AutoMated Vessels and Supply Chain Optimisation for Sustainable Short SEa Shipping

MOSES Pilot Demonstration 3 Evaluation Report

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Contributors	TNO, CTECSWE	**Lead Author**	Jonas Renlund / Janne Suominen
		Reviewers	Ignacio Benítez (VPF)
			Jason Whitehouse (TRELL)

Document Information

List of Contributors		
First Name	**Last Name**	**Partner**
Jonas	Renlund	MCGR
Janne	Suominen	MCGR
Christian	Nordin	MCGR
Stefan	Hellgren	MCGR
Frank B.	ter Haar	TNO
Bastian	van Manen	TNO
Tom	Hueting	TNO
Hans	van den Broek	TNO

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Deliverable leader	Janne Suominen (MCGR)	01/12/2023
Quality manager	Konstantinos Louzis (NTUA)	7/12/2023
Project Coordinator	Konstantinos Louzis (NTUA)	7/12/2023

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List of Acronyms

Abbreviation / acronym	Description
3DWI	3D World Interpreter
ARC	Active Rotation Compensation
BOD	Back Office Database
CTOy	Cargotec Oyj
CTSE	Cargotec Sweden Ab, aka Bromma
D1.1	Deliverable number 1 belonging to WP 1
EC	European Commission
KPI	Key Performance Indicator
MCGFI	MacGregor Finland Oy
MCGSE	MacGregor Sweden Ab
OCR	Optical character recognition
PI	Performance Indicator
RCHS	Robotic Container Handling System
SI	Success Indicator
SCC	Shore control center
SCS	Shore control Station
TNO	The Dutch Organization for Applied Scientific Research
WP	Work Package

Executive Summary

This deliverable describes the key performance outcomes of the MOSES Pilot Demonstration-3: Robotic Container handling (T7.4). Pilot Demonstration-3 deals with the robotic container handling system that has been developed under Tasks 3.3, 3.4 and 3.5 of WP3. The MOSES Pilot Demonstration and Evaluation Framework, including planning, test scenarios, and key performance indicators are described in D7.1.

The demonstration event is a joint effort by the AEGIS and MOSES projects. The development of the technology is divided between these two consortia. For the MOSES consortium, crane mechanical development and software development is achieved by MacGregor Sweden Ab (MCGSE). The innovations regarding the safety of the autonomous operation using 3D environment scanning, container and obstacle detection and real-time human activity alert-detection technologies (3DWI) have been developed by TNO, the Dutch Organization for Applied Scientific Research. The crane mechanical and software development and the 3D environment scanning technology were demonstrated at the MacGregor test site in Sweden. As part of the demonstration, TNO has also set up a shore control center in the Netherlands to monitor container handling in real time and resolve safety-critical issues.

To enable multiple operators to monitor and facilitate multiple autonomous processes simultaneously, an Intelligent Operator Support System (IOSS) has been demonstrated. This AI software layer assigns new operations to operators based on workload and expertise, supporting operators' situational awareness with a digital twin of the local environment, crane, containers, and providing alerts of safety and mission-critical conditions.

For the AEGIS consortium, Cargotec Sweden Ab (CTSE), aka Bromma, delivered and developed technology required for the container spreader. In addition, MacGregor Finland Oy (MCGFI) together with Cargotec Oyj (CTOy) created the software platform VCOP, which connects booking information with the supply chain up to the stowage planning and loading sequence of each individual port visit.

Each consecutive test case scenario executed in the MOSES Pilot Demonstration-3 builds on the previous case, so that at the end of the demonstration we have seen a successful implementation of the state-of-the-art technology with autonomous enabling technology.