



INTERMODEL EU

**Simulation using Building Information Modelling Methodology of
Multimodal, Multipurpose and Multiproduct Freight Railway Terminal
Infrastructures**

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D1.12 - RISK AND CONTINGENCY PLAN M24

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Executive Summary

Risk can be defined as the combination of the probability of an event and its consequences. While uncertain occurrences may also have positive impacts, the term “risk” is usually employed to characterise the negative effects of an event on planned objectives, budget and deadlines. Risks are intrinsic to any project and shall therefore be identified, controlled and neutralized since the very early stages of a project.

The present document reports about the monitoring and control activities related to the risks, starting with those described in the initial Risks Plan (RP), included in the project proposal and the ones identified while the project advances.

The document details the approach that will be adopted through all the steps of risk identification, assessment and management. In addition, the RP outlines the processes and actions to be developed and implemented to neutralize the risks.

This monitoring procedure will support the regular review and update of the RP, hence allowing for a continuous improvement of the project supervision until its successful conclusion. The document also includes the risk management structure including roles and responsibilities over the life cycle of the project.

The Risk and Contingency Plan was created at M6, and an updated version of the Plan is then provided together with each project periodic report about risk identified and contingency measures (M12, M18, M24, M30). This deliverable is the fourth update and additional risks have been identified and additional contingency measures have been foreseen.

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1. Introduction

1.1 Scope

The scope of this document is to report and support the effective management of risks as a key factor to achieve project's outcomes according to a plan within schedule, cost, and quality requirements. Risk Management describes the approach to offset risks and ensure success.

1.2 Audience

The intended audience of this document is the INTERMODEL Consortium.

1.3 Definitions / Glossary

The main terms used in this deliverable are described as follows:

Contingency plan: Actions designed for use only if certain events occur.

Mitigation measure – Measure that implies a reduction in the probability and/or impact of an adverse risk event within acceptable threshold limits.

Probability and impact matrix – A common way to determine whether a risk is considered low, moderate or high by combining the two dimensions of a risk: its probability of occurrence and its impact on objectives if it occurs.

Risk – An uncertain event or condition that, if it occurs, has an effect on at least one project objective.

Risk analysis – Process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.

Risk identification – The process of determining which risks may affect the project and documenting characteristics.

1.4 Abbreviations

The abbreviations used in the present document are:

CA: Consortium Agreement

GA: Grant Agreement

1.5 Structure

- **Introduction:** contains an overview of this document, providing its Scope, Audience, and Structure.
- **Risk plan:** contains a description of the risk plan defined for the project.
- **Risk register database:** presents a list of the risks identified during the reporting period and their description, their impact, the mitigation measures proposed and the contingency plan. It also indicates the risks that have been activated.
- **Risk reporting (EC format):** contains the main features of each risk identified according to the EC format, which is required in the participant portal.

2. Risk plan

The project's risk plan process is based on international best practices, mainly those described by the Project Management Institute¹ (PMI) and in the PRINCE2² methodology.

Risk can be defined as the combination of the probability of an event and its consequences. Any activity incorporates risks, and the effective management of these risks is essential to achieve the project outcomes. The Risk Management Plan describes the approach to offset risks and ensure success.

Risk Management could be considered as a systematic process that includes the identification, assessment, management, monitoring and reporting on risks, and integrates the following actions:

- Definition of the objectives, guiding principles and risk criteria regarding events that could occur and may impact the project's scope, schedule, budget and performance.
- Identify, analyse, and evaluate risk in order to optimise the contingency measures set aside to offset risks and subsequent effects.
- Develop and implement strategies to effectively prevent, contain, and eliminate obstacles to the project success.
- Track, review and report on risk evolution to re-define strategies and priorities, and allow for improved management process.

Risk Management is also a life cycle process that requires a dynamic involvement from all partners at all the stages of the project, as follows:

1. **Risk Management Policy.** Develop criteria against which risks are evaluated, and identify the structure for risk management and best practices. When the Risk Management Policy is established it will be possible to develop an adequate Risk Management Plan.
2. **Risk Identification.** The project's risks will be identified through a collaborative approach involving all the members of the project. Consortium partners are expected to employ different risk identification techniques in order to facilitate the identification

¹ The Project Management Institute <https://www.pmi.org/>

² Projects IN Controlled Environments <https://www.axelos.com/best-practice-solutions/prince2/what-is-prince2>

of risks such as Structured “What-if” Technique (SWIFT), brainstorming or just by direct observation.

3. **Risk Analysis.** An analysis of the risks will be conducted to determine their causes, and estimate their probability and consequences. Then the risk will be considered and prioritised according to the analysis and its potential impact on the project employing techniques such sensitivity analysis, probability analysis and Delphi Method – with the experts working at the consortium entities.
4. **Risk Mitigation & Contingency Plan (CP).** This process aims to limit or neutralize any negative consequence of a particular risk on the Project. For this, risk contingency measurements will be defined and implemented to cost effectively reduce, contain and control such risks.
5. **Risk Monitoring & Reporting.** The risk profile will be continuously monitored, reviewed and updated. New risks may be identified as more information becomes available and existing risks may be eliminated through the effectiveness of the risk treatments. The Risk Register will be updated with the outcomes of the risk analysis and assessment process.

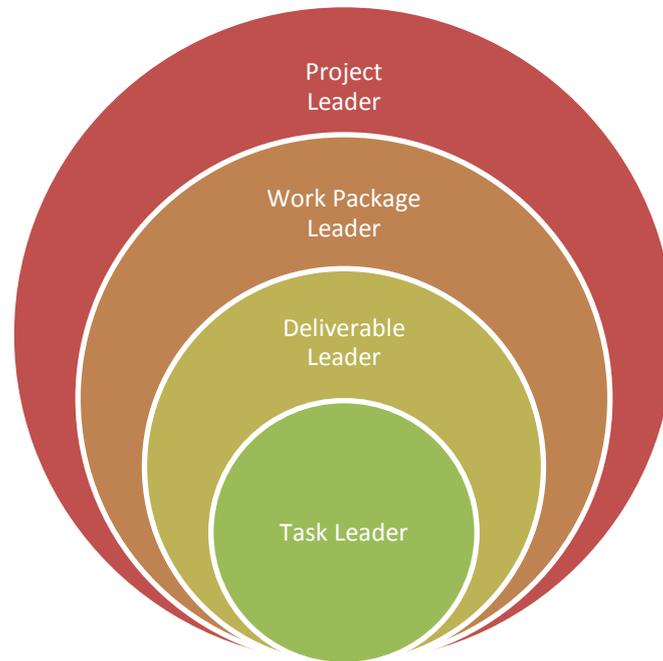
2.1 Risk management policy

This section describes the guiding principles and risk criteria regarding events that could occur and may impact the project’s scope, schedule, budget and performance.

2.1.1. Guiding principles

1. Every team member has responsibility for managing the risks within their own activities. Roles and responsibilities will be assigned in function of skills and experience. The risks will be mitigated at the appropriate level, according to the project’s structure:

Figure 1. Project's Roles - Structure



Usually tasks leaders and deliverable leaders are the best qualified to perform the function of Risk Owner – since they are the responsible for a task completion or delivery elaboration, they are in fact more likely to identify, assess, and treat risk events and consequences.

2. A risk will be prioritised according to its relevance. The dates and work to solve the risk will be realistic. A complete re-assessment of risk twice a year, synchronised with the project progress reporting may be carried out.
3. All the risks will be documented in the most detailed way. The history of processes, mitigation actions and risk evolution serves as a key input to identify cause, key learning, metrics, and risk analysis. Lessons learned as a result of ongoing risk management efforts will be captured at the end of each project phase and used to improve the risk treatment.

2.1.2. Risk Criteria

- For the **identification** of risks:

- Probability of Occurrence rating (%)
- Impact Score (1-9)
- Area categorization (Technical, Financial, etc.)
- For the **analysis** of risks
 - Regular analysis of potential risks' information such as historical data, theoretical analysts and revision of the ongoing tasks.
 - Establishment of Risk Level values (severity) according to the probability level and impact score defined during the identification of risks stage.
 - The impact will be reflected in
 - The objectives of the task/project
 - The deadline
 - The budget
 - Three levels of risk prioritisation (Low, Medium, High), according to a table of risk priority settings.
- For the **mitigation and contingency** of risks.
 - As soon as a risk is identified, a contingency plan for that risk will be elaborated to effectively respond to such event that may or may not happen in the future.
 - Elaboration of a risk register including:
 - Approaches to control, avoid, minimize, or otherwise mitigate the risk.
 - Contingency Plan, which would be reflected as a set of steps to be taken if the risk eventually occurs.
 - Risk ID
 - Category
 - Report Date
 - Description of the Risk
 - Origin or Cause
 - Probability
 - Impact

- Prioritization
 - Date of activation and date of deactivation
 - Owner
 - Current status
- For the monitoring and reporting of risks.
 - Monitoring and reporting of risks will follow the format asked by the EC for the reporting period reports – form A.

