

The Offshore Wind OPEX Ecosystem

WESC 2019 Cork

19th June 2019

University of Strathclyde, Glasgow

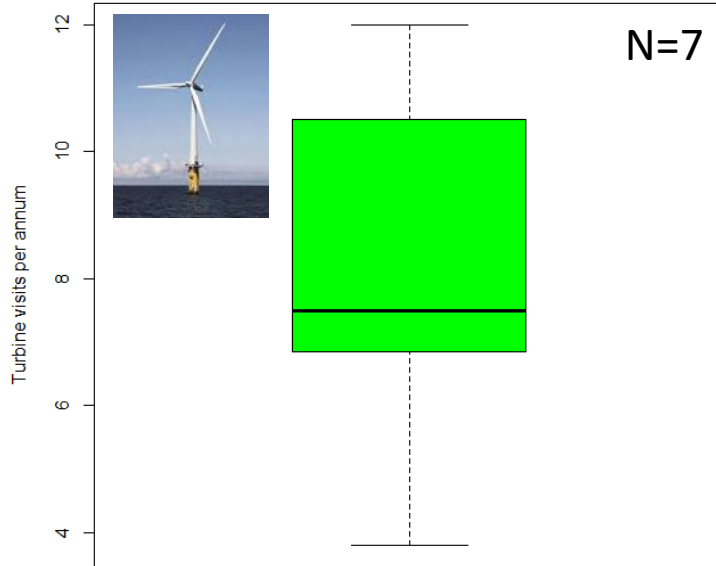
d.mcmillan@strath.ac.uk



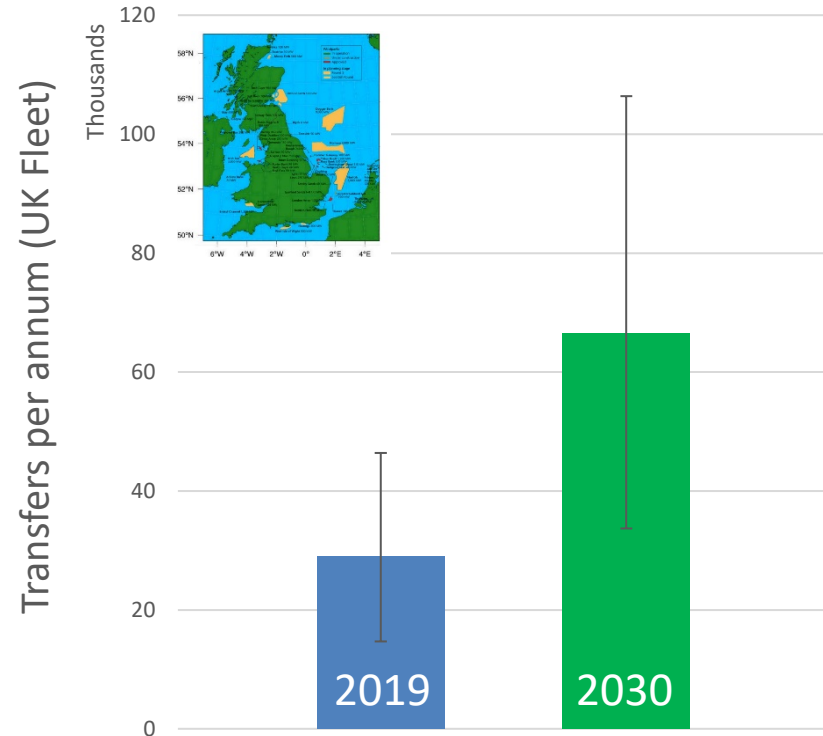
Party/ Data

KPI

How many transfers? (UK Fleet)



The pressure to achieve increased access to turbines implies a greater number of marginal-weather transfers, which carry a greater safety risk.



