

Ocean Futures

PIONEERING A SUSTAINABLE, PROSPEROUS AND DIGITALLY ENABLED OCEAN FUTURE



OCEAN
FUTURES

Contents

- 3 Foreword
- 4-5 Overview of Ocean Futures
- 8-9 Delivering government priorities
- 12-16 Innovation, Skills, Growth, Infrastructure, Build Back Better Plan for Growth and Levelling up
- 17 The Programme
- 18 Contact



Foreword

The Ocean Futures programme is 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.

The Ocean Futures programme will underpin the country's maritime industry and therefore provide economic stability and prosperity in support of a globally engaged UK.

Ben Murray
Director Maritime UK

Our vision

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, as a key pillar of the country's ambition to be a science and innovation superpower, with activity focussed on:

- **Autonomy** – leading the demonstration and integration of marine autonomous systems for applications in defence, offshore renewable energy, aquaculture and emerging ocean economy application, estimated to be a £103bn market by 2030
- **Digital Oceans** – transforming our understanding of the ocean environment and safeguarding future maritime operations with integrated digital marine communications
- **Maritime Net Zero** – leading the transition to safe and secure maritime operations that will embrace a variety of alternative energy sources bespoke to vessel type and operation

What we will deliver:

- The marine sector innovation hotbed for the Plymouth and South Devon Freezone allowing for increased exports and foreign direct investment centred on new technological development
- A global Centre of Excellence driving the shift to clean and safe maritime and an increasingly digitally enabled, autonomous maritime sector
- A framework for business clustering and coordinated support for SMEs and micros to create new technology for established end-user needs leading to high-productivity growth
- A highly visible anchor for high productivity regional employment – supporting Levelling Up by leveraging strengths to lead development of technological solutions for emerging opportunities

Underpinned by:

- **Innovation** – driving maritime research and innovation by application of world-leading research expertise and facilities towards industry need, facilitated by targeted Government support
- **Skills** – providing the necessary skills for the future workforce in rapidly expanding offshore sectors through a regional Maritime Skills Academy
- **Growth** – supporting innovation, growth, trade and investment through a South West innovation and marketing service

Infrastructure and Waterfront

- **Access** – creating a critical mass of ocean tech R&D assets in the South West with capital and digital improvements to Oceansgate Enterprise Zone, Turnchapel autonomy innovation and training wharf, Smart Sound Plymouth and other regional assets
- **Levelling Up** – application of world-leading maritime heritage, facilities and expertise into a world-class centre of excellence to shape the UK's lead in the rapidly growing ocean economy, lifting economic output and productivity

Why it matters now

The OECD predicts that the Ocean Economy will double between 2010 – 2030 to \$3 trillion, with key growth opportunities in high-value marine manufacturing, offshore renewables, marine autonomy and aquaculture. Britain's maritime heritage is long, proud and lucrative, but our international competitors are investing heavily in home-grown talent to gain a lead in tomorrow's markets. The UK has the chance to capitalise on its strengths and take a leading role.





Public/private partnership

A strong consortium developed over a decade of successful collaboration in research, science and innovation. With dedicated co-ordination, investment and government backing, this partnership will take us to the next level and firmly establish Ocean Futures as a global centre of excellence focussed on the Smart Sound Plymouth in-sea test and development range, surrounded by a commercial ecosystem and broader market exploitation.

The dynamic ecosystem anchored on key players Babcock, Thales, MSubs and over 30 organisations in the Future Autonomous at Sea Technologies (FAST) Cluster has potential to grow exponentially.

Anchored in excellence

Ocean Futures will position the UK as a global leader in advanced maritime technologies, by accelerating the work already underway in the South West region and the unique physical environment and state-of-the-art capabilities of the Smart Sound, around which industry and academic expertise have coalesced.

