ISBE Infrastructure for Systems Biology Europe

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Report on collaborative agreements with relevant ESFRI initiatives and modalities of collaboration and multi-ESFRI-nodes

Workpackage 5
Synergies and Community Building

ISBE WP5 Coordinators:
Jutta Steinkoetter and James Sharpe

Main responsible authors:
Angela Krueger, Jutta Steinkoetter

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Lead Participant	MDC, Jutta Steinkötter
Author(s)	Angela Krüger, Jutta Steinkötter, James Sharpe, Hennig Hermjakob
Project coordinator	Richard Kitney
EC Project Officer	Keji-Alex Adunmo

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1. Background information

A. Objectives of WP5

Many ESFRI Infrastructures offer cross-cutting services and act in complementary fields of technology and research. One aspect of the ISBE Work package 5 (WP5), "Synergies and Community Building", aims to engage with existing and emerging ESFRI projects in the field of the Biological and Medical Sciences (BMS ESFRI), to identify and define the ISBE overlap and complementarities as well as to make use of the added value of collaborations. The ultimate goal of WP5 efforts is the development of collaboration agreements or Memoranda of Understanding (MoUs) with existing ESFRI initiatives and to identify objectives for multi-ESFRI nodes (including agreements on accessibility and real-time connections between ISBE and other ESFRI projects: cf. Deliverable D.5.9).

B. Previous work on Synergies

Previous work on the 'Synergy' aspect of WP5 focused on the coordination and communication of the ISBE preparatory phase with projects of BMS ESFRI and other national and European initiatives. This included the participation and presentation of ISBE at various networking meetings and workshops between research infrastructures, Joint Programme Initiatives (JPIs) and other projects, and the organization of a Synergies Workshop with representation from 12 of 13 the BMS RIs. These outreach activities, their conclusions and immediate outcomes were described in detail in Deliverable D.5.7.

C. This document

After identifying the overlap and synergies with other infrastructures and initiatives, ISBE WP5 elucidated the perspective of collaboration agreements between ISBE and potential partners for the exchange of knowledge, the provision of capacities and, harmonisation of experimental and computational approaches. Since most RIs are still developing through their pilot phases, the mode of collaborative options and agreements was also evolving during this time. The engagement and interaction efforts of WP5 resulted in a strong representation and participation of ISBE in the CORBEL (COordinated Research Infrastructures Building Enduring Life-science Services), a project in response to the Horizon 2020 (H2020) INFRADEV-4 call. CORBEL aims to enhance the integration and harmonisation of actions between all 13 European BMSRIs. Moreover, a Memorandum of Understanding (MoU) has been elaborated, with the aim to establish a framework for strategic and long-term collaborations and cooperation between all 13 BMS RIs. These collaborative agreements and their objectives and planned implementation practice, is described in detail in this deliverable report.

2. Collaborative agreements with relevant ESFRI initiatives between ISBE and other BMS-ESFRIs

A. Framework of collaboration between all 13 BMS RIs

The model developed by the ESFRI (European Strategy Forum for research infrastructures) in the area of biomedical research is based on efficient utilization of distributed research infrastructures providing complementary technology and expert services.
All 13 ESFRI BMS RIs work towards serving excellent science in Europe by providing access to world-class facilities, samples, instruments, services, and data for improving knowledge, human health and wellbeing with a strong focus on the grand challenges.
Yet, these challenges can only be tackled successfully by bringing the RIs together with the complete range of European user communities in the life sciences where the research infrastructures have a key role in supporting project flow through the technology platforms. Thus, coordination between the BMS RI capabilities is essential.
Considering the need and benefits for European researchers in coordinated development of and access to the world-class infrastructures provided, the BMS RIs developed a common MoU, providing a framework for long-term strategic collaboration and cooperation and established a BMS RI Strategy Board. A summary of these approaches is given below.