ORACLES Concept

- Access forecast quantifying the upside of a marginal-weather crew transfers in terms of cost and other KPIs
- Safety/risk factors of the crew transfer itself

For methodology see **PO.114**

<https://oracles.eee.strath.ac.uk/>

& forthcoming journal paper

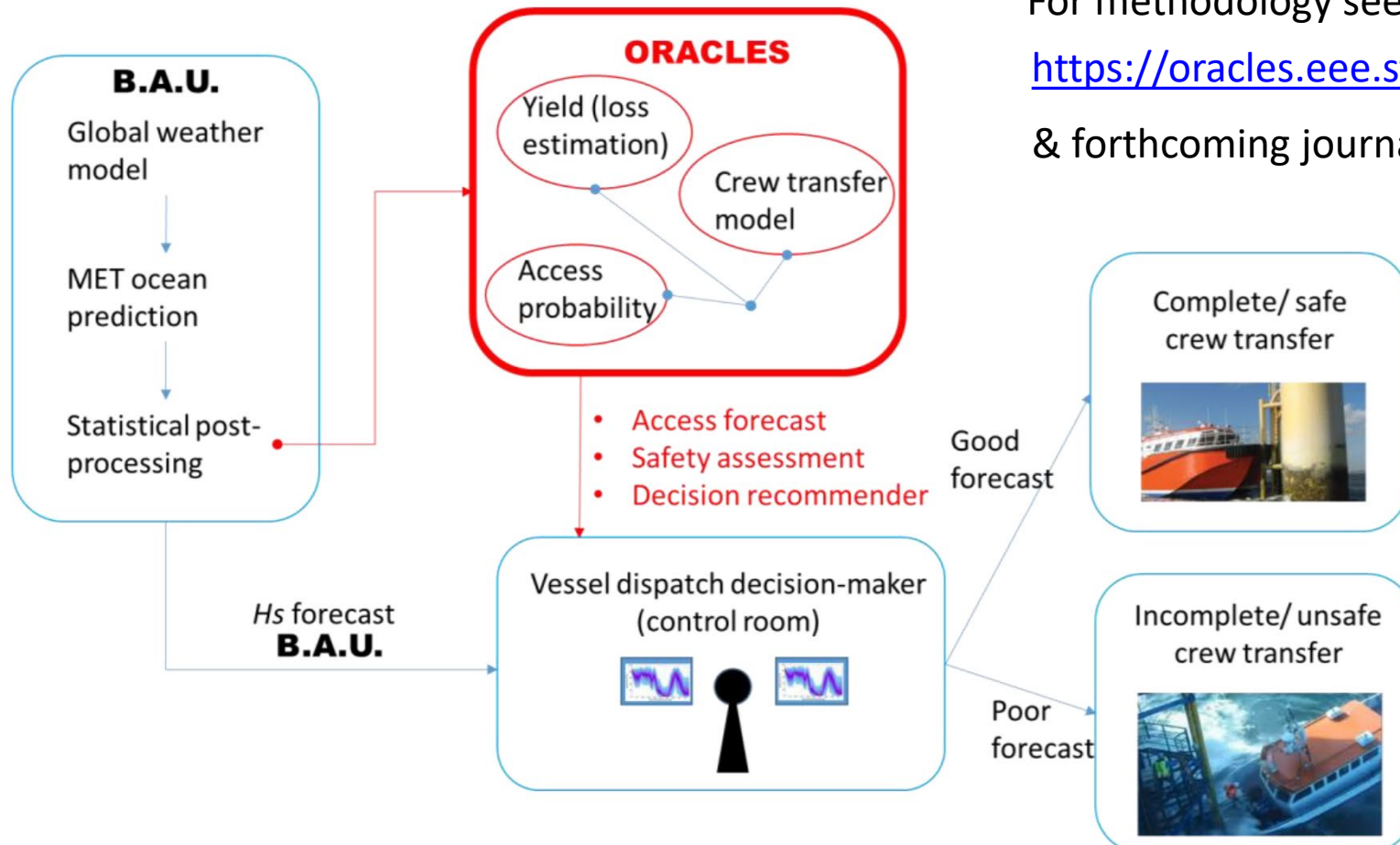


Figure 1: ORACLES Process and Business As Usual (BAU)

Importance of a good & engaged Industrial Advisory Board (IAB)



