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# D1.2 Quality Assurance and Risk Management Plan

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| 0.0 | 10.10.2024 | Martin Jírovec (BUT) | First draft of the minutes |
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| 0.4 | 26.11.2024 | Tomáš Vojnar (BUT | Proofreading, comments and revision of the final draft |
| 1.0 | 29.11.2024 | Milan Češka (BUT) | Finalizing deliverable |

## Executive summary

This document, standing for D1.2 Quality Assurance and Risk Management Plan, outlines rules to ensure effective quality assurance and risk management throughout the VASSAL project to ensure that adverse situations are properly managed along the progress of the project. Furthermore, the deliverable aims to enhance appropriate contingency planning to mitigate the impact of these risks if the latter occur.

This Plan details the processes and procedures to manage and control events that could have a negative impact on the project implementation. The factors that have been recognised as potential risks for the project have been categorised and described to estimate the impact of these risks and to outline strategies on how to mitigate them. This document also serves as a reference for the consortium members and delivery of the day-to-day work throughout the project and will be regularly updated.

This deliverable is closely connected to D1.1 Project Management Plan, which provides a general overview of the management procedures of the project.

## List of Abbreviations

| Abbreviation | Description |
|---|---|
| BUT | Brno University of Technology |
| TUW | Vienna University of Technology |
| CEA | The French Alternative Energies and Atomic Energy Commission |
| PSU | The Pennsylvania State University |
| HISRO | Honeywell International |
| EC | European Commission |
| SC | Steering Committee |
| PC | Project Coordinator |
| PM | Project Manager |
| WP | Work Package |

# Contents

# 1 INTRODUCTION

This document outlines the plans and procedures essential for the successful implementation of the project. It serves as a comprehensive guide to ensure the delivery of high-quality outputs, effective risk management, and active collaboration among consortium members.

## 1.1 THE VASSAL PROJECT

The objective of the VASSAL project is to elevate the research profile, visibility and reputation of Brno University of Technology (BUT) by fostering excellence in research and innovation (R&I) as well as by leveraging the institutional R&I governance and administration competencies while ensuring the integration and sustainability of the project. This will be achieved through intensive collaboration and knowledge sharing with internationally renowned consortium partners Vienna University of Technology (TUW), CEA, Penn State University (PSU) and Honeywell International (HISRO). The VASSAL project will use a series of twinning actions focused on several key areas to elevate the excellence of capacities and research profile of all consortium partners, mainly BUT. VASSAL aims to raise the reputation of participating institutions and deepen their collaboration while establishing new partnerships with stakeholders and opening funding opportunities.

The VASSAL project is dedicated to seeking significant advancements in its scientific domain of software safety and security and delivering cutting-edge technologies by integrating model-based design (MBD) preconditions with formal methods (FMs) for automated analysis and verification. This combined approach ensures software reliability from development through to operations. By assessing the economic implications of deploying these advanced verification tools, VASSAL aims to provide insights into the benefits and challenges for end-users, particularly in critical applications such as automotive and aerospace systems.

VASSAL is coordinated by the Brno University of Technology (BUT), with the participation of a total of four partners from EU countries and the USA.

## 1.2 PURPOSE OF DELIVERABLE

### Quality Assurance and Risk Management Plan

This deliverable outlines the quality procedures to be followed throughout the project. The document serves as a guide for both the project coordinator and partners, ensuring that quality reviews are conducted at appropriate stages. It also provides a reference for understanding participants' responsibilities related to communication, deliverables, and project outcomes.

The main objectives of this document concerning quality assurance and risk management are to:

1. Outline, explain and manage the interaction between beneficiaries and linked third parties during the project;
2. Define the rules for regular progress monitoring;
3. Establish editorial and quality standards for project documents;
4. Provide instructions for using the project templates.

## 1.3 INTENDED AUDIENCE

The main audience for this deliverable is the Consortium partners, as it outlines the internal processes necessary for smooth project management and effective internal communication. It serves as a reference for all project team members and is particularly useful for individuals or organisations joining the project later. Each project beneficiary and member must ensure that all team members are familiar with the provisions of this document.

# 2 QUALITY MANAGEMENT

Quality management is of importance to the VASSAL project, where the main focus is on the timely completion and provision of the deliverables to the EC and the preparation of high-quality documents.