1. Memorandum of Understanding

The main objective of the MoU is to connect the ESFRI BMS RIs for the creation of a complete research and development innovation chain in order to:

- align and coordinate access to the research infrastructures involved in biological discovery and innovation to improve the impact of the European Research Area (ERA) on addressing the grand challenges;

- jointly develop procedures, methodologies and quality standards to stimulate seamless development of European research and innovation;

- design joint long-term strategic plans to effectively align service developments for the benefit of European life-science researchers and other users; and to

- coordinate efforts on cross-disciplinary networking outreach to users, funding organizations and other stakeholders

This MoU is expected to be signed in summer 2015 by the coordinators of all 13 BMS RIs and is not legally binding.

2. BMS RI Strategy Board

The BMS RI Strategy Board will be comprised of two representatives nominated by each BMS RI. They may be accompanied to the Board Meetings with up to two advisors. The designated representatives of the BMS RIs, whether an established legal entity or a preparatory stage RI, can elect a chair and a vice chair amongst themselves on a 1-year rotating basis. The vice-chair will become the next chair. The role of the BMS RI Strategy Board is of advisory nature to facilitate information exchange in order to create opportunities for collaborative action. The decisions and recommendations made by the BMS RI Strategy Board are not binding for the participating BMS RI nor does the BMS RI Strategy have any role in the formal governance of the participating BMS RI. Resolutions should be approved by consensus, and if no consensus is reached, by simple majority (each signatory having one voting right).

This strategic collaboration framework of the BMS RIs, as agreed in the MoU, aims to contribute to strengthen the European position in cutting-edge life sciences as well as improving the society, health and the wellbeing of European citizens.

B. The CORBEL Project: 'COordinated Research Infrastructures Building Enduring Life-science Services'

An example of common actions and outcomes of strategic collaborations between 11 European BMS RIs is the CORBEL project, responding to the Horizon2020 INFRADEV-4 call. The ISBE WP5 partner MDC will Co-lead the CORBEL WP4 ('Biological Use case portfolio'), together with the research infrastructure EuroBioImaging. The use cases that were elaborated for CORBEL WP4 derived from previous work of ISBE WP5 (D.5.7.). To establish the common services and research pipelines between BMSRIs, as proposed in CORBEL, collaborative agreements or MoUs with relevant ESFRIs will be signed and are part of this deliverable.

1. CORBEL Objectives

The main aim of CORBEL is to establish a collaborative framework of shared services between the ESFRI Biological and Medical research infrastructures that transforms the efficiency, productivity and impact of biomedical research and its translation into medicine in the EU (and beyond). This will be achieved by delivering the following objectives:

I. **Forge effective partnerships with user communities**. Cutting edge life-science research in Europe is carried out by scientists funded nationally, through European coordination programs (JPI, ERA-NET) and through large public-private partnerships such as IMI. To be truly transformative the BMS RIs need to effectively interface with both the scientists and projects within these large and diverse user communities and the bodies responsible for organizing the funding Calls. Supporting outreach to these users across medicine and biology will be achieved through simplified access points, joint service catalogues and the establishment of user engagement boards.

II. **Develop unique solutions to users' needs**. Each of the participating BMS research infrastructures provides pan-European access to specialized research services, instruments, data, samples and facilities that cover life science research, from basic biology to translational medicine. The focus in CORBEL is on the integration of the combined capabilities of the BMS RIs into the research process of user communities, ensuring that the common services developed respond directly to the needs of those users. Building on the deep links with user communities, the BMS RIs will develop cross-RI services through collaborations, joint research activities will address critical gaps and respond to a rapidly changing research landscape. A portfolio of use cases - including IMI-funded consortia, ERC PIs and other collaborative projects - will be used to drive the development of these cross-infrastructure scientific services.

