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Abstract	Risk management plan identifying sources of risks and severity, likelihood of occurrence and controllability assessment, risk responses (strategy to reduce negative impact, mitigation and contingency plans as preliminary defined) and adjust the plan and managing events that may have a positive (opportunities) or negative (threats) effect on project's development and sustainability. Released in M3, it will remain a living document during the whole project duration.



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Versioning and Contribution History

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v.01	19/03/2018	Pilar Raya	First version
v.02	21/03/2018	Sandra Correas	Review and updates
v.03	02/04/2018	Diego Torricelli	Internal revision

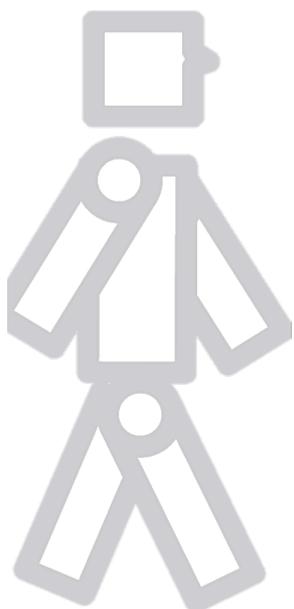


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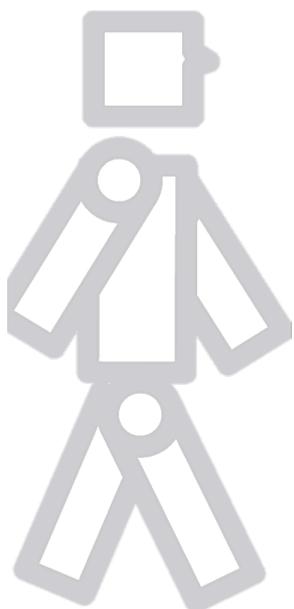
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List of Abbreviations and Acronyms

Abbreviation/Acronym	Meaning
DoA	Description of Action
EC	European Commission
WP	Work Package
PC	Project coordinator
KPI	Key Performance Indicator



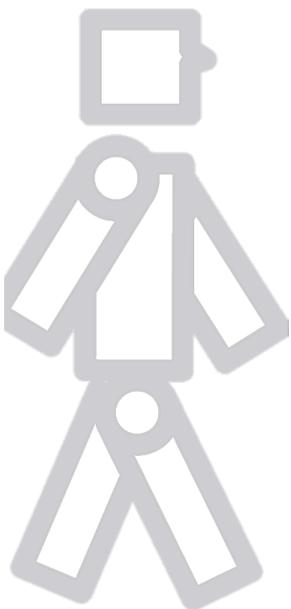
1 Executive Summary

During the implementation of the EUROBENCH project, the management process will identify and monitor technical and management risks as well as any other issues that might affect the project progress towards its objectives, in order to carry out mitigation actions as early as possible.

Risks can arise from unexpected technical difficulties or scientific findings, poor communication or co-operation between the partners, resource shortage by the partners, objectives not achievable in terms of budget or feasibility, partners leaving the consortium, human operational errors: planning errors, poor quality, etc.

The Project Coordinator (PC) will be ultimately responsible for the oversight of the entire project against milestones and KPIs and to apply Risk Management procedures. Both KPIs and Risks will be continuously updated and included in this Risk Management Plan.

Each partner has the responsibility to report immediately to their respective WP leader and to the Technical Coordinator any risky situation that may arise and may affect the project objectives or their successful completion. Any change in the time schedule of the deliverables or in the allocated budget must be reported to the corresponding WP Leader or to the Project Coordinator. In case of problems or delays, the Steering Committee will be consulted, and it may set up task forces in order to take the necessary actions. In case there is no resolution, the SC will establish mitigation plans to reduce the impact of risk occurring. Responses may include: strengthened supervision, adjustments to project strategy, changes to implementation arrangements and changes in budget allocations.