The timely delivery of all documents will be part of regular status updates among the members of the project consortium. The due dates of all deliverables were communicated and agreed on with all partners upfront and can be viewed in a shared document. During each teleconference, the Project Coordinator provides a review of timelines and deliverables with particular attention to upcoming deliverables. This ensures that all WP Leaders are fully aware of the deadlines. The WP Leader, in turn, has the responsibility of the timely completion of the deliverables that lie within his or her work package. WP Leader coordinates preparation with the Lead Author and ensures that all contributors are informed of deadlines and will establish preliminary structures for reports and other deliverables early in the process.

The quality management process for deliverables focuses on the following aspects:

- **Clarity and presentation**: Is the document well-written and easy to read? Is there an appropriate balance between text and illustrations? Does the layout enhance readability? Are all illustrations, tables, and references properly cited and complete? Is there clear guidance for users (e.g., guidelines, tools)?
- **Internal Validity**: Is the content, including text and data, consistent and credible? Are there any contradictions between the data and the narrative? etc.
- **Contribution and Compliance**: Does the deliverable align with the task's objectives? Is it tailored to the intended audience? Are there any deviations from the proposal, either in content or format? etc.

To ensure the deliverables meet the required standards, the quality management process follows three levels of review:

- **First level**: An internal review by the Work Package (WP) Leader. Each deliverable produced by a work package is reviewed by its WP Leader or a designated alternate. The WP Leader collaborates with the Lead Author to ensure the draft is of sufficient quality for the next level of review.
- **Second level**: A cross-check by other consortium partners. Each deliverable is reviewed by, ad-hoc nominated, Reviewers from other project partners than the Lead Author. This ensures an independent evaluation of the deliverable within the consortium.
- **Third level**: A review by the Steering Committee. This level is reserved for key deliverables critical to the practical application of the VASSAL approach, such as drafts related to the Progress Report (D1.6), Final R&I Report (D3.2), and Sustainability (D5.2). This limits the Steering Committee's involvement to the most significant deliverables.

At each review stage, the WP Leader will plan the review with an adequate time reserve and coordinate it with the reviewers. Reviewers will provide their written feedback to the WP Leader and the contributors of the deliverable. The WP Leader or contributors will then either incorporate the comments into the document or provide a justification for rejecting them. Additionally, the WP Leader and contributors will ensure that the performance indicators for each WP, as outlined in the grant agreement, are addressed in the deliverables.

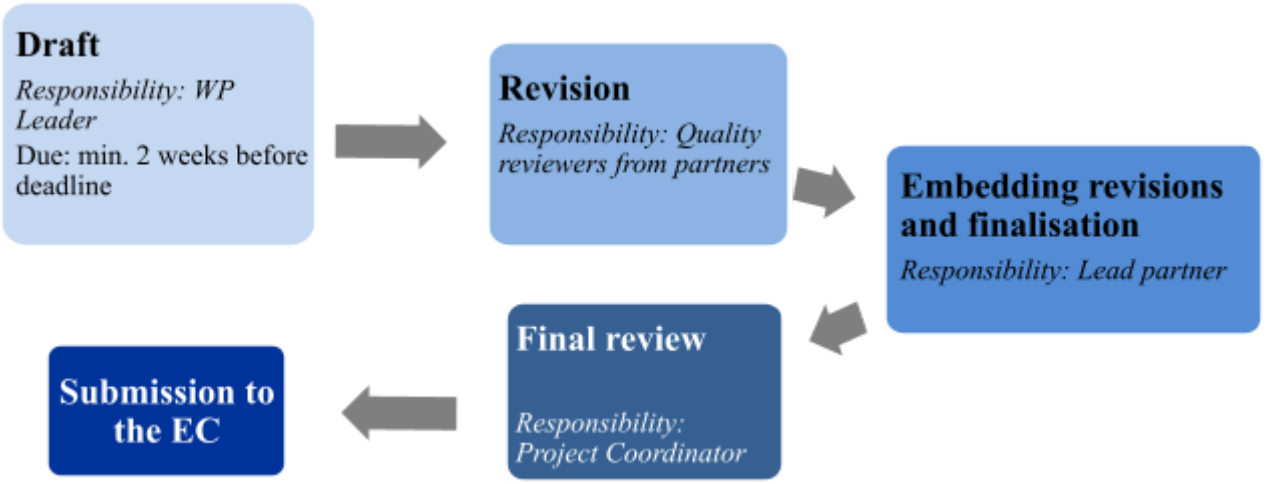


*Figure 1: Quality control and review strategy*

## 2.1. DELIVERABLES DEVELOPMENT

### 2.1.1. RESPONSIBILITIES

Consortium members have the following responsibilities:

- **Lead authors** are responsible for ensuring that deliverables are completed on time, meet high-quality standards, and align with the objectives outlined in the Grant Agreement (GA). To achieve this, they will develop a detailed plan and oversee the preparation of the deliverable, working closely with designated contributors and peer reviewers to ensure seamless coordination and compliance with requirements.
- **WP leaders** are responsible for the initial review of the deliverable. They will be in close contact with the lead authors to ensure timely incorporation of edits and suggestions into the document.
- **The coordinator** is responsible for conducting the final review of any deliverable and ensuring its timely submission via the SYGMA Portal. In the event of challenges or difficulties encountered during the process, the coordinator will support task leaders and partners in identifying and implementing solutions to facilitate the efficient and effective production of the deliverable.

### 2.1.2. DELIVERABLE DEVELOPMENT PLAN

Task leaders are responsible for ensuring the timely delivery of high-quality outputs. To achieve this, they will prepare a production plan for each deliverable, commonly at least 4 weeks prior to the submission deadline, depending on the complexity of the deliverable. This plan will be shared with designated contributors and peer reviewers and will include the following key elements:

- A timeline for the deliverable's development
- Partners involved in its preparation
- Partners Reviews
- A proposed outline of the deliverable

### 2.1.3 DRAFTING PROCESS

The task leader will be responsible for preparing an initial draft of the deliverable, which will be shared with all task contributors. Following the collection of their feedback, the task leader will revise and produce an updated version of the deliverable. This revised draft will then be submitted to the designated peer reviewers for further evaluation and input.

### 2.1.4 REVIEW

To ensure that the project's objectives are met, deliverables will be reviewed by partners, approximately two weeks prior to the submission deadline. In addition, the project's Steering Committee will conduct reviews of some deliverables, and the Ethics Board, the Advisory Board or other VASSAL body might be requested to engage and to provide external expertise, feedback and expert's knowledge.

**Final Review.** The deliverable will be submitted to the project coordinator approximately one week prior to the submission deadline for final review. During this review, the coordinator will verify the deliverable's compliance with the Description of Action (DoA) and the project's objectives, assess the quality of the content, and ensure adherence to established templates and branding requirements, including logos.

Upon approval, the coordinator will submit the finalized deliverable to the EC via the SYGMA Portal. Additionally, the coordinator will ensure that relevant public deliverables are published on the project website and disseminated to a broader audience.

The process and responsibilities associated with the production of each deliverable are summarized in the table below:

| WP no. | Deliverable | No. | Lead | Due Date | Type | Dis-Level |
|---|---|---|---|---|---|---|
| 1 | Project Management Plan | 1.1 | BUT | M3 | R | SEN |
| 1 | Quality Assurance and Risk management plan | 1.2 | BUT | M6 | R | PU |
| 1 | First version of the Data Management Plan (DMP) | 1.3 | BUT | M6 | DMP | PU |
| 1 | Updated version of the Data Management Plan (DMP) | 1.4 | BUT | M18 | DMP | PU |
| 1 | Final version of the Data Management Plan (DMP) | 1.5 | BUT | M36 | DMP | PU |
| 1 | Progress Report | 1.6 | BUT | M17 | R | SEN |
| 2 | Scientific excellence Strategy | 2.1 | CEA | M9 | R | SEN |
| 2 | 1st Report on scientific networking, mobilities, training & capacities building, incl. Ethics & inclusiveness in science | 2.2 | BUT | M18 | R | SEN |
| 2 | Final Report on scientific networking, mobilities, training & capacities building, incl. Ethics & inclusiveness in science | 2.3 | TUW | M36 | R | SEN |
| 3 | Research plan | 3.1 | TUW | M5 | R | SEN |
| 3 | R&I final report | 3.2 | CEA | M36 | R | SEN |
| 4 | 1st part of the "R&I Governance and Administration Strategy" | 4.1 | TUW | M9 | R | SEN |
| 4 | Final "R&I Governance and Administration Strategy" | 4.2 | TUW | M23 | R | SEN |
| 4 | 1st Report on admin. networking, mobilities, training & capacities building, incl. institutional ethics & inclusiveness | 4.3 | BUT | M24 | R | SEN |
| 4 | Final Report on admin. networking, mobilities, training & capacities building, incl. institutional ethics & inclusiveness | 4.4 | TUW | M36 | R | SEN |
| 5 | Integration and Networking plan | 5.1 | TUW | M15 | R | PU |
| 5 | Sustainability Plan and R&I Roadmap | 5.2 | CEA | M35 | R | SEN |
| 6 | First version of the Dissemination and Exploitation (D&E) Plan, including Communication Activities | 6.1 | TUW | M6 | R | PU |
| 6 | Mid-Term/Updated version of the Dissemination and Exploitation (D&E) Plan, including Communication Activities | 6.2 | TUW | M23 | R | PU |