2.1.3. Roles & Responsibilities

- Risk Steering Committee will be responsible for:
 - Developing and implementing the risk management policy for the project.
 - Assigning and enforcing roles and responsibilities regarding the RP.
 - Approving the RP.
 - Participating in the risk management process, and taking ownership of risk mitigation and contingency planning and execution.
 - Making the final decision on risk actions.
- Risk Manager. The Risk Manager is responsible for leading the risk management process, sponsoring risk identification activities, facilitating communication, and ensuring the Risk Database is maintained and updated. The Risk Manager is also responsible for providing the Risk Steering Committee with recommendations and statuses on risk actions.
- Risk Owners. The member of the team responsible for managing individual risks.

2.2 Risk identification

Risk identification requires attention, a broad forward-looking view, experience or expert judgements and an element of lateral thinking. According to this, the project's risks will be identified through a collaborative approach involving all the members of the project. Consortium partners are expected to employ different risk identification techniques in order

to facilitate the identification of risks such as Structured “What-if” Technique (SWIFT), brainstorming or just by direct observation.

Direct observation will include Work Package and task studies which will look at each milestone and describe both the internal and external events that can influence the achievement of those milestones. Experience from other projects, metrics and published data, reviewing project information, including plans, analysis and designs and check-lists should also be considered.

2.2.1. Risk Identification Criteria

Each risk will be rated based on the likelihood that the risk event occurs and the impact on the project if the risk eventually occurs (see **table 1**). The rating will be developed at three levels: Objectives, Budget and Deadlines.

Table 1. Probability Rating, Impact Score and Categories

Probability of Occurrence rating (%)	Impact Score (1-9)	Categories
Unlikely (0,1 - 0,3)	Low (1 - 3)	Technical Risks. Financial Risks.
Moderately likely (0,3 - 0,5)	Moderate (4 - 6)	Contractors and Subcontractors and suppliers risks. Human Resources Skills. Team Structure and performance.
Highly Likely (0,5 - 0,9)	High (7 - 9)	Environmental Risks: legal, commercial, political, social, economic, natural, infrastructure, etc.

2.3 Risk analysis

The analysis of risks will aim to determine risk's causes and estimate their probability and consequences. Then the risk will be considered and prioritised according to the analysis and its potential impact on the project employing techniques such sensitivity analysis, probability analysis and Delphi Method – with the experts working at the consortium entities. The information used at this stage may include historical data, theoretical analysts, revision of the ongoing tasks, continuous exchange of information along the project management team and the technical teams, etc.

Analysis of risks and evaluation will be systematically conducted to determine the causes of the risk, to estimate the probability of occurrence and extent, and the potential consequences or impacts on the project objectives, schedule, and resources the risk may have (**table 1**).

After the risk analysis, it will be possible to measure the severity and therefore the level of the risks identified. The level of the risk will be calculated through its probability of occurrence (0 – 0,9) and its impact on the objectives, calendar and resources (0 – 9) (**table 2**). This will allow to establish the adequate risk prioritisation through the probability and impact matrix (**table 3** and **table 4**).

Table 2. Risk Levels

Risk Level			Probability of Occurrence		
			Unlikely	Moderately Likely	Highly Likely
Impact Score	Low	Objective	Very Low	Very Low	Low
		Deadline	Very Low	Very Low	Low
		Budget	Very Low	Very Low	Low
	Moderate	Objective	Low	Medium	High
		Deadline	Low	Low	Medium
		Budget	Low	Medium	High
	High	Objective	High	Very High	Very High
		Deadline	Medium	High	High
		Budget	High	Very High	Very High

Table 3. Risk Prioritisation

Priority	Description
H	Highest priority. All the efforts and resources will be designed to avoid or solve the risk. Extra resources will be dedicated to assist with the implementation of the resolution and will be established a date for the resolution of the risk in a short time period. Special care must be taken when this type of risks are detected.
M	Medium Priority. Appropriate efforts and resources will be designed to avoid, mitigate or solve the risk timely.
L	Lower Priority. Adequate efforts and resources will be designed to avoid, mitigate or solve the risk timely.

Table 4. Risk Priorities setting (Probability and Impact Matrix).

Risk Level			Probability of Occurrence		
			Unlikely	Moderately Likely	Highly Likely
Impact Score	Low	Objective	L	L	L
		Deadline	L	L	L
		Budget	L	L	L
	Moderate	Objective	L	M	H
		Deadline	L	M	H
		Budget	L	M	H
	High	Objective	M	H	H
		Deadline	M	H	H
		Budget	M	H	H

2.4 Risk mitigation and contingency

Risk mitigation aims to avoid – reduce the probability of – the activation of risks while contingency measures are planned to limit or neutralize any negative consequence of a particular risk on the project, when the risk eventually appears.

When a risk is identified, a contingency plan is also elaborated to effectively respond to such event that may or may not happen in the future. Contingency measures should describe a set of steps to be taken if the risk eventually occurs.

For this, a Risk Register containing all the necessary information will be implemented as depicted in **table 5**.

Table 5. Risk Register

Risk ID: <#>	Short description: <Caption related to the origin or cause of the risk event>		
Priority: High / Medium / Low		Activated: Yes (Red) /No (Green)	
Report Date: <risk was registered>	Category: <e.g. technical>	Probability: <e.g. Low>	Impact: <e.g. Moderate>
Risk level: <e.g. Low>			
Description of the Risk: <There is a Risk that [Risk Source] cause [Consequences] that impacts [Project specific objectives, schedule, resources ...]>			
Mitigation Measure Proposed: <Approaches to control, avoid, minimize, or otherwise mitigate the risk. Mitigation approaches may reduce the probability or the impact>			
Contingency Plan: <Describe the actions that will be taken to deal with the situation if this risk factor actually becomes a problem.>			
Activation date: <State the date the Contingency plan implementation was begun.>		Deactivation deadline: <State a date by which the Contingency plan is to be implemented.>	
Current Status: <Describe the status and effectiveness of the risk mitigation actions as of the date of this report.>			

2.5 Risk monitoring and reporting

Any new risk identified or any change in the status of a risk will be registered and updated. The present document (RISK AND CONTINGENCY PLAN for The project), is a living document that shall be updated and reviewed in parallel to the development of the Project. It will serve both as a risk database and a risk track that records any useful information for the management of risks. Each risk owner will monitor on a regular basis the evolution of the risk assigned. This process shall contribute to provide adequate control and ensure the correct development to the project. Monitoring and reporting of risks should comply with the reporting format asked by the EC and depicted in the following **Tables 6, 7 and 8**.

Table 6. Foreseen Risks as identified in Annex 1.

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
READ ONLY	READ ONLY	READ ONLY	READ ONLY

(The table is read-only and it is provided as a reference for the State of Play table below.)

Table 7. Unforeseen Risks

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures

Table 8. States of the Play for Risk Mitigation

Risk number	Period	Did you apply risk mitigation measures?	Did your risk materialise?	Comments
		[YES / NO]	[YES / NO]	

3. Risk register database

The following table shows the identified risks, their impact, the risk level and priority given. It also indicates the risks that have been activated during the reported period.