III. **Implement a portfolio of generic, shared services that facilitate user access to data, samples and instrumentation through common access policies and shared resource portal**; enabling users to manage data across infrastructure boundaries and deliver an effective training programme for RI operators and key users (e.g. project managers) to drive the rapid implementation of shared services into the operation of the research infrastructures. Common services will support the use case portfolios, and active feedback and input from the portfolios will be used in the development of the services to meet specific user and research infrastructure needs.

2. Relation to the work programme

CORBEL responds to the requirements specified in the Call "Implementation and operation of cross-cutting services and solutions for clusters of ESFRI and other relevant research infrastructure initiatives (INFRADEV-4-2014/2015)".

CORBEL brings together a critical mass of 11 BMS RI: BBMRI, EATRIS, ECRIN, ELIXIR, INFRAFRONTIER, INSTRUCT, EMBRC, EU-OPENSCREEN, Euro-Bioimaging, ISBE and MIRRI. thus meeting the call-specific requirement to address a particular thematic area - in the case of CORBEL, the biomedical sciences. The CORBEL consortia comprises all the legal entities of the established BMS RI, critical BMS RI centres of excellence as full partners or linked third parties where appropriate, as well as the coordinating centres and key institutes of the preparatory phase infrastructures. The consortium thus covers 35 partners associated with eleven research infrastructures, which in turn have membership from over 20 European countries. Through CORBEL the BMS research infrastructures will develop the interfaces and coordinated services that support researchers on complex, large-scale European research projects. The project thus provides a comprehensive, coordinated response to the call centered around the ESFRI BMS RI:

	Status	ESFRI roadmap
BBMRI—the Biobanking and Biomolecular Resources Research Infrastructure. (http://bbmri-eric.eu/)	Established ERIC since 2013	2006
EATRIS—The research infrastructure for translational medicine. (http://www.eatris.eu)	Established ERIC since 2013	2006
ECRIN—The European Clinical Research Infrastructure Network. (http://www.ecrin.org)	Established ERIC since 2013	2006
ELIXIR—the pan-European research infrastructure for biological information. (http://www.elixir-europe.org)	Established independent organisation (EMBL "Special Project") since 2013	2006
Infrafrontier—The infrastructure for mouse disease models and phenotype data. (http://www.infrafrontier.eu)	Established independent organisation (GmbH) since 2013	2006
Instruct—integrated structural biology unlocking the secrets of life. (http://www.structuralbiology.eu)	Established independent organisation (LLC) since 2012	2006
EU-OPENSCREEN—the European Infrastructure of Open Screening Platforms for Chemical Biology. (http://www.eu-	FP7 Preparatory phase project: completed	2008

openscreen.de)

EMBRC EUROPEAN MARINE BIOLOGICAL RESOURCE CENTRE	EMBRC—the European Marine Biological Resource Centre. (http://www.embrc.eu)	FP7 Preparatory phase project: 2008 completed
EURO-BIOIMAGING	Euro-BioImaging—the research infrastructure for imaging technologies (http://www.eurobioimaging.eu)	FP7 Preparatory phase project: 2008 ongoing
Infrastructure for Systems Biology Europe	ISBE—the Infrastructure for Systems Biology in Europe. (http://project.isbe.eu)	FP7 Preparatory phase project: 2010 ongoing
MIRRI MICROBIAL RESOURCE RESEARCH INFRASTRUCTURE	MIRRI—the microbial resource research infrastructure. (http://www.mirri.org)	FP7 Preparatory phase project: 2010 ongoing

Figure 1: Partner institutes of the different BMS RIs in CORBEL.

