euro-Biolmaging Poland
NorBiolmaging (Norway)
Spanish Biolmaging
Swedish Biolmaging
Swiss-Biolmaging

National meetings and self-organisation planned in 2012:

Luxemburg
Portugal

The national imaging communities are, and will continue to be, key to support the national process of defining imaging infrastructure priorities and bringing imaging infrastructure on all national roadmaps by raising awareness among the scientists, research organisations, funders and ministries. As Euro-Biolmaging moves towards its Construction Phase, these communities will be absolutely critical for lobbying the national funding bodies to make the critical contributions necessary to deliver a useful, accessible ALM infrastructure.

In addition, the national imaging communities provide a new platform for interaction and collaboration of national facilities in form of common websites for exchange of information, data and best practice and in organising common workshops related to e.g. training in specific imaging technologies or facility management. In addition, in several countries the national imaging community has initiated the process of opening their ALM facilities for access by users at the national or regional level.

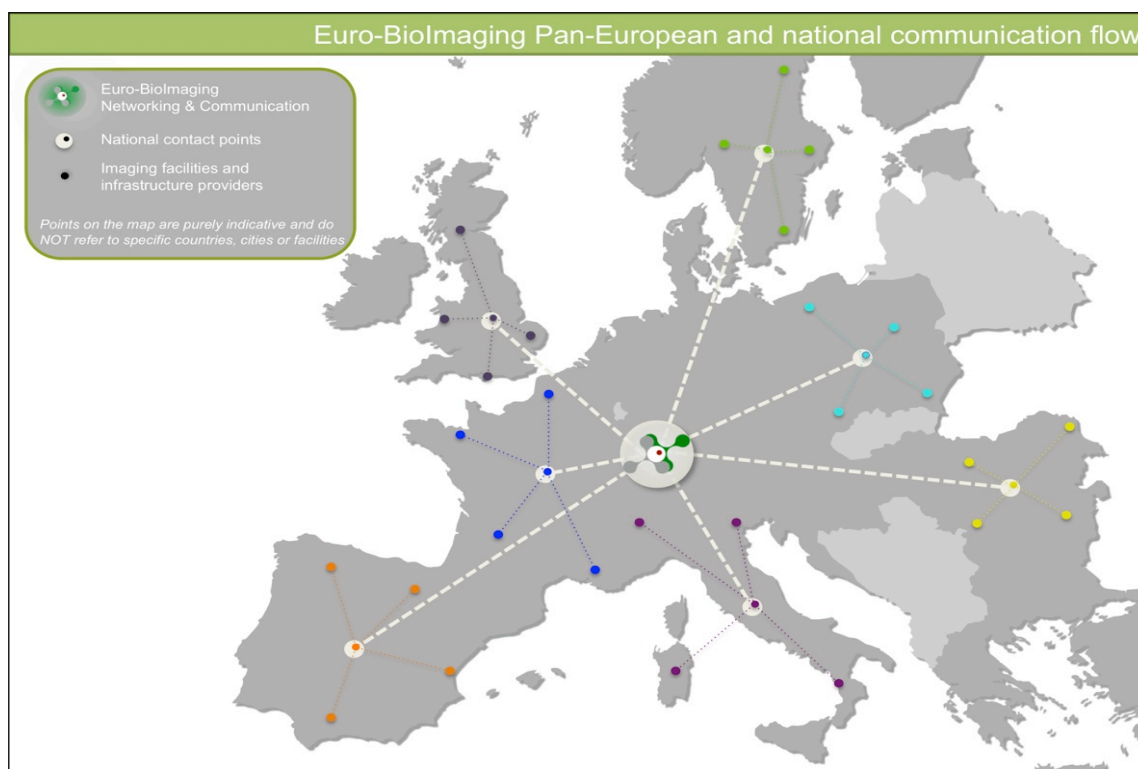


Figure. 1 Illustration of the flow of communication between Euro-Biolmaging and national imaging infrastructure communities

3.4 WP6 Communication with NCPs

Regular consultations via email, phone and face-to-face meetings with the national coordinating persons (NCPs) participating in Euro-Biolmaging have been used to assess the current level of support and development of ALM facilities across Europe. The consultations have been ongoing since 2009 and throughout the first period of the Euro-Biolmaging project they have helped to establish a baseline of current activities across the participating countries. Six face-to-face meetings of the national coordinators have taken place to date:

- ❖ Sep 2009, Heidelberg, DE: 1st Euro-Biolmaging Stakeholder Meeting – ALM Satellite meeting
- ❖ May 2010, Heidelberg, DE: Satellite meeting at ELMI organized by the German Research Foundation
- ❖ Oct 2010, Vienna, AT: 2nd Euro-Biolmaging Stakeholder Meeting – ALM Satellite meeting (WP6)
- ❖ Jun 2011, Alexandroupolis, GR: Euro-Biolmaging WP6/WP7 satellite meeting at ELMI
- ❖ Jan 2012, Heidelberg, DE: 3rd Euro-Biolmaging Stakeholder Meeting – WP6 satellite meeting.
- ❖ Jun 2012, Leuven, BE: Euro-Biolmaging WP6/WP7 satellite meeting at ELMI

The meetings provide a forum for discussion of ongoing activities at local, national and trans-national levels, exchange of experiences and information on organising the different national imaging initiatives, and addressing regional and national funders. In particular, the concepts and plans for the Euro-Biolmaging Proof-of-Concept Studies were developed at the Euro-Biolmaging WP6/WP7 Satellite Meeting/ELMI 2011 and the Euro-Biolmaging Node Eligibility Criteria were discussed at the Euro-Biolmaging WP6/WP7 Satellite Meeting/ELMI, 2012.

3.4.1 Feedback from the NCPs on national funding for ALM

Belgium

Throughout 2011 and 2012 the Belgian national bio-imaging community has been meeting to organise the Belgian scientific imaging landscape. A constituting meeting of Belgian Stakeholders was held to bring together partners from different regions and imaging backgrounds. Funders, stakeholders and government representatives were brought to the table to discuss and evaluate the needs of the scientific community. A recommendation for government funding of €30 million (from the Flanders side) has been filed. Additional funding may also become available through regional funders. Together with the national application for funding, the position for the local implementation of Euro-Biolmaging is under evaluation by the local funding agencies.

Croatia

On July 13th, 2012, the Croatian bioimaging community met in Zagreb to organise the Croatian scientific imaging landscape and to found Cro-Biolmaging. At this constituting meeting of Croatian Stakeholders, partners from different regions and imaging backgrounds came together for the first time. Here, Antje Keppler (Euro-Biolmaging Project Manager) presented the Euro-Biolmaging project.

Czech Republic

The Czech national roadmap for Large Research, Development & Innovation Infrastructures was updated in May 2011. At this meeting the Euro-Biolmaging project was upgraded from a 'promising' project to a 'priority' project. National structural funds have been invested across the Czech Republic in the period 2007 – 2013. A Czech national Bio-Imaging advisory committee was formed and is meeting regularly to define the strategy for development of bio-imaging at a national level.

<http://www.eurobioimaging.cz>

Denmark

Since 2009 investment in infrastructure for biological imaging has been at a level of €4.9M p.a. and national activities have been running since June 2011.

Estonia

A new specialised electron microscope for cell imaging will be arriving at the University of Tartu Molecular Biology Institute (TUMRI) shortly.

France

Development of the French bio-imaging community is based on the existing IBiSA. Since Feb 2011, five local biological imaging nodes have been created and funded. The nodes are directed by Maite Coppey-Moisan and distributed image processing is directed by Jean-Christophe Olivo-Marin. The nodes were selected using the existing IBiSA mechanism. A national process including community and funding bodies was included in site selection. The selected node required 20-30% more capacity to deliver access. Current funding is at a level of €26M over 10 years. €22M of investment has been directed towards infrastructure and €4M towards running costs.

<http://france-bioimaging.org/>

The Netherlands

The NL-Biolmaging community appointed a project management team to support the strategic development of bio-imaging. In June 2011, at the first national ALM meeting of the NL participants including 60 PI's and 18 support staff the community decided to apply to the BIG-NWO call for new investment to support their existing ALM facility activities. At this meeting, Antje Keppler presented the Euro-Biolmaging project. In this call, NL-Biolmaging took the first step and achieved that bio-imaging is now on the national roadmap 2012 in the Netherlands. For receiving infrastructure funding, NL-Biolmaging will apply again in future national infrastructure calls.

In addition, NL-Biolmaging has secured a nanoscopy grant of €5.6M. The focus for NL-Biolmaging going forward will be on the integration of bio-imaging with

other activities such as “life science & health”, one of the top-sectors in the Netherlands.

Finland

In 2010 bio-imaging in Finland secured €10M of investment to be utilised over 3 years. The investment has been targeted at the development of open access facilities. To facilitate the development of open access to bio-imaging a national infrastructure network has been established, with six local centres for biological imaging. The community has an ongoing dialogue with the Ministry of Education to develop a strategic plan for implementation of bio-imaging across Finland. In August 2011, Antje Keppler presented the Euro-Biolmaging project at the meeting of the Finnish imaging community.