FORESEEN RISKS					
Risk No.	Type of risk	Impact	Risk level	Risk priority	Activated
1	Major project cost, more than initially planned	Cost	Low	Low	
2	Bankruptcy of a partner	Quality, Time, Cost, Scope	High	Medium	
3	Intellectual Property Rights (IPR) conflicts	Exploitation and dissemination	Medium	Medium	
4	Coordination, coherence and synchronization of progress on work packages. Conflicts. Milestone slippage. Budget overruns. Changes in personnel involved, corporate organizations and consortium partnership	Quality, Time, Cost, Scope	Very high	High	
5	Delays of key deliverables belonging to the critical route	Time	Medium	Medium	
6	Under resourced partner/task/WP	Quality, Time	Medium	Medium	<input checked="" type="checkbox"/>
7	Partner default	Quality, Time, Cost, Scope	Medium	Medium	
8	Project estimates are not as accurate as expected	Quality	Very low	Low	
9	General risks involving the work packages	Quality, Time, Scope	Medium	Medium	
10	Delays in the information flows target in terminal use	Time	Very low	Low	<input checked="" type="checkbox"/>
11	Failures in the software interoperability text	Quality, Time, Cost, Scope	Very high	High	
12	Disagreement in the decision support	Quality, Scope	Very low	Low	
13	Disagreement among the partners in the KPI definition	Time	Medium	Medium	
14	Difficulties in the identification of data for pilot cases	Quality, Scope	High	Medium	
15	Difficulties in the construction of Build BIM Models of real locations	Time	High	Medium	
16	Build 7D BIM Models of Virtual Locations	Time, Scope	Very high	High	
17	Data collection difficulties	Quality, Time, Scope	High	Medium	<input checked="" type="checkbox"/>
18	Failure in the simulation techniques	Quality, Time, Cost, Scope	High	Medium	
19	Difficulties in calibration and validations	Quality, Time, Scope	Medium	Medium	
20	Failure of system and interfaces	Quality, Time, Scope	Very high	High	
21	Delays in the validations and demonstration at selected terminals	Time	Low	Low	
22	Transportation and logistics studies and statistical data and their implications for intermodal terminals. A specific concept/results of analysis cannot be agreed upon within the consortium.	Quality, Time, Scope	Low	Low	
23	Failures in the integration of key results	Time	Low	Low	
24	Dissemination ineffective	Quality, Scope	High	Medium	
25	Problems in target groups involvement	Time, Scope	Low	Low	
26	Lack of visibility of project achievements (scientific community)	Exploitation and dissemination	High	Medium	
27	Failure to achieve the overall objectives	Quality, Scope	High	Medium	
UNFORESEEN RISKS					
Risk No.	Type of risk	Impact	Risk level	Risk priority	Activated
28	Additional effort will be required by CENIT (communication effort, understanding of DHL's internals, stays at DHL's terminals, etc.)	Quality, Time	Low	Low	
29	CENIT will require additional budget for travelling costs	Cost	Low	Low	
30	Miscalculation of necessary DHL remaining effort	Time	Low	Low	
31	Additional effort will be required by IDP if further difficulties are found in creating the new libraries for exporting SQLite and SHP files according to the simulation library components and data structure defined under WP5 and WP6	Time, Scope, Cost	Medium	Medium	
FORESEEN RISKS PREVIOUS TO THE SIGNATURE OF THE GA					
Risk No.	Type of risk	Impact	Risk level	Risk priority	Activated
31	Withdrawal of any creative industries SMEs members before their EC grant agreement signature	Quality, Time, Scope	Medium	Medium	
32	Conflict in the real locations identification	Quality, Scope	High	Medium	
33	Difficulties in the determination of real cases for demonstration	Quality, Time, Scope	High	Medium	

Risk ID: R1		<i>Major project cost, more than initially planned</i>		
Priority: Low		Activated: No		
Report 01/09/2016	Date:	Category: <i>Financial</i>	Probability: <i>Unlikely</i>	Impact: <i>Moderate</i>
Risk level: <i>Low</i>				
Description of the Risk: <i>There is a risk that project costs could be higher than expected, which affects mainly the cost.</i>				
Mitigation Measure Proposed: <i>Agreement for coverage with own commitment. Work will be assumed by one or several consortium partners with the required qualifications.</i>				
Contingency Plan: <i>In case of cost overruns, the consortium will not ask the EC for additional funding. The Consortium assumes that unforeseen risks may require additional resources (e.g. staff time) to successfully complete the project and it agrees to provide these resources if necessary. The Consortium is fully committed to complete the scope of the project within the budget.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: <i>Control of the cost associated to the project by each partner.</i>				

Risk ID: R2		<i>Bankruptcy of a partner</i>		
Priority: Medium		Activated: No		
Report 01/09/2016	Date:	Category: <i>Contractors and subcontractors and suppliers risks</i>	Probability: <i>Unlikely</i>	Impact: <i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>There is a risk that a partner could go bankrupt, and this could have an impact in quality, time, cost, scope and resources.</i>				
Mitigation Measure Proposed: <i>Involvement of partners with similar profile. To apply the provisions of the Consortium Agreement (CA) for this case.</i>				
Contingency Plan: <i>Consortium has sufficient strength and diversity so that other partners can assume more tasks besides their own ones.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R3		<i>Intellectual Property Rights (IPR) conflicts</i>		
Priority: Medium		Activated: No		
Report 01/09/2016	Date:	Category: <i>Environmental risk (legal) Team structure and performance</i>	Probability: <i>Moderately likely</i>	Impact: <i>Moderate</i>
Risk level: <i>Medium</i>				

Risk ID: R3	<i>Intellectual Property Rights (IPR) conflicts</i>
Description of the Risk: <i>There is a risk that partners do not agree the IP rules, affecting mainly the exploitation and dissemination of the results.</i>	
Mitigation Measure Proposed: <i>Decision following the structure project management. The project management will define an intellectual property regime that will ensure:</i> <ul style="list-style-type: none"> - <i>Research publication rights will be owned by those who produce them (either employers or employees depending on their country's regime), and the distribution within the project should be granted free.</i> - <i>Software produced for the project will be the property of their producers.</i> - <i>Ontologies produced for the project will be the property of their producers.</i> <i>The Project Management Board will take appropriate action for protecting, sharing and developing the intellectual property rights of the project. This will have to be in compliance with the H2020 rules and regulations on knowledge and intellectual property rights.</i>	
Contingency Plan: <i>The IP provisions aim to provide a flexible and efficient mechanism to support the cooperation between partners guaranteeing protection and maximum use of results as well as ensure immediate dissemination thereof. If necessary, the Consortium will check the following IP arrangements: confidentiality, background list, use of IP generated parallel to the project, joint ownership of results, legal protection of results and exploitation of results and access rights.</i>	
Activation date: -	Deactivation deadline: -
Current Status: -	

Risk ID: R4	<i>Coordination, coherence and synchronization of progress on work packages. Conflicts. Milestone slippage. Budget overruns. Changes in personnel involved, corporate organizations and consortium partnership</i>			
Priority: High		Activated: No		
Report 01/09/2016	Date:	Category: <i>Team structure and performance</i>	Probability: <i>Highly likely</i>	Impact: <i>High</i>
Risk level: <i>Very high</i>				
Description of the Risk: <ul style="list-style-type: none"> - <i>Work among different partners are not synchronized, which could affect scope, quality, time and costs.</i> - <i>Key personnel become unavailable to complete the project, which could affect scope, quality, time and costs.</i> - <i>Project costs higher than planned, which could affect costs.</i> 				
Mitigation Measure Proposed: <i>Management structure. Detailed Consortium Agreement. Quality management plan.</i>				
Contingency Plan: <ul style="list-style-type: none"> - <i>Integration work package set up under leader's responsibility.</i> - <i>Changes in personnel involved: if this occurs, the work package leaders and project coordinator would find a replacement among Consortium partners and ask for concurrence from the EC. A key strength of the project is that each of the</i> 				

Risk ID: R4	<i>Coordination, coherence and synchronization of progress on work packages. Conflicts. Milestone slippage. Budget overruns. Changes in personnel involved, corporate organizations and consortium partnership</i>		
<p><i>Consortium partners has several staff members who could successfully complete the tasks assigned.</i></p> <ul style="list-style-type: none"> - <i>The Consortium has agreed to complete the expected scope of work within the budget.</i> 			
Activation date: 04/01/18		Deactivation deadline:	
<p>Current Status: Previously reported and currently solved: <i>Control of the cost associated to the project by each partner as new activities have been assumed by partners in order to avoid affecting the progress of the whole project. Two additional activities have been necessary to be able to reach the goals for the first mid-term project:</i> <i>WP4 - Models developed in QGIS in order to provide layouts of the real terminals to Macomi and Cenit and follow the workflow of different work packages avoiding delays from schedule due to data exchange.</i> <i>Work related to data exchange between BIM model in Revit and terminal simulation software has been assumed by IDP, which entails an additional effort as new libraries are being created. Further improvements for the interface between BIM and simulation component library in a more efficient way (WP4 – WP5 – WP6).</i> <i>The new situation is being communicated to the EC.</i></p>			

Risk ID: R5	<i>Delays of key deliverables belonging to the critical route</i>		
Priority: Medium		Activated: No	
Report 01/09/2016	Date:	Category: <i>Technical</i>	Probability: <i>Unlikely</i>
		Impact: <i>High</i>	
Risk level: <i>Medium</i>			
Description of the Risk: <i>Project deliverables cannot be submitted on time; it could affect the date of the end of the project.</i>			
<p>Mitigation Measure Proposed: <i>Three internal reporting deadlines have been established in order to avoid delays and detect the risk as soon as possible. These internal reporting deadlines will be monitored by the coordinator and are as follows:</i></p> <ul style="list-style-type: none"> - <i>A first draft will be delivered corresponding approximately to 1/3 of the task duration;</i> - <i>A peer review will be done one month before the final due date;</i> - <i>Final version due date according to the DoA.</i> <p><i>The main strategies used to address delays include allocating extra resources to the task, starting other tasks in parallel with the delayed task, and developing plans for reducing time needed to complete follow-on tasks.</i></p> <p><i>The three internal reporting deadlines will help to identify and address any possible delay quickly.</i></p>			
Contingency Plan: <i>In case that a key deliverable, which is needed for the implementation of subsequent work, is delayed, a provisional draft will be elaborated.</i>			