It draws in a wider, world-class ecosystem of SMEs and micros alongside assets from across the South West, including but not limited to: the UK Hydrographic Office, Met Office, National Physical Laboratory, the Marine Biological Association, Plymouth Marine Laboratory, the Universities of Plymouth and Exeter, our Science Parks, Enterprise Zones and world-class ocean technology test facilities across Cornwall, Devon, Somerset and Dorset.

Building on:

400 years of heritage, significant investment and excellent regional collaboration:

- One of England's 8 designated Freeports and an established international maritime technology hub
- The UK's largest cluster of marine researchers and home to three world-leading marine scientific institutions that form Marine Research Plymouth, recognized globally for publications, impact and influence
- One of the few European ports with littoral deep sea ocean access without being overly congested by shipping

- The largest naval base in Western Europe with unique capabilities
- The UK's first marine Enterprise Zone and National Marine Park
- The Smart Sound testing range which makes Plymouth Sound the most surveyed and digitally connected stretch of water in the world
- World-leading Maritime Cyber Threats research and the new Cyber-SHIP Lab at the University of Plymouth for safe maritime operation and a future of resilient smart ports
- The UK Maritime Autonomy Centre delivering complex systems trials, including the first of its kind UK-FR Maritime Mine Countermeasures system
- £18m investment in marine business support mechanisms across Devon and Cornwall since 2017



Delivering Government Priorities

Maritime 2050 and the Clean Maritime Plan

Ocean Futures will provide the testing, evaluation, development and manufacturing capability to make the UK an international centre for clean, autonomous and digitally enabled maritime technology.

Combining Plymouth's Freeport status with the city's globally-leading Maritime Cyber Threats Research and in-depth knowledge of autonomous operations, will make Plymouth the leading test bed for smart port developments that can support a future of short sea shipping, taking freight off the road to reduce air pollution.

Leading the transition to alternative fuels for Clean Growth.

A collaboration between Plymouth Boat Trips, the Centre for Future Clean Mobility at the University of Exeter, and Naval Architects from the University of Plymouth created E-Voyager. This applied leading-edge thinking on electric powertrain technology, with experts working with the MCA and Class Societies to interpret all aspects of regulations for vessel design to create the UK's first sea-going electric ferry.

The South West UK is now a primary area for floating wind development, and leading research from both Plymouth and Exeter on hydrodynamic design and power transmission is looking to drive cost reduction as the region develops 50GW of floating wind capacity by 2050.

Floating wind will drive the switch to autonomous monitoring, inspection and maintenance and production of green hydrogen, as well as creating the market for large numbers of clean maritime specialist support vessels.

Ocean Futures will accelerate net zero growth and create exportable technology to support the regional economy and increase national supply chain towards the 60% UK target.

Future Maritime Operations

As our seas become more congested with growth in the ocean economy, Ocean Futures will provide thought leadership to enable future marine spatial planning. Our lead in marine science, combined with new facilities including Full Mission DP Simulator and Marine Autonomous Control Centres, will drive thinking for safe, secure and sustainable future maritime operations.

25 Year Environment Plan

Autonomous, clean and digital technologies are critical to securing clean, healthy, productive and biologically diverse seas and oceans. They will enable automated global ocean observing and biodiversity forecasting to be developed to measure impacts of carbon net zero on climate change. With application to sectors including offshore renewable energy and aquaculture, Ocean Futures technological developments will lead the way for future sustainable exploitation of the ocean economy.

Defence Capability

Devonport Dockyard (Western Europe's largest naval base) and the well-established, highly skilled, defence cluster with 400+ local SMEs supports the supply chain & contributes over 14% to Plymouth's economic output; Ocean Futures will create the opportunity to leverage this national defence industrial capability. Plymouth is home to the UK Centre of Maritime Autonomy which is a key defence and civil capability. As a collaboration lead by industry, with Smart Sound Plymouth, Turnchapel & Naval Base assets, it is creating new autonomy, digital and cyber capabilities to contribute significant benefit to the South West economy.



