Évora University

Renewable Energy Chair

Deliverable 8.1

Project Management Plan

MSA-Trough

Date: 27/12/2023

Doc. Version: 1

Document Control Information

Settings	Value
Document Title:	Project Handbook
Project Title:	MSA-Trough
Document Author:	Pedro Horta
Project Owner:	European Commission (PO)
Project Manager:	Pedro Horta (PM)
Doc. Version:	1
Sensitivity:	Public
Date:	27.12.2023

Document Approver(s) and Reviewer(s):

NOTE: All Approvers are required. Records of each approver must be maintained. All Reviewers in the list are considered required unless explicitly listed as Optional.

Name	Role	Action	Date
Pedro Horta (UEVORA)	PM (Approver)	*Approved conditionally*	27.12.23
Diogo Canavarro (UEVORA)	PCT (Reviewer)	*Approved conditionally*	27.12.23
Dominique Livreiro (UEVORA)	PCT (Reviewer)	*Approved conditionally*	27.12.23

Document history:

The Document Author is authorized to make the following types of changes to the document without requiring that the document be re-approved:

- Editorial, formatting, and spelling

- Clarification

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Changes to this document are summarized in the following table in reverse chronological order (latest version first).

Revision	Date	Created by	Short Description of Changes

Configuration Management: Document Location

The latest version of this controlled document will be stored in https://www.msa-trough.eu/home/.

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1. ABOUT THE PROJECT MANAGEMENT PLAN

The *Project Management Plan* documents the selected approach for implementing the project goals. It also highlights the key controlling processes to be used, the project policies and rules, and the overall management approach. It defines the outputs of the planning (i.e. it defines the plans necessary for managing the project as well as to what extent they should be customized or/and tailored).

The *Project Management Plan* becomes the basis for managing the project throughout its lifecycle and is an important point of reference for all project members and stakeholders. The *Project Management Plan* is kept up to date throughout the life of the project. During the Closing Phase, the *Project Management Plan* becomes an important point of reference for the Project-End Review Meeting, and should be properly closed and archived.

Given the nature of these plans, adaptations and/or changes are expected along the course of the project, befitting the objectives of assuring project management. The most recent versions of documents and tools, supported by due log of changes/decisions, are made available on the project folder.

Accessory documents and tools to the *Project Management Plan* are listed in Appendix 1.

Changes to this deliverable, if needed, will be described and requested to the Project Owner (PO), for resubmission of a later version of this document.

2. PROJECT OVERVIEW

In this Section, a project overview is provided, including a summary of its objectives and approach, of stakeholders, roles and responsibilities and critical success factors.

2.1. Project summary

According to scientific prognoses, the advancing climate change can only be stopped in time if, by the year 2050, all energy is generated worldwide without the emission of greenhouse gases. The EU is promoting the "European Green Deal" Program to support an energy transition from fossil fuels to renewable energies and to become climate neutral in the next 30 years. A main challenge for this energy transition, is to integrate a massive amount of variable renewable energy (mostly solar PV and wind power) into the electricity systems, through the provision of dispatchable energy by using storage systems, so that sufficient electrical power is available even in times without wind and sun radiation. Conventional battery storage systems are expensive and do not have enough raw material resources to build up the capacities required for a complete energy transition worldwide.

The solution proposed by this project is the development of an innovative parabolic solar collector system for CSP plants. This novel system uses a molten salt heat storage and enables the generation of very cost-efficient and dispatchable energy without any raw material resource limitation.

MSA-Trough is a novel parabolic trough collector that is visibly different from conventional collector designs due to its fixed focus and its innovative torque frame structure, which improves the optical collector efficiency by decreasing investment costs at the same time.

The main advantage of the MSA-Trough is the complete independence (detachment) between the concentrator and the fixed absorber tube, so that the absorber tube string is not moved by the concentrator and can be designed in a continuous line up to a length of more than 0,8km. This eliminates the need for all collector interconnecting piping as well as all rotational joints in the solar field, which greatly reduces not only capital costs but also pressure and heat losses. When using molten salt as heat transfer fluid (HTF), the high costs for heat tracing for these "passive pipes" can be saved, too.

Eliminating the failure-prone rotational joints also avoids costly repair works and extended collector downtime, which is currently a major problem in existing parabolic trough power plants. Because of its novel "storm-position" wind loads are reduced by 75% in comparison with conventional trough collectors, thus steel structure, pylons and foundations can be designed very light and cost saving. An entire future MSA-Trough collector will have eight independent drive units, an aperture wide of 6,7m and a collector length of 800m (5.360m2 aperture area). The collector will be by far the largest parabolic trough worldwide.

MSA-Trough collectors are especially suitable for dispatchable power generation at very high temperature (555°C) using directly molten salt as heat transfer fluid and storage medium, thus reaching a very high turbine cycle efficiency and an excellent specific storage capacity. Therefore, MSA-Trough power plants provide flexibility for grid services and facilitate the integration of variable output renewables into electricity systems.

The critical disadvantage of night-time heat losses of current molten salt applications in parabolic trough collectors is eliminated by the MSA-Trough technology. The continuous absorber tube design enables the innovative "overnight drainage strategy" which avoids heat losses overnight and thus, increases the plant performance.

A further important project highlight is the development of lightweight and very stable thin-glass sandwich mirrors made of strong but biodegradable composite material. In comparison with state-of-the-art parabolic trough collectors these mirrors will increase the collector stiffness, improve the optical efficiency, decrease the mirror costs and make the collector recyclable and sustainable.

In addition, innovative improvements which are a continuous tracking system, novel torsion compensators, special bellow mirror cones, a higher collector concentration ratio, a reduced collector focal length and a novel outlet temperature control system increase the solar field performance significantly.

The special MSA-Trough collector design enables the integration of an automatic mirror washing device into the collector structure which is self-driving and recycles the washing water. Due to the automatic washer integration the electrical plant performance increases due to higher mirror cleanliness and the maintenance costs decrease significantly. According to a preliminary design, the cleaning water consumption is reduced by around 90%.

The new MSA-Trough technology is intended for use in modular power plants with outputs of 5MWel scalable up to the gigawatt range. The solar power plants can be operated in southern Europe and generate inexpensive, consumer adapted electricity (estimated LCOE at 8,4 €Cent/kWh), or they are built in the deserts of North Africa and conduct their electricity to Europe via HVDC lines. Another main application is the production of green fuels (hydrogen, methanol, etc.) for Europe. MSA-Trough power plants can be ideally combined with PV solar fields where PV produces very cheap electricity during the days and CSP during night time.

Because of the significant decrease in solar field costs and strong increase in solar field efficiency MSA-Trough collectors will also become the most economic technology for process heat generation (LCOH estimated at 2-3 €Cent/kWhth vs. 4-5 €Cents/kWhth for current solar thermal installations). Thus, economic solar steam generation by MSA-Trough solar plants will not only be possible in southern Europe but also in middle and north Europe.

In brief, MSA-Trough objectives are:
- the development of an innovative parabolic solar collector system for CSP plants;
- to eliminate the need for all collector interconnecting piping as well as all rotational joints in the solar field;
- to reduce wind loads by 75% in comparison with conventional trough collectors;
- power generation at very high temperature (555°C) using directly molten salt as heat transfer fluid;
- to eliminate the night-time heat losses of current molten salt applications in parabolic trough collectors;
- to increase the collector stiffness, improve the optical efficiency, decrease the mirror costs and make the collector recyclable and sustainable;
- to significantly increase the overall solar field performance;
- to avoid costly repair works and extended collector downtime;
- to develop and integrate of an automatic mirror washing;
- to increase the electrical plant performance through higher mirror cleanliness and maintenance costs decrease;
- to develop modular power plants with outputs of 5MWel scalable up to the gigawatt range;
- to make MSA-Trough collector the most economic technology for process heat generation;
- to develop a techno-economical framework for the implementation of MSA-Trough solar plants not only in southern Europe but also in middle and north Europe;

aiming at presenting, as outcomes:

- to achieve complete independence (detachment) between the concentrator and the fixed absorber tube;
- To make the MSA-Trough the largest parabolic trough worldwide MSA-Trough collector with eight independent drive units, an aperture wide of 6,7m and a collector length of 800m (5.360m2 aperture area;
- to develop and implement an innovative "overnight drainage strategy" which avoids heat losses overnight;
- to develop a lightweight and very stable thin-glass sandwich mirrors made of strong but biodegradable composite material;
- to develop a continuous tracking system, a novel torsion compensators, a special bellow mirror cones, a higher collector concentration ratio, a reduced collector focal length and a novel outlet temperature control system;
- to develop a mirror washing which is self-driving and recycles the washing water, having water consumption reduction by around 90%;
- to operate in southern Europe and generate inexpensive, consumer adapted electricity with an estimated LCOE at 8,4 €Cent/kWh;
- to achieve an estimated LCOH at 2-3 €Cent/kWhth.

2.2. Project Roles & Responsibilities

In the following section, the roles of the different project participants are described alongside with the expectation on their responsibilities, rights and duties. A definition of the different roles follows.

2.2.1. Project Owner (PO)

Description
Is the key project decision maker and accountable for project success.
Responsibilities
- Acts as the project champion promoting the success of the project.   - Provides leadership and strategic direction to the Business Manager (BM) and Project Manager (PM).   - Sets the business objective and defines the Business Case for the project.   - Owns the project risks and assures proper project outcomes are in-line with business objectives and priorities.   - Mobilises the necessary resources for the project in accordance with the budget.   - Monitors project progress regularly.   - Coordinates resolution of issues and conflicts.   - Ensures that the project outcome meets the business expectations.   - Drives organisation change and monitors proper evolution and change implementation.   - Approves and signs-off all key management milestone artefacts (Project Management Plan, Project Management Plans, Business Implementation Plan, etc.).

2.2.2. Solution Provider (SP)

Description
Assumes overall accountability for the project deliverables.

Responsibilities
● Represents the interests of those designing, delivering, procuring, and implementing the project's deliverables. ● May help the Project Owner (PO) to define the Business Case and scope, deliverables, milestones and budget required for the project. ● Agrees on objectives for the supplier activities and approves the contractor's deliverables for the project (if applicable). ● Assumes the overall accountability for project deliverables and services requested by the Project Owner (PO). ● Mobilises the required resources from supplier side and appoints the Project Manager (PM)

2.2.3. User Representatives (URs)

Description
Represent the interests of the end-users in the project. User Representatives (URs) are part of the Business Implementation Group (BIG). Involving the User Representatives (URs) throughout the project is important, as they gain visibility of project activities, a sense of ownership and motivation, which ensures that the deliverables are fit for business purposes.
Responsibilities
● Helps to define business needs and requirements. ● Ensures that the project specifications and deliverables meet the needs of all users. ● Approves on behalf of the users the project specification and acceptance criteria. ● Communicates and prioritises user opinions in Project Steering Committee (PSC) decisions on whether to implement recommendations on proposed changes. ● Participates in demonstrations and pilot phases as needed. ● Performs the deliverable acceptance tests. ● Signs off documents related to the users (documentation, requirements, etc.). ● Guarantees the stability of the business during the transition towards the new operational state.

2.2.4. Business Implementation Group (BIG)

Description
Consists of representatives from the business and user groups. The Business Implementation Group (BIG) is responsible for implementing the business changes that need to be in place in order for the organisation to be able to effectively integrate the project deliverables into everyday work.
Responsibilities
● Under the coordination of the Business Manager (BM), the Business Implementation Group (BIG) plans and implements the activities needed to achieve the desired business changes as described in the Business Case and the Business Implementation Plan. ● Analyses the impact of the project implementation to the ongoing operations and existing business processes, the people and the culture of the organisation. ● Participates in the design or updating of any affected business processes. ● Prepares the affected business area for the upcoming change ● Advises the Business Manager (BM) concerning the readiness of the organisation to change

● Embeds the project deliverables into the business operations and implements organisational change activities that fall under the scope of the project.

2.2.5. Business Manager (BM)

Description
Represents the Project Owner (PO) on a daily basis within the project and collaborates closely with the Project Manager (PM).
Responsibilities
● Assists the Project Owner (PO) on the specification of the project and the main business objectives.   ● Establishes and guarantees an efficient collaboration and communication channel with the Project Manager (PM).   ● Coordinates the Business Implementation Group (BIG) and acts as a liaison between the User Representatives (UR) and the provider organisation.   ● Is responsible for the Project Initiation Request, Business Case and Business Implementation Plan.   ● Ensures that the products delivered by the project fulfil the user's need   ● Manages the business side activities of the project and assures that the required business resources are made available.   ● Devises the best track for business change or reengineering actions, when needed.   ● Ensures that the business organisation is ready to accommodate the project's deliverables when made available by the provider organisation.   ● Leads the implementation of the business changes within the users organisation.   ● Coordinates the schedule and delivery of user training (and production of necessary user support material).

2.2.6. Project Manager (PM)

Description
Manages the project on a daily basis and is responsible for the qualitative product delivery within the imposed constraints.
Responsibilities
● Proposes and executes the project plans as approved by the Project Steering Committee (PSC).   ● Daily manages and coordinates the Project Core Team (PCT) activities, making optimal use of the allocated resources.   ● Ensures that project scope is realised within the quality, time, and cost constraints, taking preventive or corrective measures where necessary.   ● Manages stakeholder's expectations.   ● Is responsible to create all the management artefacts (except Project Initiation Request, Business Case and Business Implementation Plan) and proposes them for approval to the Project Owner (PO) or the Project Steering Committee (PSC).   ● Ensures a controlled evolution of products under version control, by implementing the Project Change Management Plan.   ● Compares project actuals and expenditures to what was planned and reports project progress accordingly to the Project Steering Committee (PSC).   ● Performs risk management for project related risks.   ● Escalates unresolvable project issues to the Project Steering Committee (PSC)

- Liaises between the Directing and Performing Layers of the project.

2.2.7. Project Steering Committee (PSC)

Description
The permanent members of the committee are: ● Project Manager (PM) who is responsible for the entire project and its deliverables . ● Project Core Team (PCT) composed of WP leaders.

