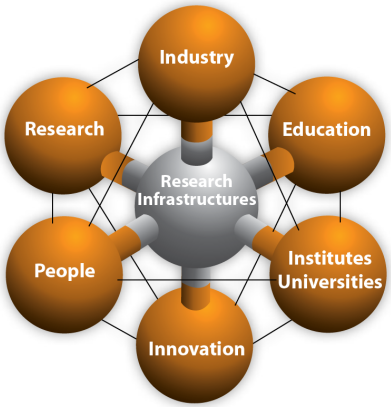
European Biomedical Imaging Infrastructure– from molecule to patient

Introduction

EUROPEAN STRATEGY FORUM ON RESEARCH INFRASTRUCTURES



- optimize use & development of existing RIs
- help to create new RIs
- support a **coherent and strategy-led approach** to policy-making and program implementation
- develop the scientific integration of Europe
- strengthen Europe´s international outreach
- **facilitate multilateral initiatives**

Introduction

DEFINITION OF RESEARCH INFRASTRUCTURES ON EUROPEAN ROADMAP

- **Facilities, resources** or **services** of a unique nature identified by pan-European research communities to conduct top-level activities in all fields.

- RI must apply an **"Open Access" policy** based on open competition and selection of the proposals evaluated on the sole criterion of scientific excellence by international peer review.

Introduction

ESFRI – European Roadmap for pan-European research infrastructures

BMS RI: Biological and Medical Sciences Research Infrastructure

Roadmap in 2006	35 RI projects including	6 BMS RIs
Update in 2008	44 RI projects including	10 BMS RIs

Commission support to ESFRI roadmap projects in FP7: € 1,7 Bill

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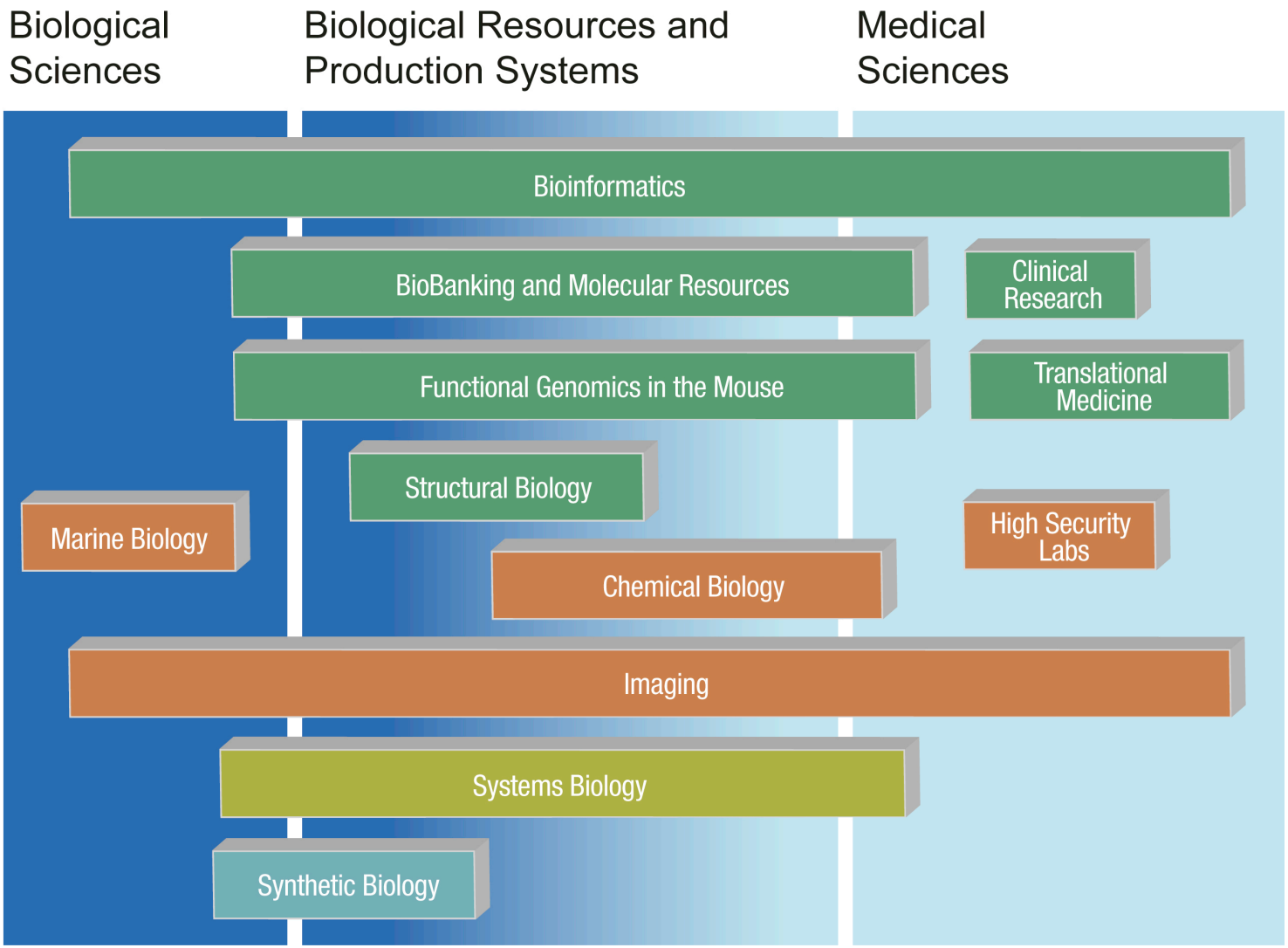
Introduction



