



Technology  
Driving  
Transition

OGTC



## DigiDecom 2021 – DIGITAL

Online international workshop focusing on digital transformation, robotics and other game changing trends in nuclear decommissioning



# Needs and trends for innovation of decommissioning in the Oil & Gas sector

Craig Nicol

23<sup>rd</sup> March 2021

# Where it began



**Our mission: to be the go-to technology centre for the oil and gas industry in the UK and globally**

**Launched in 2017, part of the Aberdeen City Region Deal**

# Enable

oil and gas industry  
diversification and  
transition to a net  
zero North Sea

# Accelerate

technology to deliver an  
affordable net zero North Sea

# Inspire

a culture of innovation  
and transformation for a  
reimagined energy future

Our mission: **Developing and  
deploying technology for an  
affordable net zero North Sea**







# Strong delivery



**25,100**

industry guests and visitors to the centre

**20**

commercialised tech



**1,260+**

technologies screened



**£100m**

leveraged from industry partners

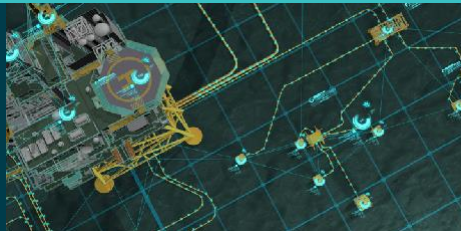


**130**

memberships

**£10-15bn**

GVA potential



**265**

projects

**110+**

field trials  
complete, planned or underway

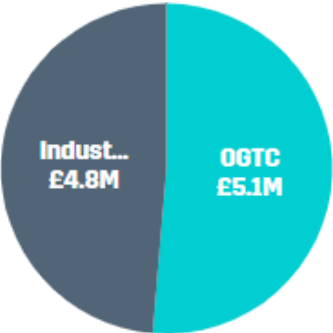




# Decom Strong Performance

## £10M Invested

Co-investing in industry-led projects to develop and deploy new technologies.



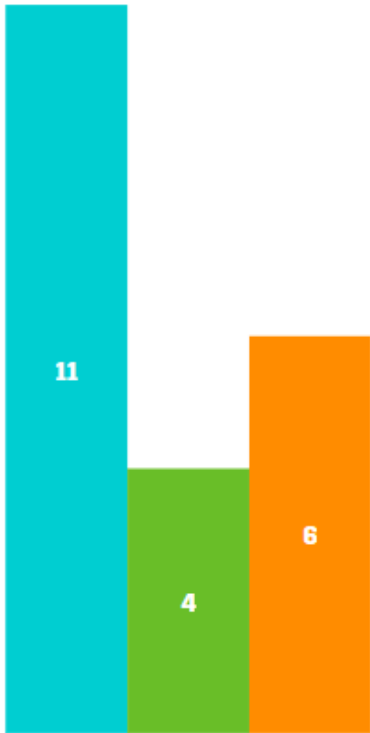
## 230+ Technologies Screened

Harnessing the power of an ever-expanding range of transformational new technologies.



## 21 Approved Projects

Delivering technology projects to fix today, maximise recovery and transform tomorrow.



## Field Trials

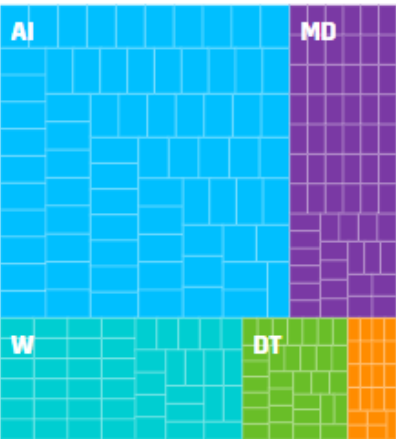


## Memberships

Bringing together Operating, Supply chain and technology companies to drive innovative new solutions.

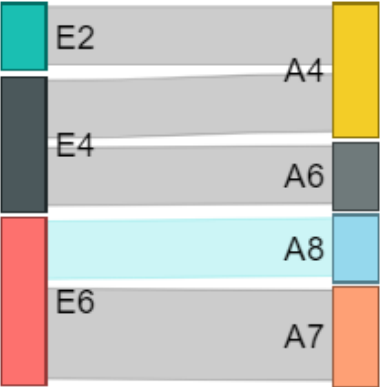


## GVA Model £1,425,364,000

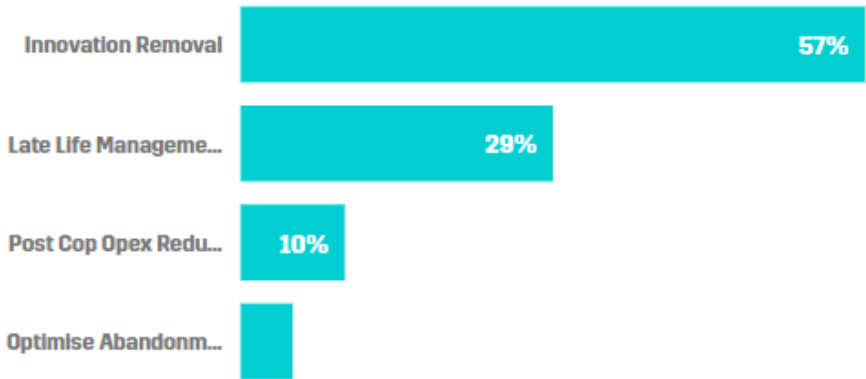


## TRL Readiness

Entry TRL to Achieved TRL.