R&D INSTITUTIONS AND TESTING FACILITIES

- 1 Electronic & Photonics Innovation Centre, Torbay
- 2 University of Exeter
- 3 Falmouth Bay Test Site
- 4 Hayle Marine Renewables Business Park
- 5 Marine Biological Association
- 6 National Composites Centre
- 7 Offshore Renewables Catapult
- 8 Oceansgate Marine Business Technology Centre
- 9 Plymouth Marine Laboratory
- 10 Plymouth and South Devon Freeport
- 11 University of Plymouth Marine Institute
- 12 QinetiQ Portland
- 13 QinetiQ Plymouth
- 14 South West Centre of Excellence in Satellite Application (Goonhilly)
- 15 South West Centre of Excellence in Satellite Application (Plymouth)
- 16 South West Centre of Excellence in Satellite Application (Exeter)
- 17 Thales Maritime Autonomy Centre (Plymouth)
- 18 Met Office (Exeter)
- 19 UK Hydrographic Office (Taunton)
- 20 Wavehub (Hayle, Cornwall)
- 21 CEFAS (Weymouth)
- 22 Teignbridge Hydrodynamic Research Vessel
- 23 Brixham Labs, University of Plymouth



Innovation

Commercially-driven research and innovation

The OECD predicts that the ocean economy will double by 2030 to \$3 trillion with key growth opportunities in high value marine manufacturing, offshore renewables, aquaculture and marine autonomy. The global autonomy market alone is predicted to grow to \$136 billion over the next 15 years with the UK having a 10% market share. This, in addition to the opportunity presented by cleaning and digitising the sector, presents a

rare economic opportunity for high-productivity growth for the South West.

Capitalising on our existing relationships, we will facilitate this growth as the centre-piece of Ocean Futures by creating a hotbed of innovation through a triple helix innovation model, with academia, industry and Catapults/Government departments all working together on future ocean markets, facilitated by Maritime UK South West.

Leveraging our assets, we will create a regional innovation programme to facilitate the growth of an ambitious and agile cohort of SMEs through translational research, skills development and data sharing, driving HEI/industry collaboration and investment in R&D, focussing on our autonomy, digital ocean and marine net zero opportunity areas.

Skills

Up-skilling the workforce

We will galvanise efforts to up-skill employees across the region, developing a Maritime Skills Academy that places industry at the heart of the skills development agenda and enables the shift to a future ocean economy.

This will build on the work of local partners such as City College Plymouth, which is already creating a bespoke facility to deliver new university-level courses on marine autonomy with higher-level pathways.

Postgraduate opportunities such as flexible Masters programmes and PhDs through the Doctoral Training College are available through the University of Plymouth, with students hosted at Marine Research Plymouth institutes as well as with maritime industry partners.



Growth

Supporting innovation, economic growth, trade and investment
Building on the world-class innovation support currently provided by the Marine Business Technology Centre in Devon and Marine-i in Cornwall, we will develop an expanded South West innovation and promotion service with a regional sector footprint (£3.5 billion GVA and 50,000 jobs)¹ that will also provide support for businesses accessing Smart Sound Plymouth and affiliated innovation assets.

Ocean Futures will assist in raising the productivity of the maritime sector more generally, drawing on our network of regional Enterprise Zones as hubs to build our network of agile and ambitious marine tech SMEs and micros in the region.

Linked to our innovation plans, we will support businesses with their current practices to become more efficient and trial ways to generate more streamlined trade growth through the use of smart technology.

Working through Maritime UK South West and drawing on resources provided through the Department for International Trade High Potential Opportunity (HPO) and Freeport initiatives, we will work as a region to promote our Ocean Futures technology offer, combining research, place and business, creating a more compelling regional pitch to increase international collaboration, trade and investment.

¹ MUKSW 2016 study by Wavehill



Infrastructure

Delivering capital and digital improvements

The Plymouth and South Devon Freezone transforms the region's ability to secure private and public investment. The new Freezone has a strong focus on innovation and advanced manufacturing and will develop three sites specifically for marine, defence and space clusters to form and co-exist.