Responsibilities
● Champions the project and raises awareness at senior level. ● Guides and promotes the successful execution of the project at a strategic level, keeping the project focused towards its scope. ● Ensures adherence to organisation policies and directions. ● Provides high level monitoring and control of the project. ● At the end of the Planning Phase, authorises the project to continue to the Executing phase, based on the Project Management Plan and Project Work Plan. ● Authorises plan deviations, scope changes with high project impact and decides on recommendations. ● Arbitrates on conflicts and negotiates solutions to escalated issues. ● Drives and manages change in the organisation caused by the project. ● Approves and signs-off the management artefacts regarding quality, delivery and closing (Project Work Plan, etc.).

2.2.8. Project Core Team (PCT)

Description
Consists of the specialist roles responsible for the creation of the project deliverables. The composition and structure of the Project Core Team (PCT) depends on the size and type of the project (e.g. IT project, policy development project, etc.) and is defined by the Project Manager (PM).

Responsibilities
Under the coordination of the Project Manager (PM), the Project Core Team (PCT): ● Contributes in the elaboration of the project scope and the planning of the project activities. ● Performs the project activities according to the project work plan and schedule. ● Produces project deliverables. ● Provides information to the Project Manager (PM) regarding the progress of activities. ● Participates in project meetings as needed and contributes to the resolution of issues. ● Participates in the Project-End Meeting to derive and document useful lessons learned for the organisation.

2.2.9. Project Support Team (PST)

Description
Consists of the roles responsible for providing support to the project. The composition and structure of the Project Support Team (PST) depends on the size of the project and is defined by

the Project Manager (PM). The Project Support Team (PST) role may be assumed by team members, a specific team or be provided as horizontal services by the organisation.	
Responsibilities	
- Provides administrative support to the project. - Defines requirements for reporting and communications. - Administers the Project Steering Committee (PSC) meetings and produces consolidated reports. - Supports the Project Manager (PM) in planning, monitoring and controlling the project. - Advises on project management tools and administrative services. - Administers the project documentation (versioning, archiving, etc.). Examples of roles comprising the PST are: Project Support Office (PSO), Project Quality Assurance (PQA), Architecture Office (AO).	

A summary of roles and their assignments on both Project Owner and Consortium sides is provided in table 1.

Table 1: MSA-Trough governance roles

Role	Abr	Description	Assignment
Project Owner	PO	Monitors project progress (high level), mobilises resources (a.k.a. budget), leadership and strategic direction, assures project outcomes are in-line with objectives, approves all key management Artefacts.	EC
Solution Provider	SP	Assumes the overall accountability for project deliverables/services requested by the Project Owner (PO), appoints the PM and mobilises resources from the provider side, agrees on objectives for the activities and approves its deliverables for the project.	UEVORA Financ. & Legal represent.
User Representatives	URs	They represent the interests of the users of the project.	Consortium partners Legal representatives: project General Assembly
Business Implementation Group	BIG	They plan and implement the business change activities.	PO, PC
Business Manager	BM	Reports to Project Owner – Daily business responsible. Good communication with PM.	Project Officer EC (PO)
Project Manager	PM	Assumes responsibility for the project deliverables. Acts as the project facilitator.	Project Coordinator (PC)
Project Steering Committee	PSC	Assumes responsibility over Quality assurance and risk mitigation, providing information to BIG and URs (on business change activities -	PC, PCT

Role	Abr	Description	Assignment
		General Assembly; escalation)	
Project Core Team	PCT	They play a key role in project delivery (development).	WP leaders
Project Support Team	PST	Support the development of activities aiming the specific objectives of each individual Task defined in the Work Plan	All Tasks participants

The assignment of responsibilities along the Execution and Conclusion phases follows the Responsibility Assignment Matrix (RAM/RASCI) provided in Table 3, upon the definition of the responsibility levels described in Table 2.

Table 2: RASCI responsibility level definition[1]

	RASCI	Description
R	Responsible	Does the work while others can support (also do work)
A	Accountable	Delegates and approves work (just one accountable person)
S	Supports	Part of a team working with the Responsible
C	Consulted	Consulted for the activity
I	Informed	Informed of the activity (kept up to date)

The ensuing RAM/RASCI table accounts for the major foreseeable actions/activities to be performed along the initiating (foreclosure, around KOM), Execution and Conclusion phases of the project.

Table 3: MSA-Trough Responsibility Assignment Matrix (RAM/RASCI)[2]

	PO	SP	URs	BIG	BM	PM	PSC	PCT	PST
Initiating (foreclosure)									
KOM	I	A	I	S	C	R	I	I	S
Project Management Plan	I	A	I	S	C	R	C	I	S
Data Management Plan	I	A	I	S	C	R	C	I	S
Management tools	I	A	I	S	C	R	C	I	S
Execution									
Deliverables	I	I	I	S	C	A	C	R	S
Milestone control	I	I	I	S	C	R	A	I	S

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[1] As in PM^2 methodology

[2] **R** Responsible; **A** Accountable; **S** Supports; **C** Consulted; **I** Informed

	PO	SP	URs	BIG	BM	PM	PSC	PCT	PST
Risk monitoring	I	A	I	S	C	R	S	S	S
Quality control	I	A	I	S	C	R	S	S	S
Project Coordination	I	A	I	S	C	R	S	S	S
Project Technical Reporting	I	A	I	S	C	R	S	S	S
Project Financial Reporting	I	A	C	S	C	R	S	S	S
Final Meeting	I	A	I	S	C	R	I	I	S
General Assemblies	I	I	A	S	C	R	S	S	S
Risk Management Plan	I	A	I	S	C	R	C	S	S
Risk management	I	A	I	S	C	S	R	S	S
DEC	S	S	I	S	C	A	C	R	S
Conclusion									
IP Protection	I	I	A	S	C	S	S	R	S

2.3. Critical Success Factors

The main Critical Success Factor (CSF) of MSA-Trough is the development of an exploitation strategy in view of larger-scale commercialisation of the proposed technological innovation in MSA-Trough. All partners are committed to exploitation of the foreground and have already included the MSA-Trough exploitation into their overall strategy even beyond the project end.

This exploitation strategy, though, is based on attaining a set of specific expected results/Key-Performance Indicators (KPI) are identified as fundamental to the achievement of project goals, namely:

● Evaluation of the MSA-Trough demonstrator

○ KPI#1 - decrease in wind loads by 75%: 40% reduction in steel and 80% in concrete consumption;

○ KPI#2 - "overnight drainage strategy" is operating reliable;

○ KPI#3 - new outlet temperature control maintains 555°C;

○ KPI#4 - annual solar field efficiency increases by 24,5%

○ KPI#5 - solar field cost decreases by 30%.

● Successful demonstration of the mirror washer

○ KPI#6 - daily complete automatic washing before sun rise;

○ KPI#7 - water recycling rate 90%;

- ○ KPI#8 - average mirror cleanliness 98%;

- ● Economic and environmental assessment

  - ○ KPI#9 - decrease in LCOE to 8,4 €Cent/kWhel;

  - ○ KPI#10 decrease in LCOH to 2,1 €Cent/kWhth;

  - ○ KPI#11 - cheapest LCOE and LCOH of all CSP technologies;

  - ○ KPI#12 - storage capacity increase (east-west field simulation);

  - ○ KPI#13 - improved environmental profile assessed by LCA

The responsibility of Consortium partners, within the User Representatives group, for each of the Exploitable strategy/Key-Exploitable Results (KER) is already identified and presented in Table 4.

Table 4: MSA-Trough exploitable strategy and partner's positioning to it.

Partner	Exploitable strategy
UEV	KER#1 - Publication of operation and maintenance experience in scientific journals and/or at conferences; KER#2 - Increase visibility of the EMSP for further projects
FER	KER#3 - Commercialization of the MSA-Trough collector worldwide (manufacture and construction)
ROD	KER#4 - Commercialization of the new MSA-Trough drive unit and the automatic mirror washing device worldwide
DLR	KER#5 - Publication of collector quality assessment results in scientific journals and/or at conferences; KER#6 - Licensing of DLR's MSA-Trough patent
OME	KER#7 - Dissemination of results to the Mediterranean energy stakeholders; KER# 8 - publication in the GEM magazine; KER#9 - Preparation for future research; KER#10 - Develop a training session on the case study within the framework of its Enermed training programme, in cooperation with the other partners
ENEA	KER#11 - Publication of MSA-Trough start-up and shutdown results in scientific journals and/or at conferences
SL	KER#12 - Dissemination of results to related stakeholders (project developer and investors), presenting the results on the company website; KER#13 - High engagement for future project activities in EU and beyond; KER#14 - Preparation of market entry of CSP technology in other energy sectors.

The attainment of these results is supported, through Project Management tools and procedures, dully covering different project execution and coordination aspects, as summarised in Table 5.

Table 5: Critical project management Success Factors and support procedures

Success factor	Support procedure	Description
Project workplan is followed closely and updated along project execution	• Quality Management • Requirements Management • Communications Management • Deliverables Acceptance Management	• continuously identify, assess and monitor scope, time, cost, quality, project organisation, communication, risks, contracts, and client satisfaction • identify the project requirements and how to manage it • establishes how the project partners communicate between them • defines the contents of each deliverable, the tools to use and the expected results
Risks are updated, monitored and mitigated	• Risk Management • Issue Management • Project Change Management	• continuously identify, assess and monitor risks • identify issues and to define mitigation actions • propose and implement project changes as mitigation of issues
Data is managed according to FAIR principles	• Quality Management • Deliverables Acceptance Management • Data Management • DEC Management	• FAIR principles continuously assess and monitor • identify dissemination level and contents of each deliverable • identify how to manage, storage and have open access (if possible) to different types of data • establishes Communication and Dissemination channels and which types of data to be published, in order to accomplish FAIR principles
IP is protected	• Data Management • DEC Management	• identify how to manage, storage and have open access (if possible) to different types of data, without compromising IP protection

Success factor	Support procedure	Description
		• establishes Communication and Dissemination channels and which types of data to be published, in order to accomplish FAIR principles, without compromising IP protection and defines an Exploitation strategy
Financial execution is monitored and controlled	• Quality Management	• continuously identify, assess and monitor costs (budgeted vs. executed)
Quality of results is assessed	• Quality Management • Deliverables Acceptance Management	• continuously identify, assess and monitor scope, time, cost, quality, project organisation, communication, risks, contracts, and client satisfaction • identify contents of each deliverable
Project impacts are monitored	• Quality Management • DEC Management	• continuously identify, assess and monitor communication, and client satisfaction • establishes Communication and Dissemination channels and which types of data to be published, and defines an Exploitation strategy

2.4. Project Stakeholders

The possible stakeholders were already pre-identified during the proposal phase of MSA-Trough project such as CEN/CENELEC and ESTIF. However, a deeper look into this subject will be carried out more specifically under WP7 activities. In a nutshell, a possible stakeholders list, for each partner, is presented on Table 6:

Table 6. MSA-Trough relevant stakeholders

Stake.	Name	Description (Influence) [Support]	Planned measures to reach stakeholders
1.Academia	Students, scholars and R&D community	Natural beholder of the scientific and technological know-how and prone to the development of innovation and technology transfer activities. (Having the ability to address technical, economic, environmental or social	• Research activities; • Capacity building through academic curricula; • educational training; • New PhD opportunities; • Dissemination through University networks,

Stake.	Name	Description (Influence) [Support]	Planned measures to reach stakeholders
		challenges, has an important role in the introduction of innovation but a less influential role in the definition of value chain options: MODERATE) [by perceiving MSA-Trough as a possible groundbreaking project proving novel and optimised solutions for CSP field and a path for future R&D activities: POSITIVE]	●Exchange programmes, academic conferences; ●Information gathering through on-site visits; ●Open data
2.Industry	Industrial partners, suppliers, associations, potential off-takers	Aggregating interests on the up-scaling and commercialization of novel cost-competitive technological solutions. (by providing important inputs and feedback for future up-scaling of MSA-Trough concept and by being some of these actors already directly and indirectly involved in the project: HIGH) [by perceiving MSA-Trough concept as a potential highly cost-competitive solution for heat and power production: POSITIVE]	●Assess cost optimisation for technology scale up; ●Data protection, IPR, patents; ●Develop business opportunities based on the experience gained in MSA-Trough; ●Commercial exploitation; ●Address standardisation issues; ●Health and safety issues
3.Market	Financing institutions, sectoral associations, donors	Market bodies play an important role in the financing of innovative sectoral approaches with impacts at the regional, national and european development level. (by providing inputs and feedback regarding the bankability of MSA-Trough concept but eventually without an initial strong commitment/initiative: MODERATE) [by perceiving MSA-Trough as a novel solution for cost-competitive electricity production, although perhaps waiting for its up-scaling demonstration: NEUTRAL]	● Socio-economic and environmental evaluation; ● Liaise with international financing institutions for scale up of technology diffusion ● Commercial exploitation;

Stake.	Name	Description (Influence) [Support]	Planned measures to reach stakeholders
4.Public Bodies	Public authorities at local/national level, national authorities, National governments, National energy agencies & regulators, European Commission	With a close link to the Central National Governments and/or European Commission, the public bodies are responsible for the definition of regional/national/european policies and strategy for the further development and implementation of renewable technologies in the current energy transition scenario. (Setting the development strategy and defining funding priorities, presents a strong influence on the incentives to development of economic sectors: HIGH) [Aware of the already existing limitations and challenges of CSP technologies for up-scaling and market penetration supports incentives and strategies which might resolve these constraints: POSITIVE]	● Socio-economic and environmental evaluation; ● Disseminate findings through its network; ● Create awareness; ● Foster replicability in South European/North African countries; ● Liaise with policy makers at national, regional and international level, including in the EU;
5.Energy & Standardization Bodies	IEA, Standardisation bodies, Energy associations	Responsible for the standardisation of technology testing and validation, as well as for its methodic comparison with current benchmark solutions. (by providing tools and information for a coherent and systematic analysis of the solution to be development and implemented : HIGH) [Possibly perceiving MSA-Trough as a game-changing technology for heat and power production at competitive cost: POSITIVE]	● Technology innovation and optimisation ● Comparison to benchmarking solutions ● Patents
6.Civil	Residents Associations, Communities near to the demonstration plant	Aggregating the interests and complaints of the populations affected by the current energy prices/deliver quality and sense of need of decarbonization of the society. (Standing for a civil society movement presenting a citizens perspective, present a moderate influence: MODERATE) [Possibly perceive MSA-Trough approach as a possible evolution towards the local production of	● Disseminate findings through its network; ● Create awareness;

Stake.	Name	Description (Influence) [Support]	Planned measures to reach stakeholders
		cost-competitive heat and power and job creation: POSITIVE]	
7. Public	Consumers/citizens	Citizens (general Public) act as both consumers and policy agents (electors) with an expectable influence over policies and market. (More as a consumer, citizens' perception might take part in the ensuing exploitation activities addressing consumers e.g. marketing, product labelling, etc. MODERATE) [Possibly perceive products deriving from MSA-Trough approach as cost-competitive and environmentally beneficial and thus with an added value: POSITIVE]	• Disseminate findings through its network; • Create awareness;

The foregoing definition enables the definition of the Stakeholders Influence/Support Matrix presented in Table 7. Enabling a clear assessment of the most critical stakeholder's opposing views on MSA-Trough approach, this matrix is an important tool in the definition of priorities concerning targeted Dissemination and Communication activities within the project.