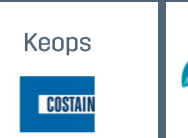
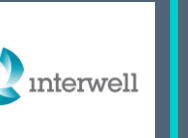



















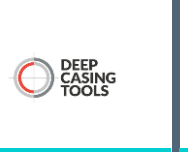






## Roadmap Focus Areas



Projects		Project Investment		Field Trials		Technology Vision		
Active	Completed	OGTC	INDUSTRY	Planned	Completed	Fix today	Maximise recovery	Transform Tomorrow
14	25	£12.96m	£22.24m	3	7	49%	28%	23%

Solution Centres : Decommissioning Projects

 C-Beaver Accelerated Corrosion Phase 1 & 2	 Ardent Jacket Buoyancy Recovery	 Subsea Skip Study	 Decom Cost Optimisation	 RLWI Deployment on a MODU	 Sealand Study on SDS	 Piece Small Removal Study	 Ambient Lifter	 Heavy Lift Vessel Availability Study	 Offshore Platform Lifting	 Thermite Plug (Ph 1 & Ph 2)
 Tubing Compaction	 Tubing Former	 Multi-barrier wellbore integrity inspection system	 Magnetic Cement & Annular Test Phase 1 & 2	 Thermic Lance	 Struan Energy: Synchronised basin wide decommissioning coaction	 Software portal for the supply chain	 Tag and track radioactive waste	 TWEFDA Renewable Energy Study	 Power/ Comms Buoy – Phase 1 & 2	
 Subsea Laser Cutting	 Single Phase Tubular Removal	 Suspended Wells Monitoring	 Optimising Subsea Asset Decommissioning	 Casing Removal Technology	 Wel-Lok M2M STC Sealing	 Flow Prediction for PSA	 Bio-Grout Barrier	 Energetics based tubing cutter	 Casing Recovery System	 Fusion Barrier
 Technologically Enabled Frontline Workforce Assistance	 Decommissioning Simulator	 Platform Power Hubs	<div> <div>Emissions Reduction</div> <div>Energy Systems Integration</div> <div>Offshore Energy 4.0</div> </div> <div>Complete</div>							





# Technology vision

## Reduce Emissions



**Offshore Electrification**



**Eliminate Flaring**



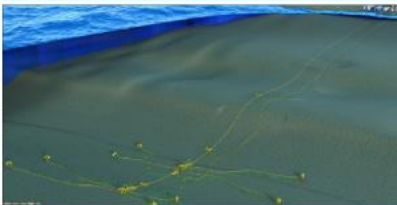
**Production Optimisation**



**Eliminate Venting**



**Net Zero Developments**



**Net Zero Decommissioning**

## Unlock Potential



**Tieback of the future**



**Data Driven**



**Carbon Capture Usage and Storage**



**Integrated Energy**



**Remotely Controlled Operations**



**Green and Blue Hydrogen**

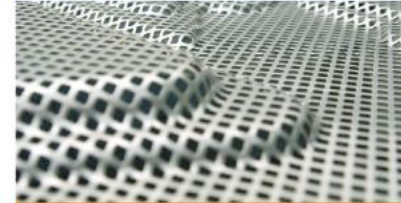
## Transform to Net Zero



**Net Zero Operations**



**Reusable Infrastructure**



**New Materials**



**Automation and Robotics**



**CCS for Industrial Decarbonisation**



**Zero Carbon Developments**



# Emissions Reduction – Decom Associated Focus Areas

## Well plug & abandonment

### Optimise Abandonment

Reduce abandonment costs by 35% and reduce emissions by 50% for all P&A activities

Alternative barrier materials	P&A for CCUS	Alternative Tubular Removal Solutions
Rigless Abandonment	Environmental Monitoring	Process Simulation & Abandonment Planning
Multi String Logging Cement Verification & Remediation Solutions	Remotely Activated Pre-Installed Barriers	Geological Barriers

## COP & removal activities

### Increased Efficiency

Efficient execution of pre & post cessation of production (CoP) activities to eliminate emissions & reduce costs by 35%

Temporary power solutions	Alternative Power & Power Sharing Solutions	Intelligent Power Management & Efficiency
Subsea infrastructure removal	Topsides & jacket removal	Asset Life Extension
Removal Simulation & Activity Optimisation	Late Life Process Optimisation	Onshore Dismantling & Waste Management

## Reuse of assets

### Repurposing of Offshore Infrastructure

10% of the existing infrastructure & pipelines repurposed to support hydrogen production or CCUS

Alternative uses for subsea equipment	Refurbish & reuse of equipment & components	Equipment, material & asset service history
Alternative uses for pipelines	Material recycling	Alternative uses for jacket structures
Alternative uses for topsides & platforms	FPSO/ FSU repurposing	Waste management



