

FLOATING OFFSHORE WIND
CENTRE OF EXCELLENCE

Delivered by

CATAPULT
Offshore Renewable Energy

**DYNAMIC CABLE SYSTEMS
STRATEGIC PROGRAMME
TECHNOLOGY DEVELOPMENT AND
QUALIFICATION**

JANUARY 2023



FLOATING OFFSHORE WIND CENTRE OF EXCELLENCE (FOW CoE)

- Accelerating the commercialisation of Floating Offshore Wind – to deliver net zero and drive economic growth;
- Collaborative programme with industry, stakeholder, academic and supply chain partnerships;
- Developing and delivering a portfolio of collaborative project activity across four workstreams...
 - Technology Development;
 - Supply Chain, Infrastructure, Construction and Operations;
 - Development and Consent;
 - Delivering Net Zero (Policy);
- Working with existing industry programmes, initiatives and activities to augment and accelerate;

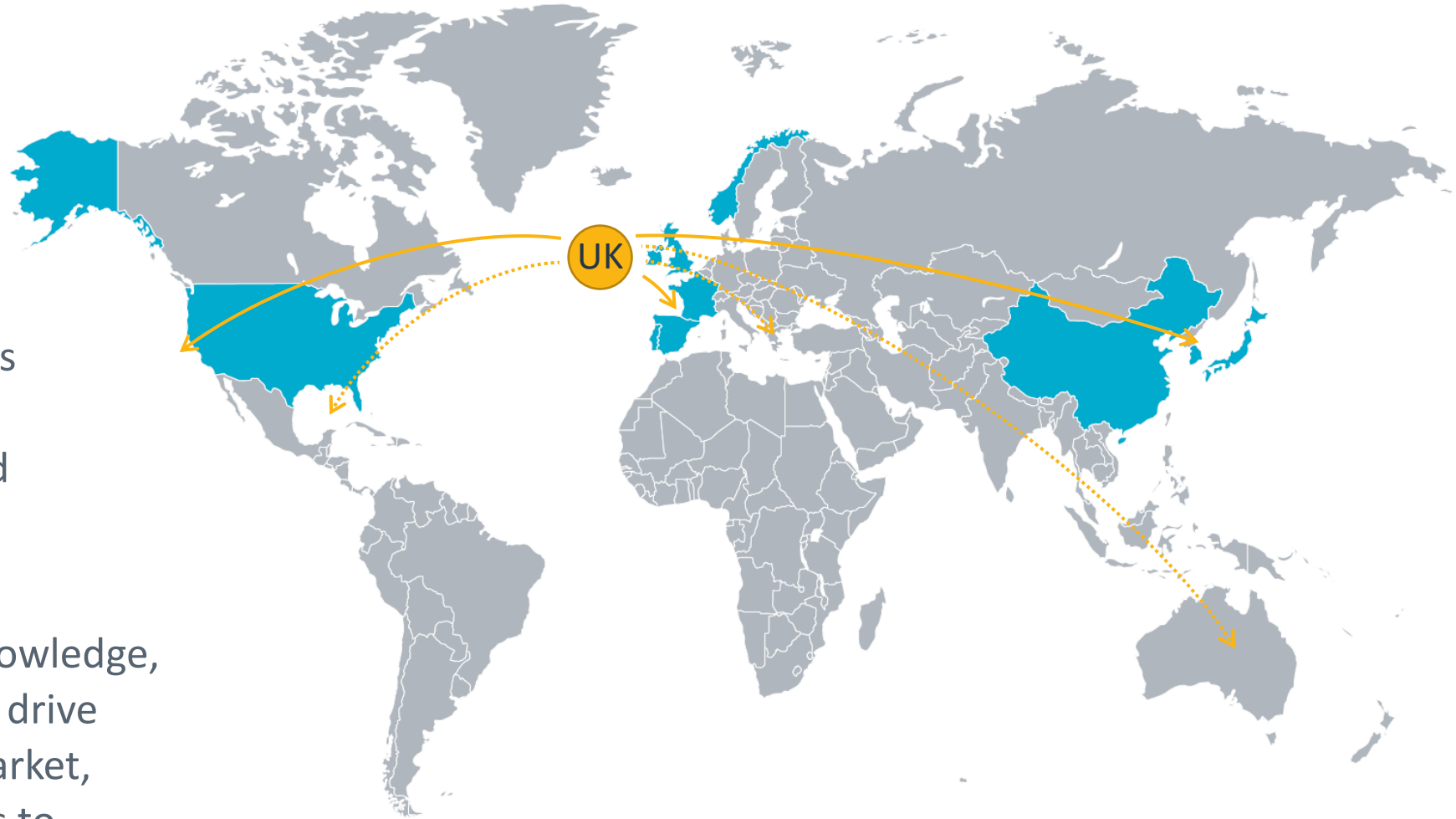


Offshore
Renewable
Energy



FOW COE – UK FOCUS / GLOBAL IMPACT

- **UK** – based in the world’s leading FOW market, driving UK market growth, supporting our partners to maximise UK opportunities and build global capability;
- **Global** – utilising UK knowledge, skills and experience to drive growth of the global market, supporting our partners to maximise global opportunities;



WHY STRATEGIC PROGRAMMES?

- Strategic Programmes developed where there is a need for intervention to address supply chain and / or technological risks / opportunities;
- Structured to facilitate significant additional funding from supply chain, stakeholder organisations and existing FOW CoE partners;
- Overseen and run by FOW CoE. FOW CoE shapes programmes and defines priority areas. Partners have access to a level of information from all activities;
- Three launched in FY22/23, with the potential for further programmes as the need is identified;

FOW CoE FY22/23/24...

**Dynamic Cabling Systems
Technology Development
and Qualification Prog.**

- ✓ Accelerate technology development to fill gaps;