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Introduction

1. ELIXIR - Upgrade of European Bioinformatics Infrastructure
2. INSTRUCT - Integrated Structural Biology Infrastructure
3. Infrafrontier – phenotyping and archiving of model mammalian genomes
4. BBMRI - European Biobanking and Biomolecular Resources
5. Euro-Bioimaging – Biomedical Imaging
6. EMBRC – European Marine Biology Resource Centre
7. EU-OPENSCREEN – screening platforms for chemical biology
8. EATRIS – advanced translational research in medicine
9. ECRIN - Infrastructures for Clinical Trials and Biotherapy
10. European High Security BSL4 Laboratories

ESFRI

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History

- **S**ubmitted by the ESFRI delegations of Austria and Switzerland
- **T**wo proposals with great importance for the European Life Sciences combined

"European Infrastructure for Research in Biomedical Imaging" – EIRBI (RU 41)
(clinical aspects of imaging technologies)

"Advanced light Microscopy Infrastructures for Europe" – AMIE (RU 16)
(imaging at the basic research level)

Euro-BioImaging – European Biomedical Imaging Infrastructure

"The combined proposal **brings together key research areas in the imaging** field stretching from basic biological imaging with advanced light microscopy to the clinical level with medical imaging." (ESFRI Roadmap 2008)

ESFRI

Aims of Euro-BioImaging

- **D**eploy imaging infrastructure in a coordinated and harmonized manner
- **P**rovide transnational access to state-of-the-art imaging technologies
- **E**nable training & service using state-of-the-art equipment
- **F**oster cooperation and networking

➡ *Create an efficient research and innovation environment*

Mission & Scope

Advanced Light Microscopy

Access
to state-of-the-art imaging equipment

Services
and **training**

Cooperation
on a pan-European scale

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Networking of imaging facilities

Research
and **innovation**
environment

Development of imaging technologies
to offer them as service

Medical Imaging

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Countries

Austria	Israel
Belgium	Italy
Czech Republic	Netherlands
Denmark	Poland
Finland	Portugal
France	Spain
Germany	Sweden
Greece	Switzerland
Hungary	United Kingdom
Ireland	Norway

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Timeline & Costs

2010 - 2013	2013 - 2017	.....
Preparatory Phase	**Construction Phase**	**Operation Phase**
Framework	**N**ew construction or major upgrades of existing facilities	**P**rovision of access and training **C**ontinuous technology evaluation to improve service
4-6 Mio € ***funded by EC***	***funded by Member States***	***funded by Member States***

ESFRI

Aims of the Preparatory Phase

- **R**eview current European biomedical imaging resources
- **D**evelop an integrated and harmonized plan for establishing the biological and medical imaging infrastructure
- **D**evelop a plan for access to Euro-BioImaging infrastructures
- **D**evelop a pan-European training program
- **D**evelop a concept for funding and financing
- **I**dentify an appropriate legal and governance structure for construction and operation phases

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Work packages

Technical WPs

- ALM Infrastructure - General access nodes
- Access to Innovative Technologies – ALM
- Molecular Imaging
- Access to Innovative Technologies – Medical Imaging
- Medical Imaging - Patient to population

- Data management
- User Access
- Training

Strategic WPs

- Project management
- Legal, governance and ethical issues
- Process plan
- Finance planning
- Networking and communications

