THE AUSTRALIAN NAVAL ARCHITECT

Volume 24 Number 3
August 2020

Dwarfed by the immensity of the Captain Cook Graving Dock, HMAS *Parramatta* in dock in July during a refit in Sydney (RAN photograph)

THE AUSTRALIAN NAVAL ARCHITECT

Journal of
The Royal Institution of Naval Architects
(Australian Division)

Volume 24 Number 3
August 2020

Cover Photo:

Austal-built trimaran ferries *Bajamar Express* and *Queen Beetle* off the coast of Perth, Western Australia
(Photo courtesy Austal)

The Australian Naval Architect is published four times per year. All correspondence and advertising copy should be sent to:

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The deadline for the next edition of *The Australian Naval Architect* (Vol. 24 No. 4, November 2020) is Friday 30 October 2020.

The Australian Naval Architect
ISSN 1441-0125

Editor in Chief: John Jeremy AM
Technical Editor: Phil Helmore

Print Post Approved PP 606811/00009
Printed by Focus Print Group

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From the Division President

Welcome to the August edition of *The Australian Naval Architect*. I trust this finds you all well and looking out for your family, friends and colleagues in these difficult times.

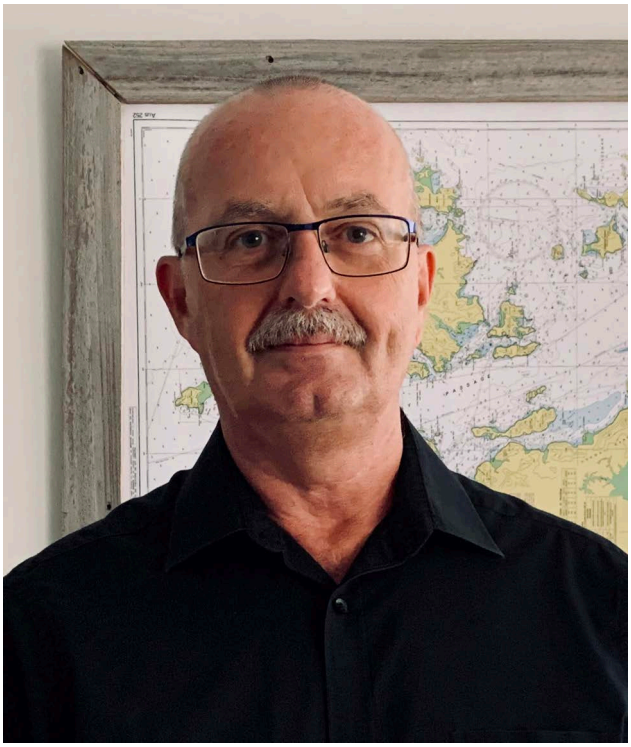
At the request of the Australian Division and under the leadership of our Secretary, Rob Gehling, RINA Council has initiated an exciting new working group on *Greater Recognition of the Role and Capability of Naval Architects*. This provides the profession with the opportunity to examine industry's perception of our role and expertise, with the intention of identifying how we can raise our brand and educate prospective fields of employment. I would encourage all members to consider this question in relation to your current and previous employment and communicate your thoughts through the sections to the Division Council.

One positive to come out of the current COVID-19 situation is the opportunity to involve a much wider participation in technical meetings held by the sections through the application of video conferencing. The NSW Section attracted over 400 participants to their virtual technical meeting in May in conjunction with Engineers Australia; this demonstrated that, with appropriate promotion, virtual technical meetings can be widely accessed by our members and provide much greater exposure of RINA to other engineers. Division Council is working on coordination of virtual technical meetings to avoid clashes and make them accessible throughout Australia and to those interested from abroad.

In the Defence sector, on 1 July the Government released the *Force Structure Plan 2020* which continues to build on the Naval Shipbuilding Plan that now encompasses over 70 vessels to be built in Australia. Further to the original program to build 12 Attack-class submarines, 9 Hunter-class frigates, 12 Arafura-class offshore patrol vessels and 21 Guardian-class Pacific patrol boats, the new plan also includes 6 Cape-class patrol boats to be built in Western Australia, up to 8 minecountermeasure and hydrographic survey vessels, 2 multi-role sea-lift and replenishment ships, a replacement for the Young Endeavour youth-scheme sail-training vessel, replacements for the Navy landing craft carried by the LHD, a new vessel to support the Pacific step-up, a replacement for ADV *Ocean Protector*, a large salvage and repair vessel, and the build of Army landing craft and riverine patrol vessels. The proposed phasing of the builds is indicated in the accompanying figure (see next page).

In the world of commercial shipping this quarter, the Australian Maritime Safety Authority is launching a focused inspection campaign targeting cargo-securing arrangements on container ships visiting Australian ports in response to several serious incidents involving shipping containers lost overboard recently. Incidents include the loss of 50 containers off Wollongong by *APL England* in May and three containers from *Navios Unite* off Cape Leeuwin in June.

COVID-19 continues to wreak havoc commercially with an increase in tonnage being scrapped, reduced new-build contracts, an increase in purchase of second-hand tonnage and, personally, with tens of thousands of crew stranded at sea due to issues in being unable to change crews.

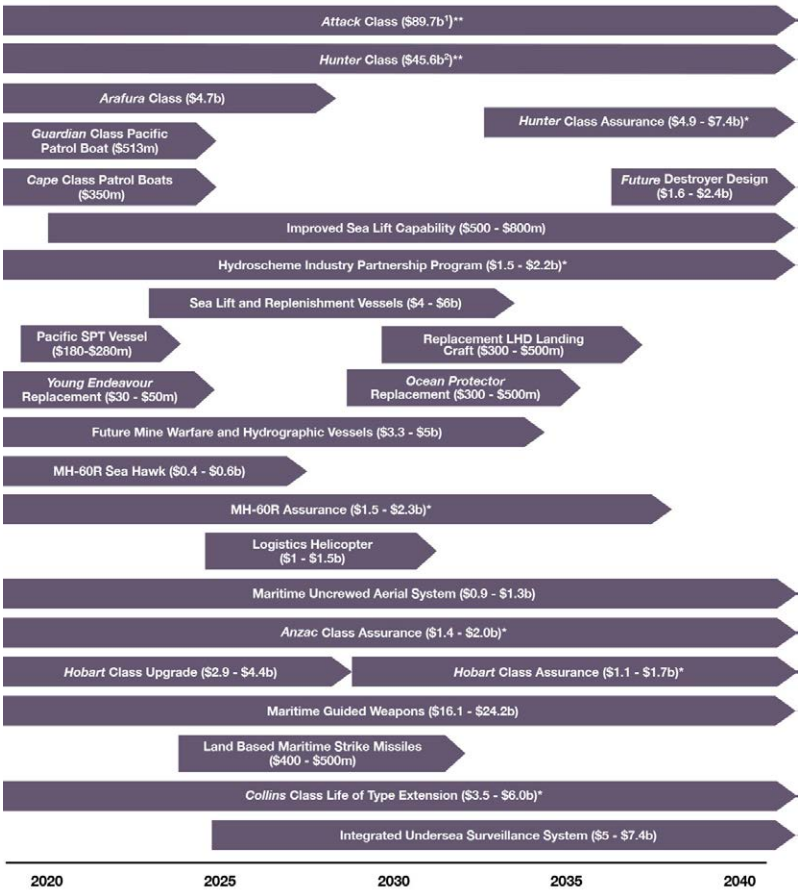


Gordon MacDonald

Through a *Letter to the Editor* in this journal (*q.v.*), the Division Council received some excellent news this month from Rear Admiral Col Lawrence RAN, Head Navy Engineering, announcing that Navy has been working collaboratively with UNSW to re-establish a naval architecture program through the Canberra campus. RADM Lawrence informed RINA that Navy and UNSW Canberra have recently formally agreed to develop a naval architecture offering. The program will mark a continuation of the long history of UNSW with naval shipbuilding and is another component of a strong, sustainable and innovative Australian naval shipbuilding industry. It is anticipated that the first tranche of graduates will complete their naval architecture studies from 2023 onwards.

Looking forward to when some form of normality returns to Australia, the Indo-Pacific (rebranded from Pacific) 2022 IMC Conference Organising Committee will hold its first meeting in early 2021. We also look forward to conducting another conference in conjunction with the Australian Oil and Gas Expo, where the Australian Oil and Gas Conference is also scheduled for 2021 in West Australia.

Gordon MacDonald



Key Maritime Domain Investments
(Gantt chart from *Force Structure Plan 2020*)

Editorial

The naval shipbuilding program set out in the recently released Strategic Defence Review holds promise for many decades of work for Australia's naval shipbuilders. With construction of the Arafura-class offshore patrol vessels well underway in South Australia and Western Australia, and the early work about to begin in Adelaide on the Hunter-class frigate program, it was encouraging to see the announcement in July that ASC Shipbuilding has recruited 18 young people as apprentices to help build up the workforce for this project. A second intake of 22 is planned for later this year.

A little surprising, to me, was the statement that ASC Shipbuilding will hire over 500 apprentices over the multi-year program. Surprising because I would expect that many more will actually need to be hired to meet the exceptional demand for skills which the construction of the frigates and the Attack-class submarines at adjoining sites will create.

Many years ago (yesterday to me but, I suspect, ancient history to many) we were faced with rebuilding a shipbuilding labour force in Sydney from a low base in order to construct a new replenishment ship for the RAN which became HMAS *Success*. It was during a recession — a time when one might expect that skilled labour would be knocking at the door looking for work. It was not so, unfortunately, and building the workforce we needed proved more difficult than expected. A recruitment drive was set up in the United Kingdom to attract skilled shipbuilders and, after interviewing some 400 applicants, we ultimately managed to bring 100 to Australia, but still not enough.

Our needs for skilled labour were ultimately met by an enormous expansion of our apprentice training program, which was already well established in the yard where many skilled artisans had learnt their trade over many decades. With expanded training schools and the cooperation of TAFE, we ultimately had 410 apprentices out of a total employment of 2650, and those young people made a great contribution to the work in hand.

Of course, training in a shipbuilding and ship repair environment is, in my opinion, amongst the best that you can get. Accordingly it was always a challenge for us to retain apprentices when they had completed their time, with many leaving to contribute to other industries. I suspect that those young people who will be trained in the shipyards of today will also be in demand and their opportunities will be considerable. The demand for labour, in South Australia particularly, for our new naval shipbuilding programs will greatly exceed ours of the early 1980s when we were simply needing to increase our workforce by less than one thousand. That is what prompts me to suggest that, ultimately, many more than 500 apprentices will be needed over the course of the Hunter-class program and the other programs in the coming decade.

Of course, numbers will depend on productivity improvements, the level of sub-contracting and the training completed under the auspices of the Naval Shipbuilding College; however, I am sure that on-going training will be a major activity in the Adelaide shipyards.

John Jeremy

LETTERS TO THE EDITOR

Dear Sir,

In the August 2017 edition of *The Australian Naval Architect*, I noticed a letter to the editor from Mr Patrick McManus drawing attention to the closure of the Naval Architecture program at UNSW Sydney. Since then I have worked collaboratively with UNSW Canberra to investigate options for this program to continue, and it is with a great sense of satisfaction that I write to inform you that the Navy and UNSW Canberra have recently formally agreed to develop a Naval Architecture offering. The program will mark a continuation of the long history of UNSW with naval shipbuilding and is another component of a strong, sustainable and innovative Australian naval shipbuilding industry.

The Australian Naval Shipbuilding Plan outlines the nation's largest-ever program of naval shipbuilding and sustainment. $1.3 billion will be injected to develop vital infrastructure in the nation's shipyards, and $90 billion will be invested in a rolling acquisition of new submarines and the continuous build of major naval vessels. The challenge posed by this national endeavour cannot be overstated; it is the greatest regeneration of our country's naval capability since the Second World War.

Navy's commitment to continue the UNSW Naval Architecture program is a demonstration of our commitment to educate and skill an Australian workforce to deliver the naval shipbuilding program. I now call upon your readers, the Naval Architecture profession, and the shipbuilding industry more broadly, to assist me in providing exciting employment prospects and sustainable career paths for the graduates when they emerge from their Naval Architecture studies from 2023 onwards.

Col Lawrence
Rear Admiral, Royal Australian Navy
Head Navy Engineering

Dear Sir,

How *not* to Choose your Designer

In the May 2020 edition of our favourite journal (*The Australian Naval Architect*, Vol. 24 No. 2, *From the Archives*, Page 60), John Jeremy writes in his usual enthusiastic manner about *Aurora Australis*. He comments that the ship was designed by Wärtsilä Marine Industries of Finland, which has been a common misattribution for the last 31 years, and I think that it is about time that the truth came out, as the actual vessel was in practice mainly designed here in Australia. It is a story which I believe is worth knowing, although it is possibly not much different to other ships which have been constructed in Australia to a foreign design, including HMAS *Success* which John will know well.

The Australian Antarctic Division signed a contract with P&O Polar, who in turn contracted the design to Wärtsilä Marine and the construction to Carrington Slipways Pty Ltd (CSPL) of Tomago, NSW, in late December 1987.

I had worked closely with CSPL for several years as a consultant naval architect, and joined them as a full-time employee at the same time as the contract, i.e. in late December 1987.

Wärtsilä Marine had evolved from the Wärtsilä and Valmet companies in the previous year, the former mainly building cruise liners and the latter specialising in building ice-capable ships for the Soviet Union. It was a forced merger by government intervention but, because the Soviets were very short of money, the ice-breaking business of Valmet was rapidly shrinking and, consequently, it was a time of redundancies and liquidity problems (see *Wärtsilä Marine* in Wikipedia for the detailed story). In 1987 it appeared that Valmet would close down and, at the same time, there was an unexpected surge in orders for large cruise vessels, seven in 1987 alone. This left Wärtsilä Marine with insufficient personnel to meet the shipbuilding demand and, furthermore, there was a severe liquidity problem owing to below-cost quotes for some of their orders.

The need to design a small ice-going ship for far-off Australia was almost totally forgotten in this maelstrom of worries. What work could be done on the initial design of *Aurora Australis* was probably subcontracted out.

In about February 1988 I made a presentation to the ANARE Club (Antarctic Division Expeditioners Club) about the capabilities of their new vessel, about to begin construction. At that time there were no approved plans that we had seen, only an initial general arrangement drawing and a small-scale lines plan for the model tests. I also had a video of the vessel being tank tested with various thicknesses of ice (actually paraffin wax), which impressed the ANARE members. It would be at about this time that the shipyard design staff started to receive a limited number of drawings, and fundamental errors in the design were immediately noted. Nevertheless, by October 1988, enough information had been received to construct enough of the keel to hold a formal "keel-laying ceremony", which was an important step for the shipyard as a substantial payment from the Owner was due on this event. The keel had been constructed from the 1:50 small-scale overall structural plan, as no detailed structural plans had yet been received. There was a detailed (but preliminary) weight estimate, which allowed CSPL to order the specialised steel from Wärtsilä Marine, steel having brittle fracture properties suitable for use in ice. Some parts of the side plating were 23.5 mm thick and, hence, not easy to fabricate. I do not know if any of that first keel actually ended up in the ship, although I would like to think so.

By mid-1988 there were still no detailed drawings, and a team from CSPL went to Finland to attempt to hurry things along. They returned with some important drawings which allowed construction to start, but it was immediately apparent that there were very many errors in the drawings; for example, stairways which went up from one deck but arrived at the next deck in a completely different place. There were sizes given on one plan that were different to the sizes given on another; for example, for a watertight door opening. It was concluded that the detailed drawings had been sub-contracted out to several smaller companies, and that each of these companies were not in contact with each other; furthermore, Wärtsilä Marine had insufficient staff to check them thoroughly.

The returning team also reported that some long-lead items, such as the specialised gearbox and main engines, had not

yet been ordered, although they had been paid for by CSPL.

A senior team of CSPL designers and draftsmen were relocated to Helsinki for the best part of a year to attempt to resolve these issues, and two personnel from Wärtsilä Marine came to the shipyard. Nevertheless, errors and omissions on the detailed drawings, including steelwork, pipework and electrical systems, were commonplace, and there were very many problems still arising. It was the drawing office staff and the foremen and managers responsible for the manufacture, who then had to design their own solutions to make the whole thing work. CSPL were responsible for submission of all the drawings required for classification society approval.

The ship was launched in September 1989.

Hand-over had been expected in December 1989 but, not only had there been such enormous issues with the planwork, but there had also been an earthquake in Newcastle, which caused some disruption.

I conducted a preliminary inclining experiment at the shipyard in October 1989, although the ship was far from complete. A copy of the report was sent to Wärtsilä Marine for comment.

A few days later, on 24 October 1989, Wärtsilä Marine declared themselves bankrupt, and all employees were made redundant.

I immediately went to Finland with the General Manager of CSPL, Keith Lynch, to attempt to get any design information, calculations, drawings, etc. for *Aurora Australis* from the receivers. The shipyard design offices had no electricity and searching desks and files was done by torchlight. The main computer had been damaged in some way and was inoperable, but we did manage to find several print-outs from the computer which proved to be useful.

I carried out a final inclining experiment at the Merewether Wharf in Newcastle in mid-January 1990. It was a very difficult experiment with a great variation of results and the boat wobbling all over the place. With over 50 tanks onboard, it appeared to be a problem with tanks being inter-connected and allowing the fluid to move as the vessel heeled, but I had to give up after 8 hours of trying, as night fell. At the pub that night, one of the waterside workers commented that there was a fresh-water river outflow at Merewether Wharf. The next morning I took hydrometer readings at four depths on both sides at the bow, midships and the stern, and he was correct, the port side was fresh water and the starboard side was salty, with varying salinities underneath the boat! We moved the ship to Lee Wharf where the water had a constant density, and completed the inclining experiment without further problems.

Aurora Australis alongside in Newcastle during final fitting out (Photo courtesy Martin Grimm)

I completed the stability book at home, having left CSPL and re-started my own business, assisting International Catamarans in the design of large high-speed craft. The stability book was a considerable work of art, as *Aurora Australis* was considered a Special Purpose ship, a SOLAS Passenger Ship, and a Fishing Vessel as well as a Polar Ship and, consequently, had to meet all of the stability requirements for all of these types of ship. Furthermore, the hull shape had been changed in a bizarre way to accommodate some deck camber (which had been omitted on the lines plan), and the location of the keel on structural drawings had been moved upwards from the baseline shown on the lines plan. This changed the cross curves of stability and hydrostatic data, which I had to recalculate. At the same time, the longitudinal strength had to be re-assessed as many of the structural members on the detailed plans were different to those in the preliminary longitudinal strength calculations.

Aurora Australis was finally handed over to P&O Polar on 30 March 1990, and was a monument to the skill of Australian shipbuilders to construct a complex vessel which worked as intended, despite the lack of a complete and proper design. The real designers as far as I was concerned, were the CSPL Drawing Office staff, all senior managers, a naval architect, the various construction managers, and the CSPL workforce.

I am sorry to see the ship go into retirement, but perhaps it is a suitable mark to the end of my career as a naval architect, now that I have also retired. I have an affinity with the vessel as the radio call sign of *Aurora Australis*, VNAA, is also my initials.

Neville A. (Tony) Armstrong
President RINA Australian Division, 2014–16

Postscript: The shipyard eventually traded out of bankruptcy and was renamed Masa shipyard. It has been sold and renamed many times since, and variously called Kvaerner Masa, Aker Finnyards, STX Finland and currently USC. There has never been any connection between Wärtsilä Marine and the engine company we know today as Wärtsilä.

Dear Sir,

I refer to the letter from Mr Pennefather in the May edition of *The Australian Naval Architect* about the sea drogue.

Many years ago I did some work for a company which had "invented" such a drogue that had the ability to significantly increase its drag coefficient by automatic opening doors (inwards). The purpose was to prevent broaching.

It was called a SeaBrake. It seems that you may be able to still buy them, see https://www.oceanchandlery.com/seabrake.html.

We tank tested them at the Australian Maritime College in the 1980s, and I wrote a paper about it.

Renilson, M.R., 'The Seabrake — A Device for Assisting in the Prevention of Broaching-to', *Third International Conference on Stability of Ships and Ocean Vehicles*, Gdansk, September 1986, Vol II, pp. 75–78.

The paper can be accessed at the stability website:

http://www.shipstab.org/index.php/conference-workshop-proceedings.

The principle behind the SeaBrake was that when the boat was accelerated to wave speed on the face of the wave, the doors would open inwards, increasing the drag coefficient, and hence the drag, considerably. This was designed to prevent the boat being surf-ridden by the wave, which is generally accepted to be a prerequisite for broaching-to.

The key to this was that the increase in the drag on the SeaBrake when the vessel was travelling faster increased the force in the tow rope, which worked on the mechanism inside the SeaBrake and pulled the doors open.

At lower speed the doors were closed and so the drag coefficient was less, making it easier to deploy and recover the SeaBrake than a conventional drogue.

I personally don't have any practical experience of having used this device, but if my memory serves me correctly the company collected quite a few testimonials from people who had used it.

Martin Renilson

COMING EVENTS

NSW Technical Meetings

Technical meetings during COVID-19 restrictions will continue as webinars using Engineers Australia's WebEx platform. Registration for each presentation is required, and details will be provided in the flyer for the meeting.

Post COVID-19 restrictions, technical meetings will generally be combined with the ACT & NSW Branch of the IMarEST and held on the first Wednesday of each month at Engineers Australia's new premises at 44 Market St, Sydney, starting at 6:00 pm for 6:30 pm and finishing by 8:00 pm.

Meetings may be subject to change at short notice so, if you are making extensive arrangements to attend, then please confirm the venue, date and time with the Secretary of the Section.

The program of meetings remaining for 2020 (with exceptions noted) is as follows:

2 Sep — Sean Langman, Managing Director, Noakes Group
Ferry Radar *Preservation — a Link to a Once Working Harbour*

14 Oct — Robert McMahon, Marine Engineer
Michael Kelly, Pilot, Port Authority of NSW
Bernie Farrelly, Project Manager, Tas Bull Seafarers Foundation
Sr Mary Leahy, Stella Maris Chaplain and Regional Coordinator for Oceania
Cruise Ships and COVID-19
Webinar hosted by IMarEST; connection and login details to be advised

3 Dec — SMIX Bash 2020

ACT Technical Meetings

Technical meetings during COVID-19 restrictions will continue as webinars using RINA's Zoom platform. Contact the Secretary of the Section for details of login.

The next scheduled meeting is:

25 Aug — David Whittaker, ex-Principal Naval Architect, ASC Shipbuilding (now BAE systems), Air Warfare Destroyer Alliance
Methods for Reviewing a Weight report — As Applied in the AWD Project

WA Technical Meetings

Technical meetings during COVID-19 restrictions will continue as webinars using RINA's Zoom platform. Contact the Secretary of the Section for details of login.

The next scheduled meeting is:

26 Aug — Yuriy Drobyshevski, Principal Consultant and Director, NavTec, and
Michael Morris-Thomas, Principal Engineer, INTECSEA
Response-based Design and Classification Society Rules: Evolution Towards a Common Basis
Registration is required and may be completed at eventbrite.com.au/e/116189697513.

America's Cup 2021

The 36th America's Cup Match will be held in Auckland, New Zealand, from 6 to 21 March 2021 and will see the defender, *Emirates Team New Zealand,* racing against the winner of the Prada Cup for the Challenger Selection Series, with the challenger being the first team to score seven points.

The racing schedule for the America's Cup matches has two races per day planned for March 6, 7, 10, 12, 13, 14 and 15. Additional reserve days have been scheduled, but the intention is to complete the event on the weekend of March 13–14, weather permitting. The winner of the America's Cup will be the first team to score seven points.

HPYD7

HPYD is the series of conferences on high-performance yacht design organised by the Royal Institution of Naval Architects NZ and the University of Auckland. The first conference was held in December 2002. Since then, the conferences in 2006, 2008, 2012, 2015 and 2018 have showcased the latest developments in yacht research from around the globe. The conference enables naval architects, engineers, designers and researchers to present and hear papers on the current state of high-performance yacht and power craft technology.

Planning for HPYD7 is under way and the event will coincide with the America's Cup in Auckland in 2021, returning to the traditional format with a full complement of papers and speakers.

The call for papers went out earlier, and the deadline for abstracts was extended to 1 August but has now closed.

Due to the COVID-19 restrictions, the conference will have both a physical and an online presence, timed to suit European time zones. The technical sessions will be recorded and be available online.

