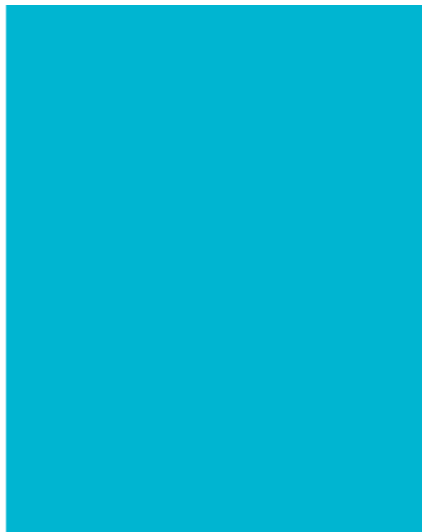# CIRCUIT

ISSUE 14 // AUTUMN 2018
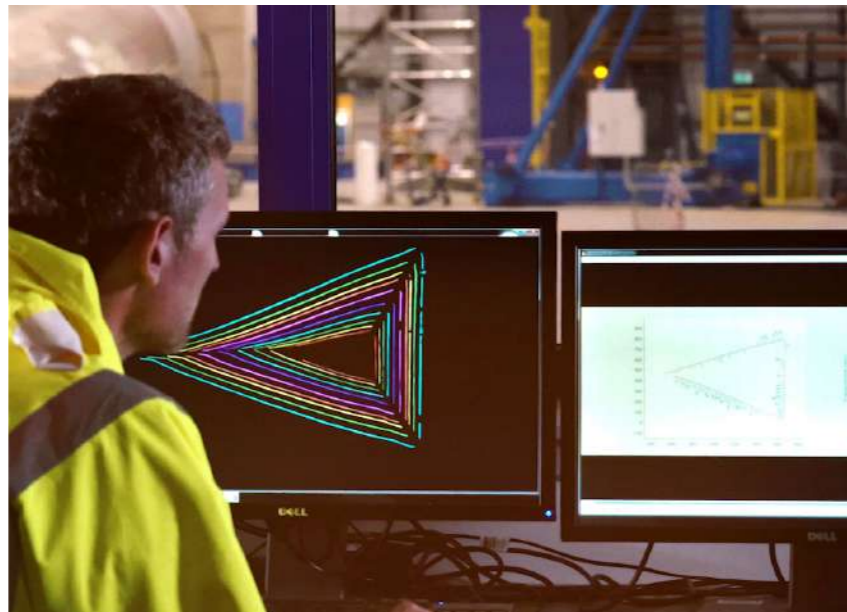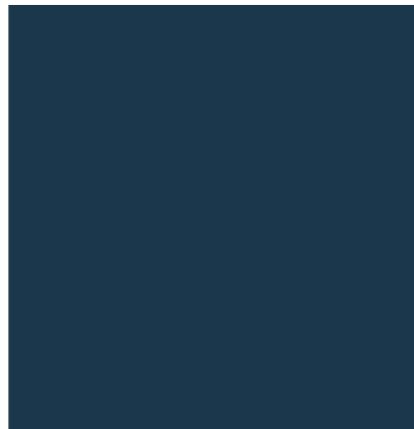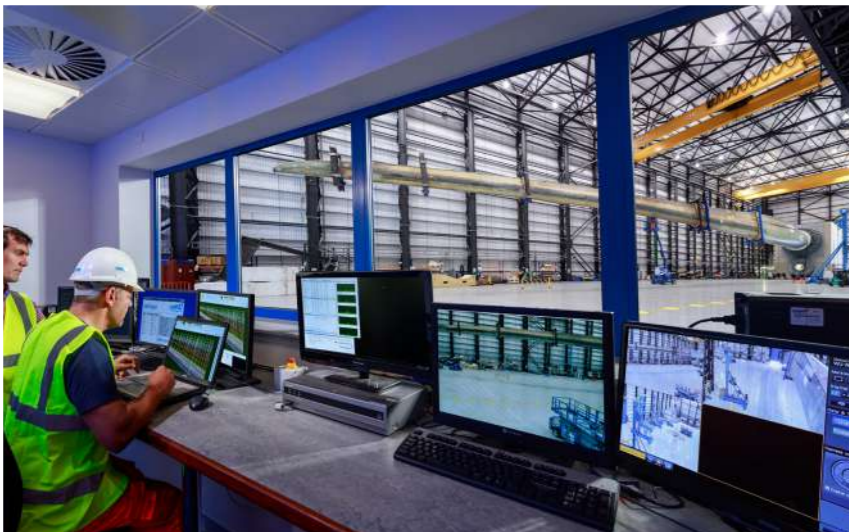
OPTIMISING THE FUTURE

FEATURES

// DIGITAL DOYENS
Introducing our Data & Digitalisation Team

// THE RISE OF THE MACHINES
Transforming the Sector's approach to O&M

// BENCHMARKING FOR SUCCESS
The Importance of Performance Data Sharing

We work with
Innovate UK

WELCOME

GUEST FOREWORD

Tom Hall
Team Lead Fleet Analysis, E.ON Climate & Renewables

Launching the UK Government's Industrial Strategy in 2017, Energy Secretary Greg Clark highlighted artificial intelligence and big data as one of the country's four "Grand Challenges." It is one of the key areas where, as in offshore wind, Britain has the opportunity to lead the global technological revolution.