Innovation  
through  
Partnership

Define  
Design  
Develop  
Deploy  
Decommission

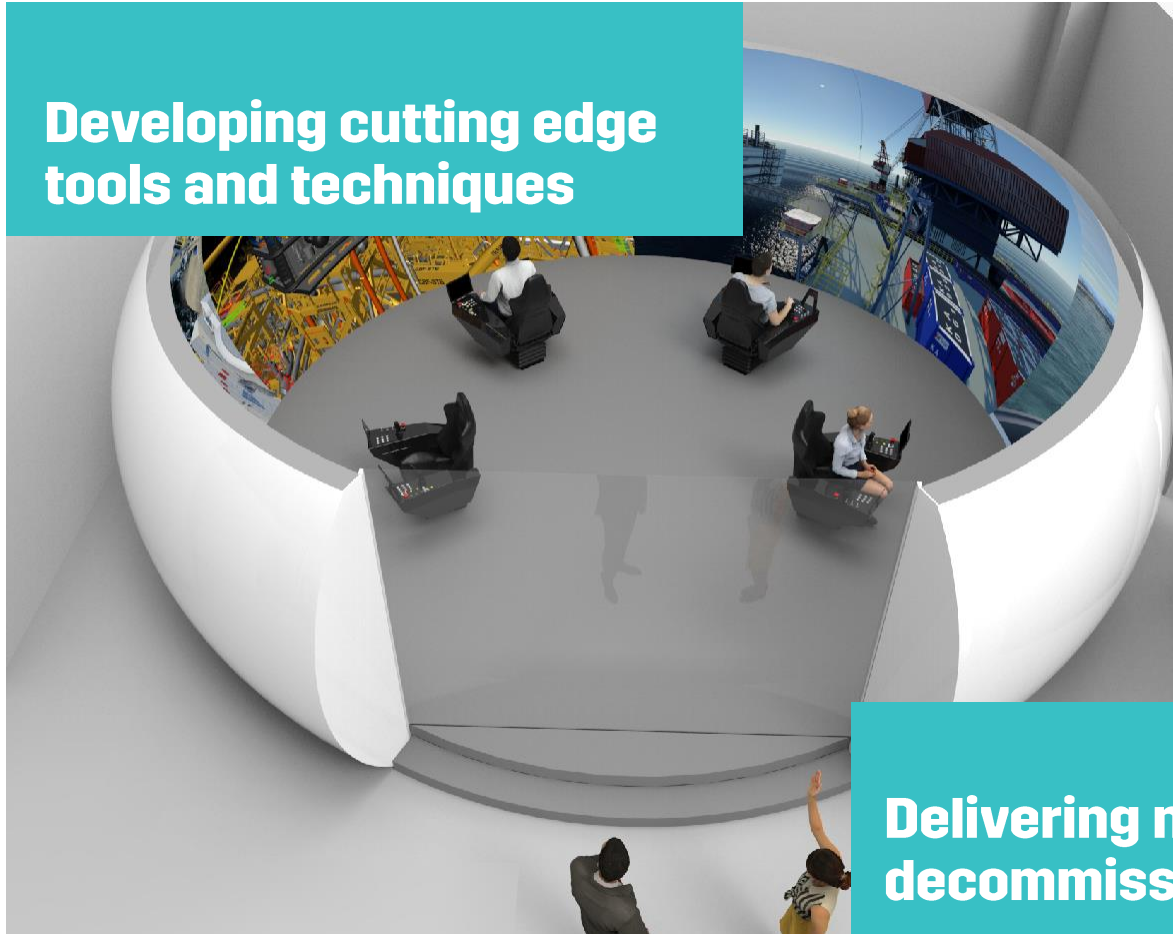
# National Decommissioning Centre





# National Decommissioning Centre

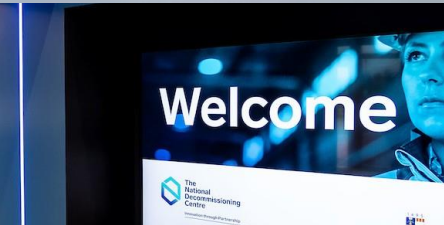
**Developing cutting edge tools and techniques**



**Partnership with the University of Aberdeen**



**Delivering net zero decommissioning**



# National Decommissioning Centre



Partnership between the OGTC and the University of Aberdeen

Launched Jan 2019

OGTC investing £12.7m over 7 years as part of the Aberdeen City Regional Deal funding

UoA investing £5.8m over over 7 years in buildings, facilities, staff time and PhD support

Aim of matched funding from industry

Supplemented by approx. £4m of infrastructure funding from the Scottish Government's Decommissioning Challenge Fund



# Current Research Projects

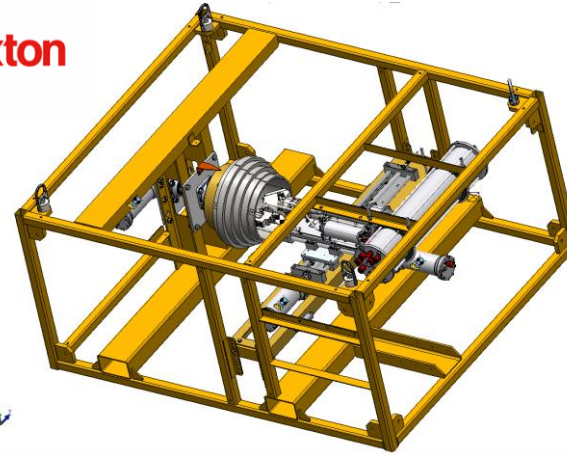


## Underwater Laser Cutting

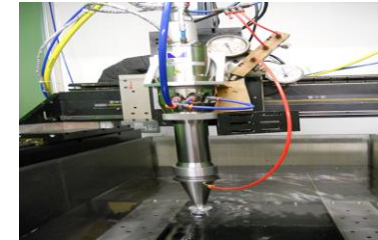
Aim – to develop an efficient laser cutting system for cutting structural members underwater.