Risk ID: R5	<i>Delays of key deliverables belonging to the critical route</i>
<i>This draft will contain the essential information needed for the performance of the work depending on it.</i>	
Activation date: -	Deactivation deadline: -
Current Status: -	

Risk ID: R6	<i>Under resourced partner/task/WP</i>			
Priority: Medium			Activated: Yes	
Report 01/09/2016	Date:	Category: <i>Team structure and performance</i>	Probability: <i>Moderately likely</i>	Impact: <i>Moderate</i>
Risk level: <i>Medium</i>				
Description of the Risk: <i>Under-resourced partner/task/WP which could affect quality and time.</i>				
Mitigation Measure Proposed: <i>Resource expenditure will be carefully monitored throughout the project.</i>				
Contingency Plan: <i>If needed, resources will be re-distributing effort among tasks / WPs / partners. All participants are prepared to temporarily commit more resources to the project, if required.</i>				
Activation date: 04/01/2018			Deactivation deadline: -	
Current Status:				
Previously reported and currently solved:				
<p><i>At the beginning of November 2016, Joachim Ritzer, representative of DHL for INTERMODEL project reported the possible activation of Risk 6 "Under resourced Partner/task/WP", due to the critical changes in the business environment occurred after the approval of the proposal which will require DHL Freight to adjust its organization. Consequently, this issue could affect the availability of resources that DHL could provide for research and reporting tasks.</i></p> <p><i>After analyzing the situation communicated by DHL which included several communications with the project coordinator and with German NCPs, a report elaborated by DHL was sent to the consortium and discussed during the first online meeting, held the 12th December 2016 to deal with the situation.</i></p> <p><i>Consortium partners agreed that CENIT will assume DHL's research tasks, and the two partners involved have redistributed and agreed the updated effort and the new role of each one has been redefined.</i></p>				
Currently activated:				
<p><i>This risk was activated as consequence of risk 11 activation, and at this moment the previous risk has been solved and disactivate, however IDP is currently working on improving the interoperative between the BIM models and simulation programs with their own resources for benefit of the project without affecting the accomplishment of the results, so the risk 11 has been activated again during this period. The Consortium is under an amendment development, doing a re-planification of the project by analysing the resources needed in each WP so in the case of being necessary some resources will be re-distributed from other WP or partners. In case there is no PM</i></p>				

Risk ID: R6 Under resourced partner/task/WP

available or PM are also needed for the original WP, IDP will continue with the developing of the interoperative between the BIM and the simulation

Risk ID: R7 Partner default

Priority: Medium **Activated: No**

Report 01/09/2016	Date:	Category: Team structure and performance; Technical	Probability: Unlikely	Impact: High
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Risk level: Medium

Description of the Risk: The amount or quality of work provided by a partner does not comply with the expectations or obligations, and could affect scope, quality, time and cost.

Mitigation Measure Proposed: In case of partner default, the consortium will seek a substitution, first internally and then, if needed, externally, utilizing the participant's extensive work networks.

Contingency Plan: Firstly, the partner will be informed by the coordinator about the problem and its impact on the overall project and will be required to improve his performance. If the partner fails to respond positively and properly, measures will be taken by the Consortium. Just in the worst case the partner can be removed from the project.

Activation date: - **Deactivation deadline:** -

Current Status: -

Risk ID: R8 Project estimates are not as accurate as expected

Priority: Low **Activated: No**

Report 01/09/2016	Date:	Category: Technical	Probability: Moderately likely	Impact: Low
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Risk level: Very low

Description of the Risk: Project delivers low quality findings, which affects the quality.

Mitigation Measure Proposed: Rework, check if reduced accuracy is acceptable to users, and to the project scope.

Contingency Plan: In case a project deliverable or a demonstrator activity within the project fails to meet high accuracy and quality, it will be returned to the responsible party for revision. This will be possible thanks to the three different delivery dates established. The work package leaders, the coordinator and experts, will provide detailed comments and discuss the quality problems with authors, and if necessary, they will work together to improve the product.

Activation date: - **Deactivation deadline:** -

Current Status: -

Risk ID: R9		<i>General risks involving the work packages</i>			
Priority: Medium			Activated: No		
Report 01/09/2016	Date:	Category: <i>Technical; Team structure and performance</i>	Probability: <i>Moderately likely</i>	Impact: <i>Moderate</i>	
Risk level: <i>Medium</i>					
Description of the Risk: <i>Risk in work package development, affecting scope, quality and time.</i>					
Mitigation Measure Proposed: <i>Establish reasonably risk assessment points along the research plan. Work package leader and task leader will be informed of the risk assessment values for each activity and will in principle care to solve any inconvenience inside the Work Package/Task.</i>					
Contingency Plan: <i>As already mentioned, the leader of each work package will set up how to proceed and will define a comprehensive set of management techniques to help to minimize the risk.</i>					
Activation date: -			Deactivation deadline: -		
Current Status: -					

Risk ID: R10		<i>Delays in the information flows target in terminal use</i>			
Priority: Low			Activated: Yes		
Report 01/09/2016	Date:	Category: <i>Technical risks</i>	Probability: <i>Moderately likely</i>	Impact: <i>Low</i>	
Risk level: <i>Very low</i>					
Description of the Risk: <i>Information flows need longer time than expected.</i>					
Mitigation Measure Proposed: <i>Re-works. Review the source of data.</i>					
Contingency Plan: <i>The proposed plan is to enlarge the duration of T6.2 Calibration and validation from M24 to M27, consequently to modify the submission of D6.2 for the same period. This modification permit to CINME collect the data needed and apply mitigation measures in case necessary.</i> <i>This activation has an affectation on Task 6.3 delayed its start by 3 months and will be delayed its end by 2 months, with a minimum consequence on T8.3 and T8.4.</i>					
Activation date: -04 /06/2018			Deactivation deadline: -		
Current Status: - The construction, validation and calibration of the external traffic simulation of the real terminals of Melzo and la Spezia has encountered some problems, due to the delay in the delivery of data on traffic from the road networks surrounding the terminals from Constship and La Spezia Port Authority . Changes in the networks area and private vehicle traffic intensities and turn appraisal at crossing and roundabouts affected the construction of networks to be simulated into Melzo terminal, for that reason has been necessary to redone terminal, and try to determinate if required to apply a modification in La Spezia too.					

Risk ID: R10	<i>Delays in the information flows target in terminal use</i>
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Risk ID: R11	<i>Failures in the software interoperability text</i>
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Priority: High	Activated: No
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Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	<i>Moderately likely</i>	<i>High</i>

Risk level: *Very high*

Description of the Risk: *Problems with the software interoperability text affecting scope, quality, time and cost.*

Mitigation Measure Proposed: *Test the system. Correction. Ask for external specialized assistance.*

Contingency Plan: *In case of activation of this risk, a specific work package will be set up with specific responsibility in this issue.*

Activation date: 16/11/2017

Deactivation deadline: - 31/08/2018

Current Status: *Throughout the development of WP2, WP4, WP5 and WP6, several discussions have been held in order to agree data exchange formats and software interoperability text.*

Simulation software reads .sqlite and .shp files.

In order to provide the layout of the real terminals (being developed in BIM formats within WP4), to WP5, files required were developed initially in QGIS by IDP as the workflow within WP4 was slowly than the required in WP5. In parallel, some investigation was done to be able to export .sqlite files directly from the software used to develop the BIM models (Revit).

Additionally, WP4 does not address modelling the external network, which is necessary for the development of WP6, and the same problem has been encountered when coupling BIM and simulation. Due to the need of importing .shp files to the simulation software, IDP is generating the external network in QGIS avoiding delays in the model simulation.

Efforts are being made in order to improve the interaction between BIM and simulation component libraries.

The risk 11 has been deactivated as the partners involved programmed a tool to import and export information from BIM to the simulation programs, allowing the interoperability defined as an objective of the project.

