



# Project DEOS-UD

## Disruptive Earth Observation Sensing for Urban Development

---

### Deliverable 3

#### Procurement, Quality, Risks and Communication Management

#### Authors:

Calderón Rosario, Borja  
De Benedicto Barba, Maria  
Escartín Vivancos, Guillermo  
Fontanes Molina, Pol  
Franch I Ruiz, Sergi  
González García, Sílvia  
Herrando Moreira, Albert  
Lopezbarrena Arenas, Santiago

Nachett, Hamza  
Pérez Sánchez, David  
Pla Olea, Laura  
Pons Daza, Marina  
Ramón Costa, Fernando  
Sellart Combalia, Ana Maria  
Serra Moncunill, Josep Maria  
Urbano González, Eva María

**National Contact Point:** Pérez Llera, Luís Manuel

**Group:** G3-220310-PM-P2018

**Delivery date:** 14-05-2018



# Contents

<b>List of Tables</b>	<b>iii</b>
<b>List of Figures</b>	<b>v</b>
<b>1 Plan procurement management</b>	<b>1</b>
1.1 Make or Buy decisions . . . . .	1
1.2 Statement Of Work . . . . .	3
<b>2 Quality management plan</b>	<b>7</b>
2.1 Quality Assurance Approach . . . . .	7
2.2 Quality Control Approach . . . . .	7
2.2.1 Documentation quality plan . . . . .	7
2.2.2 Technical quality plan . . . . .	8
2.2.3 Software quality plan . . . . .	9
2.3 Quality Improvement Approach . . . . .	9
2.4 Quality Roles and Responsibilities . . . . .	10
<b>3 Risk management plan</b>	<b>12</b>
3.1 Definitions of Probability . . . . .	12
3.2 Definitions of impacts by objective . . . . .	12
3.3 Probability and impact matrix . . . . .	14
3.4 Risk rating . . . . .	15
3.5 Risk identification and assessment . . . . .	16
3.6 Risk data sheet . . . . .	25
<b>4 Plan communication management</b>	<b>42</b>
4.1 Participants roles and responsibilities . . . . .	42
4.2 Communication process . . . . .	46
4.2.1 Informal . . . . .	46
4.2.2 Formal . . . . .	46
4.2.2.1 Status Meetings . . . . .	46
4.2.2.2 Status Reports . . . . .	47
4.2.3 External Communication . . . . .	47
4.2.3.1 General public . . . . .	47

4.2.3.2 Aerospace sector . . . . .	48
4.3 Communication management plan matrix . . . . .	48
<b>5 Bibliography</b>	<b>53</b>

# List of Tables

1.1.1	List of procurement items . . . . .	2
1.2.1	SOW 5.1.1: Manufacturing of payload sensors . . . . .	3
1.2.2	SOW 5.1.2: Manufacturing of modular system . . . . .	4
1.2.3	SOW 5.6: Quality of the product . . . . .	5
1.2.4	SOW 7.2.1: Web site development . . . . .	6
2.4.1	List of quality roles and responsibilities . . . . .	11
3.1.1	Definitions of probability . . . . .	12
3.2.1	Scope/Quality impacts . . . . .	13
3.2.2	Schedule impacts . . . . .	14
3.2.3	Cost impacts . . . . .	14
3.3.1	Risk Rating Legend . . . . .	15
3.3.2	Probability and Impact Matrix . . . . .	15
3.5.1	Risk identification and assessment . . . . .	20
3.5.2	Risk assessment . . . . .	21
3.5.3	Revised risk identification and assessment . . . . .	24
3.5.4	Revised Risk assessment . . . . .	25
3.6.1	Risk 1 data sheet . . . . .	26
3.6.2	Risk 2 data sheet . . . . .	27
3.6.3	Risk 3 data sheet . . . . .	28
3.6.4	Risk 4 data sheet . . . . .	29
3.6.5	Risk 5 data sheet . . . . .	30
3.6.6	Risk 6 data sheet . . . . .	31
3.6.7	Risk 7 data sheet . . . . .	32
3.6.8	Risk 8 data sheet . . . . .	33
3.6.9	Risk 9 data sheet . . . . .	34
3.6.10	Risk 10 data sheet . . . . .	35
3.6.11	Risk 11 data sheet . . . . .	36
3.6.12	Risk 12 data sheet . . . . .	37
3.6.13	Risk 13 data sheet . . . . .	38
3.6.14	Risk 14 data sheet . . . . .	39
3.6.15	Risk 15 data sheet . . . . .	40

3.6.16	Risk 16 data sheet . . . . .	41
4.1.1	Roles and responsibilities . . . . .	43
4.3.1	Communication management plan matrix . . . . .	52

# List of Figures

# 1 | Plan procurement management

On the following sections, procurement decisions will be exposed, determining whether to acquire outside support, and if so, what to acquire, how to acquire it, how much is needed, and when to acquire it.

## 1.1 Make or Buy decisions

In this section the WBS work packages that will be outsourced will be identified. The reasons to buy these work packages, the estimated cost, risk and other important parameters to take into account are shown in Table 1.1.1.



WBS ID	Work Package Name	Reasons for BUY	Cost estimate	Type of contract	Possible risks	List of suppliers	Special considerations or constraints
5.1.1.	Manufacturing of payload sensors	Create sensors with the designed parameters, using high performance industry standards.	125.900 €	FFP (Firm Fixed Price contract)	Delay in delivering the products. Faulty products	SUPPLIERS FOR SENSORS	Products must satisfy design parameters. Maximum due date 16/04/21
5.1.2.	Manufacturing of modular system	Use sensor interface specific outsource facilities for manufacturing the modular system	123.086 €	FFP (Firm Fixed Price contract)	Delay in delivery. Specifications not met.	SUPPLIERS FOR INTERFACE	Product must satisfy design parameters. Maximum due date 16/04/21
5.6.	Quality of the product	Outside of the project entity must do quality tests	93.248 €	FFP (Firm Fixed Price contract)	Quality standards of the products not met.	QUALITY agency	Due date of quality study is fixed on 21/01/22
7.2.1.	Web site development	Quick launch the project professional website.	17.957 €	FFP (Fixed Price Contract)	Late delivery. Not meeting communication plan specifications		Due date before 21/01/22

Table 1.1.1: List of procurement items

## 1.2 Statement Of Work

The Statement Of Work (SOW) is developed for each contract taking into account the scope baseline of the project. The SOW describes the procurement item and its needs in detail to allow sellers to determine if they are capable of providing the real product or services. In the following tables a description of the procurement items, requirements, type of contract and others are shown for each of the buying decisions.

