



MARITIME  
UK

# MARITIME UK FUTURES PROGRAMME: TECHNOLOGY AND INNOVATION GROUP FUTURE TECHNOLOGY WORKSHOP

21 MARCH 2019 | IAN STOCK AND RICHARD WESTGARTH

## Background

The Maritime Futures programme seeks to understand the future shape of the UK maritime sector through the exploration of a broad range of drivers of change, ascertaining which areas will have the greatest impact. Then, having formulated a vision of what the future holds, the programme will establish what the sector needs to do to respond to and capitalise on such a scenario. Change factors that the programme will examine include urbanisation, water, climate change, convergence, demographics, food, oceans, poverty, energy and waste. The initiative will also make use of existing research, like the UK's Government Office for Science's Foresight project regarding the future of the sea, and outlook projects led by Maritime UK members – for example, British Marine's futures project or the British Port Association's.

The Maritime UK Technology and Innovation Group was identified as a focus for a workshop on technology futures for the Maritime Sector. The recent publication of the Maritime 2050 Strategy and associated Technology Roadmap by the Department for Transport has acted as a starting point identifying a number of recommendations, this has been supplemented by key themes identified during the discussions around a UK Maritime Research and Innovation hub. As part of the M2050 strategy there is an identified need to establish a maritime equivalent to the Aerospace Technology Institute to help commercialise British R&D in the Maritime Sector. This existing collaboration is seen as a possible basis for the collaborative R&D hub, Maritime Research and Innovation UK (MarRI-UK).

## Workshop

### Objective

The workshop set out to understand the future technology challenges arising from the Maritime 2050 Strategy and their impact upon the Marine and Maritime Sector as a basis for developing a Technology Agenda from which a coordinated and prioritised Research and Innovation Programme could be developed for the MarRI-UK.

### Presentations

Initial presentations were given on Maritime 2050 (by Rod Paterson, DfT) to set the scene and remind attendees of the technology themes, and on MarRI-UK (by Richard Westgarth BMT) as the vehicle for taking forward the national maritime research agenda. The presentations have been forwarded to attendees separately.

## Workshop Structure

The workshop itself consisted of two sessions: the first to understand the issues of importance and key themes or priorities within those; the second to examine outcomes to achieve and technologies required to assist in that achievement.

## Attendees

Over 40 individuals were invited to attend, 31 attended and were formed into 4 groups. The list of attendees is given in the Annex A

## Results summary

The main issues to emerge from the workshop, together with the key themes and related technology areas are set out below.



The Environmental issue was discussed by all 4 groups and consisted of a range of priorities all designed to minimise environmental footprint, achieve a green, clean maritime industry generally (reduced GHG and emissions, fuel consumption, etc) and to enable the UK to lead and grow its economy.

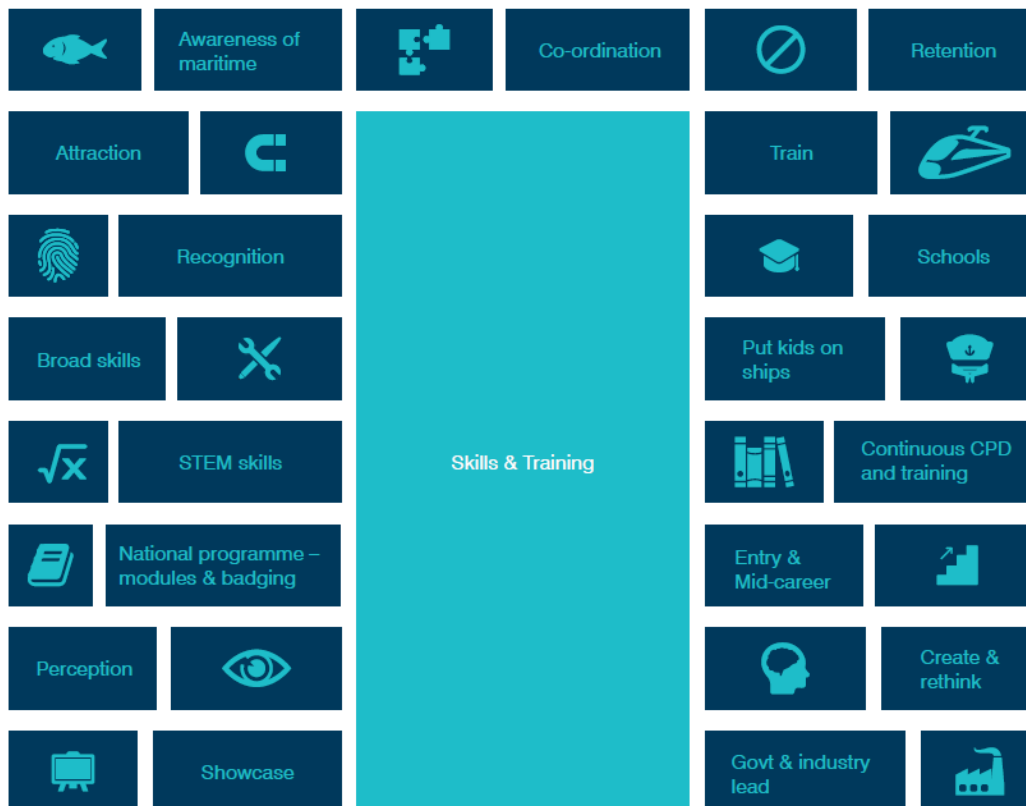
Technologies required for this outcome involved:

- Alternative fuels and propulsion methods – hybrid, electric, batteries, hydrogen, wind
- Energy efficiency through monitoring and measuring, and utilisation
- Power management, including cold ironing and electrification of ports
- Planning and routing – including data acquisition, management and communication
- Ballast and waste water, and waste products – treatment, recycling and disposal
- Automation and digitisation
- Biofouling
- Improved design
- Noise reduction

Some of these were seen as low investment/high impact

Non-technology related options included:

- UK leadership in legislative matters through local regulations / codes of practice
- Port and ship grading system
- Awareness and training



Skills and training are a priority given the loss of UK seafarers, as well as significant changes in the industry and in roles, and its future requirements for increased automation, digitisation, data analytics and use of emerging and enabling technologies, such as AI (Artificial Intelligence). Attendees saw the necessity of identifying future skill needs, and having an inspired pipeline of people with skills at all levels.

It was thought that part of the challenge revolved around (low) awareness and (slightly negative) perception of the maritime industry and the types of work / jobs it offered. This perception needed to be changed, particularly amongst the young and those with a STEM education and skills, and that this needed to start in schools. Others noted that while STEM skills are vital it was also necessary to attract those with broader more diverse skill sets, and offer a range of pathways - such as apprenticeships and 'returnships'.

The whole curriculum needs a rethink, with both Government and industry leadership and co-ordination, to first set out a long-term plan for skills requirements and a programme to achieve it, including specific maritime modules and badged courses.

Retention is also seen as an issue, with a similar rethink needed to ensure continuous training and up-dating of skill sets.

It was suggested that technologies such as Augmented and Virtual Reality (AR / VR) had a role to play in all aspects of training and skills.

In addition, a publicity programme was needed to raise public awareness, change perceptions and inspire new entrants to the industry.



Maritime as a whole has historically been an industry made up of discrete sectors, each not seeing the need for interaction between them. Attendees now see the need for a collaborative team approach with shared resources, interoperability of systems and solutions, for the mutual benefit of the whole industry.

Maritime is a competitive, global business, therefore, the UK industry needs to achieve efficiencies – business, operational and hardware, reduce overlap, and develop new products and services in order to win business globally.

Some of the suggested areas for collaboration and their related technologies were:

- Digitisation and technology to collect information and data
- Data management in a centralised database
- Common data standards
- Communications
- Those mentioned in the Environment section above

Some of these would be achieved through collaboration in MarRI-UK, a directory of shared resources, military-commercial cooperation, regional cluster growth, and increased R&D funding.

A number of other factors were said to be important in building a collaborative industry:

- Sharing knowledge to build trust
- Skills and training programmes – SEM apprenticeships, 'returnships'
- Flexible business models to give opportunities for start-ups, and to build confidence in and encourage uptake of new technologies



