HORIZON EUROPE PROGRAMME

TOPIC HORIZON-CL4-2022-RESILIENCE-01-24

GA No. 101091572

Graphene, MXene and ionic liquid-based sustainable supercapacitor

GREEN CAP

GREENCAP - Deliverable report

D7.1 - Risk Management Plan

Funded by the European Union

Deliverable No.	GREENCAP D7.1	
Related WP	WP7	
Deliverable Title	Risk Management Plan	
Deliverable Date	2023-03-31	
Deliverable Type	REPORT	
Dissemination level	Public (PU)	
Author(s)	Sebastiano Bellani (BED) Alessandra Lucini Paioni (UNR)	2023-02-22
Checked by	Francesco Bonaccorso (BED)	2023-02-24
Reviewed by (if applicable)	Maarten Weide (UNR) All Partners	2023-03-16
Approved by	Francesco Bonaccorso (BED) - Project coordinator	2023-03-30
Status	FINAL	2023-03-30

Document History

Version	Date	Editing done by	Remarks
V1.0	2023-02-23	BED	
V2.0	2023-03-16	UNR	

Summary

The Horizon Europe GREENCAP project aims to unlock the full potential of supercapacitors (SCs) as electrochemical energy storage systems, supporting the transition towards the climate-neutrality set by the EU's international commitments under the Paris Agreement, while ensuring the targets of EU's Action Plan on Critical Raw Materials (CRMs). By exploiting layered 2D materials, including graphene and MXenes as electrode materials, and ionic liquids (ILs) as high-voltage electrolyte, GREENCAP will develop a CRM-free SC technology exhibiting a battery-like energy density (>20 Wh/kg, >16 Wh/L), together with the distinctive superior power densities and high cycle life of traditional electrochemical double layer capacitors.

To support the reaching of targets and achievements in terms of resources, quality, and impact of GREENCAP, it is necessary to set up management tools and ensure smooth and structured collaboration. The good quality of the GREENCAP project results is ensured by the introduction of quality management and risk management procedures. This deliverable is an extension of the risks identified in the Description of the Action of the Grant Agreement. This risk management plan has been developed in close relationship with the quality assurance procedures that have been discussed at the project kick-off meeting and will be included in the Quality Assurance Report (D7.3, M6). The risk management plan aims at overseeing the reaching of targets and achievements in terms of time, quality and within budget. The process set up in this document helps to identify risks and to establish contingency plans as well as risk management protocols.

The execution of this risk management plan ensures the timely identification of risks and formulation of contingency plans, and it will be monitored by the Executive Board during the course of the project. Risks and their mitigation measures will be included in the risk table, which will be updated by the project coordinator with the support of all WP leaders on a continuous basis. Updates will be documented in a "living document" on SYGMA/the EC participant portal *via* the continuous reporting module. Besides the EC portal, the latest version is always available within the project collaboration platform (Mett).

Section 5 of this document presents a stepwise overview of the risk management procedure and responsibilities that will be used as a practical guideline during the project.

Contents

List of Figures

List of Tables

Abbreviations & Definitions

Abbreviation	Explanation
2D	Two-dimensional
CRM	Critical Raw Material
EB	Executive Board
EM	Electrode material
FLG	Few-layer graphene
GA	General Assembly
HPH	high-pressure homogenization
IG	Ionogel
IL	Ionic liquid
LPE	Liquid-phase exfoliation
RMP	Risk and Mitigation Plan
SC	Supercapacitor
SLG	Single-layer graphene
WJM	wet-jet milling
WP	Work Package

1 Introduction

In order to support the reaching of targets and achievements in terms of resources, quality, and impact of GREENCAP, an effective Risk and Mitigation strategy is essential. The general context of Risk and Mitigation planning is the process of identifying and assessing specific risks and then developing actions to support opportunities and reduce threats to the overall project objectives. Some risks have already been identified at the proposal stage, whereas others will emerge during subsequent phases of the project. This document is delivered in the context of the GREENCAP project as a follow up deliverable and is envisioned as a dynamic, changing document, intended to support management decision making.

