



D6.2: Innovation Plan

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1 Executive summary

This document is the VECMA Innovation Plan, which is designed to promote interdisciplinary entrepreneurial opportunities within the research activities of the VECMA project, from invention through to exploitation. This promotion will be done as follows: for each invention entering the process, the benefits and potential for impact will be assessed, the capacity to exploit from within the project (and/or need for exploitation beyond the project) will be considered, and the mechanism for exploitation will be formulated, whether for research, societal or commercial impacts. This process will be applied to the anticipated products and services generated from the research.

This document is the top-level plan, to be adhered to by all members of the consortium in executing Innovation Management activities within the project.

2 Introduction

Opportunities to impose verification, validation and uncertainty quantification (VVUQ) can be found everywhere in the HPC simulation world. Indeed, the gap between the simulated model and reality should be quantifiable and understood. In addition, a major aspect of verification is to avoid the errors coming from high performance computer (HPC) implementation including rounding and parallelisation influence on results. The VECMA project aims to develop a reference European open source scalable toolkit for multiscale VVUQ. The project includes the application of the VECMA toolkit (VECMAtk) to a wide spectrum of multiscale, multiphysics applications. VECMA will also impact a wider range of scientific and social scientific domains in European HPC domain, both in the public and private sectors, than the ones addressed in the project.

This innovation plan outlines the following objectives:

- Promote the VECMAtk software stack and its releases according to the release roadmap
- Exploitation of the VECMAtk and supporting services following application testing within the project core partners and beyond:
 - Fusion
 - Advanced materials
 - Weather Forecast and Climate
 - Migration
 - Drug discovery
 - Personalised medicine
 - Computational Fluid Dynamics
 - Other applications, external or internal, that arise as opportunities during the project lifetime
- HPC usage expansion (i.e. new HPC users enabled by VVUQ methods from VECMA)

3 Innovation Management

3.1 Interpretation

There are numerous and varied definitions of Innovation Management used across EU and other projects with research and innovation objectives. In addition, the stakeholders, partners and the wider community have different perspectives on Innovation Management, what it entails and how to achieve success.

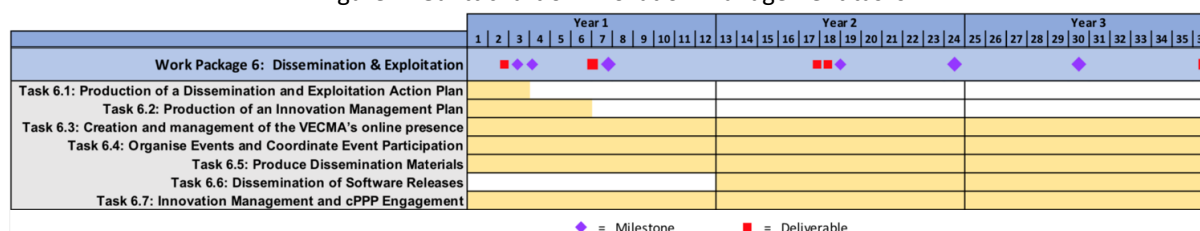
To align perspectives and to support the approach to be adopted in the project, Innovation Management within the VECMA project will use the definition *“Overall management of all activities related to understanding needs, with the objective of identifying new ideas, and managing them in order to develop new products and services which satisfy these needs”*.

These needs encompass the range of research impact, societal impact and commercial impact that may be achieved as a result of the action.

3.2 Implementation

BULL coordinates Innovation Management in the project as Task 6.7 Lead, supported by CBK.

Figure 1: Gantt chart of Innovation Management tasks



Innovation Management will be planned and reported in several deliverables during the project:

- D6.2: Innovation Plan, month 6, a detailed innovation plan, to be adhered to by all members of the consortium, to promote the innovation and commercialisation aspects of this project.
- D6.4: Interim Report Innovation Management Activities, month 18, a report on our initial setting up of framework and results of exploitation activities undertaken in the first half of the project together with engagements and involvement with the wider cPPP community.
- D6.5: Final Dissemination and Innovation Report, month 36, a review of the Dissemination and Innovation activity of the second half of the project.

The detailed descriptions of these tasks and the resources assigned to them can be found in the VECMA Description of Action, an extract of which appears at Annex A.

4 Innovation Process

Innovation Management activities in the project are designed to promote interdisciplinary entrepreneurial opportunities within the research activities, from invention through to exploitation. For each invention entering the process, the benefits and potential for impact will be assessed, the capacity to exploit from within the project (and/or need for exploitation beyond the project) will be considered, and the mechanism for exploitation will be formulated, whether for research, societal or commercial impacts. This process will be applied to the anticipated products and services generated from the research:

- Software Stack
- Training packages
- Verification and validation in VECMA applications and beyond
- Reduced Uncertainty in VECMA applications and beyond
- Exascale enabled multiscale VVUQ
- VECMAtk exploitation at the pre-exascale level

The Innovation Management activities will be coordinated across all work packages as a transversal function. The coordination of the identification and management of IP will be led by CBK and the Project Coordinator (UCL) with advice from The Innovation Advisory Board (IAB) in WP6 and with the help of all partners, where the associated team of leaders will look over all parts of the project in order to identify new opportunities and to appropriately exploit them during and also after the project's execution.