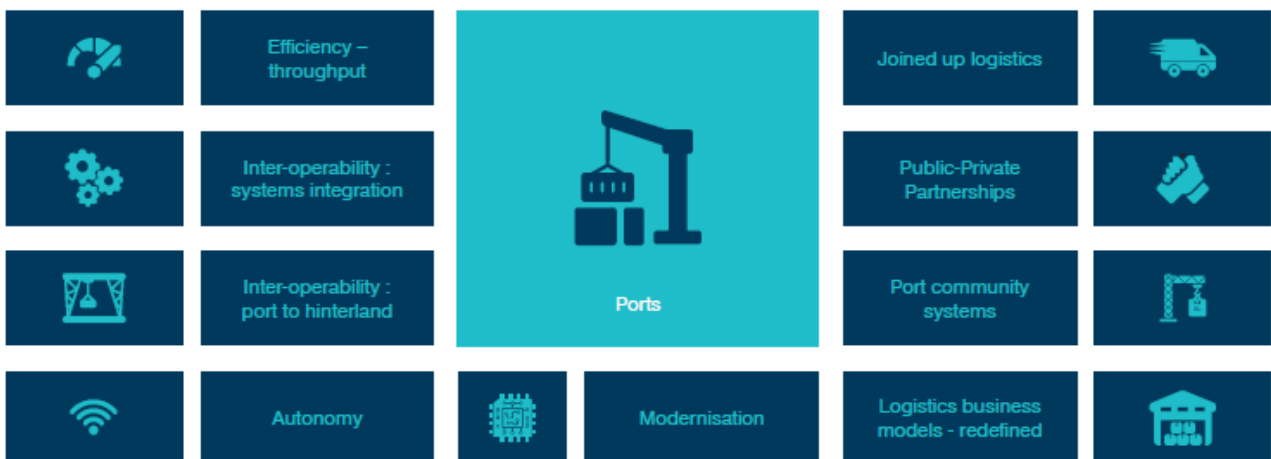
This grouping consists of three themes: defence, security and industry safety, although the discussion mainly focused on the security and resilience aspects resulting from increasing digitisation and autonomy, and collaborative data management.

Technologies needed to achieve security, resilience, and to provide protection against attack revolve around:

- Certification of software
- Common international standards and regulations
- Good data management practices, encryption and reporting systems

Another theme is that of human safety. In many “harsh” environments it is important to remove the human element and technologies such as automation (robotics & AI), digital twins/simulations, and AR/VR are useful technologies to enable this and achieve zero accidents.

Non-technological aspects around training, accreditation and regulations were also seen as important for these themes.



A port’s efficiency, its interoperability with ships and its surrounding hinterland, as well as its environmental impact and security were discussed in two of the groups.

Important themes and technologies mentioned in discussion were autonomy, joined-up logistics and integrated supply chains, collaboration and transparency, as well as systems integration and smart infrastructure.



Autonomy, information and digital themes were central to much of the workshop discussions and seen as potential “solutions’ to the other issues raised and mentioned above.

Some specific technological elements related to the autonomy, information and digital themes, included processing capability, fibre links and data transfer, intermodal connectivity, data analytics and AI, route planning and scheduling.

Regulation was seen as important and needed to be viewed with urgency because of the fast pace of technological change.

### Next Steps

Subject to the allocation of funding from Government, MarRI-UK will be formally set up in this new financial year. These funds are being matched by Industry and will provide for the recruitment of a Programme Manager. The outcomes from the workshop will be used as the basis for developing an initial programme against which a case can be made for further matched funding from Government and industry.

## Annex A Invited Attendees

Gordon Baker  
David Balston  
Ifor Bielecki  
Bill Biggs  
Stephen Brown  
Morna Cannon  
Patrick Carnie  
Becca Carpenter  
Mark Casey  
Reddy Devalapalli  
David Elson  
Jamie Finlay  
Kevin Forshaw  
Rob Furlong  
Russell Gould  
Tony Graham  
Graham Harrison  
Peter Joyce  
Sarah Kenny  
Gordon Meadow  
Anne-Marie Mountifield  
Alan Murphy  
John Murray  
Rod Paterson  
Jake Rigby  
Sheldon Ryan  
Duncan Scott  
Rory Shepherdson  
Chris Shirling-Rooke  
Jim Sibson  
Philip Smith  
Ian Stock  
Ian Strachan  
Damon Teagle  
Harry Theochari  
Gerasimos Theotokatos  
Mark Tuner  
Stephen Turnock  
Gary Umpleby  
Dracos Vassalos  
Bill Walworth  
Mark Warner  
Richard Westgarth  
Russell Wynn

BEIS  
UK Chamber of Shipping  
SeaBot XR  
QinetiQ  
Shell  
DfT  
Babcock International Group  
DfT  
UKHO  
Lloyd's Register  
Innovate UK  
MOD  
Plymouth University  
KTN  
Kelvin Hughes  
Cammell Laird  
National Composites Centre  
BEIS  
BMT Global  
SeaBot XR  
Solent LEP  
Newcastle Univeristy  
Society of Maritime Industries  
DfT  
BMT Defence & Security  
South Coast Marine Cluster  
BAE Systems Submarines Business  
UKHO  
Mersey Maritime  
Babcock International Group  
DSTL  
KTN  
Defence Science Technology  
University of Southampton  
Norton Rose Fulbright LLP  
University of Strathclyde  
BEIS  
University of Southampton  
Hogia Transport Systems  
University of Strathclyde  
Maritime Skills Alliance  
Inmarsat  
BMT Group  
NOC