The provisional schedule for HPYD7 is as follows:

Thursday 11 March

0700–1200	Technical presentations
1700–1830	Local industry presentations
1930–2100	Public session

Friday 12 March

0700–1200	Technical presentations

You can follow HPYD on Facebook or LinkedIn, or sign up for their mailing list to receive the latest news.

See www.hpyd.org.nz for more details or, for general information, email info@hpyd.org.nz; or for sponsorship opportunities, email sponsorship@hpyd.org.nz.

AOG 2021

The annual Australasian Oil & Gas (AOG) Exhibition & Conference is the largest oil-and-gas event in Australia, featuring over 300 exhibiting brands and over 8700 global visitors.

The Conference features three Forums dedicated to Industry Supply, Subsea, and Knowledge, all housed on the show floor and focusing on the opportunities and challenges in times of transformational change.

AOG 2021 is scheduled for 10–12 March at the Perth Convention and Exhibition Centre.

Indo-Pacific 2022

AMDA Foundation has provided an update for the Pacific International Maritime Exposition which was to be held in August 2021, with that show now planned for May 2022 due to the fallout from the COVID-19 pandemic and renamed the Indo-Pacific International Maritime Exposition instead.

In its news release announcing the change, organiser AMDA Foundation noted that "the Indo-Pacific has become increasingly central to world commerce, international stability and security. The Indian and Pacific Oceans include the world's busiest trade corridors, driving commercial and geopolitical connections which embrace much of the globe.

"Key Australian and international stakeholders, as well as the world's naval defence and commercial maritime industries, are increasingly focused on the Indo-Pacific. It is, therefore, appropriate that the name of the event, which provides a platform for discussion in the national interest among those key groups and is an essential engagement and promotional opportunity for industry, should reflect that focus."

The inaugural Indo-Pacific exposition will also be held in Sydney, with precise dates to be announced soon. AMDA says that once the world has transitioned past the aftermath of the pandemic,the intention is that its expositions will resume their normal biennial cycle, with Indo-Pacific returning to its regular timing in the latter half of odd-numbered years i.e. during the second half of 2023.

NEWS FROM THE SECTIONS

ACT

ACT Section AGM

The ACT Section held its Annual General Meeting on the evening of 9 June 2020 as an on-line meeting using the WebEx platform due to COVID-19 restrictions. The original intention had been to have a physical meeting, but it became obvious this wouldn't be feasible for the foreseeable future. The Agenda, annual reports by the Chair and Treasurer, and previous AGM minutes, had all been circulated to registrants in advance. As Ray Duggan had reached the maximum period as Chair under the Section Rules, a new Chair was needed, and Warren Smith accepted this role. The members thanked Ray and the outgoing committee including Joe Cole (Deputy Chair), Alistair Smith (Secretary) and Lily Webster (Assistant Secretary) for maintaining an active and interesting series of technical meetings during their term. Scheduled and potential technical meetings for the remainder of the year were also discussed along with a number of other matters.

The ACT Section Committee is now as follows:

Chair	Warren Smith
Deputy Chair	Ray Duggan
Secretary	Lily Webster
Assistant Secretary	Alistair Smith
Treasurer	Kristoffer Grande
AD Council Nominee	Alistair Smith
Members	Martin Grimm
	Peter Hayes
	Suzanne Sigalas
	Ahmed Swidan
	Alan Tat

The incoming ACT Committee held its first meeting on-line immediately following the presentation by Trevor Dove on 23 June. The main focus was seeking and arranging technical meetings for the remainder of the year.

Martin Grimm

Zero-waste Coconut Harvesting and Processing in Micronesia

Trevor Dove, Business Development Manager with BMT in Canberra, gave a presentation on *The Establishment of a Zero-waste Coconut Harvesting and Processing Operation in Micronesia* as a webinar using RINA's Zoom software platform on 23 June. This was our first webinar presentation, advertised only to the ACT Section, and attracted 20+ actually participating on the evening.

BMT has been involved in the establishment of a zero-waste coconut harvesting and processing operation in Micronesia known as *Coconuts For Life* or C4L. BMT's role in the C4L project has been to deliver engineering analysis, acquisition support and vessel support services to the project, ensuring that the marine capability to deliver such an operation is in place. This has included discrete event modelling of the end-to-end logistics chain to help determine the number and size of craft required for the operation, specification of appropriate vessels, and support in their acquisition and support in setting up vessel-management and port logistic-management processes.

Trevor gave a summary of the work completed to date and the difficulties and challenges experienced in working with such a geographically-remote client and project.

This presentation was not recorded.

Draft Marks and Bent Ships

Peter Hayes, Hydromechanics Cell Lead with the Naval Technical Bureau, Department of Defence, gave a presentation on *Draft Marks and Bent Ships* as a webinar using RINA's Zoom software platform on 21 July. This was our second webinar presentation, and attracted 70+ registrants, with 35+ actually participating on the evening.

Ships are rarely built as straight as designed and all bend to varying extents under load/buoyancy distribution and environmental forces. Traditionally, the treatment of ship drafts (calculation of trim, reading the hydrostatics, etc.) has considered the ship to be straight between the reference points, the forward and aft draught marks used for measurement. The fact that ships bend when placed under load has almost been treated as an afterthought. An allowance for the change in displacement due to any measured hull deflection has been the only correction to the hydrostatic particulars that has been typically applied. Ships can be fitted with different sets of draft marks. On a typical frigate, there will be aft draft marks at the cut-up (aft end of the skeg) and a second set near the transom. There will also be fitted draft marks for various projections. All the draft marks should accurately represent the ship and all should be able to be used to determine the local draft of the baseline, and consistently determine the hydrostatic particulars. Finally, there are situations, such as docking and navigating locks, where allowing for hull deflection can be important.

This presentation covered the development of a methodology which can handle a bent ship

Due to a technical hitch, the webinar presentation was not recorded, but a copy of the written paper is available on application to the Secretary at rinaact@gmail.com.

Lily Webster

Victoria

Hydrodynamic Design of the QE-class Aircraft Carriers

Andrew Harris, Principal Naval Architect with BMT Design and Security, gave a presentation on *Hydrodynamic Design of the Queen Elizabeth-class Aircraft Carriers* as a webinar using RINA's Zoom software platform on 25 June. This was our first webinar presentation, and attracted 60+ actually participating on the evening.

The presentation discussed the hydrodynamic development of the Queen Elizabeth-class aircraft carriers. The initial development of the ship design focused on a podded propulsion hullform prior to the adoption of the twin shaft arrangement. Suitable hullform parameters were obtained from a database of previous tank tests indexed by non-dimensionalised resistance, followed by station fitting and hull fairing. An extensive programme of work to achieve acceptable propulsive efficiency, propeller-induced vibrations and cavitation performance was undertaken. Numerical tools, towing tanks and cavitation tunnels were used. The manoeuvring and seakeeping performance of the final design have also been examined in a series of seakeeping and manoeuvring tests undertaken in the Ocean Basin at Haslar.

Andrew's presentation was recorded, and is now available on the RINA YouTube channel (see *The Internet* column).

HMS *Queen Elizabeth*
(Photo from Joint-Forces.com website)

Wave-induced Motions and Loads in Ships using the SPH Technique

Bruce Cartwright, Senior Simulation Engineer, Pacific ESI, gave a presentation on *Wave-induced Motions and Loads in Ships using the Smoothed Particle Hydrodynamic Technique* using RINA's Zoom software platform on 16 July. This was our second webinar presentation, and attracted 50+ actually participating on the evening.

This presentation described the development and recent results of a finite-element analysis technique to visualise and assess the stresses in a ship as it traverses a series of large waves. The waves were modelled using the Smoothed Particle Hydrodynamics (SPH) numerical method, a mesh-free numerical technique well-suited to modelling fluid-structure interactions, wave breaking, turbulence and other complex fluid-flow and free-surface phenomena. By including a full structural finite-element model of a ship heading into the waves within the one software code, the wave-induced stresses were predicted as a consequence of the inherent fully-coupled fluid-structure-interaction (FSI) analysis.

The aim of the project was to assess structural deterioration, through corrosion or cracking, on the ability of the ship/platform to resist limit-state loads. Hence, a particular use of the tool may be to assess life-extension projects, or damaged-vessel survivability limits. The tool may also be useful in applications to other floating maritime structures.

Bruce's presentation was recorded, and is now available on the RINA YouTube channel (see *The Internet* column).

Zoom Presentations

At the time of writing, Melbourne is heading into the second week of a six-week Stage 4 lockdown to curb the growth of COVID-19 cases, and my best wishes go out to anyone affected by this devastating virus. Around the world we're seeing an impact, and to all our members who are seeing tight restrictions on their lives in Victoria, we're thinking of you.

A silver lining has been the use of the Zoom software platform. It has allowed us to deliver the two presentations described, and is likely to be an effective platform which will allow us to keep sharing knowledge through these difficult times. We're seeking new presenters for coming presentations, and hoping to build our connection with Engineers Australia for additional avenues to knowledge sharing. Similarly, the sections nationally are hosting one another, so yet another silver lining.

Jesse Millar

Western Australia

Annual General Meeting

The annual General Meeting of the WA Section was held as a webinar webinar using the free WebEx software platform (when it was still time-unlimited) on 20 May.

A new committee was elected for the ensuing year with the following positions:

Chair	Piotr Sujkowski
Deputy Chair	Kenneth Goh
Secretary	Syed Zaidi
Treasurer	Cheslav Balash
Nominee to ADC	Yuriy Drobyshevski
Members	Sammar Abbas
	Nathan Chappell
	Tim Gourlay
	Ian Milne
	Andy Phillips
	Gino Parisella
	Matthew White

Novel Platforms for Research Vessels

Ken Goh, Managing Director with Knud E. Hansen Australia, and John Chappell from the Australian Institute of Marine Science, gave a presentation on *Novel Platforms for Research Vessels* as a webinar using the WebEx software platform on 20 May. This was our first webinar presentation, and attracted 20+ actually participating on the evening.

Research vessels are normally based on fishing or offshore vessels owing to the similar type of handling operations required on the aft end of the vessel. While a displacement monohull has proven to be a good platform for this purpose, they are challenged with low efficiency, poor seakeeping and limited deck space, especially on smaller vessels.

The authors investigated the use of alternative hullforms to meet the challenging operational environment and the benefits which they can provide over a standard monohull. Renewable and hybrid energy systems have also been applied, resulting in a design which has better performance, comfort, functionality and flexibility at a significantly lower operating cost.

The presentation was not recorded.

Syed Zaidi

Review of ISO Standards for Offshore Structures

Under the auspices of Standards Australia (www.standards.org.au), Australia joined the international committee undertaking the revision of ISO standards pertinent to offshore structures in 2018. The Australian committee, designated ME 092-01, convened by Engineers Australia and led by Partha Dev, comprises over 40 professionals from the offshore industry and academia to cover all areas of this broad field. The committee is broken into working groups undertaking reviews and preparing comments on specific ISO standards, and a number of RINA members in WA are actively engaged in this work.

In the middle of 2019, the final draft of the second edition of ISO 19904-1:2018 *Floating Offshore Structures* received particular attention. Whilst the standard was voted to be approved, a number of comments were prepared by the Australian working group for consideration in future revisions of this standard.

In January–February 2020, the second edition of ISO 19901-7:2013 *Stationkeeping Systems for Floating Offshore Structures and Mobile Offshore Units* underwent its initial review, and a number of essential comments were submitted to bring the next revision of this standard up-to-date with advances in technology and current practice.

Yuriy Drobyshevski

New South Wales

Committee Meetings

The NSW Section Committee met by video conference on 9 June and, other than routine matters, discussed:

- SMIX Bash 2019: Accounts completed, with a half-share of the loss received from IMarEST.
- SMIX Bash 2020: Organising Committee has met by video-conference, and planning proceeding is on the assumption that the Bash will go ahead in December; letter to sponsors in preparation and to be sent ASAP.
- TM Program: RINA presentations all signed up for 2020 and IMarEST in progress; video-conferencing of technical presentations attracts an order of magnitude more participants than face-to-face meetings, so live streaming and webcasting of recordings is looking good when we return to face-to-face meetings; "Thank you" bottles of wine may now be delivered easily by eGift card in these COVID-19 restricted times.
- Walter Atkinson Award 2019–20: Candidates for the award were discussed and two nominations decided for advice to Australian Division Council.
- Committee Meetings: Rather than revert to face-to-face meetings when social-distancing restrictions are eased, it was decided to continue future meetings by video conference.

The NSW Section Committee also met by video conference on 21 July and, other than routine matters, discussed:

- SMIX Bash 2020: Planning is going ahead for the event in December; letter to sponsors completed, and sponsors being actively sought — refunds will be in full if the event does not go ahead.
- Technical Meeting Program 2020: Presentations arranged for late July and early September; one to come for October; webcasts accessible on Engineers Australia website, but not without difficulty; "Thank you" bottles of wine being delivered by eGift vouchers arranged online.
- Technical Meeting Program 2021: ideas sought for presentations for 2021.

The next meeting of the NSW Section Committee is scheduled for 1 September.

Design and Construction of the RAN's New Hunter-class Frigates

Levi Catton, Managing Director/SEA5000 Technical Advisor Ship Integration, Gibbs & Cox Australia, gave a presentation on *Design and Construction of the RAN's New Hunter-class Frigates* as a webinar hosted by Engineers Australia with Phil Helmore as MC on 20 May. This was our first webinar presentation, and attracted 600+ registrations, with 400+ actually participating on the evening! This is an order of magnitude more than attendances at our face-to-face meetings, helped along by Engineers Australia advertising the presentation to their members as well.

Introduction

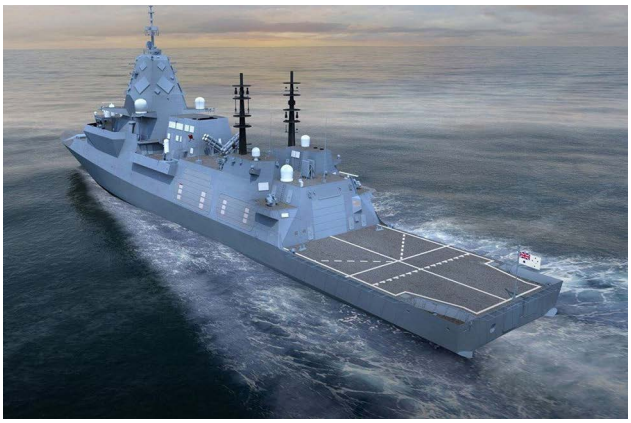
Levi began his presentation with a disclaimer, saying that the content of his presentation had been developed by himself, and that the views expressed were his own and did not necessarily represent the views of, and nor was the content endorsed by, any agency of the Commonwealth of Australia, or Gibbs & Cox Inc.

Levi then gave an overview of Gibbs & Cox's history and participation in Australia. Gibbs & Cox have had more than 90 years of design excellence, with designs including the Mahan-class destroyers in the 1930s, the Liberty ships in the 1040s, SS *United States* in the 1950s, the *Sea Legs* hydrofoil in the 1960s, the FFG7-class frigates in the 1970s, the DDG 51-class destroyers in the 1980s, the DDG 51 flight upgrade in the 1990s, the Freedom-class LCS in the 2000s, Aegis Ashore in the 2010s, the 9 m EOD with Donald L. Blount and Associates in 2015, and the FFG(X) in 2020. Gibbs & Cox has designed nearly every frigate and destroyer in the US Navy since World War II and is continuing that participation into the future.

In addition, Gibbs & Cox has 50 years of partnership with the Royal Australian Navy, designer of the Perth-class DDGs, class design agent during detail design of the Adelaide-class FFGs, warfighting improvement program on the Anzac-class FFHs, designer for the evolved design and on-site support for Navantia for the Hobart-class DDGs, and currently providing technical and program advisory services on the SEA1000, SEA1180 and SEA5000 Programs. Gibbs & Cox has been involved with every surface combatant program for the RAN since the Perth-class DDGs.

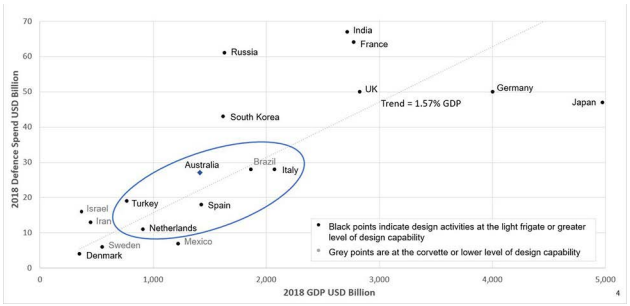
By way of background, the Hunter-class frigates are replacing the Anzac-class vessels, which are currently the mainstay of Australia's surface combatant fleet. The Anzacs are light general-purpose frigates based on Blohm & Voss'

Port bow of the Hunter-class frigate
(Image courtesy BAE Systems)



Port quarter of the Hunter-class frigate
(Image courtesy BAE Systems)

Anzac-class HMAS *Arunta* at Henderson during AMCAP work
(Photo courtesy Defence)



Sovereign capability considerations
(Graph courtesy Gibbs & Cox Australia)

MEKO-200 design. There were eight vessels commissioned into the RAN between 1996 and 2002, and they are generally considered to be a successful and cost-effective asset in the fleet. The vessels have benefitted from the Warfighting Improvement Program (WIP), and the Anzac Midlife Capability Assurance Program (AMCAP), which includes integration of the CEAFAR2 active phased-array radar to improve their capabilities. These vessels will be in service into the 2040s, some 60 years after completion of the design.

Government Considerations

Considerations which influenced the Government's decision on the Hunter-class frigates included the 2009 Defence White Paper for the Defence of Australia and the security of the immediate region, the concerns in the early 2010s about the loss of manufacturing jobs, especially in South Australia, the post-Hobart-class "valley of death" and the lobbying by the shipbuilding labour force and trade unions, the Government's Hobart-class experience, the 2013 Defence White Paper on the implications of the changing strategic circumstances in the region for Australia's national security and defence, the Hobart-class reference design study, the 2015 RAND report on Australian naval shipbuilding, and the 2017 National Naval Shipbuilding Plan.

The National Naval Shipbuilding plan addressed sovereign capability considerations, saying *"Delivering the Naval Shipbuilding Plan will result in a national approach to the delivery of affordable and achievable naval capability through a sovereign Australian industrial base that is reformed, secure, productive and cost-competitive. Achieving this objective will result in future Australian Governments being able to plan and execute: the design, construction and sustainment of future fleets of major surface combatants and minor naval vessels; and the acquisition, construction and sustainment of submarines (designed in conjunction with an international partner) in Australia."*

The Minister for Defence, Senator the Hon. Marise Payne, said in 2018 *"By the conclusion of the frigate build, ASC Shipbuilding will be a strategic national asset capable of independently designing, developing and leading the construction of complex, large naval warships."*

Why do nations maintain a warship development capability? The ability to design a competitive warship takes multiple decades to develop. There is a variety of measures and significant investments in skilling and technology necessary over a significant period in order to achieve a credible national capability. In addition, allies and partnerships must be considered and the inter-relationship between sovereign warship development capability and operational capability of a navy. We must also consider how to mature Australia's naval development capability and the operational capability of the RAN in a manner which responds to present strategic uncertainty. Accordingly, there is a range of opportunities and challenges for Australia's naval sector.

The Government's strategic interests in the Hobart-class frigate program (HCFP) have driven the acquisition strategy:

- Incorporation of key systems to which Australia has already made a significant strategic commitment.
- Development of sovereign shipbuilding capabilities.
- Early commencement of production work to minimise impact on industry capacity and jobs.
- Controlling program risk to protect cost and schedule.
- Contractor accountability for project success.

Objectives of the HCFP

The Request for Tender set out the following key objectives for the project, which have shaped the contract structure:

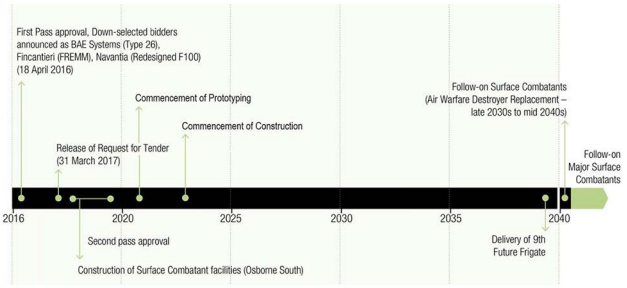
- Deliver nine anti-submarine warfare frigates based on a military-off-the-shelf (MOTS) design with minimum change.
- Contribute to a continuous naval shipbuilding industry in Australia.
- Maximise Australian industry capability.
- Commence construction in Adelaide in 2020 (to be achieved by commencing prototyping activities in 2020 with ship construction to commence within 24 months following this).
- Establish commercial arrangements which are affordable, taking into account price, payment arrangements, and allocation of risk.
- Achieve overall value for money for the Commonwealth.

Schedule

An aggressive development schedule is a fundamental characteristic of the program. Production work is to begin as quickly as possible to re-establish jobs and minimise loss of capability from the shipyard and sector following the end of Hobart-class production. This will involve using a "prototyping" pre-production program to commence production work and de-risk production processes. As a result, five blocks of various complexity will be constructed over about four years starting from late 2020, with cutting steel for Ship 1 programmed to occur in late 2022.

Key Changes

Like any MOTS program, effectively managing and containing change remains central to the success of the



Major surface combatant continuous build program
(Adapted from a Defence image)

program. The Government has sought to contain change to the reference ship design. Australia is beginning to take a system program approach to combat systems. The Government has mandated specific changes to align the Hunter class with systems into which Australia has made significant strategic investments. The overall platform system design is well preserved. The combat system is substantially re-designed from that of the BAE Systems' Type 26, although with some Type 26 elements retained, and is broadly comparable to the Hobart-class architecture. Changes include incorporation of the Aegis combat system (now produced by Lockheed Martin), the CEAFAR2 active phased-array radar, the MH-60 Romeo helicopters, and Australian weapons set, the communications suite, and changes required to meet Australian laws and standards.

Participation and Commercial Arrangements

The presentation provided an overview of some of the participants in the program and their roles and contributions.

ASC Shipbuilding is the Head Contractor, and holds overall responsibility for design, production and integration of the ships, and is a subsidiary of BAE Systems Australia.

Australian Naval Infrastructure owns and manages the Osborne South shipyard, which it leases to ASC Shipbuilding.

BAE Systems Naval Ships (UK) provides the Type 26 reference design IP and performs a large portion of the design engineering for the Hunter class as a subcontractor to ASC Shipbuilding.

CASG Combat Management and Payload Systems acquires the integrated Government–furnished combat system equipment (Aegis, CEAFAR2, etc.)

CASG Naval Construction Branch provides production assurance and manages acceptance for the Commonwealth.

CASG SEA5000 Phase 1 Project Office manages the Head Contract with ASC Shipbuilding and performs program and technical assurance.

CEA Technologies develops and supplies the CEAFAR2 active phased-array radar to CASG.

Gibbs & Cox Australia provides technical and program advisory services to CASG.

Lend Lease delivers the Osborne South shipyard-expansion project.

Lockheed Martin Australia provides combat system integration services as a subcontractor to ASC Shipbuilding.

Lockheed Martin Inc. (US) supplies Aegis systems via the NAVSEA-managed Foreign Military Sales case.

NAVSEA PEOIWS 4.0 acquires and delivers Aegis systems to CASG under a Foreign Military Sales case.

Navy Capability develops and maintains Navy's requirements and manages Government funding processes.

Odense Maritime Technologies is the designer for the shipyard.

Raytheon Australia provides combat systems technical support and assurance services to CASG.

Saab Australia provides combat systems development and integration services as a subcontractor to ASC Shipbuilding.

Combat Systems Overview

The combat-management system is Aegis, with the Australian interface to be developed primarily by Saab Australia.

Warfare sensors include CEA Technologies' CEAFAR2 multi-band active phased-array radar, electo-optical infra-red (EOIR) search and track, Ultra S2150 bow sonar array, Thales' 2087 CAPTAS-4 variable-depth bistatic towed-sonar system, and a range of electronic-warfare systems.

Soft-kill effectors include the Nulka active missile decoy as well as chaff and flare launchers.