Renewables projects and assets are relentless producers of big data. Harnessing the enormous volumes of data and using it to drive better strategy and decision-making is key in making offshore renewables infrastructure more efficient, reliable and cost effective. But it has been a learning curve for the industry: at the moment, the analytical tools, processes and procedures that could help owner/operators to maximise their assets are still in their infancy. The answer lies at the intersection of computer science, data management and engineering – combining these cutting-edge disciplines is key to capturing the prize of cost reduction, job growth, and economic prosperity.

The Offshore Renewable Energy Catapult is spearheading the digital transformation in the offshore wind, wave and tidal sectors. By working with industry large and small, and forming connections between data owners and the innovative technology suppliers who can unlock hidden value from the oceans of information that is generated, ORE Catapult is at the forefront of helping the industry become more data-led. With initiatives such as machine learning data pilots, data sharing/benchmarking platforms and Business Intelligence tools, the eyes of the sector's most digitally-savvy will be on them as big data's charge continues apace.

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10

OUR DATA AND DIGITALISATION VISION

To be the go to centre of knowledge and expertise for transforming the renewables sector into a data-led industry - extracting the full potential from digital technology, data and information.

CATAPULT
Offshore Renewable Energy

Department for Business, Energy & Industrial Strategy

EUROPEAN UNION
Investing in Your Future
European Regional Development Fund 2007-13

energy technologies institute

DemoWind
Delivering cost reduction in offshore wind

Image ›
Our Blade Test Facility Data Control Room

DIGITAL DOYENS

Meet the team spearheading the data–driven renewables revolution

> // **The ultimate goal is for the Catapult to become the go-to organisation for the offshore renewable energy sector in the field of data and digitalisation**

Offshore renewables projects are relentless producers of big data. While the sector's turbines are generating clean electricity, a complex network of sensors and systems are generating and logging information about the condition and performance of everything involved – from the turbine's blades and drivetrain, down to its bolts and even the heart rate of the technicians sent to make repairs.

All of this data presents huge opportunities for project owner/operators to aid complex decision-making, but one of the industry's key hurdles is a lack of specialist data analytics and artificial intelligence (AI) expertise to exploit it.

"We have all this data streaming off of machines, people, boats," says Dr Conaill Soraghan, head of the Catapult's Data and Digitalisation Team. "But for wind farm operators, this is problematic in two ways – the volume of data gathered and knowing which digital technologies to use to process and store it. Everybody recognises that there's an opportunity, but at the moment we lack the know-how to really take advantage."

In response to this industry-wide issue, the Catapult established a multi-disciplinary team of experts in computer science, data management, mechanical engineering and marine technology. Under Soraghan's leadership, its focus is on addressing the main challenges in wind, wave and tidal data management, and investigating and spearheading new ways of processing and handling data.
"Right now, there are three main areas of focus

for us," says Soraghan. "The first is data sharing, which is critical for identifying issues before they happen and implementing optimal solutions.

"In oil and gas, it's common practice to share data and benchmark so that you can find out how you're performing against your competitors. It also helps identify issues, for example, why particular components fail more than others. It helps companies to set targets and can inform investment decisions.

"We developed the SPARTA (System Performance, Availability and Reliability Trend Analysis) and WEBS (Wind Energy Benchmarking Service) platforms, which are our flagship data projects at the moment. We focus on wind farm operations, but we're always looking for new areas to apply benchmarking to: whether it's the installation phase, health and safety, or the cost of offshore wind."

Access to real-world operational data is one of the main barriers for the developers of innovative digital services. "At the Catapult we have access to operational assets including a

7MW offshore wind turbine," says Soraghan. "We're making this publicly available through the Platform for Operational Data (POD) to support service providers."

Distributed data and new ways of looking at data architecture are the next areas of focus for the team. "Wind farm operators all have disparate systems feeding data back to them. Our research indicates that these are not being as integrated as well as they could be, which is limiting the value of that data.

"We're configuring business intelligence tools for wind farm owner/operators and tidal turbine manufacturers that aggregate these various sources and give them interactive visualisations, unlocking that additional value and making it more accessible to those who need to know the results, but don't have the time or skill to do the number-crunching themselves.

"And it also gives a single source of the truth, as well as quality and efficiency gains."

The third area of focus for Soraghan's team is exploring new ways of analysing the vast quantities and varieties of data once it has been collected and aggregated into a useable format. "The industry

is going through an interesting phase of trying to understand the value of converting massive amounts of raw data into useful insight through new approaches like data mining, automation, digital twins and machine learning. We are seeking to de-risk these innovative, but less–understood, modern techniques," says Soraghan.