- ✓ Qualify technology for application in FOW, reducing risk;
- ✓ Optimise technology applications and system architectures;
- ✓ Support new supply chain organisations to enter the market, boosting capacity and competition;

**Mooring Systems
Technology Development
and Qualification Prog.**

**Environmental Interaction
Data and Research
Programme**

- ✓ Coordinate work to close knowledge gaps in advance of need;
- ✓ Accelerate technology innovation to improve data collection and analysis;

**Supply Chain Data and
Development Programme**

- ✓ Identify supply chain strength / weakness;
- ✓ Target support to address issues;
- ✓ Coordinate boarder supply chain development activity;

**Construction, Operations
and Maintenance
Programme**

- ✓ Optimise offshore construction, operations and maintenance activities;
- ✓ Identify and accelerate critical technology innovations;

STRATEGIC PROGRAMME VALUE PROPOSITION

SUPPLY CHAIN & INNOVATORS

- Work directly with major customers to develop and qualify technology which meets their needs;
- Identify innovation and collaboration opportunities;
- Leverage industry and grant funding to reduce the cost and risk of new product development;
- Access world leading testing and qualification expertise and facilities;

PROJECT DEVELOPER

- Work directly with key suppliers to ensure products and services developed meet project needs;
- Manage and mitigate technical and commercial project risk through early engagement with supply chain and technologies;
- Identify innovation and collaboration opportunities;
- Play an active role in supply chain development;

DEVELOPMENT / ENTERPRISE AGENCY

- Deliver short term economic and innovation impact by investing in operational industry lead programme;
- Leverage industry and other stakeholder funding, delivering high return on investment;
- Tailor support criteria to align with remit;
- Deliver demonstrable impact with key impact metrics;