<b>SOW - 5.1.1. Manufacturing of payload sensors</b>	
Description	The fabrication of the sensors that will conform the payload will be outsourced. From the final design of each of the sensors, the suppliers have to be able to manufacture them accordingly.
Requirements	Build sensors described by the 4.2.1.0. Payloads final design, related to the Earth Observation project. Seller can manufacture one part of the required items, but budget will be adjusted accordingly.
Type of contract	A Firm Fixed Price contract is stipulated because, for these tasks there are clear requirements and determined deadlines. Also, a budget has been assigned and a final product version is clearly decided.
Scheduled date	To be delivered no later than 16/04/2021. Starts after the 4.2.1.0. Payloads final design delivery and is part of the 5.0. Prototype manufacturing milestone.
Constraints	Manufactured sensors should meet all 4.2.1.0. Payloads final design constraints without exception.
Risk control actions	As one of the principal risks of this item consists on the delay of the delivery, an action regarding periodic monitoring of the fabrication progress. That way a potential delay can be detected and corrected before affecting the delivery date. In order to control that the products manufactured are not faulty, a report specifying the fabrication methods and that everything has been done according to the applying regulations will be requested from the suppliers and analysed by the technical team to assure that the risk of the fabricated product being faulty is reduced to a minimum.
Form and format	Each sensor will be delivered properly packed, with all the appropriate documentation.
Pre qualified sellers	description
Procurement metrics	description

Table 1.2.1: SOW 5.1.1: Manufacturing of payload sensors

<b>SOW - 5.1.2. Manufacturing of modular system</b>	
Description	The fabrication of the modular system that will house the payloads will be outsourced. The supplier has to follow the final design specified and assure that fulfils all the requirements.
Requirements	Build the modular system described by the 4.2.2.0. Modular system final design, related to the Earth Observation project.
Type of contract	A Firm Fixed Price contract is stipulated because, for these tasks there are clear requirements and determined deadlines. Also, a budget has been assigned and a final product version is clearly decided.
Scheduled date	To be delivered no later than 16/04/2021. Starts after the 4.2.2.0. Modular system final design delivery and is part of the 5.0. Prototype manufacturing milestone.
Constraints	The manufactured modular system should meet all 4.2.2.0. Modular system final design constraints without exception.
Risk control actions	As one of the principal risks of this item consists on the delay of the delivery, an action regarding periodic monitoring of the fabrication progress. That way a potential delay can be detected and corrected before affecting the delivery date. In order to assure that the specifications defined in the design are met, a technical report specifying the manufacturing process will be required from the supplier and will be reviewed to check that all the fabrication processes are being correctly done.
Form and format	The modular system needs to be delivered in a safe package that guarantees its integrity throughout the transportation from the manufacturing site to its destination, accompanied with the due documentation.
Pre qualified sellers	description
Procurement metrics	description

Table 1.2.2: SOW 5.1.2: Manufacturing of modular system

---

**SOW - 5.6. Quality of the product**


---

Description	The review of the quality of the product will be outsourced. This review will not focus on the correct operation of the systems but it will rather review the efficiency and order of their operation.
Requirements	The product must comply with the quality standards determined by the team.
Type of contract	A Firm Fixed Price contract is stipulated because, for these tasks there are clear requirements and determined deadlines. Also, a budget has been assigned and a final product version is clearly decided.
Scheduled date	To be delivered no later than 21/01/2022. Starts after the 5.02. Full system testing.
Constraints	The product must comply with all the quality constraints defined for each of the subsystems and elements.
Risk control actions	In order to prevent the failure of meeting the quality standards of the product, they have to be perfectly defined before starting the quality review of it.
Form and format	description
Pre qualified sellers	description
Procurement metrics	description

---

Table 1.2.3: SOW 5.6: Quality of the product

<b>SOW - 7.2.1. Web site development</b>	
Description	The creation of a functioning professional web site will be outsourced. The presence in the internet is key to get to all kind of public and make the work done available to anyone interested in knowing more about it.
Requirements	The website must help the visibility of the project and give understandable information to anyone willing to obtain more information about what HIRO is and does. It needs to have also all the on-line dissemination material specified in the communication plan.
Type of contract	A Firm Fixed Price contract is stipulated because, for this tasks there are clear requirements and determined deadlines. Also, a budget has been assigned and a final product version is clearly decided.
Scheduled date	To be delivered no later than 21/01/2022. Starts after the 7.0. Communication plan.
Constraints	The information that the site will make available has to be that that can be disclosed to the public without breaking any kind of confidentiality agreements.
Risk control actions	The contents of the website need to be the ones specified in the communication plan. To prevent any unwanted content to be included in the website, a previous analysis of the content before making it available to the public could help prevent this risk.
Form and format	The website's URL has to be delivered.
Pre qualified sellers	description
Procurement metrics	description

Table 1.2.4: SOW 7.2.1: Web site development

## 2 | Quality management plan

The Quality management Plan defines the quality levels that must be achieved in order to accept the final product that is going to be developed and the procedures that have to be followed to ensure these levels. Throughout this section the different subsections regarding the quality management plan are detailed.

### 2.1 Quality Assurance Approach

TEXTO

### 2.2 Quality Control Approach

The quality control approach of the project is divided in three main areas:

- Documentation quality plan
- Technical quality plan
- Software quality plan

#### 2.2.1 Documentation quality plan

All the documentation of the project has to follow a strict quality plan in order to ensure that no information is lost. To do so, there is a series of steps that have to be followed:

1. Definition of the document
  - Define the type of document and its content as well as the standards that it has to follow.

- Define the responsible of the document, the team that is going to work on it and the team that is going to verify it.
  - Define the deadline of the document as well as any milestone that may be related to it.
2. Redaction of the document: There may be some periodic quality controls while the document is in progress to ensure that the quality plan is met.
  3. Review and approval: Once the document is finished, the responsible of that deliverable should perform the following tasks regarding the document:
    - Spell check.
    - Consistency.
    - References up to date.
    - Check that the deliverable follows the acceptance criteria.

Then, the document can be delivered to the quality department. It will verify that the documentation follows the quality standards defined by the company. With the aim of guaranteeing a complete and trustful review, there should be at least two independent reviewers and they should not have been involved in the making of that document. If there is any review comment, it should be communicated to the deliverable responsible, since they have the final responsibility that the document meets the acceptance criteria.

This documentation quality plan refers to the deliverables but also to the internal documents of the company.