Weapons include:

- 32 strike-length Mk41 VLS cells (SM-2, ESSM and SM-3, with SM-6 probable in due course).
- Likely eight naval strike missiles (to be selected by separate program).
- Two dual launchers for the MU90 impact lightweight torpedoes
- Mk 45 Mod 4 5-inch (127 mm) gun.
- Two stabilised remotely-operated 30 mm auto-cannons.
- Two Phalanx CIWS 20 mm rotary cannons.
- 0.50 inch (12.7 mm) calibre machine guns

The MH-60R helos carry a Mk 54 lightweight torpedo, Hellfire missiles and Advanced Precision Kill Weapon System guided rockets. The combination of the Hunter-class vessel and the MH-60R helo is a highly-capable and lethal ASW system!

Platform System Overview

Principal particulars of the Hunter-class vessels are

Length	149.9 m
Beam	20.8 m
Displacement:	9000 t full load displacement
Propulsion	Combined diesel-electric or gas turbine (CODELOG) 1×Rolls-Royce MT30 gas turbine 4×MTU Type 20V 4000 M53B high-speed diesel generators 2×electric motors
Speed (max.)	27+ kn
Range	7000 n miles
Complement	180 personnel, with accommodation for 208

Construction is welded steel with an aluminium mast, classified to Lloyds Register's Naval Ship Rules.

These vessels have world-class surface-ship acoustic performance, with robust shock resistance.

Patrol and cruise speeds are obtained on diesel-electric drive, and sprint speed is achieved on the MT30 gas turbine to 27+ kn.

The mission bay extends across the beam of the vessels; four RIBs, and the davit can access either side, allowing

Mission bay on the Hunter-class frigate
(Image courtesy BAE Systems)

RIB being deployed on the starboard side
of the Hunter-class frigate
(Image courtesy BAE Systems)

deployment to port or starboard.

Osborne South Shipyard

ASC Shipbuilding operates out of the Australian Naval Infrastructure's shipyard at Osborne South. The site is Australia's largest naval shipbuilding hub incorporating a critical mass of world-class warship design and construction skills. It is the most advanced and modern shipbuilding facility in Australia.

Key features of the yard include:

Outfit Support Towers

Similar to the maintenance support towers at ASC North, the outfit support towers allow easy access to all levels of a vessel during construction. They run alongside the ship and, in addition to providing quick and easy access, they also contain support facilities to the tradespeople which are located adjacent to the work front. The support facilities include tool cribs, workshops, amenities, material stores and supervisor office space. The outfit support towers also provide efficient access to vital services such as industrial power, hotel power, welding gas, water and compressed air.

Construction and Assembly Halls

Prior to blocks being consolidated onto the ship structure, outfitting work is conducted on blocks and equipment in workshops which surround the shipyard. Fabrication work can be completed in all weather conditions with full access to all areas of blocks. Outfitting and fabrication completed in workshops as opposed to on the shipyard or wharf, saves time and reduces cost.

Abrasive Blasting and Painting

Paint and blast facilities allow continual work on components and blocks away from the main ship structure which allows work to continue unimpeded. The blast and paint chambers can accommodate large sections of vessels to be processed at one time.

Cranes and Lift Equipment

Equipment allows handling and transportation of blocks and components weighing up to 864 t. The Manitowoc 21000 crane is configured to lift 600 t and lift ship blocks weighing up to 400 t during the ship consolidation process. Two Tadano GR-1450EX cranes can lift 145 t each and have sufficient mast length to reach across the ship's hull whilst dry docked. The cranes play an important role in supporting the ships during construction, after float-off and while berthed at the Common User Facility wharf. Experienced rigging teams are on hand to undertake complex engineered lifts in support of shipbuilding operations.

Extensive Support Facilities

Osborne South has a range of support facilities including multiple trade workshops, security offices, maintenance workshops, plate storage areas and module storage areas. There is over 18 000 m^3 of warehouse storage site wide.

Shipyard Wharf Facilities and Dockside Maintenance

Once a ship is in the water, it moves to the wharf to undertake final fit out and set to work of equipment and systems before sea trials. The shipyard wharf facilities include shore-power supplies, water, gas and air supplies, telephones and communication equipment and alarm services. The wharf support building contains small workshop areas, tool cribs, offices, canteen, lunchroom and amenities.

The Osborne South shipyard
(Image courtesy Australian Naval Infrastructure)

Conclusion

The Hunter-class frigate program will deliver a highly capable and flexible surface combatant fleet with advanced ASW capability and a world-class layered anti-air warfare capability based on the Aegis combat system and Australia's advanced CEAFAR2 active phased-array radar system.

The Australian Government has mandated an aggressive development schedule for the program, with pre-production activities commencing at ASC Shipbuilding's Osborne South yard in late 2020, and first-of-class construction commencing in late 2022. The nine-hull program represents a major element of Australia's Naval Shipbuilding Plan and supports the introduction of a system program approach to

naval combat systems in Australia.

Questions

Question time was lengthy, and elicited many more interesting points. However, in the space of half an hour, we only managed to get through about half the queries; sorry if yours was one of those unanswered but, if you are still interested, then you can always contact Levi.

The certificate was subsequently posted to Levi, and the "thank you" bottle of wine delivered via an eGift card.

Levi's presentation was recorded, and is now available on the Engineers Australia On Demand website (see *The Internet* column).

Sediment Transport Processes near Tidal Energy Devices

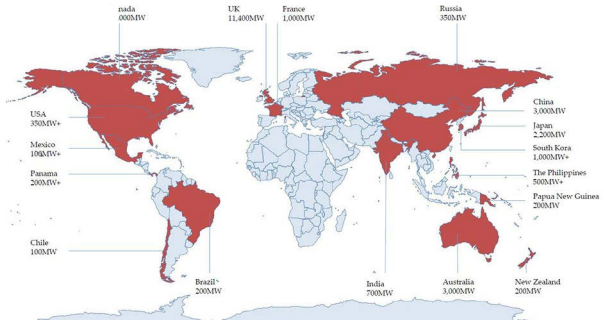
Christelle Auguste, PhD Candidate at the Australian Maritime College, University of Tasmania, and current holder of the Laurie Prandolini Award from the IMarEST, gave a presentation on *Investigation of Sediment Transport Processes near Tidal Energy Devices in Tasmania* as a webinar hosted by Engineers Australia with Phil Helmore as MC on 3 June. This was our second webinar presentation, and attracted 200+ registrations, with 150+ actually participating on the evening.

Introduction

Christelle began her presentation by asking the participants to imagine life without an energy supply! We need energy, and we must move towards renewable sources. The tide is renewable and relentless. Where the sun can energise photovoltaic panels for a variable handful of hours a day and the wind can blow turbines for days on end but, equally, disappear for extended periods without warning, the tide is near constant and entirely predictable.

The world's oceans cover about 71% of the planet, and there are many locations where tides ebb and flow with sufficient speed to generate energy. The estimates of the global potential of tidal energy generation vary, but it is widely agreed that tidal-stream energy capacity could exceed 120 GW.

The Pentland Firth in Scotland is widely considered to be one of the world's best sites for tidal power. The Bay of Fundy in Canada is also a promising location for tidal energy. China has abundant resources for tidal power, and other countries with significant tidal-power potential include the USA, Argentina, Russia, France, India and South Korea. Australia and New Zealand have large ocean energy resources but do not yet generate any power from them.

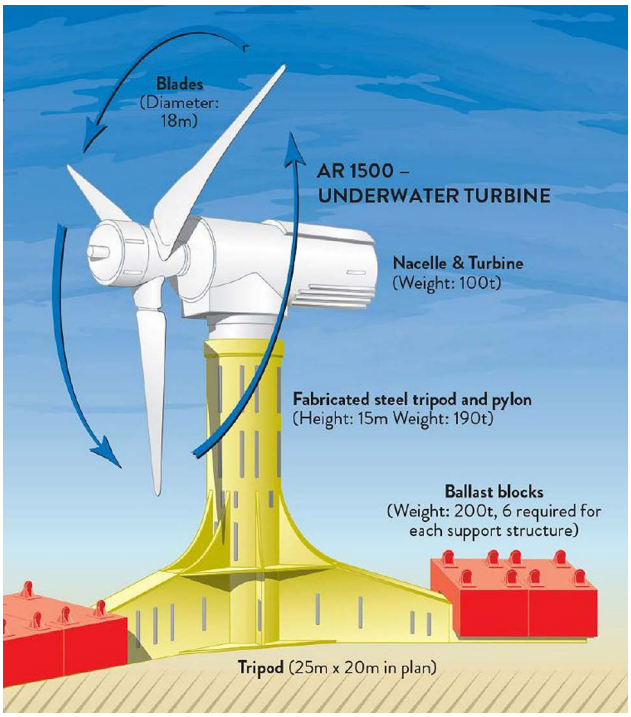


Areas of the world with estimation of potential tidal energy generation
(Chart from Offshore-Energy.biz website)

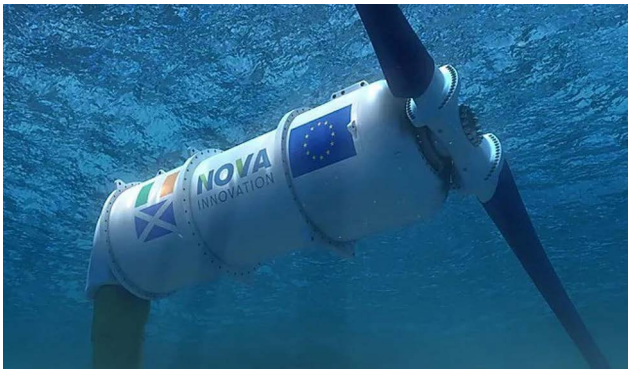
Tidal-current Energy Technologies

A number of companies already manufacture underwater turbines to harness the energy provided by tidal streams, including Naval Energies, Sabella and Blue Shark Power, all in France; Simec Atlantis Energy, Nova Innovation and Orbital Marine Power, all in Scotland; Hangzhou Lin Dong Ocean Energy Technology in China; and Mako Energy in Australia!

The Meygen tidal energy project is being developed by Simec Atlantis Energy (formerly Atlantis Energy) on a 3.5 km stretch in the Pentland Firth between the island of Stroma and mainland Scotland. Situated 2 km away from Scotland's north-east tip on a natural channel through which water flows between the North Sea and the Atlantic Ocean, the site boasts an average tidal current of 4.4 m/s, some of the fastest-flowing waters in the UK. The massive project is being developed in three phases, and reached 6 MW in 2018, with 28 MW in 2020 and an eventual planned capacity of 398 MW.



Turbine for the Meygen project
(Image courtesy Simec Atlantis Energy)



Turbine for the Shetland tidal array
(Photo courtesy Nova Innovation)

first fully-operational grid-connected offshore tidal energy array, at Bluemull Sound in the Shetland Islands. The first two Nova M100 turbines producing 100 kW at 2 m/s tidal speed were deployed at the site in 2016, and a third turbine

was added to the array in early 2017. Belgian renewable energy developer ELSA partnered with Nova Innovation on the Shetland tidal array.

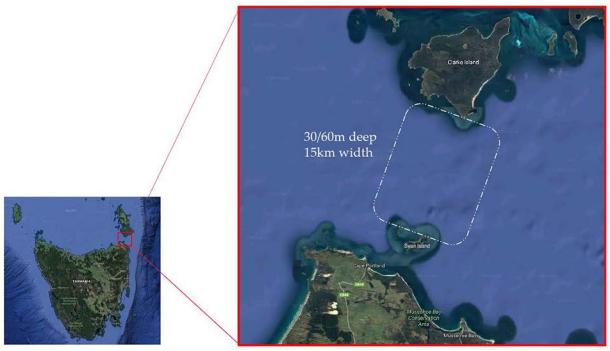
China's first tidal power station of 3.4 MW capacity on Xiushan Island in China's Zhejiang Province was connected to the grid on 25 May 2017. Also in 2017, the Chinese State Oceanic Administration released the *13th Five-year Plan for Marine Renewable Energy (2016-2020)*, which set out the key principles and specific actions for delivering the country's potential in marine renewable energy. By 2020, China planned to build four marine renewable-energy demonstration districts, increasing the total installed capacity of marine renewable energy to over 50 MW in the following two years.

In France, the Ushant Island tidal project saw Sabella set up a tidal-stream generator in the Fromveur Passage between Ushant and the coast of Brittany. In June 2015, a Sabella D10 turbine was lowered into the Fromveur Passage in a water depth of 55 m and was then connected to the island network for testing and, subsequently, to the French grid. The generator is 17 m high and has a footprint of 20×20 m on the seabed; its 10 m diameter rotor can generate 1 MW from the 4 m/s currents in the Fromveur Passage.

Deployment of the turbine for the Ushant Island tidal project
(Photo courtesy Sabella)

Tidal Energy is Coming to Australia

Promising sites for tidal energy harvesting in Australia include the Banks Strait between Clarke Island in the Furneaux Group and Cape Portland on the north-east tip of Tasmania, and the Clarence Strait, between Melville Island and North West Vernon Island, north of Darwin in the Northern Territory.



Banks Strait
(Image courtesy AUSTEn)

AUSTEn is a $5.85 million three-year project to map Australia's tidal energy resources in detail, and assess their economic feasibility and ability to contribute to the country's energy needs. AUSTEn comprises:

- Project Lead — Australian Maritime College, University of Tasmania
- Research Partners — University of Queensland; CSIRO
- Industry Partners — Mako Tidal Turbines; OpenHydro (Naval Energies); Spiral Energy; Simec Atlantis Energy
- Funding Agency — Australian Renewable Energy Agency (ARENA) Advancing Renewables Program

The project consists of three interlinked components to support the emerging tidal-energy sector. Component 1 will deliver a national Australian high-resolution tidal-resource assessment; Component 2 will conduct case studies at two promising locations for energy extraction; Component 3 will deliver technological and economic feasibility assessment for tidal energy integration to Australia's electricity infrastructure. The outcomes of this project will provide considerable benefit to the emerging tidal-energy industry, the strategic-level decision makers of the Australian energy sector, and the management of Australian marine resources by helping them to understand the resource, risks and opportunities available.

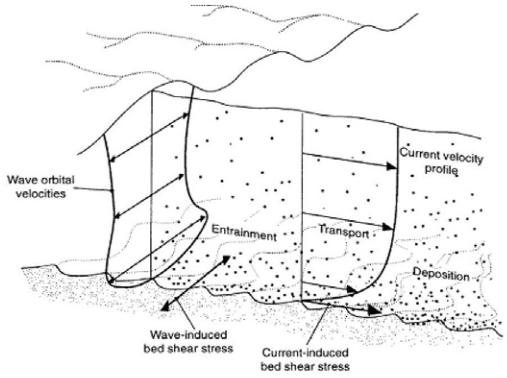
Why is Sediment Transport Important?

Tidal streams and wave action both have the ability to transport sediment on the sea bed. The wave orbital velocities generally move sediment back-and-forth parallel to the direction of wave travel. Tidal streams move sediment parallel to the direction of the stream, generally back-and-forth with the ebb and flow of the tide. The project is interested in the interaction of the turbines with the combined action of the waves and tidal streams.

Bed shear stress is the principal parameter acting on sediment dynamics. Most models define the bed shear stress with the quadratic friction law

$$\tau_0 = \rho C_D \overline{U}^2$$

where ρ is the density of water, C_D the bottom drag coefficient and $\overline{U}$ the depth-averaged current speed.



Marine sediment transport processes
(Drawing from Soulsby, *Dynamics of Marine Sands*, 1997)

Sediment transport is responsible for the dynamics of sandbanks, influences morphodynamics (coastal erosion and accretion), and influences offshore and underwater structures.

Challenges in the project include uncertainties about interactions of turbines with the environment, the limited full-scale environmental surveys, and the difficulty of acquiring data to calibrate and validate numerical models. Christelle has been on one of the four data-collection trips to the Banks Strait on the AMC vessel *Bluefin* in March 2018. Most of the time, the weather was pretty rough!

Bluefin in rough weather in the Banks Strait
(Photo courtesy AUSTEn Project

PhD Project

The objectives of Christelle's PhD project include:

- Investigate the ability and sensitivity of sediment transport models (2D/3D) to characterise high tidal-energy sites.
- Explore sediment measurement methods to determine the best compromise between cost and time with model accuracy.
- Apply the models to study the hydrodynamics and sediment transport in Banks Strait.
- Investigate the interactions between tidal-energy converters (TECs) and the sediment processes, for various seabed and array scenarios.

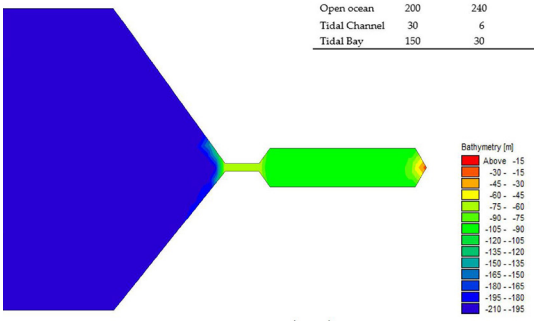
The project started with a literature review, followed by the study of an idealised theoretical channel, then study of the Banks Strait itself and, finally, defining guidelines and methods for TEC developers.

Idealised Theoretical Channel

An idealised theoretical channel comprising an open ocean, a tidal channel and a tidal bay was created based on Yang, Z.Q. et al. (2013), Modelling tidal stream energy extraction and its effects on transport processes in a tidal channel and bay system using a three-dimensional coastal ocean model, *Renewable Energy*, **50**, 505–613.

GEOMETRY OF THE DOMAIN

Domain	Length (km)	Width (km)	Depth (m)
Open ocean	200	240	200
Tidal Channel	30	6	60
Tidal Bay	150	30	100



Idealised channel
(Image courtesy Christelle Auguste)

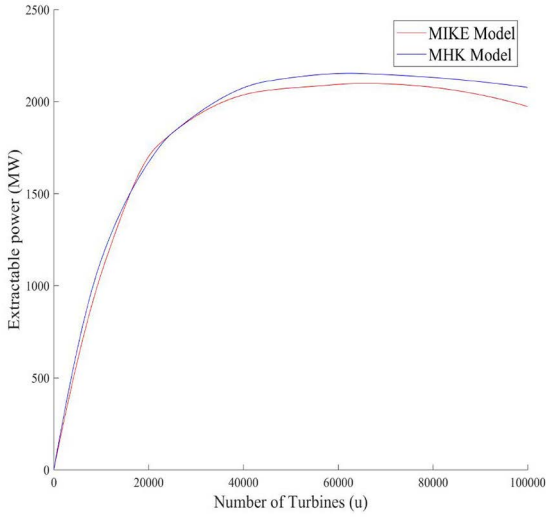
Christelle set up Yang et al.'s model with the same parameters, i.e. a turbine diameter of 10 m at a hub height above the sea bed of 10 m. Five cases were analysed with 1, 2, 5, 6 or 9 turbines in each cell of the tidal channel.

The power generated by a turbine is given by

$$P = \rho C_T A_b \overline{U}^2$$

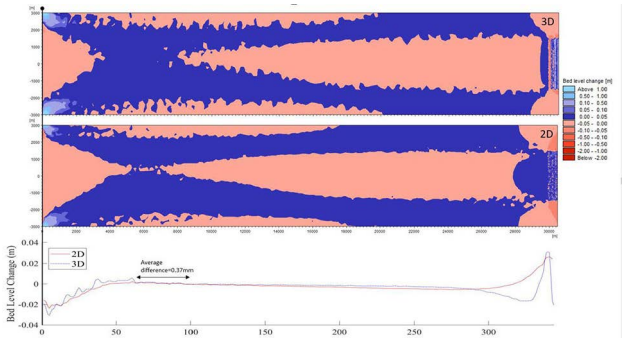
where ρ is the density of water, C_T the turbine drag coefficient (Yang et al. used 0.5), A_b the area swept by the turbine blades, and $\overline{U}$ the depth-averaged current speed.

Yang et al. used the MHK (marine and hydro-kinetic) model with 1140 cells in the tidal channel, where Christelle used the MIKE 21 model with 10855 cells. Her results for power extraction were very close to Yang et al.'s.



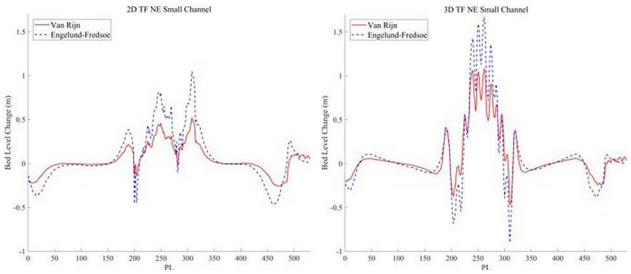
Validation of idealised channel model and extractable power
(Graph courtesy Christelle Auguste)

Other validations of the MIKE model included channel fences, the tidal farm, seabed level changes and their spatial extent.



Bed level change and spatial extent using MHK model
(Diagram courtesy Christelle Auguste)

Two sediment-transport formulas (due to van Rijn, and Engelund and Fredsøe) were also used to evaluate bed level changes for several tidal ranges for both 2D and 3D cases in the tidal channel. Differences of 1.9 were found between the Engelund and Fredsøe and Van Riijn models. The Engelund and Fredsøe model in the non-equilibrium condition was sensitive to changes in current speed, suggesting that small errors in this parameter could lead to significant error in bed level change.

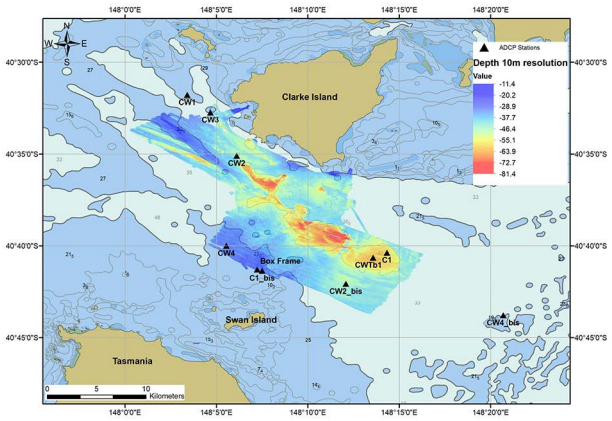


Bed level change using formulas
(Graphs courtesy Christelle Auguste)

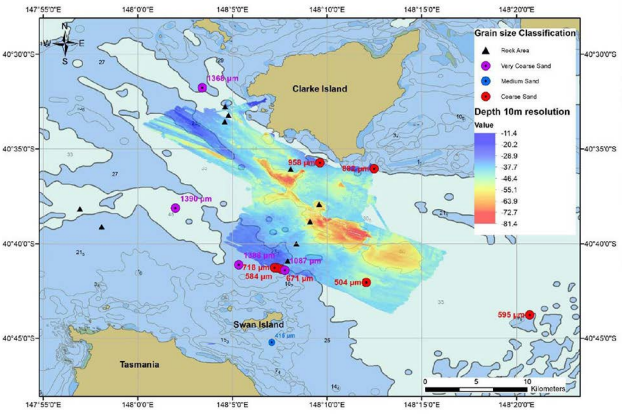
Overall, the validation of the idealised theoretical channel model provided a benchmark for the interaction of tidal-energy converters (TECs) on sediment transport. It was found that the MIKE 21/3 flow model can be used for tidal energy extraction modelling. The 2D model seems sufficient to assess behaviour of sediment dynamics away from the tidal farm, but the 3D model using the bottom velocity for sediment transport rates is needed for a more accurate result in the tidal farm itself. Beyond 100 turbines, the impact of TEC arrays become significant.

Data Collection in the Banks Strait

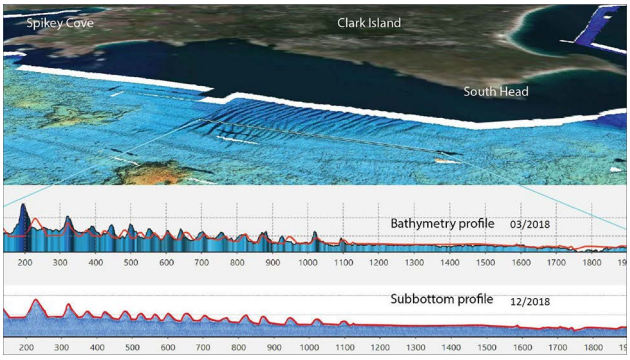
The four data-collection trips to the Banks Strait on board *Bluefin* and other vessels used a number of collection devices, including an ADCP (acoustic doppler current profiler), penetrometer, sediment traps, an optical sensor/LISST (laser in-situ scattering and transmissometry), sub-bottom profiler, and grab sampler. Here Christelle showed the locations of the sampling stations and some of the data collected.



