

# FOCUS

# Climate Risk Management

Climate change and extreme weather events are a major challenge for virtually every sector - both public and private - across the globe. But how does an organisation best prepare for and adapt to these changes moving forward?

# Climate change is happening around the world

Ocean heatwaves cause coral bleaching events which can occur at a large scale and result in massive die-off (bleaching) of corals.

## **Defence Forces Preparing** for Climate Change

It is increasingly recognised by Defence Forces around the world that climate change poses an increasing threat to peace and security globally. Its impacts can undermine livelihoods, increase involuntary migration, and reduce the ability of states to provide security.

#### The Climate Service

Companies see climate change hitting their bottom lines in the next 5 years.

### **Contents**

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### **Editorial**

Welcome to the second issue of Focus for 2019. In this edition, we have selected the theme of Climate Risk Management. It draws together a series of articles written by a range of organisations exploring the risks of a changing climate and extreme weather events, as a major challenge for virtually every sector – both public and private – across the globe.

There is a growing awareness amongst business and industry about the need to adapt, and a realisation that climate change is not an environmental consideration alone. It affects all aspects of business, and is material to profitability. Legal opinion is clear about the fiduciary responsibilities of boards and their need to consider risks of climate change to their business.

The Task Force on Climate-Related Financial Disclosure (TCFD) has made it clear that businesses should consider transitional risk and physical risk to their operations and should disclose these.

BMT seeks to support organisations in understanding their climate change risks and to help them to respond to them

Our world leading flood and coastal numerical modelling software can be used to assist our customers to map risks from climate change both spatially and temporally. More importantly, our expert staff can help to interpret and clarify climate risks and support organisations to develop management responses that are fit for their purposes.

Ultimately, we hope to assist our customers to build their own capacity about climate change; supporting them to understand and reduce risk but to also build resilience and realise the opportunities that can come from this preparedness.



# Coral rehabilitation and climate change

Climate change is happening around the world. Ocean heatwaves cause coral bleaching events which can occur at a large scale and result in massive die-off (bleaching) of corals.

Cyclones crossing over coral reefs can have a major impact on the coral environment and cause substantial damage. Climate change is resulting in warmer seas and stronger and larger cyclones. This means the damage caused on reefs is becoming more frequent and they are less able to recover.

BMT has been contributing to proposed solutions to overcome this challenge by doing work in coral rehabilitation. Coral rehabilitation helps to restore reef function and support the various ecosystem services they provide, but it's important to remember that unless global efforts to reduce emissions are achieved, coral rehabilitation will have little impact.

We are currently involved in two coral rehabilitation projects, one on Australia's Great Barrier Reef (GBR) and one in the Seychelles. Our GBR project is being done in collaboration with the University of Queensland and we are trialling an approach to stabilise coral rubble, increasing the likelihood of coral recruitment, and also returning structure to damaged reefs. The approach involves taking broken coral from the sea bed and placing it into natural-fibre nets to provide a stable base for new coral recruitment.

These artificial bommies are then placed in such a way as to protect other areas of the reef from cyclone wave damage.

In the Seychelles over 90% of coral reefs have been lost as a result of a few significant bleaching events. Coral reefs provide important ecosystem services such as coastal protection, habitat for a range of marine species and in turn support the tourism and fisheries industries, which constitute a large proportion of Seychelles' economy.

Our World Bank funded project with partners Aither (environmental economists), the University of Seychelles Blue Economy Research Institute, WiseOceans and the Marine Conservation Society, Seychelles, is helping to develop a reef rehabilitation strategy for the country, including identifying priority locations, developing a business case for rehabilitation and identifying finance mechanisms and governance structures to implement it.

This project builds on prior work in the Seychelles, and internationally, on innovative business models and financing mechanisms (such as the Debt-for-Nature Swap) to support conservation and the restoration of critical ecosystems.