The critical mass of RIs involved in CORBEL will ensure that optimal support is provided to the European biological and medical research community; the RIs represented in CORBEL include 2006, 2008 and 2010 ESFRI roadmap RIs, and this range of expertise and the tight coordination will ensure an indirect transfer of knowledge and best practice between each participating ESFRI RI. The six Biomedical infrastructures on the 2006 European Strategic Forum for Research Infrastructures (ESFRI) Roadmap (BBMRI, EATRIS, ECRIN, ELIXIR, Infrafrontier, INSTRUCT) have now all been established. Collectively these infrastructures represent a long-term commitment of funders and research communities from 19 European countries that provides bedrock for this project to secure sustainability of services and continued user engagement. Three BMS RI from the 2008 Roadmap, (EMBRC, EU-OPENSCREEN & Euro-BioImaging) have now concluded their preparatory phase and are all beginning the constitution of their legal structures with the aim of being established as legal entities in 2015. Finally the two preparatory phase BMS RI consortia from the 2010 ESFRI Roadmap (ISBE, MIRRI) are also included in this project. In addition the consortium partners with the ICT e-infrastructures, continuing the successful e-infrastructure Advisory Board, consisting of experts from relevant organizations and e-infrastructure initiatives, will ensure not only that the development of data-related services within CORBEL matches the state of the art, but will further enhance the dialogue between e-infrastructures and the biomedical research infrastructures, which will ultimately feed back into technology development.

Meeting the need of large complex research projects requires not only world-class scientific services from individual research infrastructures but also strong links between the infrastructures, such that projects swiftly move through the translational pipeline from basic biological research to societal innovation. This will be driven by the use cases and addressed through the consistent data management approach and shared ELSI support and innovation services. The translational flow of project between research infrastructures is further deepened through the scientific connectors between two or more infrastructures. These are developed in close alignment with users or user communities through a use case-led approach. The project develops around two axes bringing in use cases: a Medical branch and a Biosciences branch. These use cases will drive the organization of the research infrastructures between themselves, and guide the final establishments of those that have been very recently constituted.

We will define critical skills and curricula and deliver targeted training for operators of distributed infrastructures. The project will strongly synergize in capability building with the training of infrastructure managers in INFRASUPP projects. Training activities will drive further integration and alignment across the infrastructures and disseminate best practices.