ADCP sampling locations in the Banks Strait
(Diagram courtesy Christelle Auguste)



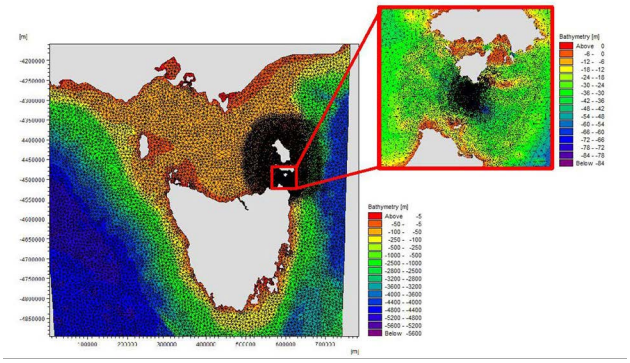
Sediment grain size classification in the Banks Strait
(Diagram courtesy Christelle Auguste)



Bathymetry and sub-bottom profile in the Banks Strait
(modelling shown in red)
(Diagram courtesy Christelle Auguste)

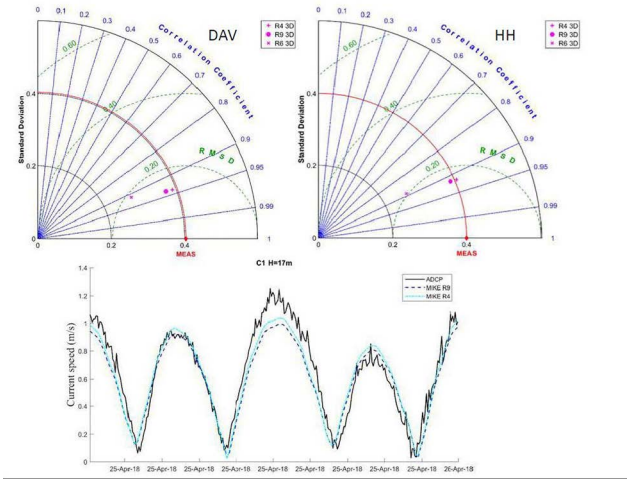
Numerical Modelling

Following collection of the data from the Banks Strait, the task of numerical modelling came next. A mesh was set up around the whole coast of Tasmania, with a spacing of nodes of 50 m in the Banks Strait and 20 m in the area of the turbine farm.



Numerical mesh model
(Diagram courtesy Christelle Auguste)

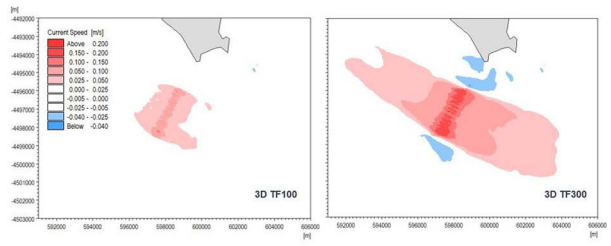
The model was run for a 35 day simulation, and the model was validated against the collected data. Here Christelle showed a number of validation results for 2D and 3D models. It was pleasing to see correlation coefficients generally in the range of 0.90–0.95, indicating good correlation of the model results with collected data.



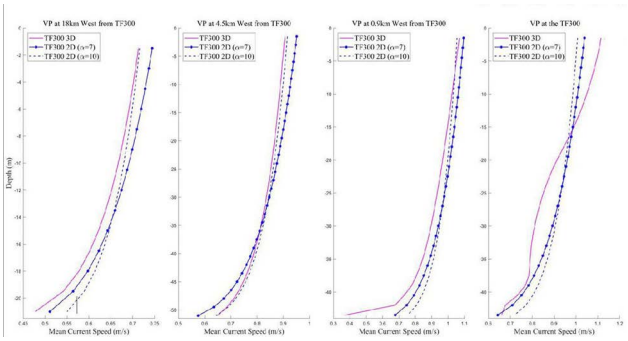
Calibration of 3D model against ADCP data for depth average velocity (DAV) and hub height (HH)
(Graphs courtesy Christelle Auguste)

Influence of the Tidal Farm

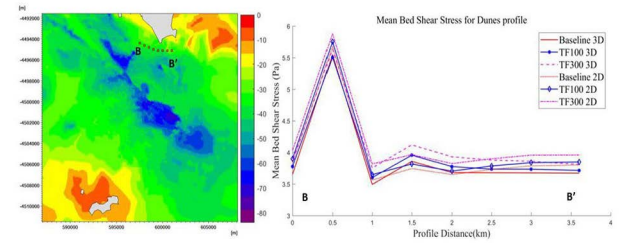
Having validated the model, it was then run to check the influence of tidal farms of various sizes on the environment.



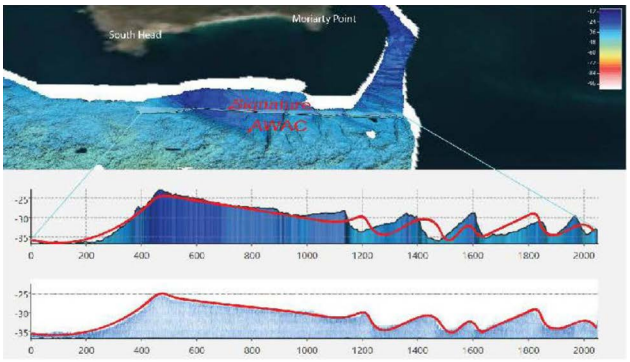
Change in magnitude of current speed at the hub height between baseline and case with tidal farm for 100 turbines (L) and 300 turbines (R)
(Diagrams courtesy Christelle Auguste)



Velocity profiles at various locations west of a 300 turbines farm using 2D and 3D simulations
(Graphs courtesy Christelle Auguste)



Mean bed shear stress for the sand dunes profile B–B' in the Banks Strait
(Diagrams courtesy Christelle Auguste)



Sand dunes profile B–B' and modelling (in red) in the Banks Strait
(Diagrams courtesy Christelle Auguste)

In general, for turbine farms of more than 100 units, the environmental impact becomes significant.

Conclusion

This investigation is part of the AUSTEn project which is laying the groundwork for the commencement of tidal-energy production in Australia. The existing technology and installations around the world have been surveyed and an idealised theoretical model has been created and validated. The Banks Strait has been surveyed to collect data on the local tidal environment, and a numerical model created and validated against the data. The model has then been run to check the influence of tidal farms of varying sizes on the environment and, specifically, on sediment transport. The model will further be used to provide guidelines and methods for developers of tidal-energy converters.

Questions

Question time was lengthy and elicited many more interesting points.

The certificate was subsequently posted to Christelle, and the "thank you" bottle of wine delivered via an eGift card.

Christelle's presentation was recorded, and is now available on the Engineers Australia On Demand website (see *The Internet* column).

Australia's New Icebreaking Research and Supply Vessel

Clive Evans, Maritime Systems Lead—Research Supply Icebreaker Project, Australian Antarctic Division, gave a presentation on *RSV* Nuyina*: Australia's New Icebreaking Research and Supply Vessel* as a webinar hosted by Engineers Australia with Phil Helmore as MC on 1 July. This was our third webinar presentation, and attracted 250+ registrations, with 180+ actually participating on the evening.

Introduction

Clive began his presentation with a video introduction to the Australian Antarctic Program and the research and supply operations involved. This was followed with photos and more-detailed descriptions.

Australia has three permanent research stations in Antarctica, at Casey, Davis and Mawson, and a permanent base on Macquarie Island, all of which have to be resupplied regularly with fuel, stores and solid cargo.

Australian Antarctic Program stations
(Map courtesy Australian Antarctic Program)

Australian Antarctic station Casey
(Photo courtesy Australian Antarctic Program)

Australian Antarctic station Davis
(Photo courtesy Australian Antarctic Program)

Aurora Australis resupplying Casey using landing craft
(Photo courtesy David Barringhaus)

Aurora Australis resupplying Davis using helicopter
(Photo courtesy William de Bruyn)

Australian Antarctic station Mawson
(Photo courtesy Australian Antarctic Program)

Aurora Australis resupplying a new crane to Davis
(Photo courtesy Mark Horstman)

Aurora Australis resupplying Mawson
(Photo courtesy Noel Tennant)

Australian Antarctic station Macquarie Island
(Photo courtesy Barry Becker)

Aurora Australis resupplying Macquarie Island
(Photo courtesy Jeremy Smith)

Another task is for the transfer of expeditioners. Some arrive on an Airbus A319 which lands on the Wilkins runway close to Casey station, a four-hour flight from Hobart. However, most expeditioners arrive by ship, typically a ten-day trip, but can be delivered to any of the stations.

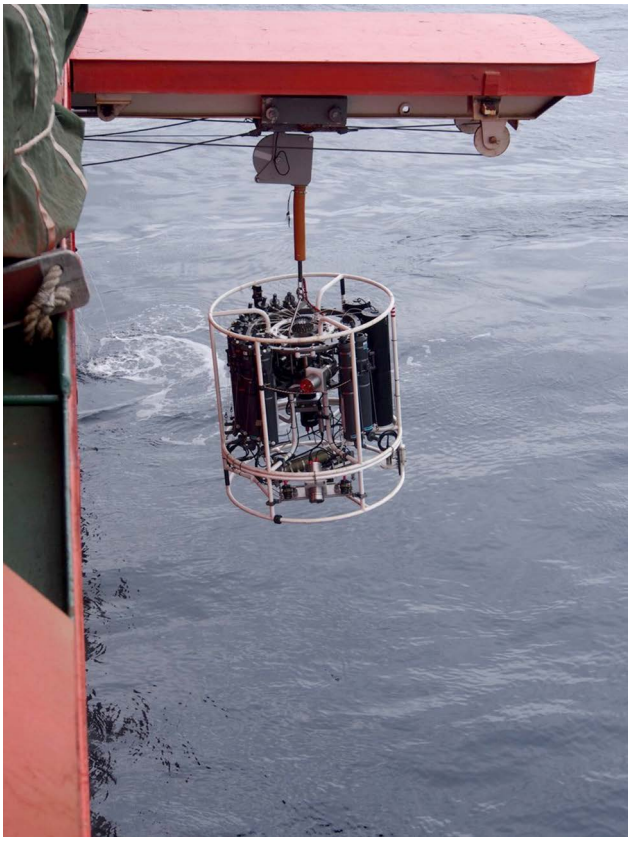
Aurora Australis delivering expeditioners ashore
(Photo courtesy Jason Mundy)

Importantly, the research-and-supply vessel provides medical facilities.

Medical facilities on board *Aurora Australis*
(Photo courtesy Jason Mundy)

The vessel is also a platform for marine-science research, including stern trawling for fish sampling, CTD (conductivity, temperature and depth) measurements, monitoring krill (at the base of the food chain), observing resident mammals (whales, seals, etc.), and monitoring the atmosphere and light.

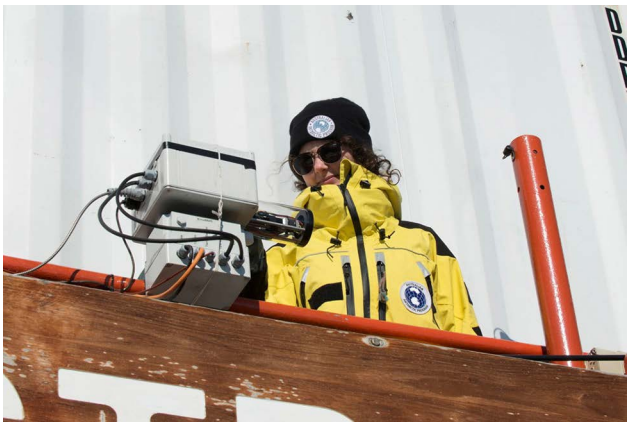
Stern trawl gear on board *Aurora Australis*
(Photo courtesy Australian Antarctic Project)



Deploying the CTD monitoring equipment from *Aurora Australis*
(Photo courtesy Wendy Pyper)

Krill close up
(Photo courtesy Steve Brookes)

Marine mammal observation
(Photo courtesy Myriam Schuller)



Monitoring the atmosphere and light
(Photo courtesy Rowan Butler)

A secondary task of the research-and-supply vessel is in a Government-support role, such as for humanitarian or disaster-relief operations.

Drivers for a New Shipping Capability

Drivers for a new ship include:

- *Aurora Australis* has now done 30 seasons in the Southern Ocean and Antarctica, and is at the end of her useful life.
- Australia's Antarctic Strategy and the 20-year Action Plan requires increased cargo capacity to deliver the whole programme of asset replacement and station resupply.
- Increased cargo capacity will lead to a change in voyages from 'one voyage, one station' to multiple stations per voyage.
- This change will allow more operational days to be available for marine science, which is severely limited on *Aurora Australis*.
- More operational days for marine science results in greatly improved science facilities.

RSV *Nuyina*

The name *Nuyina* is the word in the palawa kani language of the Tasmanian Aborigines for the southern lights. The name was suggested by school students in a competition, and is jointly attributed to students from St Virgil's College in Hobart and Secret Harbour Primary School near Perth, WA. The name *Nuyina* evokes the names of previous ships involved in Australian Antarctic research and investigation: *Aurora Australis* (1989–2020), Australia's current icebreaking research and resupply vessel; and *Aurora* (1876–1918), used by Sir Douglas Mawson for exploring the continent (1910–14) and Sir Ernest Shackleton.

Here Clive showed a photograph of *Aurora Australis* berthed in Hobart, with an image of *Nuyina* positioned for comparison.

Aurora Australis and *Nuyina*
(Photo and image courtesy Australian Antarctic Project)

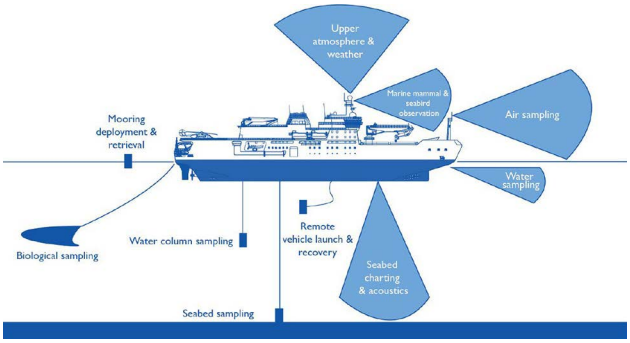
Principal particulars of *Nuyina* are

Length OA	160.3 m
Beam	25.6 m
Draft	9.30 m
Displacement	25 500 t
Crew	32
Passengers	117
Main engines	2×MAN 32/44CR 16V each 9.6 MW
Power take-in	2×Advanced Electric Drive each 3.7 MW
Propulsion power	26.6 MW
Installed power	30.2 MW
Speed (service)	12 kn
(maximum)	16+ kn
Range	16 000+ n miles
Endurance	90 days
Seakeeping	DEF(AUST)5000
Icebreaking	1.65 m @ 3 kn
Dynamic positioning	2 (SS 4, BF 8)
Silent R notation	@ 8 kn

RSV *Nuyina*
(Diagram courtesy Australian Antarctic Project)

RSV *Nuyina* Construction Update

Following contractual agreement on 28 April 2016 with DMS Maritime (now Serco Defence) for delivery, operation and maintenance, the ship's design and construction was contracted to Damen Group. Concept design was contracted to naval architects Knud E. Hansen of Denmark. The keel



Science capability on board RSV *Nuyina*
(Drawing courtesy Australian Antarctic Project)

laying took place in August 2017 at Damen's Galați shipyard in Romania. Coins from Denmark, Netherlands, Romania, and Australia were welded to the keel as part of the keel laying.

Keel-laying ceremony of RSV *Nuyina*
(Photo courtesy Australian Antarctic Project)

Here Clive showed video footage from a drone flyover of *Nuyina* alongside at Damen's shipyard in Galati in April 2020.

Harbour-acceptance trials are currently underway in Galati. Sea trials are expected to commence in the Black Sea later this year, followed by special trials (i.e. icebreaking) above the Arctic Circle in late 2020, with delivery to Hobart in early 2021.

Contract

The AAD signed a Design, Build, Operate and Maintain (DBOM) contract with DMS Maritime (now Serco Defence) in April 2016.

There were 1202 Functional Performance Specification (FPS) items included in the contract, and these remain for the duration of the contract. A technical specification for the construction of the vessel was not developed. Each FPS item has a series of verification strategies including design, harbour-acceptance trials, ship-acceptance trials, and the special sea trials (icebreaking). Each FPS continues into the operate and maintenance phases where Serco Defence will operate the ship for the first ten years.

Strengths of the DBOM model include:

- Certainty of fixed price and defined performance over the length of the contract, which is important for government procurements of this scale.
- An AAD full-time equivalent team of 6 people would not be able to deliver this project without a prime contractor.
- *Nuyina* remains a Commonwealth asset and AAD maintains a small team into the O&M phase. This provides a greater connection to ship operations than the current time-charter arrangement.

Challenges inherent in the DBOM model include:

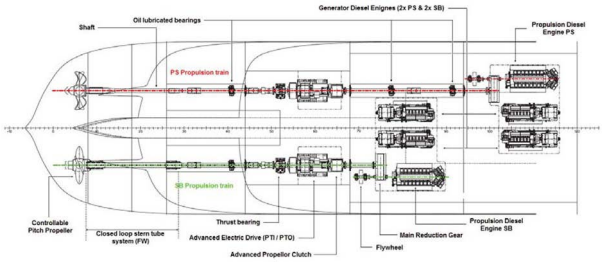
- The tri-partite arrangement of Damen Schelde Naval Shipbuilding, Serco and the AAD is further complicated by Damen subcontractors Damen Galati (DSGa) and *their* subcontractors. This can be challenging for technical meetings.
- There can be too much emphasis on the FPS requirements. Shipbuilding best practice and quality are also critical items.
- The AAD team (including contractors) is slightly larger than envisaged, due to the quantity of information transferred between the parties.

Propulsion System Design

Design drivers for the propulsion system included requirements for:

- Redundancy.
- Heavy icebreaking performance with ice milling at 3 kn.
- Ability to mill ice astern.
- Acceptable performance in open water transit up to 16 kn.
- Large variation in hotel load impacts on the propulsion system.
- LR Class Notations DP(AA), CAC(2), PSMR*, ECO (NOX-2, SOX)
- IMO Tier 2
- DNV Silent R (equivalence)

Here Clive showed a slide of *Nuyina*'s propulsion train.



Nuyina's propulsion train machinery
(Drawing courtesy Australian Antarctic Project)

The port and starboard propulsion trains are completely separate, with the main propulsion engines in different compartments and isolated from each other, providing propulsion redundancy.

For heavy icebreaking, the vessel has two MAN 32/44CR 16V propulsion engines, each rated at 9.6 MW, plus two Advanced Electric Drive PTIs, each rated at 3.7 MW, giving a total propulsion power of 26.6 MW. Aft of the main reduction gear on each propulsion engine is an inertia flywheel for ice milling, and the controllable-pitch propellers have the strength required for milling. The vessel also has the ability to mill ice astern, with an ice knife and the propellers so designed.

Controllable-pitch propellers are essential for this type

of vessel, as the speed of advance for free running and icebreaking vary enormously.

Here Clive showed a video of icebreaking model tests undertaken in the ice towing tank at Hamburgische Schiffbau-Versuchsanstalt (HSVA) in Hamburg. The video was taken from underneath the ice, and showed the bow cleaving the ice cleanly.

The hotel loads on the vessel are subject to large variations due to winterisation, heating, ventilation and air conditioning; and the vessel systems, and this impacts the propulsion system. Generating power is provided by two Bergen C25 33L9A gensets each rated at 3 MW in the aft engine room, plus one Bergen C25 33L9A rated at 3 MW and one Bergen C25 33L6A rated at 2 MW in the forward engine room. In addition, the two PTIs in the port and starboard propulsion trains can also be used as power take-offs, each rated at 3.2 MW.

There are some unusual consequences of the propulsion-system design:

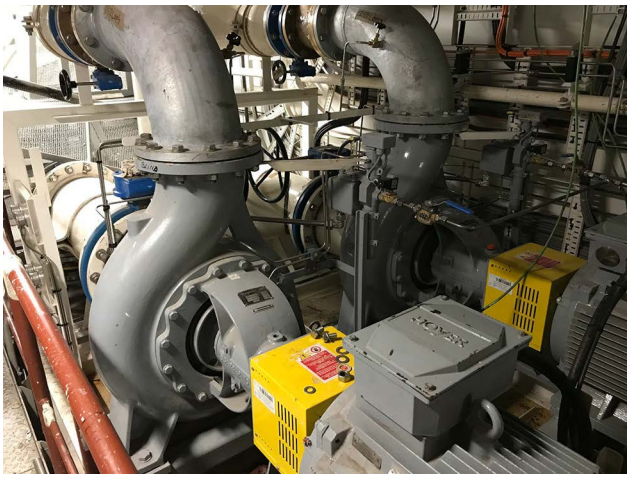
- Waste-heat recovery economisers are only fitted to the gensets; this enhances the most efficient mode for open water as diesel-electric, since this 'free energy' is lost if diesel-mechanical is selected.
- The main engines are actually rarely used, which means that the regulations on service tank and oily bilge capacity are skewed high, so a special dispensation was required for lower capacities.
- The very high installed power gives a potential open-water speed well in excess of 16 kn; this causes potential classification-society rule difficulties in that the speed of entry for manoeuvres is not realistic, and the scantling speed and maximum speed differ.

Wet Well Sampling Space

The wet well sampling space will be fitted with three filter tables and a fish-egg sampler for the collection of live samples of krill and other species for scientific purposes, both to understand known and unknown species from live samples, and to understand populations.

Nuyina's wet well sampling space
(Photo courtesy Australian Antarctic Project)

The space is located below the waterline, and is destined to handle up to 370 t/h of sea water, potentially at –2°C. How to ensure adequate drainage? The initial design proposed using floor plates as a buffer between inlet flow and drainage. However, AAD was concerned that the inlets would not shut off in time to prevent flooding, so now there is a drain tank of 30 t capacity which can be drained in 5 min using either of a pair of 500 m^3/h pumps (to provide redundancy). These pumps are actually the biggest on board, and can double as bilge pumps if required.



Nuyina's drain pumps for the wet well sampling space
(Photo courtesy Australian Antarctic Project)

Resupply

Nuyina is capable of several types of resupply operation to suit the four Antarctic stations.

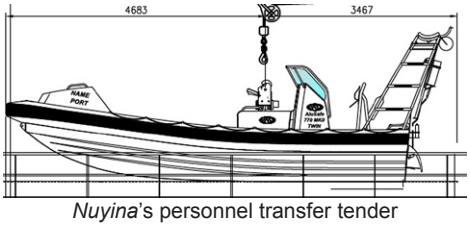
For resupplying a station whilst dynamically positioned offshore, the design considerations include:

- The main cargo cranes have counter-ballast for easier simultaneous helicopter operations and comfort onboard.
- The hatches are required to be open at sea, and this has serious consequences for the assignment of the load line and, again, a special dispensation was required.
- The landing barge must be lifted on and off *Nuyina* and refuelled afloat.

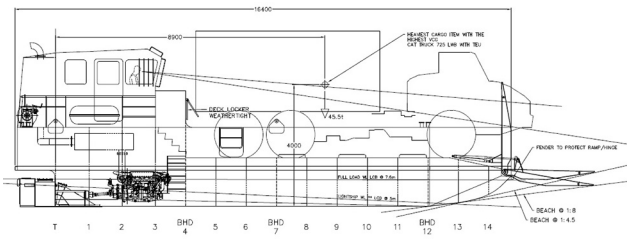
When a station is locked in due to ice, *Nuyina* can respond by either moving the cargo at the top of the hold (intended for the locked-in station) internally to allow other stations to be resupplied earlier, or the cargo can be prepared for helicopter resupply to the locked-in station via the helideck and winch-only point simultaneously.

Nuyina carries three watercraft types for various operations (including resupply):

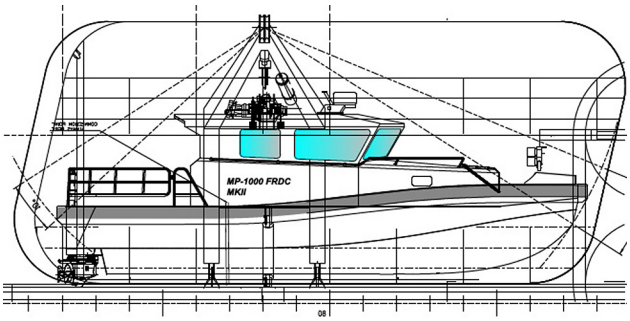
- 3×Personnel transfer tenders for transfer of expeditioners to a station (8 at a time).
- Landing barges for lo-ro transfer of construction vehicles and a Hydrema 20 ft container handler to stations on the continent.
- 1×Science tender for shallow-water underwater bottom profiling, etc.