2 Specific roles and responsibilities

Quality and risk management will be performed under the supervision of the Project Coordinator, who will be responsible for the following tasks:

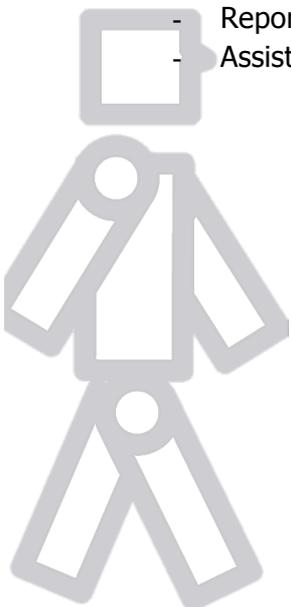
- Allocating the required resources and time to execute the Quality Assurance Plan within the scope of the project budget and schedule.
- Developing, distributing and implementing the Quality Assurance Plan.
- Monitoring the project to identify any new or changing risks.
- Updating the initial risk list with the support of the consortium.
- Contributing to risk mitigation and contingency planning.
- Coordinating with the consortium to monitor risks and implement risk response strategies.
- Managing quality control procedures on deliverables.
- Monitoring the effectiveness of the risk management strategies.
- Reporting regularly to the consortium.
- Making the final decision on risk actions, in co-ordination with the WP Leaders.

Steering Committee responsibilities include:

- Developing and/or updating the risk response strategy.
- Monitoring the assigned risks and informing the Project Coordinator of any threats or opportunities to the project.
- Assessing the probability that a risk will occur and specifying the criteria used to assess the probability.
- Assessing the impact of risks on project cost, time, scope, and quality objectives, and specifying the criteria used to assess the impact.

Work Package (WP) Leaders are responsible for the following tasks within their work package(s):

- Identifying and describing any risk.
- Helping to identify the risk owners and assisting in developing the risk response strategies.
- Performing the risk response steps assigned.
- Reporting on the progress of the risk response to the Project Coordinator.
- Assisting the Project Coordinator in activities associated with risk monitoring and control.



3 Risk management procedure

The risk management procedure includes the following steps: risk identification, analysis, response planning, and monitoring and control.

The Consortium before the beginning of the project forecasted a table of risks. This table will be completed and updated during the project progress. This *Risk Management Register* (See Table 1 and Table 2) will be maintained and will be used to record all possible risks of the project and any subsequent measures or actions required. The Risk Management Register will be placed on the intranet website and will be continuously updated.



Figure 1: Risk processing process

3.1 Risk Identification

Risk identification will be done throughout the life-cycle of the EUROBENCH project, with an emphasis on identifying risks as early as possible so effective response planning and subsequent monitoring can take place. Risk Identification will be performed within work packages. WP leaders will report the risks and suggestions for the risk priority to the Steering Committee, which will agree on the final risk priority as well as on the respective response strategy. Identified risks will be included into the Risk Management Register. This register will be accessible to the consortium through the Intranet platform.

3.2 Risk Analysis

After a risk or group of risks has been identified and documented, it is important to assess the probability that the risk may occur and if it occurs, the size of the possible impact. The exposure to a given risk is estimated using a risk matrix:



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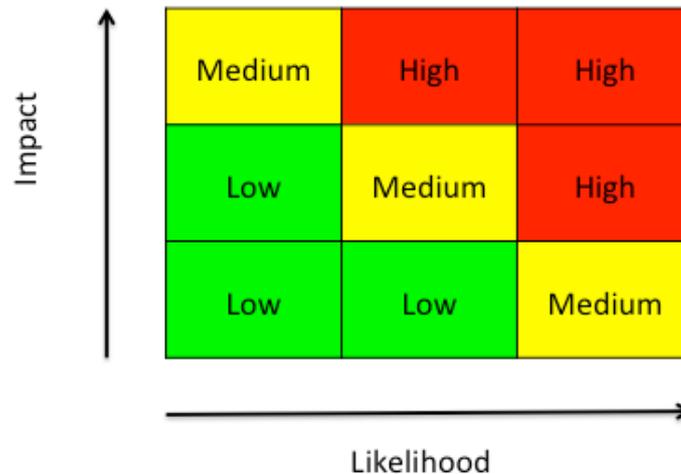


Figure 2: Risk matrix

With the following meaning:

- Low: very unlikely, but not impossible.
- Medium: Quite possible
- High: more likely to happen than not

Concerning each risk, the Steering Committee will estimate the probability it could become a problem (Low/Medium/High). The results of risk analysis will be included into the Risk Management Register.