- Test rig and laser head manufactured and assembled with components tested to 500m
- Cutting tests in NDC tank in progress with open water tests scheduled for mid Q2 2021

claxton



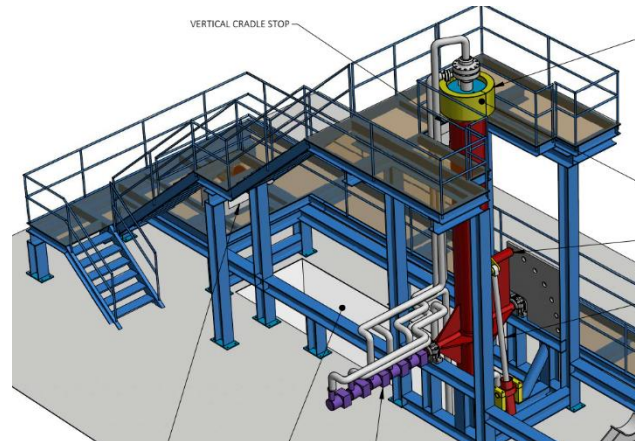
Underwater laser cutting



## Barrier Verification Chamber

Aim – to provide a test system for developers of novel well P&A barriers.

- Main FEED completed
- Cost reduction scope being undertaken prior to tender



Barrier verification chamber



# Current Research Projects



## Safe Haven

- Post Doctoral Researcher has familiarised himself with Safe Haven
- Initial stakeholder group comprising regulators, operators and supply chain identified
- Questionnaire for stakeholder engagement developed and ethical approval being obtained prior to interviews.

Safe Haven  
Data Hub

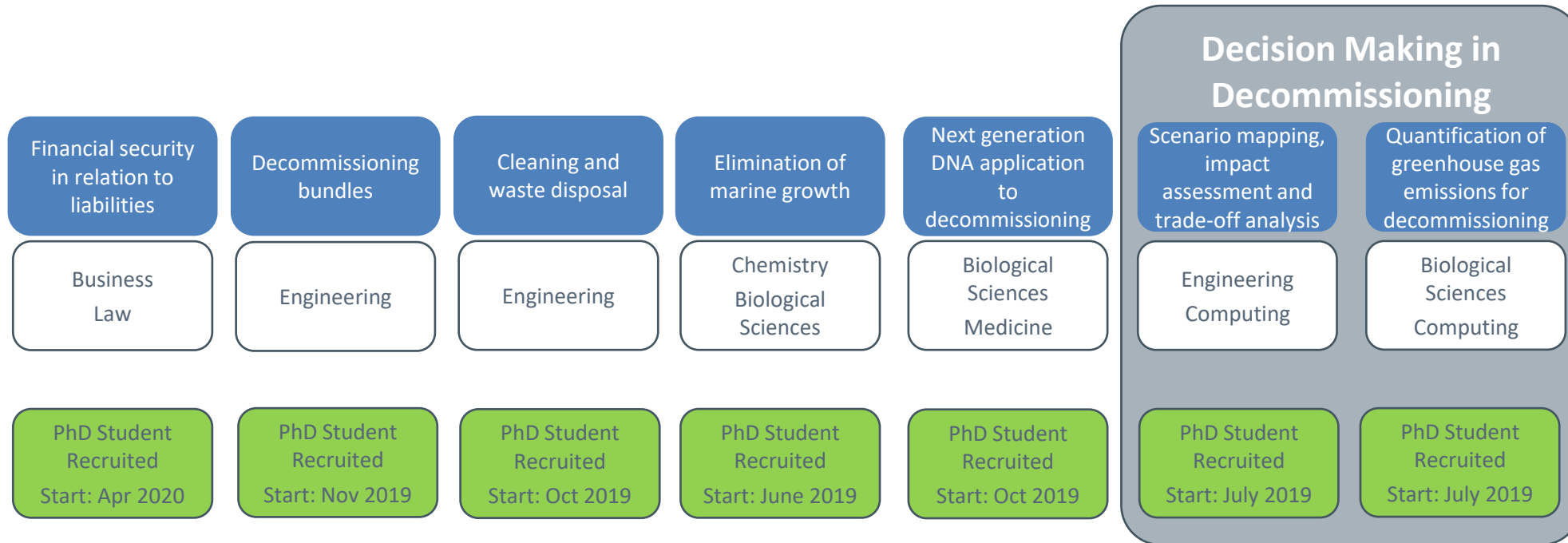


Grampian Data Safe Haven  
University of Aberdeen • NHS Grampian

## Blade Recycling

- Short study being undertaken by Prof Ana Ivanovic and two PhD students for OGTC on comparative assessment of processes for wind turbine blade recycling.

# PhD Research Programme



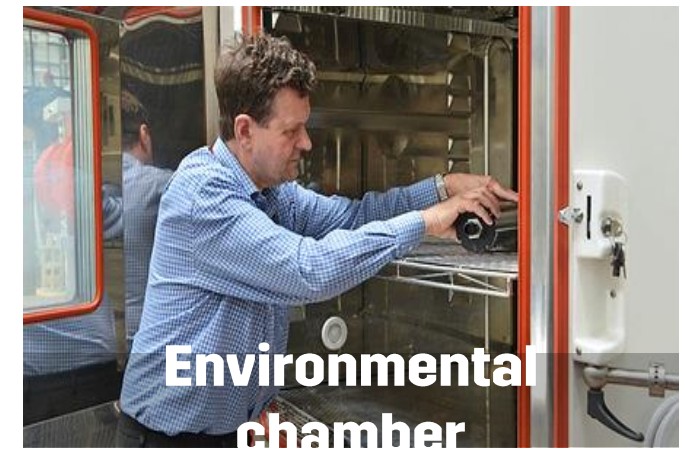
PhD co-funded by Marine Scotland Science being finalised

