





Smarter UK Ports Resilient and Efficient Operations



This report is presented by the British Ports Association, Royal HaskoningDHV, and the Connected Places Catapult as part of the BPA's *Port Futures* programme, which explores topical or innovative issues of interest to UK ports.

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British Ports Association: Port Futures Report Series

Report title	Report Partners
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Ports & Coronavirus	Hill Dickinson LLP
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Automation of ships in ports and harbours for the British Ports Association	Setfords
UK Port Infrastructure Pipeline	Moffat & Nichol

Smarter UK Ports – Resilient and Efficient Operations

Earlier this year, Royal HaskoningDHV's Smart Ports team and the Connected Places Catapult launched a series of five use cases to promote the transition to Smarter and Greener ports in the UK, bringing to life some of the key themes in the Government's Maritime 2050 strategy and the Ports of the Future roadmap published by the Catapult for the Department for Transport. Through these use cases, we combined existing or higher maturity technologies in innovative ways to solve common challenges faced by UK ports.

We shared this work through a joint webinar to showcase actionable future initiatives to ports and their related stakeholders on the journey towards smarter ports and their benefits to coastal communities and economies.



The themes for the studies were based on real port challenges, collaboratively defined with five partner ports from across the UK, including:

- <u>Virtual Gate for Ferry Operations</u> **Portsmouth International Port**
- <u>Automated Asset Inspection & Maintenance Insight</u> Shoreham Port
- <u>Climate Resilient River Operations with Predictive Forecasting</u> **Port of London Authority**
- Shore Power to support Offshore Wind Support Vessels Port of Tyne
- <u>Operational Resilience Monitoring of Remote Marine Assets</u> **Port of Milford Haven**

Bringing Smart Ports to life

A Renewed Focus and Ambition

2021 has been a busy year for the maritime and ports sector, where since the launch of these uses cases we have seen much activity related to decarbonisation and digitalisation, including:

- The launch of 55 projects in the Department for Transport's Clean Maritime Demonstration Competition
- The announcement of eight new freeports around the UK
- COP26 and the Clydebank Declaration announcing the commitment to international Green Shipping Corridors
- The commitment from the UK to cut carbon emissions by 78% compared with 1990 levels by 2035, which for the first time will include Britain's share of shipping emissions
- Publication of the UK Innovation Strategy, featuring ports and freeports
- The launch of the Coastal Powerhouse Manifesto
- Publication of The Transport Decarbonisation Plan, announced with £300 million of funding for the decarbonisation of maritime and road freight, including a commitment to creating UK SHORE and a multi-year R&D support programme

The last two years have also focussed attention on the maritime sector, through what has been a turbulent period with the UK leaving the EU, the global Covid-19 pandemic, months of lockdowns and restrictions on movement and more recently vessel delays in the Suez Canal and port congestion in China impacting supply chains globally. These events have renewed our collective understanding of the critical role the maritime sector has in facilitating the complexities of global trade and maintaining the flow of critical goods. These events have also highlighted the need for initiatives that enable our future ports to be resilient, safe and secure facilitators of efficient and sustainable international trade.

As we now focus on post-Covid recovery and 'levelling up' regions and communities across the UK, we must recognise that many of these regions are coastal, having specific challenges and opportunities related to their maritime heritage and future.

Many UK ports are located in economically deprived coastal communities, where they already contribute significantly to the prosperity of the regions in which they operate. With added momentum generated for the whole ports sector by the introduction of eight new freeports, seven of which will be located in seaports, the UK port sector has a great opportunity to showcase this contribution to the general public and demonstrate the importance of their role in society as hubs of wide-reaching innovation, industrial activity and creators of skilled jobs.

Operating at the interface between land and sea, our ports are central to the coastal ecosystems that will support the sustainable growth of future industries such as renewables. Ports are key

stakeholders and enablers in the energy generation, storage and distributions systems that will enable decarbonisation of other sectors, from carbon capture and storage to green hydrogen. From this perspective, it is clear that ports have a much larger role to play than the traditional view, as simple conduits for goods.

Freeports

Much attention is given to the trade and tariff allowances and tax benefits associated with freeports, but the opportunities associated with freeport status go far beyond this, particularly in relation to their potential to stimulate foreign direct investment in port communities. For example, UK freeports are split across discrete 'virtual' sites, which will require goods to be tracked and



monitored, obliging freeports to employ digital solutions for improved supply chain integration. Their regulatory flexibility will also enable innovation by making it easier for ports to trial new technologies whether related to decarbonisation or digitalisation, creating powerful synergies in progressing both challenges. Through establishing a clear, globally relevant investment prospectus based on regional and national strengths, there is significant potential to attract investment to fuel innovative initiatives and contribute to regional economies through new jobs and wealth creation.