"There are many visualisation tools that make data look good, but those tools need to be configured with industry insight. For example, the visualisation tool can show your gearbox temperature – but it doesn't know the safe threshold. There's a real struggle at the moment to find out what are the safe working limits and the important warning signs that there is potentially an issue developing. We've been using data mining techniques to apply key expertise, learn from the data, and capture patterns and insight. Once we've done that, we can plug it into a customer's business intelligence tools, and this is really helping them extract value from the data."

The Crown Estate-commissioned Data Pilots project is enabling the Catapult to spearhead innovation in big data and analytics. "It can be expensive to change your whole digital infrastructure," says Soraghan, "and

there's risk involved too, because we don't know for certain that new processes will work."

Other barriers include behavioural change and archaic IT. "We want to help the industry innovate and try new approaches, so we will provide an engineer and a computer scientist for three months of in-kind consultancy to showcase, and experiment with, modern digital approaches to solve problems at no fee."

Soraghan says that the ultimate goal is for the Catapult to become the go-to organisation for the offshore renewable energy sector in the field of data and digitalisation. "Data and digitalisation has been an industry buzzword lately," he says, "but here at the Catapult there has been real, tangible progress and direct investment.

"It's now clear that cutting-edge analysis can cut costs and help make smarter decisions. We're here to help the industry embrace a more efficient, effective, data-driven future."

Visit ore.catapult.org.uk/data-digital to find out more about our work in this area.

Image ❯
Benchmarking the
performance of your wind
farm is critical to success

Old (>8 years)

Young (<5 years)

Medium (5-8 years)

Image ⌃
Burbo Bank Offshore Wind Farm
Credit: Ørsted

PERFORMANCE BENCHMARKING IN OFFSHORE RENEWABLES

Our Data & Digitalisation Team Leader Dr Conaill Soraghan explores the value of industry benchmarking and profiles ORE Catapult's world-leading benchmarking services

Since the launch of its unique SPARTA offshore wind benchmarking service in 2013, ORE Catapult has quickly established itself as a leading digital services provider in offshore renewable energy, offering industry benchmarking platforms and data analysis expertise to quantify the relative performance of renewable assets and projects.

SPARTA
System Performance, Availability
and Reliability Trend Analysis

webs
WIND ENERGY BENCHMARKING SERVICES

It is recognised as good practice in mature industries to compare operational assets against competitors to understand if performance gains are possible and identify which aspects of operations should be targeted for improvement. One particular example of good practice of data sharing across industry is the oil and gas OREDA database. This system enables dissemination of sub-system failure rates based on operational experience, which helps both plant owners in planning operations and supply chain in development of components.

The value of engaging in industry benchmarking is wide-ranging. It helps owner/operators to:

// Demonstrate to investors that the fleet are outperforming comparable assets.
// Identify areas of underperformance across a portfolio.

// Tap into industry-wide operational experience to set performance targets.
// Inform discussions and negotiations with the supply chain.
// Improve strategic operations and maintenance (O&M) planning and decision-making.
// Standardise definitions of measures of performance.

In the wind industry, it is imperative to understand relative performance. However, this can only be achieved if the raw data generated at sites can be shared. One of the most significant industry barriers to benchmarking performance is this need to share raw data as it is deemed by most owners to be extremely sensitive. Essentially, everyone wants to know how everyone else is doing, but nobody is willing to admit how they are performing themselves. All that changed in 2013, when ORE Catapult

// Our data sharing platforms have helped establish ORE Catapult as the industry-leading performance benchmark provider.

partnered with The Crown Estate to launch the world's first data sharing platform for operational offshore wind farms known as SPARTA; the System for Performance, Availability and Reliability Trend Analysis. SPARTA enables industry benchmarking whilst maintaining anonymity.

The platform enables the secure upload of performance metrics that are used to generate aggregated industry statistics or benchmarks, against which each participant can compare their performance. ORE Catapult can now deploy this architecture to benchmark other domains.

ORE Catapult's benchmarking services

SPARTA is a joint industry project facilitated by ORE Catapult and The Crown Estate. 100% of owner/operators with offshore wind farms in UK waters are reporting data to SPARTA on a monthly basis. This consortium of SPARTA participants constitute an international community who meet regularly to share knowledge and best practice.

There is currently a reporting population of 21 offshore wind farms spanning 4.5 GW of installed capacity. Offshore wind performance benchmarks are available dating back to January 2014 on the topics

of availability; actual & lost production; operations & logistics; reliability.