<http://www.biocenter.fi/>

Germany

The German National Roadmap process is ongoing; an application was submitted in January 2012 by the board representing the biological and medical imaging community. The proposal is related to the European level roadmap. Seven biological imaging nodes have been requested, two are for innovative technologies and five offer general access. Each node is required to make a commitment to 50% open access for external visitors. Funding of €72M has been requested over the next 5 years. This funding will also be matched by €34M of industry contribution. A national network of biological imaging facilities has also been funded by the German Research Foundation. The grant totalling €0.45M over 3 years) has supported the recruitment of a project manager to coordinate the network activities. In October 2010, Antje Keppler presented the Euro-Biolmaging project at the meeting of the German bioimaging community.

<http://www.germanbioimaging.org>

Hungary

Funding of Hungarian participation in ESFRI projects is on the national roadmap and funding for infrastructure has been sought from other sources e.g. Hungary-Romania Cross-Border Cooperation Program 2007-2013. Recent facility upgrades have included installation of a €1.4M Microscopy Core Facility at the University of Pécs, and a €0.6M Facility upgrade at the University of Debrecen. Infrastructure upgrades across Hungary have been achieved through a combination of university, national and EU funds.

Ireland

In April 2012 the Irish bio-imaging community submitted an Expression of Interest to the Science Foundation Ireland Research Centres Programme for a national Centre for Quantitative Label-Free Bio-Imaging and Sensing this was followed up in June 2012 with a co-ordinated submission by the National BioPhotonics and Imaging Platform, Ireland to consolidate capacity and capabilities across Ireland. In October 2010, Antje Keppler presented the Euro-Biolmaging project at the meeting of the Irish bioimaging community.

Israel

Funding for bio-imaging activities is available through multiple Ministries (TELEF, ISM). The bio-imaging community is networked across seven universities resulting in 80% of national users having access to facilities within 30 minutes of their location. €25M of investment has currently been secured with additional institutional matching over 5 years.

Norway

Bio-imaging investment in Norway currently focuses on the support of researchers with grants offered in support of researcher travel. Funds have been secured to support a national bio-imaging secretary to assist with the coordination of national bio-imaging efforts.

Poland

The Euro-Biolmaging proposal (NEBI) is on the Polish National Roadmap for research infrastructures. The National Roadmap is currently awaiting confirmation of initial approval by new Secretary of State – Professor M. Orlowska. Indicative level of funding €20M for a period of 2013-2017. A detailed timeline and budget update to be submitted to the Ministry by September 2012. In May 2011, Jan Ellenberg (Euro-Biolmaging Scientific Coordinator - Biological Imaging) presented the Euro-Biolmaging project at the meeting of the Polish bioimaging community.

Spain

The Spanish Advanced Light Microscopy Network (Red de Microscopia Optica Avanzada, REMOA) was established to support national bio-imaging activities across Spain. The network covers 55 laboratories across 19 locations. Current funding for the national network includes €24,000 obtained from the Science Ministry MICINN by three groups from U. Barcelona, CRG and U. Autonoma Madrid. Funding of €192,000 for European Infrastructures has also been obtained for light nanoscopy from the Science Ministry by the Photonic Sciences Institute (ICFO), Barcelona and CRG. The funding facilitated the recruitment on an extra technician at ICFO to provide support to the increasing number of external users of the facility. In June 2010, Antje Keppler presented the Euro-Biolmaging project at the meeting of the Spanish bioimaging community.

Sweden

The National network for Swedish Biolmaging has been funded by the Swedish Research Council since 2010 and is supported by the government research infrastructure. A proposal for infrastructure investments of €20M and participation and networking funding €30M has been submitted for the period 2012-2015. The bio-imaging community are in the process of defining the national nodes and in 2011 they were awarded a grant for a national imaging database.

<http://bioimaging.se> & <http://www.vr.se> (roadmaps)

United Kingdom

In the UK investment in bio-imaging is growing. The next generation Optical Microscopy Initiative (MRC, BBSRC, EPSRC) has released an open call which closes in July 2012 awarding funds up to €22M. BiolmagingUK hosted a strategy meeting in July 2012 to define strategy for nodes and shared resources from 2013 onwards. At this meeting, Jan Ellenberg presented the Euro-Biolmaging project. This meeting is the first joint meeting of biological and medical imaging in UK and has been sponsored by the BBSRC, MRC and Wellcome Trust.

http://www.mrc.ac.uk/Fundingopportunities/Calls/optical_imaging/MRC008648.