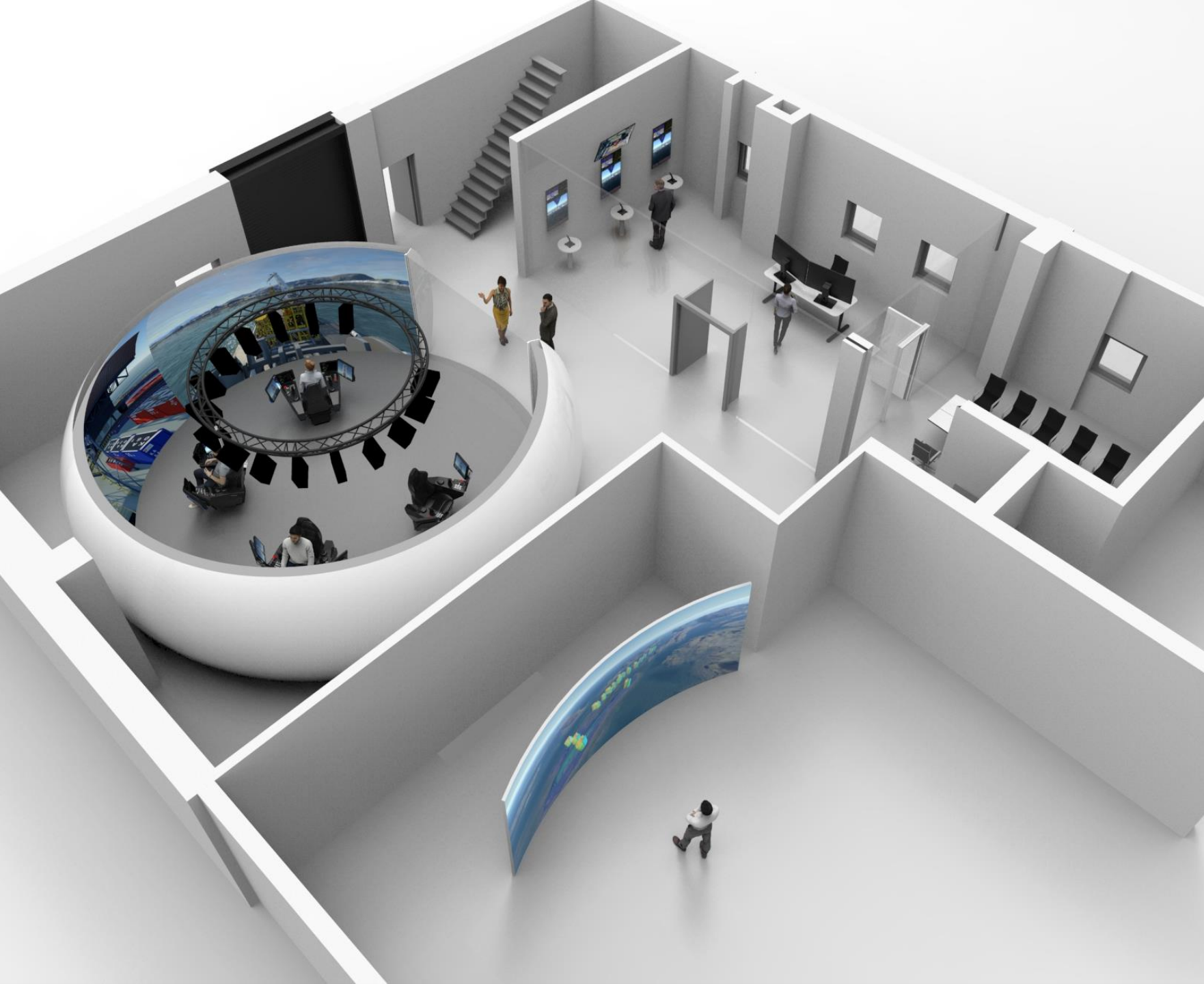
Self funded student started in March 2021

Nigerian Petroleum Technology Development Fund (PTDF) funded student due to start Q2 2021



# Our facilities





Technology  
Driving  
Transition



**A walk-in 300-degree visual immersive environment**

**4 stations with ability to assign control of any object/asset in the scene to one of the stations (chairs) for example ROVs, cranes, personnel, vessels etc.**

**All simulation based on real time physics calculations**

**Ability to create and modify simulation in runtime**

**Ability to split screen into 4 different stations/objects**

**All objects within scene have full effect from user-controlled environment, for example vessels are affected fully by waves, current, wind etc.**

