Openbare rapportage Robodock

Deze openbare rapportage moet minimaal de volgende gegevens bevatten:

- *Projecttitel*
- *Projectnummer*
- *Publicatiedatum van het rapport*
- *Uitgevende partner en auteur*
- *Samenvatting van de uitgangspunten en de doelstelling van het project en de samenwerkende partijen*
- *Beschrijving van de uitgevoerde activiteiten, de behaalde resultaten per mijlpaal, de knelpunten en het perspectief voor toepassing;*
- *Beschrijving van de bijdrage van het project aan de doelstellingen van de regeling*
- *Spin off binnen en buiten de sector*
- *Overzicht van openbare publicaties over het project en waar deze te vinden of te verkrijgen zijn;*
- *Vermelding van contactpersoon (personen) voor meer informatie*
- *Vermelding van de verkregen subsidie op de volgende manier:*

"Het project is uitgevoerd met Topsector Energie subsidie van het Ministerie van Economische Zaken en Klimaat, uitgevoerd door Rijksdienst voor Ondernemend Nederland. De specifieke subsidie voor dit project betreft MOOI-subsidie ronde 2020 "

Public summery on Robodock project

Project title: RoboDock
Project number: MOOI 12005
Publication date of this report: 30-10-2021
Published by: Fugro NV.

The Robodock project is a cooperation project between Fugro NV, RC-Dock Engineering, , Koninklijk NIOZ, Shipyard De Hoop Lobith BV and Ørsted Power A/S

Problem analysis

With the increased availability of operational wind farms in the North Sea and the safety concerns and scarcity of qualified staff, robotic based inspection, maintenance and other services of the offshore wind assets (turbines, foundations, power line infrastructure, etc.) will contribute to lowering the downtime of installed wind turbines and lowering overall O&M costs. Further, robotic inspection system in general are smaller than crewed systems and therefore have a significantly smaller environmental footprint. However, as offshore wind farms are situated at increasing distances from the coast, deployment of the robotic systems is getting more problematic without facilities nearby that are able to support such systems. Deployment of robotics for O&M are currently limited by 2 factors:

1. The robotics still **lack autonomy.** As of yet, still human on-site interventions are needed, which contribute to higher costs of operations;

2. The robotics are all deployed and serviced from **separate systems**, which causes inefficiencies (e.g. separate communication, repowering and safety infrastructures).

In addition, the offshore wind farm operations is sorting effects on others users of the North Sea: the wind farms are limiting other functions that could be performed in the same area (e.g. fishery and nature), while the environmental footprint of O&M tasks in wind farms is currently relatively high (lots of shipping traffic for supplies) and – because of its remoteness – security threats are present (e.g. sabotaging of the power supply).

Purpose of the project

This project will introduce the **RoboDock** platform, which will revolutionize the way in which offshore wind O&M and other field related activities are being organized and executed. RoboDock will provide for a protected, safe docking point, where robotic systems that are used for O&M tasks can be held (docked), refueled or recharged and upload acquired data, and where they can communicate with control and supervision centers onshore. Primarily, RoboDock will support different types of O&M related robotics for offshore wind:

1. Subsea: ROVs and AUVs that are used for inspections and repairing of subsea cables and wind turbine foundations;
2. Sea surface: Unmanned Surface Vessels (USVs) that are used for wind site surveys, monitoring of monopiles and security observations;
3. Airborne: UAVs and drones that are used for blade and nacelle inspections and replacement of light wind turbine parts.

The solution will lead to **lower societal costs**, as operational reliability will be increased by presence of multiple inspection and repair robots on-site, leading to early identification of potential problems and fast deployment for repairs, which is reducing downtime. The efficient sharing of infrastructural facilities for multiple robotic systems will further lower the societal costs. The positioning of the Robodock closer to the project site will allow for more sustainable project execution due to less distance to be travelled.

Results

Under this RoboDock project that started a year ago, the consortium aims to develop a fully automated and versatile offshore platform that will support autonomous windfarm inspection, environmental monitoring and data collection, with a modular expansion to provide additional facilities, making it a multi-purpose concept. The RoboDock will be a low-cost, but rugged shallow water mobile platform that can host various offshore robotics. It will incorporate storm-resistant docking points, automated launch and recovery, charging points and an advanced communications and positioning hub (allowing for increased positioning accuracies and redundant communication infrastructure for the robotics deployed).

Short description of activities

The project will be implemented in three distinct phases. Such a step-wise approach allows for intermediate learnings and possible adaptations, while visible results can be achieved relatively fast and shown to all relevant stakeholders. The project's phases/activities are the following

- Phase 1 (Result 1 + 2) of the project is currently running aims at realizing the 'basic' RoboDock concept (by means of a prototype) for testing the basic functionalities, in terms of releasing and docking robotic platforms, and its communication and positioning functions. We aim to test the first prototype this winter in a sheltered environment (harbour).
- Phase 2 (Result 3 + 4): when the basic principles have been validated, the consortium will extend the RoboDock concept with more advanced functions that allow for greater precision and more offshore wind-related services as well as other services (e.g. ecological research and coastguard functions). This ensembles the RoboDock's primary capacities. Again this version will be for a sheltered environment.
- Phase 3 (Result 5): when these capacities have been validated, the consortium will make the last step in the project: the design of an actual RoboDock platform for offshore application that in a subsequent project can be constructed and piloted.

In addition, there are parallel activities (under result 6) that comprise the enabling supporting actions for the non-technical issues that will need to be tackled in this project, such as the regulatory framework.

Publications: A short presentation on the project (held by penholder Fugro during a "TKI wind op zee" event, is available through You-tube:
https://www.youtube.com/watch?v=1legTKE6UE8&t=2s&ab_channel=TopsectorEnergie

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"The project is executed with Topsector Energy subsidy from the ministry of Economic Affairs and Climate, implemented by Rijksdienst voor Ondernemend Nederland. The specific subsidy for this project is the "MOOI-subsidie ronde 2020".