A risk is an event or condition that, if it occurs, could have a negative effect on the project's objectives. Risk Management is the process of identifying, assessing, responding to, monitoring, and reporting risks. This Risk and Mitigation Plan (RMP) defines how risks associated with the GREENCAP project will be identified, analysed, and managed. It outlines how risk management activities will be performed, recorded, and monitored throughout the lifetime of the project and provides a tool for recording and prioritizing risks.

The risk management plan is divided into five sections. Introduction in section 1. Section 2 presents the type of risks defined for the GREENCAP project and contingency measures. Section 3 and 4 describe the risk assessment procedure followed to identify the severity of the identified risks, together with the managerial groups responsible for risk identification, evaluation, and decision-making. Section 5 of this document presents a step-wise overview of the risk management procedure and responsibilities that will be used as a practical guideline during the project.

1.1 Scope

This report will focus on the identification of risks and mitigation that can hamper the project progress. The Risk and Mitigation Plan is created and managed by the coordinator BED and is monitored and updated on a regular basis throughout the lifetime of the project. The objectives of the Risk Management Plan (RMP) are to explore risk response strategies for the items identified in the qualitative and quantitative risk analysis. Once thoroughly analysed the critical set of risks, a better position is established to determine the best course of action to mitigate those risks. This strategy will be used to develop a RMP, which will be updated on a regular basis based on developing knowledge in the project GREENCAP. Active input from all consortium members in identifying and managing risks is required.

2 Definition of project risks

Within the GREENCAP project, risk factors and risk probabilities of the work plan will be analysed on a regular basis. The project coordinator supported by UNR, in close cooperation with the work package (WP) leaders, will closely monitor the risks identified by applying risk management procedures that entail a systematic and informed understanding of relevant risks, an assessment of their relative priority, and a rigorous approach to monitoring and controlling them. This process seeks to maximise the chances of objectives being achieved and ensuring that all partners are aware and contribute to finding solutions.

Each work package leader will monitor the risks associated to their work package and update the consortium at each monthly Executive Board (EB) meeting. Depending on the risk impact, the EB will be the ultimate management body if risks require decisions. Possible risks (related to specific WP tasks) have already been identified and are presented in a risk assessment table available both in SYGMA and in Mett. This table will be monitored by the project coordinator supported by UNR and updated after the reporting of WP leaders at the Executive Board (EB) meetings. This shall ensure that risks are identified, and contingencies developed as early as possible. Additionally, this risk assessment table will feed into the overall project reporting in the EC portal for each reporting period.

The next paragraph describes the possible risks that have already been identified. Additional risks may become evident during the course of the project (see Chapter 3).

2.1 Identified Risks

The risks cover more than only technical content of the project. This allows them to be clustered and risk owners appointed. Based on best practices the following categories are proposed:

1.	strategic	high-level goals, aligned with and supporting the project's mission
2.	operational	effective and efficient use of the resources
3.	technical	interfaces, performance, feasibility, solutions, technology gaps
4.	finance	budget and cost aspects and reliability of reporting
5.	legal	compliance with applicable laws and regulations
6.	management	practical, overall

Table 2.1 enlists the already identified risks and their proposed mitigation measures.

Based on the risk identified at the submission stage of the proposal, the consortium has done a review of the risks and updated the table accordingly.

