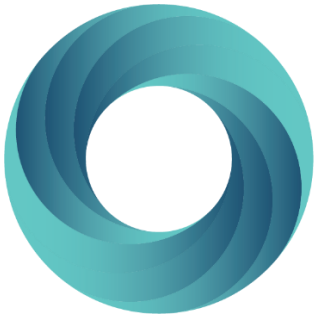

OCEAN FUTURES

10 Year Business Plan

Extended Executive Summary

2022 – 2032

04/07/22

Extended Executive Summary

Ocean Futures is a strong private-public-research partnership that has a united goal to create a global centre of excellence and super cluster in testing, development and manufacture of autonomy, digital and clean ocean technologies for the rapidly growing global ocean economy.

Vision and Objectives

Ocean Futures capitalises on the OECD's prediction that the ocean economy will double to $3 trillion by 2030. As one of Britain's biggest industries, the recent State of the Maritime Nation report (2022) showed how the sector played a crucial role in the pandemic and is expected to exceed its pre-pandemic levels by the end of 2022. Projections indicate that the UK's maritime sector will grow by 16.6% between 2021 and 2025 and that, in doing so, it will also make a contribution to wider, levelling-up and net zero objectives. But the report also recognises that there is a need to act fast to harness opportunities in light of the emergence of international competitors so that the UK can maintain its advantage and gain a lead in tomorrow's markets. The South West of the UK can make a significant contribution to this agenda but there are market failures holding businesses back: many SMEs cannot afford the equipment required to test and develop new products and need support to collaborate and bring their products to market.

This 10 Year Plan builds on the South West's prominent marine and maritime industry and world class research base to drive innovation, enable more product development and unlock further economic growth within this key market opportunity, helping to accelerate the UK's ambitions for the sector.

Ocean Futures forms an integrated part of a wider whole, incorporating a local and regional system of initiatives which, taken together, will achieve outcomes that are relevant to addressing globally recognised priorities in a fast-changing world.

By investing in this coordinated programme of activity, the Ocean Futures vision can be realised to create a global centre of excellence for the testing, development and manufacture of autonomy, digital and clean ocean technologies for the rapidly growing global ocean economy, achieving:

1. A coordinated programme of marine research and innovation, establishing the UK as a global centre of excellence for maritime technology.
2. Demonstration and integration of marine autonomous systems at scale for applications in defence, offshore renewable energy, aquaculture and other sectors of the ocean economy.
3. Significant contribution to the development of international standards for autonomy.
4. Demonstrable digital capacity to pioneer cyber secure smart ports, short sea shipping and support for national deployment.
5. A functioning Clean Maritime Gateway, enabling the development and deployment of zero emission maritime technology, building on local expertise to capture early market share.
6. A marine sector innovation hotbed that facilitates the transition from early R&D to commercial adoption, working closely with the region's universities and the Plymouth and South Devon Freeport.

Strategic Priorities

Ocean Futures has three strategic priorities:

1. Marine Autonomy

A truly disruptive technology that will replace traditional ship-based alternatives for equipment inspection and other marine monitoring operations and enhance safety of the seas. Projected demand for marine autonomy is predicted to skyrocket to become a £103bn market by 2030 with conceivable applications in almost all marine environments. Ocean Futures will lead the demonstration and integration of marine autonomous systems for applications in science, defence, offshore renewable energy, aquaculture and emerging ocean economy application.

2. Digital Oceans

Leading sensor and communications technology advancement, and their connectedness and interoperability, to inform offshore operation by enhancing our understanding of the ocean and any impact upon it. Ocean Futures will transform our understanding of the ocean environment and safeguarding future maritime operations with integrated digital marine communications, digital twins, synthetic environments, and artificial intelligence solutions.

3. Maritime Net Zero

Achieving net zero through a transition to alternative fuel powered vessels using energy from low or zero emission sources or highly efficient batteries, as well as integrating ports into a decarbonised energy network and supplying the fuels of the future. Ocean Futures will lead the transition to safe and secure maritime operations with a Clean Maritime Roadmap that will embrace a variety of alternative energy sources bespoke to vessel type and operation.