BULL will engage regularly with project partners to ensure it understands what background IP VECMA is relying on, what foreground IP VECMA is developing, who owns it, and what the innovation plans are for the IP during and after the project. The background IP are those identified in the Consortium Agreement.

A register will be maintained recording all external technologies identified by the partners that may enhance the exploitation of IC/IP developed.

BULL will run regular Innovation Management meetings and reviews on a 3-monthly cycle, where the team will meet to discuss and record innovation progress.

VECMA's Partners and Associate Partners will be actively encouraged to engage with a broad range of actors; especially all users of the VECMAtk.

Moreover, the innovation process includes building the VECMAtk community around the software stack itself (which is open to contributions), its success stories etc., but also by convincing the HPC industry that the VECMAtk provides a European VVUQ framework. Thus, in collaboration with the dissemination activity (T6.6), a forum between VECMA actors and the European HPC industry will be established, especially by creating links with ETP4HPC cPPP.

4.1 Stages in Innovation

The European IPR Helpdesk promotes a 4-stage process for Innovation Management and broadly this will be adopted, suitably adapted to the specific needs and capabilities of the consortium members. The stages are:

- Secure the foundations - ensuring the commercial framework is in place and all consortium members are suitably aware, trained and supported in their innovation activities
- Capture project outputs – ensuring the mechanisms are in place to ensure beneficial results enter the innovation process
- Manage and protect project outputs – ensuring the intellectual capital and property in those beneficial results hold their value for subsequent exploitation
- Disseminate, exploit and communicate project outputs – ensuring appropriate effort is expended in order to realize the anticipated research, societal or commercial impact

These stages have been tailored and are expanded in the paragraphs below.

4.1.1 Securing the Foundations

The Consortium Agreement defines the IP access, usage rights and policies (foreground, background, during and after project), together with the IP exploitation policy for the project.

Research institutions within the consortium, such as Bull SAS, have a commercial focus and, as such, have good IP awareness. For those individuals that feel they would benefit from further innovation training, guidance should be sought from CBK.

Similarly, a large number of individuals across the consortium membership have been active in high quality research for some time and have received formal training in good research practice with respect to different innovation aspects. Again, for those that feel they would benefit from additional training on innovation, guidance should be sought from CBK.

In the event that partners ask for training, a dedicated training plan will be set up to answer their needs, which will be included in this document.

4.1.2 Capture Project Outputs

Review of research outputs will occur regularly as part of the work package, technical and applications meetings.

WP6 coordination meetings occur on a monthly basis and on a 3-monthly cycle, BULL will incorporate a specific session to focus on identification and capture of results.

Generators of new know-how, IC and IP will propose those that are candidates to enter the Innovation Management process. Those results identified as candidates for entry into the innovation process will be recorded and also reported to the Executive Board meetings to ensure any additional necessary resources are assigned.

4.1.3 Manage and Protect Project Outputs

For those results entering the process, an assessment at the appropriate level of the IP and the opportunity will be undertaken in task 6.7, covering:

- Patentability, copyright, confidentiality, including conflict or collaboration with existing IP
- Additional formal protection and proving where it was generated
- Competitive position in light of alternative technologies
- Market(s) available for exploitation
- Innovation potential and its enhancement, together with the means to maximize impact

Consortium members should be aware that within H2020 programmes, measures for protection of IP are an allowable cost.

4.1.4 Exploitation of Project Outputs

For those candidates that show a stronger impact potential, a specific plan will be developed to ensure its exploitation to best effect. Several of the VECMA consortium members, as with UCL, have established mechanisms for exploitation of research outputs within their organizations and these will be used as a first port of call by the generators of new IP and know-how on the project.

Within the wider pool of partners and associate partners, VECMA has extensive experience of exploitation from academic, to social, to innovation impact, including commercial impact.

These specific exploitation plans will cover:

- The extent of exploitation achievable from within the project and what are the paths to further exploitation beyond the project community and project timeline

- The most beneficial business model:
 - Contractual research collaboration
 - Contractual dissemination
 - Consultancy
 - Licencing
 - Incubation
 - Spin-out/ start-up
 - Joint venture
- Incorporation of and with 3rd party capability/products
- Financial case and investment proposition
- Market assessment and sales & marketing campaign
- Business plan – what/when/how/who

Where required, BULL will match consortium members with the wider expertise available across the project in order to plan and execute exploitation activities.