### 2.2.2 Technical quality plan

Since part of the project consists in the design and construction of a prototype, it is necessary to ensure that it meets all the quality requirements to guarantee its proper operation. In order to do that, the following steps are defined:

1. Definition of the quality plan: Before beginning with the design, a quality plan has to be done in order to define the acceptance criteria.
2. Design: Once the plan is finished and the design phase starts, some quality controls have to be done periodically to guarantee that the design complies the requirements and follows the quality plan previously defined.
3. Prototype and validation: During the construction of the prototype all the components and the production stages have to meet the acceptance criteria defined at the quality

plan. Then, when the prototype is ready, a validation must be done in order to check that it fulfils all the requirements of the project as well as to verify that it complies the quality plan. This validation process has to follow the standards given by the industry.

### 2.2.3 Software quality plan

The project not only consists of a prototype that should be constructed, but it also has a software that has to be verified. The following steps are defined to guarantee a satisfactory design of the implementation platform:

1. Definition of the quality plan: Before starting with the coding, a software quality plan has to be defined. This document will set some standards that will have to be followed in the making of the interaction platform, such as coding and comment standards, to ensure a correct flow of information between the people who work on it as well as to avoid possible errors. It will also define the acceptance criteria that has to be met by the interaction platform.
2. Coding phase: During the design phase, every modification of the code will have to be registered indicating the date and a description of the changes. Then, a review of the latest modifications should be done before making them definitive. If an error is detected, it has to be immediately reported to the responsible of the software development. Then, an engineer will be assigned to solve it, and he/she will report it once the problem is solved.
3. Implementation and validation: Once the interaction platform is operative, a validation has to be performed in order to ensure that it fulfils all the requirements of the project as well as to verify that it complies the software quality plan. This validation process has to follow the standards given by the industry.

## 2.3 Quality Improvement Approach

Quality improvement (QI) is a formal analysis of practice performance and efforts done in order to improve the performance of the project with the main objective of increasing its efficiency. The information shown here about QI models and tools has been extracted from [1] and [2]. A proper QI process requires of some basics to succeed. These basics are the following ones:

- Establish a culture of quality in the project: Creation of QI teams, QI meetings and QI goals.



- Determine and prioritize potential areas of improvement: Define, according to the acceptance criteria of the project, the main areas of improvement.
- Collect and analyse data: Determine the type of data to be collected and analyse it properly according to the project objectives.
- Communication of results: Quality improvements should be transparent to the stakeholders in order to keep them satisfied.

In this project the six-sigma working philosophy will be implemented in order to improve quality. The objective of this philosophy is to adjust the existing processes in order to improve the quality and minimizing variability by reducing defects and irregularities. The model related with six-sigma philosophy that will be used is DMAIC. This model includes the following steps:

- Define: Set the objective of the problem or the existent defect. In this project this definition will be done according to the acceptance criteria. The improvement of the quality plan is one of the objectives that will need to be taken into account.
- Measurement: Measures are needed in order to have values for the problem or defect. In this project the measurements according to the effectiveness of the quality plan are:
  - Number of iterations of a document/design to be approved.
  - Stakeholders satisfaction
  - Time needed to approve a document/design.
  - Number of defects detected by the quality department
- Analyse: Figure out the causes of the problem or defect and propose solutions.
- Improve: Implement the solution approved.
- Control: Control the implementation of the improvement, assure continuity and success.

## 2.4 Quality Roles and Responsibilities

In the following Table the quality roles for this project will be stated and its responsibilities defined. These roles are important so they will be the ones to control the implementation of the quality assurance, control and improvement.

Role	Responsibilities
Project Manager	<p>Final responsible for the quality of the project.</p> <p>Schedules meetings with the Quality Department in order to discuss the quality aspects of the project.</p> <p>Establishes the quality plan of the project.</p>
Project Manager Secretary	Helps the Project Manager in the tasks that he/she delegates.
Quality Manager	<p>Main quality responsible of the project.</p> <p>Fixes the quality guidelines that all documents are required to fulfill.</p> <p>Reviews all the deliverables to make sure they fulfill the required quality.</p>
Quality Manager Assessor	Helps the Quality Manager in the tasks that he/she delegates.
Technical Manager	<p>Coordinates the work done by the engineers and technicians.</p> <p>Reviews the technical aspects of the deliverables before approving them.</p> <p>Makes sure the technical procedures have been done correctly.</p> <p>Provides assistance to the engineers and technicians in order to fulfill the quality requirements.</p>
Engineers and technicians	Make sure that the technical aspects of the project follow the quality standards.

Table 2.4.1: List of quality roles and responsibilities

## 3 | Risk management plan

### 3.1 Definitions of Probability

Two parameters are commonly used in order to model risk: the probability that something might happen and the impact it would have if it did happen. Therefore, to evaluate the probability of the potential risk to occur it is crucial to define and quantify it properly.

A scale of 1% to 100% will be used for Probability, which is linearly divided in five sections represented in Table 3.1.1. In fact, the 1% is associated with the minimum probability of a risk, meaning that it will very rarely occur; while the maximum 100% means the risk will be unavoidable.

Probability	Description	Probability Score
Very High	Means it is a fact because it is very likely to occur	(81-100)%
High	Likely to occur	(61-80)%
Medium	May occur about half of the time	(41-60)%
Low	Unlikely to occur	(21-40)%
Very Low	Very unlikely to occur	(1-20)%

Table 3.1.1: Definitions of probability

### 3.2 Definitions of impacts by objective

To evaluate the impact into the overall project if a certain risk did happen, a numerical estimate is provided to quantify the effects of the risks in terms of Scope and Quality, Schedule and

Cost. Those three categories are scaled from 1 to 5 in a linear way in order to quantify the impact, where 1 is the minimum and 5 is the maximum. Moreover, each effect is defined qualitatively depending on its category and its impact.

Scope/Quality Impact	Description	Scope Impact Score
Very High	Be unable to achieve the desired objectives. The project end item is effectively useless.	5
High	Scope and quality reduction hardly acceptable. The impact makes that the project item quality is below the desired objectives and under the acceptance criteria.	4
Medium	The risk produces moderate impact in the project and the results. Major areas of the scope are affected and quality is reduced but still above the acceptance criteria.	3
Low	It produces a low impact. Minor areas of the scope are affected and quality is slightly reduced affecting very demanding applications.	2
Very Low	It produces an insignificant impact in the project. Scope and quality decrease barely noticeable.	1

Table 3.2.1: Scope/Quality impacts

Schedule Impact	Description	Schedule Impact Score
Very High	Very significant delay in the schedule, increasing the milestone duration more than a 20%.	5
High	Significant delay in the schedule, increasing the milestone duration between a 10% and 20%.	4

Schedule Impact	Description	Schedule Impact Score
Medium	Moderate delay in the schedule, increasing the milestone duration between a 5% and 10%.	3
Low	Slightly significant delay in the schedule, increasing the milestone duration less than 5%.	2
Very Low	Insignificant delay and time increase.	1