Table 7. MSA-Trough stakeholders Influence/Support Matrix

Stakeholders Influence/Support matrix		Support		
		POSITIVE	NEUTRAL	NEGATIVE
influence	HIGH	2.Industry, 4.Public Bodies, 5.Energy & Standardization Bodies,		
	MODERATE	1. Academia, 6. Civil, 7. Public	3. Market	
	LOW			

The planned measures for dissemination, exploitation and communication shall be further developed and implemented during the project lifetime, having as a major guideline the D7.2 - "Communication and Dissemination Plan" (M6).

2.4.1. Project Dependencies or Interrelations

The MSA-Trough is a follow-up from a German national precursor project "Molten Salt Trough - Development of a Parabolic Trough Collector" (Funding number 03EE5082), where a prototype is currently being developed. The project started in May 2021 and ends in April 2024. This project includes the planning and building of a collector of 48 m length in Spain and operation with cold water for preliminary thermal evaluation of the collector. Major parts of the development are special receiver hangings, adapted mirror sandwich modules and jigs. The EU MSA-Trough project will build upon results from this project. An exchange between both projects will happen via regular joint meetings and is facilitated because the partners FER, SL

and DLR are also involved in this German national project (FER by national Spanish funding). The results from this project will have a strong impact on the decision-making process of MSA-Trough project as to avoid all possible pitfalls and major problems related to the erection, commissioning and operation of the system at the EMSP facility.

Being MSA-Trough's project main goal, the demonstration of a 350m collector at EMSP facility, the project will have a strong dependency on the availability of the facility regarding the operationalization of the interconnection of the MSA-Trough collector to the existing two-tank storage system loop.

2.4.2. Project Constraints

Project constraints are the limiting factors that can affect a project's quality of execution. They're usually different for each project, depending on the industry and requirements. Several possible constraints can affect a project, but three of them are extremely important to consider for project work. Often called the triple constraints of project management, many managers consider the following types important for project planning:

- time: Most projects have a clear deadline that a project manager respects. Delivering a project on time is usually a crucial measure of its success, as any delay typically involves higher costs and the need to revisit any plans that the project's stakeholders have after its completion. The PM may use their experience and knowledge to estimate how long the project may take until completion. This includes anticipating possible delays, setbacks, risks and other unforeseen events.
- cost: A project's overall cost is another major constraint. A PM/PCT often has to find ways to complete the project without exceeding the allocated budget. Cost management is an ongoing task during the completion of a project, as the PM may constantly monitor spending to make sure that it matches budgeting requirements. If there are any issues, a PM may develop strategies to limit spending so they can fit the budget limitation.
- scope: A project's scope is a set of deliverables that the PM guarantees to the project's stakeholders. PCT often defines the scope at the beginning of a project, therefore avoiding any miscommunication or attempts to modify it once the project begins. The project's scope is dependent on its deadline and budget, as a looser deadline and a larger budget typically result in a more satisfactory outcome for the project stakeholders. Alternatively, a tight deadline and a smaller budget typically limit the project's scope.

Additionally, one can consider a fourth element:

- resources: similar to cost, this constraint involves planning the required resources for a project and considering what's possible with resource allocation. A very particular and important example of resource is the project team.

Table 8 summarises the major constraints identified for the MSA-Trough project.

Table 8: MSA-Trough project major constraints.

Constraint	Type (time, cost, scope, resources)	Flexibility level	Description
EC contribution	cost	Inflexible	EC contribution is fixed and can not be increased

| Project budget	cost	Low	Project budget might be changed upon own contributions by URs and approval of Grant Agreement amendment by PO
Project timeline	time	Low	Project timeline may be adjusted upon an eventual extension request from the PM and approval of Grant Agreement amendment by PO
Equipment & goods acquisition processes	cost, time	Medium	Public tender acquisition process is usually fixed and dependent on the amount. Plus, suppliers' time delivery and payment conditions might put some barriers. But different supplier offers and SME project partners flexibility to acquire items may alleviate the process.
Deliverables & Milestones fulfilment	time, scope	Low	Grant agreement sets the dates for the expected outputs of project but request for extension and/or contents adaptation may be requested by the PM to the PO
Team availability	resources	High	Adaptations of the team may be required due to leave of specific persons or their unavailability to carry out the tasks. However, high flexibility to hire/adapt new workers is expected as the project partners are only committed to a mean Person-Month value.

3. PROJECT APPROACH

3.1. Project Lifecycle

MSA-Trough project lifetime is composed by three main phases:

- Initiating (foreclosure): The first phase of the project - expected to last between M1 and M7 - where the following outcomes are mandatory:
    - Establishment of the engineering projects of MSA-Trough collector components;
    - Establishment of the communication and dissemination plan, communication channels and data management plan;
    - Establishment of the main guidelines for project quality and risk management.
- Execution: The second phase of the project - expected to last between M7 and M39 - where the following outcomes are mandatory:
    - Manufacturing/procurement of assembly jig and collector parts;
    - Erection of assembly jig and collector;
    - Collector quality testing and validation;
    - Optimization of collector operation and maintenance;
    - Economic, socio-economic and environmental assessment.
- Conclusion: The third phase of the project - expected to last between M39 and M42 - where the following outcomes are mandatory:
    - Finalisation of collector testing and data collection;
    - Finalisation of techno-economic assessment;
    - Elaboration of project final report
    - Final event/meeting for dissemination of project's results.

Figure 1 shows the overall MSA-Trough project lifetime.
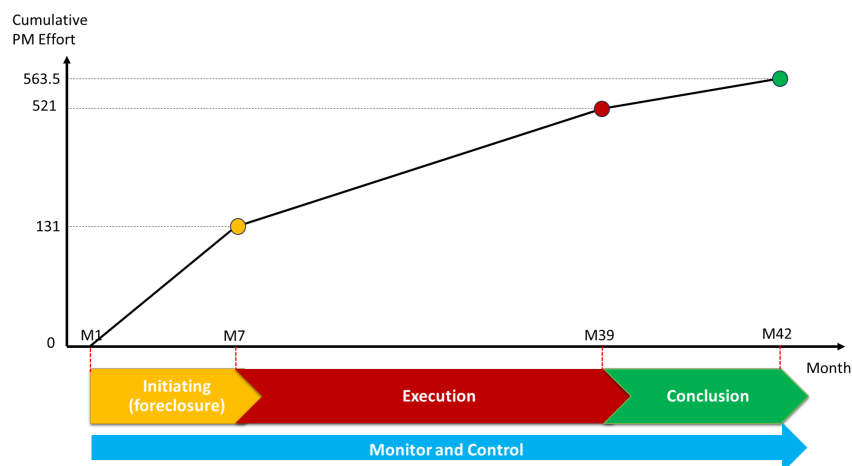
Figure 1: MSA-Trough project lifetime as a function of time (month) and consortium cumulative PM effort.

MSA-Trough is planned to be implemented over a three-and-a-half-year term. During this period, a series of activities will be conducted which encompass a wide range of disciplines, hence requiring complementary competences. The work programme is articulated into 8 interrelated work packages (WPs), led by highly qualified SMEs and research organisations.

WP1 looks at a redesign and detailed engineering of the MSA-Trough in order to adapt the current collector predesign to the final design which can be used for molten salt application. In addition, the automatic mirror washing device will be detailed. The WP will be coordinated by

RODAMA. **WP2** deals with the manufacture, production and providing of all hardware parts necessary for the installation of collector, assembly jig, washing device and connection pipe according to the WP1 design specifications. WP2 will be led by FERRUM. **WP3** looks at the erection of the MSA-Trough collector and all related components necessary to run the MSA-Trough test facility. This WP will be coordinated by FERRUM as well.

WP4 performs optical, mechanical and efficiency tests of the MSA-Trough. The data and experiences gained about the testing will be used to evaluate the new collector concept to be able to compare the efficiency and quality to other CSP technologies. The WP will be led by DLR. **WP5** analyzes and evaluates the operation and maintenance procedures of MSA-Trough collectors in order to improve part load operation and to optimize overnight operation by new freeze protection strategies. WP5 will be coordinated by ENEA. **WP6** conducts an integrated assessment of the MSA-Trough technology under an economic, environmental and social points of view, in order to get an overall evaluation of the sustainability profile of the novel technology, also in comparison with possible CSP alternatives. The WP will be led by SOLARLITE.

WP7 accompanies the other WPs and ensures that the project outputs and key results are discussed, presented and disseminated in the proper way, thus increasing the project visibility and the replicability of actions. This WP will be coordinated by OME. **WP8** supports all other WPs by ensuring the best conditions to implement the programme of work, an optimal internal communication, an efficient and cost-effective administrative and operational management, timely delivery of reporting, and a strong interaction with the technical MSA-Trough project committee. WP8 will be led by Universidade de Évora.

Figure 2 shows the PERT chart of the project and Figure 3 presents the project Gantt chart.
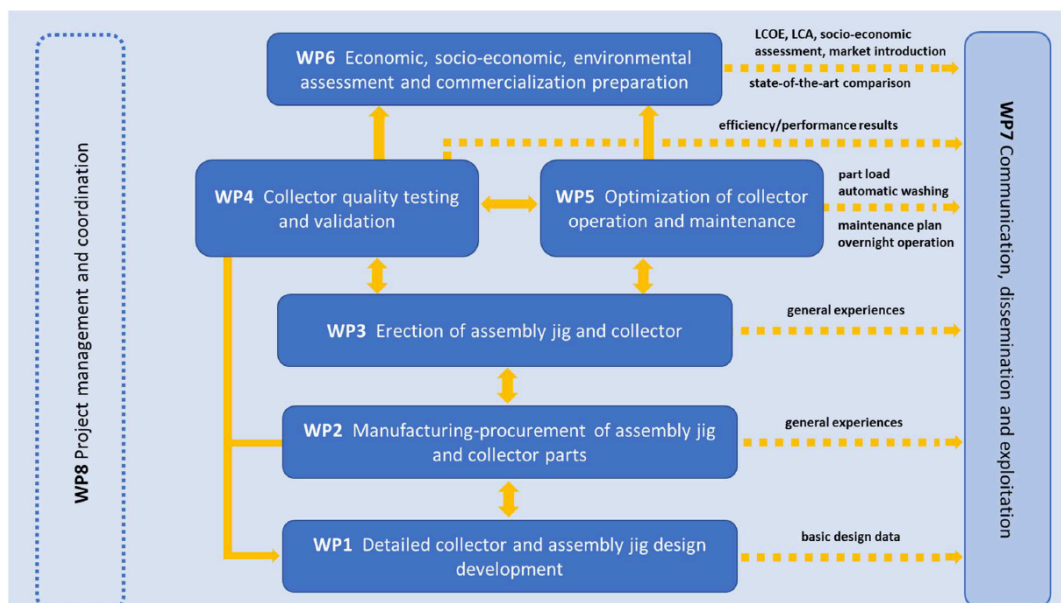
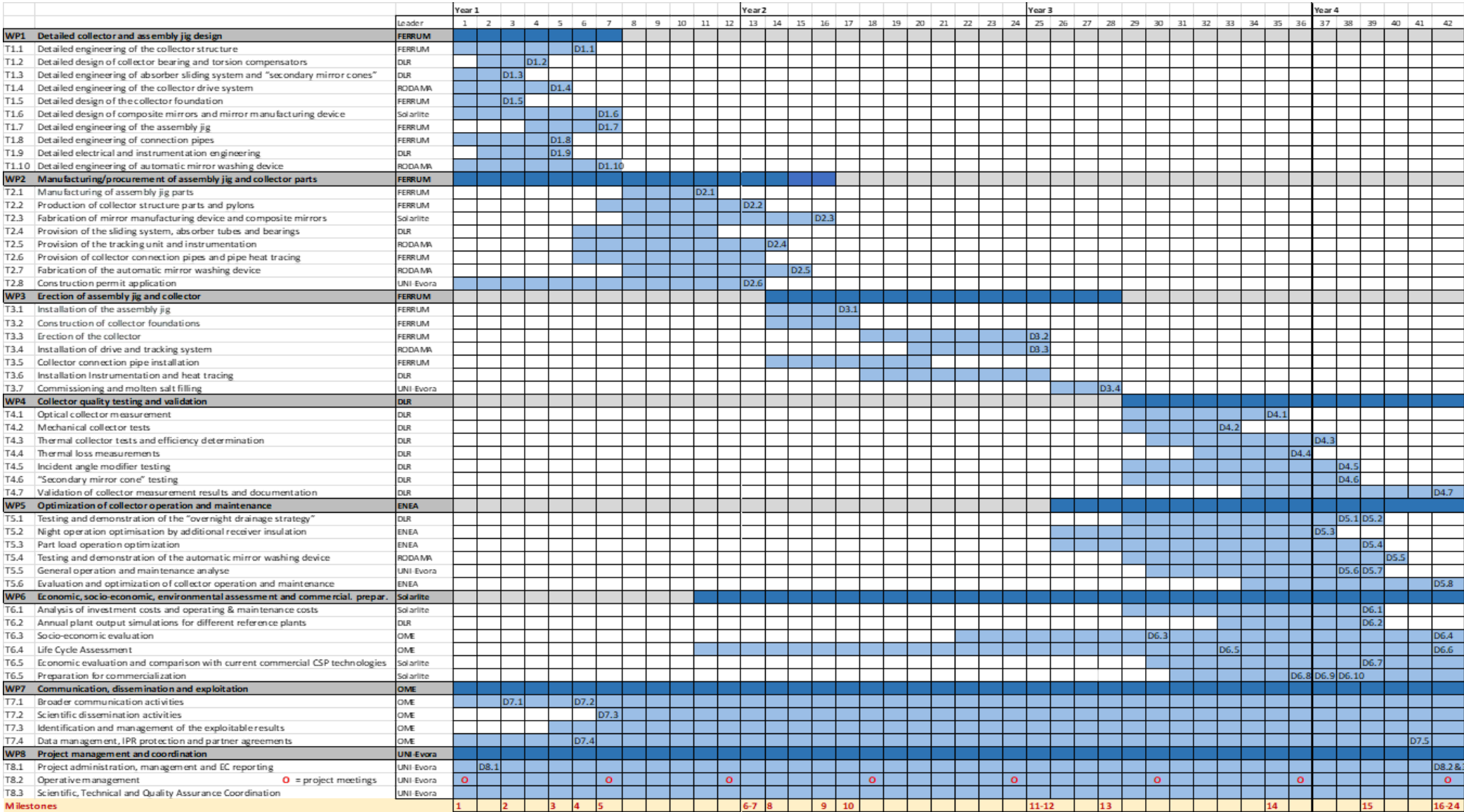**Figure 2: MSA-Trough Pert Chart illustrating the interaction of the work packages.**

