Retrofitting towards climate neutrality

D6.9 Second Virtual Reality 3D video and Release project video

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Project acronym: Green Marine

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HISTORY OF CHANGES		
Version	Publication Date	Changes
1.0	[28/05/2025]	First draft (UoS)
2.0	[15/06/2025]	Second draft (UoS)
3.0	[26/07/2025]	Third draft (UoS, UPM, CalMac Ferries)
4.0	[30/07/2025]	Fourth draft (BlueXPRT)
5.0	[31/07/2025]	Final version (UoS)

DETAILS	
Grant Agreement No.	101096522
Project acronym	Green Marine
Project full title	Retrofitting towards climate neutrality
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Due date of deliverable	M30
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Deliverable name	Second Virtual Reality 3D video and Release project video
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Author(s)	Vedanjali Polaki, Iraklis Lazakis, Dimitrios Sykas
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Table of Contents

1 INTRODUCTION

The main objective of Green Marine is to significantly accelerate climate neutrality of water borne transport through retrofitting existing fleets with cost and emission control solutions. To support decision makers retrofitting protocols and a software tool catalogue that gathers knowledge will be developed and validated. We will demonstrate these tools, and the innovative solutions aimed at carbon capture mineralization, which also aids in deacidifying our seas; carbon and water capture with membranes. An ultra-sound technology will be tailored to suit vessels (such as cruise ships) allowing air-reuse saving energy and operated as pre-treatment enhancing a membrane carbon capture process. The Ca/Mg – alkali solvent capture process of the CO2 from flue gases.

All solutions will be demonstrated first on a land-based engine followed by the selection of the most suitable solution for a demonstration on a waterborne vessel. The (land-based) demonstrations will represent the operation of a majority of vessel engines. By developing retrofitting protocols, simulations of the solutions, data generated at the demonstrations a software catalogue tool will be developed. Through engagement activities this tool will gain more users and more knowledge, its value and effectiveness will increase for all users. The project aims to bring the different solutions to TRL 8. The demonstrations, the software tool catalogue, and the dissemination and exploitation activities ensure that project results will be replicated globally. The consortium consists of 10 partners from 7 countries with 4 research institutes and 1 ship company, which will host a demo as end user and 5 SMEs.

The objectives of WP6 are categorised into 3 and listed below.

- Implement the strategy for knowledge and IPR management and protection.

- Develop the business models and business plans for commercializing the technologies after the project period.

- Disseminate project results, initiate joint activities and increase CCUS awareness and readiness.

1.1 PURPOSE OF THE DOCUMENT

This deliverable provides a report on the Virtual Reality application developed to visualise the forward engine room, stabiliser room as well as the exterior areas of the MV Coruisk vessel. Additionally, the demonstration of the application at CalMac Ferries Ltd. Head office is also reported.

1.2 DOCUMENT STRUCTURE

§2 concerns the details of the Youtube Channel of the project; contains information about the Green Marine project Youtube channel and the 360° MV Coruisk project videos and the demonstration of the Virtual Reality application.

§3 summarises the report.

2. GREEN MARINE YOUTUBE CHANNEL

The Green Marine consortium has created a dedicated YouTube channel to host videos that will disseminate the activities to the general public and other relevant stakeholders. The link of the Green Marine YouTube channel is: https://www.youtube.com/@GreenMarineproject/featured

2.1 GREEN MARINE PROJECT VIDEO

The Virtual Reality application was developed at the University of Strathclyde to visualise and familiarise with the interior and exterior configuration of the MV Coruisk vessel, in preparation for the land-based and on-board testing of our retrofitting solution. The resulting video from the

VR tool was captured in screenshots depicted in figures 1-8. The 360° videos can be viewed using the Movies and TV app preinstalled on Windows devices or the VLC media player, using this link.

The 360° videos have been reframed to form a regular horizontal 2D video with an aspect ratio of 16:9. These non-360° videos can be viewed here using any application capable of 4K video playback.