3.3 Response planning

During risk response planning, strategies and plans are developed to minimise the effects of the risk to a point where it can be controlled and managed. During response planning, higher priority risks should receive more attention than lower priority risks. Every risk that poses a threat should be assigned to a responsible party during response planning.

The following strategies will be taken (depending on the risk category):

- For high and medium - priority risks: Mitigation. Risk mitigation involves reducing the probability and/or the impact of a risk to an acceptable level. Taking early and proactive action against a risk is often more effective than attempting to repair the damage a realised risk has caused. Contingency planning is an example of risk mitigation.
- For low-priority risks: Acceptance. Acceptance is often taken as a risk strategy since it is very difficult to plan responses for every identified risk. Risk acceptance should normally only be utilised for low-priority risks. Risk acceptance can be passive, where no action is taken at all, or active. The most common active approach to risk acceptance is to develop a cost and/or schedule revision to accommodate known (or unknown) threats. Utilising a risk acceptance approach determines that the risk should be monitored rather than reassessed.

The results of response planning will be included into the Risk Management Register.

3.4 Risk Monitoring and Control

Each Work Package Leader is responsible for the Risk Management within their Work Package. Each project partner is highly encouraged to communicate and discuss any (possible) risks and response planning with their Work Package Leader. It is the responsibility of all EUROBENCH partners to communicate the Project Coordinator about the status and effectiveness of each risk and mitigation plan in order to update the Risk Management Register and assess the relevance of the tools. Risk exposure will be continuously re-evaluated and modified accordingly and the results of monitoring and control will be documented.

The partners already performed a risk analysis jointly during proposal preparation. The risks have been classified as general management risks (Table 1) and more specific technical risks (Table 2), which relate to the technical work carried out in EUROBENCH. This list, which represents the Risk Management Register, currently includes some new risks (R24-R30) that have been identified in the first three months of the project.

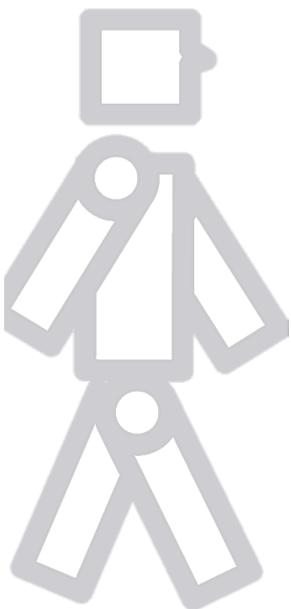


Table 1. Risk Management Register: Management & dissemination related risks

RISK N°	RISK	WPs	MITIGATION PLAN	Likelihood (1-3)	Impact (1-3)	Risk category	CONTINGENCY PLAN
R1	Partners run out of budget due to internal changes, over-expenditure, etc.	WP1	The partners will review their expenditure / budgeted amounts on a six-monthly base to identify potential deviations. INNCOME, in charge of Task 1.4, supported by the Coordinator will control the economic and financial state (cost monitoring, accounting, cost statement preparation) of the whole project	1	2	Low	In case of budget deviations partners are committed to find a sustainable solution in order to guarantee the results.
R2	Loss of critical competencies or key people in the project	WP1	Each expert group in the project is composed of a number of participants with a similar level of expertise, so the role of the withdrawn participant can be taken over by one of the remaining participants	1	2	Low	It will be possible to involve a new participant from the different networks of the involved partners and advisory boards.
R3	A partner leaves the project	WP1	Partner's expectations will be continuously verified in order to ensure their commitment to the project	1	2	Low	The project management board will analyse two main options: 1) the substitution of the partner by another one of similar characteristics 2) the assumption and redistribution of tasks among the high number of partners of the project.
R4	Loss of internal communication and awareness of project activities	WP1	The project coordinator and communication board will ensure that relationships are maintained with all of the partners throughout the project cycle. Communication, controlling mechanisms will be set in place to ensure consistent and timely communication.	1	2	Low	The Project Coordinator will call for an emergency meeting in order to re-establish the communication protocols and activities.