Risk ID: R12	<i>Disagreement in the decision support</i>
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Priority: Low	Activated: No
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Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Environmental; team structure and performance</i>	<i>Unlikely</i>	<i>Low</i>

Risk level: *Very low*

Description of the Risk: *Internal disputes concerning the decision support which can affect scope and quality.*

Mitigation Measure Proposed: *Apply the Consortium Agreement (CA) provision. Invoke the general assembly decision methods.*

Contingency Plan: *In case of activation, the measures established in the CA will be applied.*

Activation date: -

Deactivation deadline: -

Current Status: -

Risk ID: R13	<i>Disagreement among the partners in the KPI definition</i>			
Priority: Medium		Activated: No		
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	<i>Moderately likely</i>	<i>Moderate</i>
Risk level: <i>Medium</i>				
Description of the Risk: <i>There is a risk that partners have different interests and consequently have different opinion about relevant KPIs. This fact would affect time.</i>				
Mitigation Measure Proposed: <i>Re-work. Apply the decision method.</i>				
Contingency Plan: <i>In case of activation, the work package leader and the coordinator will organize an internal meeting in order to openly discuss about the KPI and come up with a final list, and the decision method will be applied.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R14	<i>Difficulties in the identification of data for pilot cases</i>			
Priority: Medium		Activated: No		
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical risks</i>	<i>Unlikely</i>	<i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>Not enough information available, affecting scope and quality.</i>				
Mitigation Measure Proposed: <i>Reinforce the source and analysis of data. In depth study of the successfully cases. Identification of academic methodologies.</i>				
Contingency Plan: <i>Most of data must be provided by some of the partners involved in the project. Thus, for getting the minimum required information, the consortium was composed to have the appropriate partners. From this perspective, a minimum quantity of data and information can be guaranteed.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R15	<i>Difficulties in the construction of Build BIM Models of real locations</i>			
Priority: Medium		Activated: No		

Risk ID: R15	<i>Difficulties in the construction of Build BIM Models of real locations</i>			
Report 01/09/2016	Date:	Category: <i>Technical</i>	Probability: <i>Unlikely</i>	Impact: <i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>Difficulties when developing the BIM models of real locations due to lack of information (layouts, dwg files, heights, etc.) affecting time.</i>				
Mitigation Measure Proposed: <i>Look for new locations. Identification of the difficulties. Technical improvements definitions.</i>				
Contingency Plan: <i>To ensure the construction of BIM models of real locations, point clouds will be carried out.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: -				

Risk ID: R16	<i>Build 7D BIM Models of Virtual Locations</i>			
Priority: High			Activated: No	
Report 01/09/2016	Date:	Category: <i>Technical</i>	Probability: <i>Moderately likely</i>	Impact: <i>High</i>
Risk level: <i>Very high</i>				
Description of the Risk: <i>Difficulties in building 7D models of virtual locations affecting time and scope.</i>				
Mitigation Measure Proposed: <i>Change the system of virtual locations. The project includes the Task 4.1 '7thD BIM Execution Plan' focused on developing an execution plan with a detail description of the process used to complete the BIM models up to 7th dimensions, this will allow foreseeing probable difficulties in the implementation.</i>				
Contingency Plan: <i>As I+D project which will try to implement 7 dimensions to the BIM model of virtual terminals, the Consortium is composed of different companies with experience in BIM technology, and they have good contacts with other companies with expertise in BIM. If necessary, external support would be sought.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: -				

Risk ID: R17	<i>Data collection difficulties</i>			
Priority: Medium			Activated: Yes	
Report 01/09/2016	Date:	Category: <i>Technical</i>	Probability: <i>Unlikely</i>	Impact: <i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>The Consortium finds difficulties in collecting the necessary data for the development of the project. Data collection and surveys need long time, operators and other stakeholders do not give enough detailed information, or even that not enough information is available. This could affect time, scope and quality.</i>				
Mitigation Measure Proposed: <i>Reinforce the source of data. Change the method for data collection. Partners involved in multiple work packages must increase their</i>				

Risk ID: R17	<i>Data collection difficulties</i>		
<i>collaboration/technical data surveys will be designed according to common criteria between partners to ensure clarity on the information required at this level.</i>			
Contingency Plan:			
<ul style="list-style-type: none"> - <i>If data collection needs longer time than expected, the work package leader and partners involved will rank the most important required for the development of the following tasks. Higher priority will be given to the urgent information regarding the project development.</i> - <i>In case that data collected from partners is not accurate enough, the Consortium will use its contacts to obtain deeper information.</i> - <i>At least, relevant information of project partners, especially the terminal operators and the port authority, will be provided. Therefore, a minimum information can be guaranteed. If necessary, the Consortium will use its contacts network to get more data.</i> 			
Activation date: 21/12/2017		Deactivation deadline: -	
<p>Current Status: <i>As no railways owners are involved in the project, it is been impossible to gather actual real data from the railway interconnection between Melzo and La Spezia. This is a problem that can have an impact in WP7 since there is no information of the layout of the rail interconnection, capacity, weight, etc and its maintenance. VIAS was supposed to define the structure of the data collected in the periodic inspections in order to be able to incorporate them into the Smart Framework developed in the Optirail Project led by them, but as it was already communicated during the development of WP3, the right properties of the models developed in Optirail project belongs to Optirail Consortium and the lack of maintenance data which make unfeasible to take them into consideration for the pilot terminals. One of the alternatives proposed is to define a methodology for the design of a predictive maintenance plan serving as a support for decision-making through a pilot to be carried out in the interconnection between real terminals. This pilot will consist in obtaining a point cloud which will allow to get more accurate data for KPIs calculation, and to propose predictive maintenance plans. Maintenance methodology will be separated from the interconnection simulation tool. Layout information will be obtained from publicly available sources, complemented with fragmentary data provided by CSI.</i></p> <p><i>The new situation is being communicated to the EC and the work package is being re-planned.</i></p>			

Risk ID: R18	<i>Failure in the simulation techniques</i>		
Priority: Medium		Activated: No	
Report 01/09/2016	Date:	Category: <i>Technical</i>	Probability: <i>Unlikely</i>
		Impact: High	
Risk level: <i>High</i>			
Description of the Risk: <i>The simulation techniques are not enough developed in time to support the project affecting scope, quality, time and cost.</i>			

Risk ID: R17	<i>Data collection difficulties</i>			
Mitigation Measure Proposed: <i>Re-work. Analyse the causes of failure. Identification of new methods/tools for simulations.</i>				
Contingency Plan: <i>Additional effort expected in order to improve the simulation techniques. If necessary, additional expert consultation is foreseen.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: -				

Risk ID: R19	<i>Difficulties in calibration and validations</i>			
Priority: Medium			Activated: No	
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	Moderately likely	Moderate
Risk level: <i>Medium</i>				
Description of the Risk: <i>The Consortium could find difficulties when calibrating and validating and to realize that the components reviewed are not representing reality. Thus affecting quality, scope and time.</i>				
Mitigation Measure Proposed: <i>Re-work. Look for external assistance.</i>				
Contingency Plan: <i>The Consortium will apply different techniques for validation, and if necessary, expert validation workshop will be organised.</i>				

Risk ID: R20	<i>Failure of system and interfaces</i>			
Priority: High			Activated: No	
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	Moderately likely	High
Risk level: <i>Very high</i>				
Description of the Risk: <i>Difficulties in coupling different systems and creating an integrated interface which would affect quality, scope and time.</i>				
Mitigation Measure Proposed: <i>The functionality of the system shall also be verified as well as interfaces, communications and links to dependent systems.</i>				
Contingency Plan: <i>If necessary, the Consortium will look for external assistance.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: -				

Risk ID: R21	<i>Delays in the validations and demonstration at selected terminals</i>			
Priority: Low			Activated: No	
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	Unlikely	Moderate
Risk level: <i>Low</i>				
Description of the Risk: <i>Delays in the validations and demonstrations at selected terminals affecting time.</i>				
Mitigation Measure Proposed: <i>Increase the resources allocated to the activity. Ask about new collaboration schemes.</i>				

Contingency Plan: *The Consortium will hold a specific meeting to discuss on this and try to organize demonstration activities within the duration of the project, and contact more stakeholders.*