Core Service

At the centre of Ocean Futures is a core offer to business that will drive innovation and technology development, provide the future workforce that meets their needs, stimulate global trade and secure further investment in strategic infrastructure. We will:

- **Establish a new Marine Innovation Delivery Service** - for marine, maritime and offshore developments, bringing together business, strategic and knowledge partners to create an innovation hotbed that supports the development and adoption of new technologies, products, processes and services, and future sustainable growth within the ocean economy. This includes new standards for data, quality infrastructure and the assurance of autonomy.
- **Facilitate Maritime Skills and Workforce Development** - marking an increase in the delivery of relevant skills and expertise across the workforce to accelerate and drive toward higher value employment and training opportunities across the maritime sector whilst also enabling new employment opportunities, inclusion opportunities, education and careers options. Aligning with the proposed Plymouth and South Devon (PASD) Freeport Skills Academy, there will be engagement with unemployed and harder to reach individuals.
- **Exploit Opportunities from Global Trade and Investment** - developing and delivering a bespoke sector specific programme of Trade and Investment activity centred on the retention of existing and attraction of new investment to the South West. This will also ensure that businesses which set up in the South West and surrounding area are well supported to maximise export opportunities.

Enabling Infrastructure

In order to facilitate a complete innovation and business support suite, physical infrastructure is needed to support the Ocean Futures programme. The aim is to create a critical mass of ocean technology R&D assets in the South West that businesses can gain easy and seamless access to in order to develop their R&D projects. This includes:

- **A new Ocean Futures Innovation Centre** – based at Oceansgate in Plymouth, hosting the Innovation Delivery Service, the Smart Sound Plymouth and Connect control centre as well as the Maritime Autonomy Assurance Testbed and ROADS project teams. The centre will also provide opportunity for defence and space sector collaboration including a satellite for Defence and Security Accelerator (DASA) and similar programmes.
- **An Ocean Futures Prototyping Centre** - also based at Oceansgate. This will provide equipment and expertise to allow businesses to rapidly prototype new technology, with waterside access enabling deployment directly to Smart Sound Plymouth for proving, testing and certification.
- **Further Investment at Turnchapel** Wharf (Plymouth) – to accommodate a new autonomy innovation and training wharf. Thales will support deployment of assets and providing training programmes for safe and certified operations and a secure test and evaluation environment for defence and security applications.
- **Further Development of Smart Sound Plymouth** – which is the UK's marine robotics proving ground for the development, validation and demonstration of marine autonomy and advanced marine technologies. The Smart Sound will be further augmented by additional equipment to build capability, including additional surface, subsurface and aerial assets to fully exploit Smart Sound Connect Phase 2.
- **A State-of-the-Art Manned Research Vessel** - incorporating the latest clean propulsion systems and advanced sensor and communications technology to continue to deliver world leading marine science and innovation.
- **An Electro-Chemistry Research Facility** – based at the University of Exeter in Cornwall to support the accelerated growth of Floating Offshore Wind through research in electrochemistry (H2 electrolysis and storage), solving major challenges related to energy transmission and storage.
- **An Appledore Clean Maritime Innovation Centre** – based in Northern Devon with Harland & Wolff as the main anchor client. The Centre at Middle Dock will provide a de facto national innovation location for clean maritime futures, whilst bringing a university research centre to northern Devon for the first time.
- **An English Aquaculture Innovation Hub** – based in Weymouth and Portland and consisting of test tanks and ocean based proving areas to provide research support for the development of the next generation of aquaculture technologies and techniques needed to support the development of ocean-based carbon reduction solutions, new food sources and improving ocean health.
- **Further Investment in the Electronics and Photonics Innovation Centre (EPIC) –** based in Torbay. Through our High Potential Opportunity (HPO) in photonics, the centre attracts inward investment, supporting the development of a world class cluster that will be at the forefront of cutting-edge innovation with a focus on 5G, Big Data and autonomous vehicles. The focus is now on building grow on space in the form of the Production Park, ensuring that adequate facilities are available to support local manufacturing.

Skills and Workforce Development infrastructure includes training and development enhancement led by a range of partners through the PASD Freeport including City College Plymouth, the University of Plymouth, Plymouth City Council and Plymouth Manufacturers Group. This also includes development of a Maritime Skills Academy which will maximise the impact of Ocean Futures and the Freeport for the local area and wider region.