Table 3.2.2: Schedule impacts

Cost Impact	Description	Cost Impact Score
Very High	Several impact on the project cost, increasing the cost more than 30%.	5
High	Important impact on the project cost, increasing the cost from 15% to 30%.	4
Medium	Moderate impact on the project cost, increasing the cost from 10% to 15%.	3
Low	Reduced impact on the project cost, increasing the cost less than 10%.	2
Very Low	Insignificant impact on the project cost.	1

Table 3.2.3: Cost impacts

### 3.3 Probability and impact matrix

Beyond the definitions of probability and impact, a further quantitative analysis of risk is required. Every risk is assigned a rate based on the probability and impact scores. This evaluation of risks is the way in which they are classified by their importance: the higher the risk rating, the higher their priority for attention. To manage ratings in a more organized manner, the probability and impact matrix is defined. This matrix specifies combinations of probability and impact that lead to rating the risks as very low, low, moderate, high or extreme. The following tables show the risk rating legend used for the elaboration of this project risk

matrix:

Risk Rating	Score	Colour
<i>Extreme Risk</i>	[4 - 5]	
<i>High Risk</i>	[3 - 4]	
<i>Moderate Risk</i>	[2 - 3]	
<i>Low Risk</i>	[1 - 2]	
<i>Very Low Risk</i>	[0 - 1]	

Table 3.3.1: Risk Rating Legend

		Probability				
		Very Low/.2	Low/.4	Medium/.6	High/.8	Very High/1
Impact	Very High/5	1	2	3	4	5
	High/4	0.8	1.6	2.4	3.2	4
	Medium/3	0.6	1.2	1.8	2.4	3
	Low/2	0.4	0.8	1.2	1.6	2
	Very Low/1	0.2	0.4	0.6	0.8	1

Table 3.3.2: Probability and Impact Matrix

Depending on the risk score, the response and priority assigned to a risk will change. For example, risks that are in the red area of the matrix (high probability and high impact) may require priority action and aggressive response strategies while risks in the light green area may not require proactive management action beyond being considered as a warning. Throughout the project risks may vary so, using this matrix, risks will be reconsidered, changing their rating if necessary.

### 3.4 Risk rating

As already mentioned, risk rate is determined through probability and impact scores. In fact, it is the result of multiplying both scores. Hence, to identify a risk's position in the matrix, first it is necessary to assess probability and impact score as explained in sections 3.1 and 3.2. The previously defined matrix, represents impact as an overall score but in our case, different impact scores have been defined depending on the project objective that is threatened (scope, schedule, or cost). Hence, to determine the general impact grade the following equation is defined:

$$I_{general} = \sum_i (W_i \cdot I_i) \quad (3.4.1)$$

Where:

- $i$  represents the different types of impact (scope, schedule, cost)
- $W_i$  represents the importance or weight (from 0 to 1) of each of the impact types and it is satisfied that  $W_{scope} + W_{schedule} + W_{cost} = 1$
- $I_i$  represents the impact score of each of the types (from 0 to 5)

Consequently, the overall impact will have a value of (0-5] calculated doing a balance between each type of impact importance. Regarding the weights defined for this project, it has been decided that cost is the most important, followed by scope and finally, the schedule. Hence, the values assigned are the ones shown below:

$$W_{scope} = 0.3$$

$$W_{schedule} = 0.2$$

$$W_{cost} = 0.5$$

Once the general impact is calculated, the risk rating is defined as: Risk Rating = Probability Score  $\times$  Impact Score

### 3.5 Risk identification and assessment

In this section risk identification and assessment is provided by taking into account the defined data of the previous sections. Here it is also provided the information about the revised-risks.

The factors that have been used in the identification process are: enterprise environmental factors, organizational process assets, the project scope statement and the project management plan.

It is worth to mention that after analyzing these points, risks have been classified in two main groups: External risks, which are risks the project team cannot control and therefore no response nor action can be defined, and Internal risks, which can be detected in advance and be addressed properly.

In the table below is presented the following information for each risk:

- Probability to happen
- Impact regarding quality, time and cost
- Score using the weights of the section 3.4
- Response. What is going to be done in order to avoid the risk before it happens.

Note that there are different types of responses that have been classified in these groups:

- Mitigation. Actions for reducing the severity, seriousness, or painfulness of the risk.
- Transfer. Delegation the actions to an outsourced company.
- Avoidance. Actions to keep away the risk and avoid it to happen.
- Acceptance. A difficult or unpleasant situation is accepted and a response is done in order to solve the issue.



Risk ID	Risk Statement	Probability	Impact			Score	Response
			Scope/Quality	Schedule	Cost		
R.1	Deliverable delays	Medium	1	4	3	1.6	Mitigation: Dedicate more resources than expected.
R.2	Inaccurate cost forecast	High	3	2	4	2.6	Transfer: Consider new funding sources and revise the financial management plan.
R.3	Lack of communication	High	3	4	3	2.6	Avoidance: Periodical meetings and use of collaborative software.
R.4	Lack of technology improvement	Low	3	2	1	0.7	Avoidance: Guarantee the development with thorough search of the actual technology.
R.5	Lack of access to project needed information	Very Low	2	2	2	0.4	Avoidance: A previous accurate research is needed before the development of the project.
R.6	Low team motivation	Medium	3	5	1	1.4	Acceptance: Personal control and team building projects.

R.7	Unsuccessfully quality control	Low	4	2	2	1.0	Mitigation: Improve or increase the quality controls.
R.8	Conflicts between members	High	2	4	2	1.9	Acceptance: Personal conflicts resolution meetings.
R.9	Infeasible design	Low	2	4	4	1.4	Transfer: Periodical reviews with experts and managers.
R.10	Technologies components with security vulnerabilities	High	4	2	2	2.1	Transfer: Check for possible security problems during development through specialized companies.
R.11	Organization issues	Very High	3	4	3	3.2	Transfer: Ask for help from an external company specialized in project management.
R.12	Stakeholder desertion	Low	2	4	3	1.2	Acceptance: Try to transfer the responsibilities to another stakeholder or contract a new one.

R.13	Competitors appearance	Very Low	4	1	4	0.7	Acceptance: Improvement of the quality/price ratio of the service.
R.14	Delay in external deliverables	Medium	2	4	2	1.4	Acceptance: Control the delivery schedules and change provider if necessary.
R.15	Economical market issues	Low	2	1	4	1.1	Acceptance: Control cost evolution due to external changes throughout the project.
R.16	Components or raw material quality	Low	4	2	3	1.2	Mitigation: Have exhaustive and regular quality controls to avoid problems in components in the final test.

