

## INTRODUCTION

Today, using a self-contained Offshore Wind Turbine Installation Vessel (WTIV) is the preferred method of installation for the main component's turbine (Tower, Nacelles and Blades). This vessel type, loads turbine components from a port facility, transports them to the installation site, jacks up into positions and performs the installation. In the United States (US), this activity is regulated by the Jones Act; therefore, this vessel will be required to comply with this regulation, including being built, owned and operated by a US company.

Currently, there is industry reluctance on the ability to build and operate Jones Act compliant WTIV's due to the extensive costs and delays in delivery.



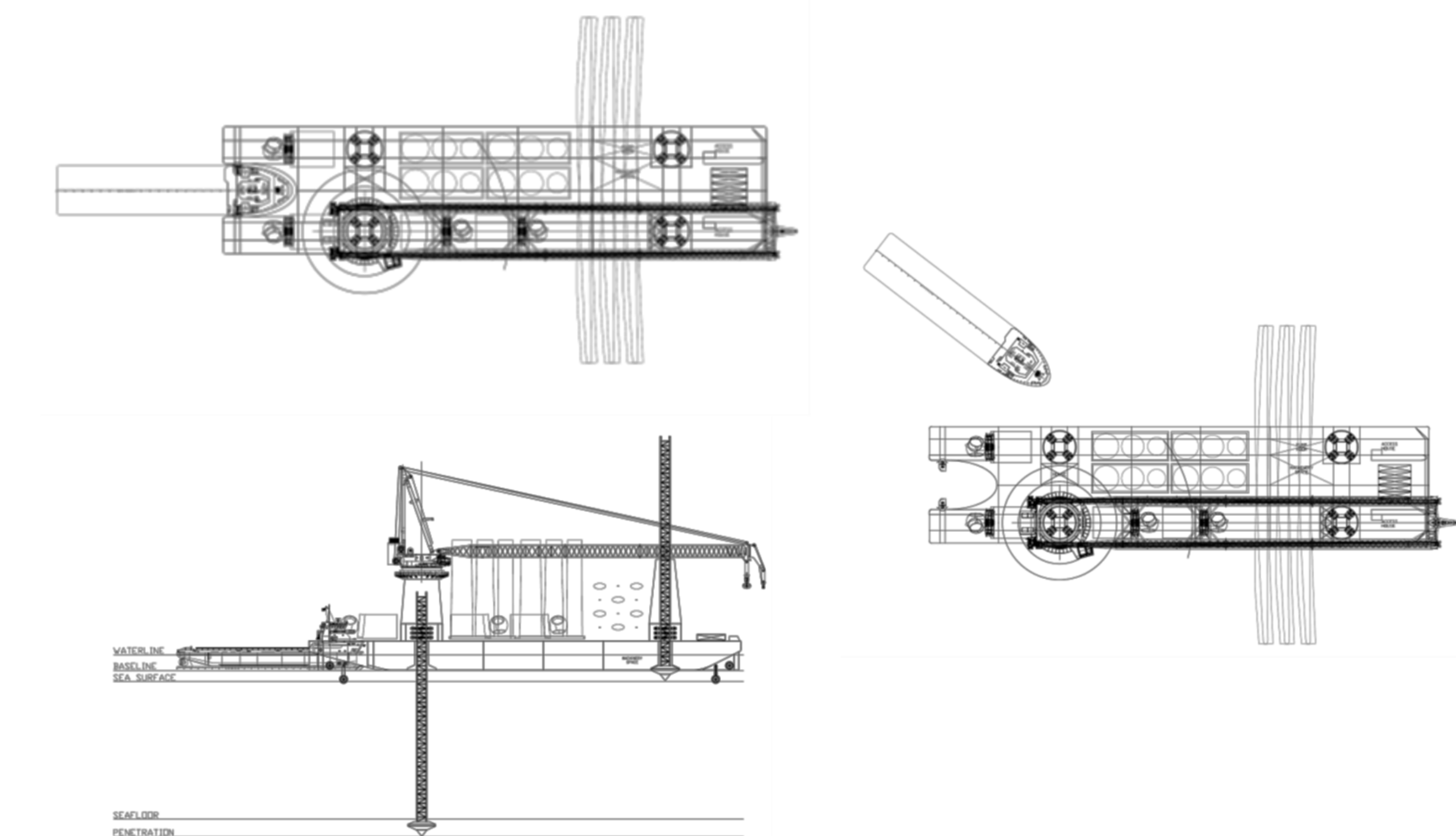
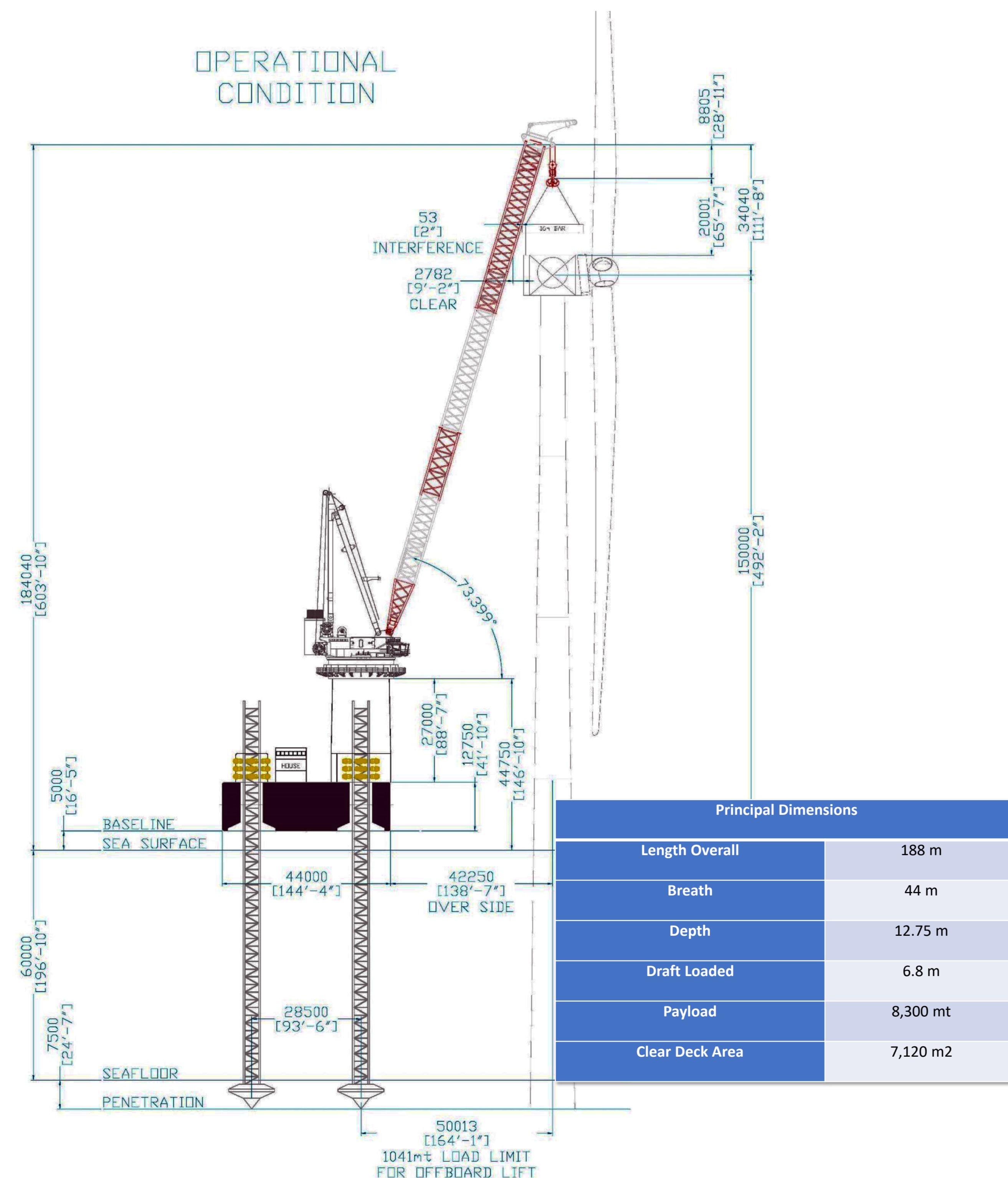
## METHOD