DYNAMIC CABLE SYSTEMS – TECHNOLOGY DEVELOPMENT AND QUALIFICATION



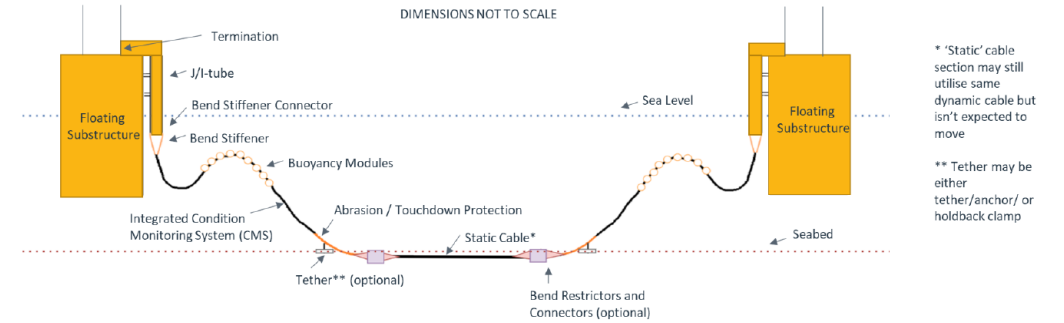
DYNAMIC CABLE SYSTEMS STRATEGIC PROGRAMME

Strategic Programme Aim?

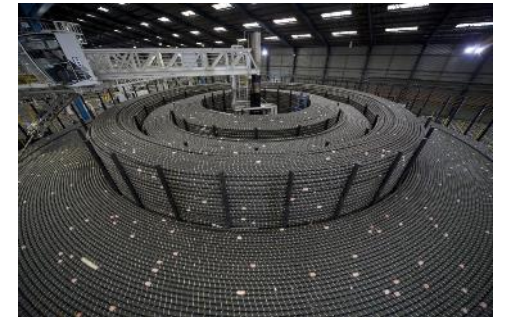
- Improve the FOW industry's access to suitable, reliable and cost-effective dynamic cable technologies;

Why FOW CoE Focus?

- Step change for supply chain in terms of scale;
- UK supply chain strength;
- High risk components subject to a new loading regime;