Senior Principal, Climate Change Adaptation, BMT, Brisbane, Australia

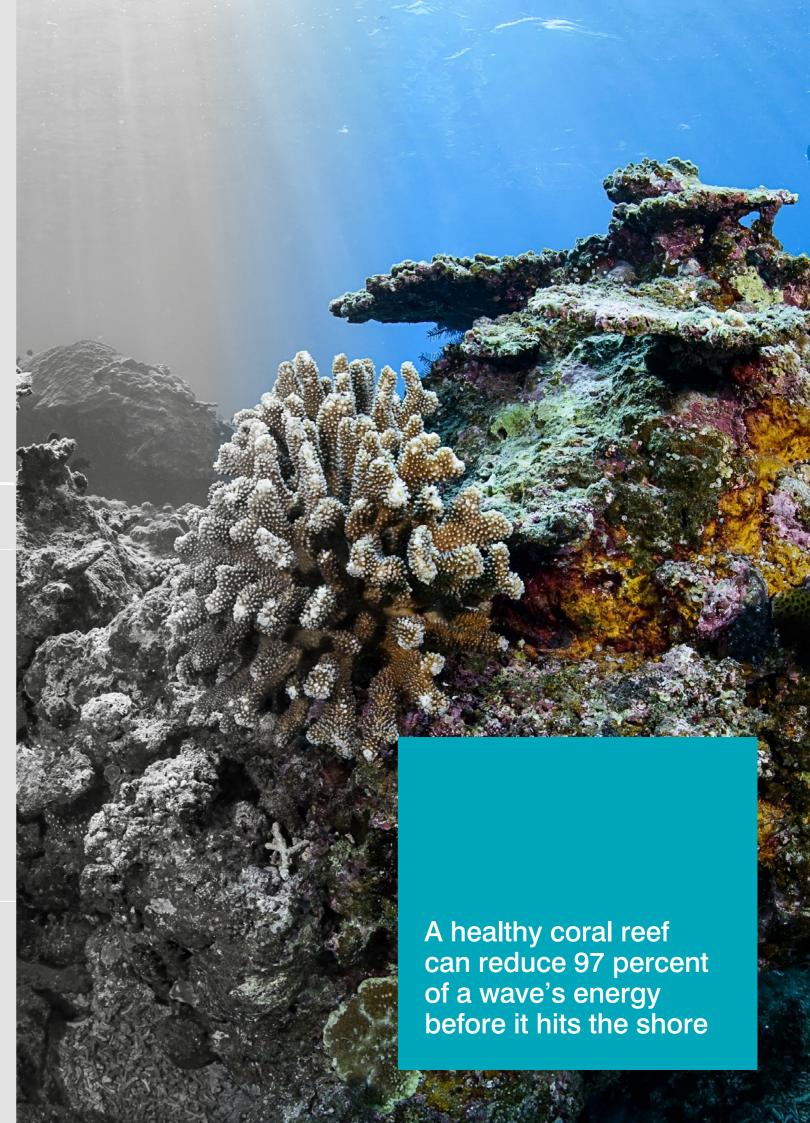
David has significant experience in climate change adaptation, having co-developed and applied a variety of tools and approaches to support effective responses to climate change. He has delivered many risk-based climate change adaptation projects around Australia for the government and private sectors. He has a background in coastal and estuarine management, and a strong interest in the use of science and research to underpin policy and decision making.