Activation date: -	Deactivation deadline: -
Current Status: -	

Risk ID: R22	<i>Transportation and logistics studies and statistical data and their implications for intermodal terminals. Specific concept/results of analysis cannot be agreed upon within the consortium.</i>			
Priority: Low		Activated: No		
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	<i>Unlikely</i>	<i>Moderate</i>
Risk level: <i>Low</i>				
Description of the Risk: <i>Difficulties when agreeing the concept and results of the analysis of transportation and logistics in intermodal terminals, affecting quality, scope and time.</i>				
Mitigation Measure Proposed: <i>Immediately a review process will be invoked. The recommendations will lead to corrective actions. Apply the CA conclusions for the decision process.</i>				
Contingency Plan: <i>Check the CA conclusions for the decision process and apply the new ones. Specific workshop in order to agree concepts and results of analysis.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R23	<i>Failures in the integration of key results</i>			
Priority: Low		Activated: No		
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical Technical; Contractors and subcontractors and suppliers risks</i>	<i>Unlikely</i>	<i>Moderate</i>
Risk level: <i>Low</i>				
Description of the Risk: <i>Failures in the integration of results affecting time.</i>				
Mitigation Measure Proposed: <i>Reinforce the integration task. Invoke GA assembly and involve new end users. Reinforce the commitment of responsables of facilities for the demonstration activities.</i>				
Contingency Plan: <i>New end users will be involved.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R24		<i>Dissemination ineffective</i>		
Priority: Medium		Activated: No		
Report 01/09/2016	Date:	Category: <i>Human resources skills; Environmental (commercial)</i>	Probability: <i>Unlikely</i>	Impact: <i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>This risk is associated to the extent of dissemination, which means that project information does not reach the intended target audience. This would affect scope and quality.</i>				
Mitigation Measure Proposed: <i>Extend to wider audience, different events, publications, etc.</i>				
Contingency Plan: <i>As indicated in the DoA, the project utilizes a wide range of communication channels including internet, technical and scientific publications, public events, conferences, newspaper articles and videos. Some of the partners have proven experience disseminating technical research results. Using different media will help the project reach a large target audience. In case that this is not enough, the Consortium will use a proactive approach to develop a database of contacts and will communicate with this audience via e-mail. This database will be developed through the collection of information from Consortium partners. Also, interested organizations will be able to sign-up on the database (proposed via: project internet site, newsletters). The demonstrations activities developed during the project can be more interesting and more attractive than simple reports when trying to capture the attention of possible stakeholders, so live and videos on website or YouTube could be a good dissemination channel.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R25		<i>Problems in target groups involvement</i>		
Priority: Low		Activated: No		
Report 01/09/2016	Date:	Category: <i>Environmental; contractors and subcontractors and suppliers risks</i>	Probability: <i>Unlikely</i>	Impact: <i>Moderate</i>
Risk level: <i>Low</i>				
Description of the Risk: <i>Problems in target group involvement affecting scope and time.</i>				
Mitigation Measure Proposed: <i>Re-work. Identification of new target groups. Improvement of the customized information sent.</i>				
Contingency Plan: <i>Communication plan review.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R26 <i>Lack of visibility of project achievements (scientific community)</i>				
Priority: Medium			Activated: No	
Report 01/09/2016	Date:	Category: <i>Environmental</i>	Probability: <i>Unlikely</i>	Impact: <i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>Risk associated with the extent of dissemination and not reaching the intended scientific community, which affects exploitation and dissemination.</i>				
Mitigation Measure Proposed: <i>Additional channels of dissemination will be utilized. The novel idea for optical system is a good opportunity to make international publication in a JCR indexed journal with elevated impact on scientific community. Moreover, the Exploitation Agreement will be revised every 6 months in specific sessions during the project general meetings.</i>				
Contingency Plan: <i>Developing real and virtual pilot cases and demonstration activities will make the project more interesting and attractive. If necessary, the exploitation agreement will be modified.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: -				

Risk ID: R27 <i>Failure to achieve the overall objectives</i>				
Priority: Medium			Activated: No	
Report 01/09/2016	Date:	Category: <i>Human resources skills; technical risks</i>	Probability: <i>Unlikely</i>	Impact: <i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>Failure to achieve the overall objectives thus affecting scope and quality.</i>				
Mitigation Measure Proposed: <i>The participation of leading researchers with vast experience in projects at a national and international level will ensure that the projects goals are achievable in principle. Structuring the project into phases with growing complexity enables the identification of possible future problems and respective counter measures at a prior stage. This represents a core instrument of risk contingency since increasing the complexity of the objectives step-wise will naturally lead the consortium towards the barriers of the proposed technology. Such barriers that do not allow an eventual breakthrough through the projects activities do exist. Wherever the project hits them, there will be exploitable results present resulting from the prior project stages. Thus, complete failure is not possible.</i>				
Contingency Plan: <i>Additional engineering and researchers resources will be allocated and also back up personnel within the project budget to ensure achieving overall objectives.</i>				
Activation date: -			Deactivation deadline: -	

Risk ID: R27	<i>Failure to achieve the overall objectives</i>
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Current Status: -

After activating risk #6 in September 2016, some other unforeseen risks were identified. These are explained as follows:

Risk ID: R28	<i>Additional effort will be required by CENIT (communication effort, understanding of DHL's internals, stays at DHL's terminals, etc.)</i>			
Priority: Low		Activated: No		
Report 27/12/2016	Date:	Category: <i>Team structure and performance</i>	Probability: <i>Unlikely</i>	Impact: <i>Moderate</i>
Risk level: <i>Low</i>				
Description of the Risk: <i>Higher effort to assume and develop the new tasks and consequently, higher costs.</i>				
Mitigation Measure Proposed: <i>From the beginning of the project, CENIT has a wide base of staff working in the project, and additionally back up personnel has been defined.</i>				
Contingency Plan: <i>The difference of salary between Spain and Germany would generate a budget surplus which could cover the additional effort carried out by CENIT. In this case, additional budget could be transferred from DHL to CENIT.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R29	<i>CENIT will require additional budget for travelling costs</i>			
Priority: Low		Activated: No		
Report 27/12/2016	Date:	Category: <i>Financial risks</i>	Probability: <i>Unlikely</i>	Impact: <i>Moderate</i>
Risk level: <i>Low</i>				
Description of the Risk: <i>CENIT requires additional budget for travelling costs affecting costs.</i>				
Mitigation Measure Proposed: <i>Travelling costs of the whole consortium will be carefully monitored to avoid this situation.</i>				
Contingency Plan: <i>If additional budget is needed for this issue, it will be obtained from:</i> <ol style="list-style-type: none"> 1) <i>The budget surplus described in R32</i> 2) <i>The remaining travelling budget from other partners (reimbursed at the end of the project).</i> 3) <i>By any other remaining budget from any partner (reimbursed at the end of the project).</i> 4) <i>Assumed by the consortium.</i> 				
Activation date: -		Deactivation deadline: -		
Current Status: -				

Risk ID: R30		<i>Miscalculation of necessary DHL remaining effort</i>		
Priority: Low		Activated: No		
Report 27/12/2016	Date:	Category: <i>Team structure and performance; technical risks</i>	Probability: Low	Impact: Moderate
Risk level: Low				
Description of the Risk: <i>Not enough personnel to assume and develop the remaining tasks, affecting time.</i>				
Mitigation Measure Proposed: <i>From the redistribution of work between DHL and CENIT, DHL will carefully monitor the development of its tasks, identifying problems from the beginning and taking corrective measures.</i>				
Contingency Plan: <i>The original calculation included three main categories of effort.</i> <ol style="list-style-type: none"> 1. <i>Contribution of senior management and business experts (availability for interviews, workshops, reconciliation of assumptions and results).</i> 2. <i>Research activities, preparation and conducting workshops, interviews and terminal visits with senior management and experts as well as consolidation of results including preparation of related papers.</i> 3. <i>Administration and coordination of work package, alignment with project coordinator and project partners, preparation of required reports and documents.</i> <p><i>Effort categories 1 and 3 were planned to be executed by DHL employees on a part time or on demand basis (especially senior management and experts).</i></p> <p><i>Effort category 2 (ca. 75% of total effort and costs) was planned to be executed by 1-2 members of the global Finance organization (e.g. a senior and a junior controller). The senior person was planned to work part time on the project (10% of capacity), the junior person almost in full time (ca. 90% of capacity).</i></p> <p><i>Effort categories 1 (senior management and experts) was estimated with ca. 15% of costs. Effort category 2 (administration and coordination) was estimated with 10% of costs.</i></p> <p><i>If additional budget is needed for the remaining effort not transferred to CENIT, it will be obtained from:</i></p> <ol style="list-style-type: none"> 1) <i>The budget surplus described in R32</i> 2) <i>The remaining travelling budget from other partners (reimbursed at the end of the project).</i> 3) <i>By any other remaining budget from any partner (reimbursed at the end of the project)</i> 4) <i>Assumed by the consortium.</i> 				
Activation date: -		Deactivation deadline: -		
Current Status: -				

After activating again risk #6 in December 2017, some other unforeseen risks were identified. These are explained as follows:

Risk ID: R31	<i>Additional effort will be required by IDP if further difficulties are found in creating the new libraries for exporting SQLite and SHP files according to the simulation library components and data structure defined under WP5 and WP6</i>			
Priority: Medium		Activated: No		
Report Date: 04/01/2018	Category: Technical risks	Probability: Moderately likely	Impact: Moderate	
Risk level: Medium				
Description of the Risk: <i>Higher effort to assume and develop the new tasks and consequently, higher costs.</i>				
Mitigation Measure Proposed: <i>From the beginning of the project, IDP has a wide base of staff working in the project, and additionally back up personnel has been defined.</i>				
Contingency Plan: <i>Further development for the improvement of interface between BIM and simulation library components will be carry out to reduce time, effort and cost of the methodology and tool being developed throughout the INTERMODEL EU project. Efforts will be made to achieve maximum efficiency without affecting the overall cost of the project. Monitoring of PMs in order to check that effort transfer is correct and if within the extension requested (6 months) is not enough to complete the work for data exchange formats between BIM models and simulations, the Consortium will discuss about lengthen the activity without affecting the overall cost of the project, and any decision will be communicated to the EC.</i>				
Activation date: -		Deactivation deadline: -		
Current Status: -				

The following risks have been removed from the previous list included in the DoA, as they cannot happen once the GA was signed:

Risk ID: R7	<i>Withdrawal of any creative industries SMEs members before their EC grant agreement (GA) signature</i>			
Priority: Medium		Activated: No		
Report Date: 01/09/2016	Category: Contractors and subcontractors and suppliers risks	Probability: Unlikely	Impact: High	
Risk level: Medium				
Description of the Risk: <i>There is a Risk that a proposed partner could withdraw the Consortium and the project before the GA signature. Consequently, the scope, quality and time could be affected.</i>				
Mitigation Measure Proposed: <i>The consortium has a list of creative industries alternatives interested in join the project. The consortium will seek a substitution.</i>				
Contingency Plan: <i>In case of withdrawal of any of the creative industries, the Consortium will look for its replacement immediately, and if necessary, the work assigned to this SME would be re-distributed among the most appropriate partners to avoid affecting the time schedule to develop the project.</i>				

Activation date: -	Deactivation deadline: -
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Current Status: <i>This risk does not exist.</i>

Risk ID: R16 <i>Conflict in the real locations identification</i>				
Priority: Medium			Activated: No	
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Technical</i>	<i>Unlikely</i>	<i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>Conflicts when choosing real locations for the development of pilot cases, affecting quality and scope.</i>				
Mitigation Measure Proposed: <i>Exhaustive process for identification and negotiation of new facilities.</i>				
Contingency Plan: <i>The Consortium includes the two operators of the terminals that will be modelled as real pilot cases. Therefore, it is guaranteed that there will not be any conflicts.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: <i>This risk does not exist.</i>				

Risk ID: R20 <i>Difficulties in the determination of real cases for demonstration</i>				
Priority: Medium			Activated: No	
Report	Date:	Category:	Probability:	Impact:
01/09/2016		<i>Human resources skills; team structure and performance</i>	<i>Unlikely</i>	<i>High</i>
Risk level: <i>High</i>				
Description of the Risk: <i>Difficulties in the determination of real cases for demonstration affecting time, quality and scope.</i>				
Mitigation Measure Proposed: <i>Reinforce the Communication with key stakeholders.</i>				
Contingency Plan: <i>The Consortium includes the two operators of the terminals that will be modelled as real pilot cases. Therefore, it is guaranteed that there will not be any conflicts.</i>				
Activation date: -			Deactivation deadline: -	
Current Status: <i>This risk does not exist.</i>				

4. Risk reporting (EC format)

4.1 Foreseen Risks

Table 9. Foreseen Risks as identified in Annex 1.

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
1	Project costs could be higher than expected.	1	Agreement for coverage with own agreement. Search of alternative funds (national-regional funds). The Consortium assumes that unforeseen risks may require additional resources (e.g. staff time) to successfully complete the project and it agrees to provide these resources if necessary. The Consortium is fully committed to complete the scope of the project within the budget.
2	A partner could go bankrupt.	1	Involvement of partners with similar profile. To apply the provisions of the Consortium Agreement (CA) for this case. Consortium has sufficient strength and diversity so that other partners can assume more tasks besides their own ones.
3	Partners do not agree the IP rules, affecting mainly the exploitation and dissemination of the results.	1, 9	<p>The project management will define an intellectual property regime that will ensure:</p> <ul style="list-style-type: none"> - Research publication rights will be owned by those who produce them (either employers or employees depending on their country's regime), and the distribution within the project should be granted free. - Software produced for the project will be the property of their producers. - Ontologies produced for the project will be the property of their producers. <p>The Project Management Board will take appropriate action for protecting, sharing and developing the intellectual property rights of the project. This will have to be in compliance with the H2020 rules and regulations on knowledge and intellectual property rights.</p>
4	Work among different partners are not synchronized; Key personnel become unavailable to complete the project; Project costs higher than planned.	All	<p>Management structure. Detailed Consortium Agreement (CA). Quality management plan. Integration work package set up under leader's responsibility.</p> <p>Changes in personnel involved: if this occurs, the work package leaders and project coordinator would find a replacement among Consortium partners and ask for concurrence from the EC. A key strength of the project is that each of the Consortium partners has several staff members who could successfully complete the tasks assigned.</p> <p>The Consortium has agreed to complete the expected scope of work within the budget.</p>
5	Project deliverables cannot be submitted on time; it could affect the date of the end of the project.	All	Three internal reporting deadlines have been established in order to avoid delays and detect the risk as soon as possible. These internal reporting deadlines will be monitored by the coordinator and are as follows:

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
			<ul style="list-style-type: none"> - A first draft will be delivered corresponding approximately to 1/3 of the task duration; - A peer review will be done one month before the final due date; - Final version due date according to the DoA. <p>The main strategies used to address delays include allocating extra resources to the task, starting other tasks in parallel with the delayed task, and developing plans for reducing time needed to complete follow-on tasks.</p> <p>The three internal reporting deadlines will help to identify and address any possible delay quickly.</p> <p>In case that a key deliverable, which is needed for the implementation of subsequent work, is delayed, a provisional draft will be elaborated. This draft will contain the essential information needed for the performance of the work depending on it.</p>
6	Under-resourced partner/task/WP.	1	Resource expenditure will be carefully monitored throughout the project. If needed, resources will be re-distributing effort among tasks / WPs / partners. All participants are prepared to temporarily commit more resources to the project, if required.
7	The amount or quality of work provided by a partner does not comply with the expectations or obligations.	All	The consortium will seek a substitution, first internally and then, if needed, externally, utilizing the participant's extensive work networks. Firstly, the partner will be informed by the coordinator about the problem and its impact on the overall project and will be required to improve his performance. If the partner fails to respond positively and properly, measures will be taken by the Consortium. Just in the worst case the partner can be removed from the project.
8	Project delivers low quality findings.	2, 3, 4, 5, 6, 7, 8, 9	Rework, check if reduced accuracy is acceptable to users, and to the project scope. In case a project deliverable or a demonstrator activity within the project fails to meet high accuracy and quality, it will be returned to the responsible party for revision. This will be possible thanks to the three different delivery dates established. The work package leaders, the coordinator and experts, will provide detailed comments and discuss the quality problems with authors, and if necessary, they will work together to improve the product.
9	General risks involving the work packages.	1	Establish reasonable risk assessment points along the research plan. Work package leader and task leader will be informed of the risk assessment values for each activity and will in principle care to solve any inconvenience inside the Work Package/Task. As already mentioned, the leader of each work package will set up how to proceed and will define a comprehensive set of management techniques to help to minimize the risk.
10	Information flows need longer time than expected.	2,6	Re-works. Review the source of data. The Consortium will make a ranking of the most important information

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
			required for the following tasks. Priority will be given to the most urgent information regarding the development of the project.
11	Failures in the software interoperability text.	2, 5, 6, 7	Test the system. Correction. Ask for external specialized assistance. In case of activation of this risk, a specific work package will be set up with specific responsibility in this issue.
12	Internal disputes concerning the decision support.	All	Apply the Consortium Agreement (CA) provision. Invoke the general assembly decision methods. In case of activation, the measures established in the CA will be applied.
13	Disagreement among the partners in the KPI definition.	3, 8	Re-work. Apply the decision method. In case of activation, the work package leader and the coordinator will organize an internal meeting in order to openly discuss about the KPI and come up with a final list, and the decision method will be applied.
14	Difficulties in the identification of data for pilot cases.	2, 3, 4, 5, 6, 7, 8	Reinforce the source and analysis of data. In depth study of the successfully cases. Identification of academic methodologies. Most of data must be provided by some of the partners involved in the project. Thus, for getting the minimum required information, the consortium was composed to have the appropriate partners. From this perspective, a minimum quantity of data and information can be guaranteed.
15	Difficulties when developing the BIM models of real locations due to lack of information (layouts, dwg files, heights, etc.).	4	Look for new locations. Identification of the difficulties. Technical improvements definitions. To ensure the construction of BIM models of real locations, point clouds should be carried out.
16	Difficulties in building 7D models of virtual locations.	4	Change the system of virtual locations. The project includes the Task 4.1 '7thD BIM Execution Plan' focused on developing an execution plan with a detail description of the process used to complete the BIM models up to 7th dimensions, this will allow foreseeing probable difficulties in the implementation. As I+D project which will try to implement 7 dimensions to the BIM model of virtual terminals, the Consortium is composed of different companies with experience in BIM technology, and they have good contacts with other companies with expertise in BIM. If necessary, external support would be sought.
17	The Consortium finds difficulties in collecting the necessary data for the development of the project. Data collection and surveys need long time, operators and other stakeholders do not give enough detailed information, or even that not enough information is available.	2, 3, 4, 5, 6, 7, 8	Reinforce the source of data. Change the method for data collection. Partners involved in multiple work packages must increase their collaboration/technical data surveys will be designed according to common criteria between partners to ensure clarity on the information required at this level. <ul style="list-style-type: none"> - If data collection needs longer time than expected, the work package leader and partners involved will rank the most important required for the development of the following tasks. Higher priority will be given to the urgent information regarding the project development.