A review of performance metrics over 2017/18 is available in the SPARTA 2017/18 Portfolio Review

Over the past year, ORE Catapult has leveraged the lessons learned from designing, delivering and operating SPARTA to create a performance benchmarking system for the onshore wind sector called WEBS, the Wind Energy Benchmarking Service. WEBS was launched with a reporting population of 26 onshore wind farms spanning over 900MW across six different countries and seven different turbine manufacturers. Analysis and Insight reports are released periodically and the latest is the WEBS 2018 Autumn Report that is available at **www.webs-ltd.com/publications**

Our data sharing platforms have been designed based on the following principles, which have helped establish ORE Catapult as the industry-leading performance benchmark provider:

// **Anonymity:** Users can only access their values and aggregated industry statistics. Maintaining anonymity has created a pathway for data sharing and industry benchmarking between owner/operators of windfarms.

// **Transparency:** There is complete transparency in definitions and methodologies used and these are published in a Metric Handbook. Consequently, results are clear and comprehensible.
// **Quality:** Extremely high quality and reliable output is achieved through continuous metric assurance and verification activity.
// **Security:** All data is encrypted, there is a multi-tier architecture and information security audits are regularly carried out on the whole system.
// **Industry-Led:** Our benchmark platforms are designed by owner/operators for owner/operators and are continuously improved to ensure they reflect industry needs.
// **Monthly Benchmarks:** New benchmarks are made available every month. This reveals seasonal variations and can inform detailed optimisation of operations.

ORE Catapult is now working to expand its existing benchmarking services on an international scale and is open to exploring opportunities to deploy its best practice in benchmarking in new domains such as cost reduction, Health & Safety and in new offshore renewable sectors such as floating wind and tidal.

Contact Alistair Lee (alistair.lee@ore.catapult.org.uk) to find out more about performance benchmarking.

Image ➤
Digital visualisation of
an offshore asset

Image ❮
Levenmouth 7MW
offshore wind
demonstration turbine

THE PLATFORM FOR OPERATIONAL DATA (POD)

Facilitiating innovation and growth through offshore data provision

ORE Catapult's Platform for Operational Data (POD) service enables individuals and organisations to access and request data sets collected by the Catapult from our operational Levenmouth 7MW offshore wind demonstration turbine. POD supports innovative research, projects and product development through data provision to academics, researchers and the wider community in pursuit of growth opportunities in renewable energy.

POD currently provides access to operational data from the 7MW Levenmouth Demonstration Turbine. This incorporates 1Hz and 10 min aggregate collections from over 500 different SCADA sensors and alarms across the wind turbine, met mast and substation at the site. The data is available from January 2017 onwards and is refreshed monthly. The intention is to expand POD in the future to showcase and disseminate operational data from a wide range of assets and collaborative projects.

Turbine SCADA data is often deemed as extremely sensitive by renewable asset owner/operators, and this can be a barrier for industry and academia to test and improve tools, products and services. Offering SCADA data from the Levenmouth Turbine allows the supply chain to get access to much needed operational data to allow innovative investigations, research and product development. This data helps the industry further improve their understanding of how a wind turbine or farm operates and its various operational states. It also highlights areas where performance can be optimised. With access to bespoke data like this, clients are able to test and verify ideas, products or services against live, operational data.

Prospective clients can download sample data from the data sets required to ensure it meets their needs, and then request the full data and data sensors needed for the time specified. The Catapult will then carry out internal checks and provide recommendations on the data request (e.g. provide meta-data and suggest useful additional data collections). The data points from the sensors are all catalogued by component and datatype (e.g. integer, Boolean etc.) and a description of each sensor is given, so users fully understand the data they may be processing and can find key data easier.

Visit **www.pod.ore.catapult.org.uk** to access these valuable data sets or contact Steve Ross (steve.ross@ore.catapult.org.uk) to find out more.

IMPROVING ASSET OPERATIONS AND PERFORMANCE: THE RISE OF THE MACHINES

'Machine learning' is revolutionising the sector's approach to operations and maintenance

Applying 'Machine Learning' in offshore renewables could reduce the cost of asset operations and maintenance activities, which can account for almost a quarter of the levelised cost of energy of an offshore wind farm.

Machine Learning involves using computer systems to analyse vast quantities of data. The machine recognises patterns and trends from that data, from which we are then able to extract valuable information and learnings. By extracting value from data in this way, operators can gain a competitive advantage. For global technology firms, data is the raw material that drives their business. Offshore renewables organisations must follow their lead or risk being left behind in the Fourth Industrial Revolution.

Wind farms generate vast quantities of data in a variety of forms. Onboard SCADA systems produce operational data covering every aspect of the turbine. In addition, the support infrastructure of a wind farm generates data in the form of work orders, supply chain management and the like. Currently, ORE Catapult observes that much of this data is simply archived or worse; discarded. This data has the potential to offer valuable insights, and Machine Learning is a highly effective technique to uncover them.

Many of the current technology challenges in offshore renewables are solved by manual, laborious inspection, or even by guesswork. For example, identifying leading edge erosion of turbine blades is currently done by shutting the turbine down and inspecting the blade. The Catapult is exploring the use of Machine Learning to identify erosion using SCADA data and drone footage.