4.1.5 Exploitation of VECMA^{tk}

The VECMA project has a defined roadmap for developing the VECMA^{tk} software stack, while deep application testing is undertaken. This testing will provide direct feedback to revise and improve the toolkit in order to broaden its effectiveness and its use. Regular updating and re-issuing of the software stack is anticipated to give rise to opportunities for further exploitation and ultimately increase the overall impact of the action. Early Innovation efforts will focus on the feedback from this application testing, along with the exploitation channels that may arise in dialogue between the project and external partners as they explore the use of VECMA^{tk} in their domains. We will also explore how partners and users might exploit the toolkit for the benefit of the economy, whether local, regional, national or global.

4.2 Intellectual Property and Intellectual Property Rights

Creation and management of the VECMA IP Registry is one of the tasks coordinated by the management of the project. Bull will follow up such Intellectual Property via this IP Registry.

The IP Registry contains all information regarding the IC/IP components in the project, with each component defined and detailed within it. The IP Registry is available centrally within the VECMA intranet and it will be continuously updated as new components are gathered following the various reviews of results.

The IP registry records the status of the project IC/IP components (background/foreground/know-how), the ownership & access rights, protection arranged (or to be arranged) and the pre-publication reviews and public disclosure monitoring required.

The project General Agreement details the terms of common use, ownership of foreground/background IP and its commercialization. Consortium members can seek further guidance as necessary from BULL. The IP Registry can be found in the VECMA Intranet (WP6 section).

4.3 Performance Reviews

The early activities will focus on stages 1 and 2 of the Innovation Management process, namely ensuring that the project has firm foundations in framework, training and support and that all IP

brought into the project is properly identified, characterized and made available for active use across the project.

BULL will lead in reviewing the performance of these activities annually as the project progresses.

5 Innovation Advisory Board

The project has established an Innovation Advisory Board, chaired by Bull, to provide strategic guidance and support in Innovation Management within the project. The members of the board are drawn both from within and externally to the project. Its composition will change in order to meet the specific needs of the emerging innovation activities as they evolve.

The Innovation Advisory Board will be increasingly consulted as the programme of innovation activities grows during the project. Early release of the software stack is anticipated to generate early results to enter the innovation process and it is the assessment of these results that will receive early input from the board.

The Innovation Advisory Board is currently composed of:

- Beniamino Di Martino, UniCampania
- Pär Strand, Chalmers University of Technology
- Javier Garcia-Blas, University Carlos III of Madrid

The detailed Terms of Reference for the board are included at Annex B.

6 Project Key Performance Indicators

All Innovation Management activities will adhere to the overall project philosophy of working towards clear Key Performance Indicators (KPIs). Those related to Innovation Management specifically, or those to which Innovation Management has a significant contribution will be included at Annex C in future revisions as the project KPIs are established.

7 Bibliography

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- CENELEC – Integrating standards in your Horizon 2020 project - https://www.cencenelec.eu/News/Publications/Publications/Standards_Horizon2020.pdf
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Annex A – Extract from Description of the Action – Innovation Task Descriptions

Task 1.5: Business Plan (M24-36)

Leader: BULL (1PM); partners: UCL (1PM), CBK (1PM)

VECMA will develop a formal Business Plan for its continuance that captures the evidence generated from within the project that supports future revenues, marrying that with its assessment of the potential for future business and the real sources of finance that have been identified. The Business Plan will show the form that VECMA will take after the project, the target income streams that are available to it when the grant ceases, as well as a capture plan for commercial activities and for external investment as appropriate.

Task 6.2: Production of an Innovation Management Plan (M1-6)

Leader: CBK (1PM); partners: BULL (1PM)

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Task 6.7: Innovation Management and cPPP Engagement (M1-36)

Leader: BULL (3PM); partners: CBK (1PM)

The Innovation Management activities will be coordinated across all work packages as a transversal function. Under the direction of the WP6 managers and with input from the Innovation Advisory Board, the associated team will look over all parts of the project in order to identify new opportunities and to appropriately exploit them during and also after the project's execution. This task will also be responsible for creating links to the ETP4HPC contractual Public-Private Partnership, to establish a forum and mechanism for the HPC industry to interact with our communities, whether in academia or industry. This task will oversee nominating potential members of the Innovation Advisory Board, who will then be formally voted onto the board by the General Assembly.

Annex B - Innovation Advisory Board Terms of Reference

The following terms of reference have been developed to guide invitation, selection and management of input to the project from the Innovation Advisory Board:

- The chair of the IAB will be Erwan Raffin of BULL, which coordinates Task 6.7 Innovation Management and cPPP Engagement
- The IAB members will be drawn from stakeholder groups from within and external to the project to ensure a positive mix of perspectives and contributions
- Initial membership of the IAB will be for 12-18 months only, thereafter existing members will be replaced to reflect the required contribution as the project progresses
- The board will be supported by internal members drawn from the VECMA partners
- Members will represent their own view and not those of their parent organizations and shall sign up to confidentiality as individuals to allow their access to information confidential to the project as required
- The IAB will be called on for advice on general and specific issues arising from Innovation Management activities with specific focus on maximising Impact; research, societal and commercial