

Work package 1

Deliverable 1.1

i-MASTER project management plan

D1.1 i-MASTER project management plan

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1 Introduction

This document is the deliverable “D1.1 – Project Management Plan” of the EU Horizon Europe Research and Innovation project “Integrating Adaptive Learning in Maritime Simulator-Based Education and Training with Intelligent Learning System” (hereinafter also referred to as “i-MASTER”, project number: 101060107).

This document details the beneficiaries and members of the i-MASTER consortium, defines the responsibilities and roles of all project participants, and specifies the general procedures and management tools that are implemented during the project.

This deliverable is closely aligned with the Grant Agreement, Description of the Action (DoA) Part B and Consortium Agreement of i-MASTER.

The project participants, as signatories of the Grant Agreement, are fully responsible towards the granting authority for implementing the project tasks and deliverables as described in the DoA Part B and for complying with all its obligations. The purpose of this document is to provide a detailed plan for proper management of the scientific, administrative, and supporting processes necessary to the successful implementation of the i-MASTER project.

The project management plan is not a static document but will be continuously checked, updated and improved to ensure its relevance, accuracy and validity for the project implementation and control. The project coordinator is responsible for monitoring the project implementation and for maintaining it as well as subsequent revisions to the project management plan, however all project participants shall monitor and can request to the updates of the project management plan to ensure effective project administration and successful project completion.

1.1 Overview of the i-MASTER project

The development and application of Artificial Intelligence (AI) and Machine Learning (ML) have shown great potentials to improve and transform many aspects of modern industries and society at large.

In educational context, the application of AI and ML fosters educational innovation and holds great promises to open up many future avenues of learning (OECD, 2021). The education industry has been using ML techniques for numerous and varied applications to support the success of the students and offered promising opportunities such as designing tailored learning pathways, providing virtual assistance, enabling real-time and predictive assessment of students' learning outcomes that cannot be experienced in traditional educational process.

i-MASTER explores how we can effectively integrate emerging new technologies into maritime training practices, and to gain a critical understanding regarding the opportunities and problems of using these technologies in this sector. We hope to support the current maritime education and training systems with an AI enabled learning platform that could be effectively used to augment and extend teacher's capabilities and allow for a more engaging, personalized, and flexible ways of learning.

The primary objective of i-MASTER project is to study and develop an Intelligent Learning System (ILS) with maritime learning analytics and adaptive learning function for students engaged in both remote and on-site maritime simulator-based education and training.

The i-MASTER project is coordinated by UiT-The Arctic University of Norway. The Research Consortium includes University of Gothenburg (Sweden), Fraunhofer CML (Germany), Swedish National Road and Transport Research Institute (VTI) (Sweden), TERP Global (Norway), University of South-eastern Norway (Norway), Novia University of Applied Sciences (Aboa Mare Maritime Academy and Training Centre) (Finland), Vienna University of Economics and Business (Austria).

1.2 Research context

The research project is contextualized in the maritime industry. It is an industry that has great significance towards the global supply chain and world economy, with over 80% of the volume of world trade in goods is carried by sea (UNCTAD, 2021). High-quality vocational education and training is the cornerstone of effective youth transition into the European labour market and to enhance professional development and advancement in society. During the Covid-19 pandemic period, the lockdowns and distancing measures have given many challenges to the maritime simulator-based training and education sessions and created difficulties with regards to training access, skill development, certification, and competency examination. In addition to the backlog in training, the rapid development of related online learning has also raised several issues in terms of current and future teaching methodologies and methods.

By accounting for the needs, knowledge gaps and challenges faced by today's maritime education and training sector, the i-MASTER project has been developed to integrate emerging technologies in maritime education and training to study and develop an innovative Intelligent Learning System with learning analytics to facilitate learning during both remote and on-site maritime simulator-based education and training. The i-MASTER research aims to enhance the effectiveness and accessibility of simulator-based education and further improve safety of maritime operations in the future.



Figure 1. Maritime industry

1.3 Enabling objectives

To achieve the primary objective, the project has established the following enabling objectives (EO):

EO 1: Analyse the state-of-the-art intelligent and adaptive learning tools and technologies used in various industrial domains and explore the potentials, benefits, and constraints of their applications in the maritime simulator-based education and training.

EO 2: Conduct pedagogical planning of the learning pathways and ship navigation competence mapping for students involved in maritime simulator-based education and training to support theoretically informed technology integration.

EO 3: Determine the data requirements and system architecture of the Intelligent Learning System (ILS) with a clear commercial focus.

EO 4: Develop testable prototypes of the ILS system with the current remote ship simulation technologies to enable remote maritime simulation activities and AI-assisted home-based simulator training.

EO 5: Extend the ILS system capabilities by integrating the ILS with the information outputs from the full-mission ship simulators and eye tracking devices to enable real-time assessment of student's operational actions and visual attention.

EO 6: Experimentally evaluate the system performance and effectiveness of the intelligent learning algorithms for student learning and skill acquisition during both remote and physical simulator training activities.

EO 7: Maximize the potential impact of the innovation for learners, teachers, and education institutions through various impact-maximization activities at national, European, and international arenas.

2 Consortium composition

Given the concurrent developments in AI and ML, i-MASTER is timely for the maritime sector, and to inform boarder trends within education.