James Fisher and Sons plc
Marine Services Worldwide



RENEWABLE ENERGY
OPERATIONS &
MAINTENANCE EXPERTISE

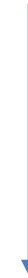
generating **better**



Data



Network



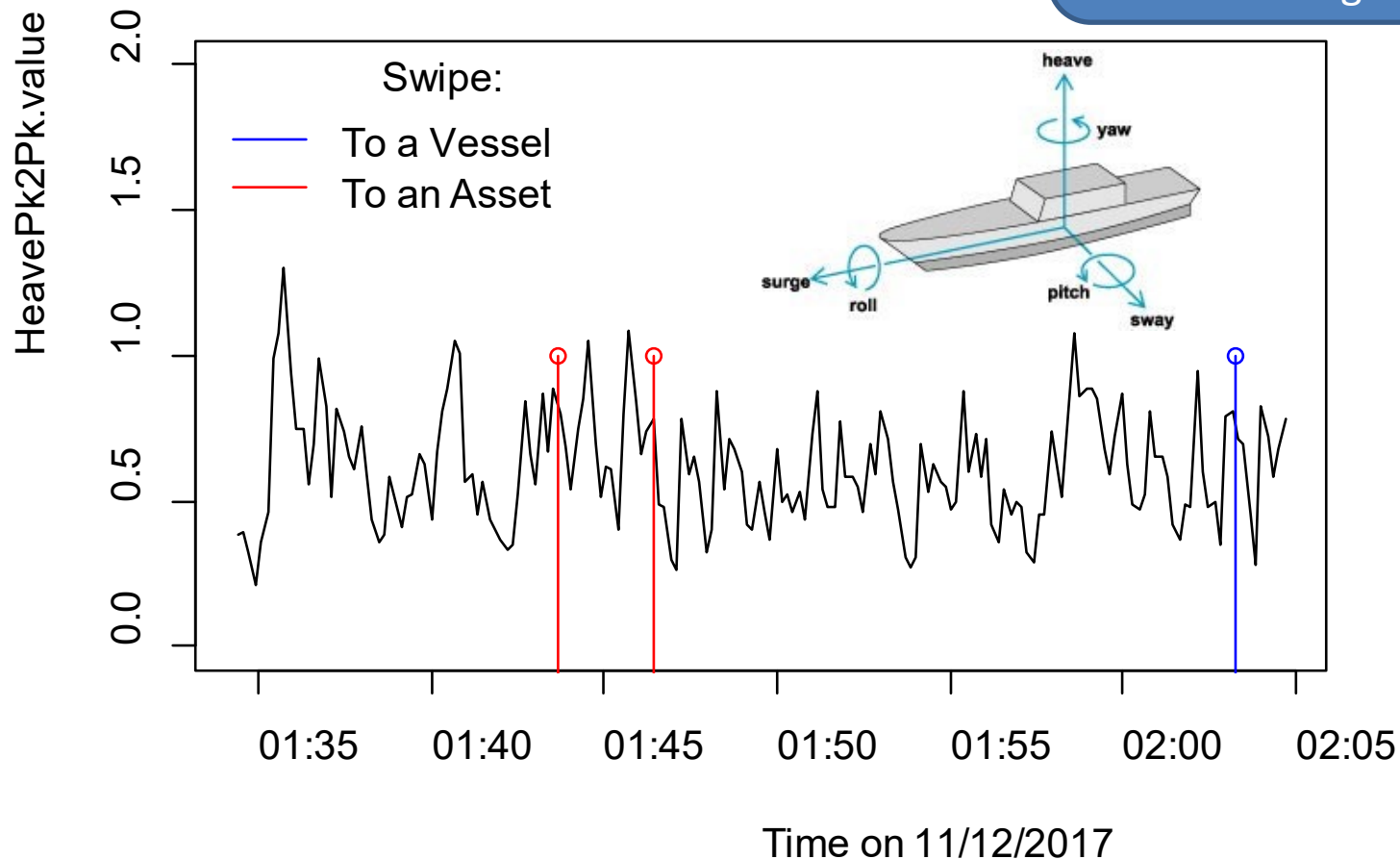