**Delivered with a library of ships, ROVs, cranes and objects (jackets, containers etc.)**

**Ability to import CAD data to the simulator system.**



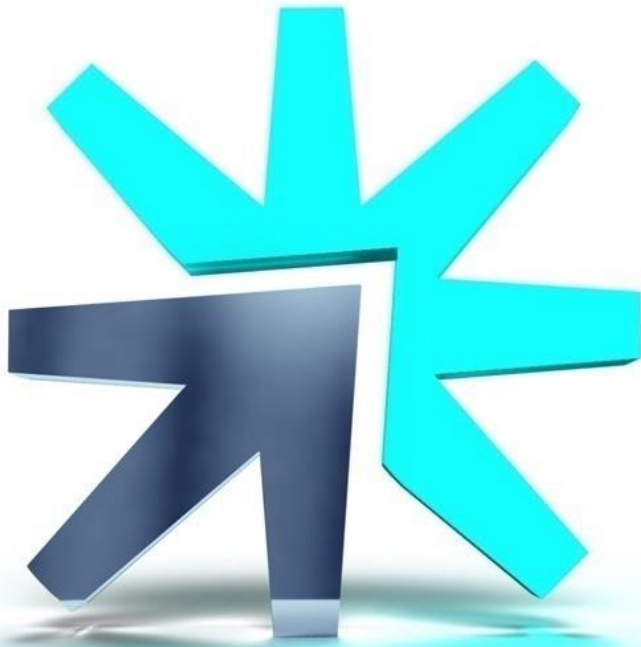
# The Simulator







# Key Opportunities



## **Marine simulation:**

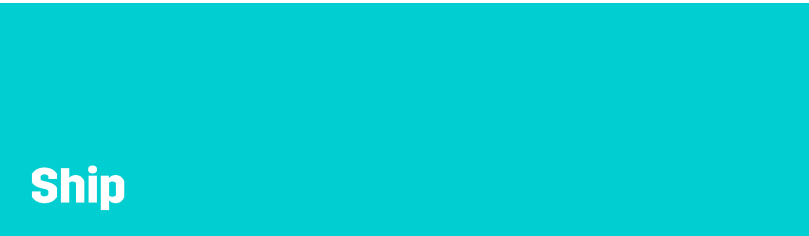
- Scenario planning of decommissioning programmes
- Trialing of new offshore technologies (not just decommissioning)

## **Smart Cities capability:**

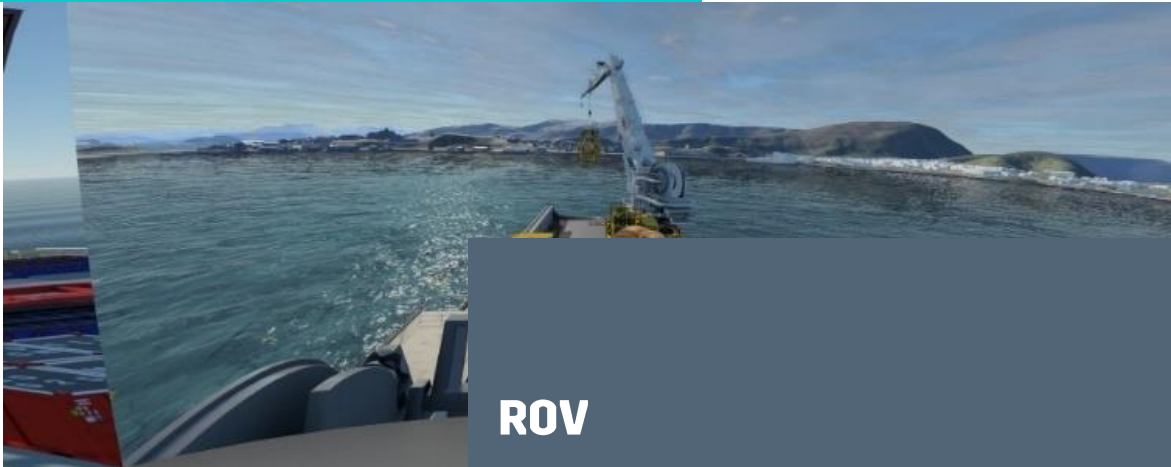
- Ability to visualise, analyse and model data rather than mechanical systems
- OSC simulator is the preferred platform for the UN's smart cities programme
- The simulator is not tied to oil and gas decommissioning. We can look at:
  - Offshore/floating wind installation or decommissioning
  - Basin wide decision making using the smart cities capability
  - Energy integration using the smart cities capability