The Project Consortium is comprised of eight organizations from five nations with a diverse range of expertise and experience that relates to the maritime sector.

Table 1. Consortium composition

Participant No.	Participant organization name	Country
1 (Project coordinator)	University of Tromsø - The Arctic University of Norway	Norway
2	University of Gothenburg	Sweden
3	Fraunhofer CML	Germany
4	Swedish National Road and Transport Research Institute	Sweden
5	TERP Global	Norway
6	University of South-Eastern Norway	Norway
7	Novia University of Applied Sciences (Aboa Mare Maritime Academy and Training Centre)	Finland
8	Vienna University of Economics and Business	Austria

The project coordinator acts as the intermediary for communications between the project consortium and the Commission. This task mainly involves correspondence with the Project Officer/Financial Officer on matters revolving around the deliverables and project related inquiries raised by the consortium, as well as preparation and submission of periodic reports and Financial Statements (FS) for the consortium.

2.1 Description of consortium members

University of Tromsø (UiT) – The Arctic University of Norway, founded in 1968, is northernmost university in the world and a unique learning destination for students and researchers. UiT takes special interest in research related to emerging technologies, climate change, arctic science, environmental threats, as well as maritime research that supports sustainable development. UiT has a strong nautical and machine learning group with significant infrastructure including high-end full mission ship simulation technologies, UiT Onshore Operation Centre, virtual reality headsets, and training ship. These equipment and facilities support maritime education and training as well as various types of research activities.

Vienna University of Economics and Business (WU), founded in 1898, is one of the largest educational institutions dedicated to business and economics, business law, and social sciences. WU is a key contributor for the multi-dimensional impact analysis of the i-MASTER intelligent learning system (ILS). WU has a long legacy of online learning and information platform development with LEARN, one of the most-frequented university eLearning platforms in the world. The Institute for Transport and Logistics Management (ITL) at WU focuses on education and research services within the field of transport, logistics, and supply chain management. It offers a wide range of different consulting services for its customers - from e-business, optimization of business processes or the implementation of innovative solutions to vocational management training in public and private transport organizations. ITL develops innovative solutions in the transport, logistics and supply chain context.

TERP AS is a Norwegian company in adaptive learning solutions in the maritime domain. TERP's goal is to make knowledge attainable through AI-powered, adaptive learning technologies to ensure excellence in education and professional skill training. The company has experience in ML applications and adaptive learning solutions on mobile app. Their Adaptive Books (Abooks) can work offline and enable the students to study on

personal smartphones whilst having a strong cost-advantage over conventional learning materials.

University of Gothenburg (UGOT) is one of the largest universities in Northern Europe. It is the most wide-ranging and versatile university in Sweden and engaged in numerous collaborative projects and partnerships all over the world. In Horizon 2020, UGOT has become a beneficiary in 164 projects, including 26 European Research Council projects. UGOT's Department of Applied IT (AIT) hosts the Gothenburg Knowledge Lab (GKL), an institution for research that provides equipment and knowledge on generating, representing and analysing data. Equipment for data collection includes video cameras, microphones, audio recorders, eye-tracking devices, virtual reality headsets, and software for tracing data from digital systems. GKL also provides specialized software for analysing data and the infrastructure for storing, archiving, indexing and sharing data between the different members of a research project. AIT is situated in an intensive technological innovation cluster on Lindholmen campus, which has the Sweden's largest maritime simulator centre for education and research. There are nine ship simulators, including bridge simulators for training navigation and teamwork, a nautical operations studio and a Dynamic Positioning (DP) simulator for advanced operations involving precision navigation.

With its focus on developing the key technologies that are vital for the future and enabling the commercial exploitation of this work by business and industry, The Fraunhofer Centre for Maritime Logistics and Services (CML) develops innovative solutions for the maritime sector and the maritime supply chain. The focus is on solutions for end-to-end digitalization and process automation, service concepts, and AI-supported data analysis, as well as autonomous maritime systems and sustainable shipping. The innovative concepts are tested and improved at the CML through simulation, models and in real operation. Fraunhofer CML has been engaged in a variety of relevant research projects on maritime training, simulation, AR and AI applicability as well as machine learning techniques within maritime datasets. Fraunhofer CML currently owns and operates three full-mission ship handling simulator bridges as research simulators, with the ability to incorporate within these a range of interface formats.

The Swedish National Road and Transport Research Institute (VTI) is an internationally recognized research institute in the transport sector, whose principal task is to conduct research related to infrastructure, traffic, transport, and mobility users. VTI is an assignment-based authority under the Swedish Ministry of Infrastructure, dedicated to continuously developing knowledge pertinent to the transport sector and in this way actively contributing to achieving the Swedish transport policy objectives. VTI conducts commissioned research in an interdisciplinary organization, and also undertakes investigations, consulting services, and various measurement and testing services. The institute has a wide range of advanced research equipment and world-class infrastructure.

Aboa Mare, Novia's Maritime Academy, is specialized in maritime simulator training, providing Bachelor and Master-level education as well as short courses to students, shipping companies, authorities, and maritime industrial stakeholders. The Aboa Mare simulator suite consists of ten ship bridge simulators and a wide range of other maritime simulator training solutions and has been upgraded on a regular basis to meet future challenges. Aboa Mare has strong simulator training know-how and expertise and its simulator instructors are well trained in pedagogy. The research team combines both strong knowledge of maritime operations and development expertise for structuring, testing and validating simulation tools and intelligent solutions for shipping.