Table 3.5.1: Risk identification and assessment

At this point, with the information of the previous table, the risk assessment has been done.

Each risk, has been positioned in the impact-probability matrix. In the vertical axis there is the impact of the risk (calculated with the formula of the section 3.4) and in the horizontal axis the probability of the risk to happen is shown.

It can be observed that regarding probability, there is an equilibrium between all the risks, but if the impacts are considered, the majority of them are medium.

		Probability				
		Very Low/.2	Low/.4	Medium/.6	High/.8	Very High/1
Impact	Very High/5					
	High/4					
	Medium/3	R.13	R.9 R.16 R.12 R.15 R.7	R.1	R.2 R.3 R.10	R.11
	Low/2	R.5	R.4	R.6 R.14	R.8	
	Very Low/1					

Table 3.5.2: Risk assessment

Having done this analysis, the revised situation has to be considered too. It means how the probability and the impact will change once the corresponding response has been executed.

There are also presented specific actions to take in order to avoid the revised risk and the responsible to carry out them.

Risk ID	Revised Probability	Revised Impact			Revised Score	Owner	Action
		Scope/Quality	Schedule	Cost			
R.1	Low	1	2	2	0.7	Project Manager	Increase the number of control meetings. Allocate more human resources in delayed tasks.
R.2	Medium	2	2	2	1.2	Project Manager and Financial Manager	Highly periodical cost and expense controls.
R.3	Low	1	2	1	0.5	Project Manager secretary	Impart communicative skills courses to team members. Enhance use of collaborative software.
R.4	Very Low	2	1	1	0.3	Project Manager	Use all resources that are needed to guarantee the innovation expected. Propose redesigns and alternatives if needed.
R.5	Very Low	1	1	2	0.3	The manager of the corresponding department	Maintain contact with scientific and technological centers to be up to date of last technological improvements.

R.6	Low	2	3	1	0.7	Human Resources Manager	Interview team members to know their level of satisfaction with their work and request for their suggestions to improve their motivation.
R.7	Low	2	1	2	0.7	Quality Manager	Use higher qualified personnel, and buy better quality control resources.
R.8	Medium	1	2	2	1.0	Project Manager	Encourage communication among team members. Look for possible causes of conflicts. Establish teambuilding activities.
R.9	Very Low	1	2	4	0.5	Engineering Department Manager	Follow the specified design standards. Stick to the available technology.
R.10	Low	2	2	2	0.8	Engineering Department Manager	Establish regular contact with outsourced companies responsible for technological safety.

R.11	Medium	2	2	2	1.2	Project Manager	Establish weekly meetings between the department responsables. Enhance the use of organization software.
R.12	Very Low	1	2	2	0.3	Project Manager	An in-depth research of alternatives to the current members would allow fast solutions.
R.13	Very Low	3	1	3	0.5	Quality Manager	Improve the image that HIRO gives to the European Union. Use of resources more efficiently.
R.14	Low	2	1	2	0.7	Sales Department Manager	Buy the resources in advance and keep them in stock.
R.15	Low	2	1	3	0.9	Sales Department Manager	Reconsider budget estimations with market variations.
R.16	Low	2	1	2	0.7	Software Engineering Manager	Establish quality inspections of the acquired materials.

Table 3.5.3: Revised risk identification and assessment

Finally, the risk assessment with revised risks has been carried out. Note that this time the risks has less probability to happen and less impact if they occur. This is because the taken responses have mitigated the severity of the risks.

		Probability				
		Very Low/.2	Low/.4	Medium/.6	High/.8	Very High/1
Impact	Very High/5					
	High/4					
	Medium/3	R.9 R.13				
	Low/2	R.12 R.5	R.15 R.10 R.7 R.14 R.16 R.1 R.6	R.2 R.11 R.8		
	Very Low/1	R.4	R.3			

Table 3.5.4: Revised Risk assessment

### 3.6 Risk data sheet

In this section a summary of the previous tables will be done in data sheet form for each risk. The presented information is its description, status, cause, normal and revised probability, impact and score, the owner, responses and actions, secondary and residual associated risks and the contingency plan, funds and time.



<b>Risk-ID:</b> R.1	<b>Risk Description:</b> Deliverables delays: The deliverables could not be completed at the time of their corresponding deadlines, leading to an increase of costs and a delay of all the schedule of the project.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	1	4	3	Probab. x Impact	Mitigation: Dedicate more resources than expected.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	1	2	2		Project Manager	Increase planning hours and scope controls.
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.1: Risk 1 data sheet

<b>Risk-ID:</b> R.2	<b>Risk Description:</b> Inaccurate cost forecast: The financial predictions could be wrong or different issues may occur increasing the total cost of the project.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
High	3	2	4	Probab. x Impact	Transfer: Consider new funding sources and revise the financial management plan.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	2	2	2		Project Manager and Financial Manager	Increase control of the costs and reduce unnecessary expenses
<b>Secondary Risks:</b> Description of the risk that arises from of the response strategies implemented to address the risk						
<b>Residual Risks:</b> Description of the remaining risks after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risks, the status, or response strategies.						

Table 3.6.2: Risk 2 data sheet

<b>Risk-ID:</b> R.3	<b>Risk Description:</b> Lack of communication: The absence of a proper communication method or channel might affect the quality of the product, the fulfilment of the deadlines or a good coordination between members and departments.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
High	3	4	3	Probab. x Impact	Avoidance: Periodical meetings and use of collaborative software.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	1	2	1		Project manager and secretary	Compulsory courses will be carried out to teach everybody to use collaborative software.
<b>Secondary Risks:</b> Description of the risk that arises from the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risks, the status, or response strategies.						

Table 3.6.3: Risk 3 data sheet

<b>Risk-ID:</b> R.4	<b>Risk Description:</b> Lack of technology improvement: The main goal of the project is to innovate but there is a possibility that the company does not find the way to improve enough the different technologies.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	3	2	1	Probab. x Impact	Avoidance: Guarantee the development with thorough search of the actual technology.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Very low	2	1	1		Project Manager	Take the necessary measures to achieve to desired level of innovation including redesign and propose alternatives.
<b>Secondary Risks:</b> Description of the risk that arises from the response strategies implemented to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risks, the status, or response strategies.						