Table 2.1 *Possible identified risks and their mitigation measures for GREENCAP*

Risk No.	Description	WP	Proposed Mitigation Measures
1	Development of an industrial production of pristine SLG/FLG through sustainable processes Risk: the use of synthetic graphite as raw material and non-toxic exfoliating solvent to produce SLG/FLG through LPE can alter the quality of graphene produced using natural graphite and conventional organic solvents, affecting the quality of the materials for the fabrication of SC electrodes. Level of likelihood: low Severity: high	1	Screening of various synthetic graphite from different supplier and development of quality control process to assess their native properties; theoretical and experimental screening of a large portfolio of solvents and their mixtures, aiming at matching their surface energy and solubility parameters with those of graphite/graphene to guarantee efficient graphite exfoliation yield and high graphene dispersions stability. Investigation of ILs as exfoliating media, creating IL-intercalated SLG/FLG as ready-to-use EM for IL-based SCs.
2	Development of a sustainable industrial production of pristine SLG/FLG flakes Risk: graphene-based material industrialization readiness issue (quantity and quality) Level of likelihood: low Severity: high	1	Adjustment of WJM and HPH process parameters compared to traditional processes based on toxic solvents and natural graphite as starting raw materials. Evaluation of multiple powder drying methods (e.g., lyophilization, drum-drying, microwave drying and spray drying) to massively produce SLG/FLG in form of powder.
3	Electrochemical exfoliation of graphite Risk: low yield of reaction by using synthetic graphite Level of likelihood: medium Severity: medium	1	Using recycled natural graphite as a starting material to reduce the effect of using natural graphite as CRM.
4	Poor processability of newly developed materials in form of electrodes Level of likelihood: medium Severity: low	1,3	Establishment of new slurry formulations, modification of ratio of new materials to carbonaceous materials and adjustment of process parameters during material deposition/coating (time, temperature, loading).
5	Development of sustainable electrolytes. Risk: Insufficient quality of the produced electrolytes Level of likelihood: medium Severity: medium-low	1	Mixing of ILs with organic solvent at different material ratio to refine the electrolyte composition and achieving target properties

6	Development of sustainable electrolytes. Risk: requirement of a considerable amount of toxic solvent in the electrolyte formulation. Level of likelihood: medium Severity: medium	1	Development of diglymes and other non-toxic solvents through scalable industrial methods to limit the amount of toxic solvent in the electrolytes.
7	Poor functionalization yield of MXenes in non-toxic solvents. Risk: low functionalization degree (<10%) of CRM-free MXenes. Level of likelihood: medium Severity: medium-low	2	Systematic screening of ratio MXene/organic molecule within the reaction mixture. Addition of catalysts, pH adjustments.
8	Electrode fabrication with high mass loading (*e.g.*, 5-10 mg/cm^2) Risk: low mechanical stability of electrodes at high loadings. Level of likelihood: medium Severity: medium	3	Functionalization of 2D materials with sustainable agents to improve adhesion of electrodes with the current collector; surface treatment of current collectors with plasma processes; screening of various binders to improve mechanical properties of electrodes.
9	Electrode with >200F/g and >150F/cm^3 performance in IL-based electrolytes Risk: low performance at high current densities. Level of likelihood: medium Severity: medium	3	Optimization of electrolyte formulation (ratio IL/solvent); functionalization of 2D materials to improve the hybridization/intercalation of ILs with/in 2D materials to produce IGs.
10	Upscaling of CRM-free MXenes production Risk: MXene production capability lower than kg/day scale for a single reactor and using alcohol-based solvents. Level of likelihood: medium Severity: medium	4	Increase the process temperature for the iodine etching method to increase the MXene formation kinetics. Adoption of common chemical industry processes to carry out high-temperature molten salt etching, being supported by industrial players interested in this activity (*e.g.*, Carbon-Ukraine, with who TCD strongly collaborates).
11	Upscaling and prototyping Risk: developed materials cannot be provided in sufficient quantity for the massive slurry production. Level of likelihood: medium Severity: low	4	Screening of multiple electrode slurry formulation, minimizing the amounts of materials produced with insufficient quantities and focusing on the most scalable ones.