Figure 3: MSA-Trough Gantt Chart.

To summarise, Table 9 shows project's lifetime settings with planned approvals to move forward to each next phase.

Table 9: MSA-Trough project lifetime settings

Phase	Active period	Approval conditions
Initiating	M1-M7	• Fulfilment of all WP1 activities and deliverables (D1.1 to D1.10); • Partial fulfilment of WP7 activities and deliverables (D7.1, D7.2 and D7.4); • Partial fulfilment of WP8 activities and deliverables (D8.1);
Execution	M8-M39	• Fulfilment of all WP2 activities and deliverables (D2.1 to D2.6) • Fulfilment of all WP3 activities and deliverables (D3.1 to D3.4) • Partial conclusion of WP4 activities and deliverables (D4.1 to D4.7) • Partial conclusion of WP5 activities (D5.1, D5.2, D5.3, D5.4, D5.6, D5.7) • Partial conclusion of WP6 activities and deliverables (D6.1, D6.2, D6.3, D6.5, D6.7, D6.8, D6.9, D6.10)
Conclusion	M40-42	• Conclusion of WP4 activities and deliverables (D4.7) • Conclusion of WP5 activities and deliverables (D5.5, D5.8) • Conclusion of WP6 activities and deliverables (D6.4, D6.6) • Conclusion of WP7 activities and deliverables (D7.5) • Conclusion of WP8 activities and deliverables (D8.2, D8.3)

3.2. PM² Tailoring – Required Project Documentation

Table 10 presents a list of the documents that are going to be used in the MSA-Trough project, besides the deliverables, and that are going to be available for all partners in the MSA-Trough website as described in section 4.5.

Table 10: MSA-Trough documents

Artefact	Yes/No	Location	If No, briefly explain the reason
Project Initiation Request	Yes	Private section in the MSA-Trough website	

Artefact	Yes/No	Location	If No, briefly explain the reason
Project Management Plan (this document)	Yes	Private section in the MSA-Trough website	
Stakeholder Matrix (in this document)	Yes	Private section in the MSA-Trough website	
Project Work Plan (Grant Agreement)	Yes	Private section in the MSA-Trough website	
Risk Log	Yes	Private section in the MSA-Trough website	
Issue Log	Yes	Private section in the MSA-Trough website	
Quality Log	Yes	Private section in the MSA-Trough website	
Decision Log	Yes	Private section in the MSA-Trough website	
Change Log	Yes	Private section in the MSA-Trough website	
Deliverables Acceptance Plan	Yes	Private section in the MSA-Trough website	
Deliverables Acceptance checklist	Yes	Private section in the MSA-Trough website	
Deliverables Acceptance note	Yes	Private section in the MSA-Trough website	
Project's Contacts List	Yes	Private section in the MSA-Trough website	
MSA-Trough Scope & Success Criteria	No	Private section in the MSA-Trough website	In progress
Change Request form	Yes	Private section in the MSA-Trough website	

3.3. Specific Project Management Rules

In order for the project management to work properly, certain actions will be taken, such as:

- defining a programme for each project meeting, to ensure that all relevant topics are covered and that the partners are adequately prepared. This programme must be approved and sent to all partners in good time (by email);
- before each meeting, a location file will be sent by email to all partners in good time, so that they can book their travel and accommodation more easily;
- at each meeting or event related to the project, an attendance sheet must be signed by all participants (which will contain the data protection rules in force in the project) to prove their presence and allow the contact list to be updated if necessary;
- after each project meeting, minutes of meeting will be prepared and approved by all the partners, so that the content and decisions made at the meeting can be recorded;
- in these minutes, an action/To Do list will also be registered, which will contain the decisions on actions to be taken throughout the project, indicating who is responsible and the date the action is due. At subsequent meetings, this list can be checked for the status of actions taken or yet to be taken.

3.4. Conflict Resolution and Escalations

Conflicts are situations in which one or both parties perceive a threat. They are considered to be critical issues and can be raised by any of the project stakeholders. The Project Management team should proactively identify, log and raise such issues for resolution. When required, conflicts are discussed at the weekly Project Status Meetings or, if needed, escalated to the Project Steering Committee (PSC).

Conflict resolution activities are registered in the *Issue Log*, while conflict resolution decisions can be logged in the *Decision Log*.

In general, the escalation procedure for this project is as following:

- Only issues/changes/risks with Very Low and Low impact can be approved by the Project Core Team (PCT). In this case, the Project Manager (PM) must always be informed and decisions may be registered in the *Decision Log*;

- Issues/changes/risks with Medium impact are approved by the Project Steering Committee (PSC). Decisions are registered in the *Decision Log*;

- Issues/changes/risks with , High and very High impact are approved by the Project Steering Committee (PSC) and brought to the Project General Assembly (URs). Decisions are registered in the *Decision Log*;

- When relevant, the Project Steering Committee (PSC) has extraordinary meetings for approving remediation actions related to urgent or very urgent issues with considerable impact or size.

This escalation procedure further follows the Governance rules defined in the project Consortium Agreement (CA), namely those described in Section 6. According to the CA (Section 6.3.7), issues to be brought by the PSC to the General Assembly, for decision, include:

- Content, finances and intellectual property rights
  - Proposals for changes to Annexes 1 and 2 of the Grant Agreement to be agreed by the Granting Authority
  - Changes to the Consortium Plan
  - Modifications or withdrawal of Background in Attachment 1 (Background Included)

- ○ Additions to Attachment 3 (List of Third Parties for simplified transfer according to Section 8.3.2)
- ○ Additions to Attachment 4 (Identified entities under the same control)
- Evolution of the consortium
  - ○ Entry of a new Party to the Project and approval of the settlement on the conditions of the accession of such a new Party
  - ○ Withdrawal of a Party from the Project and the approval of the settlement on the conditions of the withdrawal
  - ○ Identification of a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement
  - ○ Declaration of a Party to be a Defaulting Party
  - ○ Remedies to be performed by a Defaulting Party
  - ○ Termination of a Defaulting Party's participation in the consortium and measures relating thereto
  - ○ Proposal to the Granting Authority for a change of the Coordinator
  - ○ Proposal to the Granting Authority for suspension of all or part of the Project
  - ○ Proposal to the Granting Authority for termination of the Project and the Consortium Agreement

As described in the CA (Section 6.4), the Coordinator shall be the intermediary between the Parties and the Granting Authority and shall perform all tasks assigned to it as described in the Grant Agreement and in the Consortium Agreement. In particular, the Coordinator shall be responsible for:

- monitoring compliance by the Parties with their obligations under this Consortium Agreement and the Grant Agreement
- keeping the address list of Members and other contact persons updated and available
- collecting, reviewing to verify consistency and submitting reports, other deliverables (including financial statements and related certification) and specific requested documents to the Granting Authority
- preparing the meetings, proposing decisions and preparing the agenda of General Assembly meetings, chairing the meetings, preparing the minutes of the meetings and monitoring the
- implementation of decisions taken at meetings
- transmitting promptly documents and information connected with the Project to any other Party concerned
- administering the financial contribution of the Granting Authority and fulfilling the financial tasks
- providing, upon request, the Parties with official copies or originals of documents that are in the sole possession of the Coordinator when such copies or originals are necessary for the Parties to present claims.

4. PROJECT PROCESSES

4.1. Quality and Risk Management

The objective of this section is to provide a report on Quality Assurance and Risk Management procedures and targets providing guidance to project management and control throughout its duration.
In the implementation of Risk Mitigation and Quality Assurance activities, the PM² Project Management methodology[3] and framework have been used.

4.1.1. Quality Management

Project quality management aims to ensure that the MSA-Trough project will meet the expected results in the most efficient way and that deliverables will be accepted by the relevant stakeholders. It involves overseeing all activities needed to maintain a desired level of excellence. This includes creating and implementing quality planning and assurance, as well as quality control and quality improvement. The MSA-Trough Scope and Success Criteria file (Excel) will be used as a support monitoring tool.

The main project quality objectives are:

- Quality assurance activities are performed as planned;

- Assure compliance with the organisation's rules, regulations and legislation of:
  - each partner regulations;
  - Consortium Agreement;
  - General Assembly;
  - Grant Agreement;
  - external rules and regulations;

- Any non-conformity (or opportunity for quality improvements) is identified and implemented;

- Deliverables are accepted by the relevant stakeholders based on the defined quality/acceptance criteria.

The project quality management process comprises all activities (related both to processes and deliverables) that will increase the ability to meet the project expected results. The quality management process for this project is comprised of five key steps:

- Define (Project) Quality Characteristics;

- Perform Quality Assurance;

- Perform Quality Control;

- Perform Deliverables Acceptance; and

- Perform Final (Project) Acceptance.

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[3] https://op.europa.eu/en/publication-detail/-/publication/b8458be2-821d-11eb-9ac9-01aa75ed71a1

Step 1: Define Quality Characteristics

The purpose of this step is to identify the objectives, approach, requirements, activities and responsibilities of the project's quality management process and how it will be implemented throughout the project. These are documented in this plan based on the project objectives, approach, deliverables, expected benefits and resources available.

Quality assurance and control activities related to project deliverables can be found in a separate document according to the information to be generated for each deliverable in a deliverables acceptance check-list which follows the deliverables acceptance framework defined in the as *Deliverables Acceptance Plan* (see appendix 1). These documents are project domain specific and therefore not part of the PM². Quality Control activities in the context of formal customer acceptance of the deliverables are documented in the *Deliverables Acceptance Plan.*

The techniques that will be used for <u>quality planning</u>, according to their suitability to the nature of the activity under control, include:

- Cost-benefit analysis;

- Cost of Quality (CoQ);

- Benchmarking;

- Quality Requirements Prioritisation (MoSCoW – Must have, Should have, Could have, or Won't have).

Considering requestor requirements, the Project Manager (PM) determines the balance between cost/time/risk and quality of deliverables based on a cost-benefit analysis, and defines the quality assurance and control activities. For these activities, quality metrics should also be defined along with acceptance tolerances.

The *Quality Review Checklist,* the *Phase-exit Review Checklist* and the *Deliverables Acceptance Checklist* are the tools that will be used to validate compliance with this plan.

Step 2: Perform Quality Assurance

The purpose of this step is to verify the performance and compliance of project (and project management) activities with the defined quality requirements. Quality assurance will be performed by evaluating:

- the design of the project controls, by confirming that they are implemented, and by assessing their operational effectiveness. These activities will consider the project quality objectives along with the project risks.

- compliance with the organisation's rules and regulations, with the *Consortium Agreement,* with the project *Grant Agreement* as well as with relevant governmental and industry rules, regulations and legislation.

Quality assurance activities will be carried out:

- <u>Internally</u>: by a Project Quality Assurance (PQA) person: part of the PCT nominated within the SP ranks and by the project organisation: PSC after quality assurance discussions along the project meetings; and PM after review of the quality assurance results to be submitted by the BM and;

- <u>Externally</u>: after outsourced audits by the PO covering both the technical and financial execution of the project, by the end of each of the project reporting periods.

The results of the quality assurance activities, guided by this Plan, will be documented after use of the following tools:

- Quality Review Checklist;
- Phase-Exit Review;
- Deliverables Acceptance CheckList;
- Deliverables Acceptance Plan;
- Project Reports.

Recommendations for improvements may result from quality assurance and are processed by quality control in the form of change requests.

Step 3: Perform Quality Control

The purpose of this step is to monitor and consolidate results from the quality assurance activities in order to assess compliance and performance, recommend necessary changes, and plan new or refine existing quality assurance activities. Quality monitoring & controlling is performed throughout the project by the PM.