Courtesy: ORE Catapult



Courtesy: JDR Cables

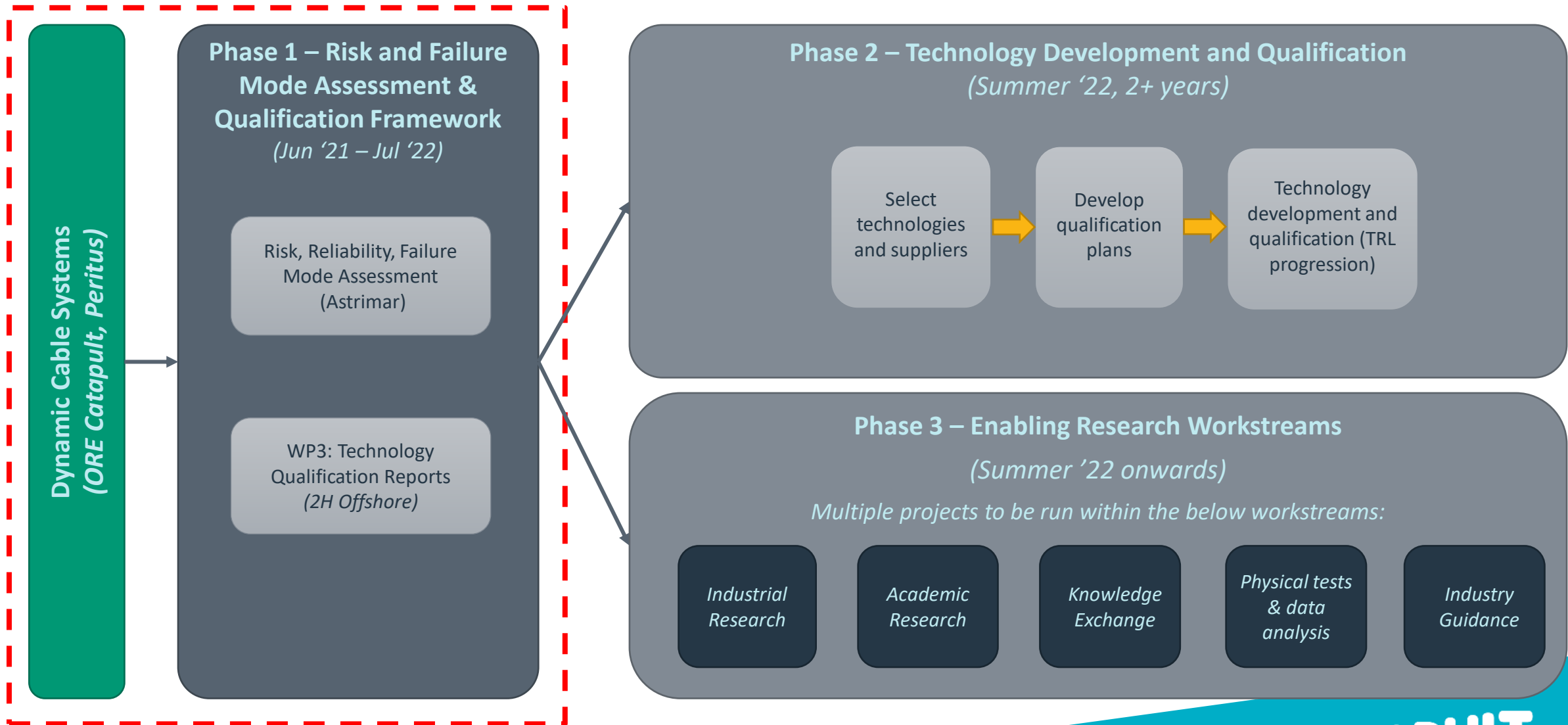


Courtesy: CRP Subsea

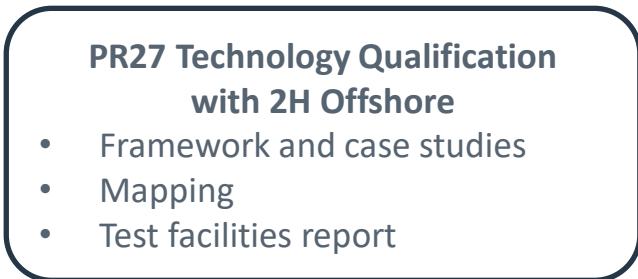
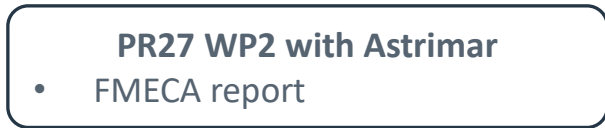
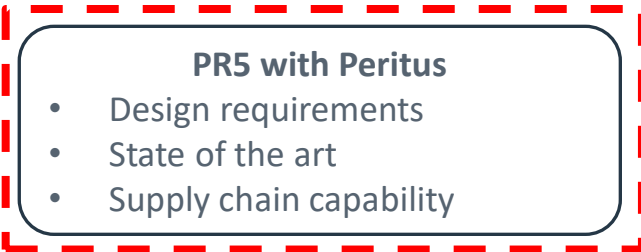