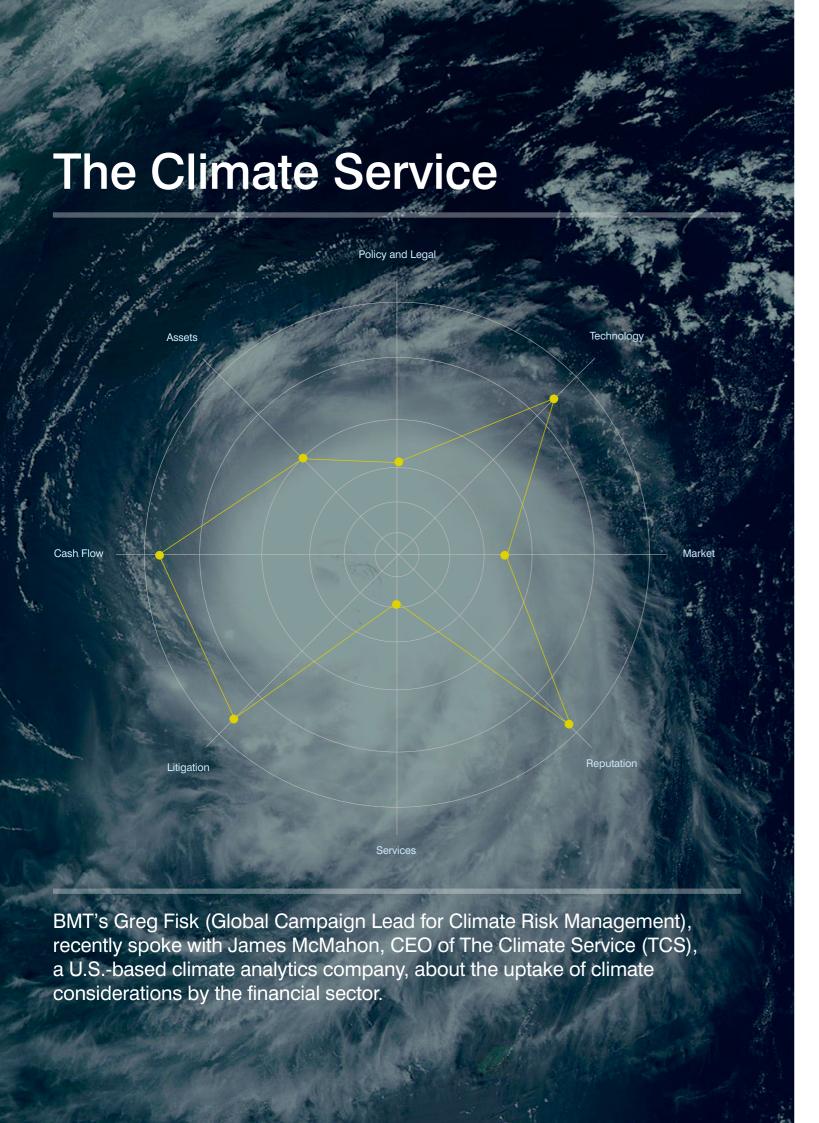
David is involved in a variety of projects related to coral rehabilitation and ecosystem management, including projects in the Great Barrier Reef, the Pacific Region and in the Seychelles.

In addition to his role at BMT, David is a Non-Executive Director of Green Cross Australia and an Adjunct Professor at Griffith University.

Percentage of coral reefs lost in the Seychelles, as a result of bleaching events.







Reflecting on a marked increase in interest by corporate customers in understanding financial risk associated with future climate, James recently posted an article on his LinkedIn feed, published in the New York Times in June 2019 with the headline, 'Companies See Climate Change Hitting Their Bottom Lines in the Next 5 Years.'

The article noted that, 'Under pressure from shareholders and regulators, companies are increasingly disclosing the specific financial impacts they could face as the planet warms, such as extreme weather that could disrupt their supply chains or stricter climate regulations that could hurt the value of coal, oil and gas investments. Early estimates suggest that trillions of dollars may ultimately be at stake.'

James noted that the team at TCS work with their customers, 'to understand how big their potential risks are, using our analytics software to fully quantify financial risks and undertake scenario planning.'

He adds that, 'There's a pervasive myth that climate change is a systemic risk. While there are some systemic components, it's also completely possible to diversify out of the risk - across sectors, within a sector, and even within a company. You just have to have the foundational financial risk analytics to do it.'