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|---|---|---|---|---|---|---|
| 6 | Final version of the Dissemination and Exploitation (D&E) Plan, including Communication Activities | 6.3 | TUW | M36 | R | PU |
| 6 | Report on publications, Proceedings of scientific conferences and DEC activities | 6.4 | BUT | M36 | R | PU |

*Legend*: Report (R), Data Management Plan (DMP), Public (PU), Sensitive (SEN)

# 3 RISK MANAGEMENT

Risk management is a continuous process throughout the project's duration, aimed at identifying and mitigating potential risks. As with any project, VASSAL may face various risks that could hinder the achievement of its objectives. The primary objective of the risk management process is to anticipate these potential risks, assess their likelihood and impact, and establish control and mitigation measures.

Risk management consists of the following activities:

- Risk identification - spotting the events which can compromise the timing, costs, quality or scope of the project;
- Risk analysis - estimation of the exposure to each risk;
- Response planning and implementation - strategy planned to mitigate the risk;
- Risk monitoring and reporting - tracking the risk status and the progress in solving the issue if occurred.

Each activity is further described in the sections below.

## 3.1 RISK IDENTIFICATION

Risk identification is a set of activities that detect, describe and catalogue all potential risks to assets and processes that could negatively impact project outcomes in terms of costs, timing, quality or scope. During the project preparation phase, a number of possible risks and their respective mitigation measures were identified. Those were listed in the project Proposal (PART B) and as well in the Grant Agreement (see List of Critical Risks, p. 23-24).

Risk identification is done whenever a new risk is identified by a Consortium partner during the project, and it is fundamental to activate the following Risk management activities. Once a new risk arises, the partner which has identified it shall notify the PC (as WP1 Leader) and the risk-related WP Leader(s). The WP Leader(s) will be in charge of updating the List of Critical Risks with the Risk description and related mitigation measures.

The following issues can be considered as tools and techniques for risk identification (non-exhaustive list):

- Analysis of deliverables/milestones status;
- Analysis of WP schedules, timing and scopes;
- Analysis of internal and external relations;
- Analysis of the project context.

## 3.2 RISK ANALYSIS

Risks are generally evaluated based on two key factors: their probability and severity of their impact.

When a possible risk has been identified, it is important to assess the likelihood that the risk may be realised in the project lifetime (or its sustainability period) and the size of its possible impact, if it is realised. The exposure to a given risk is estimated using a risk matrix, which assesses each risk according to these two dimensions on a given scale (low - medium - high).

The following figure represents the risk matrix. The output (being shown with the different colours within the matrix) classifies the risk level (i.e., “very low risk, low risk, medium risk, high risk or very high risk”). The risk analysis is part of the activities that the WP Leader(s) involved shall do when updating the Risk management register (see section 3.5).

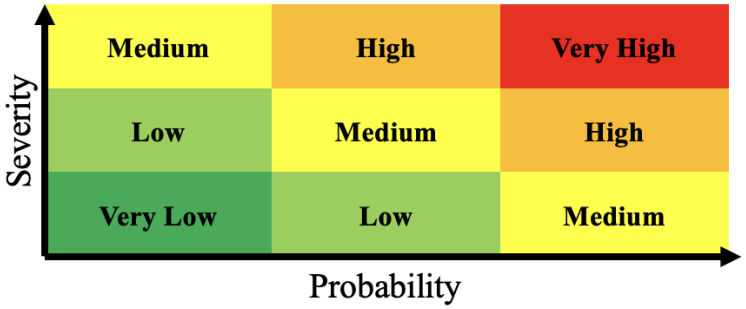


*Figure 2: Dimensions of Risks Assessment*

## 3.3 RESPONSE PLANNING AND IMPLEMENTATION

The response plan selects the most suitable risk response strategy, identifies and plans the actions required to control the risks, to eliminate the risk and mitigate the probability that it occurs, and its impact. The response plan involves defining a contingency plan for each risk and, if successful, leads to the re-scoring of the risk.