Nuyina's personnel transfer tender
(Drawing courtesy Australian Antarctic Project)



Nuyina's landing barge
(Drawing courtesy Australian Antarctic Project)



Nuyina's science tender
(Drawing courtesy Australian Antarctic Project)

Conclusion

In summary, *Nuyina* is not just a modernised *Aurora Australis*; *Nuyina* has vastly increased capacity in all areas, particularly in the ability to deliver marine science. It is a very significant investment in Australia's Antarctic Program. This much complexity in a relatively small platform led to numerous design challenges, and will require smart operating in the future to utilise *Nuyina*'s full capability. All this makes it one of most eagerly anticipated ships in recent years.

Questions

Question time was lengthy and elicited many more interesting points.

The certificate was subsequently posted to Clive, and the "thank you" bottle of wine delivered via an eGift card.

Clive's presentation was recorded, and is now available on the Engineers Australia On Demand website (see *The Internet* column).

Cruise Ships and COVID-19

Robert McMahon, Marine Engineer; Simon Robards, Manager East Operations, Australian Maritime Safety Authority; Michael Kelly, Pilot, Port Authority of NSW; and Bernie Farrelly, Project Manager, Tas Bull Seafarers Foundation, were scheduled to give a presentation on *Cruise Ships and COVID-19* as a webinar hosted by IMarEST in London using the Zoom platform with Kevin Daffey, President of IMarEST, as MC and keynote speaker on 29 July.

However, due to circumstances beyond their control, the presentation had to be postponed with less than 24 h to go to the scheduled start time.

The presentation has been re-scheduled for Wednesday 14 October; connection and login details to be advised.

Phil Helmore

CLASSIFICATION SOCIETY NEWS

LR opens new Naval Liaison Office to support Australasian Naval Community

Lloyd's Register has strengthened the local naval Australasian support structure by establishing a new Naval Liaison Office (NLO) in Sydney. The office will provide dedicated naval classification and assurance services, and technical and project-management support to the Royal Australian Navy, the Royal New Zealand Navy, and their respective Departments of Defence, and companies in the wider defence industry with local capability.

The NLO will support LR's wider naval business throughout the Asia-Pacific region as more navies and defence-industry companies and organisations choose LR's naval assurance and advisory services.

Steve McDowall, LR's Naval Business Manager for Australasia, who will lead the NLO, said "LR is proud to bring this new high-quality local capability to strengthen our existing relationships with navies, defence departments and the defence industry in Australasia, and the extensive range of services which LR delivers in providing assurance services to naval safety and capability management.

"The new NLO team have a huge naval pedigree and have supported navies and the wider defence community in Australasia for many years. The core capability is built around the management of safety and naval fleets, and in the design, build and sustainment of future naval ship classes. It is an extremely bright future for navies in the Australasian region, and LR is ready to continue partnering with them for ongoing success with local expertise" Mr McDowall said.

David Lloyd, LR's Global Naval Business Director, commented "Whether it's the Royal Australian Navy embarking on a considerable newbuilding program, or the Royal New Zealand Navy in the midst of a significant fleet capability upgrade, establishing a Naval Liaison Office in Sydney reinforces LR's commitment that we are both present and ready to be the classification society partner of choice."

This follows recent developments with Babcock International in which LR has been selected for the UK Ministry of Defence's Type 31 frigate program to provide naval assurance services, and LR will also class new multi-role ships for the Federal German Government, where it was announced that LR was chosen as the preferred classification society for two new 95 m multi-role ships in April.

November 2019 marked the twentieth anniversary of the first Naval Ship Technical Committee meeting, where a group from LR, different navies from around the world and the defence industry set out to develop a unique set of rules for navies and the naval shipbuilding industry. LR's *Naval Ship Rules* were a turning point for the naval industry and are now used by shipyards around the world, and classification rules are now required in nearly all naval ship specifications.

Due to the COVID-19 restrictions, Steve McDowall and his new team will be working from home until safety and travel protocols are lifted and day-to-day operations return to normal.

LR *Press Release,* 30 Apr 2020

LR Makes the Case for Remote Surveys

Surveys undertaken remotely are still viewed with caution by some, but experts at LR believe that reticence over new survey methods, which make the most of digital technology, is misplaced. Here, James Forsdyke, LR's Head of Product Management, and Sean van der Post, LR's Global Offshore Business Manager, explain some of the reasons why the interaction between hardware, software and human expertise offers an unbeatable formula.

Restrictions on travel amid the COVID-19 pandemic is forcing unprecedented change on some of shipping's age-old procedures as access to ships in ports, and oil and gas assets in offshore waters, is barred. Yet ships continue to fulfil a vital role in the global supply chain and energy facilities can't easily be switched off. Both must continue to operate efficiently and safely whether surveys are due or not.

LR has had a wide range of remote survey options available to clients for years, particularly in the offshore industry where floating assets stay in place or are fixed to the seabed for long periods. But COVID-19 has forced a new reality on many who have traditionally relied on the physical presence of a surveyor at the rig or ship.

Nick Brown, LR's Marine and Offshore Director, believes

that the dramatic uptake of remote services and support is a trend which will inevitably continue, and likely gather pace, long after the virus. His sentiment is borne out by LR's frontline experts, James Forsdyke and Sean van der Post.

Remote Survey Champions

Both experts agree wholeheartedly with Brown's thinking. They highlight LR's recent focus on remote services, notably its team of Remote Survey Champions located in no fewer than 16 of the world's key shipping and offshore hubs. These experts can be linked digitally to their clients whenever necessary, and LR's systems are 'technologically agnostic', meaning that connectivity can be based on Microsoft Teams, Skype or WhatsApp. If a client has no systems in place, then the classification society has its own system — LR Remote.

The team, despite the worldwide coverage, is interconnected by digital communications, real-time data transfer, live streaming and all of the other technologies that have been developed recently, but which the virus has now made essential. The remote survey champions are a hub of excellence who support and guide LR's frontline colleagues and clients alike with remote surveys, ensuring consistent practices and safety at all times. Furthermore, Forsdyke believes that LR's remote-inspection techniques, combined with digital data transfer and the expertise of top specialists, can provide an equivalent service to physical attendance.

He goes further, stressing that this is not a short-term reaction to the crisis. LR, he says, has been working with customers remotely where appropriate for many years. What COVID-19 has done is significantly broaden the range of use cases where remote support is considered appropriate, providing the industry impetus needed to embrace what technology has been able to offer for a number of years.

In times past, a traditional survey would involve a surveyor travelling to a location, going onboard a ship, meeting key personnel and then heading to the master's office to check on the validity of certificates and other documents. It's a process which could take a significant proportion of the available time. Then the surveyor would undertake the actual survey.

Forsdyke compares this to modern banking applications, where you still need a whole range of valid documents before you can proceed, but now you upload all your documents in advance, for pre-validation, making the process infinitely more efficient. And he asks, 'why can't classification be the same?'

Unbeatable Combination

Thankfully, shipping is moving on from these old procedures. Now, says Forsdyke, the interaction between hardware, software and human experts, wherever they may be in the world, offers a really exciting combination which complements and enhances the traditional offering based on physical attendance only.

Far from reducing the role of the human being, Forsdyke says that latest techniques enhance it. LR's experts in a particular field are instantly available to pass opinion on a specific issue, live-streamed and on the scene. The client is receiving dramatically more added value from this service, he says, which is faster, more accurate, more incisive and no longer the result of one person's physical attendance, often limited to a few hours.

Van der Post's brief covers the assurance of a wide range of oil and gas assets, including subsea pipelines, floating storage terminals, fixed offshore structures and LNG terminals. Remotely-operated vehicles (ROVs) have been an essential part of his business for years — ROVs and pigging tools are a routine component of maintenance-management programs which van der Post and his team must audit.

Fantastic Opportunity

Despite all this, however, van der Post is enthusiastic about the opportunities for the future. "You don't make progress any time as quickly as at a time of upset and agreed purpose," he declares, referring to the virus. "This is an opportunity to extend our remote capabilities in the offshore field." With about 70% of the UK's offshore assets under LR's assurance regime, there is plenty of scope.

However, the UK is only a small part of van der Post's portfolio. LR has offshore assets all over the world, from security hotspots in North and West Africa to assets operating in the Timor Sea.

Van der Post points to one recent development, forced on organisations like LR by COVID-19, which amounts to a sea change. Previously, he says, no new procedure could be undertaken without detailed preparations, risk assessments and meticulous rules, written in advance. Safe working practices are, of course, essential, he says, but now the approach is "why can't we do this remotely?" rather than "we must send someone as soon as possible".

Both recognise the continued hesitance in the industry; as industry stakeholders collectively gain more experience in using remote techniques and demonstrate the capability, Forsdyke and van der Post believe there will be continued acceleration of adoption and LR is poised to lead that sea change.

LR *Insights,* 2 July 2020

ABS Launches Guidance for Assets Exposed to COVID-19

ABS has launched comprehensive guidance on sanitising and decontaminating marine and offshore assets exposed to COVID-19. *Response Measures to COVID-19 for the Marine and Offshore Industries* provides best-practice guidelines for sanitising assets exposed to COVID-19 and helps maritime leadership address the many challenges which the virus brings. The best-practices document helps to answer a range of practical, urgent questions including how to prevent an asset from becoming contaminated, how to maintain an asset in a sanitised state, how to decontaminate an asset when there is an onboard COVID-19 case, and considerations for the choice, use and disposal of cleaning and disinfecting products.

Produced from a maritime public-health perspective, the best practices are applicable to commercial and naval vessels, as well as drilling units, production installations and other offshore units.

"Marine and offshore operators face the same challenge globally today. Determining how to protect crews while continuing operations in complex environments with unique requirements, where decontamination is considerably more challenging than for assets on land. For instance, improper application of detergents and disinfectants can degrade

structural materials or weaken coatings designed to protect structures," said Christopher Wiernicki, ABS Chairman, President and Chief Executive Officer. "This guidance builds on ABS' industry safety leadership to give operators confidence that they are doing everything possible to protect their crews and assets. It is yet another example of ABS innovating to find new ways to support the industry during these challenging times."

Rear Admiral Joyce Johnson DO MA US Public Health Service (Ret.), a physician with a 35-year career of senior public-health leadership in civilian and US military sectors, said "ABS has compiled a useful, best-practices publication for mitigating the SARS-COVID-19 virus threat aboard marine and offshore platforms. The sanitisation guidance provided will potentially save lives for people who must live and work at sea."

Response Measures to COVID-19 for the Marine and Offshore Industries is built from a range of independent governmental and commercial sources and is intended to be a consolidation of the best-available information at the time of publication. This guidance reinforces ABS' commitment to safety and the continuity of vital industry operations. Through innovations involving remote surveys and a strengthened focus on shipowner needs, ABS continues its industry support.

The guidance follows the mid-April announcement by ABS subsidiary, ABS Group Consulting, of a Restart Risk Model™ designed to help commercial and public organisations get workers safely back on site following the COVID-19 stay-at-home directives. The easy-to-follow risk-based framework will aid ship owners to maintain their operations with enhanced working practices that address the 'new normal' business environment.

A copy of *Response Measures to COVID-19 for the Marine and Offshore Industries* may be downloaded at

https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/other/314_gnonresponsemeasurescovid19formarineaoffshore/covid-19-gn-may2020.pdf

For more information on the ABS Group Restart Risk Model™, visit www.abs-group.com.

ABS *Press Release,* 26 April 2020

DNV GL wins Class Award at Seatrade Maritime Awards Asia

DNV GL was awarded the first Classification Society Award at Seatrade Maritime Awards Asia 2020 ceremony which took place online on 23 June. The Classification Society Award is one of the seven new categories introduced in this year's event. It recognizes DNV GL's commitment to enhance industry safety, efficiency and reliability through the development of innovative solutions like remote surveys, cyber security, class notation and additive-manufacturing guidelines.

"It's a great honour to receive this award," said Cristina Saenz de Santa Maria, Regional Manager, South East Asia, Pacific & India at DNV GL—Maritime. "The award is an affirmation of our role as a classification society to safeguard life, property and the environment across the maritime supply chain."

DNV GL was also acknowledged for its *Alternative Fuel Insight* platform and the *Maritime Forecast to 2050* publication which supports the industry's transition to a cleaner, less carbon-intensive future.

"As the maritime industry faces major transformations, we will continue to innovate and offer new ways of working to enhance quality, efficiency and safe operations at sea," added Cristina Saenz de Santa Maria.

Seatrade Maritime Awards Asia is a prestigious industry award which recognises and honours the achievements from maritime companies and individuals in Asia. Winners were selected by a judging panel made up of influential maritime and shipping professionals.

DNV GL *Press Release,* 24 June 2020

FROM THE CROWS NEST

Bluebottle Development Continues

The development of the capabilities of Ocius Technology's Bluebottles is continuing in several areas. Among them, Prof. Chun Wang, Head of the School of Mechanical and Manufacturing Engineering at UNSW Sydney, is working with Ocius Technology to develop a conformal radar antenna for the Bluebottles.

"At the moment, their sail is basically a photovoltaic panel; it has no communication device in it. So we are currently working on a new project to integrate a radar communication device into the solar sail. The sail will then be able to not only capture energy from the sun, it will also be able to provide a much more powerful communication tool," said Prof. Wang.

Since the solar sail has such a large surface area. It is an ideal place to integrate a radar antenna, which is what Prof. Wang is working on at the moment.

"We just got a new project. We start now to design and to manufacture and implement a radar device," he said. "So we need to put the receiver device onto the sail; then it can plug into the existing equipment."

[*For further details, refer to the article* Drones at Sea *in the reference*—Ed.]

Create, Engineers Australia journal, June 2020

Ocius Awarded $5.5 million Contract

On Tuesday 16 June, Minister for Defence Industry, the Hon. Melissa Price MP, announced a $5.5 million Defence Innovation Hub (DIH) contract to Ocius Technology to continue developing its autonomous unmanned surface vessels (USVs).

"Defence's partnership with Ocius will continue the development of its innovative Bluebottle vessel, which can conduct advanced maritime surveillance and communicate data in real time," Minister Price said. "This technology could provide the Royal Australian Navy with a unique capability to protect Australia's maritime borders."

Layup for *Beth*, the next-generation Bluebottle
(Photo courtesy Ocius)

"We look forward to working again with DIH, Navy and Thales Australia, as well as demonstrating Bluebottle's persistent maritime-surveillance capability to other agencies and industry partners across Australia." said Robert Dane, founder and CEO of Ocius Technology. "Under this two-year contract, we will deploy five intelligent networked Bluebottles to three different areas of operations doing three different types of jobs."

[*The names of the Bluebottles are* Nemo *(meaning 'no one' in Latin, and after the fish in* Finding Nemo*),* Bruce *(named after Bruce Heggie and Bruce Steber, and the shark in* Finding Nemo*), Bob (named after our previous Chairman, Bob Hawke), and the latest,* Beth *(named after our current Chairman, Mark Bethwaite)* — Robert Dane].

Ocius Update, June 2020

Bluebottle USVs Permitted to Operate Autonomously in Australia's EEZ

Bluebottle *Bob* left the heads at Botany Bay at 1100 on Wednesday 1 July, and arrived at Ulladulla heads at 1500 on Thursday 2 July, a distance of 96 n miles, having averaged 3.4 kn for the voyage.

Bob used 360-degree cameras, radar, Automatic Identification Systems (AIS) and collision-avoidance software to autonomously navigate safely during the voyage, with engineers at our R&D facility at UNSW Campus Randwick and at Charles Darwin University (CDU) Darwin, taking it in turns being the 'human on the loop' supervisors.

Previously, we have escorted USVs out to a 50 n mile[2] AMSA-approved area, 20 n miles off Ulladulla, where we could operate autonomously. However, we are now approved by AMSA to operate *Bob* (and brother *Bruce*) Bluebottles as Domestic Commercial Vessels (DCV) under the Marine Safety (Domestic Commercial Vessel) National Law Act 2012. This means that they are permitted to operate autonomously out to the extent of Australia's Exclusive Economic Zone. We thank AMSA for working with us to achieve this excellent result.

Following this successful trial, *Bob* is heading to Darwin to begin logistics and sea-trial tests before the first new next-generation Bluebottle, *Beth*, arrives in September. This will be followed by four more Bluebottles in 2021, each armed with Thales thin-line sonar arrays, radar, cameras and other sensors, as well as new, larger next-generation keel winches.

Under our new Defence Innovation Hub Contract, in 2021 we will deploy five Bluebottles in an intelligent networked squad to three different Areas of Operations, doing three different types of jobs.

For other news, visit the Ocius website.

Ocius Update, 6 July 2020

Beth, the first of five new next-generation Bluebottle USVs
(Photo courtesy Ocius)

Chief Engineer Lloyd Breckenridge and the first new keel winch, inset showing the Ocius logo on the winch
(Photo courtesy Ocius)

Monte Christo Reborn

Elders of the tribe will know that Ken Warby, the current holder of the world water speed record, was a very successful circuit racer of powerboats for most of his life, and had a massive amount of seat time going fast on the water and winning boat races before he ever started building jet hydroplanes. And not just at local club level either, with Ken winning three NSW State Championships, one after the

other in 1967, 68 and 69, such was his dominance and skill as a driver. The craft in which he achieved such outstanding success was the Lewis 16 ft (4.88 m) skiff *Monte Christo*, powered by a 260 in^3 (4.26 L) V8 engine. However, sadly, Ken had to sell the boat to fund his attempt on the outright world water speed record.

Rhonda Wojcikewycz, a close friend of Ken's son Dave and boat racer herself, in September last year stumbled across *Joker*, one of these now very-rare Lewis 16 ft skiffs hidden away. *Joker* had raced in the same club as Ken and *Monte Christo* in the 1960s, and had been restored by a father-and-son team, both now deceased. Rhonda let Dave know about the boat and he purchased it, did a further restoration, renamed the boat *Monte Christo*, painted it with the original colour scheme and recently presented it to Ken.

Phil Helmore

Ken Warby's *Monte Christo* (ex *Joker*)
(Photo from Longbow website)

WWSR *Spirit 2*

Dave Warby of Warby Motorsport is attempting to break his father Ken's World Water Speed Record in *Spirit of Australia* of 317 mph (511 km/h), in their latest vessel, *Spirit of Australia 2*.

The fabrication of the new horizontal stabiliser for *Spirit of Australia 2* was finished in mid-June by NP Aviation at Bankstown airport, and then mounted on the new vertical stabiliser and sub-frame in Dave's workshop in Newcastle before painting. The team is now looking at late August/early September for return to Blowering Dam to continue chasing down 300 mph (483 km/h).

New horizontal stabiliser for *Spirit* 2 completed by NP Aviation
(Photo from Warby Motorsport website)

Spirit 2's new T-tail
(Photo from Warby Motorsport website)

For more information and photos, visit the Warby Motorsport website at http://warbymotorsport.com/.

Warby Motorsport website

WWSR *Longbow*

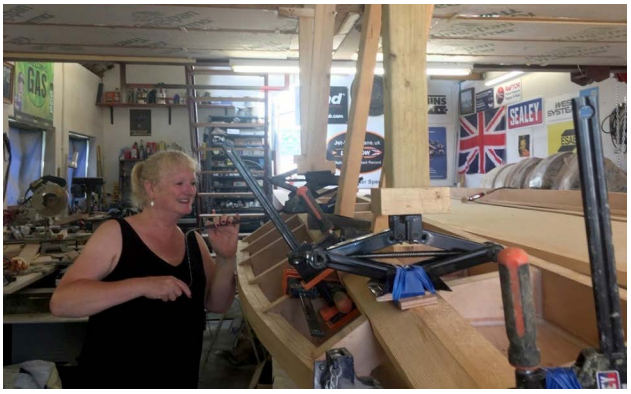
Britain has re-entered the contest for the World Water Speed Record with a new vessel, *Longbow*, having commenced construction in April 2018.

The *Longbow* team has been progressing construction, with arrival of the batteries to start the two Rolls-Royce Viper Mk 535 jet engines, cabling for the batteries from the tender, and setting up of the control panel. Paul Davidson, a gas turbine test-bed engineer, has joined the Longbow venture and his expertise, along with that of their other gas turbine engineers, will be of great assistance with the proper engine start, maintenance and running of the jet engines.

Work is progressing on the control box, control cables and the fitting of gauges, switches, engine start button anf throttle quadrant.

For the hull of *Longbow*, with the newly-formed outer rails of the sponsons in place, the next stage was for the primary cut and shaping of the timber runners on the underside of the sponsons, followed by steam bending of the largest cross-sections that they have attempted to date. The Douglas fir (Oregon pine) timber to form the rear planing shoe on the vessel has recently arrived.

Longbow's sponson outer rails completed
(Photo from Longbow website)



Longbow's port sponson runner steamed and in place
(Photo from Longbow website)

For more information and photos, visit the Longbow website at https://www.jet-hydroplane.uk and click on the News tab.

Longbow website

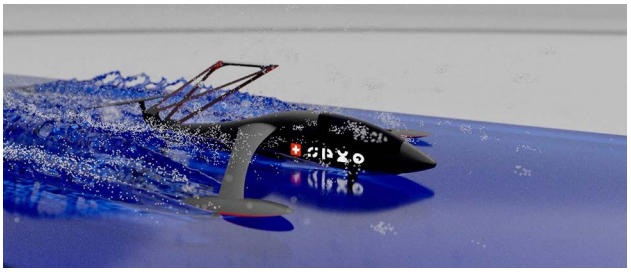
SP80 Aims for World Sailing Speed Record

The world sailing speed record is currently held by Australian Paul Larsen in *Vestas Sailrocket 2* at an average speed of 65.45 kn (121.1 km/h) over the 500 m track. *SP80* is the vessel being designed and built by three young engineering students from the Swiss engineering school École Polytechnique Fédérale de Lausanne (EPFL) to attempt the world sailing speed record in 2022 and take it back to Europe. To achieve their goal they are aiming for a speed of 80 kn (148 km/h) using a boat with shaped hulls, propelled by a the usual kite wing, while the overall stability is achieved via super-ventilating hydrofoils.

The team's enthusiasm for chasing and breaking the world's sailing speed record has started to spread among EPFL's student community as well. Three master's-degree students in mechanical engineering have been inspired to illustrate their lesson on particle-based fluid-mechanics methods within the project, and have worked closely with the *SP80* team and Charles de Sarnez, the fluid team manager. Charles commented that "Having students discover this new method of fluid analysis and apply it to *SP80* is a perfect opportunity for us to further understand the behaviour of the boat at high speed. With particle-based methods, we can visualize the shape of the water spray formed behind the boat at record speeds and this cannot be done in other ways."

For an overall view of the project, visit https://sp80.ch/.

SP80 website



SP80 at speed using particle-based hydrodynamics
(Photo from SP80 website)

Pioneering Spirit

The offshore oil industry is at a critical turning point. Shallow-water oilfields are drying up and, between now and 2050, many hundreds of rigs will be scrapped. In the old days, no-one thought of removing a platform, the whole idea was to keep it at sea for years. Now, from an environmental point of view, platforms have to be decommissioned. Standard oil rigs consist of a steel base fixed to the sea floor. This supports the giant topside, holding the drill rig and the processing plant which can, alone, weigh over 40 000 t.

Dismantling these metal giants is far from easy. The conventional method used a crane on a big barge. However, this has a lot of disadvantages, mainly because you are offshore for a long time, it's a lot of lifting and lifting is always a risk, especially at sea. With so many rigs requiring decommissioning, the industry needed a radical new approach. What they wanted didn't exist, so they had to design something new.

Designed and operated by Swiss-based Allseas Group, *Pioneering Spirit* (originally named *Pieter Schelte*) was built in South Korea by Daewoo Shipbuilding & Marine Engineering (2011–14) at a cost of €2.6 billion and commenced offshore operations in August 2016. The design is of a massive catamaran hullform, featuring a lifting system at its bows for lifting platform topsides up to 48 000 t in a single lift and a lifting system at its stern for lifting steel jackets up to 25 000 t. The design also includes pipelay equipment to handle pipe diameters ranging from 15–175 cm at water depths exceeding 4000 m.