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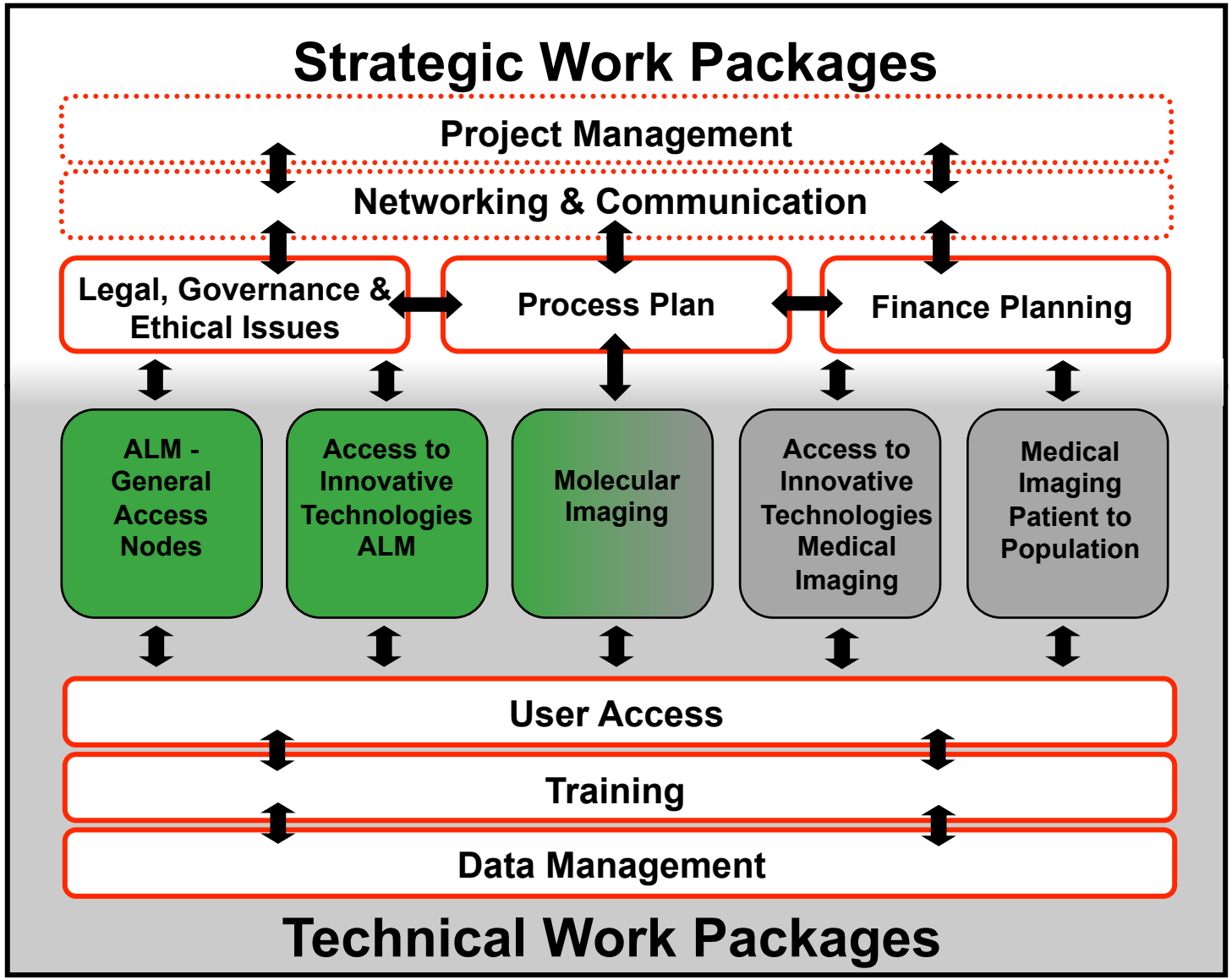
Work packages