The *Quality Review Checklist* will be used by the PM for evaluating the quality control activities and to validate compliance with the plans in terms of scope, time, cost, quality, project organisation, communication, risks, contracts, and client satisfaction. Additionally, the PM will summarise and document the *Quality Review Checklist* findings, their impact, recommendations along with any remediation/improvement actions. The project logs will then also be used to document related risk, issues, decisions and changes.

When controlling and verifying the adequacy of project quality management, the PM will consider all events that may influence adversely or favourably the achievement of project objectives and refine the present document accordingly. Moreover, the PM will determine the effectiveness of project processes, look for potential improvements in processes efficiencies, analyse measurement results and their effectiveness, and include *Quality Review Sections* in the projects periodically reports, with the consolidation of the results and recommendations.

The results of the quality assurance activities will be used for improving the quality of project activities and so they may generate change requests for corrective or preventive actions, or updates in project documentation.

After the identification of all non-conformities or opportunities to improve, the PM will elaborate/validate recommendations and establish action plans, consulting the relevant stakeholders.

Actions may result in change requests, identification of new risks and issues, re-scheduling activities or adding new activities to the project. It can also identify training and resources needs, additional quality assurance activities, among others. These actions will identify which project documentation should be updated and the ID of the action from the related documents (project logs).

Furthermore, this step also comprises the review and validation of each project work package. If results are compliant with project quality requirements, the PM will obtain approval on the outputs produced in each phase-gate, based on the defined criteria. The *Phase-Exit Review Checklist* is used to support each phase-gate review. Additionally, formal go/no-go decisions for each milestone or phase will be agreed on and accepted by the Project Steering Committee (PSC), based on the success criteria.

All changes to the *Quality Management* and *Deliverables Acceptance Plan* will be agreed by the relevant stakeholders and approved by the Project Steering Committee (PSC).

Step 4: Perform Deliverables Acceptance

The purpose of this step is to obtain formal approval from the Project Owner (PO) for each project deliverable. It comprises the verification if deliverables meet the predefined objectives and set of criteria defined in the *Deliverables Acceptance Plan*, so that the PO can formally accept them, in the Deliverables Acceptance Note by the PO.

The *Deliverables Acceptance Checklist* supports the monitoring of the status of all activities that are pre-condition to the delivery of project outputs to the PO and the formal acceptance from him/her. Project deliverables are accepted if the acceptance activities (as described in *the Deliverables Acceptance Plan*) are successfully performed and within the pre-specified tolerances. The Project deliverables may be conditionally accepted even with a set of known issues, provided that these are documented and that there is a plan for addressing them.

Step 5: Perform Final Acceptance

The purpose of this step is to manage the final acceptance of the project, including the accepted deliverables and to perform the administrative closure of the project. The final acceptance is obtained from the PO, through a formal signature of the Project *Grant Agreement*.

Before the formal project sign-off, the PM should report on project performance in the Project-End Review Meeting, discuss lessons learned and develop the *Project-End Report*. This report should summarise project performance throughout the project lifecycle and describe the main risks, issues, constraints, opportunities and lessons learned identified along the project. It can also identify stakeholders' satisfaction level based on questionnaires or other types of feedback. The pitfalls, best practices and solutions implemented should be maintained in a project repository, accessible for future projects.

The administrative closure of the project includes updating, reviewing, organising and archiving all project documentation and records. It is done by the PM with the help of the Project Support Office (PSO). It also comprises the release of project resources, the final project acceptance and the communication of project end to the relevant stakeholders. The *Phase-exit Review Checklist* will be used to validate the completion of project activities and all documents will be stored following each organisation's internal procedure.

4.1.2. Risk Management

Risk management brings visibility to risks and accountability as to how they are handled, and ensures that project risks are proactively dealt with and regularly monitored and controlled. The main objectives of project risk management are:

● Project risks are identified, assessed, approved and reported throughout the project;

● All major risks are reported to the Project Steering Committee;

● Risk response strategies are in line with stakeholders' risk appetite and/or risk mitigation resources/competencies;

● All risks are monitored and under control;

- Risk response actions are implemented effectively.

The project risk management process defines the activities to identify, assess, prioritise, manage and control risks that may affect the execution of the project and the achievement of its objectives. This process is divided into four steps:

Step 1: Risk Identification

The purpose of this step is to facilitate the identification and documentation of risks that can impact the project objectives. Departing from the initial risk list already identified in the project initiating phase (proposal) risks are continuously identified throughout the project lifecycle, upon frequent update of the initial risk list. This process will be followed in parallel with the *Risk Log*.

The *Risk Log* (see Appendix 1) contains the risk identifier, risk name and short description, the risk category and owner, as well as strategies, actions and timing which will facilitate the monitor and control aspects of the project.

In addition to the *Risk Log*, the following tools will be used:

- at internal Consortium level (PM, PCT) Brainstorming and Assumption analysis;

- at external Consortium level (external Stakeholders) Questionnaires, Interviews and Workshops.

Step 2: Risk Assessment

The purpose of this step is to assess the likelihood and impact of the identified risks in terms of their influence to the project objectives. This assessment is necessary before any risk response planning can be done.

Risks are assessed based on their likelihood of occurrence and the impact in project objectives. The product of their likelihood and impact defines the Risk Level, which is then used as a reference for their prioritisation and risk response development.

Depending on the stakeholders' risk appetite, evaluation scales and tolerances will be defined based on which the most appropriate risk response strategies are chosen.

Step 3: Risk Response Development

The purpose of this step is to select the best risk response strategy and identify and plan the actions to control the risks.

The selection of the risk response strategy will be based on the results of the risk assessment (risk level), the type of risk, on the effects on the overall project objectives (e.g. schedule and costs), as well as on the cost of the strategy and its benefits (cost/benefit analysis). The strategy (or strategies) selected for each risk are documented in the *Risk Log*. There are four strategies to be considered as risk responses: Reduce, Avoid, Transfer, or Accept a risk. For the risks that have been accepted, contingency plans are defined to help control their impact in case they occur, while a Risk Owner assuming the responsibility for its implementation in such a situation, is assigned.

After the strategy for each risk has been selected, specific actions to implement the strategy will be defined, described, scheduled and assigned. Actions will detail concrete activities, milestones and deliverables and will be documented in the *Risk Log*. Moreover, they will clearly identify the target resolution date, as well as the estimation of resources involved and dependencies.

Step 4: Risk Control

The purpose of this step is to monitor and control the implementation of the risk response activities while continuously monitoring the project environment for new risks or changes (e.g. probability and/or impact) in the risks already identified.

The Project Follow-up Meetings are used to revise the status of risks and related actions, and to identify new risks that can impact project milestones, deliverables or objectives. The review of the *Risk Log* also appears in the agenda of the Project Review Meetings. Risks will be revised at regular predetermined intervals, but also after the occurrence of any event that might have a significant impact on the project environment and hence the project risks.

The updating of the *Risk Log* can include adding new risks or actions, updating the status of response activities, changing risk levels based on mitigation actions, changing the assignment of actions, etc.

In the occurrence of an accepted risk, an issue is to be created in the *Issues Log*. The new issue will include, besides its description, a detail of the actions (effort & responsible), level of Urgency, Impact, Size of effort and target date for completion, according to the foreseen risk mitigation plan (or its update), as well as an identification of the Issue Owner (which might differ from the Risk Owner after the principle of "best fit partner to resolve risk" and on the Escalation procedures, if applicable.

The resolution of an issue - as of the *Issue Log* description - might entail decisions and/or changes to the project. As so, and in addition to the *Risk Log*, the following tools will be used: the *Issues Log,* the *Decisions Log,* the *Changes Log and* the *Change Request Form* (see Appendix 1).

The Risk Control activities occur at three levels:

- WP level: coordinated by the related Project Core Team (PCT - Work Package leader), risk control activities related with Risk identification stem from the execution of WP activities, along which new risks are likely to be identified both at task execution level (by the PCT) or in the interaction with external parties (Stakeholders) along DEC activities. The identification of new risks deploys their registration by the PCT in the *Risk Log*, along with their description, assessment and a proposal of risk mitigation actions. At this level risks are considered to be in the following status: "Proposed" when added to the *Risk Log* by the PCT for internal WP discussion; "Assessing" along the internal assessment and; "Waiting for Approval" when ready to be brought to the PSC level by the PCT;

- PSC level: new risks are brought to the PSC upon the periodic review of the *Risk Log*. Presented by the corresponding PCT, new risks are assessed in terms of their relevance and proposed mitigation actions and classified by the PSC as: "Rejected" when considered to be not relevant or; as "Accepted" when considered relevant - thus being brought under continuous surveillance.

  Risks classified as "Accepted" are revised by the PSC upon the periodic review, with their status updated and presented by the corresponding PCT. Whenever a risk occurrence is confirmed, the PCT transfers the relevant corresponding information to the *Issues Log*, as to guide the discussion by the PSC on the actions to follow for its mitigation.

  The resolution of the risk is then guided through the *Issues Log* - whose revision is part of the Risk Control procedures - which in turn raises decisions on actions - brought and described in the Decisions Log.

  Upon the resolution of the risk, its status in the *Risk Log* is changed to "Closed".

- GA level: whenever the actions stemming from risk mitigation lead to decisions implying changes to the *Project Description of Action* (possibly even implying

communication with the Business Manager (BM) in view of possible Grant Agreement amendment requirements), the *Changes log* is filled by the PM accordingly as to bring it to the GA, for final decision and approval.

Risk Control activities are performed continuously throughout the project and assure a permanent identification of new risks, monitoring of accepted risks and monitoring of risk mitigation actions. As so, and along with the identification of new risks - normally occurring at WP level and involving the participation of the PCT - risk control might be summarised as follows:

- The Risk Owner will report periodically the status of the risk and any response activities to the PM.
- The PM will report to the Project Steering Committee (PSC) the status of the major risks and to other project stakeholders (as per the project's communications management). If any of the identified risks occur, then the PM will ensure the implementation of the contingency plans and communicate the issue to the PSC.

Being MSA-Trough an engineering project with the erection of a 350m parabolic trough collector, the project's main risks are related to materials/goods acquisition processes (costs, delivery, quality control), inherent civil works problems and delays and commissioning and operation of the system. The main constraints/risks are presented in Table 11:

Table 11: MSA-Trough risks identification and proposed risk-mitigation strategies.

Description of risk level of (i) likelihood, (ii) severity: Low/Medium/High =L/M/H	Related WP	Proposed risk-mitigation measures
Delay of construction permit (L) (M)	2	The EMPS site has already been designated for the use of test facilities. The planning application should be submitted in the first month. Good relationship between UEV and local administration.
Biodegradable mirror material is finally not suitable for the sandwich mirrors (L) (M)	2	Mirrors will be made from non-biodegradable material which can later be recycled by crushing (including glass mirror pieces for reinforcement) to be reused to make new sandwich mirrors by mixing about 80% of the recycled material with 20% of non-biodegradable virgin material.
Foundation works are complicated because of unexpected granite very close to the ground surface (H) (L)	3	The final collector location can vary 10 m from south to north to find a locally optimal position. Due to the very low wind loads on the MSA-Trough in "storm position", small drilled foundations can be used for foundations affected by granite.
Receiver damage due to high temperature gradients when preheating the receiver with solar energy to prepare the molten salt filling (L) (H)	3	Receiver preheating with solar energy is successfully tested by DLR at PSA in all radiation conditions and also successfully tested at the current HelioTrough Testloop at EMSP within the MS-OPERA project. The preheating can be carried out in the morning with very low sun radiation. In case of problems, the air flow through the loop can be increased, as well.

Description of risk level of (i) likelihood, (ii) severity: Low/Medium/High =L/M/H	Related WP	Proposed risk-mitigation measures
Formation of salt plugs when filling the receiver due to partially too low local temperatures (some colder receivers when preheating with solar energy) (L) (H)	3	The temperature of all single receivers will be measured indirectly by measurement of the receiver thermal length prolongation during the preheating process. In case of colder receiver detection, the preheating temperature will be increased or the impedance preheating system from the EMSP-HelioTrough Testloop will be temporarily installed at the MSA-Trough until the solar preheating process is optimized.
Expected functionality of MSA-Trough technology is not achieved due to incorrect component design (L) (H)	3	The general MSA-Trough concept will be tested in the national project in summer 2023 so that the mayor errors will be detected soon and eliminated before the start of the MSA-Trough project. If necessary, the components can be redesigned and reinforced in the MSA-Trough project.
Molten salt pump stops due to power failure (M) (H)	4,5	Immediate reaction with automatic draining. MSA-Trough will have a 0,15 % slope to south (to the drainage tank). Collectors will be equipped with an automatic defocusing system.
Primary data is not available or difficult to exploit (L) (M)	6	Use of secondary data identified by literature review and/or expert interviews
Scarce visibility of MSATrough (L) (M)	7	A PDEC will guide the consortium in the implementation of scientific and broader communication
WP execution delays (L) (M)	8	Clear allocation of roles and responsibilities; TC will monitor project progress and reaching of milestones.
Travel restrictions or illness related to global health crisis (L) (M)	All	WHO recommendations will be followed; Online platforms will be used for project meetings and workshops. Site visits and trainings will be organized in small groups and respecting social distancing

All these constraints were already pre-identified during the proposal phase of MSA-Trough project. The project will tackle them based on the major vectors:

1. Experience and "Lessons learned" from the MSA-Trough national project results;
2. Experience from former and on-going projects at EMSP facility such as HPS-2, MS-OPERA, EuroPatMoS and ADVIAMOS.

4.2. Issue Management

The project issue management process defines the activities related to identifying, documenting, assessing, prioritizing, assigning, resolving and controlling issues. Issues are defined as unplanned project related events that happened and require a project management action. The objectives of this section are:

- To outline the issue and decision management process to be used for the project;

- To identify the roles and responsibilities related to issue and decision management;

- To specify the methodology, standards, tools and techniques used to support issue and decision management.

Issue management aims to ensure that issues that have a potential impact on project scope, time, cost, quality, risk, or stakeholder satisfaction are assessed and acted upon. Relevant issues should be logged and followed-up in the *Issue log*.