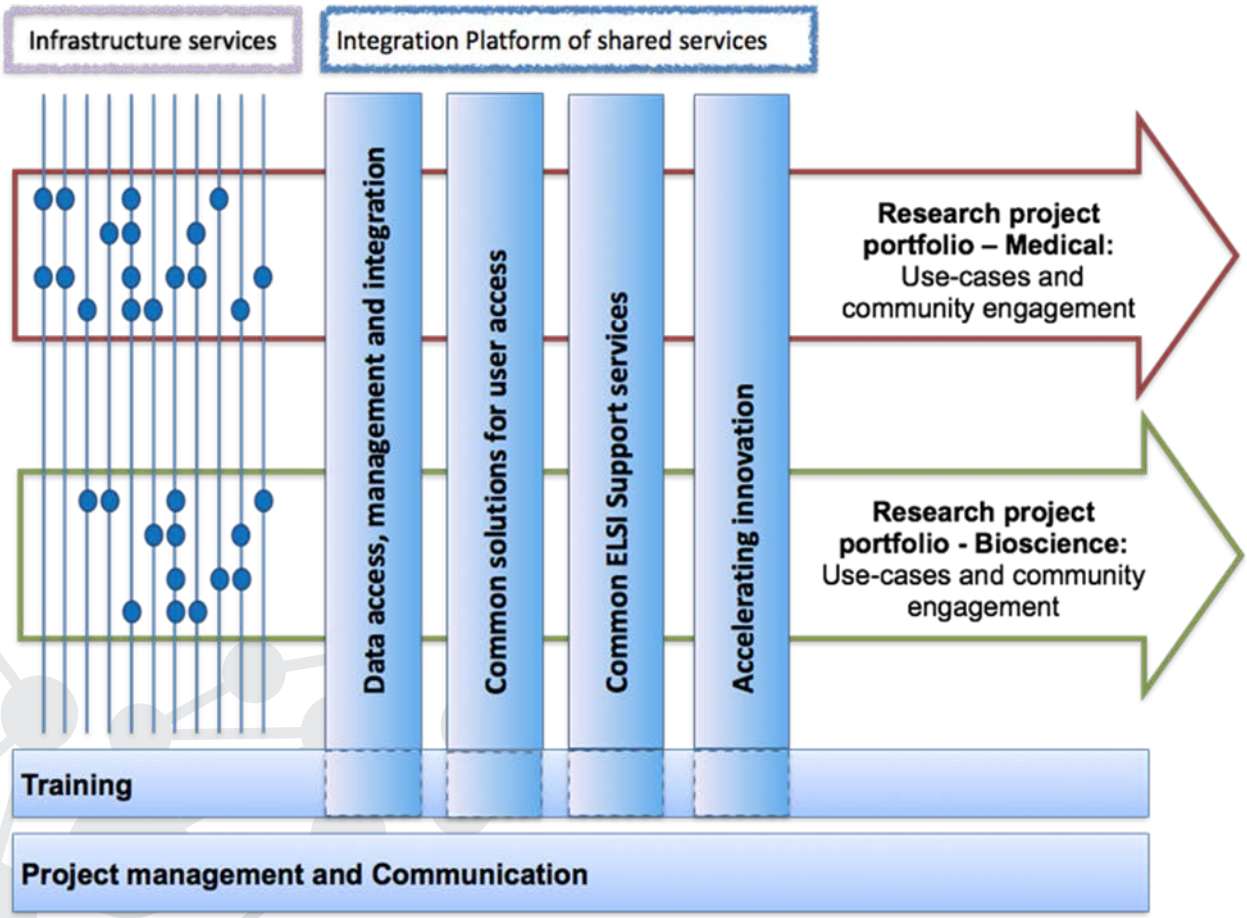

Figure 2: The CORBEL concept and work packages

3. Concept

In CORBEL, the BMS research infrastructures address the grand societal challenge of health, demographics and well-being by establishing a pan-European platform of user-aligned services to support biomedical research. Although several BMS RI have a remit covering the full spectrum of life-science research the focus of this project is medicine and bioscience, thus complementing parallel proposals to this call that addresses the challenges of climate change and sustainable food production. A particular focus of this proposal, through the user-centered portfolios of pilot actions, is on two transformative aspects of the health challenges: personalizing diagnostics and treatments and bridging the translation gap between the understanding of biological mechanisms and innovative medicines.

The concept and execution strategy of the project rests on four pillars:

1. User focused development of infrastructure scientific connectors and shared services that allows scientists to seamlessly access the combined capabilities and allow unencumbered mobility of samples and data.

2. Integration with BMS research infrastructure long-term strategic developments and leadership through associating the BMS RI Strategy Board, established through an independent MoU between the infrastructures, with this project.

3. Continuous input from external expert advisers and user feedback to effectively respond to a rapidly changing life-science field.

4. Growing a culture of equal opportunities from the start to ensure that the research infrastructures draw on the capabilities of the entire life science work force.

4. ISBE Participation in CORBEL

CORBEL counts with a strong representation and participation of ISBE, making up 10% of the total budget.

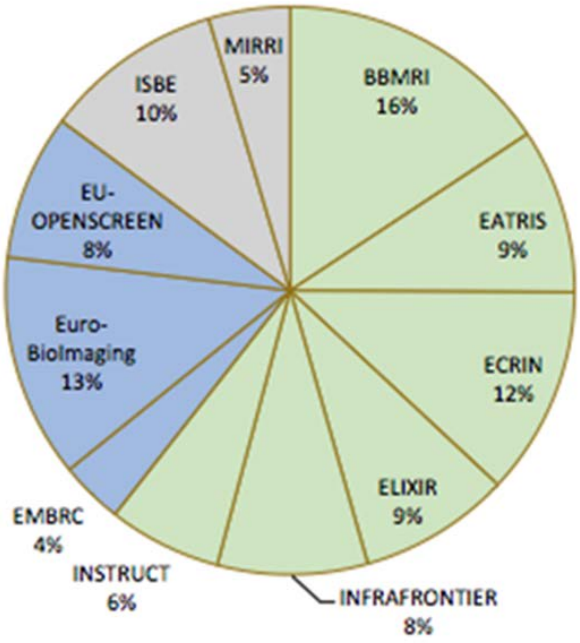

Figure 3: Distribution of budget between BMS RIs in the CORBEL project.