Table 3.6.4: Risk 4 data sheet

<b>Risk-ID:</b> R.5	<b>Risk Description:</b> Lack of access to the required project information: Discovering new technologies implies working with cutting-edge technology. This could enable teams to access the last improvements or patents.					
<b>Status:</b> Closed	<b>Risk Cause:</b> The patents and information may not be easily accessible.					
Probability	Impact			Score	Responses	
	Scope/Quality	Schedule	Cost			
Very low	2	2	2	0.4	Avoidance: A previous accurate research is needed before the development of the project.	
Revised Probability	Revised Impact			Revised Score	Owner	Actions
	Scope/Quality	Schedule	Cost			
Very low	1	1	2	0.3	The manager of the corresponding department	Maintain contact with scientific and technological centres to be up to date of last technological improvements.
<b>Secondary Risks:</b> Not all the information is accessible because the centres or authors do not authorise it.						
<b>Residual Risks:</b> Partial lack of communication between the scientist and centres that got the information.						
<b>Contingency Plan:</b> Improve the communication with the centres.				<b>Contingency Funds:</b> 130.000€		
				<b>Contingency Time:</b> 3 weeks		

Table 3.6.5: Risk 5 data sheet

<b>Risk-ID:</b> R.6	<b>Risk Description:</b> Low team motivation: The team could lose motivation, which would lead to requiring more time and costs to be completed.					
<b>Status:</b> Closed	<b>Risk Cause:</b> Stagnation, poor management and global feeling of uselessness.					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	3	5	1	1.4	Acceptance: Personal control and team building projects.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	2	3	1	0.7	Human Resources Manager	Interview team members to know their level of satisfaction with their work and request for their suggestions to improve their motivation.
<b>Secondary Risks:</b> People may still feel unmotivated and may decide to leave.						
<b>Residual Risks:</b> It might be difficult finding someone new and people require time until they adapt to a new job.						
<b>Contingency Plan:</b> During the selection period, to have interviewed many people and keep				<b>Contingency Funds:</b> 50.000€		
				<b>Contingency Time:</b> 14 weeks		
<b>Comments:</b> To improve the team building, the enterprise can take charge of some after-work leisure activities.						

Table 3.6.6: Risk 6 data sheet

<b>Risk-ID:</b> R.7	<b>Risk Description:</b> Unsuccessfully control of quality: The quality of some component, product or deliverable may not be as it is expected and established in the acceptance criteria.					
<b>Status:</b> Closed	<b>Risk Cause:</b> The employees may not be sufficiently qualified and the controls may not be sufficiently accurate.					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	4	2	2	1	Mitigation: Improve or increase the quality controls.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	2	1	2	0.7	Quality Manager	Use higher qualified personnel, and buy better control resources.
<b>Secondary Risks:</b> Specialists are expensive, but they might not be able to do all the tasks they are asked to do.						
<b>Residual Risks:</b> The quality control established may still not be accurate enough.						
<b>Contingency Plan:</b> Design specific quality control methods to ensure that the new technologies accomplish the project.				<b>Contingency Funds:</b> 250.000€		
				<b>Contingency Time:</b> 8 weeks		

Table 3.6.7: Risk 7 data sheet

<b>Risk-ID:</b> R.8	<b>Risk Description:</b> Conflicts between members: There could be a disagreement over the project issues between executive members.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Either lack of communication between the team members or bad relation between them.					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
High	2	4	2	1.9	Acceptance: Personal conflicts resolution meetings.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	1	2	2	1	Project Manager	Encourage communication among team members. Look for possible causes of conflicts. Establish team-building activities.
<b>Secondary Risks:</b> Bad communication between the members can still persist, even if the environment is good.						
<b>Residual Risks:</b> People may still need someone as their interlocutor, as it can be difficult for some people to improve their communication skills.						
<b>Contingency Plan:</b> The manager of each department has to be aware of the all the decisions that are made a				<b>Contingency Funds:</b> 100.000€		
				<b>Contingency Time:</b> 6 weeks		
<b>Comments:</b> The manager does not have to see what all its team members are doing at all times, but as he is responsible for its team he has to watch over.						

Table 3.6.8: Risk 8 data sheet



<b>Risk-ID:</b> R.9	<b>Risk Description:</b> Infeasible design: The design could turn out to be excessively costly or not possible to be built.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	2	4	4	Probab. x Impact	Transfer: Periodical reviews with experts and managers.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Very low	1	1	4		Engine Department Manager	ACtions
<b>Secondary Risks:</b> Description of the risk that arises from the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.9: Risk 9 data sheet

<b>Risk-ID:</b> R.10	<b>Risk Description:</b> Technologies components with safety vulnerabilities: Safety vulnerabilities are unwanted in high-tech projects if some government is interested in using the technology.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
High	4	3	2	Probab. x Impact	Transfer: Check for possible security problems during development through specialized companies.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	2	1	1		?? Manager	Action
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.10: Risk 10 data sheet

<b>Risk-ID:</b> R.11	<b>Risk Description:</b> Organization Issues: The project could be not well organized in terms of timing, activities, etc. and the schedule may be always changing.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Very High	3	4	3	Probab. x Impact	Transfer: Ask for help from an external company specialized in project management.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
?	?	?	?		?? Manager	Action
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.11: Risk 11 data sheet

<b>Risk-ID:</b> R.12	<b>Risk Description:</b> Stakeholder desertion: The abandonment of a stakeholder could occur for several reasons, leaving the project without its contribution.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	2	4	2	Probab. x Impact	Acceptance: Try to transfer the responsibilities to another stakeholder or contract a new one.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Very low	1	2	2		Project Manager	An in-depth research of alternatives to the current members would allow fast solutions.
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>					<b>Contingency Funds:</b> Funds needed to protect the budget from overrun	
					<b>Contingency Time:</b> Time needed to protect the schedule from overrun	
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.12: Risk 12 data sheet

<b>Risk-ID:</b> R.13	<b>Risk Description:</b> Competitors appearance: The emergence of other companies that could offer the same product. This could modify the benefits of our company.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Very low	4	1	4	Probab. x Impact	Acceptance: Improvement of the quality/price ratio of the service.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
?	?	?	?		?? Manager	Action
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.13: Risk 13 data sheet

<b>Risk-ID:</b> R.14	<b>Risk Description:</b> Delay in external deliverables: If the products that the company orders do not arrive at the predicted time all the processes can experience a delay, incrementing costs.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	2	4	2	Probab. x Impact	Acceptance: Control the delivery schedules and change provider if necessary.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Very low	2	2	2		Sales Department Manager	Ask for materials to arrive before the delivery final deadline and have them in stock.
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budget from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.14: Risk 14 data sheet

<b>Risk-ID:</b> R.15	<b>Risk Description:</b> Economical market issues: During the period of time that the project is executed, there could be large-scale economic crisis.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	2	1	4	Probab. x Impact	Acceptance: Control cost evolution due to external changes throughout the project.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	2	2	2		Sales Department Manager	Use the contingency budget to afford the unexpected overrun.
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budged from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun.		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.15: Risk 15 data sheet