Key decisions can be logged in a *Decision Log*, which brings visibility to decisions and accountability as to how and by whom they are taken, and to whom they should be communicated.

The PM^2 project issue management process defines the activities related to identifying, documenting, assessing, prioritising, assigning, resolving and controlling issues.

The issue management process for this project is a four-step process and falls under the responsibilities of the PM who should execute the process when required throughout the project lifecycle:

Step 1: Issue Identification

The purpose of this step is to facilitate the identification and documentation of issues. Examples of issues that can arise in the project are:

- There are disagreements on the interpretation of requirements;

- The Project Core Team (PCT) has difficulties achieving the set goals (e.g. in terms of time, resources or quality);

- Non-conformities are identified by the PCT or by other Stakeholders (e.g. Quality Assurance Manager);

- Risks identified in the *Risk Log* occur, and thus risks change from potential problems to actual problems;

- External effects that influence the project in a negative way;

- Many other reasons.

Issues can be identified/raised by any Project Stakeholder throughout the project lifecycle, using different communication channels such as meetings, emails, reports, among others.

After receiving the issue information, the PM registers the issue in the *Issue Log*. Issues can be also registered in the *Issue Log* by the PCT members and then validated by the PM.

The *Issue Log* contains information to be fulfilled at this stage, such as the issue identifier, the issue category (e.g. IT, business, people & organisation, etc.), the issue details and impact, the

status of the issue, the name of the person that identified the issue and the date of identification.

Step 2: Issue Assessment and Action Recommendation:

The purpose of this step is to assess the urgency and impact of the issue and decide on a priority for its resolution.

When an issue arises, an initial assessment (informal) will be performed by the person who raised the issue. This informal assessment will consider dimensions like:

- **Category**: Is the issue related to a specific area?

- **Impact**: What are the possible consequences of this issue? Will it have contractual impacts?

- **Urgency**: How urgent is a solution to this issue? This will influence the speed and planning of the issue reporting and resolution.

- **Size**: Is it an issue that requires some effort/cost to solve, or is it best handled by immediate action?

After this first assessment, the PM assigns the detailed analysis of the issue to a project stakeholder. This person will assess the issue and identify its root cause. Also, it will recommend a solution and detail the necessary steps, effort and resources involved. This information will be documented in the *Issue Log* and then used as an input to request the approval by the appropriate decision makers (based on the escalation process). The PM then documents the decisions in the *Decision Log*.

Issues can generate new change requests and therefore the next steps may follow the project change management process.

Step 3: Actions Implementation:

After issues are evaluated and the remediation actions approved, the PM will incorporate these actions into the *Project Work Plan* and update project related documentation such as project plans and logs (e.g. *Decision Log, Resource Plan*, *Change* Log).

Step 4: Issue Control:

The purpose of this step is to monitor and control the issues identified during the project, to be able to easily communicate them to the several project decision layers, for remediation action approval or status updates.

Project Status meetings will be performed weekly and used to revise the status of issues and related actions, and to identify new issues. The PM is responsible for updating the *Issue Log*, which can include adding new issues, updating issue status, updating remediation action details, modifying urgency, impact, and/or size levels based on changes in project environment, etc.

Additionally, the PM will report periodically (monthly) the status of the major issues identified for the project to the PSC and, when adequate, to other project stakeholders (as per the project *Communications Management Management*).

Issue Log

The *Issue Log* for the project is using the PM² *Issue Log* template and no changes have been done to the structure, fields or values, as following:

Issue Identification and Description	
ID	The issue identifier. It should be numbered sequentially.
Category	Issue category related to the area affected by the issue (e.g. business, IT, people & organisation, external or legal).
Title	Short title for the issue.
Description	A description of the issue and consequences of doing nothing.
Status	The issue status can be any of the following: **Open:** the issue has been identified and requires attention and, if possible, a resolution. **Postponed:** this status is set if resolving the issue is postponed due to other priorities. **Resolved:** this status indicates that all necessary actions are completed and the issue is resolved. **Closed:** this status indicates that all work is completed and verified. The issue can then be marked as closed.
Identified By	The name of the person who identifies the issue.
Identification Date	The date on which the issue was raised.
Issue Assessment and Action Description	
Action Details (effort & responsible)	Description of the recommended action, and the steps, deliverables, timescale, resources and effort involved.
Urgency	A numeric value denoting how urgent the issue is. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**
Impact	A numeric value denoting the issue's impact. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**
Size	Issue size represents the effort needed to resolve the issue. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**
Target Date	The date on which the issue is expected to be resolved.
Issue Owner	The person accountable for resolving the issue.
Escalation	Whether the issue is to be escalated to the Directing or Steering Layers: **Yes** or **No**.
Traceability/Comments	The ID(s) of the task (in the Project Work Plan) that implement the issue actions, or/and the IDs of related change, risk or decisions (log entries). Also include any additional information/comments related to the issue.

The location of this artefact is found in the Appendix 1.

Decision Log

The *Decision Log* for the project is using the PM² *Decision Log* template and no changes have been done to the structure, fields or values, as following:

Decision Identification	
ID	The decision identifier. It should be numbered sequentially.
Category	Decision category related to the area affected by the decision (e.g. Business, IT, People & Organisation, External or Legal).
Title	Short title for the decision.
Description	A description of the decision details and impact, if applicable.
Identified by	The name of the person who identified the need for a decision.
People present	Log the names of those present when the decision was made.
Comments	The IDs of related Change, Risk or Issue Log entries, or meeting minutes, and any additional information related to the decision.
Ownership	
Decision Owner	The person accountable for the decision.
Decision Date	Date on which the decision was taken
Escalation	Whether or not the decision is to be escalated to the Directing or Steering Layers: **Yes** or **No**.
Decision Implementation	
Date of application	The date on which the decision is applicable.
Decision communicated to:	The group, teams and other audiences to whom the decision should be communicated.

The location of this artefact is found in the Appendix 1.

Escalation

The issue escalation workflow for this project is as following:

- Only issues remediation actions with <u>Very Low and Low Size and Impact</u> can be approved at the Managing Layer (Business Manager (BM) and PM approval);

- <u>Other actions</u> (with Medium, High and very High Size or Impact) are approved by the Project Steering Committee (PSC);

- When relevant, the PSC has extraordinary meetings for approving remediation actions related to urgent or very urgent issues with considerable impact or size.

- Major Issues (High and very High Size or Impact) are reported yearly in the *Project Progress Report*, to be reviewed and approved by senior management (Business governing layer).

Decision

Issues are tracked together with the key decisions. These decisions (at Managing, Directing, or Steering Layer) will be documented in the *Decision Log*, which refers to the related issues, risks or changes, describes the decision details, identifies the person/group accountable for the decision and to whom the decision should be communicated. Any other key decision taken can be documented and followed-up through the *decision log*.

4.3. Requirements Management

The requirements management process comprises the activities related to the specification, evaluation, approval, monitoring and validation of the project's requirements. The purpose of this section is to define the *Requirement Management* process for this project. More specifically:

- Describes the requirement management process to be used for the project;

- Defines the roles and responsibilities related to requirements management;

- Specifies the methodology, standards, tools and techniques and templates used to support requirements management.

Requirements Management is the process of gathering, documenting and validating requirements, and managing their implementation and change. It is a process that runs continuously throughout the project life cycle and relates to other project management processes, such as quality and change management.

The PM^2 requirements management process defines the activities related to identifying, documenting, evaluating, prioritising, approving, validating requirements, and communicating the status of requirements to all relevant stakeholders. The requirements management process for this project is a five step process and falls under the responsibilities of the PM who should execute the process when required throughout the project lifecycle:

Step 1: Specify the requirements

Together with the project stakeholders, gather the project requirements and document them clearly in the Requirements documentation. Structure them by adding relevant metadata. Many tools & techniques can be applied here to gather requirements: brainstorming, nominal group technique, interviews, observation, storyboards, prototyping, user stories, and more. Requirements can be documented using MS Word or Excel, or in a requirements documentation and management system.

It is crucial to identify and specify as many of the requirements as possible during planning. Discovering important requirements during execution might have a big impact on project cost and schedule.

Step 2: Evaluate the requirements

The project team assesses the feasibility, consistency and completeness of the requirements, and estimates the effort/costs needed to implement them. The PM balances the list of requirements against project constraints (budget, time, etc.) and makes a proposal to the project stakeholders.

A requirement traceability matrix might be helpful to provide structure and traceability in extended requirements documentation, linking high-level business needs to detailed requirements, and detailed requirements to deliverables.

Prioritization of requirements is part of this step. Techniques like e.g. MoSCoW prioritisation can be applied. An important aspect of prioritisation is the relationship between requirements. Related and dependent requirements need to have the same priority.

The PM verifies if requirements are in-scope as to the scope boundaries defined in the *Project Charter*. Requirements that are out-of-scope are logged as "not in scope" in or outside the Requirements documentation.

Any requirement should be testable on the deliverable(s). For this reason acceptance criteria are defined for each requirement. These criteria are part of the requirements documentation. These criteria are fundamental in the development of the deliverables as well as the test plans for final deliverable acceptance.

Step 3: Approve the requirements

The PM and key stakeholders (such as the PO or Business Manager (BM)) negotiate and agree on the requirements for the project and their priorities. In these negotiations the PM makes sure that the in-scope requirements can be delivered given the cost and schedule boundaries set in the Project Charter.

The formal approval of the requirements documentation is logged in the *Decision log* and/or the minutes of the meeting, e.g. the PSC.

Step 4: Monitor requirements implementation

The PM continuously monitors the Project Core Team's (PCT) implementation of the requirements, adds new requirements and changes existing ones where needed through formal change control. New and changed requirements need to follow the steps 1, 2 and 3 as described above. After approval the *Project Work Plan* (PWP) will be updated.

Step 5: Validate the implemented requirements

When the requirements are implemented, the deliverable is validated by the User Representatives (URs). They assess if the initial business need is satisfied. This validation is based on the acceptance criteria that are defined for each requirement (see step 2). Formal acceptance of the project deliverables should comply with the Deliverables Acceptance process as described in the *Deliverable Acceptance Plan*.

A requirement may run through these lifecycle stages:

- **Specified**: The requirement is specified in a document or in a requirements documentation and management system.

- **Proposed**: The requirement has passed evaluation but not yet approved by the client. If it does not pass evaluation it will get status For Fixing or Rejected.

- **Approved**: The requirement is formally approved by the client. If it is not approved it will get status For Fixing or Rejected.

- **Incorporated**: The requirement is incorporated in the Project Work Plan (PWP). If during incorporation an issue is discovered the status may change into For Fixing.

- **Implemented**: The requirement is implemented in one or more of the project deliverables and tested against the acceptance criteria by the Project Core Team (PCT), but not yet formally accepted by the client. If during implementation an issue is discovered the status may change into For Fixing.

- **Validated**: The implemented requirement is formally validated against the acceptance criteria and accepted by the client. If during validation and acceptance an issue is

discovered the requirements may be partially accepted and the status may change into For Fixing.

In addition, requirements may have these special statuses:

- **For Fixing**: If there is an issue, a requirement may get the status For Fixing at any stage of the requirements lifecycle. Reasons for this status may be that the requirement is not well documented or inconsistent with another requirement. Another reason is that the requirement did only partially pass validation. After resolving the issues a requirement may return to the status Specified. If an issue cannot be resolved a requirement may get the status Rejected.

- **Rejected**: A requirement may be Rejected for different reasons. Examples are: The requirement is obsolete, out of scope, not feasible, postponed (to a later project phase, or another project), merged with another requirement, and a requirement may be identified as a duplicate requirement and therefore rejected.

The Requirement documentation may have the following structure:

Requirements documentation	
Change Identification and Description	
ID	The unique requirement identifier. It should be numbered sequentially.
Name	Short name of the requirement.
Category	Categorizes the requirement, e.g. Business need, Feature, Functional Requirements, Technical Requirements, Training Requirements, Quality Requirements, Performance Requirements, Security requirement, Support Requirements, Maintenance Requirements, System quality requirement, Business rule, etc.
Type	Requirement type refers to the technique used to describe the requirement, e.g.: Epic, User story, Story board, Use Case, User interface sketch, Business Process Model, Report structure, etc.
Requirement Description & Details	A description of the requirement in text or using picturising techniques like use case diagrams, sketches, etc.
Acceptance Criteria	One or more acceptance criteria that allow the stakeholders to test if the deliverable meets the requirement.
Status	The status of a requirement can e.g. be any of the following: Specified, Proposed, Approved, Incorporated, Implemented, Validated, For Fixing & Rejected.
Requested by	The source of the requirement. The stakeholder(s) to whom the requirement is important.
Identification Date	The date that the requirements were brought up.

Requirements and requirement attributes may need to be traced from the high level business needs down to the detailed requirements, and finally into deliverables. A traceability matrix is used to maintain these relations. This matrix can be an excel file with attributes as e.g. the one

below, or a system that may be part of a larger requirement management system. The Requirement traceability matrix may have the following structure:

Requirement traceability matrix	
ID	Unique identifier.
Name	Short and descriptive name.
Status	The status of a requirement can e.g. be any of the following: Specified, Proposed, Approved, Incorporated, Implemented, Validated, For Fixing & Rejected.
Priority	Statement of relative importance of the requirement, as e.g. High, Medium, Low, or Must-have, Should-have, Could-have, Won't-have.
Size	An indication of the level of effort needed or how hard it will be to implement the requirement. (Big, Medium, Small)
Comments	Comments on the requirement. If the requirement has been REJECTED the reason for rejection must be described here.
Derived From	Identifier of the Requirement from what requirement it was derived (for example a Feature must always be derived from a high level Business requirement or Stakeholder Need, and a detailed requirement from a Feature).
Related WBS code	Identifier of the WBS element that produces the deliverable for which this is a requirement.
Specification of documentation	Name of the document where the requirement is specified and the file location.
Test Plan	Name and file location of the document where the test plan or acceptance criteria for this requirement is described.