Expertise

Data: Vessel motion & transfer attempt

James Fisher and Sons plc
Marine Services Worldwide

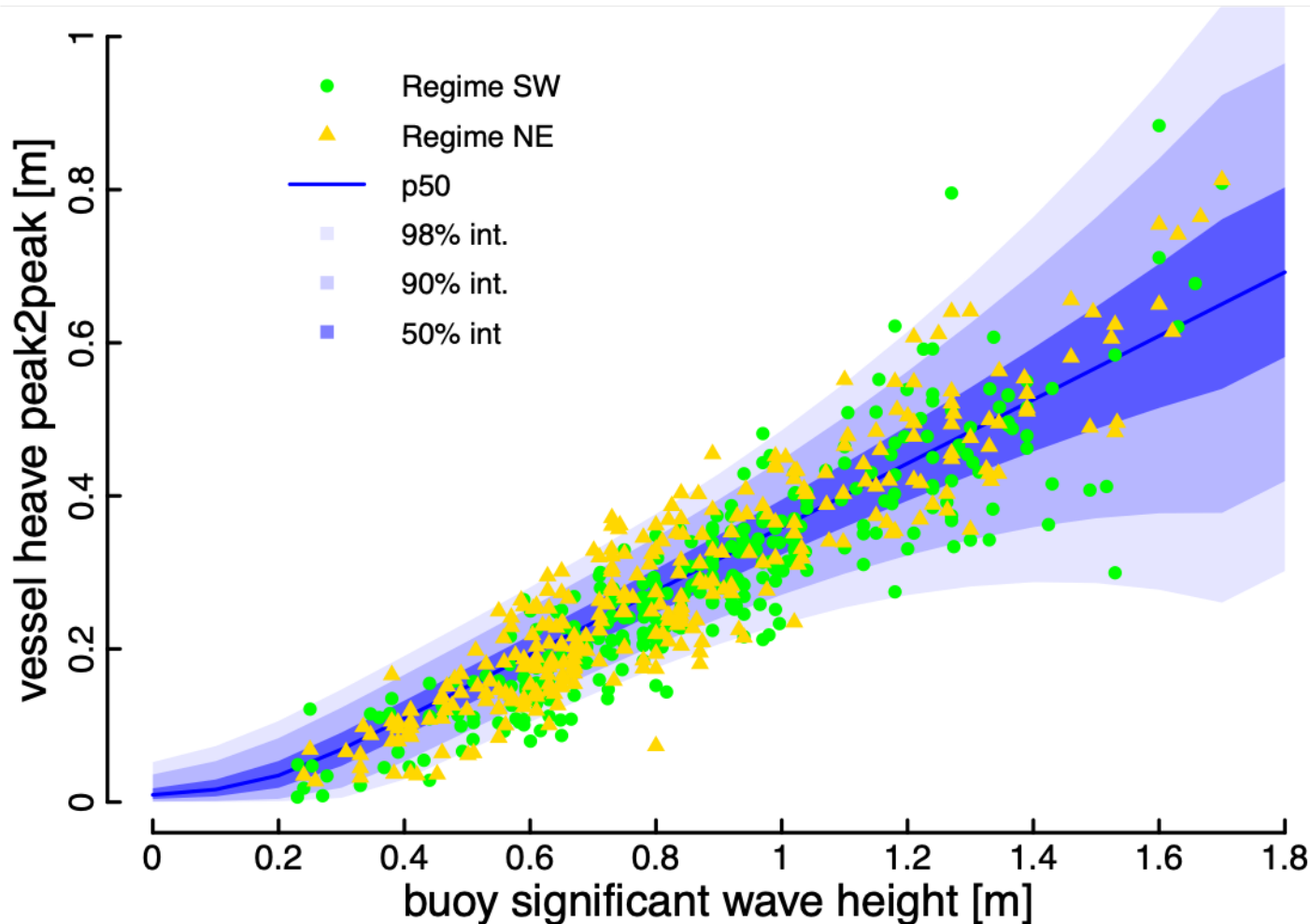


>700 Push-ons
>1500 Swipes
Unique high quality data set
No reverse engineering req'd