The risk owner (the body/individual who is responsible for the management, monitoring and control of all aspects of a risk, including the implementation of the selected responses) is identified on the basis of the risk type. As a general rule for the VASSAL project, the Risk owner is the WP Leader of the WP (mainly) affected by the risk. For instance, project management risks are assigned to BUT, as WP1 Leader. Of course, if it is more suitable for a risk, partners can agree to choose another partner as the Risk owner.

## 3.4 MONITORING AND REPORTING

Risk monitoring controls the implementation of risk response activities while at the same time continuously monitoring the project for changes in identified risks or the appearance of new ones.

It is the responsibility of the Risk owner to keep track and communicate to the PC - as WP1 Leader. In the case of any changes, the status of each risk and the effectiveness of each response action implemented should be reported.

The communication shall happen through the update of the Risk Management Register (see section 3.5), which would be accessible for all team members in the shared Google Disc Drive, together with an informal communication by email.

The Risk Management and Risk Management Register will be regularly discussed at the Steering Committee meetings.

## 3.5 RISK MANAGEMENT REGISTER

A risk management register is a document that is used as a risk management tool to identify potential threats within a project. This process aims to collectively identify, analyse, and solve risks before they become problems. A risk management register tracks potential risks; it also includes information about the priority of the risk and the likelihood of it happening.

A project risk register should not only identify and analyse risks, but also provide tangible mitigation measures. This way, if the risk becomes a larger threat, our team is prepared to seek suitable solutions to solve the issues.

An overview of the possible risks (Table 1) associated with the VASSAL project includes risk's probability, severity, corresponding mitigation measures, and status. A similar table can be found in Part A) of Annex I. Any new risks identified during the project will be addressed during regular project meetings or

teleconferences, or, in cases of severe risks, through exceptional meetings. In these discussions, the consortium will evaluate mitigation strategies and decide on the appropriate course of action. If an unexpected severe risk emerges that threatens the project's overall success and cannot be adequately managed, the Project Coordinator will immediately notify the EC project manager, outlining the risk and its potential impact and consequences.

During the project initiation phase, the team identified critical risks and developed corresponding mitigation measures. These risks, along with those identified during the project's execution, are systematically tracked and managed to ensure smooth implementation. Details of the identified risks and mitigation strategies are presented in the table below, which includes:

- **Description of Each Identified Risk**: Including the relevant WPs where the risk may occur.
- **Risk Assessment**: Evaluating the likelihood and impact of each risk.
- **Proposed Mitigation Response**: Outlining strategies to address and mitigate the risk.
- **Responsible Partner**: Identifying the partner assigned to implement the mitigation actions.
- **Status** of a risk: Describing whether a risk is to be/being solved (pending) or inactive

*Table 1: Overview of possible risks and planned risk mitigation measures*
*Legend:* Scale: 1 = lowest, 3 = highest