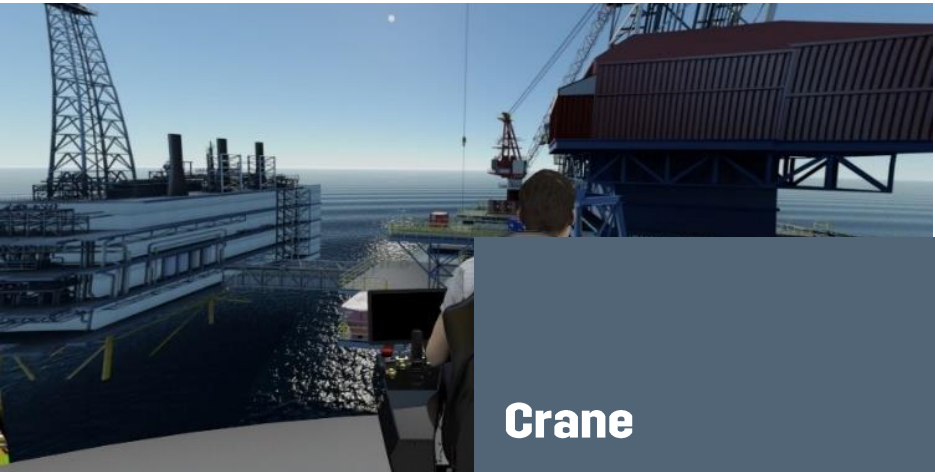
# Simulator Stations



Ship



ROV



Crane



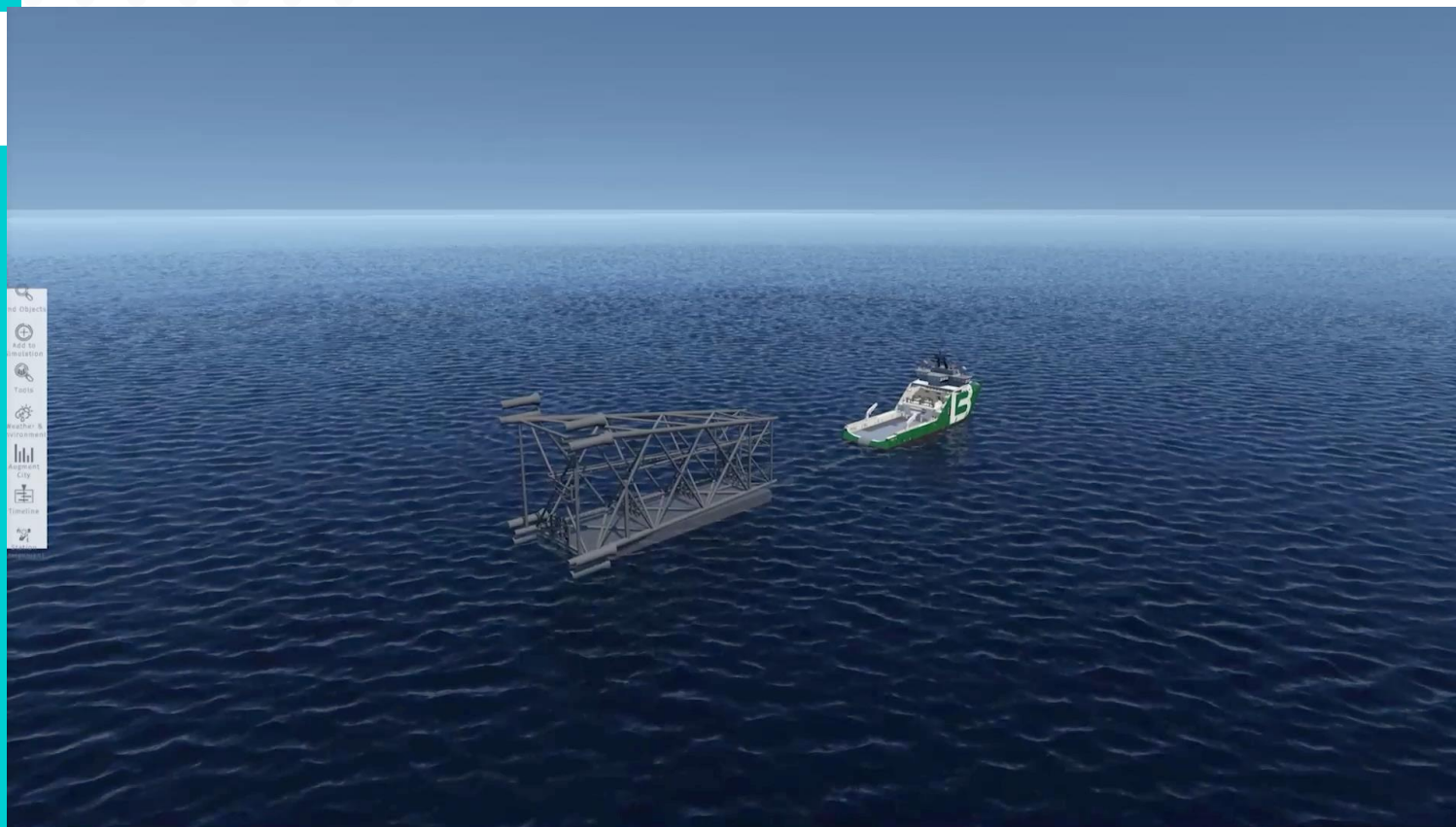
Personnel

Technology  
Driving  
Transition

OGTC



## New Harbour Simulations







# The Smart Basin

# The Smart Basin

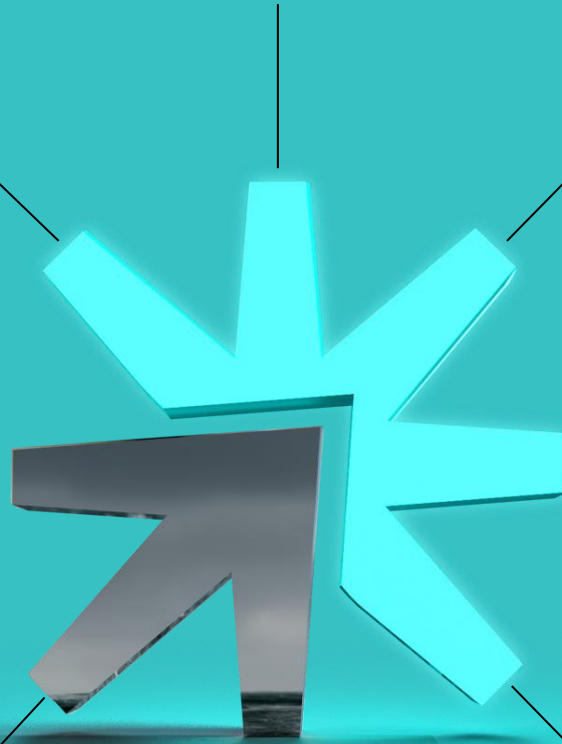
**Virtual model of the entire basin starting with an exemplar area, either east of Shetland or southern North Sea.**

**Modelling to better understand how interactions between operators e.g. campaigns and/or renewables could improve the efficiency of decommissioning, optimal reuse and energy transition.**