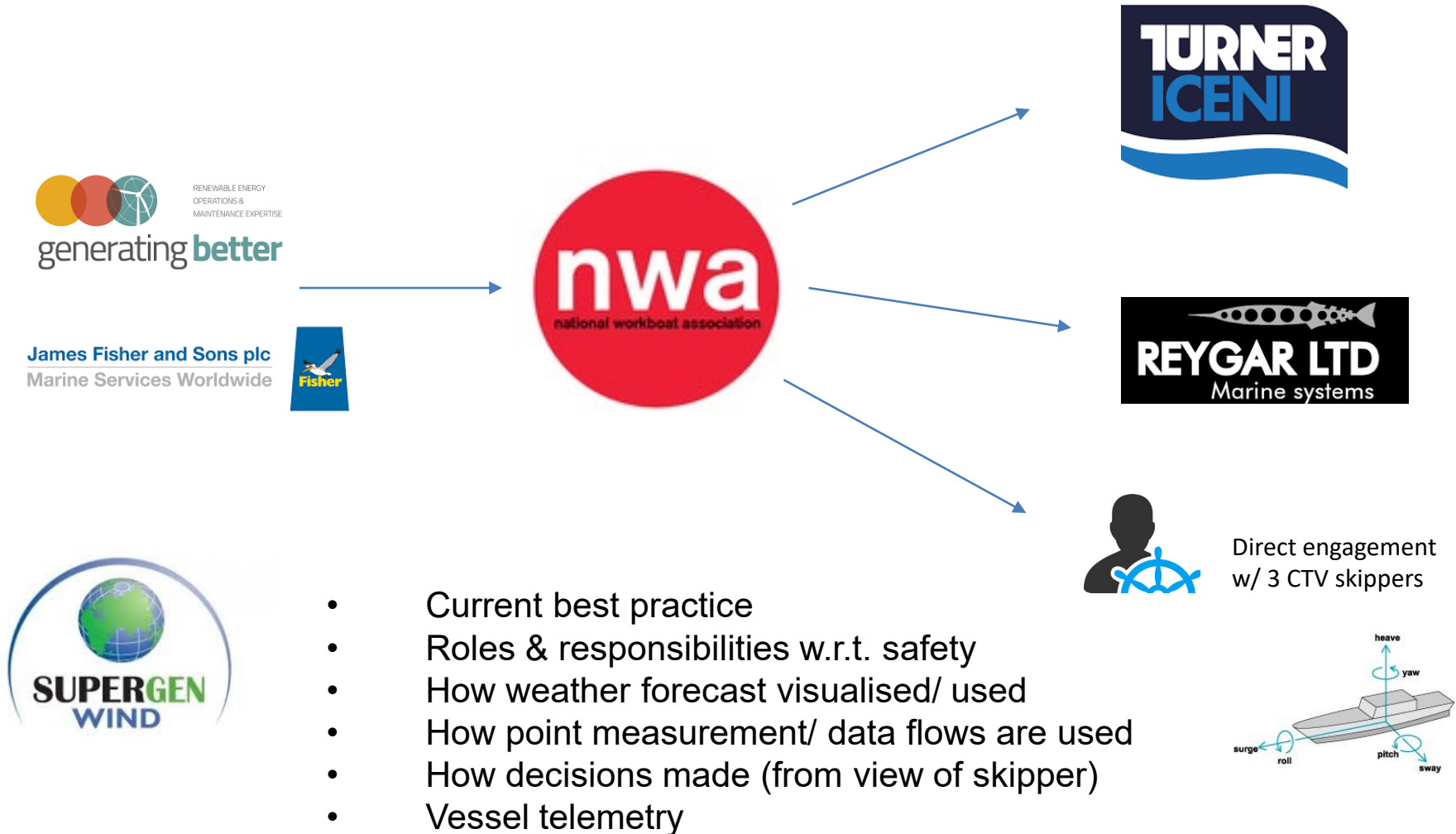
Vessel Motion Modelling

Key result facilitated by IAB links



- $Pk2Pk \sim f(H_s, T_p, dir)$
- Observations only in a section of H_s distribution
- Outer confidence interval 98%
- Link to MET forecasts via Copula

IAB Network: Linking to Workboat community



IAB Network & Expertise: Linking to Marine Controller world



James Fisher and Sons plc
Marine Services Worldwide



Major
OWF
operator



Direct engagement
w/ 3 MCs



- Role of site KPIs
- Experience of MC & effect on decision process
- Understanding link between forecast, MC, vessel skipper
- Understanding responsibilities w.r.t. safety
- Process mapping, ops shadowing