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
			<ul style="list-style-type: none"> - In case that data collected from partners is not accurate enough, the Consortium will use its contacts to obtain deeper information. - At least, relevant information of project partners, specially the terminal operators and the port authority, will be provided. Therefore, a minimum information can be guaranteed. If necessary, the Consortium will use its contacts network to get more data.
18	The simulation techniques are not enough developed in time to support the project.	5, 6, 7, 8	Re-work. Analyse the causes of failure. Identification of new methods/tools for simulations. Additional effort expected in order to improve the simulation techniques. If necessary, additional expert consultation is foreseen.
19	Difficulties when calibrating and validating and to realize that the components reviewed are not representing reality.	5, 6, 7, 8	Re-work. Look for external assistance. The Consortium will apply different techniques for validation, and if necessary, expert validation workshop will be organised.
20	Failure of system and interfaces.	7	The functionality of the system shall also be verified as well as interfaces, communications and links to dependent systems. If necessary, the Consortium will look for external assistance.
21	Delays in the validations and demonstration at selected terminals.	8	Increase the resources allocated to the activity. Ask about new collaboration schemes. The Consortium will hold a specific meeting to discuss on this and try to organize demonstration activities within the duration of the project, and contact more stakeholders.
22	Transportation and logistics studies and statistical data and their implications for intermodal terminals. Specific concept/results of analysis cannot be agreed upon within the consortium.	8	Immediately a review process will be invoked. The recommendations will lead to corrective actions. Apply the CA conclusions for the decision process. Check the CA conclusions for the decision process and apply the new ones. Specific workshop in order to agree concepts and results of analysis.
23	Failures in the integration of key results.	8	Reinforce the integration task. Invoke GA assembly and involve new end users. Reinforce the commitment of responsables of facilities for the demonstration activities.
24	Dissemination ineffective. project information does not reach the intended target audience	9	Extend to wider audience, different events, publications, etc. As indicated in the DoA, the project utilizes a wide range of communication channels including internet, technical and scientific publications, public events, conferences, newspaper articles and videos. Some of the partners have proven experience disseminating technical research results. Using different media will help the project reach a large target audience. In case that this is not enough, the Consortium will use a proactive approach to develop a database of contacts and will communicate with this audience via e-mail. This database will be developed through the collection of information from Consortium partners. Also, interested organizations will be able to sign-up on the database (proposed via: project internet site,

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
			newsletters). The demonstrations activities developed during the project can be more interesting and more attractive than simple reports when trying to capture the attention of possible stakeholders, so live and videos on website or YouTube could be a good dissemination channel.
25	Problems in target groups involvement.	9	Re-work. Identification of new target groups. Improvement of the customized information sent. Communication plan review.
26	Lack of visibility of project achievements (scientific community).	9	Additional channels of dissemination will be utilized. The novel idea for optical system is a good opportunity to make international publication in a JCR indexed journal with elevated impact on scientific community. Moreover, the Exploitation Agreement will be revised every 6 months in specific sessions during the project general meetings. Developing real and virtual pilot cases and demonstration activities will make the project more interesting and attractive. If necessary, the exploitation agreement will be modified.
27	Failure to achieve the overall objectives	1, 2, 3, 4, 5, 6, 7, 8	The participation of leading researchers with vast experience in projects at a national and international level will ensure that the projects goals are achievable in principle. Structuring the project into phases with growing complexity enables the identification of possible future problems and respective counter measures at a prior stage. This represents a core instrument of risk contingency since increasing the complexity of the objectives step-wise will naturally lead the consortium towards the barriers of the proposed technology. Such barriers that do not allow an eventual breakthrough through the projects activities do exist. Wherever the project hits them, there will be exploitable results present resulting from the prior project stages. Thus, complete failure is not possible. Additional engineering and researchers resources will be allocated and also back up personnel within the project budget to ensure achieving overall objectives.

4.2 Unforeseen Risks

Table 10. Current Unforeseen Risks.

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
28	Additional effort will be required by CENIT (communication effort, understanding of DHL's	4, 7, 8	From the beginning of the project, CENIT has a wide base of staff working in the project, and additionally back up personnel has been defined.

Risk Number	Description of Risk	Work Packages Concerned	Proposed risk-mitigation measures
	internals, stays at DHL's terminals, etc.).		
29	CENIT will require additional budget for travelling costs	4, 7, 8	Travelling costs of the whole consortium will be carefully monitored to avoid this situation. If additional budget is needed for this issue, the Consortium will analyse the situation to see how it can be solved.
30	Miscalculation of necessary DHL remaining effort	4, 7, 8	DHL will carefully monitor the development of its tasks, identifying problems from the beginning and taking corrective measures.
31	Miscalculation of necessary IDP remaining effort	4	IDP will carefully monitor the development of its tasks, identifying problems from the beginning and taking corrective measures.

4.3 State of the Play for Risk Mitigation

Table 11. Current states of the Play for Risk Mitigation.

Risk number	Period	Did you apply risk mitigation measures?	Did your risk materialise?	Comments
1	M1 – M18	YES	NO	After several discussions held among partners involved in WP2, WP4, WP5 and WP6 and in order to complete the scope of the project, IDP is assuming the creation of new libraries to improve data exchange between software used for modelling and simulations. In order to be able to work on different work packages, IDP in charge of BIM modelling, also has developed layouts in QGIS in order to provide material required for the simulations. Consortium partners agreed to transferring effort without affecting the work planned. This new situation has been communicated to the EC.
2	M1 – M18	YES	NO	
3	M1 – M18	YES	NO	
4	M1 – M18	YES	YES	After several discussions held among partners involved in WP2, WP4, WP5 and WP6 and in order to complete the scope of the project, IDP is assuming the creation of new libraries to improve data exchange between software used for modelling and simulations. In order to be able to work on different work packages, IDP in charge of BIM modelling, also has developed layouts in QGIS in order to provide material required for the simulations. Consortium partners agreed to transferring effort without affecting the work planned.

				This new situation has been communicated to the EC.
5	M1 – M18	YES	NO	
6	M1 – M18	YES	YES	<p>Previous RP: At the beginning of November 2016, Joachim Ritzer, representative of DHL for INTERMODEL project reported the possible activation of Risk 6 “Under resourced Partner/task/WP”.</p> <p>After analyzing the situation, the consortium partners agreed that CENIT will assume DHL’s research tasks, and the two partners involved have redistributed and agreed the updated effort and the new role of each one has been redefined. Status: SOLVED</p> <p>Current RP: Additional work has been developed to avoid delays in overlapped WPs (WP4, WP5 and WP6), and further improvements are required concerning BIM and simulation coupling and data exchange.</p> <p>Consortium partners are discussing about redistribution of effort within WP4.</p> <p>This new situation has been communicated to the EC.</p>
7	M1 – M18	NO	NO	
8	M1 – M18	NO	NO	
9	M1 – M18	YES	NO	
10	M1 – M18	NO	YES	
11	M1 – M18	YES	NO	<p>As work has progressed in WP4, WP5 and WP6, there has been some difficulties in software interoperability text, which has lead the consortium to work on automation of exporting the layout from BIM to the simulation, without using QGIS. Thus, reducing time, effort and cost in the tool being developed.</p> <p>Work is being done in this sense by IDP, with the collaboration of MAC to check the appropriateness of the new libraries.</p> <p>This new situation has been communicated to the EC.</p>
12	M1 – M18	NO	NO	
13	M1 – M18	NO	NO	
14	M1 – M18	NO	NO	
15	M1 – M18	NO	NO	
16	M1 – M18	NO	NO	
17	M1 – M18	YES	YES	<p>In September 2017, Manuel Menéndez, representative of VIAS for INTERMODEL project reported the lack of data for developing their works within WP7 and impossibility of using Optirail models, and possible activation of Risk 17 “Data collection difficulties”.</p> <p>After analyzing the situation, VIAS proposed to change the method of obtaining data and developing a new degradation model maintenance methodology. The consortium partners agreed their proposal and started re-planning the work in WP7.</p>

				This new situation has been communicated to the EC.
18	M1 – M18	NO	NO	
19	M1 – M18	NO	NO	
20	M1 – M18	NO	NO	
21	M1 – M18	NO	NO	
22	M1 – M18	NO	NO	
23	M1 – M18	NO	NO	
24	M1 – M18	NO	NO	
25	M1 – M18	NO	NO	
26	M1 – M18	NO	NO	
27	M1 – M18	NO	NO	
28	M1 – M18	NO	NO	
29	M1 – M18	YES	NO	
30	M1 – M18	YES	NO	
31	M1 – M18	YES	NO	

References

ANSI/PMI 99-001-2008 (Fourth Edition). A Guide to the Project Management Body of Knowledge. Qualitative evaluation and research methods. ANSI, Project Management Institute, Inc.

The Project Management Institute. <https://www.pmi.org/>

Projects IN Controlled Environments. <https://www.axelos.com/best-practice-solutions/prince2/what-is-prince2>