<http://bioimaginguk.org>

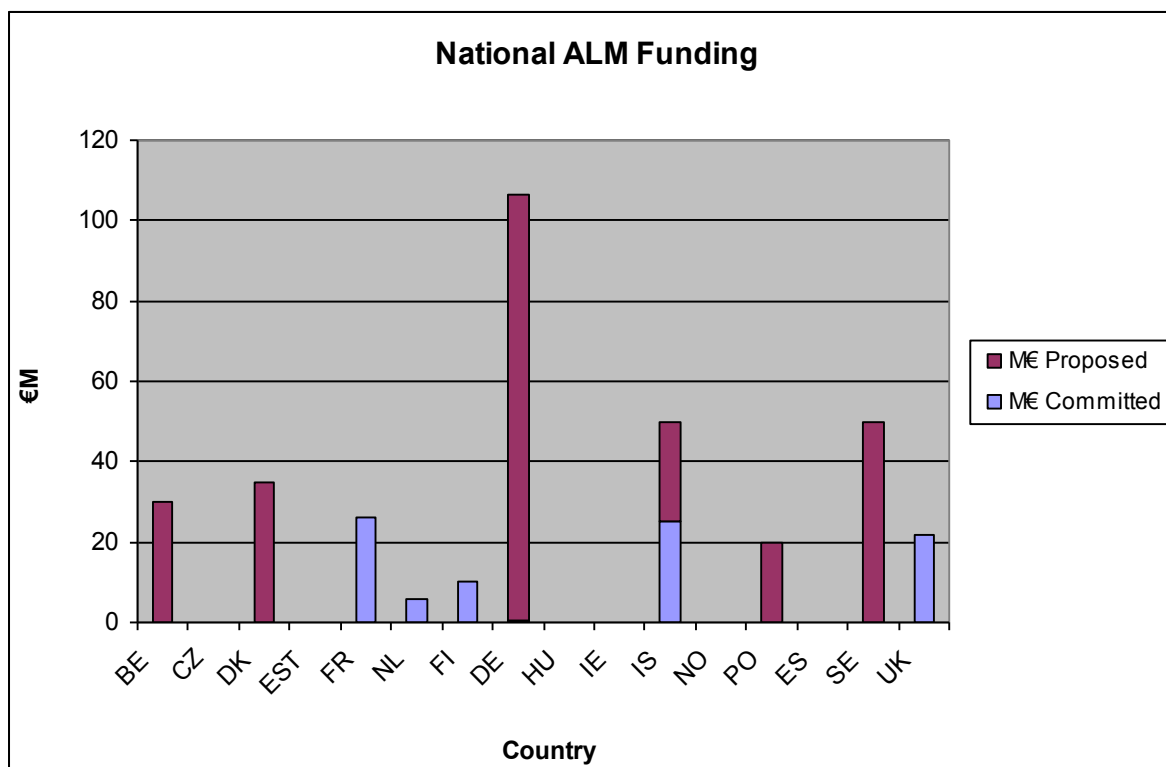


Figure 2. Level of committed and proposed funding for Biolmaging by country. From consultation with Euro-Biolmaging NCPs.

4 Funding sources for ALM

The response from consultation with the NCP's regarding the commitment to fund ALM resources supports the findings in WP4 with regard to funding available to support the construction and operation of Euro-Biolmaging (see D4.1). Although not all of the participating NCPs responded to the consultation it is evident from the responses that significant investment in bio-imaging and ALM infrastructure has already been demonstrated across Europe with current a level of over €50M of committed funding and over €200M of proposed funding. However, this is far from uniform, and at least in some cases, not part of a true national or trans-national strategy. As funding the Construction Phase depends on the existing funding mechanisms and policies in each country, Euro-Biolmaging and NCPs will need to work more closely together to inform funding bodies about potential synergies and the advantages of Euro-Biolmaging.

In particular, there is an opportunity for Euro-Bioluming to support the continued operation and upgrade of these facilities, and extend the value of the original national investments by integrating them into a European infrastructure.

This may be particularly attractive to national funding bodies, as sustaining technology investments is often challenging. Identifying and articulating this synergy with NCPs at the national level is critically important, as Euro-Bioluming will need to plan the Construction Phase activities in 2013-2014.

5 Conclusion: Outlook for the development of ALM infrastructures

Across the Euro-Bioluming countries, there has been substantial progress in forming National imaging communities and indeed, several national-level commitments for investment in ALM infrastructure. As noted above, this has not yet matured towards a uniform strategic vision for construction and sustainable operation of this critical research infrastructure at the European level. A focus for Euro-Bioluming going forward will be to prepare the NCP's for the open call for Euro-Bioluming nodes and support the NCPs in defining strategies for receiving funding from national sources for the required ALM infrastructure implementation as part of Euro-Bioluming.