University of South-Eastern Norway (USN) is the largest maritime higher education institution in Norway. USN is responsible for the Norwegian government project MARKOM 2020 to professionalize maritime education, coordinating Norwegian regions and increasing recruitment and quality of maritime R&D. The Department of Maritime Operations engaged in the i-MASTER project has experience in national, EU and international research projects on integrating emerging technologies into maritime education and training. Notable projects are ENHANCE, an EU Horizon 2020 project on enhancing human performance in complex socio-technical systems, InnoTraining, a national research project on innovating maritime training simulators using VR and AR, a research project on the OpenAR framework for augmented reality advanced maritime operations, and the "Towards Improved Training and Performance" project funded by the Research Council of Norway and the German Academic Exchange Service.

3 Project workplan and schedules

The i-MASTER project will be delivered and completed in 48 calendar months from 1st September 2022 to 31st August 2026. The project comprises three phases with eight corresponding and interdependent Work Packages (WPs), as described in the following Table 2, that designed to address and answer the Research Questions and ultimately accomplish the primary objective.

Table 2. i-MASTER project work packages

No	Work Package Title	Lead Participant	Person-Months	Start Month	End month
WP1	Project management, communication and coordination	UIT	37	M01	M48
WP2	Review of the state-of-the-art ILS technologies and KPI development	VTI	43	M01	M08
WP3	Development of ship simulation scenarios, learning resources and performance standards	USN	45	M07	M12
WP4	Maritime learning analytics dashboard development, experimental testing and expert validation	Fraunhofer	55	M11	M17
WP5	Testable prototypes of the Intelligent Learning System (ILS)	UIT	63	M15	M24
WP6	Intelligent Learning System (ILS) advancement and integration	TERP	57	M23	M32
WP7	Implementation & Evaluation	AMA	59	M30	M40
WP8	Dissemination, exploitation, and impact-maximization activities	WU	33	M05	M48

The i-MASTER project has a waterfall structure but adopts an agile approach to project management by breaking it up into several phases and facilitate constantly collaboration with all stakeholders and continuously improve through planning, executing, and evaluating at every development phase. As illustrated in the following figure 2, agile approach has been adopted inside a larger waterfall WP structure to allow for quicker innovation of some parts alongside fixed schedules for others.

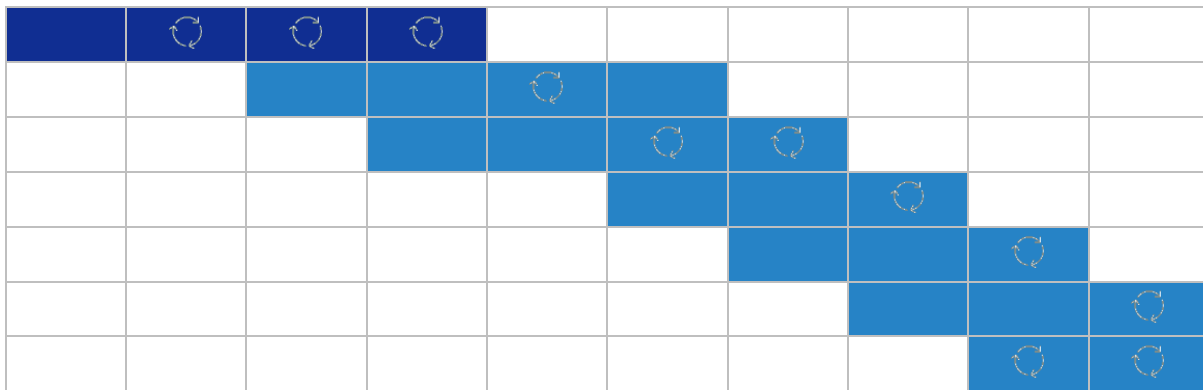


Figure 2. i-MASTER project management approach (simplified version)

Waterfall is a structured and sequential project management approach and consists of several discrete phases. This has the advantage of giving the project a well-defined workflow and clear responsibility structure. Each project participant can see when they're expected to do their part and what happens if there's a delay. It shows the project progress simply and makes it easy to determine if a project is moving forward on schedule. Agile project management methodology, on the other hand, focuses on 'agility' and 'adaptability' and project phases are arranged in iterations, this gives the project the ability to respond to the changing requirements. Agile methodology is one of the popular approaches to project management due to its flexibility, adaptability, and high level of stakeholder engagement (Rasnacis & Berzisa, 2017).

Both approaches have their advantages and disadvantages. Waterfall is a rigid project management methodology that takes a well-defined project process to completion through a series of tasks, activities, and deliverables. This rigid management system may not allow for revisiting a prior phase easily due to the resource and time constraints. Agile project management enables the participants to better respond to changes and ensure that what is being worked on is well-connected to and synchronized with the end-user alongside the project lifecycle.

A blended use of both has been considered in i-MASTER project management to not only give the project a structured collaborative workflow by dividing the project development cycle into short-term sprints, but also enables flexibility and frequent stakeholder and subject matter expert engagement within all WPs and it also ensures feedback can be acted on quickly and that responsive changes can be made at each stage of project development.