| Description | WP | Risk-mitigation measures | Partner in-charge | Likelihood | Impact | Status |
|---|---|---|---|---|---|---|
| Partner leaving the consortium; | All | Extraordinary SC meeting to assess whether a leaving partner's work can be covered by other consortium members or otherwise. Liaison with a grant provider on existence of complications, beginning of needed procedures. | BUT | 1 | 3 | **Pending** |
| Endangered Sustainability; | 5 | Intensified funding and commercial R&I acquisition by R&I support units; training in proposal applications skills and creativity. | BUT | 2 | 3 | **Inactive** |
| Key personnel leaving the team; | All | In each task force and at each partner, there is a sufficient overlap of competences and more staff members included. Therefore, any loss of personnel can thus be compensated. We operate a shared repository of documents where key documents are shared, bridging the knowledge continuity. | BUT | 1 | 3 | **Inactive** |
| Communication and implementation problems; | All | The Kick-off meeting has established personal contacts. Consortium members will follow guidelines and communicate regularly via email, MS Teams, and in-person. PC and WP leads will be prepared to redesign and reattribute activities within the VASSAL and seek expertise in the Advisory Group in case circumstances should change. | BUT | 2 | 2 | **Inactive** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Insufficient interest in VASSAL outputs from stakeholders; Issues in IPR; | 2,3, 5,6 | R&I plan and performance benchmarked with interests and needs of stakeholders including suggestions for improvements. Networking will further activate collaboration networks and mediate communication with potential users. VASSAL will consult international peers to assist and evaluate gaps and to learn best practices in avoiding risks. | BUT | 2 | 2 | **Inactive** |
| Underperforming admin. capacities; | 4 | Improvement of skills via intensive training, recruitment of admin talent. Partners offer spare capacities. | BUT | 2 | 2 | **Inactive** |
| Weak policy support for SW engineering R&I; | 5,6 | Work with certification and policy making stakeholders to understand their concerns and include them in sustainability strategy design and R&I roadmap T5.2. We reach out to the policy sector to ensure representation of SW/system security and safety in relevant strategies. | BUT | 2 | 2 | **Inactive** |
| Non-fulfilment of monitoring indicators, delays in delivering in due time; | All | The SC regular meetings or ad-hoc in urgent matters. A partner not adhering to rules revises its strategy. Reinforced direct communication between the PC and the concerned partner, ensuring adherence to the schedule and alignment. If needed, revision of PA to re-establish the terms | BUT | 1 | 3 | **Inactive** |
| Data compliance and protection; | All | The manager in charge performs a preliminary evaluation of the situation with the support of IT and legal departments. Identification of data risks, the assessment and selection of technical mitigation strategies. | All | 1 | 3 | **Inactive** |
| Issues in reaching the R&I goals, changes on planning execution; | 3 | The task leaders of WP3 monitor progress on a bi-weekly basis and report to the WP3 leader, who immediately addresses the risk at the Steering Committee meeting. Rescheduling of the work plan and applying any corrective actions ensuring objectives are reached. A list of measures will be created. | BUT | 1 | 3 | **Inactive** |
| Low quality of submitted international proposals; | 2,3, 4,5 | The steering committee and project coordinator analyse the reasons. WP leader(s) proposes counter-measures. Enhanced engagement of the advanced partners' Grant Offices, seeking external support, seeking more competitive consortia. Improvement of skills via intensive training (writing, proposal applications skills etc.) | BUT | 2 | 2 | **Inactive** |

| | | | | | | |
|---|---|---|---|---|---|---|
| WPs work hinder the achievement of project objectives. | All | BUT will facilitate communication among project partners to ensure synergies across all WPs. The project coordinator will explore and discuss with the Steering Committee alternative methodologies to ensure project progress. | BUT | 1 | 3 | **Inactive** |
| Financial shortage; Expenses exceeding budget; | 1 | Realistic planning of the cost setting and spending as per Consortium Agreement and through coordination – regular expenditures reviews ensuring timely and accurate cost certification; proactive operation of SC constantly updated on expenses and forecasts. | BUT | 1 | 2 | **Inactive** |
| Low visibility and dissemination of project outcomes and results | 6 | All project partners will leverage their networks to actively promote the project's activities and results. Additionally, the Advisory Board will be engaged to strengthen dissemination efforts, ensuring broader reach and impact. | BUT | 1 | 2 | **Inactive** |
| Cancellation of training due to force majeure | 2, 4 | Online training replaces physical training. The leader ensures the use of suitable infrastructure to promote adequate participation and active engagement. | BUT | 1 | 2 | **Inactive** |
| Partners face challenges in completing reporting due to staff changes or organizational issues. | All | The coordinator maintains regular contact with partners and requests the necessary documentation to complete reporting. | BUT | 1 | 1 | **Inactive** |
| Underperforming partner | All | Ad-hoc meeting of the project coordinator with an under-performing partner to remind the obligations and devise a plan to get activity back on track. If there are no immediate signs of improvement, the coordinator seeks advice from the project officer. In short term, redistribute the work among other partners, and in the long term, replace partner | BUT | 1 | 1 | **Inactive** |

# 4 CONCLUSION

This deliverable outlines the Quality Assurance and Risk Management for the VASSAL project. Quality Assurance is designed to ensure the quality of the project's outputs, while Risk Management focuses on identifying, anticipating, and mitigating potential risks throughout the project lifecycle. This document establishes the quality management procedures necessary to maintain high standards in project execution and defines the risk management processes for effective risk detection, monitoring, and mitigation. It will serve as a key reference for all consortium members throughout the project duration.