Machine Learning can also be used for predictive maintenance. By identifying when a component deviates from normal operation, operators may be able to take corrective action before major damage occurs.

The application of Machine Learning can be applied to many other forms of data: text, image, video and sound data are all ripe for analysis. By combining the industry expertise of engineers, managers and business analysts with data science techniques, offshore renewables organisations will be uniquely placed to benefit from the digital transformation.

Operators need to review their data management procedures, with a focus on making data available to analysts. Operators must then work to understand the data that their organisations have and create infrastructure that supports Machine Learning. The Catapult's experience is that short pilot projects, combining field experts of both offshore renewables and data science, are a good way to start and show the potential of Machine Learning.

Contact Peter Van Heck (peter.van.heck@ore.catapult.org.uk) to find our more about machine learning.
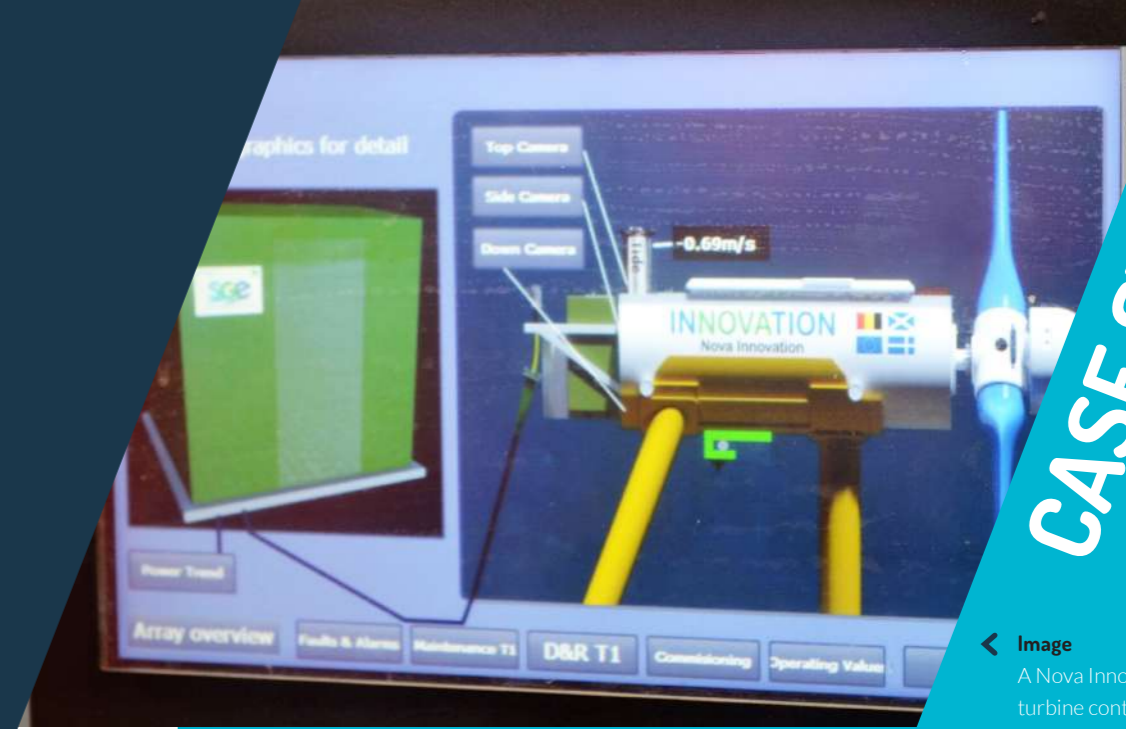
STREAMLINING DISPARATE DATA WITH BUSINESS INTELLIGENCE TOOLS

Companies that invest in data analysis and visualisation tools can see a real return on investment

A recurring theme of this edition of Circuit is how the renewables industry relies on operational data to provide understanding of performance gains and shortcomings. Although data is readily available, its exploitation for better reporting, analysis and decision-making is limited. Investment into this digital transformation can reward real insight which, in-turn, can be fed back into design and operation strategies to add real value to operational assets.

Understanding data and dashboarding

To date, the use of operational data in the renewables industry has primarily consisted of retrospective analysis, often following a fault or failure or a modification to enhance performance. Although this use of data is necessary and undoubtedly valuable, there are now innovative ways to get more insight from the data streams of operational assets.

A fundamental requirement in generating this insight is the consolidation and understanding of disconnected data sources. Business intelligence (BI) dashboarding provides a way to achieve this. It involves compiling data into an appropriate structure (such as connecting data streams based on common features) and providing an interactive means to interrogate the underlying data. A BI dashboard allows for a comprehensive view of performance and enables the detection of unwanted patterns or anomalies in operations. Dashboards are often implemented as a means of reporting, where the dynamic and

configurable nature of visualisations allows for reports tailored to the end user.