Courtesy: Balmoral Comtec

FOW COE DYNAMIC CABLE SYSTEMS TECHNOLOGY DEVELOPMENT PROGRAMME



STRATEGIC PROGRAMME PHASE 1 – DEVELOPING A TECHNOLOGY QUALIFICATION FRAMEWORK



Public report available on ORE Catapult Website

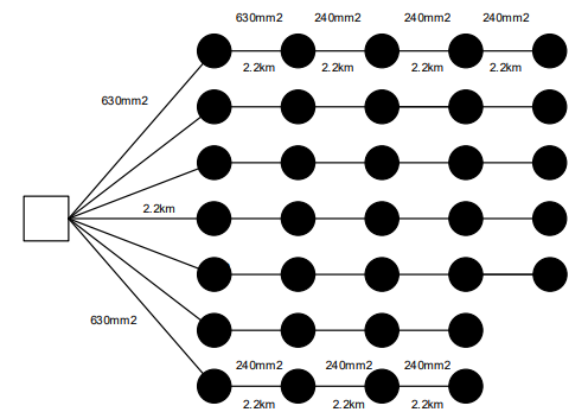
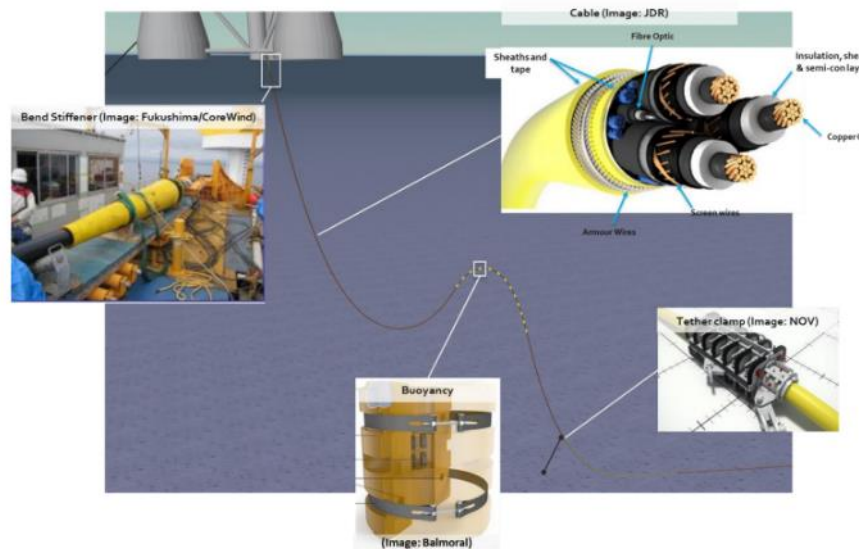


Figure 14: Concept layout for 33 x 15 MW WTGs at 66 kV (copper cables)

Item	unit	2021-2030	2031-2040	2041-2050
Cable lengths (copper)	#	132	858	1,525
Buoyancy modules	No.	3,444	26,258	48,693
Dynamic bend stiffeners ¹⁰	No.	236	1,494	2,659

STRATEGIC PROGRAMME PHASE 1 – DEVELOPING A TECHNOLOGY QUALIFICATION FRAMEWORK

PR5 with Peritus

- Design requirements
- State of the art
- Supply chain capability



PR27 WP2 with Astrimar

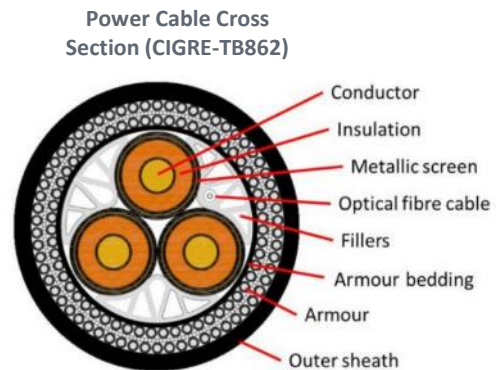
- FMECA report



PR27 Technology Qualification with 2H Offshore

- Framework and case studies
- Mapping
- Test facilities report

Focussing on Qualification Framework for 2 Case Study Components



Bend Stiffener Connector (First Subsea)