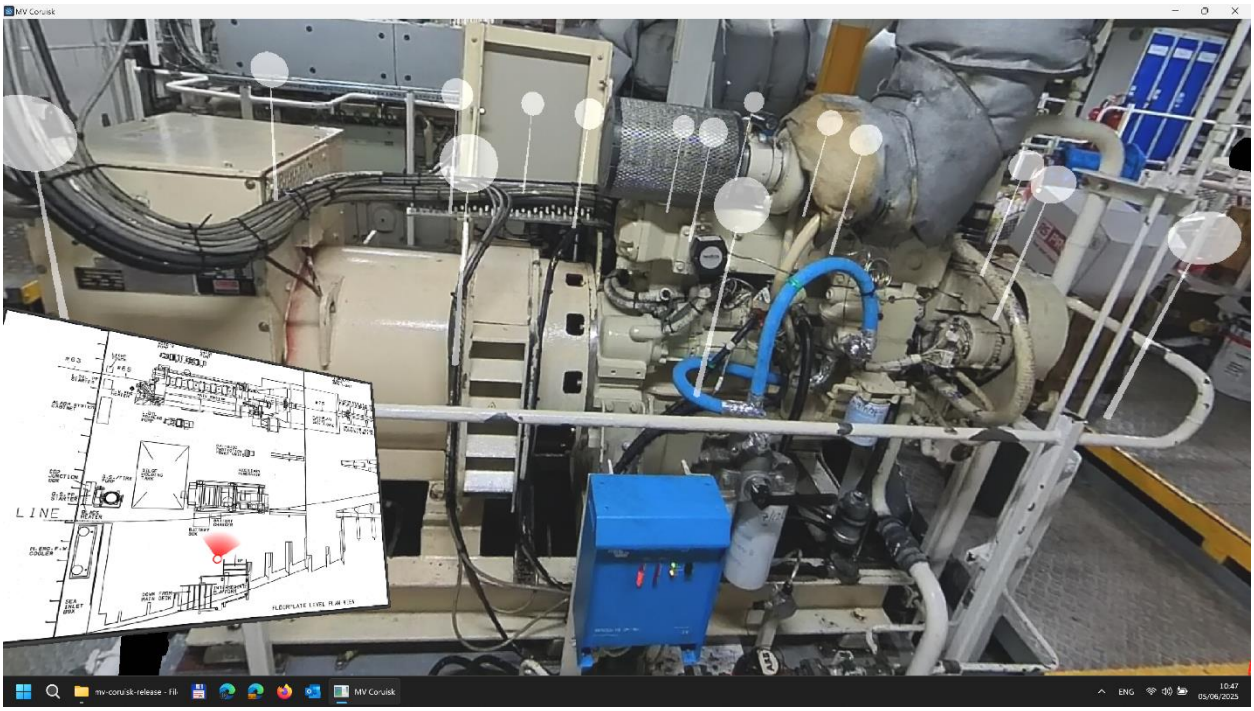

Figure 1. Auxilliary engine to be retrofitted with Green Marine technologies

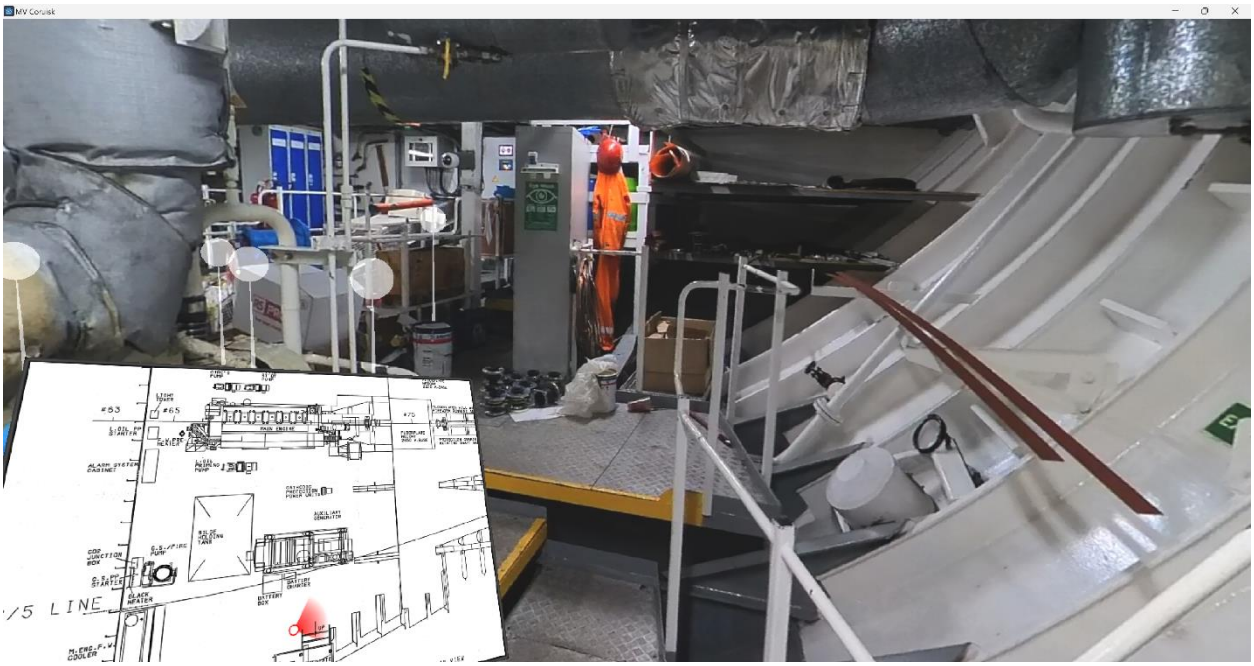

Figure 2. Location of installation of Green Marine technologies in the Engine Room

