

## MOBILISATIONS

# Engineering the Integration of a 290t Vertical Lay System on a Multi-Purpose Offshore Vessel

CLIENT CONFIDENTIAL

YEAR 2023

### PLATFORM TYPE

Multi-purpose offshore vessel

### CLASS

DNV 1A1, ICE C, SF, COMF-V(3), C(3), HELD-SH, CRANE E0, DYNPOS-AUTRO, NAUT-AW, CLEAN DESIGN, VIBR DK(+), TMON

### SOW

Full engineering support for the installation of a Vertical Lay System and auxiliary systems



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#### CLIENT CONTEXT

## Strategic offshore asset upgrade

The client is a major player in the maritime and offshore industries, with a strong focus on vessel upgrades and retrofits to support offshore energy projects.

For this particular initiative, the end beneficiary had identified a strategic opportunity to repurpose their offshore asset by installing a high-capacity 290t Vertical Lay System (VLS) on board one of their flagship vessels.

The VLS was to be integrated above the moonpool, requiring substantial structural, systems, and stability modifications.

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#### THE WORK TO BE DONE

## Project phases

GLO Marine was commissioned to carry out the full engineering design and support package for the integration of the VLS, including:

- Lay ramp foundations
- Moonpool modifications
- Carousel loading/Laying hatch
- Ancillary equipment foundations
- Cooling water system upgrade
- Assessment of longitudinal strength
- Carrying capacity and stability book update
- Statutory and layout drawings
- New compartment design for storage winch, spooling tensioner, and control van

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#### THE CHALLENGE

## Complex structural and multidisciplinary integration

The main engineering challenges were:

- Structurally integrating the VLS over the existing moonpool and ensuring it could withstand all operational and survival load conditions.
- Modifying and strengthening the hull, decks, and compartments to accommodate new equipment foundations.
- Synchronizing multiple disciplines (electrical, structural) while managing client expectations, class approvals, and shipyard constraints.

# Implementation steps

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## 01. Initial Survey and 3D Lased Scan

GLO site engineers boarded the vessel for the initial inspection, as well as to generate the 3D scan model of the project environment. The initial inspection concluded with the Survey Report detailing the current status of the vessel and a preliminary proposed arrangement to establish the correct way forward.

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## 02. Concept Development

Based on the survey data, the engineering team developed the preliminary integration concept for the Vertical Lay System and its auxiliary equipment.

- Definition of the VLS layout above the moonpool and firing line configuration
  - Preliminary arrangement of the lay ramp, carousel loading hatch, and ancillary equipment
  - Identification of required hull, deck, and compartment modifications
  - Initial evaluation of weight distribution, stability impact, and vessel carrying capacity
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## 03. Structural & Naval Architecture Engineering

Our structural analysis team has defined the loads to be applied by combining the local and global (HG) loads for sagging and hogging conditions, considering the environmental conditions of operational and survival conditions correspondingly.

The Lay Ramp was arranged with the firing line in the centre of the moonpool and with the main hinge pins located 1030 mm above the ship's main deck. A range of static and dynamic load cases (up to 20 cases), covering both operating and "survival" conditions, has been considered using reactions provided by the equipment designer.

## 04. Class Approval

This stage consisted of managing the interaction with Class for the duration of the project and developing the full set of drawings necessary for the approval process. The basic engineering drawings have been supported by detailed calculation reports, documenting the design assumptions, considerations, limitations, and applicable rules & regulations.

During the Class approval stage, our team put a great emphasis on the communication flow between disciplines such as Electrical, Stability, and Structural, to ensure that all inputs and outputs are circulated in a timely and concise manner. This eliminated all delays from the Class approval process, which was carried out with no major modifications.

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## 05. Project Management & Delivery

We provided engineering assistance throughout the final project stages to ensure smooth implementation at the shipyard.

- Delivery & handover of the complete engineering and documentation package
- Support during installation planning and yard preparation
- Optimized foundation design to reduce installation time
- Successful integration of the 290t Vertical Lay System and auxiliary equipment

# The outcomes

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## Final results

- The VLS and all auxiliary systems were successfully integrated on board.
- Project delivered within the scheduled time frame.
- Optimized foundation and equipment layout, reduced yard installation time.
- Positive feedback from the client led to a long-term Frame Agreement for future vessel upgrades.

The vessel was successfully upgraded with a fully integrated 290t VLS system, ready for offshore operations.

All engineering deliverables were completed on time, Class approvals were secured without delays, and installation time at the yard was minimized.

# GLO Marine

Your vessel upgrade partner

## Bucharest <sup>RO</sup>

Biharia 26, First Floor  
+40 (0) 336 401 047

## Galați <sup>RO</sup>

Aleea Școlii 3  
+40 (0) 336 401 047

## Mangalia <sup>RO</sup>

I.C Brătianu 2, Delphine Comar Building  
+40 (0) 757 065 058

## Woking <sup>UK</sup>

3 Radstone Court, Hillview Road, GU22 7NB  
+44 (0) 7795 322 207  
+44 (0) 7786 392 636

[www.glo-marine.com](http://www.glo-marine.com)

[contact@glo-marine.com](mailto:contact@glo-marine.com)

## Work with us

Contact our retrofit specialist for details

[inquiries@glo-marine.com](mailto:inquiries@glo-marine.com)

[+40790870949](tel:+40790870949)