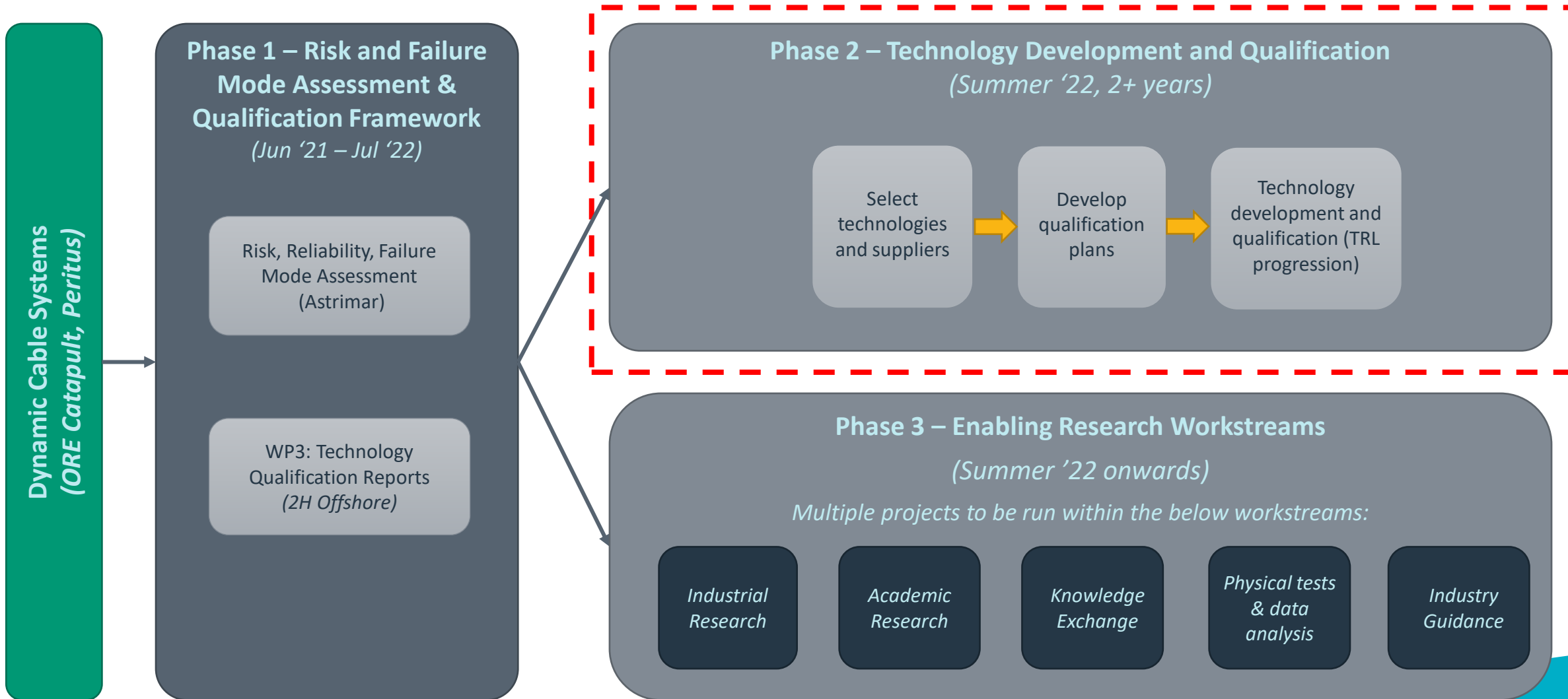
Public report available on
ORE Catapult Website



Author: 2H Offshore
(edited by ORE Catapult)
Date: 29/09/2022
Reference: PN000486-RPT-013
Status: Public

