Offshore Operational Advice System

Publieke samenvatting / Public summary

Aanleiding

Wind, waves and current are crucial factors affecting the feasibility of offshore activities involved with installation and exploitation of offshore wind farms. Such activities include cable lay operations, WTG installation, survey campaigns, personnel access and jack-up vessel operations. For OSV personnel transfer operations, OSVs keep station on DP alongside a wind turbine or substation and allow technicians to transfer to the turbine by means of a motion compensated gangway. The planning and execution of these operations heavily depends on the weather conditions at site. Both wave induced motions as well as the DP footprint are of key importance for the operation of the gangway. They are variable and not accurately known beforehand. However, when the system's operational limits are exceeded, personnel safety is at risk. In 2019 a feasibility study (TKI project 'Operational Decision Support') was performed where ship motions and workability were predicted based on basic wave characteristics. This showed the need for more detailed wave characterisation and inclusion of non-linear responses of the vessel to the DP system, anti-roll tank and gangway.

Doelstelling

This project aims to improve the operability of vessels involved in the installation, O&M phase and decommissioning of offshore windfarms by giving upfront advice for the planning and execution of critical offshore operations. This improves efficiency, reduces downtime and lowers LCOE of offshore wind farms. The planning and associated vessel operability will be improved by using response

Projectinformatie / Project information

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Algemene informatie / General information

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Publicaties en materialen / Publications and attachments

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based forecasting methods that give much more accurate operational advice based on in-situ motion measurement than conventional engineering methods. During the execution of the transfer the vessel's crew can use the response forecasts to choose the most optimum approach to the platform, the most optimum vessel heading, approach time, DP setting and potentially vessel ballast condition.

Korte omschrijving

Sensor development, numerical modelling, full-scale trials, implementation and evaluation of the system are all part of the scope of work. To deliver a system with TRL8 readiness level, validation is an important part of the project. The following work packages can be distinguished: WP 1. Development of adaptive motion simulation model with interfaces to the gangway, DP system, anti-roll tank, ship's loading WP 2. Development of high fidelity wave finecast method using onboard sensors, incl. validation using external reference sensors WP 3. Full scale validation of adaptive motion simulation onboard the OSV Acta Auriga WP 4. Development of the onboard operational decision support and planning tool WP 5. Implementation, testing and evaluation of the advisory and planning tool onboard the OSV Acta Auriga WP 6. Project management The project is expected to run from end 2020 till the end of 2022

Resultaat

The project delivers a system that gives planning advice in several stages of an operation, from heading and routing advice onboard to workability planning one year prior to operation. The system provides advice based on a generic hydrodynamic approach, that is able to take the non-linear behavior of the DP system, anti-roll tank and gangway characteristics to environmental conditions into account. Measured 2D wave spectra from the vessel and measured ship motions are used to continuously update and improve the hydrodynamic calculations and wave monitoring algorithms to deliver unprecedented accuracy in terms of operational advice. The system, consisting of a wave characterization method, hydrodynamic

digital twin, optimization and advice algorithm and planning tool, will be tested and validated on Acta Marine's OSV Acta Auriga. It is expected that by using the system, the workability will increase between 10-30 days per year for the OSV.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
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