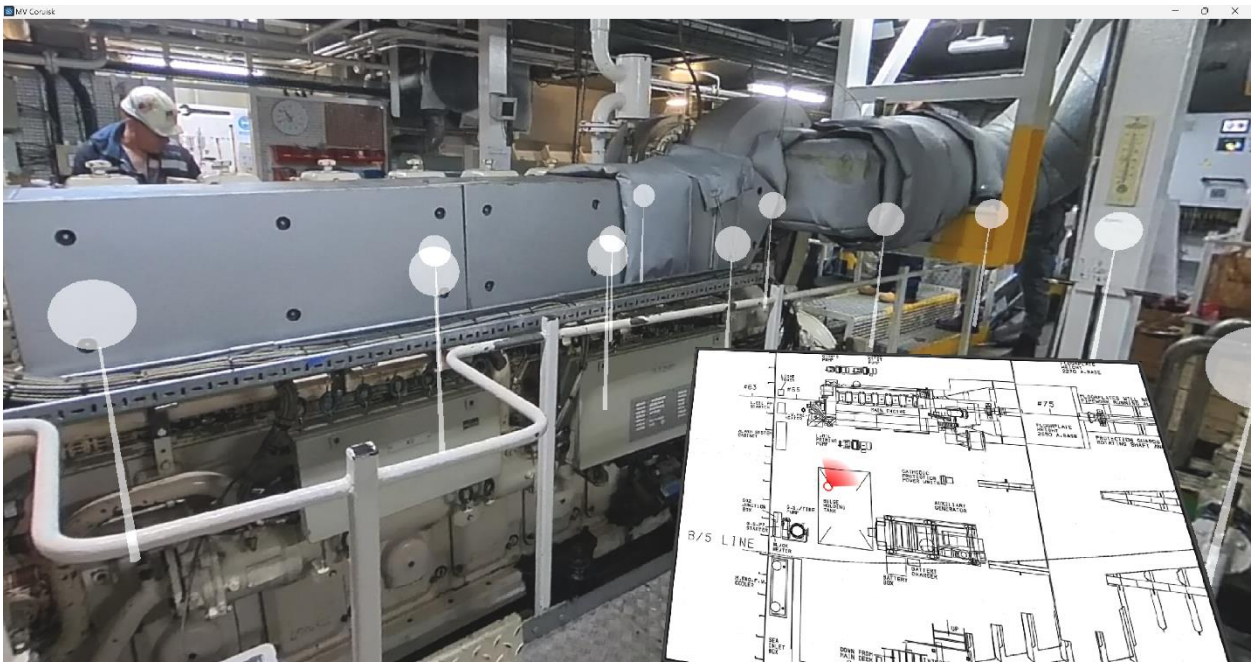

Figure 3. Main engine

Figure 4: Engine room – looking aft

Figure 5: Engine room – air compressor

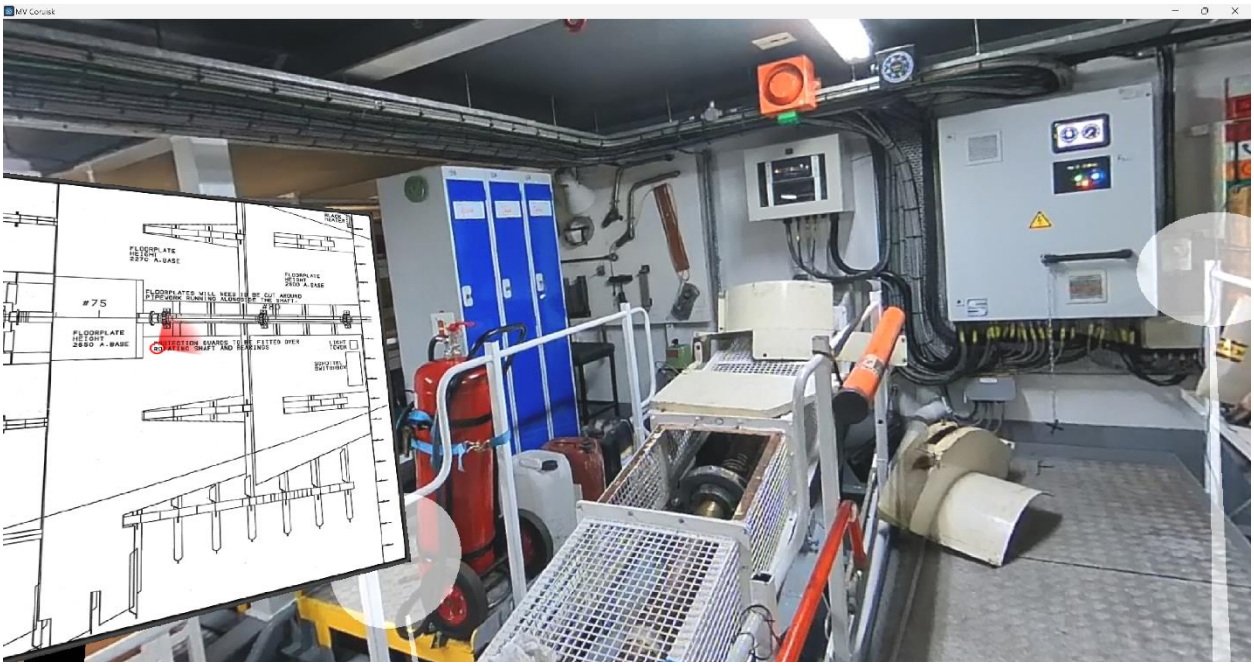

Figure 6: Engine room – Shaft

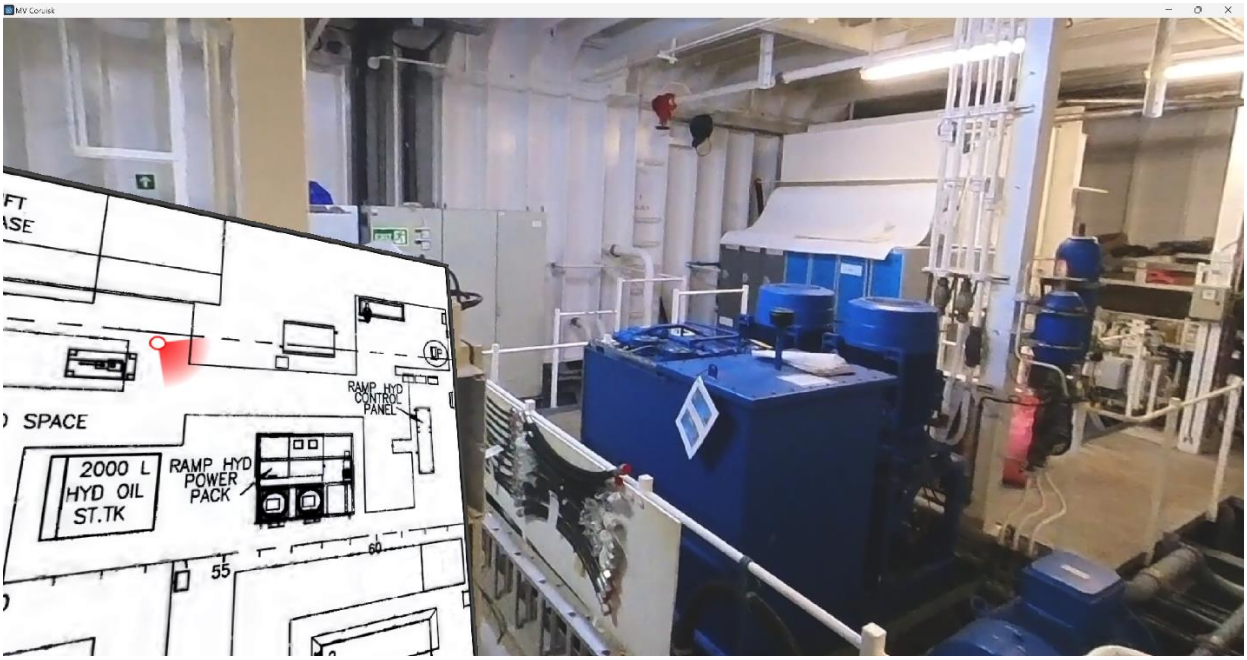

Figure 7: Stabiliser Room – Hydraulics

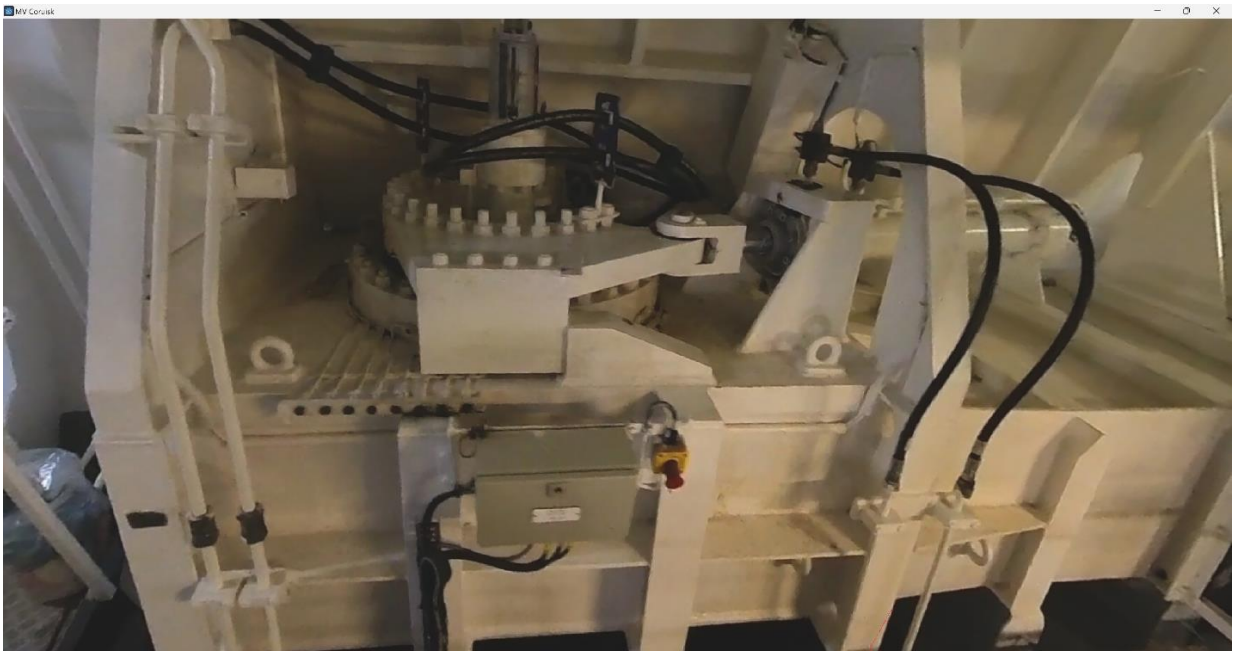

Figure 8: Stabiliser Room - Stabiliser fin control mechanism

2.2 Second Virtual Reality Video

The Green Marine partners developed a portable Virtual Reality (VR) application to visualise the engine room of the MV Coruisk vessel. With immersive 360° views of the engine room, stabiliser room as well as the external dry-docking area, the VR application provides a comprehensive visualisation capability to improve familiarity with the configuration of the engine room and make necessary preparations for the retrofitting of novel carbon capture technologies, especially since direct physical access may be limited at times. The VR application was demonstrated at the