Overview of ORE Catapult R&D activities

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Contents

• ORE Catapult Background
• Research and test facilities – Knowledge Areas
• R&D project examples
  • Accelerated Life Testing of tidal turbine drive trains
  • Tidal Turbine Powertrain reliability model
  • KTP projects
  • Other projects
Catapults: A long-term vision for innovation & growth

- Established and overseen by the Technology Strategy Board
- Bridging the gap between business, academia, research and government
- Long-term investment to transform the UK’s ability to create new products and services
- Open up global opportunities for the UK and generate sustained economic growth for the future
- Delivering the ‘know-how’ economy

£1.4bn private and public sector investment
Why do we need Catapults?

• UK research sector one of the top performers worldwide, but excellence fails to translate into business opportunities

• Technology & innovation centres proposed by entrepreneur Hermann Hauser in report for Government, March 2010

• Proven European model

Catapult’s expertise extends UK’s innovation deeper into early stage technology & research
Research and testing facilities to create added value

- Research for a purpose:
  - Specialisation (Knowledge Areas) -> creation of added value.
  - Research to complement and drive a unique set of testing facilities (Fraunhofer model).
  - Development of innovative products and services -> transform the market and generate revenue.

- Partnerships with industry and academia -> accelerate the impact and to be more competitive.

- International projection.

- Solution provider.

Objective: to become an international reference research centre for offshore renewables
Where is ORE Catapult positioned in the R&D landscape?

From applied research to the market
R&D Project Examples
Project 1: Accelerated Life Testing (ALT) of tidal turbine drivetrains

Objective: To develop an effective methodology for proving the reliability and performance of tidal turbine drivetrains.

- The project will deliver a validated acceleration model capable of compressing the 20 year life of drivetrains into a test which takes months to
Project 2: Tidal Turbine Powertrain Reliability Project

Background:
- LCoE reduction focusing on reliability of tidal turbines
- Design for Reliability (DfR) methodology and a simulation model
- Core grant fund: Up to £2.2 mil.

Purpose:
- Increase reliability, support accreditation, reduce LCoE, reduce finance and insurance premiums by 2018

Project partners:
- Ricardo, DNV-GL, Turbine developers, EMEC, Academia
Powertrain Reliability Project
Organisation, Roles & Responsibilities

Marine Farm Accelerator Steering Group

ORE update on progress to Steering Group and Device Advisory Group. DAG review technical specification

Software Developer
SIM tool GUI

Ricardo AEA
Spin off projects e.g. array condition monitoring, nanochip sensor technology, condition monitoring. Read across into wind/wave.

DNV - GL
Certification

Industry Technical Consultant Ricardo
DfR methodology Drivetrain design

Financiers & Insurers
Degree of confidence building

EMEC
Data gathering through EMEC Developers Forum

Tidal Turbine Developers
Turbine load and component data

University of X
Identify data requirements to inform reliability case, FMEA

University of Y
Development of a generic condition monitoring test rig

University of Z
Direct drive technology for tidal turbines

ORE Project management

ORE Technical lead

Project Management (Schedule, time risk, cost risk, project steering group)
Procurement
Liaison with MFA
Scoping phase and Phase 1, 2, 3 funding
Dissemination

CTO – Project Technical Lead
Project technical management (including technical risk)
Technical approval of designs
Development of SIM tool

Project Steering Group
ORE Chair with Leads from each team

Project team

Collaboration with Academia
KTP projects:

- Power Electronics condition monitoring – Warwick
  - Development of a method to estimate the remaining life of power electronic components of wind turbines based on temperature sensors.

- Dual axis blade testing – Durham
  - Development of an innovative method to accelerate the testing time of long blades.

- Condition monitoring for wind and tidal turbines – U. Newcastle
  - Development of a condition monitoring system that minimises the instrumentation and equipment fitted to a turbine (Wind and tidal).
KTP Dual axis blade testing (U. Durham – ORE Catapult)

PhD Narec - Durham University

KTP ORE Catapult - Durham University

Validation in BT1

Dual axis blade test patent

Product commercialised
Offshore Renewable Energy Catapult - Other Selected Projects

- Marine Farm Accelerator (MFA)

  The MFA framework has been established with a project developer steering group, technical working groups and a device advisory group.

- Scottish Enterprise: Marine Energy Cabling Solution

  The project has been set up by Scottish Enterprise to develop a cable protection system for a marine tidal array. Project partners include IHC, Ocean Flow Energy and Tekmar.

Other future developments: Component Failure Testing, Environmental Monitoring Technology