# Driving innovation in sub-sea inspection for offshore wind

## New challenges and old solutions

Michael Stephenson | Carbon Trust

GCE Subsea Offshore Wind Seminar

31/05/2018

# Agenda

1. The Offshore Wind Accelerator
2. Underwater Inspection Competition
3. Wrap-up

# Carbon Trust Offshore Wind

1. The OWA

2. Underwater Inspection Competition

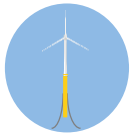
3. Wrap-up

## Advice and insights >

- Policy
- Cost Analysis
- Market Insights
- International

## Programmes >

Offshore Wind Accelerator



Floating Wind JIP

Offshore Renewables JIP (ORJIP)

# The Carbon Trust's Offshore Wind Accelerator (OWA)

1. The OWA

2. Underwater Inspection Competition

3. Wrap-up

**Industry-led** programme centred on the **cost reduction** and de-risking of offshore wind

Partnering developers are **involved in over ¾ of all operating offshore wind farms** in Europe

Programme promotes the engagement of **industry designers, innovators, consultants and specialists**

# The Carbon Trust's Offshore Wind Accelerator (OWA)



**Since 2009**

Driving international, cross industry engagement and development

**> £100m**

Cumulative investment in R&D projects

**60%**

Funded by the participating industry developers

**> 100**

R&D projects developed

# The Carbon Trust's Offshore Wind Accelerator (OWA)

**The programme has 5 research areas. Projects in each area range from technical studies to technology testing, demonstrations or support. New projects are developed and tendered every year according to the interests or needs from the programme partners.**

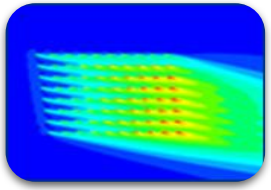


**ACCESS**

**CABLE INSTALLATION**

**ELECTRICAL SYSTEMS**

**FOUNDATIONS**



**WAKES AND WIND RESOURCE**

INNOSEA Marine Energy Engineering

everoze

Underwater Inspection Methods Project

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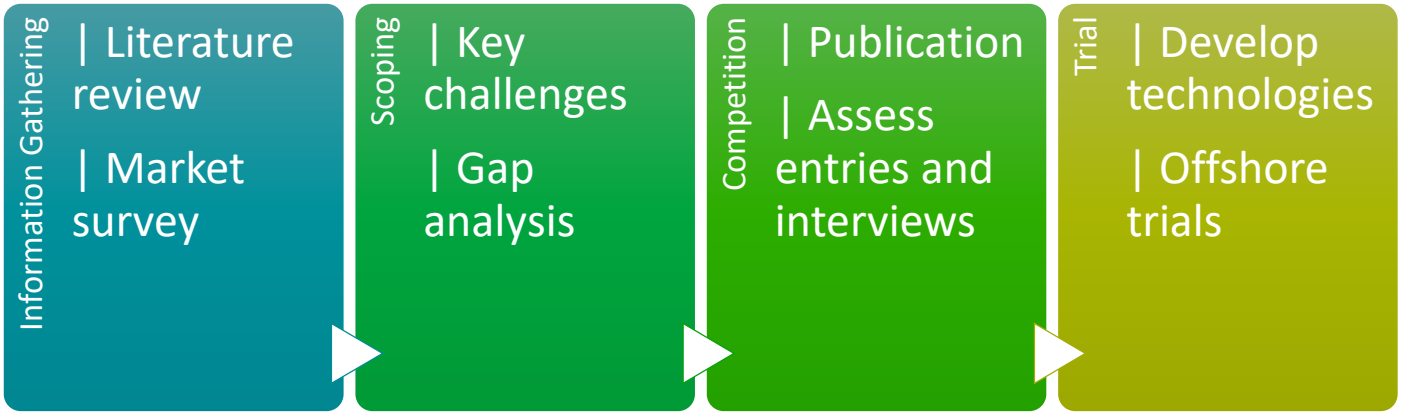
# Overview of Underwater Inspection Methods project

*Why?*

Developers are interested in new methods for carrying out underwater inspections to improve data quality and ultimately reduce costs and improve HSE





# Challenge 1: Monopile weld inspection

## Winner: Oceaneering

### Oceaneering

- Crawler based inspection technique – magnetic attachment
- Use of ‘phased-array’ ultrasonic sensors
- Can be deployed internally
- Tracks circumferential weld