head office of CalMac Ferries Limited in Gourock, Scotland, on 20th May 2025 (Figure 9). The VR application was well received by the staff members at CalMac Ferries Ltd., and their feedback was collected to inform the future improvement of the application. The visit also included productive discussions with CalMac personnel regarding the potential future applications of the developed VR application. Some of the ideas included survey planning, crew training and familiarisation, digital twin development, and enhancing passenger experience through virtual tours. We extend our thanks to CalMac personnel for hosting and joining us for the demonstration, especially Mr. Alex Cross for hosting and organising the event. Prior to this event, the VR tool was also demonstrated at the University of Strathclyde (UoS) to a class of 40 students in February 2025 as part of the curriculum for the Department of Naval Architecture, Ocean and Marine Engineering at UoS.

Figure 9. Second Virtual Reality 360º video onboard the engine room of selected CalMac vessel MV Coruisk. Demonstration of videos via VR application developed at the University of Strathclyde (Gourock at CalMac Ferries Ltd. Head office).

3. CONCLUSIONS

The second Virtual Reality video depicting the internal spaces of the engine room of MV Coruisk are to be made public. The approval from the shipyard for the public release of the external spaces captured in the VR video is currently in process. The virtual reality tool for visualisation of the MV Coruisk vessel to aid in land-based testing and future demonstration has been developed and demonstrated with Green Marine partners, CalMac Ferries Ltd. These activities were carried out as part of the deliverable D6.9, "Second Virtual Reality 3D video and Release project video." Note that the 360° videos are available to the Green Marine consortium to enable with the relevant activities. The deliverable D6.3, "Third Dissemination and Communication Plan," is planned to be submitted on M36.