For topside removal, the vessel takes on ballast water, then straddles the payload at the bow. Two sets of eight (one set per bow) retractable motion-compensated horizontal lifting beams are slid under the payload. Once the load is secure, a fast lift system is used to lift the payload up to 2.5 m in 15 s to remove the topsides from the jacket. The vessel then offloads the ballast and can turn around to lift a steel jacket (if used) at the stern, and delivers the unit(s) ashore for dismantling/recycling.

The vessel is also able to install new units, transfer existing units to new sites, and lay pipelines.

Pioneering Spirit is the world's largest vessel, in terms of her gross tonnage (403 342 GT), breadth (123.75 m), and displacement (1 000 000 t).

For further details of this remarkable vessel, see the Wikipedia article at https://en.wikipedia.org/wiki/Pioneering_Spirit_(ship), or watch the YouTube video at https://www.youtube.com/watch?v=v3H87D_fLTM&feature=youtu.be or the fine detail of the removal of the topsides of Shell's Brent Delta platform in the North Sea at https://allseas.com/project/brent-delta-topsides-removal/

Phil Helmore

Pioneering Spirit having removed the 25 000 t topsides from Shell's Brent Bravo concrete gravity platform
(Photo courtesy Allseas)

GENERAL NEWS

Austal Delivers first of two 118 m Trimarans to Fred. Olsen Express

On 7 July 2020 Austal Australia delivered *Bajamar Express* to Fred. Olsen Express at a ceremony held at the Company's shipyard in Henderson, Western Australia.

The 118 m high-speed trimaran ferry is the first of two identical vessels ordered by Fred. Olsen Express in a €126 million ($190 million) contract in October 2017. The second vessel, *Bañaderos Express*, is under construction at Austal Philippines shipyard in Balamban, Cebu, and is scheduled for delivery in the first half of 2021.

Speaking at the delivery ceremony, Austal's Chief Operating Officer, Patrick Gregg, said that *Bajamar Express* was the second trimaran to be delivered to Fred. Olsen Express and the fourth Austal-built vessel to join the Fred. Olsen fleet.

Bajamar Express joins *Benchijigua Express* plus two Austal-built catamarans already operating in the Fred. Olsen fleet, *Bocayna Express* and *Betancuria Express*. When *Bañaderos Express* is delivered in 2021, Fred. Olsen Express will be operating five Austal vessels, including three trimarans."

During sea trials, *Bajamar Express* achieved impressive speed, seakeeping and passenger-comfort results, highlighted by Austal's new Marinelink-Smart technology which provides real-time analysis of vessel performance, on board and remotely. With the benefit of Austal's Motion Control System, *Bajamar Express* was able to reach trial speeds in excess of 44 kn whilst maintaining superior passenger comfort.

Capable of transporting 1100 passengers and 276 cars at a cruising speed of more than 37 kn, the new trimaran ferries for Fred. Olsen Express feature class-leading interior amenities and facilities, including multiple bars, kiosks, a retail shop and children's play area.

Fred. Olsen SA CEO, Andrés Marín, said that *Bajamar Express* was eagerly awaited in the Canary Islands, where the ship will commence operations between Santa Cruz, Tenerife and Agaete, Gran Canaria, immediately upon arrival in August 2020.

"We cannot wait to introduce this fantastic new trimaran to our fleet and offer our customers an enhanced level of service on even more routes in our popular ferry network," Mr Marin said.

"On behalf of the entire Fred. Olsen Express team, I would like to thank the Austal Australia team for their outstanding commitment and shipbuilding capabilities, especially during the COVID-19 pandemic which has affected all of us, around the world."

US Government to Invest in Austal USA Shipbuilding and Maintenance Capacity

On 22 June Austal announced that the United States Government, Department of Defence (DoD), in support of US Navy Shipbuilding Industrial Base, has announced a $US50 million Defence Production Act Title III Agreement (DPA Agreement) with Austal USA. The DPA Agreement will maintain, protect, and expand US Domestic Production of steel shipbuilding capability and capacity through capital

Bajamar Express was recently delivered by Austal to Fred. Olsen Express
(Photo courtesy Austal)

Austal USA's shipyard in Mobile, Alabama
(Photo courtesy Austal).

projects which will be executed over the next 24 months, beginning in June 2020.

The DoD has entered into the agreement with Austal USA as part of the US national response to COVID-19 to maintain, protect, and expand critical domestic shipbuilding and maintenance capacity. The scope of this agreement has still to be defined but, subject to agreement with the DoD, Austal intends to use the funds to commence investment in the development of additional capacity for steel naval vessel construction at the Mobile shipyard.

It is likely that Austal will match the DPA Agreement funding which would take the total investment to about $US100 million. These investments will also have long-term benefits for US Navy shipbuilding while accelerating pandemic recovery efforts in the Gulf Coast region.

Australian-made Steel for Australian Frigates

Australian company BlueScope Steel AIS has signed a contract worth about $2.5 million with ASC Shipbuilding, a subsidiary of BAE Systems Australia, to deliver more than 1500 t of steel plate which will be used to construct five ship blocks in the prototyping phase of the program.

The blocks will then test processes, systems, tools, and facilities prior to construction commencing on the first of nine frigates by end 2022.

Dongara Marine/Southerly Designs selected for new WA Rescue Vessels

Dongara Marine has been selected by Western Australia's Department of Fire and Emergency Services to be on a panel of contractors for the supply of new "fit for purpose" rescue vessels and vessel refit services.

The first confirmed order is for a new 8.3-m rescue craft for Marine Rescue Shark Bay, which is based in Denham, Western Australia.

Designed by the naval architects at its long-standing partner, Southerly Designs, the aluminium-hulled rigid inflatable boat will have foam-filled collars. It features an enclosed cabin with seating for three crew. The cabin is open at the rear, enabling direct access to the work deck, which is sheltered by a fixed canopy.

Propulsion will be by twin 149 kW Yamaha outboard motors, and the comprehensive suite of navigation and communications electronics will include radar, chart plotter, sounder, a forward looking infra-red thermal camera, and underwater cameras.

Fuel-efficient Crayboat *Force of Nature*

Completed by Dongara Marine in late April 2020, some 12 months after contracts were signed, *Force of Nature* is a 22.4 m Southerly Designs monohull which, like other recent Dongara Marine fishing and pilot boat newbuilds, combines an aluminium hull with a composite superstructure. It was delivered to Geraldton-based fisher Dave Perlman.

Onboard facilities meet the AL36-72 specifications in the National Standard for Commercial Vessels (NSCV) enabling the vessel to remain at sea with seven people onboard for up to three days.

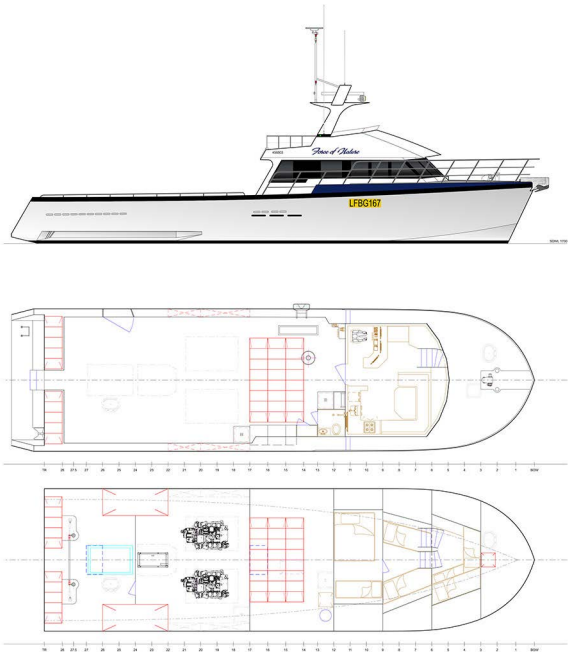
Force of Nature
(Photo courtesy Dongara Marine)

Included within the crew accommodation, which is temperature-controlled throughout, are three dedicated sleeping compartments totalling seven berths, including one queen-size bed. While on some vessels personnel may have to pass through cabins to reach machinery or tanks spaces, on *Force of Nature* this is not necessary. This helps to enhance the ability to rest.

The composite wheelhouse has the helm station aft on the port side, with the galley plus a mess area which exceeds survey seating requirements to starboard. A self-contained shower and head compartment is located on the work deck immediately aft of the wheelhouse and adjacent to the flybridge access.

Twin Scania DI16 076M engines rated for 662 kW at 2300 rpm each drive a fixed-pitch propeller via a ZF gearbox. On trials this combination gave the fishing boat a maximum speed of 24.5 kn and 18.5 kn cruising speed, each about 1.5 kn above expectations. This performance was achieved with the boat's 7500 L fuel tanks full.

Force of Nature is the twelfth new Southerly Designs vessel which Dongara Marine has been involved in constructing in the past five years, and another is close to completion at the boatbuilder's facility in Port Denison.



General Arrangement of *Force of Nature*
(Drawing courtesy Dongara Marine)

Another Recent Dongara Marine Delivery — *Jetwave Nelson Point*

Jetwave Nelson Point is the latest addition to Jetwave Marine's owned-and-operated fleet, which includes nearly 30 specialised commercial vessels including harbour tugs, barges, multi-cats, utility/crew boats, and port-service craft. These cater to the requirements of clients in the oil and gas, and resource industries, Australia-wide.

Designed by Southerly Designs, the 9.8 m aluminium workboat can perform a variety of harbour-service tasks including line handling, crew/personnel transfer, and survey operations. Completed in late May, it went straight to work upon arrival in Port Hedland.

Jetwave Nelson Point
(Photo courtesy Dongara Marine)

For the primary line-handling task, Dongara Marine has fitted the vessel with a towing crucifix rated to 2.5 t. The two crew sit in a covered protective cage forward of this, with a mesh guard aft shielding against potential lines snap-back. The attention paid to minimising the chance of lines getting caught is reflected across the boat in details such as bollards recessed within the bulwarks.

To facilitate crew/personnel transfer operations, fold-down seats for six passengers are integrated into the bulwarks. In addition to handling lines, the flush aft deck with open transom enables the carriage of 2.2 t of deck cargo.

As with the previous vessel, the propulsion package consists of a single 272 kW Yanmar diesel, Twin Disc gearbox, and a HamiltonJet waterjet. A key reason for selecting the HJ322 waterjet was its combination of towing power, cavitation resistance, and high-speed performance.

This was borne out during trials, which confirmed 1.2 t of bollard pull as well as loaded speeds of 29 kn at full power and 26 kn at 85 per cent MCR. Fuel consumption is less than 3 L/n mile, and the boat has a 600 L fuel tank.

Progress with New Patrol Boats for the RAN

On 22 July the Defence Industry Minister, the Hon. Melissa Price MP, officially 'cut metal' on the second of six new Cape-class patrol boats to be constructed by Austal Australia for the Royal Australian Navy (RAN).

The plate cutting of the second vessel follows the award of the $324 million contract for six Cape-class patrol boats, announced on 1 May.

Austal Chief Executive Officer, David Singleton, said that the plate cutting for the second new Cape-class vessel for the RAN was completed less than 12 weeks after the contract announcement.

"With a hot production line, already constructing two Capes for the Trinidad and Tobago Coast Guard, our shipbuilders have quickly progressed to cutting metal on the second of six Capes for the Navy," Mr Singleton said.

"These new Capes for the RAN are helping to boost Australian sovereign shipbuilding capability, through the continued engagement of more than 700 Austal employees here in Western Australia and more than 1000 suppliers, Australia wide."

On 24 July, the project reached a further stage with the keel laying of the first of the new patrol boats.

Australia's Defence Industry Minister The Honourable Melissa Price MP (centre) was joined by RADM Wendy Malcolm CSM, RAN, Head Maritime Systems Division, Capability Acquisition and Sustainment Group (left) and First Assistant Secretary Ships, Capability Acquisition and Sustainment Group, Ms Sheryl Lutz (right) for the Cape-class plate cutting hosted by Austal CEO David Singleton and COO Patrick Gregg (rear) (Photo courtesy Austal)

Based on Austal's proven 58 m aluminium monohull patrol boat design, the new RAN Capes include a number of enhancements which further extend the capability of the vessels and the fleet. Crew accommodation has been increased by 10 people, to now total 32 and 'quality-of-life' provisions have been enhanced, ensuring that those who operate the new Capes have Wi-Fi connectivity to the outside world regardless of the operating environment.

Delivery of the first of six Capes, Hull 811, is scheduled in September 2021 with subsequent deliveries of remaining vessels through to mid-2023.

Australian Gearboxes for Hunter Class?

The Commonwealth Government is moving to create opportunities for Australian industry in its Hunter-class frigate program with a feasibility study launched into locally-manufactured main reduction gearboxes for future Hunter-class frigate batches.

On 13 August The Minister for Defence, Senator the Hon. Linda Reynolds CSC, said that the study will determine the capability and suitability of locally-sourced gearboxes to meet the stringent technical requirements of the program.

"The manufacture of an anti-submarine frigate's main gearbox must meet a very high standard of shock resilience, noise and vibration, which has never been done before in Australia," Minister Reynolds said.

"As we grow Australian industry capacity and skills to support sovereign shipbuilding, this feasibility study demonstrates the Morrison Government's commitment to actively open new opportunities for Australian industry to expand its capacity to support the Hunter-class frigate program.

"This Government does not underestimate the value of Australian industry as a fundamental input to capability.

"Australian industry is proving its ability to produce these gearboxes right here in Australia to enhance our sovereignty."

Austal Starts Construction of Largest Ferry

Austal Philippines has commenced construction of a newly-designed 115 m high-speed vehicle-passenger catamaran for Danish ferry operator Molslinjen, a repeat Austal customer. The new Auto Express 115, to be named *Express 5*, will be

The Royal New Zealand Navy's new 26 000 t, 173.2 m long replenishment ship arriving in Auckland in June. She was commissioed as HMNZS *Aotearoa* on 29 July 2020 and is the largest ship in the RNZN (RNZN photograph)

Australia's third, and last, new air-warfare destroyer built by ASC Shipbuilding in Adelaide, HMAS *Sydney* was commissioned at sea on 19 June. She is seen here in Jervis Bay on the NSW coast after the ceremony (RAN photograph)

the largest ferry (by volume) ever built by Austal and is a further design evolution of the distinctive 109 m high-speed catamaran, *Express 4*, delivered to Molslinjen in January 2019.

Molslinjen's *Express 5* will have capacity for 1610 passengers, space for 450 cars (or 617 lane metres for trucks plus 257 cars) over two vehicle decks and an operating service speed of 37 kn. It is powered by an LNG-capable, medium-speed power plant which offers a powerful yet economic and environmentally-friendly solution. On board, passengers will enjoy leather-appointed reclining seats with USB ports, wi-fi, a full bistro and bars, children's play area and multiple audio-visual screens.

Construction of Austal Hull 423, *Express 5* for Molslinjen of Denmark, has commenced at Austal Philippines (Image courtesy Austal)

The 115 m catamaran was designed by the same Austal Australia team who developed the signature raked-bow hull for Molslinjen's *Express 4* in 2017, and includes Austal's proprietary Motion Control and Marinelink-Smart systems which help deliver a smoother journey for passengers and crew and a more efficient, better performing, 'smart' ship for operators.

Naval Shipbuilding Growth for Australia

The Commonwealth Government is investing an unprecedented $75 billion in Australia's maritime capabilities over the next decade, including more than $50 billion in the regeneration and expansion of the Australian Defence Force (ADF) maritime platforms through the naval shipbuilding enterprise.

This builds on the Government's 2017 Naval Shipbuilding Plan, and will enhance Australia's warfighting capabilities across its operations. As set out in the *Force Structure Plan 2020*, released on 1 July, the Naval Shipbuilding Plan now encompasses over 70 vessels to be built here in Australia, with more opportunities in the future,

The Minister for Defence, Senator the Hon. Linda Reynolds CSC, said that as the future geostrategic environment evolves, so must Defence's plans to grow, update and evolve its naval force.

"For our Navy, the five cornerstones of contemporary naval power — strategic deterrence, sea control, decisive lethality, projection of power ashore and naval presence — remain central to our force design," Minister Reynolds said.

"Through our Naval Shipbuilding Plan we are delivering the ADF with a truly world-class maritime capability to protect maritime trade and the region's security and prosperity.

"Under the Naval Shipbuilding Plan, the Government will invest up to $183 billion in naval shipbuilding between now and the 2050s, through building or upgrading up to 23 different classes of vessels for Navy and Army.

"With 15 000 new Australian jobs set to be created under the 2017 Naval Shipbuilding Plan, this number will now grow even more with new opportunities being created for Australian defence industry to benefit from."

Consistent with this Government's Naval Shipbuilding Plan, Defence will continue with the construction of:

- 12 Attack-class submarines;
- 9 Hunter-class frigates;
- 12 Arafura-class offshore patrol vessels; and
- 21 Guardian-class Pacific patrol boats (six already delivered).

Through the *Force Structure Plan 2020*, the Government will be investing in the following additional shipbuilding programs:

- 6 new Cape-class patrol boats built in Western Australia (already under construction);
- up to 8 new mine countermeasure and hydrographic survey vessels built here in Australia, with consideration for the vessels to be based on the Navy's Arafura-class design;
- 2 new Australian-built multi-role Sea-Lift and Replenishment ships;
- a replacement for the Young Endeavour youth scheme sail training vessel, built in Australia;
- replacements for the Navy landing craft, carried by the LHD;
- a new vessel to support the Pacific Step-Up, built in Australia,
- replacement for ADV *Ocean Protector*;
- a large salvage and repair vessel; and
- Army landing craft and riverine patrol vessels.

Investments in upgrades to the Hobart-class destroyers, Anzac-class frigates and Navy's amphibious ships; the design of the future destroyer; as well as upgrades and life extension to the Collins-class submarines will continue.

In support of Defence's undersea combat and surveillance capability, next-generation systems including large uncrewed submersibles and undersea surveillance vessels are proposed.

To support a larger and expanded fleet, up to $12 billion will be invested in developing the infrastructure necessary to support the capabilities of our naval fleet during construction, operation and sustainment.

This includes expanded undersea warfare facilities, a new Army watercraft base and upgrades to key port and docking facilities.

To sustain our sovereign naval capabilities, the future of maritime sustainment in Australia is set to change, with a new plan to maximise Australian industry capability in defence industry's national supply chain.

The Navy's recently announced Plan Galileo will further lay the foundations for an integrated, consistent approach to maritime sustainment by leveraging the opportunities made available through the Government's Naval Shipbuilding Plan.

Further detail on opportunities for Australia's shipbuilding industry will be included in an update to the Government's Naval Shipbuilding Plan to be released later this year.

Change to Bass Strait Ferry Plans

The TT-Line Company has been advised by the TT-Line Shareholder Ministers that the Tasmanian Government will not proceed with the proposed vessel replacement contract with Finnish shipbuilder Rauma Marine Constructions (RMC) due to COVID-19 and its economic implications for the State.

TT-Line Chairman, Michael Grainger, said that the Government indicated that, given current and emerging economic problems caused by COVID-19, there needed to be more consideration of local content and manufacturing jobs in Tasmania and Australia as part of the overall vessel replacement project.

"The decision is not a reflection of the quality of the business case developed by TT-Line, nor the ability of RMC to deliver the proposed contracts," he said. "It is simply a matter of timing and the unprecedented impact COVID-19 is having, and will have, on state and national economies."

"The Government and TT-Line still believe it is essential that the present vessels are replaced in coming years to support the growing passenger and freight transport needs of the state.

"We therefore look forward to working with the government on the next proposal and business case for its consideration that will further maximise local economic benefits."

Mr Grainger said that the government's decision did not impact the company's decision to move its Victorian port operations from Station Pier, Port Melbourne, to Corio Quay, north of Geelong.

"The company will still relocate by the end of 2022 when the Station Pier lease expires," he said.

The Tasmanian government had supported the company's original vessel replacement business case presented in 2017, and a subsequent recommendation in 2018 to sign a contract with German shipbuilder Flensburger Schiffbau-Gesellschaft (FSG).

More recently, when it was mutually agreed between TT-Line and FSG that FSG would not build the new vessels, TT-Line signed a Memorandum of Understanding with RMC and commenced contract negotiations and agreed final design specifications.

The TT-Line Board submitted an updated business case following a unanimous Board recommendation that TT-Line sign a new ship construction contract with RMC. That recommendation was considered but subsequently not endorsed by the Shareholder Minsters.

Terror from Incat Crowther

Incat Crowther has announce the launch of *Terror*, a monohull landing craft which will be one of two support craft on the polar research ship RRS *Sir David Attenborough*. Built by Exeter Fabrication in Exeter, UK, the vessel packs a lot of functionality into a compact platform.

Terror will play a critical role in the operations of RRS *Sir David Attenborough* which, in addition to its scientific role, will support the resupply of the five Antarctic research stations operated by British Antarctic Survey. *Terror* will transfer food, vehicles, fuel and science equipment to any location where the water is too shallow for the new polar ship to approach.

The working deck accommodates one 20 ft container or two 10 ft containers with twist-lock fittings and additional lashing points. A folding bow ramp and removable vehicle

ramps combine with the shallow forefoot for bow loading, with the vessel being designed to load and accommodate a tele-handler. The Heila HLM10-2S deck crane is capable of lifting loads of 2 t to the cargo deck. A kedge anchor and deck winch further enhance the functionality of the vessel.

The challenge which faced Incat Crowther was fitting all of this capability and performance into a package that fitted the mother ship's available deck space and launching capacity. Meeting the challenge, *Terror* features high capability for her compact size, with a displacement of under 22 t.

An elevated wheelhouse affords excellent visibility and accommodates three crew in addition to the captain. The vessel can carry an additional 12 personnel.

The vessel is powered by twin Doosan L086TIH main engines driving fixed-pitch propellers with robust skegs for protection. The vessel has a service speed of 9 kn.

Incat Crowther is proud to be involved in this project, using the firm's expertise and experience to meet the challenges of such a capable research and logistic vessel.

Principal particulars of *Terror* are

Length OA	14.3 m
Length WL	12.8 m
Beam OA	5.00 m
Depth	2.00 m
Draft (max)	1.10 m
Personnel	12
Crew	4
Fuel oil	1700 L
Deck cargo	16 t
Main engines	2×Doosan L086TIH each 210 kW @ 2100 rpm
Propulsion	2×fixed-pitch propellers
Speed (service)	9 kn
(maximum)	10 kn
Construction	Marine-grade aluminium
Flag	UK
Class/Survey	MCA

Port quarter of *Terror*
(Photo courtesy Incat Crowther)

35 m Crew-transfer Vessels from Incat Crowther

Incat Crowther has announced the contract for a pair of hybrid catamaran crew-transfer vessels, designed in conjunction with Danish shipping company MHO-Co. The Incat Crowther 35s will use modern electric motors to save on weight, space and emissions for the benefit of the environment as well as fuel economy in the offshore wind industry.

The vessels will use a combination of direct drive and electric propulsion for maximum flexibility and significant redundancy. Reductions in emissions will be seen across a range of operating modes, including a zero-emission mode. The newly-developed hybrid propulsion packages are designed in a way which enables them to be adapted at a later state to future eco-friendly power-generation technologies such as hydrogen.

Under construction at Afai Southern Shipyard in Guangzhou, China, the vessels will enter service in mid-2021, operating under contract with Ørsted, where they are scheduled to transport technicians and equipment to the offshore wind farm Hornsea 2 in the North Sea.

"Designing and building hybrid CTVs is a huge step in the environmental direction, and I am proud that we at MHO-Co. have found partners who share our vision for sustainable development in the offshore industry. With these new vessels we still offer some of the largest and most reliable CTVs in the world, and they can be converted to future technologies", said MHO-Co. CEO and founder, Mik Henriksen.

Starboard bow of 35 m crew-transfer vessel
(Image courtesy Incat Crowther)

Bird's-eye view of 35 m crew-transfer vessel
(Image courtesy Incat Crowther)

MHO-Co. has partnered with Incat Crowther to develop the new generation of vessels, following the success of *MHO Gurli* and *MHO Esbjerg*. Incat Crowther's expert knowledge of offshore catamarans will combine with MHO-Co.'s insight and experience with CTVs to result in two unique, state-of-the-art vessels.

Ed Dudson, Managing Director of Incat Crowther Europe,

says "MHO-Co. always push the boundaries when it comes to new vessels in the offshore wind industry. These new 35 m vessels are no different. It's great to be working with Mik and his team again on the latest project, which will really bring hybrid technology to the fore."