**CEO of The Climate Service** 

James founded TCS with the vision that every financial decision on Earth should incorporate climate change. The company's risk analytics software as a service gives investors and corporate managers the financial information they need to incorporate climate-related risk into their decisions.

## 'Companies See Climate Change Hitting Their Bottom Lines in the Next 5 Years.'

**James McMahon** 

# Defence Forces Preparing for Climate Change

It is increasingly recognised by defence forces around the world that climate change poses an increasing threat to peace and security in the world. Its impacts can undermine livelihoods, increase involuntary migration, and reduce the ability of states to provide security.

As well as becoming a contributing factor to future global conflicts, climate change is also shaping how defence agencies manage their estates and assets, spending priorities and operations.

Responses to climate change being developed by defence forces and agencies include the assessment of vulnerability such as the U.S. Department of Defence (DOD) Climate Related Risk, to DOD Infrastructure Initial Vulnerability Assessment Survey [SLVAS], as well as the development of sector-based strategies such as the UK Ministry of Defence Climate Change Strategy and Delivery Plan in 2012 and the 2018 New Zealand Ministry of Defence document, The Climate Crisis: Defence Readiness and Responsibilities.

However, practical implementation of these strategies is challenging; as highlighted in the recently released June 2019 report by the U.S. Government Accountability Office (GAO) on how the DOD is building resilience of its assets to future climate change.

Moving forward, one of the major challenges for managing defence estates is to ensure that they recognise and manage the risk posed by climate change, but then also move to build resilience and adapt infrastructure, strategic and operational planning and their delivery accordingly.







Campaign Lead, Climate Risk Management and Business Director (Environment), BMT, Brisbane, Australia

Greg is a Senior Principal Scientist at BMT with over 20 years of experience in both private and public sector roles. Greg's experience in climate change and coastal management dates back to his time working for the Queensland (Australia) State Government in the late 1990s developing plans for identifying and minimising risks from coastal erosion and storm tide hazards. Since joining BMT in 2007, he has carried out climate change impact assessments for a range of major transport infrastructure projects such as ports and airports as well as leading and contributing to a broad range of climate planning, resilience and adaptation studies with Government entities and authorities.

Greg has a particular interest and expertise in understanding the vulnerability and resilience of natural assets to climate change and extreme weather events through his work on a range of Ramsar international wetlands and more broadly in the context of marine habitat resilience. Greg is an accomplished presenter and facilitator for climate studies, with extensive experience in the planning and delivery of workshops, science communication, expert elicitation and stakeholder consultation and engagement.





# The Australian Coastal Councils Association

Alan Stokes in an Executive Director of the Australian Coastal Councils Association (ACCA). The ACCA is an organisation of coastal councils from all states around Australia which has been set up as an incorporated association with the role to represent the interests of coastal councils at a national level.



We approached Alan for some of his perspectives on how local governments are dealing with coastal hazards and climate risks in Australia:

"The Australian Coastal Councils
Association (ACCA) recently conducted
a survey of their member councils to get
them to identify the number one priority
issue or the range of issues that are of
current concern to them. What emerged
as the number one priority is the need
for adequate funding to respond to
coastal hazards including climate change
impacts.

"Another priority was for the need for a national approach to managing coastal hazards; one that involved the three levels of governments working together - which doesn't exist at the moment. This is important because, with the growing recognition of the role coastal councils are going to play in terms of responding to the impacts of climate change, rising sea levels, more severe extreme weather events, and widespread coastal erosion, there is also a recognition that they do not have sufficient resources to undertake this huge task.

"Part of the issue is Australia's vertical structural balance, whereby the distribution of taxation revenue is heavily weighted in favour of the Commonwealth (Federal) Government. So the way this works currently is that the Commonwealth Government receives 81-82 % of total taxation revenue. The State Governments receive about 16% of those revenues, leaving very little for local governments. This makes it extremely difficult for local governments to do all of the things they need to do with their own financial resources, as they simply don't have the funding available to implement strategies and plans.