12	Upscaling and prototyping Risk: upscaled materials show low performance. Level of likelihood: medium Severity: high	4	Decreasing batch sizes and increasing batch number can mitigate this risk as the materials properties can be maintained on a smaller scale, while providing sufficient amount of materials needed for the SC prototype.
13	Management of the project Risk: financial deviations and insufficient collaboration between partners. Level of likelihood: low Severity: high	7	Coordinator-encouraged day-to-day communication among partners to assure that all activities are implemented on time and on a high-quality level. Requiring detailed justifications for delays in achieving milestones, increasing collaborative efforts to make up delays and submitting deliverable on time.

3 Risk Assessment

The assessment of risks is an integral part of the project management, but also a responsibility of the entire project team. **Figure 3.1** shows the organisational structure of the risk management process.

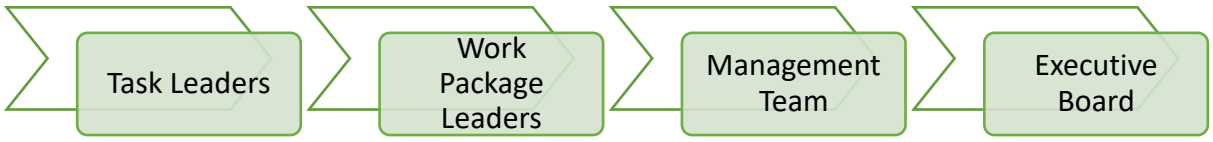


***Figure 3.1** Organisational structure of the risk management process.*

Although risk management is an integral part of project management, all project members are responsible to identify possible risks and inform responsible task and WP leaders. The responsibility for the implementation of risk management in the different project activities lies with the WP leaders. The management team (coordinator BED with support from UNR) ensures the monitoring of the effectiveness and regularity of the risk management system. Central risk management lies within the EB as highest operational body of the project and as such already responsible for the planning process. The management team makes sure that the EB is informed of all risks, which could lead to significant deviations from the project plan.

Work package leaders assume responsibility for the identification, assessment, and mitigation of the risks related to the tasks, deliverables, and results of their work package. In order to meet these tasks, an appropriate organisation of the risk management process is required in the individual tasks of the work packages. This is left to the responsibility of the project partners and task leaders.

3.1 Risk reporting and early warning system

Within each work package, task and activity, risks are monitored on a continuous basis. At the start of each activity, the involved task members report risks that can already be foreseen and report them to the work package leader. The work package leader will report these risks to the management team and depending on the severity of the risk (see Section 3.2), they will inform the EB without undue delay. In all cases, the identified risks will be included in the risk management table, which ensures the monitoring of the risk until the related activity or task has been completed.

Partners have already identified an initial list of possible risks before the start of the project as presented in the Description of Action (**Table 2.1**). These already identified risks are the starting point of the risk management procedures described in this risk management plan. During monthly EB meetings work package leaders will give an update on the risk management table and highlight new risks and respective mitigation strategies. **Table 2.1** included in the Description of the Action will be updated to gather the new risks identified during the implementation of the project and their mitigation measures during each internal reporting (every 6 months) and periodic reporting.

The risk assessment table is a living document that is shared within the EB on the project management platform (Mett) as well as on SYGMA/the EC participant portal via the continuous reporting module.

3.2 Risk Monitoring

Risk reporting and early warning system will feed into the overall project reporting and will be linked to evaluation and activities. The aim is to:

- Identify potential impacts of risks
- Evaluate Probability Impact Scores
- Prioritize the risks according to their criticality, determine the preventive or corrective actions and manage the actions. For this purpose, during each EB meeting the potential risks will be discussed; additionally, each deliverable report will contain a risk session (implemented in the general template) as the one presented in the table below.