<b>Risk-ID:</b> R.16	<b>Risk Description:</b> Components or raw material quality: The ordered equipment or materials could not be in good condition, delaying processes and increasing costs.					
<b>Status:</b> Open or Closed	<b>Risk Cause:</b> Description of the circumstances or drivers that are the source of the risk					
<b>Probability</b>	<b>Impact</b>			<b>Score</b>	<b>Responses</b>	
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Low	4	2	3	Probab. x Impact	Mitigation: Have exhaustive and regular quality controls to avoid problems in components in the final test.	
<b>Revised Probability</b>	<b>Revised Impact</b>			<b>Revised Score</b>	<b>Owner</b>	<b>Actions</b>
	<b>Scope/Quality</b>	<b>Schedule</b>	<b>Cost</b>			
Medium	3	1	2		Software Engineering Manager	Plan a quality schedule for each component and increase the human resources if it is needed.
<b>Secondary Risks:</b> Description of the risk that arise out of the response strategies taken to address the risk						
<b>Residual Risks:</b> Description of the remaining risk after response strategies						
<b>Contingency Plan:</b>				<b>Contingency Funds:</b> Funds needed to protect the budgeted from overrun		
				<b>Contingency Time:</b> Time needed to protect the schedule from overrun		
<b>Comments:</b> Any other information on the risk, the status of the risk, or response strategies.						

Table 3.6.16: Risk 16 data sheet



## 4 | Plan communication management

This section stands for an accurate description of the communication management inside the DEOS-UD Project, as communication is one of the keys to a successful development of any project. In the first insight, the different roles and responsibilities will be described as well as the different relations between people, teams and committees inside DEOS-UD. Along with the detailed roles and responsibilities of teams and committees, every member's specific task inside them will be mentioned. Secondly, the different communication procedures will be carefully detailed to provide the maximum information possible in order to allow a correct development of meetings and communications between people and departments, thus increasing the overall project efficiency. The section will end with a communication management plan matrix, which will summarize all the previously described procedures by mapping all the communication requirements of the project.

### 4.1 Participants roles and responsibilities

As previously stated, this section will provide the reader with the roles and responsibilities of the different DEOS-UD staff in terms of the Communication Plan. In this section, different committees and teams will also be described.

#### Steering Committee

The steering committee will provide DEOS-UD with solutions to problems along with strategic command in order to ensure a correct and efficient development of the project. As this team's role is of extreme importance when it comes to the project's success, a careful selection of its representatives must be performed. The steering committee will be composed of the members with key roles in DEOS-UD project; these members are listed in the following table, extracted from the first project charter.

Role	Resource Name	Organization	Responsibilities
Project Sponsor	Luís Manuel Pérez Llera	European Commission	Supervise the project.
Project Manager	Pol Fontanes Molina	HIRO	Manage the project.
Project Secretary	Sílvia González García	HIRO	Administrative the internal documents and information of the group.
Financial Manager	Santiago Lopezbarrena Arenas	HIRO	Estimate and control the costs of the project.
Stakeholders & Procurement Manager	Eva María Urbano González	HIRO	Identify the stakeholders of the project and manage and control their engagement. Plan, conduct and control the procurements of the project.
Scope & Time Manager	Marina Pons Daza	HIRO	Define and control the scope and deadlines of the project.
Risk Manager	Borja Calderón Rosario	HIRO	Identify and manage the possible risks of the project.
Quality Manager	Guillermo Escartín Vivancos	HIRO	Control that the quality requirements of the project are met.
Technical Managers	David Pérez Sánchez, Hamza Nachett, Laura Pla Olea	HIRO	Analyse and control the technical aspects of the project.
Marketing & Communications Managers	Albert Herrando Moraira, María De Benedicto Barba	HIRO	Promote the project and its final product. Search for possible customers. Ensure communication between the different members of the group.

Table 4.1.1: Roles and responsibilities

As described, the team will not only work as a steering committee but also as an advisory committee, for this reason it will be composed by multiple consortium members that will act as advisors in diverse fields. The key roles developed by the steering committee are detailed below.

- Take and implement management decisions that affect a significant part of the

stakeholders.

- Take action in important schedule delays as well as cost overruns by modifying resources assigned to departments, staff planning, or anything necessary to redirect situations that endanger a correct development of the project.
- Offer leadership, guidance and support to problems that smaller groups have not been able to solve by themselves.
- Enhance communication skills along with communications procedures in order to avoid communication-related problems.

### **Project Manager**

DEOS-UD Project manager, Pol Fontanes Molina, is the person in charge of assuring that every aspect of the project is functioning as planned. He is ought to detect, communicate and correct any deviations (schedule variances, cost overruns and scope changes) from the original plans. The decisions taken by the PM, will be communicated directly to the steering committee, members of which will communicate to the rest of the staff.

### **Advisory committee**

Participants in the advisory committee are detailed here.

- Research and Development assessors:
  - Matthew Perren (Airbus Defence and Space GmbH)
  - Ismael López (Deimos Space)
- Legal and Business Assessor
  - Oliver Heinrich (BHO Legal)
- Application collaborators
  - Jean François Rapp (ICUBE-SERTIT)
  - Vessela Samoungi (ReSAC)
- Development and Application collaborator
  - Steven Krekels (VITO nv)

The function of this committee will be that of providing tailored assistance in anything related with the project in order to solve issues and avoid risks during DEOS-UD development. Given

the importance of this group itself, its participants will meet with the steering group regularly to ensure a correct use and implementation of their know-hoy inside DEOS-UD.

### **Business Project Team**

This team will be directed by Santiago Lopezbarrena Arenas, the financial manager, and is in charge of assuring an economical resources correct management by providing careful tracing in the use of the budget along with a proper staff training in means of economical performance. This team is also ought to communicate the project manager with the latest information on earned value management parameters in order for the latter to know at what point exactly the development of the project is found.

### **Technical Project Team**

The Technical Project Team, conducted by its three leaders David Pérez Sánchez, Hamza Nachett and Laura Pla Olea, will be in charge of analysing and controlling every single technical aspect of the project. The team itself must assure that everything done during DEOS-UD project development meets the requirements of the contract by successfully following all de documentation and activities received from the overall project staff, including contractors and subcontractors as well. As part of its essential activities, the Technical Project Team is expected to resolve and to give advice in any inconveniences or issues that may appear during the course of the project. The Technical Project Team's leaders will be part of the Steering group and will report regularly to the project manager on topics that concern the technical progresses of DEOS-UD project, by having gathered all the information related to this subject from the different departments developing such activities.