Defining Business As Usual



Major OWF operator

James Fisher and Sons plc
Marine Services Worldwide



RENEWABLE ENERGY OPERATIONS & MAINTENANCE EXPERTISE
generating better



- O&M Engineers
- Schedulers
- MC

- O&M Engineers
- Marine Coordinator

- Skippers
- Marine Coordinator

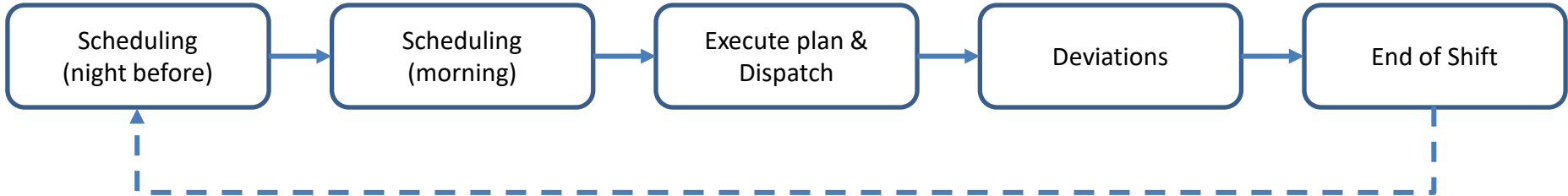
- Skippers
- MC
- Technicians

- Weather FCs
- Work Orders
- Vessels
- Technicians
- Priority

- Updates from <--
- Measurements
- Site expertise

- Access cond.
- Measurements
- Site expertise

- Work orders <--



Timeline

Information

People

IAB Network

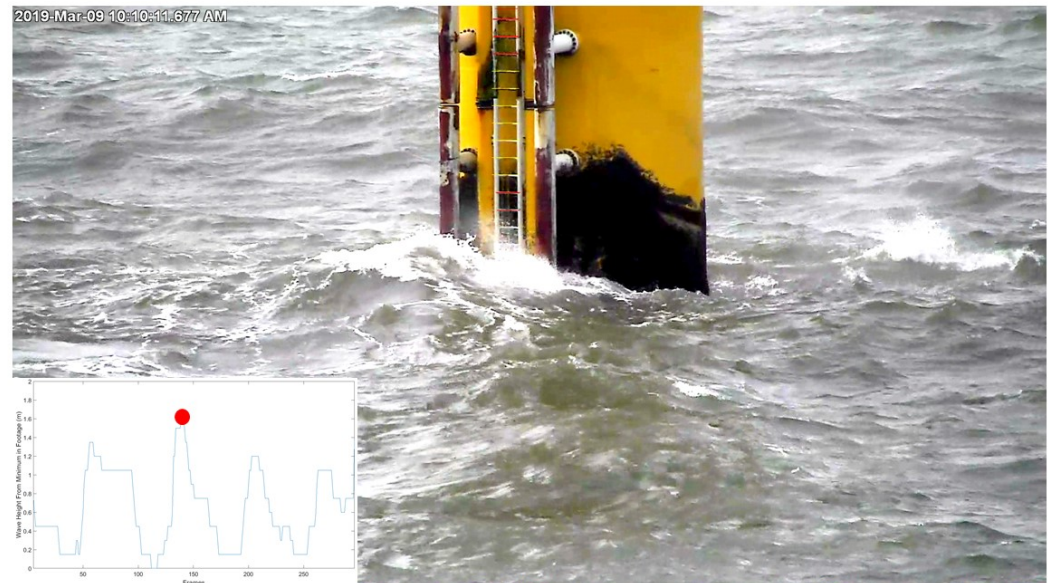


“Wouldn’t it be great to have a turbine location-specific access forecast” – Gregg McConnell
Site Ops Lead Robin Rigg EOn Q3 2018



- Supergen short project led by Dr. Paul Murray Image Processing @ Strathclyde
- EPSRC IAA project with Reygar
- ETP funded extension
- In discussions with Reygar for further funded work