The creation of an internationally significant in-sea test and development asset, centred on Smart Sound Plymouth and to complete the Oceansgate development in

Devonport South Yard, are part of the Freezone plans and will serve as an international anchor investment, creating a truly global centre of excellence.

It will drive investment, interaction and supply chain pull across other regional assets including the Met Office in Devon, National Composite Centre in Bristol, the National Oceanography Centre in Southampton, FaBTest in Cornwall, Enterprise Zones in Dorset and Cornwall and other test and development sites across the South West.



Build Back Better and Levelling Up

Lifting economic performance, supporting regional development

The cumulative effect of the Ocean Futures programme will be to deliver high productivity regional employment accelerating GVA growth and innovation output, in particular from our agile and innovative SMEs and micros to support the government's levelling-up agenda.

Although average levels of productivity across the South West lag behind those of the rest of the UK, the maritime sector punches well above its weight in GVA terms. The average job in the maritime industry generates £65,000 in GVA, significantly above the UK-wide level of £50,800. Investment in the development of high-value maritime subsectors can therefore make a significant contribution to regional productivity (The Centre for Economics and Business Research 2016).

Our bedrock ocean economy in the South West therefore provides a rare opportunity to regenerate communities and increase productivity. Investment in Ocean Futures will help to transform our maritime sector to provide much needed high-value employment, investment and GVA growth, in addition to creating hubs of highly visible prestige technology that garner a sense of local pride in our coastal communities, helping to attract and retain our workforce of the future.



The Programme

Ocean Futures has an exciting programme of investment in the core team and mission critical projects co-designed by industry, research and public sector partners:

- **Smart Sound Plymouth** supported by a digital twin and a 5G Maritime test bed, to enhance our understanding of the ocean, and leading the transition to a future of integrated autonomous operation, resilient smart ports and short sea shipping.
- **Smart Port Laboratory** combining leading marine autonomy, cyber security and connected ocean strengths to enable developments that will embrace the efficiencies of short sea shipping and future smart ports without compromising security
- **Clean Maritime Gateway** extending the regional offer through the provision of a dedicated Clean Marine Propulsion Facility within the Centre for Future Clean Mobility, and associated network of shoreside charging throughout the City to drive adoption of alternative propulsion solutions
- **A SW maritime innovation service** focusing the South West's world class research and innovation capability to drive collaboration, innovation and productivity in the region's SMEs and micros
- **Assured Autonomy programme** working closely with the National Physical Laboratory and Lloyds Register to develop a centre for measurement standards, testing and certification underpinning the new assurance frameworks and regulations required for marine autonomy and remote operation
- **Ocean Technology promotion** working through Maritime UK SW to promote our combined place, business and research offer to drive international trade, investment and collaboration
- **Maritime Skills Academy** an industry-led maritime related curriculum delivered through existing and possibly new suppliers to ensure solid SW pipeline of competence for tomorrow's new high quality jobs
- **Oceansgate: Marine and Defence Innovation Centre** a regional anchor innovation and collaboration space and start-up premises with waterfront access
- **Clustering via Maritime UK SW** providing international, national and regional coordination and partnerships across the ocean economy
- **The Plymouth and South Devon Freezone** providing a simplified commercial and regulatory environment, providing an Innovation Hotbed to accelerate the clean growth of our marine, defence, engineering and manufacturing sectors to provide the high quality jobs we need for the future.

All supported by the following enabling activities:

Ocean Futures will work with government departments to co-design a programme of investment. Funds will be secured over the next 3 to 5 years from a variety of public and private sector partners, matched by the consortium. This will enable co-ordination across local, regional and national actors supporting the South West to become an internationally recognised centre for advanced blue and green ocean technology and R&D, providing long term, sustainable economic growth, jobs and investment. The ambition is to become self-sustaining in the longer term.

For further Information

Please contact:
Richard May
Ocean Futures programme lead
richard.may@plymouth.gov.uk