Strategic Pipeline Projects

Working with a range of private sector, research and public sector partners Ocean Futures will enable delivery of a range of strategic pipeline projects across the three priority areas. Individual business cases will be developed for each project, ensuring their deliverability, Value for Money and demonstrating impact for local/regional partners and the UK.

Marine Autonomy

- **Maritime Autonomy Assurance Testbed (MAAT)** – led by Lloyd's Register with the National Physical Laboratory, MAAT will build on the established Smart Sound Plymouth testbed to provide the first virtual and physical certification platform to accelerate the adoption of autonomy. This is a scalable project.
- **ROADS (ROADS) project** - supported by Serco and the King Abdullah University of Science & Technology (KAUST), ROADS will kick start a joint programme of common data standards for the development of new technology and provide a pilot test case for the Maritime Assured Autonomy Testbed.
- **National Centre for Coastal Autonomy (NCCA)** - led by the Marine Research Plymouth partners and building on the success of Smart Sound Plymouth, NCCA will expand the nation's capability to deliver autonomous marine platforms, technology and research in a safe and sustainable manner.
- **Oceanus Research Vessel** - led by MSubs with Plymouth Marine Laboratory, this will provide the UK research community with a large cutting edge global autonomous research vessel to support the Marine Autonomy Assurance Testbed to carry out operations for building certification scenarios for the virtual testbed and showcase the capabilities of the UK. It is a unique product that other oceanographic businesses may be interested in accessing – thus the model could potentially be replicated and have much wider applicability and impact.
- **Remote Operation Centres (ROC)** - led by Smart Sound Plymouth, ROC will support the specific operations of the National Centre for Coastal Autonomy and the defence requirements for Thales and Babcock.

Digital Oceans

- **Smart Sound Connect Phase 2** - led by Smart Sound Plymouth to deliver an integrated 6G underwater network, Phase 2 will provide a unique platform for connected autonomy innovation across the offshore energy, aquaculture, and defence sectors.
- **Smart Port Lab** - led by the University of Plymouth and leveraging the existing National Facility for Maritime Cyber Resilience, the Smart Port Lab will ensure the efficiency advantages of smart ports can be embraced without compromising security.
- **5G Coastal Highway** - led by Smart Sound Plymouth, this project will form a unique connected 5G coastal highway between Dorset, Plymouth and Falmouth for application across the maritime sector including short sea shipping, aquaculture and floating offshore wind.

Maritime Net Zero

- **Appledore Clean Maritime Innovation Centre** – led by Torridge District Council, the Centre will feature an on-site presence and support from the Universities of Plymouth and Exeter, providing a range of office, workshop, wet lab and aquaculture tank facilities to further innovation work into clean maritime futures, whilst working in collaboration with Petroc College to drive regional skills growth.
- **Clean Maritime Propulsion Hubs** - led by the University of Exeter with partners such as Harland & Wolff and Torridge District Council, this project will create new bases across the South West, initially in Plymouth, Appledore, Falmouth and Dorset, providing expertise and support for vessel conversion and new build with clean propulsion technology. It can be rolled out further over time.
- **Clean Maritime Charging Network** - led by the University of Plymouth and building on the DfT funded Marine e-Charging Living Lab project with Princess Yachts Limited and Aqua SuperPower, this project will establish charging infrastructure for electric and alternatively propelled vessels across the South West.
- **Maritime Hydrogen Project** - led by the Universities of Plymouth and Exeter with Warwick University and Imperial College to mirror the Clean Maritime Charging Network, the project will establish proper testing and deployment of hydrogen infrastructure, potentially in in South Yard Freeport site, and explore hydrogen production from the Celtic Sea floating wind proposals. This project is scalable.

Delivering Government Policy

Ocean Futures has strong alignment with local and regional agendas including the Cornwall, Dorset and Heart of the South West Local Industrial Strategies and the Great South West's Natural Powerhouse. These strategies prioritise the green and blue economy, focussing specifically on development of the marine, maritime, defence, energy and aquaculture sectors.