Requirements may change as well as new requirements may come-up during the execution phase of the project. As the project started with an approved set of requirements the project manager needs to manage changes to the requirements in a formal way. Any changed or new requirement should:

- be logged using the *Change Request Form,*

- follow the requirements management process as described in chapter 3 of this document, and

- be processed through change control as described in the *Project Management Plan*.

4.4. Project Change Management

The project change management process defines the activities related to identifying, documenting, assessing, approving, prioritising, planning and controlling changes, and communicating them to all relevant stakeholders. The purpose of this section is to define the *Project Change Management* process for this project. More specifically:

- Describes the change management process to be used for the project;

- Defines the roles and responsibilities related to project change management;

- Specifies the methodology, standards, tools and techniques used to support project change management.

Project change management aims to bring transparency, accountability and traceability to all project changes implemented after the project scope and project plans have been baselined. It ensures that changes with a significant impact in any of the project dimensions (i.e. scope, time, cost, quality or risk) are properly assessed, agreed on and approved by the appropriate level of authority.

A project change can result e.g. from a scope change, a new requirement (quality,…), an identified issue, a preventive action to reduce the risk level, or from a decision taken to change any of the project baselines (scheduling, staffing or budget).

Note that managing changes to configuration items (e.g. project artefacts and deliverables) is part of quality management and are therefore documented in the *Quality Management.*

The PM^2 project change management process defines the activities related to identifying, documenting, assessing, approving, prioritising, planning and controlling changes, and communicating them to all relevant stakeholders. The change management process for this project is a five step process and falls under the responsibilities of the Project Manager who should execute the process when required throughout the project lifecycle:

Step 1: Change Identification

The purpose of this step is to facilitate the identification and documentation of change requests to project baselines as scope, requirements, deliverables, resources, costs, schedule or quality characteristics.

Changes can be requested (or identified and raised) throughout the project lifecycle by any Project Stakeholder. After receiving a change request, the PM registers the requested change in the *Change Log* and makes sure the change request is described using the *Change Request Form*.

A request for a change can be submitted formally via a *Change Request Form*, or can be identified and raised during meetings as a result of decisions, issues or risks. The *Change Log* contains information to be fulfilled at this stage, such as the change identifier, the name of the requestor, the date of identification, the change category (e.g. new requirement, issue or risk related, business, etc.), the change details and impact, and the status of the change.

Step 2: Change Assessment and Action Recommendation

The purpose of this step is to assess a) whether this request is indeed a project change, b) to define the different options to meet this request, c) to assess the size of the identified change for each option defined in terms of the impact to the project objectives, quality, risk, schedule, cost, effort, and the contract with the contractor, and d) to decide on a priority for the implementation of that change request.

After this assessment, the recommended action will be detailed with the necessary steps, deliverables, cost, timescale and resources involved. Be aware that the recommended action may be to reject the requested change. This information will be documented by the PM in the *Change Log* (the *Change Request Form* documents the original request) which is then used as an input to the formal change approval or rejection by the appropriate decision makers.

New changes can generate new risks, issues or quality requirements and therefore change assessment will include the assessment of current or new risks, issues and quality requirements. The design of the change implementation (action) will also impact cost, scheduling and resources assigned to the project, so all these dimensions will be assessed before change approval. If a contractor is involved, the impact on the contract needs to be considered. Any change to a contract brings a considerable amount of administrative work that

is costly and may delay the project. Be aware that the amount of change to a contract may be constrained by the European tendering rules.

Step 3: Change Approval

The purpose of this step is to achieve a decision regarding the approval or rejection of the change, according to the escalation procedure defined for the project. Changes classified with high size will always be communicated to the Directing or Project Steering Layer. Moreover, project scope changes will be yearly reported to the Corporate Governance Bodies.

There are four possible decisions to be considered: Approve, Reject, Postpone, or Merge the change request. The decision details are documented in the *Change Log*. Key decisions may also be logged in the *Decision log*. If the change request needs further information or clarification, it returns to the "Change Assessment and Action Recommendation" step.

Step 4: Change Implementation

For the approved or merged changes, the PM will incorporate the actions related to these changes into the *Project Work Plan* and update project related documentation such as project plans, logs and checklists, (e.g. *Deliverables Acceptance Management Plan*, *Risk Log*, *Issue Log*, *Decision Log*, *Quality Review Checklist* and *Deliverables Acceptance Checklist*).

Step 5: Change Control

The purpose of this step is to monitor and control project changes, to be able to easily communicate them to the several project decision layers, for approval or status updates. The Project Manager will collect any changes to the project or related actions and control the status of each change management activity.

Project Status meetings will be used to revise the status of changes and related actions, and to identify new changes. The PM is responsible for updating the *Change Log*, which can include adding new changes, updating change status, updating effort estimation, modifying size and/or priority levels based on changes in project environment, etc.

Additionally, the PM will report periodically the status of project changes to the Project Steering Committee (PSC) and, when adequate, to other project stakeholders (as per the *Communications Management Plan*), e.g. to the Corporate Governance Bodies (yearly *Project Progress Report*).

The project *Change Log* has the following structure:

Change Log	
Change Identification and Description	
ID	The change identifier. It should be numbered sequentially.
Category	Categorises the change (e.g. new requirement, issue or risk related, business improvement, etc).
Title	Short title that describes the requested change.
Description	A more detailed description of the requested change and the impact of not implementing the change.

Status	The change status can be any of the following: **Submitted**: this is the initial status. Use this while the requested change is still being specified. **Assessing:** use this status to initiate an assessment.. **Waiting for Approval**: use this to initiate approval. Before doing this, make sure that the investigation is complete and that the estimates shown are correct. **Approved**: this status is set once the change has been approved. **Rejected**: this status is set if the change was rejected. **Postponed**: this status is set if the change is postponed indefinitely. **Merged**: this status indicates that this change has been merged into some other change so it is no longer being actively handled. Merging is common when there are many changes. **Implemented**: this status indicates that the work implementing this change has been incorporated into the Project Work Plan.
Requested by	The name of the person requesting the change.
Date identified (or Submission Date)	The initial submission date of the change request.
Change Assessment and Action Description	
Action Details (effort & responsible)	Description of the recommended actions, including steps, deliverables, timescale, resources and effort involved.
Size	The effort required to implement the change. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**
Priority	A numeric value denoting the agreed priority of the change. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**
Target Delivery Date	The target date for the change to be delivered.
Change Approval	
Escalation	Escalation to the Directing or Steering Layers is needed? (**Yes** or **No**).
Decision	The decision taken
Decided by	Person (or Committee) that approved the change.
Decision Date	Date that the project change is approved.
Change Implementation	
Actual Delivery Date	The date on which the change was actually delivered.
Traceability and Comments	The ID(s) of the task (in the Project Work Plan) that implement the change, and/or the IDs of related issues, risks or decisions. Also included any additional information/comments related to the change (activities).

The location of this artefact is found in the Appendix 1.

The Change Request Form for the project is using PM^2 *Change Request Form* template and no changes have been done to the structure, fields or values, as following:

Change Request Form	
Change Request	
Project Name	*<The change identifier. It should be numbered sequentially.>*
Change ID	*<The change identifier from the Change Log. IT links this change request to the corresponding entry in the Change Log.>*
Change Name	*<A short name for this change.>*
Identification Date	*<The date that the change has been raised. dd/mm/yyyy>*
Requested by	*<The name of the person/group requesting the change.>* *A short name (description) for the change.*
Category	Categorizes the changes into new requirement, issue or risk related, business improvement, etc.
Priority	*<Note that the priority is given from the point of view of the requestor and is not necessarily the priority that will be given to this change (if approved) after an impact analysis has been performed and the change is prioritised against other change requests or work)>.* A numeric value denoting the priority of the change. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low** **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**.
Change Description & Details	
Current Situation	*<Describe the current situation (a problem, an opportunity or a new need – why is there a need for a change in the project?>*
Desired Situation	*<Describe the desired situation. What is the goal and benefits of this change request?>*
Impact or Risks	*<Describe the impact or risks of not implementing this change. If this impact or risks can be quantified, then this can help with the analysis (cost benefit analysis) and final decision regarding the implementation (or not) and the priority of this change. >*
Out of Scope	*<Clarify what is out of the scope of this change request. This clarifies further the boundaries of the requested change and ensures that only the needed change is implemented.>*
References and Related Documents	
Link	The Location of relevant (or supporting) documents

Recommended actions for the changes of significant size (i.e. significant impact on delivery time and budget) will be discussed during the Project Steering Committee (PSC) Meeting, planned to occur monthly. The Project Steering Committee (PSC) plays the role of what is usually known as the Change Control Board (CCB) or Change Advisory Board (CAB). For substantial scope, schedule and cost changes the PSC or CCB/CAB will review the Project Charter to make sure the requested change does not go beyond the boundaries defined. For substantial cost changes the PSC will review the business case to make sure business justification is still valid.For each change, the *Change Log* should have already the following information:

- Change description and assessment;

- Action recommended, main steps, deliverables, and estimation of time, resources and cost;

- Change approved by.

For changes which do not have significant impact on delivery time and budget, the changes can be approved during the Change Control Meetings.

New or open changes will be identified/reassessed during the Project Status Meetings and the Project Manager will then update the *Change Log* with the results of the analysis/review.

For the <u>Medium, High and very High Size changes</u>, the Project Manager will report their status to the Project Steering Committee (PSC), and, when adequate, to other project stakeholders.

4.5. Communications Management

The Communications Management Plan helps to ensure that all project partners have the information they need to perform their roles throughout the project. Planning and executing project communication activities is essential for project success.

The Communications Management Plan determines how to communicate most efficiently and effectively. It defines and documents the communication items content, format, frequency, the audience and expected results.

Proactive communication is important on all projects. Communication needs to be:

- Adequate: in the right format and right content;
- Specific: for the targeted audience;
- Sufficient: providing all the necessary information;
- Concise: brief, avoiding repetition and non-important information;
- Timely: addressing points at the right time.

The communication means that are used for the project are:

- Emails;
- Documents (MS Word, PowerPoint, PDF…) in a shared folder;
- Phone call(s);
- Meetings (online and on-site).

The communication media above contains, among others:

- Minutes of Meeting (MoM);
- The Project Status Reports;
- The Quality Review Report;
- Project Work Plan (updated estimates of effort and schedule);
- Project Logs;
- Documentation archived in the project shared folder;
- Contact List;
- Thread of email communications.

Emails

Electronic correspondence will be used on a daily basis to share preliminary versions of documents that require partners' inputs, to share final versions of documents (e.g. deliverables or minutes), to schedule and prepare meetings, etc.

Emails are sent with knowledge of the PCT or PSC (using the contact list), depending on the subject (for instance, the approval of a deliverable or the quality and risks review is done by

PSC, a gender equality online seminar or a project meeting organisation is done with PCT) so that information is available to all partners.

All emails are sent with the following subject tag:

[MSA-Trough]: WP# Topic (type of communication, e.g. for approval, for information, for review, for action, update), FreeText – if needed.

Example: [MSA-Trough]: WP8 D8.1 update

Shared drive
An online shared drive will be available in the MSA-Trough website (https://www.msa-trough.eu/home/) to store working versions of artefacts and deliverables in a designed folder for the effect as well as storage of the final versions of each document.
The shared drive is accessible, upon due access grant, in the following link: https://www.msa-trough.eu/participants-area/.

Phone calls
Phone calls are used very occasionally and for informal matters. They do not require recording.

Online meetings
Online meetings are scheduled with the PCT or PSC, using videoconferencing tools, usually on Zoom, but possibly in any other video conferencing platform enabling screen sharing, if necessary.

These meetings aim to check the status of project tasks, define procedures, check documents (e.g. deliverables), etc.

To set the date and time of these meetings, the PM or someone designated by him, indicates some possible schedules and dates (in accordance with the deadlines to be met) for the meeting and sends a Doodle (scheduling tool) to the expected participants (using the contact list) so that they choose the most suitable one.
Once the date and time for the meeting have been selected, an invitation to participate in the video conference is sent by email.

On-site meetings
As defined in the Kick-off Meeting, on-site (in Évora) and online (alternatively) project meetings are scheduled every 6 months and the date is set by the partners at the previous meeting. They are hosted by UÉvora.

Contact list
The contact list includes the name and organisation of the people included in the project, their affiliation, role in the project as well as their email contacts. This information was made available after the Kick-off meeting and if there are any changes in the contacts or persons involved in the project, these changes shall be informed at the project meetings or by email.

In this section the following project meetings are described:
- Kick-off Meeting
- Project Core Team (PCT) Meeting
- Project Steering Committee (PSC) Meeting
- General Assembly Meeting
- Project-End Review Meeting.

MEETING	Kick-off Meeting
Purpose	Official kick-off of the executing phase of the project. After this meeting, the PCT is aware of the scope of the project as well as the project governance structure, the expectations of all the key project stakeholders and their roles & responsibilities must be set and all the relevant risks at the time must be identified. Project rules are defined.
Location	Defined by the Project Manager (PM). On-site, in the leader partner institution.
Frequency	Done once at project level. Date of the meeting to be defined.
Chairperson	Project Manager (PM)
Minutes by	To be defined by the Project Manager (PM).
Attendees	Business Manager (BM) Solution Provider (SP) Project Manager (PM) Project Core Team (PCT) Business Implementation Group (BIG) User Representatives (URs) Other project roles or stakeholders (optional)
Agenda Items	● Introduce the agenda; ● Introduce participants; ● Outline the goals, expectations and activities of the Planning Phase, and discuss the planning timeline; ● Present the Project Work Plan; ● Introduce the project scope statement; ● Invite the Project Owner (PO) to explain the importance of the project for the organisation and other beneficiaries; ● Discuss the governance structure, roles & responsibilities of the Project Core Team (PCT) and the Business Implementation Group (BIG); ● Clarify the expectations for the Project Core Team (PCT); ● Discuss the overall project timeline; ● Discuss the overall approach of the project; ● Discuss the project plans needed for the project; ● Discuss risks, constraints and assumptions; ● Discuss or present any project supporting tools; ● Agree on the conflict resolution process and present the escalation procedure; ● Present the Project Stakeholder Matrix; ● Agree on the team's ground rules (communication via email, meetings, phone, meeting minutes to be produced, availability, etc.); ● Allow time for any other business (questions & answers); ● Summarise the discussion (decisions, actions, and risk); ● Communicate the next steps.
Means	Meeting minutes written in MS-Word and sent by email and shared drive.