The vessels' propulsion systems will be installed by Danfoss' Editron, consisting of permanently-magnetised electric motors which save both weight and space on the CTV while consuming less fuel and giving higher efficiency.

Incat Crowther is proud to collaborate with MHO-Co. on this ground-breaking design, continuing to remain at the forefront of the implementation of modern technology in fast offshore vessels.

Principal particulars of the Incat Crowther 35 m CTVs are

Length OA		34.3 m
Length WL		33.3 m
Beam OA		11.0 m
Depth		4.15 m
Draft	(hull)	1.45 m
	(propellers)	2.05 m
Personnel		24
Crew		8
Fuel oil		62 600 L
		5000 L (day tank)
Fresh water		3500 L
Sullage		2500 L
Main engines		2×Volvo Penta D13
		each 515 kW @ 2250 rpm
Hybrid System		2×Danfoss EM-PMI
		each 550 kW @ 2250 rpm
Generators		5×Danfoss EM-PMI Volvo D8
		each 230 kW @ 1900 rpm
Propulsion		4Volvo IPS 30
Harbour Generator		1×50 kW
Batteries		Corvus 78 kWh
Speed	(maximum)	25 kn
Construction		Marine-grade aluminium
Flag		Denmark
Class/Survey		DNV GL 1A HSLC Crew
		Windfarm R1
Class/Survey		MCA

Inkanyamba from Incat Crowther

Incat Crowther has announced the delivery of *Inkanyamba*, an aluminium 20 m monohull workboat, to the Armaments Corporation of South Africa (ARMSCOR). Built by Cape Town shipbuilder Veecraft Marine, the vessel will be tasked by the South African National Defence Force (SANDF) with the transportation of personnel and equipment, and support training activities in coastal waters up to 10 n miles off the coast under the inclement weather conditions often experienced in the area. The vessel is designed in accordance with BV requirements and in compliance with flag-state rules defined by the South African Maritime Authority (SAMSA) for Category C vessels.

The main deck features a forward deckhouse with wheelhouse above and a generous 25 m^2 aft cargo deck. The modestly-sized deckhouse is fitted with galley and mess areas along with two toilets and a deck locker accessible from the cargo deck. The wheelhouse is arranged for 360-degree visibility, including an unobstructed view of the cargo deck.

The cargo deck is able to accommodate a 6 m ISO container and is also fitted with a 5 t marine crane. A foldable dive platform is fitted aft of the transom along with stairs integrated into the main deck to provide safe access.

Below deck includes two 7.5 m^3 cargo holds with access hatches above, engine room, fuel and water tanks, and overnight accommodation featuring three staterooms for a total capacity of 12 personnel.

Other notable features include a robust fendering system and heavy towing bollards at each end of the vessel.

With a service speed of 15 kn at a substantial deadweight load of 20 t, the vessel is powered by two MAN D2862 LE431 marine engines rated at 551 kW @ 1800 rpm driving Teignbridge fixed-pitch propellers through ZF 2050 gearboxes.

Inkanyamba is the twelfth Incat Crowther vessel built by Veecraft Marine in less than a decade, and further demonstrates the versatility of both organisations to deliver custom solutions tailored to unique and demanding requirements.

Principal particulars of *Inkanyamba* are

Length OA		20.0 m
Length WL		19.4 m
Beam OA		5.50 m
Depth		2.80 m
Draft	(hull)	1.20 m
	(propellers)	1.70 m
Personnel		16 (berths for 12)
Crew		4
Max. deadweight		20 t
Fuel oil		9200 L
Fresh water		2300 L
Sullage		600 L
Main engines		2×MAN D2862 LE431
		each 551 kW @ 1800 rpm
Propulsion		2×fixed-pitch propellers
Generators		1×Kohler 10 kVA @ 1800 rpm
Speed	(service)	15 kn
	(maximum)	18 kn
Construction		Marine-grade aluminium
Flag		South Africa
Class/Survey		BV/SAMSA

Starboard bow of *Inkanyamba*
(Image courtesy Incat Crowther)

Another Incat Crowther 35 for World Heritage Cruises

Incat Crowther has announced that construction is well underway on a new vessel for World Heritage Cruises. The Incat Crowther 35 will be the eighth Incat Crowther vessel for the Tasmanian operator. Under construction at Richardson Devine Marine Constructions in Hobart, the vessel is due to launch by the end of the year. It will draw on the many successful features of World Heritage Cruises' current Incat Crowther 35, *Harbour Master*. This vessel has garnered acclaim for its efficient and stable platform, leading to expressions of interest in purchasing the vessel.

WHC saw this as an opportunity to take their immense knowledge of the operation and build a new vessel which takes the best of *Harbour Master* and improves the package in key areas. The competitive operating environment of Tasmania's World Heritage-listed Gordon River means that the bulk of the improvements fall under the banner of passenger amenity. Primarily, the vessel is 1 m wider to provide greater space, more aisles and smaller groups of seats.

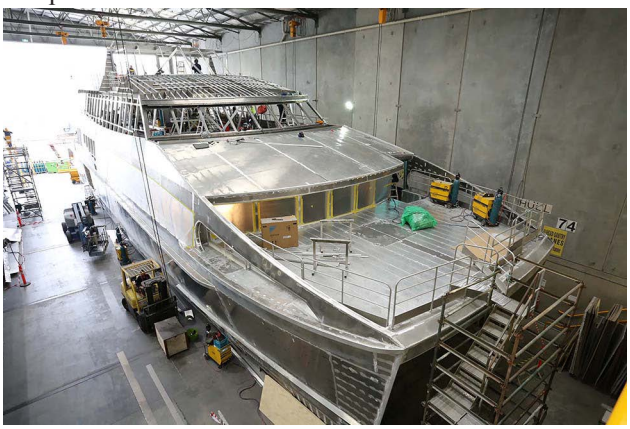
A bar has been added to the mid deck, linked to the main-deck food-preparation space by a dumb waiter. One of the highlights of WHC's tours is the gourmet lunch featuring local produce. To further enhance the offering, main-deck service spaces have been expanded, with the bar and food preparation now separated and a larger serving island installed.

The cabin will be lighter and brighter with deep windows and the absence of the main stair tower, which has been moved aft amongst other obstructions such as bathrooms.

On-board amenity will also be boosted by wi-fi and multiple device-charging options.

The new vessel will be powered by quad Scania DI16 076M main engines. These will drive a quartet of Doen DJ200 water jets. The quad Scania package has proven itself in *Harbour Master*, and the addition of jets will provide an efficient, reliable package with inherent redundancy. The vessel will operate at 25 kn.

Plans are well progressed to optimise *Harbour Master* for its new owners to operate to Rottnest Island, with Incat Crowther's expertise in vessel support coming to the fore. The new owners will take delivery of *Harbour Master* upon completion of the new vessel.



Incat Crowther 35 under construction for World Heritage Cruises at Richardson Devine Marine Constructions in Hobart (Photo courtesy Incat Crowther)

Principal particulars of the new Incat Crowther 35 are

Length OA	36.40 m
Length WL	35.80 m
Length measured	34.95 m
Beam OA	10.00 m
Depth	3.40 m
Draft (hull)	1.15 m
Passengers	220
Crew	6
Fuel oil	7500 L
Fresh water	2500 L
Sullage	6000 L
Main engines	4×Scania DI16 072M each 662 kW @ 2300 rpm
Propulsion	4×Doen DJ200 Waterjets
Generators	2×80 kVA
Speed (service)	25 kn
(maximum)	28 kn
Construction	Marine-grade aluminium
Flag	Australia
Class/Survey	NSCV Fast Craft F2

Stewart Marler

Largest Container Vessel to ever Visit Port Botany

NSW Ports was pleased to welcome the largest-capacity container ship to ever call at Port Botany, with the arrival of the record-breaking vessel *Ural* on 28 June 2020. Capable of carrying 10 662 TEU, *Ural* is almost double the capacity of the typical 5 500 TEU container ships currently visiting the port. The vessel has a length of 299 m and a beam of 48.2 m, and is named after the Ural mountain range which runs from north to south through western Russia, and is one of six currently deployed on the South-East Asia–Australia trade route called the AAX1. The vessel commenced its 42-day round-trip in Port Kalang, Malaysia, calling at Singapore before making its way to Fremantle, Adelaide and Melbourne to call at Port Botany. The vessel was serviced at Patrick Terminals—Sydney AutoStrad, before departing for Brisbane and Tanjung Pelepas, Malaysia, and completing the trip in Port Kalang.

NSW Ports CEO, Marika Calfas said "As Australia's premium container port, Port Botany handles more than 99% of NSW's container volume, 2.6 million TEU per annum, and is inextricably linked to our lives and our lifestyles. "We rely on Port Botany to facilitate the daily trade of everyday goods and critical supplies into our nation, while connecting our exporters with the global marketplace. In fact, nearly half (42%) of all goods in a Sydney household have been imported in a container through Port Botany — everything from food, beverages, footwear and floor coverings to mattresses, paints, fridges, televisions and toys."

Marika says that the arrival of the record-breaking *Ural* demonstrates the resilience of Port Botany, despite the current COVID-19 pandemic. "As an essential service, Port Botany has remained open and operating 24/7 to keep the goods flowing to service the people and businesses of NSW. Ships continue to arrive regularly at Port Botany, carrying supplies including food, beverages, retail and construction goods and manufactured items as well as bulk liquid imports of petrol, LPG and chemicals, with minimal disruption."

Port Botany operates 24/7 and handles 99% of NSW's container volumes (2.6 million TEU) and the bulk of NSW's LPG, fuel and other bulk liquid needs. The port plays a critical social and economic role, delivering $3.7 billion to NSW's economy every year and supporting 25 000 jobs

Port Botany has a natural deep-water shipping channel, 12 container vessel berths, a short transit to and from berth facilities and infrastructure in place to handle ships up to 15 000 TEU today.

For more information on NSW Ports and an analysis of Port Botany's trade statistics throughout the COVID-19 pandemic visit the NSW Ports website.

Media Release, NSW Ports, 28 July 2020

CMA CGM Ural
(Photo from VesselFinder website)

THE INTERNET

RINA Webcasts

RINA has set up a YouTube channel and RINA webcasts can be viewed there. The RINA YouTube channel is at

https://www.youtube.com/channel/UChb1sfHbWfQmG-iwpp_QGJg/videos

Bookmark this website and keep your eye on it!

Video recordings of presentations should be sent to Jim-Ray Semanhiya <jsemanhyia@rina.org.uk> at RINA HQ for uploading.

Branch and Section presentations are shown at the left of the top line. Click on *View full Playlist* to see the list, or click on the search function to the right of *About* in the menu bar, type the title of the presentation you are looking for (or at least the first few words thereof) and press Enter.

Victorian Section Webcasts

The Victorian Section webcasts recorded and uploaded within the last three months are:

- *Domestic Commercial Vessel Surveys in Australia: The Changes in Regulation and Privatisation of Survey*, presented by James Nolan, Naval Architect/Marine Surveyor, Marine Survey Australia, to the Victorian Section of RINA on 13 December 2018 at the Mission to Seafarers in Docklands, Melbourne.
- *Hydrodynamic Design of the Queen Elizabeth-class Aircraft Carriers*, presented by Andrew Harris, Principal Naval Architect with BMT Design and Security, as a webinar using the Zoom software platform on 25 June 2020.
- *Wave-Induced Motions and Loads in Ships using the Smoothed Particle Hydrodynamics Technique,* presented by Bruce Cartwright, Senior Simulation Engineer, Pacific ESI, as a webinar using the Zoom software platform on 1 July 2020.

Further recordings will be added to the RINA YouTube channel as they occur.

Jesse Millar

NSW Section Webcasts

The NSW Section webcasts recorded and uploaded to the RINA YouTube channel within the last three months are:

- *Structural Integrity of Ships,* presented by Bruce Cartwright, Research Associate, University of Newcastle, and Senior Simulation Engineer, Pacific ESI, to a joint meeting with the IMarEST attended by 28 on 4 May 2020 in the Boardroom at Engineers Australia, Chatswood. A slightly updated version of this presentation was presented by Bruce as a webinar using the Zoom software platform on 1 July 2020 for the Victorian Section under the title *Wave-Induced Motions and Loads in Ships using the Smoothed Particle Hydrodynamics Technique*, and you are referred to that recording on the RINA YouTube channel.

Further recordings will be added to the RINA YouTube channel as they occur.

The NSW Section webcasts recorded and uploaded to the Engineers Australia (EA) On Demand website within the last three months are:

- *Design and Construction of the RAN's New Hunter-class Frigates*, presented by Levi Catton, Managing Director/SEA5000 Technical Advisor Ship Integration, Gibbs & Cox Australia, as a webinar hosted by Engineers Australia on 20 May 2020.
- *Investigation of Sediment Transport Processes near Tidal Energy Devices*, presented by Christelle Auguste, PhD Candidate, Australian Maritime College, as a webinar hosted by Engineers Australia on 3 June 2020.
- *RSV* Nuyina*: Australia's New Icebreaking Research and Supply Vessel,* presented by Clive Evans, Maritime Systems Lead—Research Supply Icebreaker Project, Australian Antarctic Division, as a webinar hosted by Engineers Australia on 1 July 2020.

To watch webinars on the EA On Demand website, you must either be a member of EA or have an EA ID (for which you do not need to be a member of EA). To obtain an EA ID (if not a member), go to the website at https://eaondemand.engineersaustralia.org.au/. Click on any Watch Now or Add to Cart button and then the Login button. At the Login screen, click on Create New Account. You will have to give your name, date of birth, address, phone number etc. and your own password. Click Create an Account and you will then receive an email giving you an ID number, and you have to activate the account. You can use that ID to register for any subsequent webinars, and to watch *all* EA recordings on the On Demand website.

In addition, to watch recordings of webinars for free, you must have previously registered for the webinar. This is because the list of registrants is transferred to that recording on the On Demand website, and allows you to watch for free. If you did not register for the webinar, then EA want you to pay $30 to watch!

RINA/IMarEST presentations are on the top line and can be scrolled by clicking the right-arrow on the right-hand side. Alternatively, specific presentations can be located by typing the title (or, at least, the first few words thereof) into the search box and pressing Enter.

Further recordings will be added to the EA On Demand website as they occur.

Phil Helmore

International Hydrofoil Society Celebrates 50th Anniversary

The inaugural meeting of the International Hydrofoil Society (IHS) was held on 20 October 1970 at the Institute of Mechanical Engineers, London.

To mark the 50th anniversary of the society, an on-line celebration will be held throughout the month of October. Presentations will be given on a diverse range of hydrofoil topics from military, commercial, sailing, recreational and human-powered through to foil-assistance and even radio-controlled hydrofoil models. Both current projects and hydrofoil research and development activities, as well as hydrofoil history, will be covered. The schedule for the live (via Zoom) question-and-answer sessions has yet to be finalised; however, presentations are generally being prepared in advance and will progressively be uploaded to the YouTube Hydrofoils channel for the HIS at

https://www.youtube.com/channel/UCHZDDNMvsa9JFi6YcFfrooQ

The schedule for the presentations should become available on the IHS website at www.foils.org closer to October.

Martin Grimm

EDUCATION NEWS

Australian Maritime College

This year marks 40 years since the Australian Maritime College (AMC) was officially opened to provide maritime education and training for Australia's merchant navy and fishing industry. Over these years, AMC has presented 18 334 awards to 14 037 graduates, who are now active and representing AMC across all levels of industry, nationally and internationally. Appropriately, in our 40th anniversary year, this article is intended to provide an update on progress of key 'future-proofing' initiatives related to programs of study and applied research at AMC.

The recent announcement of the Defence and Maritime Innovation Design Precinct (DMIDP) in Northern Tasmania will expand the capabilities of the Australian Maritime College (AMC) and other elements of the University of Tasmania (UTAS) within Launceston and surrounding districts, to meet the growing research and development needs of the Department of Defence and its industry supply chains. The key drivers of this need for the DMIDP are the Naval Shipbuilding Plan and Defence Industrial Capability Plan. AMC's role as the national maritime institute will remain unaffected, ensuring that the needs of both civil and defence maritime industrial sectors are served.

The defence sector has been an important inclusion in the AMC's growth strategy since the release of the Defence White Paper in 2016, and the subsequent Naval Shipbuilding and Defence Industry Capability Plans. AMC is ideally placed to support the workforce-skilling requirements outlined in these plans, predominantly through its Maritime Engineering and Maritime Business and International Logistics academic programs, and in 2017 AMC was invited to become a strategic partner and preferred provider for the Naval Shipbuilding College (NSC). A significant challenge for AMC has been to increase the output of graduate maritime engineers to meet the growing demand from the naval shipbuilding and repair sector, as well as for the maritime industry more broadly, particularly in the naval architecture specialisation. In November of 2019, these challenges and proposed enterprise-level initiatives were included in the AMC submission to the Senate Economics References Committee (ERC) inquiry into developing and delivering Australia's sovereign naval shipbuilding capability. Encouragingly, AMC has seen a 23% increase in domestic student commencing load for the Bachelor of Engineering in 2020, with the overall domestic student load 7% higher than in 2019. While a pleasing result, there remain underlying strategic challenges with career and study attraction if such potential output is to be sustained.

While awaiting outcomes of the ERC inquiry, AMC continues to actively promote maritime engineering careers in collaboration with the NSC, willing industry partners, and peak industry bodies such as Engineers Australia and the Royal Institution of Naval Architects. Another significant industry workforce challenge which AMC is responding to, particularly for the growing Naval Shipbuilding and Repair sector, is upskilling for working professionals. In order to quickly address this challenge, AMC is taking the initial step of promoting its existing postgraduate study programs while pursuing development of content in short-course format, subject to the determination of industry requirements. These courses were specifically developed for the career development of working professionals, including for shore-based seafarers in the sectors of Shipbuilding and Repair and Ports and Shipping, and have some inherent packaging and delivery flexibility. All postgraduate units are available via on-line distance learning, on a full-time or part-time basis, with classes streamed live and recorded for working professionals to undertake at their convenience. Exit points at Graduate Certificate, Graduate Diploma and Master's degree qualification levels exist, and there is also the option for enrolment in one or more individual units.

While at present no avenue exists for unit credit award

and iterative accumulation for academic qualification, the University of Tasmania has recently established a Short Course and Credentials Framework which provides the ability for several existing units to be converted to credentialed, credit-bearing short courses with greater scheduling and delivery flexibility. In an effort to further enhance the value proposition of AMC's postgraduate and future short courses, it has been suggested to the NSC that a Government-funded subsidy scheme might be pursued. The AMC Senate ERC Inquiry submission also suggested a scholarship or bursary scheme for studies related to professions experiencing workforce shortages, potentially including maritime engineers. It is envisaged that this challenge and our responses will also apply to resurgent offshore and marine science sectors, with AMC again well placed, being home to the Blue Economy Cooperative Research Centre (CRC) which was announced in 2019.

With respect to applied research, and in addition to the Blue Economy CRC, a project is underway to establish a Defence and Maritime Innovation and Design Precinct (DMIDP) at Launceston, involving industry collaboration and with AMC at its core. The DMIDP is intended to expand the capability and capacity of AMC to meet the growing capability needs of Defence and Defence Industry; however, it will not be to the detriment of the needs of civil maritime industry e.g. commercial shipbuilding and repair, ports and shipping, offshore resources and renewable energy. It will be physically and functionally blended with AMC to ensure that multi-purpose learning, teaching and research capabilities remain applicable to both defence and civil applications. On 17 April 2019 the Prime Minister announced his Government's decision to support the establishment of the DMIDP and pledged an initial contribution of $30 million to a first stage of development between 2021 and 2024.

Planning and execution of the DMIDP project continues with the commitment to it by Defence highlighted in the recently released Defence Science and Technology's *Strategy 2030: More, together*. An Operational Concept Description (OCD) document, completed and approved within the University of Tasmania in February this year, and endorsed by Defence Science and Technology (DST) as the Defence Project Sponsor, provided the project charter and scope required for approval of the funding grant, and identification of potential supplementary expenditure and priority required from within the University's capital and operational expenditure budgets. During the upcoming design phase the scope, priority and apportionment of budget for each approved inclusion identified in the OCD will be refined, and solutions developed.

The emphasis of the DMIDP Stage 1 is to enhance the existing maritime engineering and hydrodynamics test, experimentation and enabling infrastructure, including technical support services, and integrating the University's capabilities in the thematic research area of human performance and resilience. This aligns with the strategic goal of the Defence Industrial Capability Plan by providing Defence and Australian industry with key elements of the sovereign technical capability needed to design, test and assure that ships and submarines continuously acquired and sustained through the Naval Shipbuilding Plan are operationally ready for service. Stage 1 will create a centre of maritime research excellence with a suite of comprehensive capabilities to complement larger-scale international organisations and reduce reliance on them by DST and Australian industry. Given the potential complexity of large-scale testing and experimentation, the ability to undertake enabling activities at the DMIDP to a high degree of accuracy at small scale is an advantage to DST and Australian industry. These capabilities will create a collaborative environment for visiting and virtual users to directly engage with researchers, industry partners and students, with accessibility to secure networks for Defence and registered Defence Industry Security Program (DISP) users.

Gregor MacFarlane

AMC Partners with Re-Engineering Australia Foundation

Engaging student interest and promoting Life-Long STEM learning is critical to bringing new entrants and new skills to industries like the marine and maritime sector. To achieve this goal, the Australian Maritime College has formed a strategic partnership with Re-Engineering Australia Foundation to support the immersive Subs in Schools national program. The program aims to engage, inspire and educate students, at the earliest ages, around Australia. The partnership will help facilitate collaboration between schools, industry, government and academia as the students become engaged in real-world, in-context activities.

STEM is a methodology designed to integrate the four educational disciplines of science, technology, engineering and mathematics into a learning environment based on real-world applications and real-world problem-solving. STEM is not just about more mathematics and more science but rather a curriculum based on the concept of educating students in an interdisciplinary and applied learning method. STEM education has proven to create more enjoyable learning, catalysing innovation and creating more capable students.

Developing awareness of the opportunities in the growing maritime, defence, marine, offshore, and Australia's continuous naval shipbuilding program is a strategic focus for AMC and the University of Tasmania. Re-Engineering Australia Foundation, in association with the Australian Department of Defence, and many industry stakeholders like the AMC, have developed the Subs in Schools program focused on engaging student interest in the technology of submersible vehicles and submarines and is built on the fundamentals of project-based learning.

Subs in Schools is a high-level STEM project where students have the opportunity to learn about complex engineering systems. Four levels of participation exist within the Subs in Schools program: Mini ROV construction, large ROV design and construction, 3D-spatial design of submarine environments and submarine design and manufacture. Each level is designed to help students explore science, engineering, materials and manufacturing techniques, with increasing levels of complexity.

A fundamental and critical differentiator of Subs in Schools is the requirement for students to work directly

with industry partners in the context of their projects. The tasks faced by the students within Subs in Schools are no less complicated than those faced by engineers working on real marine and maritime projects. The opportunity to collaborate with experts, as a means of solving these problems, will help to develop the communication and collaboration skills of the students.

Both parties look forward to working together to grow the Subs in Schools program across Australia to continue building awareness of the marine and maritime industry opportunities and outlining the study pathways available to students.

University of Newcastle

ARC Linkage Grant for Naval Vessel Corrosion Project

A research team from the University of Newcastle has received $650 000 in funding from the coveted Australian Research Council (ARC) Linkage Project scheme to improve the understanding of the deterioration of ships and maritime structures.

Prof. Rob Melchers, and his team of Prof. Chong Min Song from UNSW Sydney and the two industrial partners, the Defence Science and Technology (DST) and Pacific Engineering Systems International (ESI) were successful recipients of the scheme which is designed to join academic and industrial researchers to undertake new collaborations which will deliver tangible outcomes to Australia. The team will develop a computer-modelling system which simulates the deterioration of vessels that are subject to corrosion, fatigue and extreme ocean conditions.

"In creating this simulation, we will have a better understanding of the lifespan of such vessels, which will help with decision making around potential economic, personnel and other risks involved for ship owners and operators, including the Royal Australian Navy," said Prof. Melchers. "By better predicting the structural response of naval vessels and commercial maritime assets which are subjected to severe environments, this project has the potential for significant defence, commercial, economic and environmental benefits for Australia."

Ship and maritime structures form an important component of Australia's national infrastructure, supply chain and defence interests. Examples include not only naval (military) defence craft such as frigates, patrol boats and submarines, but also offshore oil and gas production facilities.