All project partners have staff effort allocated in project management and dissemination/communication WPs as well as in all other research and innovation WPs.

All project partners are free to communicate to and share information to any other partners within the project and a common communication platform (Microsoft Teams) has been established that ensures quick and accurate distribution of essential information related to the project. WP leaders have been encouraged to use Teams as the communication platform and file portal.

3.1 Project task and deliverable management

The project has 48 deliverables to be submitted by the end of M48. The deliverable details are given in the tables below.

WP1 is led by UiT-The Arctic University of Norway and it runs throughout the entire duration of the project. WP1 is to coordinate all project management activities across the i-MASTER consortium. The coordinator team manages 9 deliverables in WP1 as detailed below.

Table 3. Deliverables in WP1

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D1	D1.1	Project management plan	1	UIT	R	PU	M02
D2	D1.2	i-MASTER gender equality plan	1	UGOT	R	PU	M02
D3	D1.3	Communication and coordination plan	1	WU	R	PU	M02
D4	D1.4	Data Management Plan (DMP)	1	VTI	R	PU	M06
D5	D1.5	Research practice, quality assurance and risk management plan	1	USN	R	PU	M06
D6	D1.6	i-MASTER project website and social media platforms	1	UIT	DEC	PU	M02-48
D7	D1.7	Organization of the kick-off, workshops, research and industrial events	1	UIT	DEC	PU	M12
D8	D1.8	IPR strategy development and implementation	1	UIT	R	PU	M12
D9	D1.9	Interim & end of project documents	1	UIT	R	PU	M24, M48

UIT and VTI define the data management principles in collaboration with the steering committee and ensure the research partners adhere to the agreed guidelines.

Deliverables in WP2

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D10	D2.1	State-of-the-art analysis report	2	VTI	R	PU	M05
D11	D2.2	Navigation competency mapping report (detailing the knowledge, skills, and proficiency requirement for ship navigation from basics to advanced level)	2	Fraunhofer	R	PU	M06
D12	D2.3	KPI analysis for the evaluation of navigation competence	2	VTI	R	PU	M07
D13	D2.4	KPI measurement methodology, frequency and data needs report	2	USN	R	SEN	M08
D14	D2.5	Research publications on systemized performance assessment for maritime navigation	2	UIT	DEC	PU	M08

WP2 is led by VTI and 5 deliverables are managed in this WP. The WP2 leader provides the deliverables to the coordinator and he/she will then submit the deliverables by uploading them to SyGMa. The project officer will be additionally informed through email. WP2 leader monitors the progress of the WP against time and resource allocations, ensure that the work package fulfils the objectives listed as milestones and deliverables.

Deliverables in WP3

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D15	D3.1	Consolidation of learning resources for the developed training scenarios	3	USN	R	SEN	M09
D16	D3.2	Tutoring or instructional strategies for the developed training scenarios	3	AMA	R	SEN	M10
D17	D3.3	User requirement and needs analysis for learning analytics and visualization dashboard	3	WU	R	PU	M10
D18	D3.4	Architecture of the i-MASTER learning analytics and ILS	3	TERP	OTHER	SEN	M11
D19	D3.5	Validation of the concept and components of the technology report	3	TERP	R	SEN	M12
D20	D3.6	Research publications on maritime learning analytics and adaptive instructional design strategies	3	USN	DEC	PU	M12
D21	D3.7	Policy Brief	3	UIT	R	PU	M12

WP3 is led by USN and 7 deliverables are managed in this WP. WP3 defines the training scenarios that can be built into the learning analytics and adaptive learning functions. The parameters that can be used to measure the performance during the simulation exercises will also be studied and described in this WP.

Deliverables in WP4

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D22	D4.1	Maritime learning analytics algorithms and visualization dashboard	4	Fraunhofer	DEM	SEN	M14
D23	D4.2	Usability testing and evaluation of the learning analytics for remote maritime simulation	4	USN	R	PU	M16
D24	D4.3	Usability testing and evaluation of the learning analytics for on-site maritime simulation	4	USN	R	PU	M16
D25	D4.4	Expert validation report regarding the validity and reliability of the developed maritime learning analytics system for remote and on-site simulator-based education	4	AMA	R	PU	M17
D26	D4.5	Research publications on implementation process of a learning analytics system in maritime education and training	4	UIT	DEC	PU	M17

WP4 is led by Fraunhofer and 5 deliverables are managed in this WP. WP4 will initiate the development of the maritime learning analytics algorithms and visualization dashboard.

User needs and requirements will be incorporated to ensure their coherency with the requirements and needs.

Deliverables in WP5

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D27	D5.1	Maritime Intelligent Learning System (ILS) software development	5	TERP	OTHER	SEN	M18
D28	D5.2	Adaptive learning function specification	5	TERP	R	PU	M21
D29	D5.3	Testable prototype of the maritime ILS for remote (desktop) maritime simulations	5	TERP	DEM	SEN	M24
D30	D5.4	Research publications regarding the evaluation and validation process of the algorithms for adaptive learning process for maritime simulator training	5	USN	DEC	PU	M24

WP5 is led by UIT and 4 deliverables are managed in this WP in close collaboration with TERP and USN. WP5 will build the adaptive learning functions and testable ILS system prototype to be used in simulator-based training and educational process.