"The Association believes that there is a need for inter-government agreement and governance – in the form of an inter-governmental committee – on the coastal zone. This was proposed at the House of Representatives Coastal Enquiry about ten years ago, and recognises that there is a need for the Commonwealth Government to become involved and provide the leadership and resources necessary to respond effectively to climate change."

Executive Director of the Australian Coastal Councils Association (ACCA)



# Spotlight on Climate Change Resilience in the UK for Flooding and Coastal Erosion

On 8 July 2019, the UK Government published a call for evidence that it can use in developing its policy on flood and coastal erosion. In particular, this call for evidence focusses on some specific flood and coastal erosion policy questions that the government would like additional evidence on.

#### They are:

What we understand by the term "resilience" – asking how the term resilience is currently used, and whether the different aspects of resilience could usefully be brought together into one overall concept.

#### Describing outcomes, driving action and monitoring progress

 seeking examples of cases where metrics have been used effectively to achieve an overarching outcome, and information on the advantages and disadvantages of using composite metrics to describe, drive and monitor flood and coast outcomes.

Adapting to coastal change – seeking information about what coast protection authorities have done to join up decisions about managing the coastline with wider plans and decisions for the area, and examples of whether councils have used, or tried to use powers to fund specific coastal erosion works or to create Coastal Change Management Areas.

Corporation tax relief for business contributions – asking how businesses have used the provision for businesses to receive corporation tax relief on their contributions to government funded flood and coast projects.

Local funding initiatives for flood risk management – seeking examples of local initiatives funded from sources other than the public sector and what could be done to help these types of initiatives succeed.

**Developer contributions** – asking about the barriers and enablers to the use of developer contributions to ensure developments are safe for their lifetime, and what arrangements are in place for maintaining flood assets in new developments.

Managing financial risks from flooding – asking about how organisations manage the financial risks associated with flooding, in the context of climate change.

## New national benchmark for floodplain management

To prepare and plan for floods in Queensland, Australia, we were commissioned by the Queensland Government to prepare the Brisbane River Strategic Floodplain Management Plan, a comprehensive roadmap to guide floodplain management in the lower catchment.

State Government Minister, Cameron Dick, described the plan as "a new national benchmark for floodplain management."

After 18 months of intensive effort from our team, project partners, client and stakeholders, the Strategic Plan was released. It helps stakeholders and the community better understand current and future flood risks and identifies regionally consistent approaches to strengthen flood resilience across the lower Brisbane River floodplain.





# Award of ELMS2 contract to support Royal Canadian Navy

We are proud to have been awarded the Engineering, Logistics, and Management Support 2 (ELMS2) contract by the Canadian Department of National Defence (DND). The services will directly support the Director General Maritime Equipment Program Management (DGMEPM) and the Director General Major Project Delivery (DGMPD) (Sea).



DuraCluster, our innovative mining modification and repair scheme, has secured exclusive patent rights in the United States of America.
Charles Constançon, Director for Canadian Services, Critical Infrastructure Americas at BMT, commented: "With 'DuraCluster' offering the highest levels of lifecycle support and optimisation of removal capacity at the lowest cost per tonne, our dragline design scheme is one of the industry's most sustainable mining solutions."





## We win multiple cruise ship orders

We have reported phenomenal growth in sales for our maritime simulator, BMT REMBRANDT, and have signed multiple key contracts with select cruise lines including Holland America Line, Princess Cruises, Seabourn in North America and P&O Cruises Australia. The orders for both office and ship-based licences will support 39 cruise ships.

Dr. Phil Thompson, Simulation and Training Business Director at BMT. commented:

"It is a proud day for BMT to have been entrusted to provide our versatile and scalable systems to power international fleets for some ships within the world's largest leisure travel company."

