Quantifying the impact of robotics in offshore wind applications

01/09/2020 | Dr Anthony Gray

CATAPULT
Offshore Renewable Energy

Project Summary

"We are **engaging experts** in both academia and industry to build a 'birds-eye-view' of the **current and future opportunities for robotics in offshore wind**. This will allow us to understand the current **research and development areas of focus**, provide knowledge of early stage technology and estimate the time it may take for developments to **reduce costs in offshore wind** projects. The outcome of the study will be a comprehensive report detailing our findings and will be publicly available."

We welcome further engagement, so please get in touch!

Project Background

- Project Partners
  - Xodus Group
  - ORCA Hub
  - ORE Catapult
  - Offshore Wind Innovation Hub

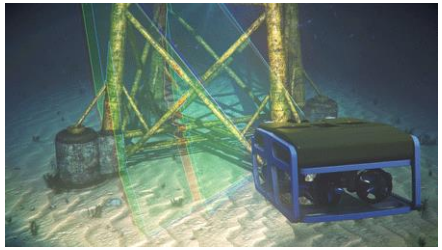
< *match funding from OWIH*

- Project Team
  - Dr Alex Koltsidopoulos, Xodus Group
    (Top left)
  - David Wavell, ORCA Hub
    (Top Right)
  - Dr Anthony Gray, ORE Catapult
    (Bottom Left)
  - Dan Sumner, ORE Catapult
    (Bottom Right)

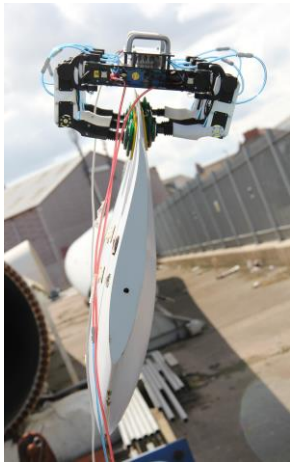
Project Background

Why this project?

- Value of robotics (during O&M phase):
  - Process automation
  - Reducing human exposure to dangerous environments
  - Improving the way tasks are performed
  - Repeatability of actions
  - Remote and more accurate monitoring of engineering assets
- Building on previous work from OWIH on O&M: Cost Drivers & Offshore Wind Digitalization
- Robotics expected to revolutionise the way that we are doing operations:
  - When?
  - How?
  - Technology type?
  - ££?
  - H&S?



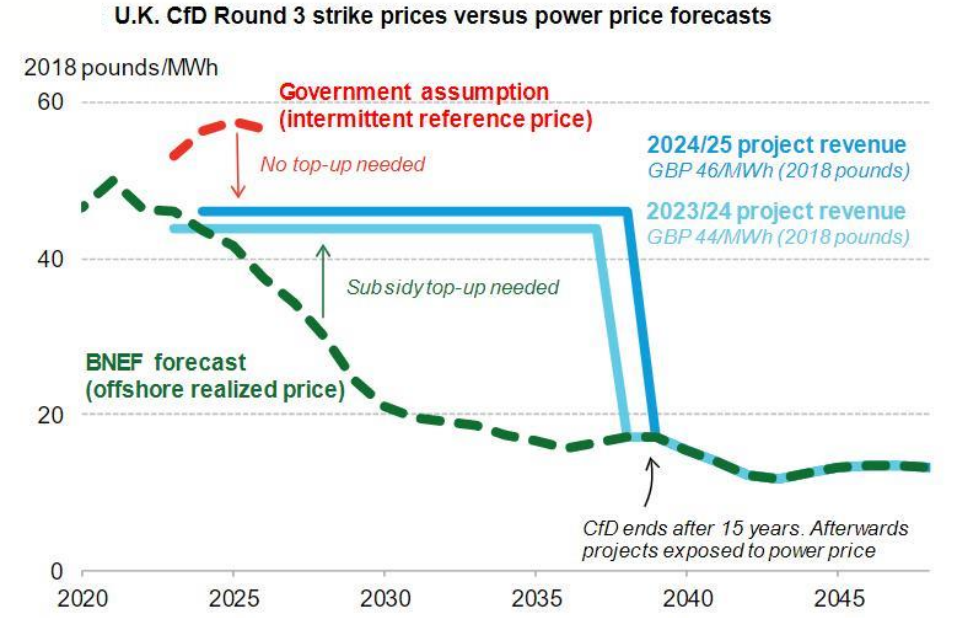
Photograph Sources: Iberdrola, AUV, Bladebug, SeaVision



Project Background

Why now?

- 40GW by 2030 in the UK
- Numerous different developments at different TRL stages
- Predicting future falling prices of offshore wind
    - How much will robotics influence LCOE?
    - How do we include them in future auction cost estimates?



Source: BloombergNEF. Note: Corrected for inflation using CPI. Financial years converted to calendar year using first referenced year, eg, 2024/25 simplified to 2024.