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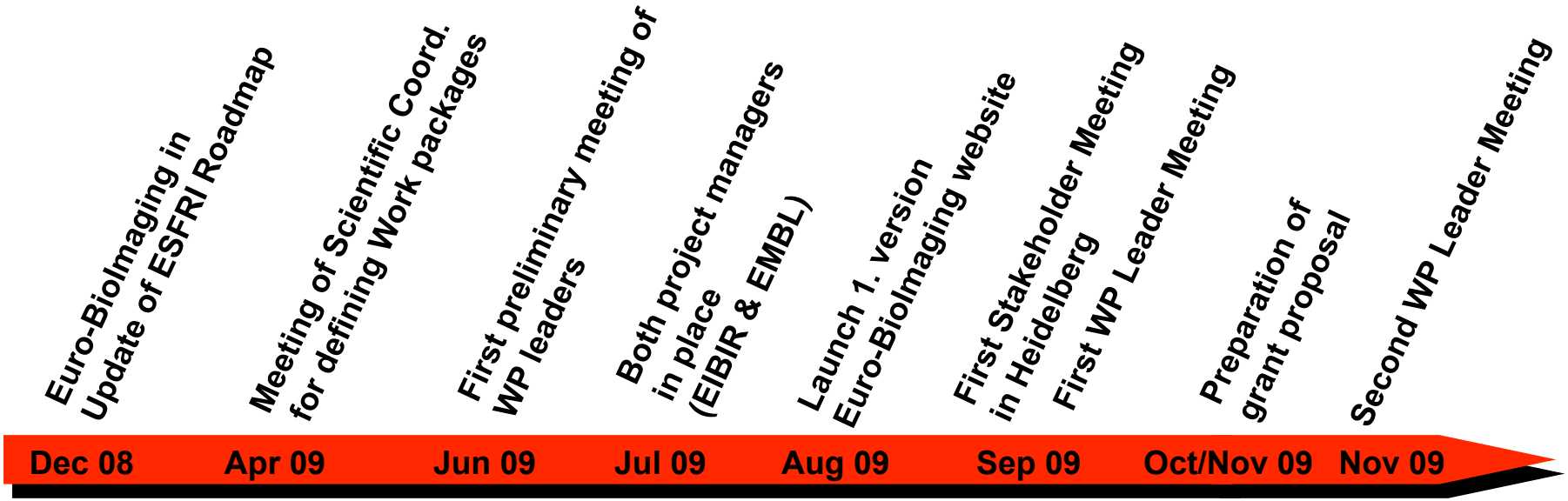

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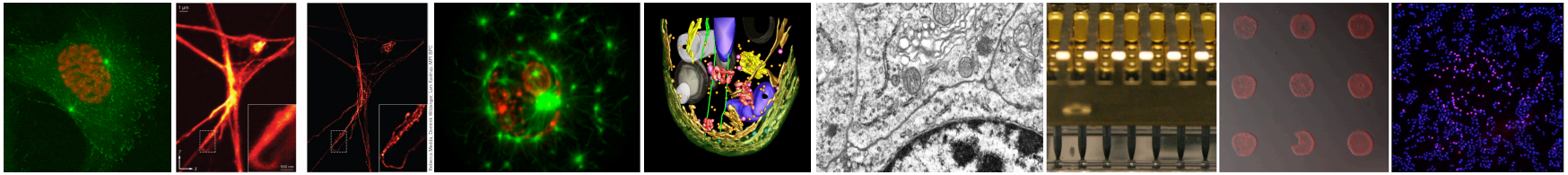
WP ALM infrastructure - General access nodes

- **A**ccess to a broad range of methods in basic biological imaging to visiting scientists
- **C**reate a distributed infrastructure of high-end ALM imaging facilities
- **E**stablish pan-European training platforms for these methods
- **A**dopt new technologies from specialized nodes to maintain nodes at state of the art
- **A**ct as regional centers of reference for basic biological researchers

Chair: Andrea Musacchio (IFOM-IEO Campus, Milan)
Jason Swedlow (University of Dundee)

WP Access to Innovative Technologies – ALM



- **Provide access and training in cutting-edge technologies**
- **Act as European reference centers in the respective technologies**

- **S**uper-resolution light microscopy (Stefan Hell, MPI Göttingen)
- **F**unctional imaging of live cells (Paul French, Imperial College London)
- **C**orrelative light and electron microscopy (Judith Klumperman, Utrecht)
- **H**igh throughput microscopy for systems biology (Rainer Pepperkok, EMBL)

Chair: Rainer Pepperkok (EMBL)

Benny Geiger (Weizmann Institute)

WP Molecular Imaging

- **Link and integrate biological with medical imaging**
- **Act as European reference centers in the respective technologies**

- **M**ulti-modal molecular imaging (Andreas Jacobs, Münster, and James Sharpe, Barcelona)
- **D**esign and testing of novel probes (Silvio Aime, Torino, and Carsten Schultz, EMBL)

Chair: Silvio Aime (University Torino)

Andreas Jacobs (EIMI Münster)

Carsten Schultz (EMBL Heidelberg)

James Sharpe (CRG Barcelona)

WP Access to Innovative Technologies – Medical Imaging

- **F**ocus on use and improvement/validation of new imaging technologies
- **C**entralized facility or distributed technology platform
- **D**evelopment and implementation of a specific imaging technology

TECHNOLOGY NODES

- **Ultra-high field MRI**
- **Phase contrast X-ray imaging**

→

Improve image acquisition techniques
Implement new methods for image acquisition
Provide training
Give access to technology for scientific users

Chair: Jürgen Hennig (University Hospital Freiburg)