#### **Recognition from Nautical Institute**

We are delighted to have been recognised for our Navigation Assessment Services by The Nautical Institute. Having achieved external recognition of our expertise in the field makes us the only company in the world who are able to offer Navigation Assessment Services that have been evaluated and approved by The Nautical Institute – the international representative body for maritime professionals. We have been providing navigation assessments to the international market since 2015.

Jeroen de Haas, Managing Director, Surveys at BMT said, "With the team being uniquely qualified to deliver navigation assessments, and as we experience phenomenal growth in our audits, receiving formal recognition from the Nautical Institute is a huge accomplishment for us. We are very proud that our assessment services satisfy the highest standards. Our team of assessors are uniquely qualified to provide insight in all aspects of modern marine navigation, including use of integrated bridge systems, manoeuvring of vessels in complex traffic situations and effective bridge resource management techniques."





Industry-leading mooring solutions supplier, SOFEC, Inc., has selected BMT and Sonardyne Inc., under their teaming agreement, to supply an innovative mooring monitoring system (MMS) for a major new deepwater development.

The new system will involve monitoring of the turret mooring system on a new-build floating liquefied natural gas (FLNG) facility being built in South Korea for ENI's Coral South project offshore Mozambique. With water depths ranging from 1,500-2,300 metres, SOFEC, a MODEC Group company, wanted to integrate a robust and reliable MMS to complement their market-leading turret mooring solution. SOFEC chose to use our combined engineering strength in

order to acquire the most technically competent and robust MMS. Their selection was based on high data availability, ease of remotely operated vehicle (ROV) installation, robustness of the subsea technology and the longevity between maintenance periods that the MMS offers in comparison to other solutions in the market.

Above the waterline, we will supply the station-keeping turret monitoring system and local control panel with touchscreen interface. The control panel will also house Sonardyne's topside equipment, to minimise the system's footprint. Additionally, the system will allow SOFEC's client to gain remote data access through our secure cloud-

based portal, BMT DEEP. Below the waterline, Sonardyne's SMART (Subsea Monitoring, Analysis and Reporting Technology) will be used to constantly monitor mooring integrity on each of the 20 anchor legs. Daily summary reports and automatic fault detections will be wirelessly communicated to the surface from SMART in real-time.

Robert Barker, Offshore Commercial Manager at BMT, commented: "We are proud to be supporting SOFEC with this work and the Coral MMS project represents a significant contract award. Our system will be providing valuable integrity data and important real-time monitoring of the mooring system to enhance operational safety."

# We are privileged to join the World Ocean Council

We have become a member of the World Ocean Council (WOC), bringing a wealth of maritime experience and expertise to the WOC and significantly adding to the select number of important firms from around the world joining. With the growing number of challenges facing the ocean and the ocean business community, we look forward to enhancing its engagement with a diverse range of leadership companies and organisations that seek to collaborate on ocean sustainable development action.

BMT's Business Development Director for Environment Greg Fisk commented, "We are pleased and privileged to be joining WOC's unique global, cross-sectoral platform as we seek to strengthen our engagement with leading companies and organisations in the ocean business community that share

a common interest and commitment to sustainable development. Being part of the responsible collaborations at this unprecedented global, multi-industry forum for ocean companies, and sharing best practices about marine sustainable development practices and enterprise, is a new and progressive partnership milestone for us."

"The World Ocean Council is extremely pleased to welcome BMT to our growing ocean business leadership alliance. Strong leadership is needed from offshore and maritime sectors to demonstrate their commitment to tackling ocean sustainability issues and the new autonomous technologies facing ocean industries," said Paul Holthus, founding President and Chief Executive Officer of the World Ocean Council.





We are pleased to introduce a new design for a 'High Speed, Interceptor Patrol Boat' for Ares Shipyard (Ares). The new interceptor with a length overall of 26 metres, and composite construction, adds to our proven track record in new build projects, and as demonstrated with its most recent win for Ares, to deliver a more modern and capable craft for the Royal Oman Police Coast Guard (ROPCG). This latest contract for a governmental customer is a significant

milestone for us in a growing market area for larger fast interceptors.