Methodology

Overall Project Management and project delivery

- Work Packages and Progress up to date
    1. Interview framework
        - Build the questionnaire and receive feedback- Feedback received, received HWU ethics board approval
        - Identify interviewees- Complete
    2. Expert Engagement
        - Reached out to 25 identified companies and individuals
        - Conduct the interviews & follow ups if necessary
    3. Roadmap
        - Analyse interview data to define state of the art and the industry forecasts
        - Identify potential milestones
        - Generate different scenarios
    4. Cost Modelling
        - Benchmark the 2 cost models from ORE Catapult and Xodus
        - Assess the cost model inputs form the questionnaire
        - Modify models and produce final outputs
    5. Dissemination
        - Produce final report (expected Q1 2021)

Interviews – Stakeholder Groups

- Identified 47 organisations and 58 individuals
- Grouped and categorized companies on their capabilities
- Shortlisted 25 organisations/individuals and 18 backup options

Research and Academia
- Cutting edge research
- Potential work that could be commercialized
- Other industries (such as oil & gas)

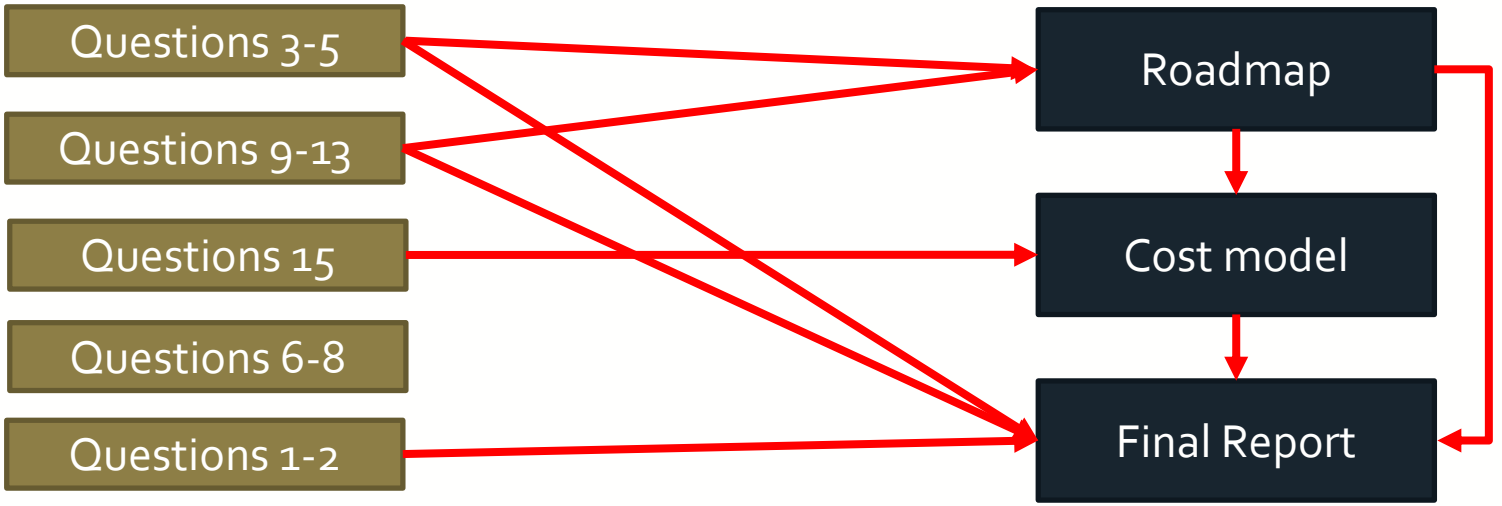
Robotic Technology Developers
- State of the art developments
- Potential upcoming developments
- Challenges in the development

Robotic Service Providers
- State of the art applications
- Challenges in the applications
- Future solutions

Wind Farm Owners/ Operators and OEMs
- State of the art applications
- Current challenges in operations
- Limitations on what can and cannot be deployed

Interview Questions - Themes

- Questions 1-2; general information on the interviewee and his/her organisation/department
- Questions 3-5; current strengths, challenges and barriers for the deployment of robotics
- Questions 6-8; Future robotic landscape and limitations
- Questions 9-13; tools and techniques, their benefits, timelines and importance
- Question 14; additional comments
- Question 15; Quantitative survey
    - Assessing the effect on cost, labour, time saved and risk for a range of categories (depending the tools/ services of the interviewees organisation)



Early Insights

Turbine OEM

- It is important to find the business case to justify the different robotics solutions: "*We've heard loads of ideas and a lot of them seem to fall down when you get down to business case. They do not provide any economic benefit.*"
- Companies are approaching the wrong stakeholders: "*Often it's the case that companies are approaching the wrong solutions, they should be talking to drone manufacturers instead, for example.*"
- Connect robotic developers with the end users: "*There is a gap between the robotics developers and the processes and technicians don't know what robots can do. Trying to bring those populations together to talk about those things.*"

Robotics Developer

- End users need to be "*more open to more novel ideas*".
- Lack of "*transparency of the issues that developers face*" as sometimes they "*do not realise have problems they've got*".
- There needs to be "*more ways to try new things faster*" and "*a good way to interface with end users*".

Contact us

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Engage with us:

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