Deliverables in WP6

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D31	D6.1	Prototype assessment and usability testing of the maritime ILS for on-site maritime simulation	6	Fraunhofer	R	PU	M27
D32	D6.2	ILS technical specification for on-site training with full mission ship simulators (technical documentation, including glossary, model and architecture)	6	Fraunhofer	R	PU	M31
D33	D6.3	User experience report	6	UGOT	R	PU	M32
D34	D6.4	System functional verification and performance evaluation report	6	TERP	R	SEN	M32
D35	D6.5	Scientific publications on the development and implementation of performance metrics for automated evaluation of seafarer's performance under simulator-based training	6	VTI	DEC	PU	M32

WP6 is led by TERP and 5 deliverables are managed in this WP. The learning system will be further advanced in this work package. WP6 leader monitors the progress of the WP

against time and resource allocations, ensure that the work package fulfils the objectives listed as milestones and deliverables.

Deliverables in WP7

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D36	D7.1	Large-scale demonstration programme	7	AMA	DEM	PU	M36
D37	D7.2	Component-wise evaluation of the maritime intelligent learning system	7	AMA	R	PU	M38
D38	D7.3	Research publications on pedagogical guideline regarding the implementation of AI-assisted intelligent learning system in maritime simulator-based education and training	7	UGOT	DEC	PU	M40
D39	D7.4	Multi-dimensional impact analysis regarding the implementation of maritime learning analytics and intelligent learning system in higher education and Vocational Education And Training (VET)	7	WU	R	PU	M39
D40	D7.5	Advanced maritime training and assessment package using i-MASTER	7	UGOT	R	PU	M40

WP7 is led by AMA and 5 deliverables are managed in this WP. The WP7 leader provides the deliverables to the coordinator and he/she will then submit the deliverables by uploading them to SyGMa. WP7 leader monitors the progress of the WP against time and resource allocations, ensure that the work package fulfils the objectives listed as milestones and deliverables.

Deliverables in WP8

No.	WP No.	Name	WP No.	Lead	Type	Diss. Level	Delivery Date
D41	D8.1	i-MASTER Clustering, Dissemination, Exploitation, and Communication (DEC) plan	8	WU	R	PU	M06
D42	D8.2	Gender equality campaign: Empowering women and girls in the maritime education sector	8	UGOT	DEC	PU	M39
D43	D8.3	Presentations at international conferences and meetings of professional associations	8	VTI	DEC	PU	M14, M28, M36, M42
D44	D8.4	i-MASTER system development workshop and clustering activity	8	USN	DEC	PU	M12, M17
D45	D8.5	Dissemination materials (online tools and printed materials)	8	AMA	DEC	PU	M08, M39
D46	D8.6	i-MASTER showcase and instructor training event	8	USN	DEC	PU	M40

D47	D8.7	i-MASTER knowledge sharing seminar	8	UIT	DEC	PU	M46
D48	D8.8	i-MASTER clustering, dissemination, exploitation, and communication final report	8	WU	R	PU	M48

The project management and dissemination of results will be integrated throughout the progress of i-MASTER and realized through impact-maximization activities in WP8. WP8 is led by WU and 8 deliverables are managed in this WP.

The assignments of deliverable leader(s) have been determined in advance for the entire project duration and are collected by the coordinator in collaboration with the WP leader. All deliverables will be introduced during consortium meeting and uploaded on the common platform on Microsoft teams for feedback.

Some deliverables have more than one release date because they will be updated several times during the project duration.

3.2 Milestone management

The following table presents an overview of the major milestones set within i-MASTER. They constitute achievement and control points, where an essential project outcome will have been achieved. The timely achievement of the listed milestones will indicate the proper progress of the project.

Table 4. List of milestones

No.	Milestone name	Related WP(s)	Due date	Means of verification
MS1	Project start	WP1	M01	Project governance principles, risk management strategy, DMP, and DEC plan are presented and approved by the Steering Committee.
MS2	Functional requirements are specified ILS technologies and KPIs are established.	WP2	M08	Functional requirements specification report is approved by the Steering Committee.
MS3	Simulation scenarios, learning resources and performance standards are established.	WP3	M12	Simulation scenarios, learning resources and performance standards is approved by the Steering Committee.
MS4	Maritime learning analytics dashboard established, experimental testing and expert validation have done.	WP4	M17	Performance of maritime learning analytics dashboard has been validated, and approval by experts is secured.
MS5	Testable prototypes of the intelligent learning system (ILS) are established.	WP5	M24	Testable prototypes of the ILS prototypes have been validated in real-world environment using project KPIs.

MS6	ILS advancement and integration are established	WP6	M32	Advanced testable prototypes of the ILS prototypes have been validated in real-world environment using project KPIs.
MS7	Large-scale demonstration programme completed.	WP7	M41	Demonstration and impact analysis report is approved by the Steering Committee and disseminated via project and partner COMMS channels.
MS8	Project ends	WP8	M48	The project objectives have been met to a satisfactory level and the EC project officer confirms.

i-MASTER has eight milestones to be used as reference points that mark a significant event within a project. As illustrated in the following figure 3, milestones correspond to the achievement of each WP, allowing the next phase of the work to begin.