Frame 139



New links generated by ORACLES



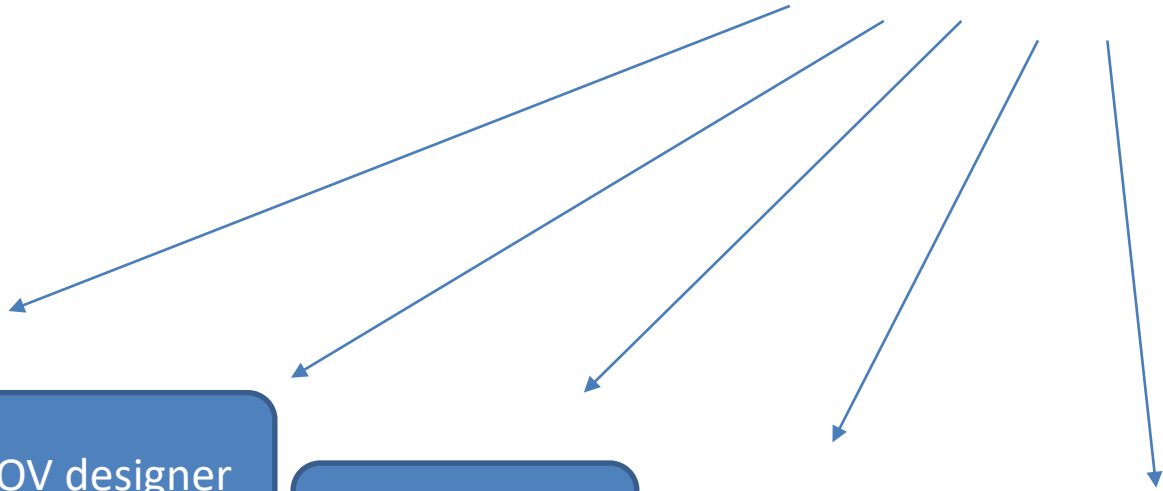
Marine leasing
body

SOV designer

Workboat/
CTV operator

Met ocean
forecast vendor

Major OWF
operator



Raw Vessel Motion Forecast & Transfer Quality Forecast

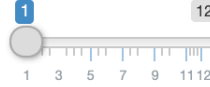
Visualisation

Classification

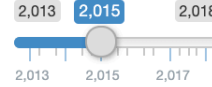
Day



Month



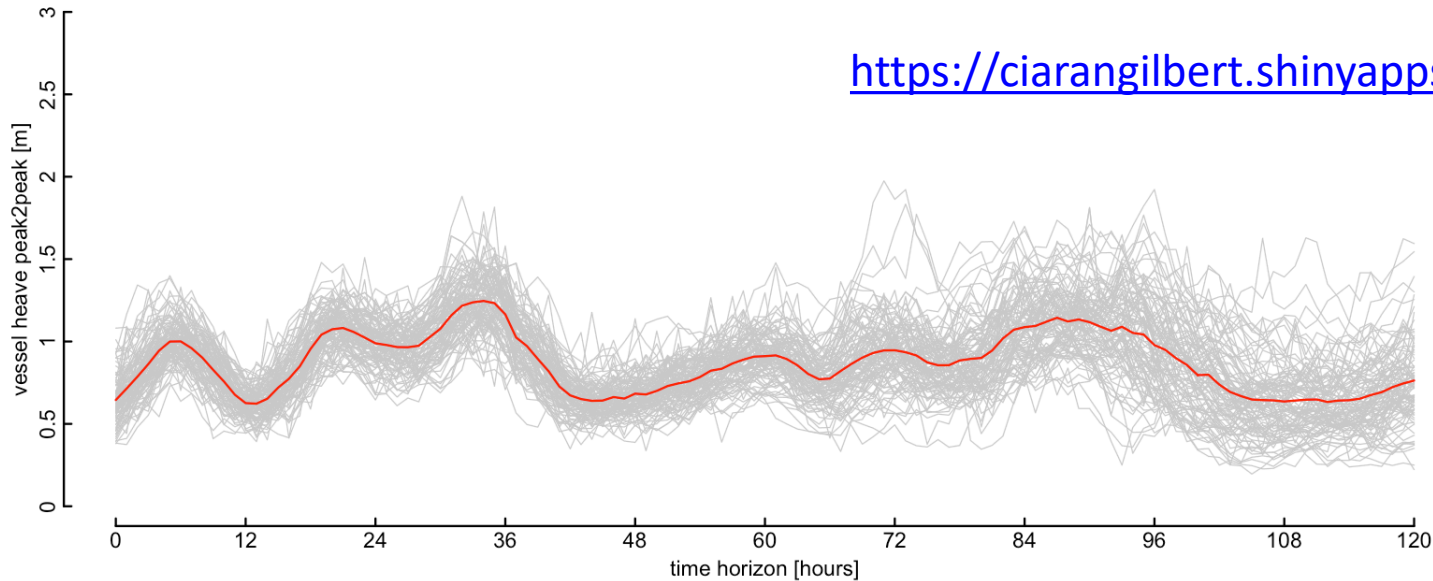
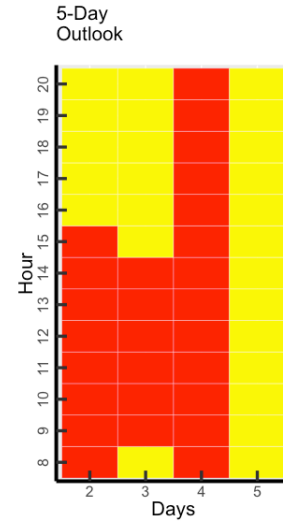
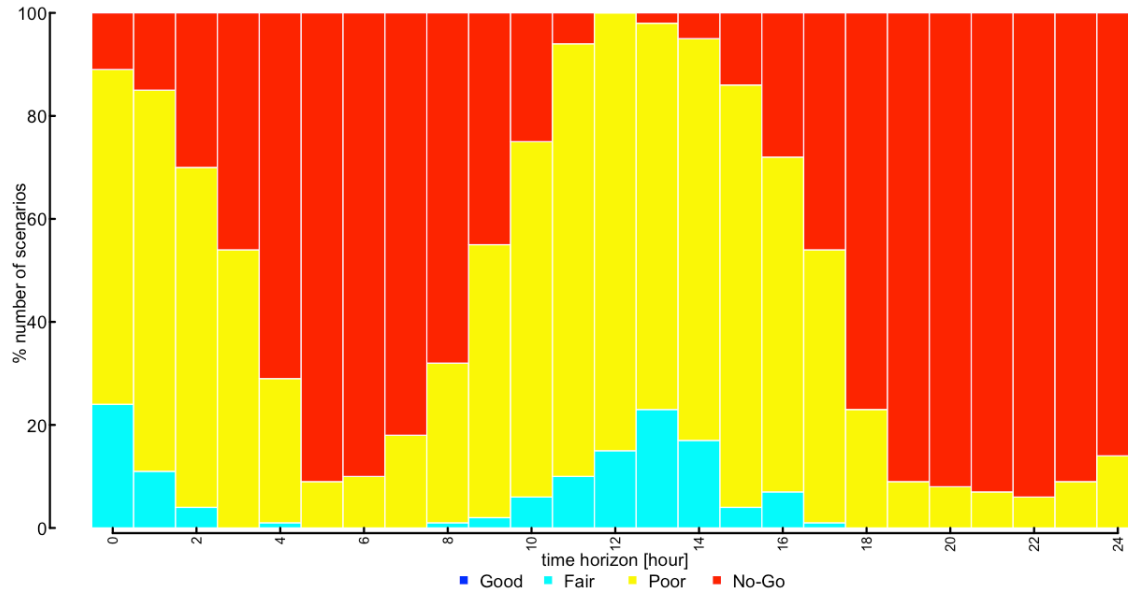
Year