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R5	Non-performance of partners and/or delay in deliverables	WP1	The project coordinator will monitor the progress in all areas of the project closely against the project plan, goals, objectives, requirements, and quality standards of deliverables. Regular checks and WP and technical meetings will be held to ensure partners are clear on the progress and targets.	1	2	Low	The Project Coordinator will call for an emergency meeting in order to re-establish the terms of the consortium agreement.
R6	Changes on planning execution	WP1	The structure of the management of the project will allow changes and it is designed to permit smooth adaptations and modifications to the project execution if this proves improvements for results' achievement and do not affect the scope agreed.	2	2	Medium	The Project Coordinator together with the working groups will reschedule the work plan and request any corrective actions in order to ensure that project objectives are reached. If the situation should arrive to an out-of-control level, the Project Coordinator will call for an emergency meeting in order to re-establish the terms of the consortium agreement.
R7	Poor results of evaluation (EC review)	WP1	The management structures are prepared to launch severe corrective measures if reviewers detect major failures. Earlier actions are encouraged to avoid this.	1	3	High	The management structures are prepared to launch severe corrective measures if reviewers detect major failures.
R8	Legal problems: IPR, liability, etc.	WP8	The Project includes a task dedicated to the review of the adequacy of protecting the Intellectual Property in each geographical targeted market and deal with any IPR-related issue.	1	3	High	The Manager in charge of the affected results will perform a preliminary evaluation of the situation and make use of IPR experts in order to deal with the specific problem.
R9	Lack of public awareness of Project activities	WP2 , WP8	The network is diverse and includes leading scientists, industrial partners, end users, standardization partners, etc. most of them affiliated to international Committees that guarantee relevant connections and channels. In addition, EUROBENCH includes a significant set of actions to maximise the impact: different Tasks fully dedicated to Dissemination activities, Communication	2	2	Medium	Dissemination activities and contact with projects, testing facilities, stakeholders and end-users will be intensify to counteract the situation. If needed, extra budget coming from indirect costs or own resources will be directly allocated to perform the



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			Strategies and collaboration with other EU-Projects and Testing Facilities. In addition, Task 2.1 will guarantee the participation of relevant end-users and stakeholders from the very first beginning.				contingency plan
R10	Low rates of participation in the FSTP actions	WP2 , WP7 , WP8	<p>Previous contacts and background of the EUROBENCH Partners and supporting projects and entities showing their interest in participating to the FSTP actions (see Support Letters) represent a preliminary analysis of the FSTP expected potential.</p> <p>In addition, involvement of stakeholders from the beginning (Task 2.1) and Dissemination and Communication Actions will ensure the FSTP expected participation rates (WP8).</p>	1	3	Medium	Dissemination activities and contact with projects, testing facilities, stakeholders and end-users will be intensify to counteract the situation. If needed, extra budget coming from indirect costs or own resources will be directly allocated to perform the contingency plan
R24	FSTP Evaluation delays	WP7	At least ten external experts (and not three as previously planned) will be appointed to be part of the FSTP Committee and a maximum number of ten proposal per evaluator will by assigned. Partners of the consortium acting as internal evaluator will maintain the timeline.	1	2	Low	<p>In addition, if assigned evaluators cannot come to a consensus regarding the evaluation report a third expert will be immediately assigned in order to solve the conflict in just one additional week.</p> <p>If the evaluation process takes longer than planned in FSTP-1 the 6-month integration period should be reduced and the planned activities re-schedules in order to guarantee full integration of the EUROBENCH framework by M36.</p> <p>In the delay happens in FSTP-2 Action the project development period will be reduces and activities will be schedules to guarantee full completion of the project in M48</p>
R25	Cash-flow	WP7 ,	Because of the limitations established in the G.A. (interim payments will be done if 90% has not been achieved with pre-financing + previous interim	3	3	High	To be discussed with PO.



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		WP1	payments), partners will probably receive only the pre-financing payment and the first interim payment until the end of the project (when payment of balance and guarantee fund will be released)				
R26	Third Parties IPR		A plan for exploitation of IPR for specific testbeds and methods produced by Third Parties will be defined within the Working Group on Sustainability, and included in the contract with Third Parties.	2	3	High	To be defined.

