

Autonomous Service Operation Vessel

Publieke samenvatting / Public summary

Aanleiding

Service Operation Vessels (SOVs) are used to service medium to large (40+ turbines) windfarms further than 40 km offshore, and are a significant part of the O&M costs. SOV owners must guarantee vessel availability to turbine suppliers of a specific wind farm to facilitate efficient and safe supplies and personnel deliveries. The current international state-of-the-art in SOV technology is that motion compensated gangways are used to transfer the personnel from moving ship to stationary wind turbine. The vessel operator manually navigates the SOV to the turbine and maneuvers the vessel sideways to about 20m from the turbine before switching on the dynamic positioning (DP) system. Next, the gangway operator moves the gangway into position and steers the tip into the turbine platform bracket. The gangway operation is done on sight and is a skill that needs to be acquired by practice. Once the gangway is in position the personnel can be transferred. These existing procedures are time-consuming; feedback from operators suggests that 80% of time lost is during the landing of the gangway tip onto the turbine.

Doelstelling

The goal of the project is to develop an autonomous Service Operation Vessel. The industrial investigation will result in an integration of different components of an SOV leading to more time efficient operation. A validated Mission Master, i.e. a 'virtual captain' will enable the SOV to perform a set of tasks in a wind farm safely and autonomously while being supervised by human operators. The Mission Master will drive and manage several sub-

Projectinformatie / Project information

Projectnummer / Project number

TEWZ119015

Subsidiebedrag / Grant amount

€ 660.171,00

Algemene informatie / General information

Penvoerder / Secretariat

IHC Holland B.V.

Publicaties en materialen / Publications and attachments

- 04.06.2020

Autonomous SOV (Presentation Matchmaking Day 2020)

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systems. A Path Planner will automatically optimize the turbine access for the maintenance tasks per day, based on time, fuel and workability. The manually operated motion-compensated gangway will be developed into a fully autonomous system, to enable the gangway to land on the wind turbine without human intervention. The existing dynamic positioning technology will be adapted with an interface to interact with the Mission Master and the gangway. The active heave compensated crane for transferring cargo and parts will be modified to be operated from the wheelhouse; it can potentially be integrated with the operation of gangway.

Korte omschrijving

At the start of the project, the autonomous philosophy will be defined. Based on the defined philosophy, the vessel, components and interfaces will be designed. The Mission Master will be developed to manage the sub-systems. In parallel the auto-landing will be developed. The innovations will be validated using a combination of model tests and simulations. A simulator will be built modelling the vessel and its autonomous operation including all subsystems. The simulator will be based on verified test model results, guaranteeing a close match to real operating conditions. The simulator will be used to prove the well-functioning autonomy to potential clients and authorities. Additionally, the simulator can be used for benchmarking with current practices using actual data from vessel operators, research and training purposes.

Resultaat

Ultimately, application of the more efficient operation of the autonomous vessel will lead to three major savings in the cost of electricity generation: 1. More efficient operations will lead to earlier access to turbines for maintenance. The time saved can be translated into an increased uptime of the turbines and therewith a lower LCoE. 2. The autonomous operations increase the workability from 3 to 3,5 to 4, giving 10 extra working days per year. 3. Moving humans on board from operator into supervisor roles will enable a reduction in required crew on board, i.e. a lowering of the operational

expenses of the vessel and thereby a lower LCoE.
Combined, these innovations will reduce the cost of service and maintenance by 15%, i.e. from 41.1 EUR to 35 EUR per MWh. In addition, the average windmill uptime will increase from 4355 to 4364 hours per year.

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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