Table 3.1 *Risk Monitoring table.*

Risk No.	WP	What is the risk	Probability of risk occurrence[1]	Effect of risk[1]	Solutions to overcome the risk
Indicate the number of risk	*Indicate the WP*	*Describe the risks here! And please refer to the section of the text in the document dealing with this.*	*Indicate the level*	*Indicate the level*	*Give a description how to overcome the risk / describe give possible solution(s)*

1) Probability risk will occur: 1 = high, 2 = medium, 3 = Low

As part of the risk monitoring, the risk table will be managed and updated by the coordination team, with input from the EB, after each EB meeting, to ensure that risks are timely identified, and contingencies are developed as early as possible. Additionally, every six months risks will be assessed and reported as part of the half year interim reports by all partners. All project partners should identify the project risks they have encountered or foreseen and give input to the half year reports. The risks must be defined and reported through the progress report template, indicating risk likelihood, impact, contingency plan, responsible partner, and in what period of the project the risk is valid and should be monitored. The main typical risks in a research project are:

- Technological risk
- Partnership risks
- Market risks
- Legal risks
- Management risks
- Environmental/regulation /safety risks

In case they are needed, corrective actions will be taken including possible work reallocation. This will be discussed among the management and coordination team (BED and UNR) and the EB.

3.2.1 Work package leaders

Work package leaders will coordinate and chair their own work package. Work package leaders deal with the developments and overall coherence and technical implementation of the project output. Each work package leader is responsible for maintaining contact with the task leaders and coordinating the activities within the work package; ensuring completion of work package activities and deliverables on time, within budget and of high quality; managing of risks within the work package, and reporting on work package progress, quality and risk status to the project coordinator, monthly to the EB and semi-annually to the consortium during the General Assemblies .

During the monthly EB meetings, each work package leader should provide a summary of the major achievements, risks, uncertainties and problems encountered (critical or not critical). The work package leaders will comment on the status of previously identified risks, indicating how they were addressed and whether additional actions need to be taken and also report any new risks identified. Based on the severity of the risk, the EB will make a decision regarding the mitigation plan.

3.2.2 Project coordination

The project coordinator (BED) together with UNR prepare the agenda and the discussion points related to risk assessment and risk management.

Whenever work package leaders identify a new risk within their work package, they will first inform the project coordinator. If the risk is minor and no other work packages are affected, the project coordinator together with the work package leader will decide on mitigation actions if required. In other cases, the risk will be brought forward in the next work package leaders' meeting.

3.2.3 General Assembly meeting

The General Assembly (GA) is composed of representatives from each partner in the consortium. Meeting at six-monthly intervals, the GA will discuss and decide on the overall project management, strategic management issues and contract amendments. When a risk is labelled as severe by the project coordinator and work package leaders, all partners will be informed of the risk and the proposed mitigation plan will be discussed during the GA. If the plan requires a decision (*e.g.*, project plan needs to be adapted considerably), *ad hoc* meetings or voting by use of e-mail might be used to avoid unnecessary delays.

4 Status of the Risk and Mitigation Assessment

This Deliverable is an update of the identified Risk and Mitigations that have been provided in the proposal. Together with the consortium partners, risks have been identified and their impact and probability estimated. In the grant agreement a total of 13 risks were identified. The coordination team, in close cooperation with the EB, will regularly monitor risks which have been identified by a systematic and informed understanding of relevant risks, an assessment of their relative priority, and a rigorous approach to monitor and control them. All Risks (existing or expected) will be written down in the "Risks Log" to keep track of them during the entire project.

The Risk Log lists the identified risks ranking them based on their overall Effect. The risk with the highest potential effect on the GREENCAP project objectives is given rank number 1.

4.1 Risk likelihood and impact

Risk assessment during the GREENCAP project will make use of a risk likelihood and impact matrix. This matrix (below) shows the combination of risk likelihood of occurring and impact when materialising is utilised to decide the relative priority of risks.