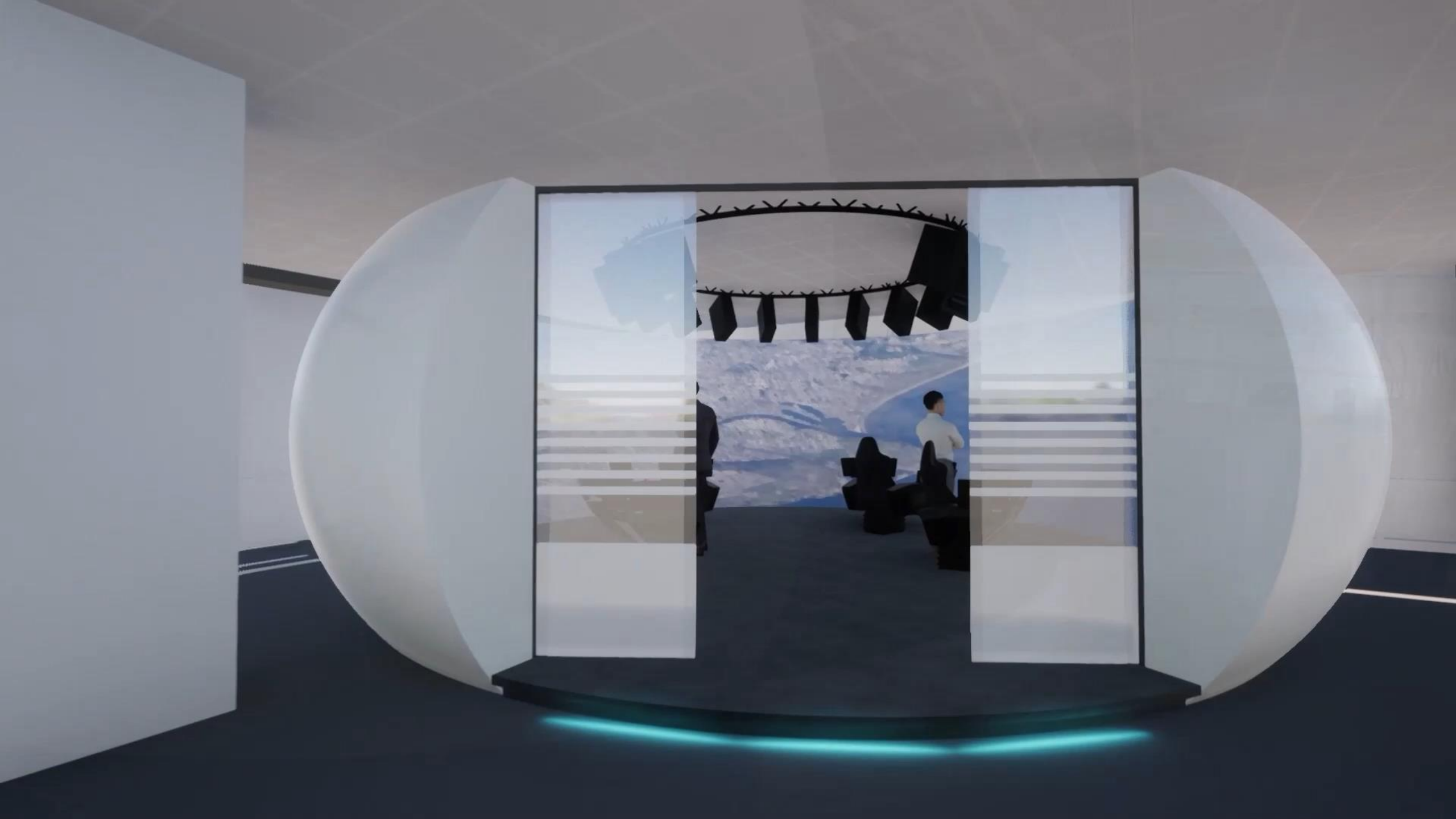
**Basin-wide decision making based on the modelling**

**Data visualisation to show the spatial distribution of a parameter – e.g. CO2 emissions, power usage, vessel traffic, available local renewable capacity etc.**

**Industry wide supply chain productivity/utilization forecast more accurately**









Find Objects

Add to Simulation

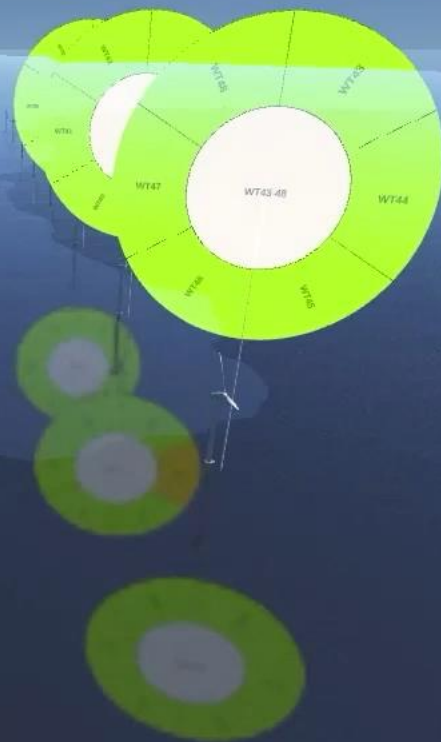
Tools

Weather & Environment

Augment City

Planning tool

Record playback



Pause

> Add to simulation

# Collaborating for transition

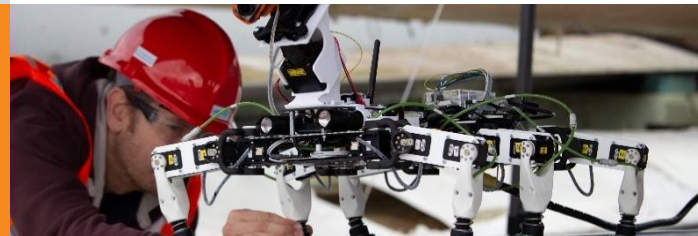


**Technology, innovation and commitment to cross-sector working are essential**



**Accelerating technology development to achieve a net zero North Sea energy system**

**Collaborating to make a difference**



Technology  
Driving  
Transition

OGTC



# Thank you for attending

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