This latest collaboration with Ares, involving our design of a new 26m fast interceptor for the ROPCG, saw delivery of an advanced naval asset equipped with interceptor and ISR technology and capable of achieving speeds of over 50 knots.

John Bonafoux, Director of Business Development at BMT, commented: "We are thrilled to continue our partnership with Ares and our international design mandate for a governmental customer. This contract is a true reflection of the progressive nature of our company and the abilities of our skilled staff who have taken on the challenge to produce a winning design."

## Our subsea technology supports Norway

We are partnering with Sonardyne to deliver to Subsea 7, our proven 'Riser Monitoring System' (RMS). This industry-leading subsea integrity monitoring solution has been adopted by the world's largest spar platform, Aasta Hansteen. Located 300 kilometres west of Sandnessjøen on the Norwegian Continental Shelf (NCS) in water depths of up to 1,300m, the deepest field development on the NCS, the Aasta Hansteen Spar is installed in a harsh environment utilising highly robust deepwater Steel Catenary Risers (SCR).





#### Foothold in US offshore wind

We have been awarded a contract to design two advanced Crew Transfer Vessels (CTVs) for the expanding U.S. offshore wind industry. The vessels will be deployed to service Ørsted's Coastal Virginia Offshore Wind Project.

Using our considerable experience in this area, we have designed the new 20m CTV specifically for East Coast conditions

with manoeuvrability, performance and redundancy in mind whilst reaching a top speed in the region of 28 knots. The design is a fully-classed vessel ensuring the highest of build standards. Carrying 20 passengers, plus 4 crew, the first CTV will be delivered early next year and is already under construction, with the second earmarked for late 2020.

#### We announce ELLIDA™, a new MRSS

We have unveiled our latest concept design, the ELLIDA™ multi-role support ship, at this year's international defence trade show DSEI 2019. ELLIDA™ will be the third family of vessels designed by us for the auxiliary market and will complement the AEGIR and SALVAS families.

The ELLIDA™ concept is underpinned by the proven experience that we have gained while designing the AEGIR vessels now in service, the Tide class with the Royal Fleet Auxiliary, and HNoMS Maud with the Royal Norwegian Navy.

The first member of the ELLIDA™ family is a 195m multi-role support and logistics vessel designed to provide the capabilities needed in future global operations, offering the flexibility of a large hull, with internal vehicle and stowage decks, weather deck stowage and additional accommodation. It has the utility to transport and deliver troops, vehicles, equipment and supplies from anywhere in the world in support of amphibious warfare and littoral manoeuvre. Its versatile mix of ship-to-shore offloading and logistics capabilities allow support to naval operations through landing craft, boat

operations, multi-spot aviation and replenishment at sea.

"In Norse mythology, God of the Sea, Aegir, presented Viking with a magical ship called Ellida – so the name for our latest family of vessels seemed like an obvious choice," comments Benjamin Dunscombe, Business Development Manager at BMT.









#### We make waves in nautical publication

Our digital reconstruction and maritime forensics expert has contributed to a pioneering publication setting out guidelines for the recovery and use of electronic evidence and the presentation of evidence in the Admiralty and Commercial Courts.

Dr. Phil Thompson, who leads BMT's Simulation and Training Systems business, has written a chapter for The Nautical Institute's second volume of its Collecting for Guidelines Maritime Evidence series. The book, launched at London International Shipping Week 2019 (LISW19), focuses on the collection and preservation of electronic evidence and how it can be used to understand the circumstances that led to a maritime incident. Expanding on the electronic evidence theme, the book sets out good practice to avoid major casualties on board ships and the lessons that can be learned from their errors. Within the first few days of the book launch, sales of the book had already exceeded 3,000, representing a wide variety of maritime stakeholders.