ORE Catapult has, in projects with a number of windfarm operators, used dashboarding as a first point of contact in understanding the available data. This has allowed for improved understanding of the data streams, a visual way to connect related information and enables the user to address industry challenges.

Acting on Insight

Once data streams are connected and well understood, specific challenges can be addressed. Prediction of failure modes, accurate estimation of resource and scheduling of service interventions are examples of industry challenges that can benefit from digital innovation.

ORE Catapult is actively supporting and developing capability in this area within the renewables industry. Several 'data pilots' have been conducted with academic and industrial partners with the goal of developing advanced analytics tools and capability in this area. These

range from building reference maps of specific components for anomaly detection, to developing machine learning algorithms to detect previously hidden patterns in datasets. The knowledge gained through these ongoing pilots is further growing the knowledge base of ORE Catapult and industry partners alike.

Developing capability is, however, only one piece of the digital transformation puzzle. The future of these developments will incorporate a feedback loop into design and operations. This will require real-time evaluation of operational plant for improved performance and decision making. ORE Catapult identifies the gap between the data owners (the OEMs and owner/operators of operational assets) and the data specialists as a bottleneck of the digital transformation in the renewables industry. Leaning on the capability of both parties, through collaborative projects, will help in upskilling the renewables industry as a whole and addressing real technology challenges.

Contact Craig Stout (craig.stout@ore.catapult.org.uk) to find out more about Business Intelligence tools.

Maximising the way EnFAIT is using data

Enabling Future Arrays in Tidal (EnFAIT) is a Horizon 2020 funded collaboration between Nova Innovation and eight European partners. The project aims to advance tidal energy through demonstrating the world's largest tidal array, located in the Shetland Islands, over a five-year period. As part of this project, ORE Catapult and Nova Innovation have developed a means of transforming operational data into Key Performance Indicators (KPIs). This enables the optimisation of the design and operations and maintenance (O&M) of current and future tidal arrays.

The Process

The objective of this collaboration is to use operational data to provide a range of KPIs to measure performance within the project. The process of converting operational data into KPIs involves:

// **SCADA data is used to identify operative states**
Logic is used to categorise the modes of operation (operative states) of the tidal turbines, differentiating between states such as: full performance, derated performance, downtime due to tidal conditions and downtime due to forced outages.

// **KPIs are generated**
Aggregation of the time spent in these operative states is used to calculate KPIs such as downtime and generating hours. Combining accurate tidal energy resource predictions with the known operation of the turbines allows for the calculation of production losses in each operative state (enabling the calculation of production-based availability and capacity factor). Additional KPIs are calculated using the time spent in each operative state.

// **KPIs are visualised and reported**
KPIs are reported through interactive BI dashboards. These dashboards enable clear reporting of the operational performance of the turbines and provide a visual and interactive means to interrogate the underlying data.

Value-add

The EnFAIT KPIs are now being used to analyse periods of better-than-expected operations and identify aspects for potential improvement, so that designs and maintenance approaches can be improved.

The process of creating systems to record KPIs has also allowed Nova Innovation and ORE Catapult to develop a better understanding of what tidal turbine and array data should be recorded and how. This is informing the design of data systems for the expanded tidal array.

The logic, data-streams and use of these KPI processes will be updated regularly throughout the EnFAIT project. The aim is to provide information to benefit the project and to potentially standardise operational KPI reporting in the tidal industry. This will baseline the way data is used in the sector and drive tidal energy towards a competitive future.

✧ EnFAIT

More information regarding EnFAIT and the work described in this case study is available at www.enfait.eu/blog

PROJECT SNAPSHOTS
Latest collaborative research projects

OCTUE

Octue offer a cloud-based data platform and is developing a suite of offshore renewables-specific analytics applications including wake models and digital twins.

ORE Catapult has partnered with Octue in various publicly funded collaborative projects, including Simulation to enable Asset Life Extension of wind turbines (SALE) that aimed to validate software designed to improve the control strategies of offshore wind turbines. Octue have deployed their data management and analytics expertise to characterise a site and deliver a Lidar-based rotor load prediction algorithm.

LINDAHL LTD

Lindahl Ltd are an SME offering a data mining tool called Sift that is tailored to wind turbine SCADA data structures. Sift makes complex data science accessible and promotes data exploration.

Lindahl supported ORE Catapult by providing software, a series of workshops, and support in developing process documentation to help elevate the in-house capability in processing and using data collected at operational wind farms for performance monitoring and failure prognostics.

SENNEN

SME Sennen have developed a software system for the dynamic planning of maintenance activity and team deployment at London Array Wind Farm.

The Sennen system integrates live site data (wind, wave, vessels etc) in real-time and connects to systems used by contractors Siemens and James Fisher giving a unified point of monitoring and control.

As part of an Innovate UK-Funded collaborative project to explore the value of total wind farm control, Sennen was selected to provide an interactive visual model to show how an over-arching wind farm control system may be used to optimise total wind farm generation.

WOLFRAM RESEARCH EUROPE LTD.