WP Medical Imaging Infrastructure - Patient to Population

- **F**ocus on different magnitudes of biomedical imaging from molecule to population
- **U**se of different imaging technologies

COORDINATION NODES

- **Population imaging**
- **Clinical research of imaging technologies**

Deliver knowledge, expertise and training

Enable exchange of methodologies

Allow joint use of acquired data

Chair: Jørgen Frøkiær (University of Aarhus)

WP Data Management

- **D**evelop concepts for a computing infrastructure for image data
- **I**dentify database models for quantitative imaging data
- **D**evelop synergies with ELIXIR and other databases
- **E**valuate development of central digital repositories for large scale quantitative datasets
- **I**nvestigate solutions for addressing the specific image processing and analysis needs of users
- **P**rovide user access to documented, state-of-the art imaging software and protocols

Chair: Michael Unser (EPFL)
Wiro Niessen (Erasmus MC)

WP User Access

- **U**ndertake an inventory of existing or foreseen platforms open for external access
- **S**urvey expectations and needs of user community
- **D**evelop an integrated plan for access
- **D**evelop user access protocols for Euro-BioImaging nodes

Chair: Christian Glaser (LMU, Munich) &
John Eriksson (Åbo Akademi University)

WP Training

- **U**ndertake an inventory of existing or foreseen training platforms
- **S**urvey expectations and needs of user community
- **D**evelop pan-European training programs
- **I**ntegrate existing training programs in biomedical imaging in Europe
- **D**evelop online training resources
- **M**ake imaging methods available through Euro-BioImaging nodes

Chair: Pavel Hozák (IMG, Prague)
Alejandro Frangi (UPF, Barcelona)

WP Project Management

- **C**oordination and support of collaborative work between partners
- **O**rganization of meetings (for stakeholders, partners, users …)
- **E**stablishment of management structure
- **S**upport of scientific coordinators
- **C**oordination of proposal preparation for Preparatory Phase

Chair: Pamela Zolda (EIBIR)

Antje Keppler (EMBL)

WP Legal, Governance and Ethical Issues

- **I**dentify an appropriate legal and governance structure, which
  - **s**upports Euro-BioImaging´s distributed nature
  - **a**llows for a sustainable and long-term infrastructure
  - **m**eets the expectations of funders and stakeholders.
- **C**ooperate closely with other Euro-BioImaging work packages to gain insight into the scope and operation of Euro-BioImaging (WP Process Plan and WP Finance Planning)

Chair: Silke Schumacher (EMBL)
Edvard Beem (ZonMw)

WP Process plan

- **P**rovide a strategic review of existing European biomedical imaging resources (technical equipment, external user accessibility, etc.)
- **D**efine the scope, role and benefits of Euro-BioImaging, including a coordinated and harmonized plan for the infrastructure deployment
- **D**efine strategies to include all relevant stakeholders
- **D**efine strategic milestones and deliverables
- **D**evelop a process plan for the construction and operation phase

Chair: Karin Lohmann (Helmholtz)
Ivan Baines (MPI Dresden)

WP Finance Planning

- **I**nventory of future research infrastructure | investments, operational costs
- **D**evelop finance models and scenarios for construction and operational phase
- **I**dentify and liaise with public and private funding & finance resources
- **D**evelop financial commitments from MS for the construction and operational phase
- **D**evelop financial commitments from other parties including industry

Chair: Wouter Spek (T.I.B. Development)

WP Networking and Communications

Euro-BioImaging as a central hub for communication and collaboration

- **W**ebpage
- **P**ublic relations (e.g. articles, flyers, conferences)
- **S**ynergies with other ESFRI projects
- **O**rganization of thematic and national user meetings

Chair: Antje Keppler (EMBL)

Monika Hierath (EIBIR)

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Euro-BioImaging in Update of ESFRI Roadmap	Dec 08
Meeting of Scientific Coord. for defining Work packages	Apr 09
First preliminary meeting of WP leaders	Jun 09
Both project managers in place (EIBIR & EMBL)	Jul 09
Launch 1. version Euro-BioImaging website	Aug 09
First Stakeholder Meeting in Heidelberg	Sep 09
First WP Leader Meeting	Oct/Nov 09
Preparation of grant proposal	Nov 09
Second WP Leader Meeting	

Submission of proposal	Dec 09
Launch 2. version Euro-BioImaging website	Feb 10
Evaluation result expected from EC	Mar 10
Meetings of Working Groups and National Groups	Apr 10
Negotiations for EC Grant Agreement	- Oct 10
Second Stakeholder Meeting in Vienna	Sep 10
Start Preparatory Phase	~ Nov 10

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www.eurobioimaging.eu

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