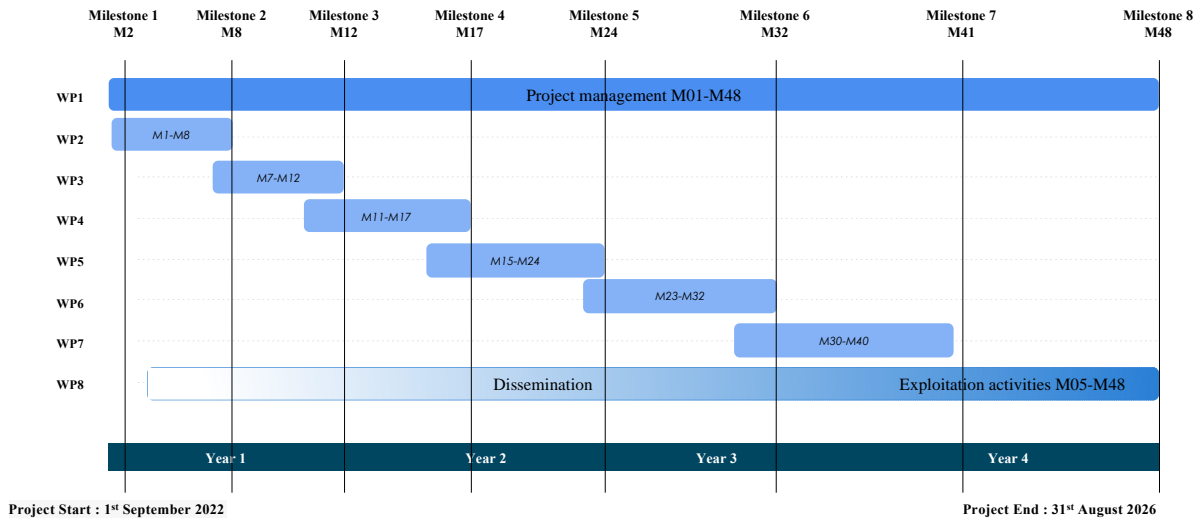


Figure 3. Milestone and work packages

4 Project organization and management structure

The Steering Committee has the overall responsibility for, and authority to, control the preparation, conduct and completion of all research and administrative activities in i-MASTER. The Steering Committee is comprised of one representative from each of the consortium partners and chaired by the coordinator.

The Steering Committee has a range of pre-determined tasks:

- provide support, guidance, and oversight of the research progress,
- ensure the research partners adhere to the agreed research content and ethical guideline,
- optimize the quality, validity and relevance of the research and innovation,
- review and approve changes made to research activities, partnership, project resource plan, schedules, scope, goals, cost estimates, etc.,
- identify, monitor, assess, evaluate, and control any project risks or deviations.
- The Steering Committee members are duly authorized to deliberate, negotiate, and decide on all matters related to the i-MASTER project as specified in the Consortium Agreement (CA), and all partners and research teams must abide to the decisions taken by the Steering Committee. The Steering Committee meets every one year during the project period to review the progress made and the actions for coming period.

Each partner undertakes to take part in the efficient implementation of the project and to cooperate, perform and fulfill, promptly and on time, all of its obligations under the GA and the CA. Each partner will inform the coordinator, who will in turn inform the Granting authority and other partners, of any significant information, problems, or delay likely to affect the project.

4.1 Roles and Responsibilities

The roles and responsibilities of project steering committee, WP leader and project coordinator are specified in the table 5 below.

Table 5. Role and responsibilities

Category	Responsibility	Roles and Bodies
Overall project management	Review and approve changes made to research activities, partnership, project resource plan, schedules, scope, goals, cost estimates, etc.	Steering committee
Project coordination	Overall coordination of the project; consortium and EC communication	Project Coordinator team
Financial and day-to-day management	Supervision of deliverables preparation and submission, organization of project meetings and reviews, control overall project expenditure, cost report collection, check and payment	All project partners
Scientific and technical management for tasks and activities in WPs	Coordination of operative efforts in WPs, responsible for scientific, technical decisions	WP Leaders
Consultancy, Exploitation, Dissemination	Monitoring, consultancy feedback, exploitation and dissemination of the project results within and outside of the consortium.	WP leaders Advisory Board (AB) (if formulated)

5 Consortium communication procedures

To ensure effective and efficient implementation and progression of the i-MASTER activities, a project management structure, shown in the following figure 3, has been developed and described in the DoA Part B.