In partnership with:
2H
offshore

FOW COE DYNAMIC CABLE SYSTEMS TECHNOLOGY DEVELOPMENT PROGRAMME

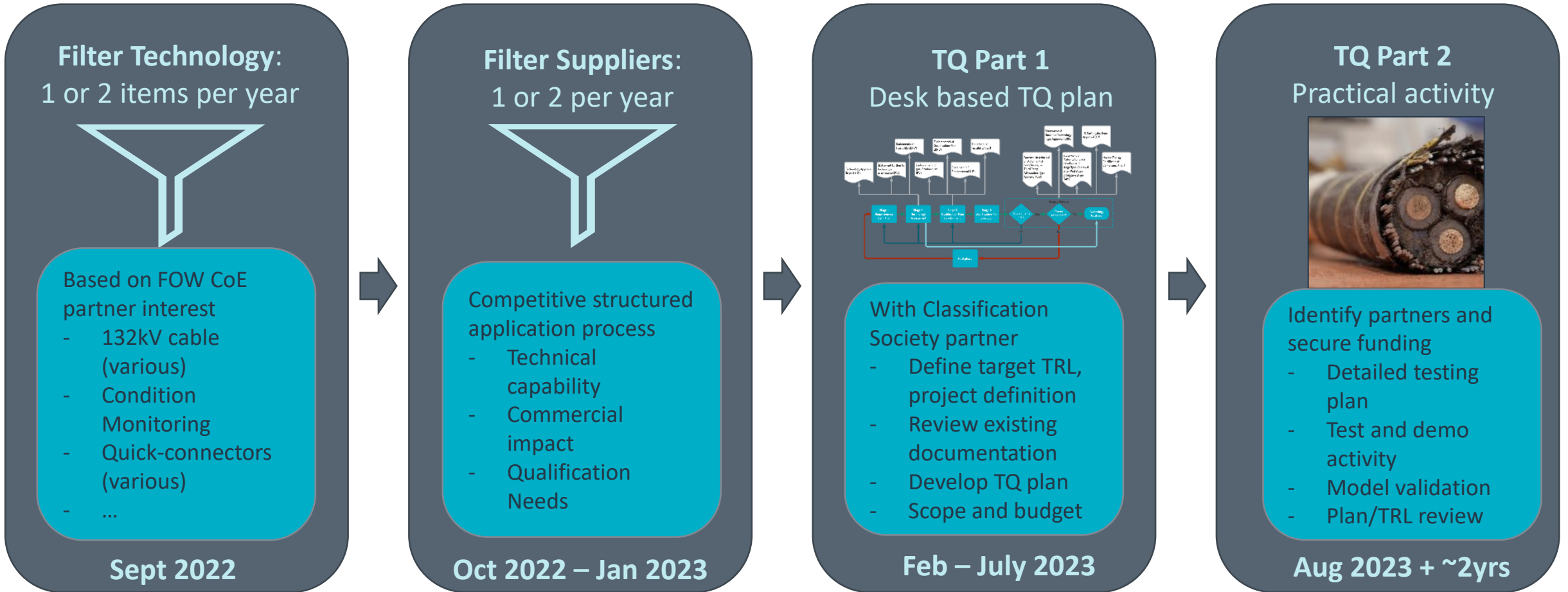


DC01 / DCXX – WHY FUND ENHANCED QUALIFICATION

- Dynamic cables are a serious reliability concern:
 - Evidence of dynamic cables being a major concern from O&G experience
 - High value losses from static cable issues due to dynamic motions
- Robust qualification from low to high TRL is our main tool to produce reliable cables at commercial scale.
- We have developed a dynamic cable specific qualification framework to map out a clear route for suppliers to follow
- Now we need to apply it to the right technology and the right suppliers



DYNAMIC CABLE TECHNOLOGY DEVELOPMENT AND QUALIFICATION



Qualification Plan Fully Funded By FOW CoE

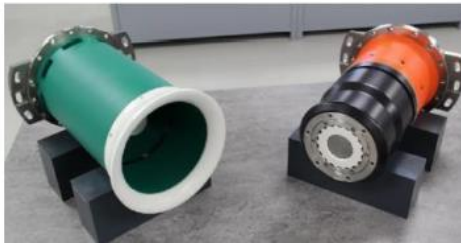
Shared Funding Model: FOW CoE, supplier, industry stakeholders

Will be rerun periodically with new technology focus areas (6-12 monthly)

TARGET TECHNOLOGY FOCUS AREA SHORTLIST

- High-interest technology areas for qualification are outlined below.
- Some are likely to be picked up over the next 2-3 years.

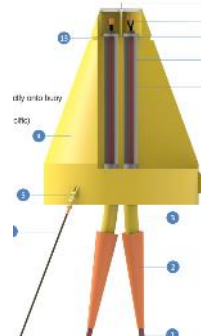
Wet Mate Connectors
(Source: Siemens)



Deep Water Cable Solutions
(Source: Hellenic)



Disconnectable
Turret Buoy
(Source: SBT)



Smart Condition
Monitoring



Bend Stiffener
Connectors
Source: First Subsea



Cable Power Cores



External Inspection
(source: Innospection)