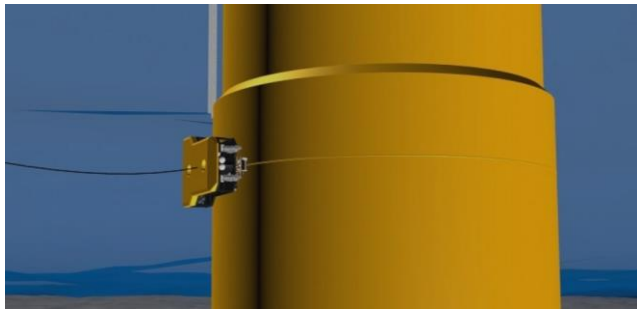


Image courtesy of Oceaneering

# Challenge 2: Jacket weld inspection

## Winners: (1) Oceaneering and (2) Kraken Robotik



### Oceaneering

- Tool equipped with alternating current field measurement sensors
- Attaches directly to jacket leg and can inspect weld

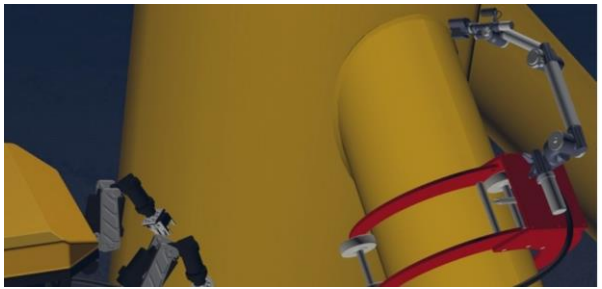
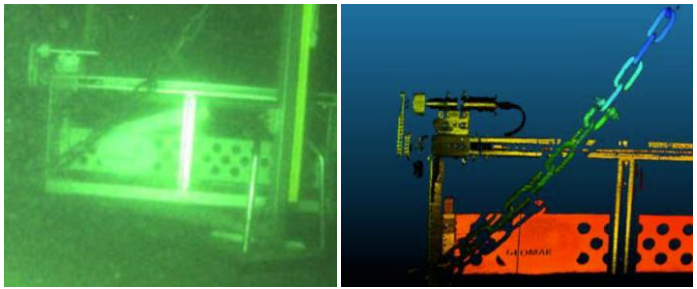


Image courtesy of Oceaneering

### Kraken Robotik - Seavision

- Laser image scanning
- Increased accuracy visual inspection
- Flexible mounting – ROV proposed
- On board real time processing



Images courtesy of Kraken Robotik

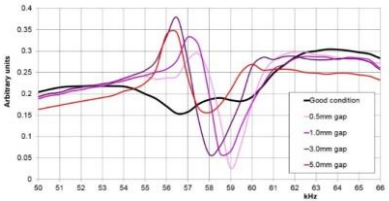
# Challenge 3: Monopile grout inspection

## Winners: (1) Uniper Technologies and (2) Next Geosolutions



### Uniper Technologies

- Low frequency ultrasound at wavelength of grout thickness.
- Produces spectra from reflections that can be interpreted to understand gaps in grout.
- Technology developed with British Geological Survey.
- More mature than other entrants – lab and offshore trials already undertaken.
- Further commercialisation support.




Example spectra – front gaps (*above*); previous offshore trials (*below*)

Images courtesy of Uniper Technologies

# Challenge 4: Jacket grout inspection

## Winner: Next Geosolutions

**Next Geosolutions (in partnership with Hydrason and Ashtead Technology)**

- Use of innovative wideband sonar to tackle jacket grout inspection.
- ‘Bio-sonar’ inspired by bottlenose dolphins.
- Consortium has operational, logistical and technological bases covered.
- Previously used in other industries but not yet applied to offshore wind.

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# Summary

- Another case study of market-pull innovation.
- Innovators now have direct access to nine leading global offshore wind developers.
- Still a lot of interest despite no cash award – a lot of value in experience and support.
- Offshore trials planned for summer/autumn 2018.
- OWA continues to be interested in innovation in this sector.

# Offshore Wind Accelerator

## Opportunities

- **Consultancies and universities**– keep an eye out for our annual tenders for engineering studies, desktop work.
- **Supply chain –** let us know about potential demonstration projects, key capabilities so we can involve you in our projects.
- **Innovators and researchers –** have a great idea that will reduce the cost of offshore wind? Talk to us.



carbontrust.com/about-us/tenders/ or search ‘Carbon Trust tenders’

carbontrust.com/offshore-wind/ or search ‘Carbon Trust offshore wind’


## Thank You

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CARBON TRUST

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