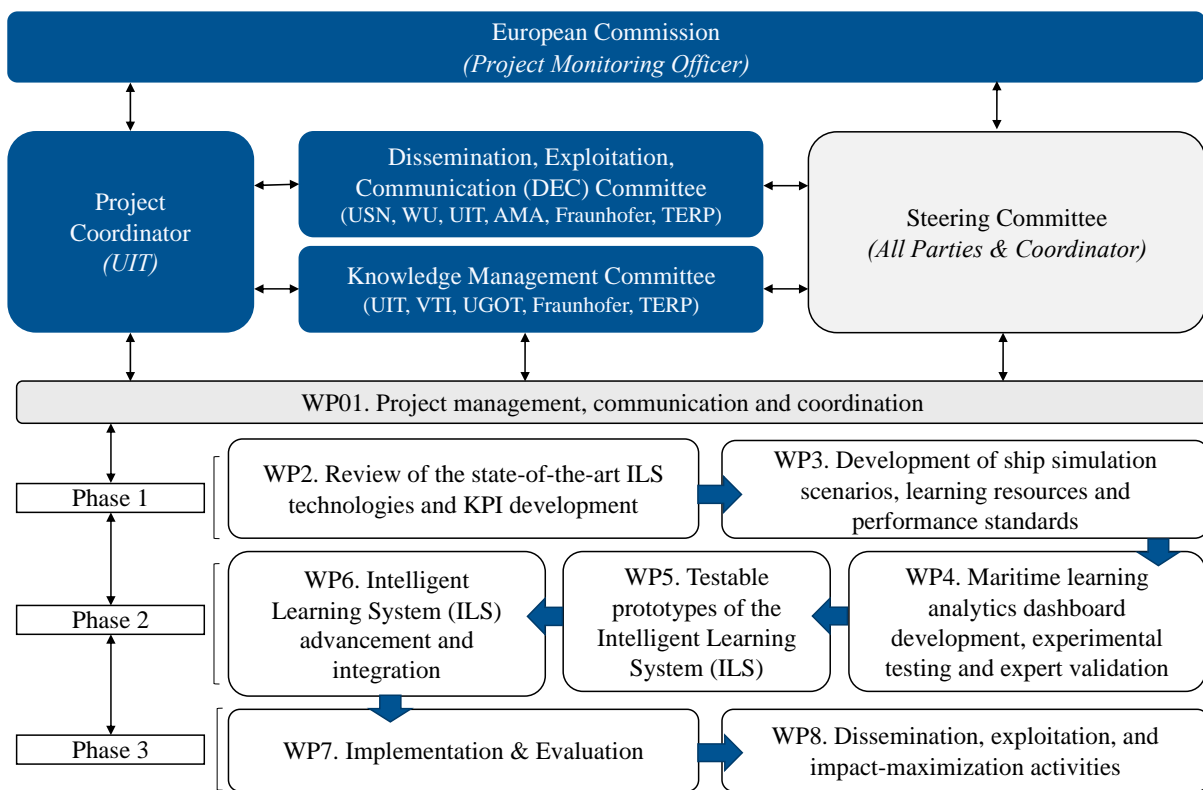


Figure 4. Project management structure

The consortium communication plan is detailed in Deliverable 1.3. The knowledge management committee and DEC committee do not have contractual role in the project.

The purpose of internal communication is to establish a steady flow of information that keeps consortium partners connected, informed, and aware of ongoing and future activities. Regular meetings are organized. The aim is to increase involvement and engagement among the partners of the consortium.

To avoid conflicts and reduce the chaos in project communications, the general recommendation is that the participant shall discuss the issues and present the case to the relevant WP leader and coordinator. The WP leader can handle the scientific issues at the WP level in accordance with the agreed research content and ethical guideline. The coordinator can handle the project issue in accordance with the CA and Grant Agreement and may send inquires to PO if needed.

All WP leaders will be responsible for executing the dissemination and exploitation strategy of i-MASTER, including developing the dissemination materials (both online social media platforms and printed materials such as posters, leaflets, brochures), participating at scientific and industrial events, exhibitions, conferences and tradeshows to actively promote the i-MASTER outputs and to set the ground for a commercial and scientific exploitation of the project results.

The consortium has agreed that the chairperson of the meeting shall produce minutes of meeting, which will be the formal record of all decisions taken. He/she shall send a draft of these minutes to all Members within 14 calendar days of the meeting.

The minutes will be considered as accepted if, within 15 calendar days from receipt, no Party has sent an objection to the chairperson with respect to the accuracy of the draft minutes by written notice.

The chairperson shall send the accepted minutes to all the Members, and to the coordinator, who shall archive them and retain copies.

6 Issue and conflict management

As the roles, tasks and responsibilities for all partners have been thoroughly discussed and well defined, through prior project development, issues of concern or matters of conflict are not expected to be a significant factor. However, in the event of any issues of concern or matters of conflict – potential or actual – arising, then resolution will be handled thoroughly and systematically in accordance with the following steps:

- All concerned parties shall try first to resolve any issues or conflicts between themselves through candid and constructive discussions in a polite and professional manner.
- The project coordinator can be involved further if the issue or conflict is unable to be resolved in an approved and amicable manner between the concerned parties. In the first instance, the coordinator will attempt to facilitate resolution of the issue of concern or conflict between the concerned parties. The coordinator may propose an alternative solution for the conflict. If this is agreed, the issue is solved.
- If this attempt fails, the issue will be escalated to the steering committee. The coordinator presents the issue to the steering committee and a consensus solution will be tried.
- In the event that the steering committee meeting is unable to facilitate a resolution of the issue or conflict between the concerned parties, the matter may be resolved through a voting procedure among the partners; a majority, 2/3 of votes will be required for the decision to be taken. The steering committee will decide the procedures to follow and the corresponding corrective measures that should be taken. The participants involved in the conflict will declare acceptance of the procedure and the corrective measures.
- If the conflict cannot be resolved by the above procedures, the coordinator declares the participant does not conform with the project specifications and the Consortium will ask for a contract termination for the participant concerned, in accordance with the procedures set out in the consortium agreement. The Project

Officer will be immediately notified of the situation and of the measures to be taken to solve it.