Table 2. Risk Management Register: Research-related risks

RISK N°	RISK	WPs	MITIGATION PLAN	Likelihood (1-3)	Impact (1-3)	Risk category	CONTINGENCY PLAN
R11	Poor participation of end-users and/or stakeholders in the initial survey (T2.1)	WP2	Several potential stakeholders (companies, academic entities, associations) have been already contacted and they formally agreed to collaborate in the project activities (see Letters of Support).	1	2	Low	Directs contacts of Consortium partners will be involved in the definition of need. This action has high probability of success, since several partners are chairs of international committees and communities.
R12	Delay in the definition of experimental protocols (T3.1, T4.1)	WP3, WP4	The work plan is flexible in the process of turning experimental protocols into benchmarking tools, including iterative activities in parallel. This process will be able to accept delays in some protocol definitions.	2	1	Low	The development of benchmarking algorithms and test-benches will be initiated on those scenarios and abilities more easily defined, e.g. those already identified in previous benchmarking efforts (e.g. Motion ability).
R13	The design and manufacturing of test benches delays	WP3, WP4	The Consortium will monitor the activities from the very beginning in order to detect delays promptly.	2	2	Medium	In the case a delay is detected, simpler version of the test benches will be implemented. This will ensure that at least a minimum set of test benches can be



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							manufactured
R14	The manufacturing of the Reem-C delays	WP3, WP5	Other humanoid platforms are available at the IIT Facility (e.g. I-cub, COMAN). The task T3.6 (triggered by the availability of humanoids) can be postponed with no high impact on other tasks.	2	1	Low	Initial testing trials will be performed on the other humanoid platforms available at IIT.
R15	Testing trials on humans delay or are not possible due to Ethical permission procedures	WP3, WP4	Ethical permissions for experiments, and recruiting processes will be initiated at the very beginning of the project, to obtain response before month 6. The delay of up to 6 months in human testing will not considerably affect the other activities.	1	1	Low	Testing will be performed on tasks that already received ethical permissions from the RRD institution. More resource will be dedicated to analysis of data on pre-existing database, while waiting for ethical/recruitment.
R16	Low performance of algorithms on quantifying ability levels	WP3, WP4	The implementation activity will give priority on simple benchmarks, already identified by the Consortium, which can be applied successfully to bipedal locomotion (e.g. Motion ability).	1	3	Medium	The causes of low performance will be analysed and converted into scientific questions that will be proposed to the international community, for their discussion.
R17	Lack of enough space at the facilities to include all successful test-benches developed by Third Parties.	WP5, WP7	The space available at IIT and CSIC is sufficient to host a considerable number of test benches, which should cover the solutions of all Third Parties that can be financed with the allocated budget. Maximum dimensions for test benches will be included as a requirement in the call description.	1	2	Low	During the FSTP-1 project monitoring, in the case that a test bench is excessively big to be included in the corresponding facility, a different design will be asked to the Third Parties.
R18	Users reluctant to share system	WP6	Privacy and confidentiality will drive not only users contractual relationship with the consortium, but also the definition of functional requirements and the	2	2	Medium	Critical functionalities, such as data security and confidentiality, will follow Test-Driven Development (TDD) methodology, so a set



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	detail or benchmarking results		development of security assurance features.				of functional test are going to be define and implemented in order to probe the required feature. Security and confidentiality acceptance test procedures can be shared with anyone who requires it.
R19	Development costs are unacceptably higher than expected	WP6	The development cost should be kept in reasonable level. One of the reasons for an incremental and iterative development is to focus on functional availability, following a prioritized order. Also a conservative plan and budget have been defined.	1	3	Medium	Open-source software modules and frameworks, hardware and software as-a-service and so are ways to avoid strong investments. During the WP6 development, 2 solutions will be always under consideration, a licensed and a costless product.
R20	Failure or strong delay reaching target analytic and forecasting model	WP6	Analytic modelling will drive the definition of a set of data format requirements and data base structure to make easier their following task.	2	1	Low	Information from other data bases and consortium platforms and experience are going to be considered, so previous, raw or unformatted data can be used to get ahead on modelling. Consulting services based on consortium experience will make up for the time analytic reporting is not available.
R21	Benchmarking algorithms cannot be easily deployed into a Unified Benchmarking software	WP3, WP4, WP6	The algorithm module deployment will be considered yet from the beginning within the specifications of all concerned Work Package.	1	3	Medium	If specific benchmarking algorithms modules cannot be easily embedded within the Benchmarking Software, we will consider the possibility of re-implementing them within compliant environments, or of replacing them by equivalent algorithms that could fit to the Benchmarking software constraints.
R22	Benchmarking Software is not ready on time for	WP6	We consider this risk could be mainly due to a bad description of the specification so that unexpected additional work could be needed, delaying the software	2	2	Medium	The software implementation is envisioned with a lean model in which the required interfaces are early on implemented, and