Issue Time



Update View



Links to O&M Research



HOME-Offshore

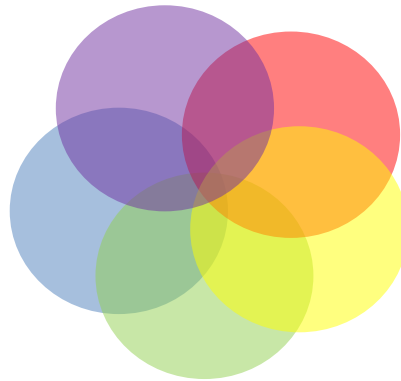
Remote inspection and asset management of offshore wind farms



Novel Data Integration Techniques for Enhanced Wind Turbine Condition Monitoring

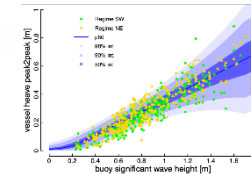


POSEIDOM



SPOWTT: Safety and Productivity in Offshore Wind Technician Transit

ORACLES



Reliable OM decision tools and strategies for high LCoE reduction on Offshore wind

P-Plot



CTV Performance plot

Quotes



“the ORACLES project brought together academics and practitioners in a unique and interactive way which ensured a good understanding of the challenges faced and helped to identify areas where **innovation adds value**.

The approach also resulted in an improved understanding of the data available and how it is used in the real world”

Quotes

James Fisher and Sons plc
Marine Services Worldwide



“The ORACLES project arose from JFMS work with the IAB for the Centre for Doctoral Training and is a perfect example of how a valuable industry project has provided real benefits by creating a **strong working relationship between academia and front end operations.**

JFMS have found the study to be a valuable experience with output of benefit not just to JFMS; but the industry as a whole. We are keen to explore further opportunities of working with academia and the synergy this presents to mutual benefit”

Quotes



“Reygar’s business is all about making data work effectively – it is great to see this at work on ORACLES.

Reygar is looking forward to collaborating on the next stage of the project as part of some “live” data versus forecasting. With the core vessel fleet monitoring product, BareFLEET, augmented by our DPR system we will be able to capture vessel performance in real-time to feedback into the decision making process.”



University of
Strathclyde
Glasgow