This alternative WTIV design is tailored for the US Jones Act Market:

- Designed with focus on the key elements required for a full but practical functionality to install turbine components in the East Coast of the US.
- Obtained input from Developers with installations in Europe.
- Designed with consideration of US shipyards build strategies and capacities.
- Based on proven US operational philosophy.

## WTIV DESIGN BASIS

- Minimum Lifting Capacity of 1,100 MT at a 42.5 m radius, based on a NREL 15 MW, upgradable to potential 22 MW with Minimum lift capacity of 1250 MT is considered.
- Jacking system for installation operations in up to 60m water depth.
- Dynamic Positioning (DP) system – with DP 2 redundancy level and environmental conditions established for the Northeast Coast of the US:
  - 35 Knots – Wind
  - 2 m – Hs
  - 1.4 Knot Current
- Cargo deck capacity to accommodate minimum of 3 x 15 MW NREL Ref turbine.
- Accommodations to support 60 working crew.



## RESULTS: US OPERATING PROFILE

- The WTIV is designed to work in conjunction with a workboat in coupled configuration for transiting from and to sit.
- This workboat would also serve as a Service Offshore Vessel (SOV), fitted with accommodations and walk to work heave compensated gangway.
- The connection is via proven Coupler System currently utilized in the US Flag ATB industry.
- The WTIV will be self positioning with a DP 2 system once onsite.
- The WTIV will be fitted with state-of-the-art accommodations to house industrial personnel required for the installation operation.

## CONCLUSION

This alternative WTIV design use as basis lessons learned from successful US building programs including:

- Incorporating simple design techniques from similar vessels already built and operating in the US.
- Vessel hull and hull modules designed with consideration of US shipyard capabilities.
- Critical components such as Jacking System, which is developed in collaboration with companies with experience in fabricating Jacking Systems.
- Consensus from Class and Flag on the applicable rule and regulations.
- Detail Engineering including Class approvals prior to beginning construction.
- Design development cooperation with the various stake holders. This has proven to be a successful model within the US shipbuilding industry.

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- NETSCo Naval Architects – Jared Boyd, Julian Fraize and Daniel Lunca
- OEM's – Liebherr, Kongsberg, Wartsila, Flender
- Regulators – Lloyd's Register, USCG

## REFERENCES

- Lloyds Register Guidance Notes for Wind Turbine Installation Vessels – July 2014.
- IMO guidance (MSC-MEPC.7/Circ.10) Industrial Personnel.
- ABS - Rules for Building and Classing Marine Vessels Part 5D Offshore Support Vessels for Specialized Services.
- Guidelines for the Selection and Operation of Jack-ups in the Marine Renewable Energy Industry – 2013.

## CONTACT INFORMATION

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