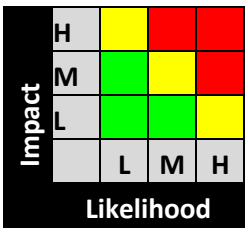
The probability and impact of occurrence for each identified risk will be assessed by the Project Coordinator, with input from the consortium members:

Likelihood

- High (level 3) – Greater than 75% probability of occurrence
- Medium (level 2) – Between 25% and 75% probability of occurrence
- Low (level 1) – Below 25% probability of occurrence

Impact

- High (level 3)– Risk that has the potential to greatly impact project objective. An example of such a high-severity risk is if critical outcomes of the project cannot be achieved.
- Medium (level 2) – Risk that has the potential to slightly impact the project objective. Medium severity of a risk is considered to have, *e.g.*, missing input for other work packages or major time delays across reporting periods.
- Low (level 1) – Risk that has relatively little impact on the project objective. For example, inefficiency or other time delays during reporting periods are of low impact for the outcome of the project.



Risks that fall within the RED and YELLOW zones will have risk response planning which may include a risk mitigation and a risk contingency plan.

4.2 Risk prioritization and Risk Log

The Risk Log of the internal risks that can hamper the project progress has been generated. It basically ranks the risks with the highest Priority (Likelihood level × Impact level) from high to low. The result is presented in **Table 2.1** below.

Table 4.1 *Risk rank (from the most to the less dangerous)*

Rank	Risk Nr.	WP	Likelihood	Impact	Priority
1	12 - upscaled materials show low performance.	4	2	3	6
2	3 - Electrochemical exfoliation of graphite Risk: low yield of reaction by using synthetic graphite	1	2	2	4
3	6 - requirement of a considerable amount of toxic solvent in the electrolyte formulation.	1	2	2	4
4	8 - Electrode fabrication with high mass loading (*e.g.*, 5-10 mg/cm^2) Risk: low mechanical stability of electrodes at high loadings.	3	2	2	4
5	9 - Electrode with >200F/g and >150F/cm^3 performance in IL-based electrolytes Risk: low performance at high current densities.	3	2	2	4
6	10 - MXene production capability lower than kg/day scale for a single reactor and using alcohol-based solvents.	4	2	2	4
7	1 - the use of synthetic graphite as raw material and non-toxic exfoliating solvent to produce SLG/FLG through LPE can alter the quality of graphene produced using natural graphite and conventional organic solvents, affecting the quality of the materials for the fabrication of SC electrodes.	1	1	3	3
8	2 - graphene-based material industrialization readiness issue (quantity and quality)	1	1	3	3
9	13 - Management of the project Risk: financial deviations and insufficient collaboration between partners.	7	1	3	3
10	5 - Insufficient quality of the produced electrolytes	1	1	2.5	2.5
11	7 - Poor functionalization yield of MXenes in non-toxic solvents. Risk: low functionalization degree (<10%) of CRM-free MXenes.	2	2	1.5	2.5
12	4 - Poor processability of newly developed materials in form of electrodes	1,3	2	1	2

13	11 - developed materials cannot be provided in sufficient quantity for the massive slurry production.	4	2	1	2

4.3 Escalation of decision making

The following levels of risk priority have been defined. Depending on the identified level of the risk priority, mitigation measures should be taken accordingly and carefully monitored to assess their success.

- Very low and low priority (level ≤2): WP leaders follow established procedures according to quality assurance on deliverables. The final step of escalation for decision-making is to the project coordination team.
- Moderate priority (2<level<4): once risks occur, work package leaders shall regularly report to the coordination team during work package leaders' meetings to find adequate mitigating measures. The final step of escalation for decision-making is to the Executive Board meetings.
- High and very high priority (level≥4): Once such risks occur, work package leaders shall regularly report to project coordination and work package leaders. A contingency plan should be developed which describes how the project will continue if the risk still materializes despite the taken mitigation measures. The final step of escalation for decision-making is to the EB.