While not completely replacing traditional records, data from ECDIS, VDR and AIS are now established as vital resources for investigators. Dr. Thompson sets out clearly how careful processing and merging of disparate data sets, based on proprietary encrypted data and open-industry formatted data sources - can be used to help answer a key question: "What happened?" But he goes further and illustrates how, by further post-processing and the integration of electronic data with advanced simulation techniques, this can help answer two further questions: "Why did it happen? And what can we learn?"

Dr. Phil Thompson, continued, "The guidelines set out in The Nautical Institute's book will assist a broad range of maritime stakeholders in better exploiting the latent potential of electronic data. It will also help to promote the early resolution of collision and related disputes. New opportunities are likely to open up for broader mariner training and reflective learning, which further supports the wider shipping industry in building an effective lesson's learned culture."



#### We collaborate on world-leading simulators

We have been working with Bath and University of Exeter on ground-breaking new facilities to spur research and innovation. The VSimulator facilities are new test platforms that are being built at the universities of Bath and Exeter, consisting of hydraulically-powered moving chambers that allow researchers to study the impacts of vibration and movement on people's wellbeing in a range of environments, from working and living in skyscrapers and on vessels to operating equipment in industrial environments.

The £4.8 million VSimulator project aims to discover more about how to design environments to make their occupants and operators as safe and as comfortable as possible. The facilities are being developed with funding from the Engineering and Physical Sciences Research Council (EPSRC).

James Brownjohn, Professor of Structural Dynamics and Principal Investigator for VSimulators at University of Exeter, said: "VSimulators offer opportunities for collaborative international and multi-disciplinary research and innovation, linking academic and commercial communities. Our initial focus will be on factors including vibrations that compromise user experience in the built environment such as wobbly footbridges and bouncy office floors, but we will also study usercentred design of building environments, biomechanics of human balance on moving surfaces and rehabilitation physiotherapy."

These facilities will not only help design new physical environments, but can also help mitigate the impact of existing environments through better training and enhanced immersion in synthetic environments. Mike Cottrell, Visualisation Capability
Manager from BMT said: "I'm personally
excited by the technical integration the
VSimulator motion platform will bring
to our immersive solutions at BMT.
Integrated immersion will bring a whole
new dimension to what we can offer
customers to simulate scenarios in a
much more realistic way. Being able to
move the environment independent of
the individuals, whilst keeping immersion
synchronised, will be a powerful
combination that we are looking forward
to exploiting."

"The simulator further enables us to understand human response and measure psychological, physical and physiological responses to the environment", adds Phaedra Gibson, Head of Training at BMT. "This enables us to design and deliver authentic, meaningful and reliable training solutions to meet the complex operational demands of our customers."

## On the move



Sarah Kenny, OBE

We are delighted to announce that our Chief Executive, Sarah Kenny, has been appointed Officer of the Order of the British Empire (OBE) in the 2019 Queen's Birthday Honours. The accolade, for services to the Maritime Industry, and Diversity, reflects her long-standing commitment and contribution to supporting and promoting the United Kingdom's maritime industries, in addition to her work on STEM and promoting the importance and value of diversity in the sector.

Sir John Hood, Chairman of BMT Group, said: "On behalf of the board of BMT, may I say we are thrilled that our Chief Executive, Sarah Kenny, has been honoured by the Queen for her services to the Maritime Industries and Diversity.

The award is timely recognition of Sarah's outstanding leadership in both areas over many years. We offer Sarah our whole-hearted congratulations on her OBE."



#### Rob Teasdale, Business Development Director, Defence and Security

Rob Teasdale has been appointed as Business Development Director for Defence and Security across BMT.

Rob brings to the company 35 years of Defence and Security experience from the Royal Australian Navy and employment with global Defence companies. His most recent role was as the inaugural Chief of Staff for BAE Systems Australia, a company where, as the Head of Business Development, he was a key player in their successful campaign for the \$35 billion Future Frigate Program.