Innovation will not be confined to freeports, where benefits will be felt across the whole maritime sector and the UK economy. The use cases that were jointly developed echo these sentiments of digitalisation, improved resilience, and decarbonisation, including:

- Facilitating reduced emissions of pollutants from vessels in port through the use of shore power, while supporting the transition of society at large to cleaner wind energy, at the Clean Energy Park in the Port of Tyne
- Using digital solutions such as automatic number plate recognition to improve the flow of traffic and pre-checks for post-Brexit clearances, managing the supply chain within a constrained footprint in Portsmouth International Port while reducing air quality and traffic impacts from congestion in the wider city
- Using digital tools to ensure port operations and infrastructure planning decisions are made with the impacts of a changing climate in mind or
- Using technology to support the long-term maintenance and resilience of critical assets in ports such as Shoreham and Milford Haven.

Bringing Smart Ports to Life

Following the publication of the Smart Port Use Cases by Royal HaskoningDHV and the Connected Places Catapult, work has proceeded together with the port partners to bring these use cases to life and start delivering real impact for the sector and our stakeholders across the UK.

Shoreham Port: infrastructure condition monitoring



In Shoreham, Royal HaskoningDHV has applied its AI-based CREATE platform to identify road and pavement defects in the port. This tool enables inspections of pavements to be undertaken in a lower cost, quicker and safer method, by capturing video images using a camera attached to a vehicle. Images are passed through the Envision engine for defects to be automatically identified and classified. Royal HaskoningDHV is looking at combining this

with drone technology so that the condition of large, functional areas of the port can be routinely monitored quickly and safely. Thus, allowing them to quickly prioritise areas for maintenance and plan future maintenance more effectively.

Royal HaskoningDHV is continuing to expand its AI-based inspection toolkit for ports to incorporate other extensive structures from quay walls to warehouse roofs.

Port of London: Energy Diversity Strategy



In the Port of London, Royal HaskoningDHV are working on an Energy Diversity Study for the Thames. The purpose of the study is to model the future energy demand and supply on the tidal Thames as the Port of London Authority (PLA) looks to shape the zerocarbon port for the future.

Over the course of the study we have assessed the energy solutions (available and emerging) and infrastructure needed to support decarbonisation of the vessels using the Thames, including the PLA's own fleet and to support both the PLA and the wider Thames community in making their next steps towards a lower carbon future. Factors considered included the speed of technological change for both the inland and international shipping fleets, future growth, geographic constraints, safety, supply chain, current regulations, and commercial viability.

The first phase of the study has highlighted some of the remaining challenges with respect to regulation and safety, but also the opportunities for stakeholders on the Thames as energy supply and demand patterns change. The second phase will consider the feasibility of delivering identified solutions at potential sites, gauging the pros and cons of the best suited options for relevant end users.



Portsmouth International Port: Connected Logistics

The Connected Places Catapult has recently а Phase 1 completed project with Portsmouth International Port based on the connected logistics theme discussed in the ANPR pre-clearance use case. The 'SpacePort' feasibility project, funded by the Geospatial Commission in partnership with Innovate UK, successfully established a novel geospatial solution to streamline port operations, improve efficiency and reduce the environmental impacts of port operations on the city of Portsmouth.

This project was a collaboration between MSE International, the Catapult, Portsmouth International Port and Portico, working to show how transferable solutions in port operations can make significant contributions to the UK's decarbonisation of freight and logistics infrastructure. The project considered the challenges for the port including; the impact of maritime logistics on the city's air quality; the requirements 2050 of the maritime emissions targets; the congestion in the city centre and surrounding areas and alignment with the city's transport strategy including the Solent Freeport. The project assessed the diverse geo-spatial and other data resources that could offer solutions as well as undertaking a detailed technical appraisal available geo-spatial solutions. of In addition, the port's existing logistics systems were reviewed and a detailed use-case mapping exercise conducted to check that all the data resources and positioning and sensing technologies could deliver the functionality required by the port.

Ports embrace change, for a resilient future

Whilst the last few years have brought forth challenges many would not have expected, this disruption and increasing recognition of the ports sector as vital to the UK also presents a unique opportunity for the maritime and ports sector. By nature, their vital roles in how the UK works means that it's also an exciting time for our regions, manufacturers, logistics providers and innovators. There is a genuine drive and commitment to not only transform the sector itself, but to take a much more integrated, connected and collaborative approach.

The creation of eight new freeports, inclusion of the maritime sector in the UK Innovation Strategy, increased innovation funding and commitments to tangible targets in emissions reduction highlights the renewed focus and ambition for the UK maritime sector as a fundamental enabler to Global Britain and our future place in the world. Both Royal HaskoningDHV and the Connected Places Catapult look forward to continuing to work together with the sector to realise the opportunities to deliver a greener, more efficient and resilient future for the UK, ultimately strengthening our place on the global stage of world trade as an innovation leader in maritime and ports.



Read the use cases from the project for Smarter UK Ports in more detail by downloading from <u>here</u>.