The following ISBE partners are participating in CORBEL work packages (in red, Table 1):

MDC: Max-Delbruck Centre for Molecular Medicine, Berlin
Imperial: Imperial College, London
VUA: VU University Amsterdam
DKFZ: German Cancer Research Institute, Heidelberg
UMAN: University of Manchester

WP	Lead	Partners
WP1 – Management and coordination	**ELIXIR**	All **coordinators** / directors for strategy board, BBMRI, Infrafrontier
WP2 – Documentation, Communication and Outreach	**MIRRI (DSMZ)**	ECRIN, EU-BI (EMBL), EU-OS (FMP), EMBRC (CNRS) **ISBE: Communication of use cases (MDC)**
WP3 – Medical use-cases	**ECRIN**	ELIXIR, BBMRI, EUBI, EATRIS, Infrafrontier
WP4 – Bioscience use-cases	**EUBI** , **Co-lead ISBE**	Instruct, EU-OS, BBMRI, Infrafrontier, EMBRC **Use case 1: ISBE (VUA, MDC)** Use case 2: Eu-Openscreen **(VUA)** Use case 3: EUBI **(DKFZ)** Use case 4: EMBRC **(VUA)**
WP5 – Enabling common solutions for user access	**Infrafrontier, INSTRUCT**	BBMRI, EATRIS, ECRIN, EUBI (EMBL), EMBRC (CNRS), EU-OS (FMP), MIRRI (CABI) **ISBE: through WP4 use cases (MDC)**
WP6 – Data access, management and integration	**ELIXIR**	EUBI (UniDun), Infrafrontier, MIRRI, EU-OS (FMP), EATRIS, BBMRI **ISBE (UMAN): Task 6.1 (lead) and 6.2**
WP7 - ELSI	**BBMRI**	ECRIN, Infrafrontier, ELIXIR, EATRIS
WP8 - Innovation	**EATRIS**	BBMRI, Infrafrontier, Instruct, MIRRI, other RIs incl. **ISBE (Imperial)** (1PM each)
WP9 - Training	**BBMRI**	ELIXIR, Infrafrontier, MUW, EATRIS, CNRS, FVB, EU-BI, Instruct, **ISBE (Imperial, MDC)**, MIRRI

Table 1: ISBE participation in CORBEL work packages.

The ISBE WP5 partner MDC will Co-lead the CORBEL WP4 ('Biological Use case portfolio'), together with the research infrastructure Euro BioImaging. Other ISBE partners participate in tasks of WP 4 and 6, as well as to smaller amounts in the Innovation-, Training-, and Communication Work packages. For detailed information on the tasks involved confer to appendices and D.8.9.

3. Potential multi-ESFRI nodes

Objectives for multi-ESFRI nodes are diverse: they range from maximizing the use of synergies and minimizing duplication between RIs, ensuring common development of services and technologies, facilitating the access of users to the high-class services and increasing the number of users, also from different communities.

As ISBE partner institutes however, will offer distinct services, depending on national expertise, national funding foci and the countries' participation in other RIs and initiatives, decisions on the establishment of common nodes and their characteristics will be left to the partner institutes themselves and their national policies and interests.

So far, Sweden, Norway and the Czech Republic are considering the establishment of common ISBE - ELIXIR nodes at some of their partner institutes. The future development and characteristics of such nodes will depend on national funding decisions.