Wolfram Research Europe Ltd. is a pioneering organisation in computation and computational knowledge.

ORE Catapult collaborated with them to explore how machine learning and artificial intelligence can be applied to operational offshore wind farms. Unsupervised feature extraction algorithms identified anomalies in the fleet while a supervised neural network algorithm was developed to predict high speed shaft failures.

DATA PILOTS

ORE Catapult has partnered with The Crown Estate to initiate a new project called Data Pilots that will kick start innovations through novel uses of data.

The two main objectives of the project are:
1. Help data owners explore innovative solutions to data and digital issues
2. Capture and share common data and digitalisation problem statements facing the offshore wind sector

There is no fee to participate in this new project. In return for sharing a problem statement and a representative sample of operational data (minimum 6 months), a data owner will receive:
// A dedicated team working on a priority data challenge for a two month period
// Proof of concepts designed to solve your data challenges
// Access to a 'state of the nation' report that shares the priority data challenges across data owners in the offshore wind industry

Here are some examples of the Data Pilots we have already delivered:
// Aggregation of disparate offshore wind data streams (SCADA, failure logs, service schedules, weather etc.) via a Business Intelligence (BI) Dashboard
// Machine learning algorithms trained to predict drive train failures
// Interactive visualisation of spare parts and inventory stock levels
// Automation of repeated monthly performance analysis and reporting

DIGITAL TWIN ARRAY PROJECT

ORE Catapult has recently won public funding to support an innovative digital twin project with a consortium involving two SMEs, an offshore wind owner/operator and an academic partner.

The Digital Twin Wind Array (DTWindArray) project will develop and validate the first Digital Twin (DT) for a complete and operating offshore wind farm. The DT will combine operational data with simulations and artificial intelligence in an innovative and disruptive approach of monitoring and predicting the performance/reliability of wind turbines in virtual worlds, minimising the costs of physical inspections, monitoring and data analysis.

This cost reduction and improved predictive monitoring will transform the maintenance management philosophy of the offshore wind industry from a reactive-preventative to predictive-maintenance approach. The use of virtual environments to inform physical maintenance processes is potentially disruptive, addressing the competition scope seeking game-changing ideas.
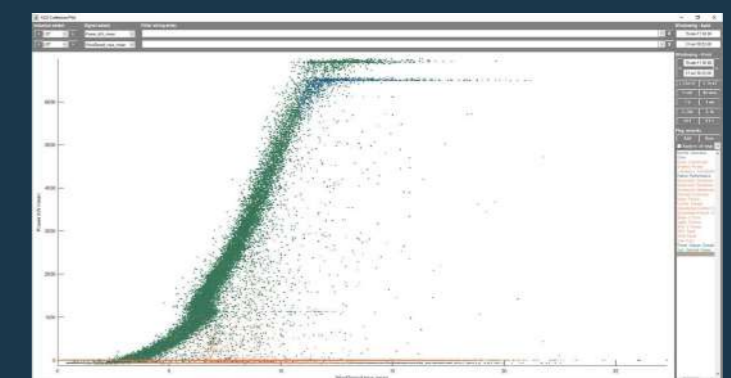
NEWS ROUNDUP

Latest news and developments

Levenmouth offshore wind demonstration turbine gets green light for innovation

We've been awarded a Section 36 consent variation by the Scottish Government to operate our 7MW Levenmouth Offshore Wind Demonstration Turbine in Fife until 2029.

The consent extension means that the Turbine can continue to offer UK industry and academia an unrivalled opportunity to develop a wide range of new technologies as well as a deeper understanding of the operations and maintenance aspects of offshore wind turbines, with the ultimate goals of reducing the cost of energy and creating more jobs.

Over the past four years, the Turbine has supported more than 50 UK companies with access for technology development, demonstration and validation or access to data and information generated by turbine operations. The current value of ongoing projects associated with the Turbine is more than £11m.

The Catapult's activities around the Turbine have also attracted significant support from the Scottish Government, with £685k funding provided to run SME technology demonstration projects and establish data sharing initiatives.

The Turbine also provides the blueprint for a state-of-the-art Immersive Hybrid Reality system installed at Fife College that is used for training the next generation of offshore wind turbine technicians.

UK and China partner to create £2m research centre to drive offshore wind technology innovation

We're partnering with China's Tus-Wind to establish the TUS-ORE Catapult Technology Research Centre, a £2m, three-year investment backed by the Yantai local government authority.

Based in Yantai in China's Shandong Province, the Research Centre will drive the development of innovative technologies and support the development of an offshore wind farm of at least 300MW capacity, with a minimum 10% UK content. This represents a UK supply chain export opportunity of at least £90m and provides a launch pad for the UK to access the Chinese wind market, estimated to be worth £15bn by 2030. The Centre will assist UK SMEs looking to enter the Chinese market, and lead Research & Development projects to drive collaboration between China and the UK.