TARGET TECHNOLOGY FOCUS AREA – DYNAMIC CABLES

First area of focus for dynamic technology qualification workstream is targeting organisations who:

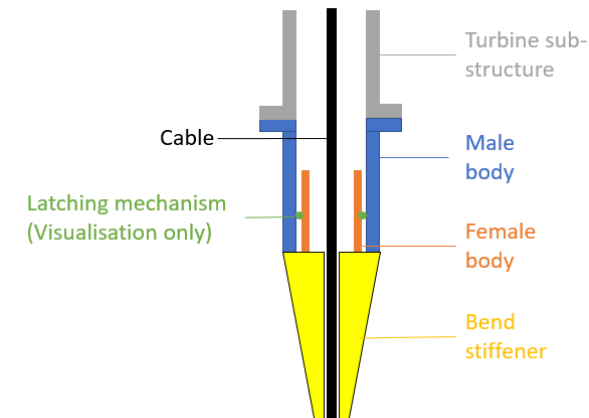
- Currently produce bend stiffener connectors for use in FOW applications
- Currently produce bend stiffener connectors which are used in other similar applications (e.g., Oil and Gas) and could be developed for FOW
- Have a technology or product which is not currently in service in any industry, but which they believe could have an FOW application and could reasonably be commercialised in the near term (~3-5 years)

Any bend stiffener connector technology suitable for FOW will be considered eligible, but the areas of most interest are (in order of priority):

1. Technology to increase the long-term reliability of the bend stiffener connection against extreme loading and degradation mechanisms
2. Technology to increase the efficiency of the latch/unlatch process to facilitate easier assembly and disassembly
3. Technology with an integral emergency release mechanism
4. Technology prioritising low cost and complexity



Bend Stiffener Connectors
Source: First Subsea



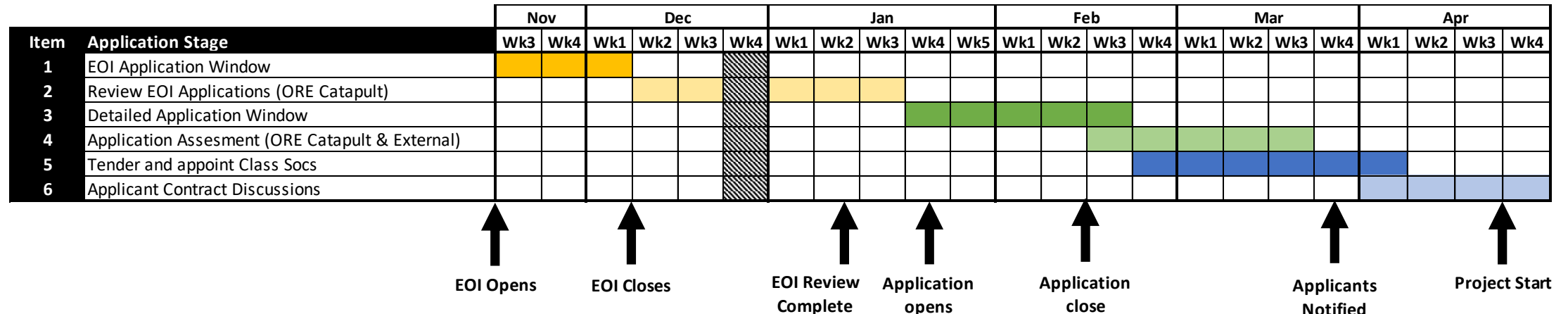
SUPPLIER SELECTION PROCESS

Expressions of Interest

- Open applications
- 3-4 taken forward

Detailed Applications

- More in-depth questions and responses from invited applicants
- Evaluated by FOW CoE and external independent assessors; feedback provided
- 2 winning suppliers technology onboarded for the enhanced qualification programme



More information and guidance: [ORE Catapult – Strategic Programmes](#)

CONTACT US

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GLASGOW

BLYTH

LEVENMOUTH

GRIMSBY

ABERDEEN

CHINA

LOWESTOFT

PEMBROKESHIRE

CORNWALL