Issue and conflict resolution will be conducted in accordance with the “Code of Conduct for Research Integrity” through the principles of: Reliability, Honesty, Respect and Accountability¹.

7 Project monitoring and reporting

The coordinator keeps track of the budgeting of the project and each partner and submit periodic reports to the Commission. This will help in the efficient monitoring of the project and identifying any possible deviations from the planned targets.

Each partner, if requested, shall provide with all the necessary information and documentation in order to prepare the official periodic reports to be submitted to the European Commission.

Each project partner will ensure that their respective financial and administrative information is provided in a timely manner. The reporting to the European Union includes information on how the research is progressing, results obtained to date (e.g., deliverables), ongoing compliance with the work programme and all the relevant information at management level (resources, costs and, if necessary, information on any delays). The project coordinator will synthesis the overall project status updates, planning developments and compile the formal reports. These reports will be available to the project partners.

¹ https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/european-code-of-conduct-for-research-integrity_horizon_en.pdf

8 Overall quality assurance plan

Detailed quality assurance plan will be published in M08. In general, quality assurance and evaluation will be performed throughout the duration of i-MASTER to ensure the highest quality of the project, its research outputs and results. The following guidelines will be implemented.

8.1 Deliverable templates

Templates for i-MASTER deliverables, to be followed by all partner, were created by the coordinator. These will be distributed to the partners and general template has been added to the shared space on Microsoft Teams. The i-MASTER logo to be used in all official communication was also created by coordinator.

The deliverable template includes the key information regarding the specific deliverable and the core content to be included. The coordinator produces the template and will add them to the shared space on Microsoft Teams and will also send it to the deliverable leaders through email with cc to the WP leaders.

8.2 Deliverable quality assurance

Deliverable completion will be under the responsibility of the relevant Work Package leader and Deliverable Leader. The deliverable leaders shall upload the draft on Microsoft Teams, walk through the deliverables with all consortium members during meeting(s) and receive feedback from all for improvement. Each work package leader needs to ensure that they have reviewed a near-final draft of each deliverable before its deadline and all consortium members should do the quality check before the submission of the deliverable.

9 Ethical management

Integrity, truthfulness, and accountability are fundamental ethics requirements for research projects (Holt, 2012; Israel & Hay, 2006). All consortium members will strictly follow both national and European legislations regarding scientific research and data management, will ensure the action to be carried out in line with the highest ethical standards and the applicable EU, international and national law on ethical principles.

i-MASTER project has limited use and application of AI in its research and innovation process. The use is limited to a specific adaptive learning purpose with well-known ML methods to support the purposeful and pedagogical use of emerging technologies to address this specific research call, which do not raise any ethical concerns related to human rights and values.

Use of simulators in vocational education is a normal educational practice which does not pose any physical dangers, health hazards or psychological harm to the participants and respondents. No identifiable personal data is needed during the research process.

The qualitative data generated from interviews, subject matter expert and focus group discussions will be rendered anonymous in such a way that the data subject can no longer be identified.

An i-MASTER project-specific informed consent form and detailed information sheet that describe the aims, methods and implications of the project activity, the nature of the participation will be developed and given to the participants who would like to voluntarily join the experiments, interview or group discussions. The informed consent will explicitly state that participation is entirely voluntary and that anyone has the right to refuse to participate and to withdraw their participation, interview answers or data at any time without any consequences.

The digital quantitative questionnaires will also be designed with “anonymized responses” function, which does not collect any email or IP addresses. All respondents will be given an informed consent form and information sheet regarding the nature of the research and their rights before they proceeded further in the survey.

10 Finance and administration

The legal basis for finance and general operations of the i-MASTER has been set out in the Grant Agreement between the Coordinator and EU, as well as in the Consortium Agreement among all consortium members.

The coordinator administers the financial contribution of the EC to the project. Prefinancing payment has been received and distributed by the coordinator in a timely manner. The consortium members have been requested to keep original records and supporting documents to justify the amounts declared, must be made available upon request or in the context of checks, reviews, audits or investigations. All financial aspects shall in compliance with the terms set out in the Grant Agreement and the Consortium Agreement. All partners are responsible to ensure legal certainty and compliance with the appropriate cost category.

11 Equality, Diversity and Inclusion

The i-MASTER project values equality, gender balance and diversity and is committed to these issues being a conscious element in all activities and the project management structure. We nurture a cheerful, caring and respectful project team, and welcome all researchers and students to join every phase of the research journey.

Reference

- Holt, R. (2012). Ethical research practice. *Qualitative organizational research: Core methods and current challenges*, 90-108.
- Israel, M., & Hay, I. (2006). *Research ethics for social scientists*. Sage.
- OECD. (2021). OECD Digital Education Outlook 2021. *Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots*.
- Rasnacis, A., & Berzisa, S. (2017). Method for adaptation and implementation of agile project management methodology. *Procedia Computer Science*, 104, 43-50.
- UNCTAD. (2021). *Review of Maritime Transport 2021*.
https://unctad.org/system/files/official-document/rmt2021_en_0.pdf

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