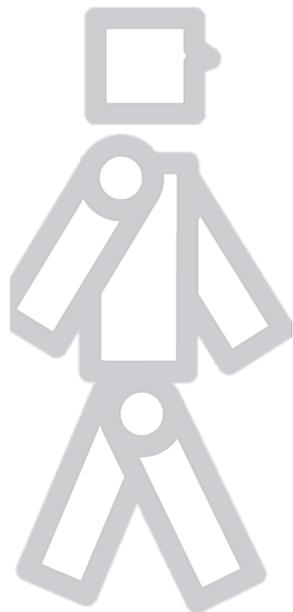
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	internal & external evaluation		delivery. The system specification is coordinated with the similar effort in other WP, which help to make sure all requirements are jointly aligned.				the core of the functionalities is progressively implemented to reach the targeted functionality. If a delay is observed in some functionalities, the system could still be usable to permit the evaluation of the other features.
R23	Low quality of submitted proposals to FSTP actions	WP7	Previous contacts and background of the EUROBENCH Partners and supporting projects and entities showing their interest in participating to the FSTP actions (see Support Letters) represent a preliminary analysis of the FSTP expected potential not just in number but also in quality expectations. Proper dissemination activities and collaboration with other EU-Projects and Testing Facilities will help to mitigate this risk.	1	2	Low	INN and the Evaluation Committee will analyse the reasons in order to be sure that the problem is not the evaluation criteria. If that's so, these criteria will be reviewed if no proposals are considered valid. On the contrary, it is not a question of minimum thresholds, Evaluation Committees will directly contact the FSTP participants and will propose countermeasures.
R27	Software compatibility and integration with other different databases	WP6	A specific analysis of the current databases existing is already ongoing (anticipated with respect to the WP6 tasks, starting at month 6), in order to identify in advance the compatibility issues.	1	2	Medium	An Internal Database will be created
R28	FSTP proposals not covering all the framework requirements	WP7	A preliminary analysis of the Third Parties interested in participating has been implemented, through the "Declaration of Interest Form", currently available in the website, to know in advance which groups are interested in participating, and on what topics. We are also planning to have different Info Days, in order to inform in advance about the priorities of the framework, and stimulating the submission of proposals on more important topics. We are also establishing joint actions with other European projects (e.g. SciRoc, ROSin,	2	2	Medium	The Consortium will cover those important aspects not addressed by Third Parties.



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			Robmosys), to cover all important aspects.				
R30	Lack of replicability of testbeds	WP5	We are designing modular elements that should ensure replicability of test beds, as well as integrability, while at the same time ensuring the creativity of proposals.	2	2	Medium	Test beds will be used only in the facilities, and not replicated.
R31	System abilities as defined in the MAR doesn't apply	WP2	We are discussing this aspect in international forum and workshops (e.g. the last workshop at ERF 2018), also with other European projects and entities (e.g. ERL) in order to find suitable definitions of System Abilities.	2	1	Medium	New System abilities definitions will be created and discussed with the community.



4 Conclusion

This deliverable has introduced its risk management methodology, along with the main risks foreseen at the time of writing this deliverable. The risks can be classified as general management risks, but also as more specific technical risks that relate to the technical work carried out in EUROBENCH Project.

Now that the initial risk management plan for EUROBENCH has been established, it will serve as a reference for the consortium during the execution of the project.