In December 2017, ORE Catapult signed a Research and Development Collaboration Agreement with TUS-Wind and TusPark Newcastle, witnessed by the UK's Secretary of State for Business, Energy and Industrial Strategy, The Rt Hon Greg Clark MP, in which the organisations committed to working together to advance offshore wind technology cooperation between the UK and China.

Since then, the Catapult has organised a number of workshops aimed at introducing UK SMEs to the Chinese market and in March 2018 was part of an Innovate UK trade mission to China along with 15 UK companies. The Research Centre is the next stage in further developing the collaboration.

Two new ORE Catapult board appointments

Two new Non-Executive Directors for ORE Catapult were announced over the summer. The Crown Estate's Director of Energy, Minerals and Infrastructure, Huub den Rooijen, joined the Board on 1st July 2018, replacing Andrew Mill at the end of this year. And the former Repsol Nuevas Energias UK General Manager Ronnie Bonnar will join the Board from 1st January 2019, replacing Alan Moore.

£1.3m funding boost for Scottish Offshore Wind Innovation

A £1.3m programme of technology innovation projects designed to advance Scotland's offshore wind sector was announced in the Summer. The programme is backed by £445k funding from the Scottish Government, a further £150k from industry partners including Fergusons Marine Engineering, CWind and WOOD, and match funding from ORE Catapult.

The four projects will focus on next generation crew transfer and service vessels, a technology accelerator programme, investigating alternative communication and remote supervisory systems, and establishing a 'Fit for Offshore' business excellence programme to enable the Scottish supply chain to access offshore wind commercial opportunities.

Image
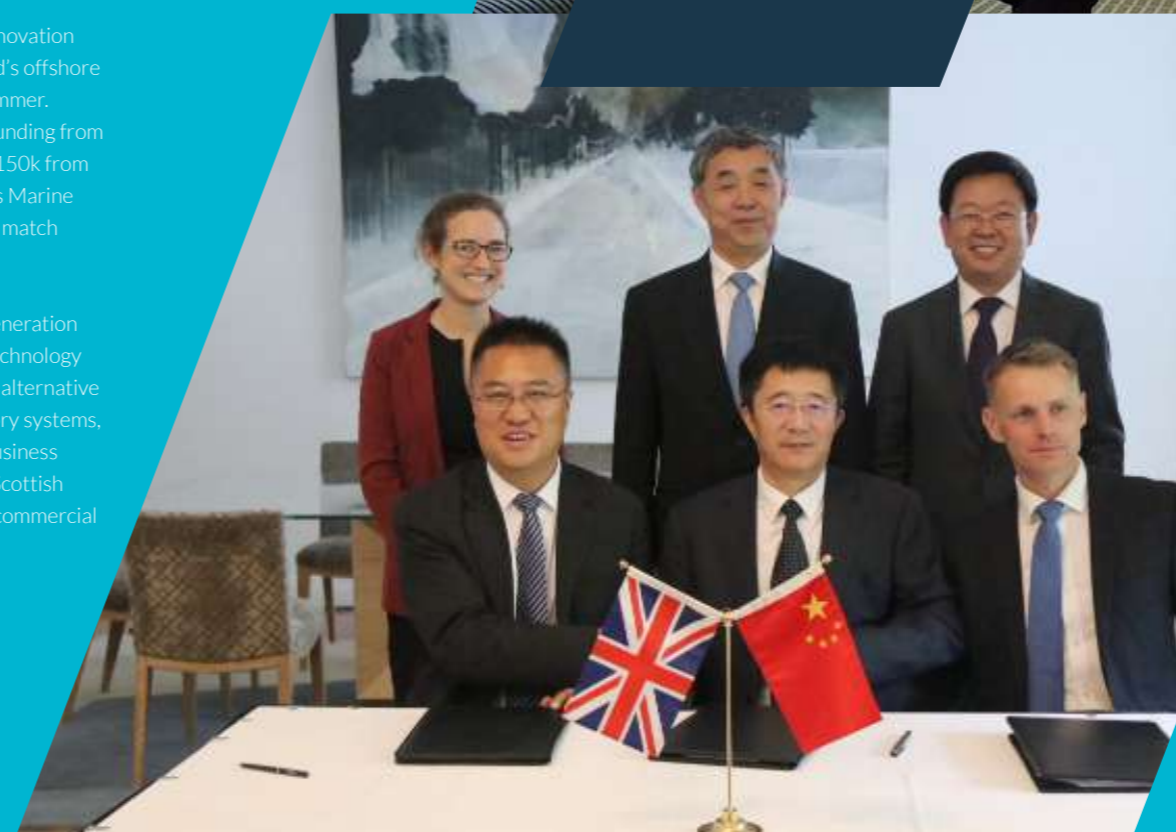The Levenmouth Demonstration Turbine

Image
New Non-Executive Director Ronnie Bonnar

Image
The signing ceremony to establish the TUS-ORE Catapult Technology Research centre

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ORE Catapult

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