4.4 Risk response planning

Each risk will be assigned to WP leaders. For each major risk, one of the following approaches will be selected to address it:

- Avoid – eliminate the threat by eliminating the cause
- Mitigate – Identify ways to reduce the probability or the impact of the risk
- Accept – Nothing will be done
- Transfer – Make another party responsible for the risk (buy insurance, outsourcing, etc.)
- Contingency – define how the project will continue if the risk still materializes despite the taken mitigation measures.

For each risk that will be mitigated, the consortium members will identify ways to prevent the risk from occurring or reduce its impact or probability of occurring. For each major risk that is to be mitigated or that is accepted, a contingency plan will be outlined in the event that the risk does materialize in order to minimize its impact. This course of action should however be reasonably and within the overall scope of the project.

5 Conclusion and Recommendation

This risk management plan describes the risk types defined within GREENCAP, the way that risks are assessed and the responsibilities of the different consortium bodies within the management of risks. This section presents a practical summary of the risk management procedures that will be used as a guideline for handling risks within GREENCAP.

5.1 Step 1: capture risk and assign ownership

First, a risk needs to be identified. All project members are responsible to identify possible risks related to their activities (as soon as they commence) and report them to the responsible task and WP leaders. The WP leader will actively ask his team members if there are new risks to be considered.

The WP leader reports the identified risks to the project management team. They ensure that the risk will be discussed during the next work package leaders' meeting. The work package leaders' group will make an initial judgement if the risk needs to be registered and monitored, by determining the risk likelihood and impact, and will assign a risk owner that will be responsible to monitor and manage this risk:

- WP leaders are responsible to identify and manage risks related to their WP.
- The work package leaders' group is responsible for identifying and managing WP transcending risks, general project risks and risks related to the consistency between WPs. The project management team takes the lead in this.

5.2 Step 2: define and decide on mitigation measures

Once the risk is identified, the newly assigned risk owner will define a mitigation plan. This plan usually comprises a set of measures that either decrease the negative effect of the risk or the likelihood of it materialise.

The mitigation plan is presented by the risk owner during the next work package leaders' group meeting. The work package leaders group decides on the appropriateness of the proposed mitigation measures and either approves the plan or comes up with an alternative. After approval of the mitigation plan, the management team will add the risk to the risk register, together with an indication of the severity of the risk and the approved mitigation plan.

In case of a severe risk (likely to occur and with high severity), the EB will be informed of the risk and proposed mitigation measures and a contingency plan in case the risk materializes despite the mitigation. If the proposed mitigation plan requires the mandate of the EB (*e.g.*, if the project plan needs to be adapted considerably), *ad hoc* meetings or voting by use of e-mail might be used to avoid unnecessary delays.

5.3 Step 3: monitor and manage the risk

To monitor and manage risks, the risk register will be discussed at the three-monthly work package leaders' meetings. The project coordinator will lead these discussions and address the most relevant risks. The EB will discuss the progress of the proposed mitigating measures and review whether the likelihood and severity of risk have changed over time, leading to different priority.

6 Deviations from Annex 1

There are no deviations from the description of this deliverable as given in Annex I of the Grant Agreement.

7 Acknowledgement

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Project partners:

#	Partner short name	Partner Full Name
1	BED	BEDIMENSIONAL SPA
2	SOLV	SOLVIONIC
3	FSU	FRIEDRICH-SCHILLER-UNIVERSITAT JENA
4	SKL	SKELETON TECHNOLOGIES OU
5	TCD	THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD, OF THE COLLEGE OF THE HOLY & UNDIVIDED TRINITY OF QUEEN ELIZABETH NEAR DUBLIN
6	TUD	TECHNISCHE UNIVERSITAET DRESDEN
7	UNISTRA	UNIVERSITE DE STRASBOURG
8	SM	SKELETON MATERIALS GMBH
9	UNR	UNIRESEARCH BV
10	CNR	CONSIGLIO NAZIONALE DELLE RICERCHE
11	UCAM	THE CHANCELLOR MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101091572. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.