### **Oversight**

For the sake of a reliable accomplishment of the project's goals along with a recognized meeting of the contract's specifications, an oversight agency will actively work with DEOS-UD mostly when different milestones are achieved and a certification in the results is needed. The company auditing DEOS-UD results will be Bureau Veritas and its specific responsibilities are detailed here.

- Auditing a correct implementation of the different requirements of the contract regarding privacy policies with data management.
- Auditing and guaranteeing that the results obtained through the milestones of the project meet the requirements of the contract.
- Supervising and advising on issues that may lead to undesired situations by providing the managers with the tools to perform an auditable work.

Given that an auditory is an external agency, it has not been included the advisory team; yet its collaboration inside the project is key to a successful accomplishment of the project's goals.

## 4.2 Communication process

This section approaches the way in which the information is transmitted. In order to communicate efficiently it is important to bear in mind who are we addressing to. The communication process can be divided into three main categories: informal communications, formal communications, and external communications.

### 4.2.1 Informal

Informal communications consist of e-mail, conversations, or phone calls and serve to supplement and enhance formal communications. Due to the varied types and ad-hoc nature of informal communications, they are not discussed in this plan.

### 4.2.2 Formal

The DEOS-UD Project will engage in various types of formal communication. The general types and their purpose are described below as "Status Meetings" and "Status Reports".

#### 4.2.2.1 Status Meetings

There are five basic types of status meetings for the DEOS-UD Project:

- Status meetings internal to the DEOS-UD business team to discuss assignments, activities, and to share information
- Status meetings and reports between the DEOS-UD business team, and the technical project team
- Advisory Committee meetings with the project stakeholders, and project manager to review progress, risks, and issues
- Status meetings and reports between the DEOS-UD project manager and the steering committee
- Status meetings and reports to stakeholders, such as oversight agencies

### 4.2.2.2 Status Reports

A variety of status reports will be produced during the project. The status reports will be produced on regular intervals to provide stakeholders project information on the status and progress of the DEOS-UD project. At a minimum the reports will contain:

- Project status on major activities
- Project schedule
- Budget and cost tracking
- Status of issues and risks
- Health status
- Status of action items, if applicable.
- Future or planned activities

The intent of the status reports is to inform stakeholders of the project's progress and keep them actively involved in the project. The information provided will contain enough detail to allow stakeholders to make informed decisions and maintain oversight of the project.

### 4.2.3 External Communication

Although internal communication is very important for the proper development of the project, we must not forget that external communication is also crucial in a project of this magnitude. Having a good dissemination plan involves explaining how the outcomes of the project will be shared with stakeholders, relevant institutions, organisations, and individuals.

In order to achieve the proposed objectives in terms of external communication, the process of dissemination will be focused in two different ways depending on whether we want to reach the general public or aerospace sector.

#### 4.2.3.1 General public

It is important to find an adequate channel to reach the less specialized public in the aerospace field. In order to achieve the maximum diffusion of the project in this sector, the following resources will be used.

- **Social Networking.** Social networks are the best way to reach the widest possible audience. Posting regularly is also crucial to keep people interested in the project. Some of the platforms that will be used during the project development are: Twitter, LinkedIn, Facebook and Instagram. There will be at least one update a week in order to keep people informed of the progress of the project.
- **Website.** A project website is one of the most versatile dissemination tools and will help reaching people unfamiliar with social networks. It can contain information intended to different profiles. As in the previous case, it has to be kept updated.

### 4.2.3.2 Aerospace sector

- **Trade shows.** Trade shows, fairs and exhibitions are a great way to get in close contact with people from other regions and countries that we would ordinarily never be face to face with. They are also helpful in terms of finding new prospects, nurture current client relationships and stay up to date on the latest industry developments.
- **Conferences.** National and international conferences will help sharing the achievements of the project with specialists of the field.
- **Journal Articles.** To promote project ideas and results in scientific research.

## 4.3 Communication management plan matrix

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverable	Format
Internal Business Status Meetings	Discuss assignments, activities and sharing information	Face to Face	Weekly	Business Team	Financial Manager	Agenda, Meeting Minutes	Soft copy archived on SharePoint site and project website
Technical and Business Status Meetings and Reports	Discuss assignments, activities, sharing information and reporting the project status	Face to Face	Weekly	Project Manager, Business Team, Technical Team, Project Secretary	Project Manager	Agenda, Meeting Minutes, Status Reports	Soft copy archived on SharePoint site and project website
Advisory Committee Meetings	Review progress, risks and issues	Face to Face	Monthly	Advisory Committee, Project Stakeholders, Project Manager, Project Secretary	Project Manager	Agenda, Meeting Minutes	Soft copy archived on SharePoint site and project website



Steering Committee Status Meetings	Enhance communication and coordination of the project	Face to Face	Monthly	Steering Committee, Project Manager, Project Secretary	Project Manager	Agenda, Meeting Minutes	Soft copy archived on SharePoint site and project website
Status Meetings and Reports to Stakeholders	Report the status of the project including activities, progress, costs and issues	Face to Face or Video Conference	Monthly	Stakeholders, Project Manager, Project Secretary	Project Manager	Agenda, Meeting Minutes, Status Reports	Soft copy archived on SharePoint site and project website
Project Status Reports	Provide Stakeholders information on the status and progress of the project	Email	Monthly	Project Stakeholders, Stakeholder and Procurement Manager, Project Manager	Stakeholder and Procurement Manager	Project status, schedule, budget and cost tracking, status of issues and risks, health status, status of action items, future or planned activities	Soft copy archived on SharePoint site and project website

Social Networking	Share any updates on the project	Facebook, Twitter, Instagram	Weekly	General Public	Marketing and Communication Manager	Online Posts	Online
Website	Contain varied information about the project	Website	Updated with any change	General Public	Marketing and Communication Manager	Online Posts	Online
Trade Shows	Face to face contact with potential customers as well as finding new prospects, nurture client relationships and stay up to date with latest developments	On site stands	Scheduled	Potential Customers, General Public and Industry Professionals	Marketing and Communication Manager	None	Face to Face
Conferences	Sharing achievements with industry specialists	Conferences	Scheduled	Industry Professionals	Project Manager	Presentation	Face to Face

Journal Articles	Promoting project ideas, concepts and results in scientific and applied research communities and getting feedback from relevant stakeholders	Digital and Written platforms	When Available	Potential Customers, General Public and Industry Professionals	Project Manager	Journal Article	Hard Copy
------------------	--	-------------------------------	----------------	--	-----------------	-----------------	-----------

Table 4.3.1: Communication management plan matrix

## 5 | Bibliography

- [1] AAFP. Basics of Quality Improvement – Practice Management.
- [2] Lean Solutions. ¿Que es Six Sigma?