MEETING	Project Core Team (PCT) Meeting
Purpose	- Obtain commitment on the execution tasks; - Review the accomplished work and estimate time to complete + schedule; - Review risk & issues; - Assess new change requests.
Location	Online or on-site. Defined by the Project Manager (PM).
Frequency	At least, every 6 months.
Chairperson	(Functional) Team Leader
Minutes by	Minutes will be made by the PM (or delegated person).
Attendees	Project Manager (PM) All Project Core Team (PCT) members working on the project.
Agenda Items	Project status: - Current and next milestones; - Done; - To do; - Estimate Time to Completion review; - Plan reviews; - Indicators review. Process status: - Debriefing on quality assurance aspects. Risk & Issues: - Risks, issues & actions monitoring. Change management: - Assess new change requests.
Means	- Updated project plans; - Estimate Time to Complete every task in Project Work Plan; - Updated Change Log with assessment results; - Meeting minutes: written in MS-Word document and sent by email and shared drive.

MEETING	Project Steering Committee Meeting
Purpose	- Meeting with the Project Manager (PM) about the status and follow-up of the project; - This meeting has also to be held when there are: - Contractual aspects to be discussed; - Formal project approvals requested; - Commitments made.
Location	Online or on-site. Defined by Project Manager (PM).
Frequency	Whenever PSC related discussions or decisions are required (e.g. Risk Review, Quality review).
Chairperson	Project Manager (PM)
Minutes by	Project Manager (PM) or delegated person.
Attendees	Project Steering Committee (PSC)
Agenda Items	Project debriefing: - Accomplishments for the respective reporting period; - Problems encountered and actions taken; - Major points meriting management attention; - Subjects to be realised until next milestone/meeting; - Risk review;

	● Quality review; ● Evaluation of current status with respect to project scope, project budget, project end date; ● Formal approvals / Commitments / Contractual aspects.
Means	● Meeting minutes written in MS-Word, and sent by email and shared drive; ● Decision log updated.

MEETING	**General Assembly Meeting**
Purpose	Meeting about the project status, for monitoring the overall project and democratically signing-off high-level decisions using a 2/3 majority with a 2/3 quorum process. The meeting will have one representative from each partner.
Location	On-site. Defined by the Project Manager (PM).
Frequency	Every 12 months.
Chairperson	Project Manager (PM).
Minutes by	Minutes will be made by the PM (or delegated person).
Attendees	Consortium partners legal representatives Project Manager (PM)
Agenda Items	● Project status; ● Legal decisions in the project.
Means	● Meeting minutes: written in MS-Word document and sent by email and shared drive.

MEETING	**Project-End Review Meeting**
Purpose	The objectives for the Project-End Review meeting are: ● Review the project performance and main achievements; ● Discuss the overall project experience; ● Discuss if the objectives have been met and if not, why; ● Discuss challenges faced during project and the way they were addressed; ● Discuss Lessons Learned and Best Practices that might be useful for future projects.
Location	Defined by the Project Manager (PM). On-site, in the leader partner institution.
Frequency	The meeting is realized once per project.
Chairperson	Project Manager (PM)
Minutes by	To be defined by Project Manager (PM).
Attendees	Project Owner (PO) Project Manager (PM) User Representatives (URs) Project Core Team (PCT) Project Support Officer (PSO) (if applicable) Project Quality Assurance (PQA) (if applicable)
Agenda Items	● Review the project performance and achievements; ● Evaluate project relevant facts (budget & work history, milestones & timing history, technical & methodological approaches used); ● Access the Lessons learned;

	● Business Implementation plan (change management, how to achieve desired outcomes and benefits).
Means	Project-End Report in MS-Word and sent by email and shared drive, and submitted in the EC portal.

Reports are produced to show the status of the project or a particular work package or the collected required measurements, etc. This section should document when the reports will be delivered and the standard format for the project reports.

The following reports are described in this section:

- Project Interim Reports
- Project Final Report (M42)

REPORT	**Project Interim Report**
Purpose	The Project Interim Report provides summary information regarding the overall project performance, including one page with traffic light visualisation of the major project parameters as cost, schedule, scope/changes, risks, issues. This document reports on the status of important milestones for the current reporting period and provides forecasts for future performing periods. The report follows a template provided by the PM.
Frequency	The elaboration of this report will follow the frequency defined for the Project.
Author	Project Manager (PM)
Distributed to	Project Steering Committee (PSC) Project Owner (PO) Business Manager (BM)
Media	Word Document
Reference to	*<Please reference to the document.>*

REPORT	**Project Final Report**
Purpose	The Project Final Report summarises project experience. The evaluation of the major project achievements, parameters, best practices, lessons learned, pitfalls and solutions to problems are documented in this report. The report follows a template provided by the PM.
Frequency	This report is realised once, during the Closing Phase.
Author	Project Manager (PM)
Distributed to	Project Steering Committee (PSC) Project Owner (PO) Business Manager (BM)
Media	Word Document
Reference to	*<Please reference to the document.>*

4.6. Deliverables Acceptance Management

This project will follow the PM² quality management procedures as defined in the *Quality Management Plan* in order to increase the chances that the project deliverable will meet the acceptance criteria as defined in this plan.

Deliverables acceptance (in the PM² context) includes the following steps:

● Define Acceptance Criteria;

● Perform Acceptance Activities;

● Accept (provisional/final) or Reject Deliverable.

Step 1: Define Acceptance Criteria & Activities

The purpose of this step is to define the acceptance criteria for each one of the project deliverables (i.e. the requirements that need to be met before deliverables can be accepted by the Client side).

This includes defining the specific metrics (and tolerances) to be evaluated, the acceptance activities to be performed and the processes, tools and techniques on how to implement the acceptance procedure.

The acceptance criteria are derived from the project objectives, needs, scope and features, deliverables, quality requirements and expectations as well as available resources (as defined in the *Risk and Quality Management Plan* and related artefacts).

Step 2: Perform Acceptance Activities

The purpose of this step is to support the verification of deliverables compliance with the acceptance criteria. The deliverables acceptance activities are described in this plan and aligned with the overall project approach (as defined in the *Risk and Quality Management Plan*). These activities are further detailed, scheduled, budgeted, and assigned in the Project Work Plan.

The results of the deliverables acceptance activities are documented in the relevant reports and logs:

● in the Deliverables Acceptance Checklist, upon presentation of the Deliverable to the (PSC) by the (PCT);
● in the Deliverable Acceptance Note, upon assessment by the PSC and decision of acceptance for submission or request for revision by the PCT.

Step 3: Accept or Reject Deliverables (provisional/final)

The purpose of this step is to obtain (formal/final) approval from the project client (i.e. PO) for each project deliverable. It comprises the verification if deliverables meet the predefined objectives and set of criteria defined in this Deliverables Acceptance Plan, so that the PO can formally accept them.

Project deliverables may be provisionally accepted by the client, when for example non-critical acceptance criteria have been only partially met, as long as they are properly documented and there is a plan for addressing them before or very early in the closing phase of the project).

In the case where deliverables fail to meet acceptance criteria they are rejected. This is considered to be a project issue (see issue management). After the resolution of the issue(s), deliverable(s) are re-submitted for deliverables acceptance.

This process is handled electronically in the project Participants Portal, upon electronic submission by the (PC) to the (PO) and ensuing acceptance or request for revision by the (BM).

4.7. Data Management

The Data Management Plan (DMP - *Deliverable 8.1*) describes the data management life cycle for the data to be collected, processed and/or generated during the project. As part of making data findable, accessible, interoperable and reusable (FAIR) the DMP include information on: the handling of data during and after the end of the project;what data will be collected, processed and/or generated; which methodology and standards will be applied; whether data will be shared/made open access and how data will be curated and preserved (including after the end of the project).

Considering the potential heterogeneity of the data produced in a project, different data categories might be defined, according to parameters such as purpose, and data origin, namely: experimental datasets, publications (including Open Access publication of scientific articles), experimental layouts, project deliverables, IP protection, personal data and external data.

Specifically regarding Open Access, the MSA-Trough project will use as the main channel the Open Research Europe platform. This platform provides a high quality peer-reviewed venue to publish the results of the MSA-Trough project in open access and it is in full compliance with the open access policies of the European Commission. The publishing of results on Open Access will be mandatory during the project's lifetime, considering that previous assessment of potential conflicts of interest (data protection, potential IP, etc.) are carried out before the submission of works.

4.8. DEC Management

Communication, Dissemination and Exploitation (DEC) is an important part of the Horizon Europe projects that all partners must take part in. Communicating European projects should aim at how research and innovation are contributing to an "Innovation Union".

Aiming at maximising MSA-Trough impact, a set of different Dissemination, Exploitation and Communication (DEC) activities is foreseen along the project. Each of these activities is classified in terms of its nature[4]:

● Dissemination activities (making results public): targeting not only the scientific community but also the members of the 4Helix which might learn/use project results in the advancement of the State of the Art (policy makers, industry, civil society), these actions rely in FAIR and Open Access principles and take place from the moment the project starts producing results and go until the project end. Examples of such activities include e.g. scientific publications or communications or experimental datasets;

● Exploitation activities (make concrete use of results): targeting the stakeholders which might take part in the exploitation of the project results towards the foreseeable outcomes (e.g. industry in the development of new products and/or services, policymakers in the definition of new regulations, value chain actors in the implementation of new business

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[4] "PROPOSAL WRITING FOR RESEARCH AND INNOVATION PROJECTS", training materials by EUROPEAN ACADEMY

models), these actions might rely in the Protection of Intellectual Property and take place from the end of the project (or as soon as there are exploitable results). Examples of such activities include e.g. roadmaps, patents, prototypes, regulatory recommendations, experimental datasets;

●   Communication activities (promote actions and results): targeting a widespread audience (stakeholders, citizens) and at engaging with stakeholders, experts, market and public as to raise awareness and show the success of European collaboration, these actions rely on public media (social media, web-based communication, TV, radio, newspapers) and take place from the moment the project starts until its end. Examples of such activities include e.g. website, newsletters, TV or radio interviews or newspaper articles.

Dissemination and communication activities are oriented to show the attractiveness of the results achieved and their impact towards a target audience composed of key stakeholders.

Exploitation actions establish the main pillars for a future market uptake plan of the results generated in the project. The exploitation strategy will identify technical choices towards the most promising directions, thus maximising the opportunities for innovation and business.

The coherent implementation of these impact maximising measures follows the deliverables D7.2 Plan for dissemination and exploitation including communication activities and D7.5 IPR & Exploitation Plan. To be followed along the project, these plans describe Dissemination, Exploitation and Communication activities and procedures, as well as a list of all related documents and tools used in the framework of their implementation.

APPENDIX 1: REFERENCES AND RELATED DOCUMENTS

ID	Reference or Related Document	Source or Link/Location
1	Project folder <Not yet available>	*https://www.msa-trough.eu/participants-area/*
2	Risk Log <MSA-Trough_LOGS.18-12-2023.v1.xlsx>	*https://www.msa-trough.eu/participants-area/*
3	Issue Log <MSA-Trough_LOGS.18-12-2023.v1.xlsx>	*https://www.msa-trough.eu/participants-area/*
4	Quality Log <[28.I.PM2.v3].Quality_Review_Checklist.MSA-Trough.18-12-2023.v1.0>	*https://www.msa-trough.eu/participants-area/*
5	Decision Log <[28.I.PM2.v3].Quality_Review_Checklist.MSA-Trough.18-12-2023.v1.0>	*https://www.msa-trough.eu/participants-area/*
6	Change Log <[28.I.PM2.v3].Quality_Review_Checklist.MSA-Trough.18-12-2023.v1.0>	*https://www.msa-trough.eu/participants-area/*
7	Deliverables Acceptance Plan <[08.I.PM2.v3].Deliverables_Acceptance_Plan.MSA-Trough.21-11-2023.v.1>	*https://www.msa-trough.eu/participants-area/*
8	Deliverables Acceptance checklist <[29.I.PM2.v3].Deliverables_Acceptance_Checklist.MSA-Trough.18-12-2023.v1.0>	*https://www.msa-trough.eu/participants-area/*
9	Deliverables Acceptance note <[29.I.PM2.v3].Deliverables_Acceptance_Checklist.MSA-Trough.18-12-2023.v1.0>	*https://www.msa-trough.eu/participants-area/*
10	Project's Contacts List <Contact List MSA-Trough>	*https://www.msa-trough.eu/participants-area/*
11	MSA-Trough Scope & Success Criteria <MSA-Trough_Scope and Success Criteria_v1>	*https://www.msa-trough.eu/participants-area/*
12	Data Management Plan <Not yet available>	*https://www.msa-trough.eu/participants-area/*
13	Change Request form <[21.I.PM2.v3].Change_Request_Form.MSA-Trough.18-12-2023.v0.1>	*https://www.msa-trough.eu/participants-area/*

ID	Reference or Related Document	Source or Link/Location
14	Plan for dissemination and exploitation including communication activities <Not yet available>	*https://www.msa-trough.eu/participants-area/*
15	IPR & Exploitation Plan <Not yet available>	*https://www.msa-trough.eu/participants-area/*
16	Consortium Agreement <DESCA_HorizonEurope_MSA Trough_vFinal_SIGNED>	*https://www.msa-trough.eu/participants-area/*
17	Grant Agreement <Grant Agreement - GAP-101122276-1.pdf>	*https://www.msa-trough.eu/participants-area/*