Through engagement with the Freeport Regulatory Engagement Network Ocean Futures can accelerate UK leadership in developing international data standards and will also deliver tangible outcomes in core government policy areas:

- Maritime 2050 and the Decarbonised Transport Plan.
- The UK SHORE Programme.
- Ten Point Plan for a Green Industrial Revolution and the Energy White Paper.
- Defence and National Security Capability.
- UK Innovation and Export Strategies.
- National Shipbuilding Strategy.

Importantly, it will also support the government's levelling up policy objectives, creating a pipeline of jobs across the spectrum of employment from entry level to higher skilled/high value with investment in skills and progression pathways, making a real difference to peoples' lives.

Delivery

The current Ocean Futures Partnership is a working group which includes local and regional government along with industrial and academic partners to provide oversight and leadership of this programme of work. It has spent 18 months building the business case and establishing the need in the region. With the focus now moving to delivery we will evolve our governance structure, ensuring that Ocean Futures continues to be agile and that it facilitates innovation, development and growth.

Implementing a phased approach, we will establish:

- **A Partnership Board (within the next three months, with a first meeting in September 2022).** This will be the core of our governance model. The Board will work with critical government and private sector stakeholders to establish the Ocean Futures programme as outlined in this business plan.
- **An Advisory Board (within six months)**. Drawing on membership of the current Ocean Futures working group, the Advisory Board will provide additional guidance on the delivery of the Ocean Futures programme.

We will also appoint a Programme Director within the next six months to provide leadership and ensure delivery on behalf of the Ocean Futures Partnership. A full Oceans Futures programme team will be in place from 12 months onwards.

Finance Plan

The total planned investment in the Ocean Futures programme is £176 million within current horizons, broken down as follows:

- Core team and data resource for three years (including overheads) - £3.77m.
- Core service for three years covering innovation, skills, trade & investment - £11.7m.
- Enabling infrastructure
    - Skills and Workforce Development - £10.5m.
    - R&D Infrastructure - £88.4m.
- Strategic pipeline projects
    - Marine Autonomy - £68m.
    - Digital Oceans - £28m.
    - Maritime Net Zero – 37.5m.

The priority of the partners is to secure funding for the small, dedicated Ocean Futures team and delivery of the core service. Potential public sector funding sources include Innovate UK and DIT, the Shared Prosperity Fund and emerging County Deals for Cornwall and Devon.

Work is already progressing well to secure funding for the R&D and skills infrastructure projects, in part from the opportunity presented by the PASD Freeport as well as private sector investment and research proposals to NERC. We will also look to leverage local funding from County Deals and the Shared Prosperity Fund.

The aligned strategic projects led by industry funds, matching with public funding from appropriate innovation calls or direct public funding project by project, currently make up £133.5 million investment over the 10-year programme. This investment level will flex over time as industry requirements and other projects align. The Ocean Futures Partnership is already working to secure the funding for these projects from a variety of sources, including significant international partners and Lloyd's Register, and the funding campaign will be on-going throughout the programme lifetime. As and when opportunities arise for this to be matched by public funding, the partners will be in a strong position to respond with robust business cases that leverage maximum private finance. Working with the DIT, options will be explored for capital investment in R&D as well as venture capital, private equity and angel investment support at pre-commercialisation stage and, where appropriate, international partnering. Projects have been designed to be scalable where possible and potential funders are invited to consider investments in single projects or packages that align with their priorities.

Why Invest

Ocean Futures represents a once-in-a-generation opportunity for Government, Industry and Academia to work together to develop the South West regional economy, building on existing unique assets to create a world-class centre of excellence, whilst delivering the Maritime 2050 ambition to create a cleaner, digitally enabled sector. Its programme of activities will strongly contribute to the UK's ambition to be a science and innovation superpower at the heart of the future blue economy but speed is of the essence. With the right investment we can collectively support the UK to maintain its advantage and gain a lead in tomorrow's markets whilst focusing on core policy objectives from net zero to levelling up, making a tangible difference to people lives and communities.

Investment in Ocean Futures will enable us to accelerate our activities – delivering faster and more targeted support for businesses and the research base to deliver innovation, skills, trade and investment that will contribute to the UK's ambition to be a science and innovation superpower at the heart of the future blue economy.