"For all of these structures, the operational environment and the consequences of corrosion and fatigue are very important aspects for determining maintenance and life extension, both of which have significant economic and safety implications," said Prof. Melchers.

The team of structural engineers, hydrodynamicists, naval architects, fatigue specialist and corrosion specialist will use data records and the operational history of particular vessels, and use information such as weather bureau records (such as storm conditions), to analyse the effects of deterioration and, in particular, corrosion on the welding that such vessels face. By understanding the condition of a vessel, based on their operational history, the modelling will be able to determine the future lifespan of such a vessel.

"This will contribute to more optimal management of the structural integrity of defence vessels, and to the safety, reliability and life-time economics of such vessels, offshore structures, and other maritime assets," said Prof. Melchers.

"The benefit of this will be seen in our national defence preparedness and to both industrial and government end-users in areas such as improved asset functionality and reduced downtime of vessels due to repairs. It will also see safer structures and lower risks to the environment, removing the risk of the potential for vessels to crack, break and cause damage to the marine environment around them."

Deputy Vice-Chancellor (Research and Innovation), Prof. Janet Nelson, said that the project was testament to the quality of Prof. Melchers' research and his reputation as a leading structural engineering academic in Australia. "This project is an example of our University's focus on supporting our region's growing defence industry. Prof. Melcher's world-class research is delivering tangible outcomes to our region, Australia and beyond," said Prof. Nelson.

Professor Melcher's reputation saw the industrial partners approach him with the project seeking his guidance and input, and the project is also a prime example of DST's support of both local universities and local industry.

For further information, please contact Anita Harvey at the University of Newcastle on (02) 4985 4387 or email anita.harvey@newcastle.edu.au.

First Intake of Apprentices for Hunter-class Frigate Program

The first intake of apprentices from South Australia has started work on the Hunter-class frigate program.

On 13 July, the Minister for Defence Industry, the Hon. Melissa Price MP, said that the 18 apprentices will form part of the growing workforce which will build the Royal Australian Navy's nine Hunter-class anti-submarine warfare frigates.

"The apprentices will work in steelwork, mechanical, electrical and technical trades and will have the opportunity to begin their training while also completing school," Minister Price said.

"These young men and women are the future of the National Naval Shipbuilding Enterprise and this intake is an important first step for the Hunter-class frigate program.

"This apprenticeship program complements the work which ASC Shipbuilding is doing with its Diploma of Digital Technology. This is a terrific program which began earlier this year and which teaches the digital technology skills needed to work on the Hunter-class frigates."

ASC Shipbuilding will hire over 500 apprentices throughout the multi-decade Hunter-class frigate program, with a second intake of 22 students to occur later this year.

UNSW Sydney

Undergraduate News

Thesis Topic

Fitri Mahmood, the last UNSW Sydney student to complete coursework for her naval architecture degree, undertook the recently-established Practice Thesis (as opposed to Research Thesis). This was a group project, involving a team of seven thesis students over two ten-week terms. Research Thesis is individual, and is over three ten-weeks terms, but involves the same total units of credit as Practice Thesis.

A Remotely-operable Portable Amphibious Device for Retrieving Water Samples for Analysis

Clean water is not a luxury. It is the foundation of life and is a vital component that is needed for a multitude of everyday applications such as drinking, washing and cooking. Therefore, having access to clean water is a fundamental human right to which everyone should be entitled. Unfortunately, not everyone has access to clean and drinkable water. This is especially true in developing countries which face the ongoing challenge of sourcing, treating and maintaining their water. It is estimated that 80% of the diseases which plague developing countries are linked to poor water quality. It is therefore of utmost importance that different groups work together and focus their efforts on doing what they can to make sure that clean water is accessible to every living organism.

The design brief for this thesis project set the problem as the research, design, and provision of proof-of-concept for a remotely-operable portable amphibious device to retrieve water samples from the environment for chemical analysis. The main objective was to aid organisations in their efforts by providing them with a viable water sampling device which is able to automatically retrieve water samples for analysis.

The group met and decided on a number of functional requirements in addition to the constraints in the design brief. They came up with the in-principle design of a vessel hull, with wheels which could be lowered to allow navigation on land, water sampling into six 500 ml sample bottles, and with radio control and telemetry.

The project was divided into the following areas:

Fitri Mahmood	Watercraft design
Ray Lau	Car component design
Aya Zeidan	Propulsion system
Sriram Ghanta	Water-sampling system — Design and development
Kaunstubh Rane	Water sampling system — Validation
Timothy Davis	Telemetry system, water sensor system and prototyping
James McColl	Navigation and control systems

Fitri designed a catamaran hullform of length 1.5 m (a constraint), allowing the land wheels to be raised and lowered between the hulls. She tried two different hullforms, analysing the hydrostatics and then the resistance in Maxsurf using the slender-body method and choosing the hullform with the lower resistance. She then analysed the stability in Maxsurf for lightship, departure and arrival conditions, and checked the dynamic/directional stability using four analytical methods. This was followed by design of the structure using E-glass for the shell, frames and stringers, and then estimating the manufacturing cost for the hull.

Aya designed the in-water propulsion system. Using CFD, she checked the performance of two-, three- and four-bladed propellers of varying diameter, and selected a three-bladed propeller of the largest diameter which could reasonably be accommodated as giving the best performance.

Overall, the design met the design constraints and most of the functional requirements, with some work needing to be done to meet the remaining requirements.

Graduation

UNSW Sydney's last three naval architecture students have completed all coursework requirements for their degrees, and only have industrial training to complete before graduation. COVID-19 restrictions have provided difficulties in finding placements, but one has successfully completed IT (report to be submitted) and is now employed, while the other two are in the midst of their IT placements.

Phil Helmore

UNSW Canberra

New Naval Architecture Degree

It was announced on 18 August that UNSW Canberra is creating a new naval architecture degree to ensure Australia's future naval shipbuilding needs are being met.

UNSW Canberra Rector, Michael Frater, said that the new Bachelor of Engineering Naval Architecture program will continue UNSW's long history of educating naval architects, but in a refreshed context in Canberra which is responsive to the future needs of the country and, particularly, the Navy.

UNSW has had a long and successful history in delivering Naval Architecture as an engineering discipline on the Kensington Campus (at UNSW Sydney) since 1962 and now it is coming to Canberra.

"This new program is planned to be offered from 2022 and will support the current Defence White Paper, the continuous naval shipbuilding policy and the requisite foundational skills development in the discipline," he said.

"UNSW Canberra has been educating members of the Australian Defence Force for over fifty years, and this program is the next step we are taking in developing capabilities in this important Defence sector."

The Naval Architecture program at UNSW Canberra is planned to run in parallel with Mechanical Engineering for the first two years.

"What this means is that students who satisfy the requirements of the first two years of the Mechanical Engineering four-year degree program, having studied at any Australasian tertiary institution, may be admitted into year 3 of the proposed program leading to the award of a Bachelor of Engineering degree in Naval Architecture," Prof. Frater said.

"This is exciting as it means the very first students who will be admitted to the degree, and form the first graduating class, are already studying and have begun their career towards contributing to this ship design, production, maintenance and operation capability."

A/Prof. Warren Smith will take the initial academic leadership and responsibility as the discipline coordinator for the program. Key academics from Sydney and Canberra will together develop the new curriculum and course offerings. Together, they will consciously be designing and tailoring the degree to meet the needs of tomorrow's Navy and Defence's shipbuilding program.

Commenting on the development, the Minister for Defence, Senator the Hon. Linda Reynolds CSC, said that naval shipbuilding is a key Defence priority for the Government.

"This program will enhance our university sector's ability to support this important industry, by providing world-class education and training to future Navy, Australian Public Service (APS) and defence industry staff," Minister Reynolds said.

"UNSW Canberra's co-location with the Australian Defence Force Academy (ADFA) makes it the ideal place to prepare young Australians for future work in our shipbuilding industry."

Once established, each year the Naval Architecture program will see up to 15 Bachelor of Engineering (Naval Architecture) students at UNSW Canberra undertake a specialised stream of courses in their third and fourth year of study.

The Minister for Defence Industry, the Hon. Melissa Price MP, added that the program would play an important role in ensuring that there is the workforce required for the Government's unprecedented investment in naval shipbuilding.

"Our ambitious shipbuilding plan is creating new jobs and developing new skills, and this program will help ensure that we have the right people for those jobs," Minister Price said.

"At ADFA, our future Navy leaders can combine university education and ongoing military training as they begin their careers as officers in the Australian Defence Force and future careers in the maritime industry.

"For those who want to support naval shipbuilding by working in the APS or in defence industry, there will be opportunities to study alongside future Navy leaders at UNSW Canberra."

The first of two new replenishment ships for the RAN, to replace HMA Ships *Success* and *Sirius*, NUSHIP *Supply* recently completed three days of sea acceptance trials from her builders Navantia. *Supply* is expected to arrive in Western Australia in late September when naval equipment including communications, weapons and the combat system will be fitted. A further period of sea trials will follow (Photo courtesy Navantia)

THE PROFESSION

Survey Matters

Survey Matters is AMSA's e-Newsletter relating to domestic commercial vessel (DCV) survey and is published approximately six times per year. You can request placement on the mailing list by emailing DCV Survey <dcvsurvey@amsa.gov.au>. The e-Newsletter is now also available online at

https://www.amsa.gov.au/news-community/newsletters#collapseArea612

Past editions have now been added to this website.

Items included in the April 2020 e-Newsletter included:

- COVID-19
- Passive fire protection measures
- What is a fire control plan with regard to the AMSA575 Form?
- Using CE documentation for Class 1, 2 and 3 vessels
- Equivalent solutions
- Guidance for renewal survey—internal hull inspection and internal foam buoyancy.

The item on COVID-19 is reproduced below.

Items included in the May 2020 e-Newsletter included:

- Providing MARS codes to surveyors
- Recommendations from the inquiry into the loss of FV *Cassandra* and FV *Dianne*
- Alternate survey processes
- Vessel system changes – transition implications
- EX40 Structural Assessment
- Relationship between plan approval and construction phase surveyors

Phil Helmore

COVID-19

We find ourselves in a new world since the last *Survey Matters*, with many of us working from home and subject to restrictions on movements.

AMSA continues to provide services during this period and has put in place contingency plans to mitigate disruptions to statutory activities.

We acknowledge that it may be difficult to arrange surveys, audits, inspections and service equipment during this period, particularly if travel is required. If you find yourself in these circumstances as a result of COVID-19 restrictions, please contact us directly at dcvsurvey@amsa.gov.au to discuss the circumstances.

At this point in time, following the directions of the Australian Government, we understand that surveys may still occur, whilst still observing social distancing rules in place. However AMSA will consider cases on a case by case basis if a community or vessel cannot be surveyed or facilities are not available.

Survey Matters, April 2020

INDUSTRY NEWS

New Chief Executive for Austal

On 3 June John Rothwell, Chairman of Austal Limited, announced that its Chief Operating Officer, Patrick Gregg, will be promoted to the position of Chief Executive Officer effective from 1 January 2021, following a six-month transition from current Managing Director and CEO, David Singleton.

Mr Gregg possesses significant project management, manufacturing and business experience acquired within the high-technology nuclear defence industry, rail industry and naval shipbuilding industry, including at BAE Systems where he was Project Director for the second-of-class hunter-killer nuclear submarine build.

Mr Singleton will have completed nine years as a director, including five years as CEO, when he completes his term with Austal at the end of this calendar year. He will continue to work closely with Mr Gregg for the next six months to ensure an efficient handover.

Mr Rothwell said that three-and-a-half years ago Patrick Gregg was appointed as COO with a view to him being a natural successor for the CEO role in the future. Since his appointment Austal has set up operations in Vietnam, expanded its operations in the Philippines and won a new Cape-class contract with the Australian Government.

"Our shipyards in Australia, the Philippines, Vietnam and China are working incredibly efficiently while producing quality defence and commercial vessels," Mr Rothwell said.

Patrick Gregg will be promoted to the position of Austal's Chief Executive Officer effective from 1 January 2021
(Photo courtesy Austal)

"That is a reflection of Paddy's drive, commitment and ability to engender similar characteristics from his employees. Those skills and personal qualities made him an ideal choice to take over from David at the end of the year.

"Paddy already possesses a good working relationship with Austal USA President, Craig Perciavalle, and I have no doubt that will continue.

"I would also like to thank David for his contribution to Austal over almost five years as CEO, and before that as a non-executive director, and wish him all the best for the future."

David Singleton said that, after five years overseeing considerable business growth, the time was right to step aside and look for new opportunities.

"Austal is an incredible company producing excellent defence and commercial vessels and support services, delivering strong returns for shareholders," he said.

"After an extended period with the company, the time is now right to hand over to Paddy and explore new challenges."

Patrick Gregg said that he was looking forward to the opportunity as CEO.

"Working as COO at Austal has provided me with an in-depth understanding of the opportunities and challenges that Austal faces. Working with Craig Perciavalle, CFO Greg Jason and the rest of Austal's executive team, I will be focussed on ensuring Austal continues to drive value for our shareholders," he said.

Patrick Gregg has extensive expertise and experience in the maritime defence sector and broader transportation industry, including vast knowledge of the Austal business

As COO, he has been responsible for major strategic investment in Austal's shipbuilding facilities in the Philippines and establishing the new operational shipyard in Vietnam. This has been a key driver behind Austal's strong revenue and earnings growth.

Prior to joining Austal, he most notably served in several senior project manager roles at BAE Systems, which is one of the world's largest defence companies, over a period of 11 years.

While at BAE Systems, he oversaw the successful development and delivery of a nuclear submarine project worth around £1 billion and was a key project manager in a strategic initiative which reduced overhead costs at the company by 31%, i.e. 11% over the original target.

He has also held senior project management roles at Network Rail, which is the owner and infrastructure manager of most of the railway network in Great Britain.

Patrick Gregg holds a Master's of Mechanical and Automotive Engineering (Hons.) from the University of Newcastle-upon-Tyne and a Masters of Business Administration from Warwick Business School.

Contract Extension for DMTC

The Commonwealth Government has signed a $3.9 million contract extension with DMTC Limited which will help put cutting-edge capabilities into the hands of Australia's service men and women.

On 17 August the Minister for Defence Industry, the Hon. Melissa Price MP, said that the contract extension would help build a vibrant and competitive innovation sector within defence industry.

Minister Price said that DMTC had a strong track record of delivering for Defence and industry, from partnering with industry primes and their supply chains in sovereign capability areas, to building research networks and supporting future generations of researchers.

"I had the opportunity to visit DMTC in late 2019 and was impressed by their focus on making a positive impact across the defence and national security sectors," Minister Price said.

"It is partnerships with organisations like DMTC which help Defence identify innovative technologies being developed by Australian businesses."

The contract extension will include $1.65 million for research and development and innovation activities, and $1.1 million to support DMTC's supply-chain development activities, many of which are in regional and remote areas of Australia.

"It is great to see Defence and industry working together to provide opportunities for businesses based in regional Australia," Minister Price said.

DMTC CEO, Dr Mark Hodge, said that DMTC's collaborative model would continue to leverage contributions from industrial partners at all levels of the supply chain and from Australian universities and research organisations.

"Our commitment is firm, and has been since we were established over a decade ago, to generating industrial capability for Australia in areas identified as priorities by Defence," Dr Hodge said.

"Collaboration is about doing real work with shared purpose. That is true of DMTC's collaborations with all our partners from across industry and government."

Critical Subsystems on Future Submarines

Two Australian companies have signed subcontracts for the design of key subsystems in the Attack-class submarine program.

Safran Electronics subcontracted Adelaide-based Acacia Systems and Western-Sydney based Thomas Global Systems for the design of the optronics search and attack, navigation radar and navigation data distribution systems.

The Minister for Defence, Senator the Hon. Linda Reynolds CSC, said that the Government is committed to maximising Australian industry content.

"The signing of these most recent subcontracts is a positive next step in expanding Australian industry involvement in the program as we transition towards detailed design and the construction of the fleet.

"We remain firmly committed to maximising local industry involvement in this nationally-significant program which will deliver a regionally-superior capability for our Navy."

Under the subcontracts, Acacia Systems will deliver prototypes and interface simulators, enabling Lockheed Martin Australia to conduct test activities and validate the integrated performance of the combat system in its Adelaide-based Combat System Architecture Laboratory.

Thomas Global Systems will carry out the design of processing hardware for the optronics masts, navigation radar and navigation data distribution systems.

New Ferries for KiwiRail

The New Zealand transport operator KiwiRail has been provided with $NZ400 million of government funding for the acquisition of two new battery-hybrid rail-enabled ferries.

The new ferries will replace the three existing vessels in the KiwiRail fleet and will be operated by the company's Interislander service on the Cook Strait route.

The new ships are expected to enter service in 2024 and 2025. On 27 May KiwiRail issued a request for proposal to find a preferred shipyard to build the new ferries. An undisclosed naval architecture firm has already begun design work on the vessels.

Naval Group Australia and ASC in Partnership

Naval Group and ASC have partnered to launch their inaugural graduate program, aimed at identifying and training the aspiring engineering professionals of tomorrow.

Engineering graduates will be provided with a unique chance to gain hands-on experience, training and development on the current Collins-class submarines, before being offered the opportunity to apply their new skills to Australia's future submarines

The graduates will be employed by ASC, in Osborne SA, and commence a two-year program which will leverage the combined resources of ASC and Naval Group Australia, providing graduates with access to the brightest and most experienced submarine engineers in Australia.

Leveraging ASC's established and highly-regarded graduate program, graduates will receive a tailored rotation plan across several submarine engineering functions and participate in structured learning and development. They will be supervised by highly-experienced ASC engineers, and receive regular mentoring and reach back into Naval Group Australia.

At the successful completion of the program, the graduates will have the opportunity to transition into a permanent engineering role within Naval Group Australia.

"Making the most of Naval Group Australia and ASC's collective resources and recruitment programs remains a fundamental aspect of ensuring the growth of Australia's submarine industry," said John Davis, CEO, Naval Group Australia.

"Graduates will benefit by having the opportunity to gain hands-on experience with two world-leading organisations," he said. "Practical experience will complement the knowledge they have gained from their academic studies which will boost their career prospects enormously."

ASC's Chief Executive Officer and Managing Director, Stuart Whiley, welcomed the program where graduates will have a unique opportunity to learn from the best Australian and French minds in submarine design, construction and sustainment.

"It's an exciting time for ASC and our people to be working with Naval Group Australia and I'm confident that, in continuing to work together, both Australian sovereign submarine programs will deliver for Australia now and into the future," said Mr Whiley.

Graduates are being sought who currently hold, or will be completing by September 2020, a minimum of a Bachelor of Engineering degree in any of the following disciplines; Electrical/Electronic, Mechanical, Mechatronics, Materials, Structural, Aeronautical or related fields [*naval architects included, hopefully* — Ed.]

World Record Held for 30 Years

Thirty years ago, a ship built in Hobart by Incat Tasmania, *Hoverspeed Great Britain*, challenged for the coveted Hales Trophy which recognises the fastest commercial passenger ship to cross the Atlantic Ocean. The 74 m *Hoverspeed Great Britain* left New York on her Transatlantic Challenge voyage arriving in at Bishop Rock on England's south coast on 23 June 1990. The crossing was achieved in 3 days, 7 hours and 54 minutes.

The previous record had held for 38 years, SS *United States* having taken it out in 1952 after a long list of transatlantic challenges by the great passenger liners over the previous century. Two Incat-built ships have since shaved time off the 1990 transatlantic record, the 91 m catamaran *Catalonia* in June 1998, and another Incat 91 m catamaran *Catlink V* in July 1998. The 2 day 20 hours and 9 minute record set by the Danish *Catlink V* still holds today. It is the first time in the history of transatlantic records (dating back to the 1860s) that three ships to win the trophy in succession had been built by the same shipyard.

Although the records commenced in the 1860s the Hales Trophy was created and first awarded in 1935. The original 1 m high gilded Hales Trophy is on display in Denmark; however, a full replica made in 1990 is on display at Incat Tasmania's shipyard in Hobart.

It is important to understand that the Hales Trophy is awarded to "The ship which shall, for the time being, have crossed the Atlantic Ocean at the highest average speed". So it is not simply a matter of reaching the highest speed momentarily, the right to fly the Blue Riband is a test of endurance as well as speed, the voyage must be without re-fueling. High speed needs to be maintained over the entire crossing, although a ship will naturally be travelling slower at the beginning with a full fuel load and become much faster toward the end of the journey as the heavy fuel load is expended.

The record-breaking Incat ships were fast due to lightweight aluminium construction utilising revolutionary wave-piercing technology with the advantages of low-buoyancy, long and slender hulls in catamaran form. While a long narrow hull will slice through waves rather than ride over them, in large sea conditions they tend to deck dive. The Incat wave-piercer lessens this by including a centre bow, normally clear of the water, which increases buoyancy during these events, thus preventing serious nose-diving at high speed or in high seas.

Catlink V is still in service 22 years after breaking the transatlantic record. Bearing the name *FjordCat,* the ship is operated between Denmark and Norway by the ferry company Fjordline. *Hoverspeed Great Britain* is now owned

by the Greek ferry company SeaJets bearing the name *Seaspeed Jet*. The former *Catalonia*, now *SuperExpress,* is also operating in Greece.

Incat is currently building ferries for clients in Europe and Korea, and is close to completion of a 100 m long ferry, for the Government of Trinidad and Tobago. The ship, *Bucco Reef*, will have capacity for 1000 passengers and 239 cars.

An impression of *Buccoo Reef*, currently under construction by Incat Tasmania
(Image courtesy Incat Tasmania)

Wärtsilä and the Mayflower Autonomous Ship Project

Retracing the voyage of its famous 17th century namesake vessel, the *Mayflower* autonomous ship is set to become one of the world's first fully-autonomous, unmanned vessels to cross the Atlantic. Led by marine research organisation, ProMare, the project is developing autonomous systems which can later be deployed commercially, offering a window into the future of shipping and marine research.

Wärtsilä has joined a global consortium of technology partners which includes IBM. IBM is providing the AI, cloud and edge computing, and power systems behind the *Mayflower's* AI Captain which will enable the vessel to sense, think and make decisions at sea.

The Wärtsilä RS24 system is a ground-breaking high-speed, high-resolution FMCW K-Band radar (24 GHz) designed to provide high levels of situational awareness — especially in densely-populated marine environments. The RS24 radar system will work in tandem with the *Mayflower's* onboard cameras, AIS, and navigational systems as a core part of the AI Captain. The AI Captain constantly evaluates the *Mayflower's* environment and long-term goals, and modifies the ship's course in order to avoid debris and storms which could threaten the ship at sea.

The RS24 is already established as one of the primary sensors onboard the Wärtsilä IntelliTug — the first commercial maritime autonomous surface ship, which underwent successful trials in Port of Singapore waters last year.

The Wärtsilä RS24 has a five times higher resolution than existing marine S and X-band radars with spin cycles of 60 rpm. This enables resolution separation of small craft in crowded waters, especially in close proximity to the vessel, and will allow *Mayflower* to navigate safely in complex situations. By identifying potential hazards, and through fusing data with that from the video recognition and AIS, the Wärtsilä system helps produce a high-fidelity map of the operating area.

Wärtsilä's experience in integrating complex systems, and its know-how in manned and unmanned marine operations, were cited as being of huge importance to the project. The company's Smart Marine approach emphasises the value in collaborating with qualified partners to achieve greater efficiencies throughout the maritime ecosystem. It is anticipated that, when completed, the *Mayflower* voyage will represent a major step forward in bringing autonomous shipping to realisation.

Mayflower will support the development of a flexible and cost-effective platform for oceanographic research. It will also act as a testbed for new navigation software, renewable energy, and propulsion systems for marine vessels.

At 15 m in length and weighing a mere 5 t, *Mayflower* is small and fast. Performing nimble manoeuvres to avoid other ships and marine debris, *Mayflower* will benefit from a highly-responsive short-range radar to help detect and avoid potentially show-stopping objects in the water. Specifically designed to look for potential hazards at close range, up to 1000 m, the Wärtsilä RS24 radar will play a fundamental part in securing safe passage as she traverses oceans.

The *Mayflower* project features state-of-the-art technologies, including the Wärtsilä RS24 high-resolution radar system
(Image courtesy IBM)

World's First Full-scale Ammonia Engine Test

Wärtsilä, in close customer cooperation with Knutsen OAS Shipping AS and Repsol, as well as with the Sustainable Energy Catapult Centre, will commence the world's first long-term, full-scale testing of ammonia as a fuel in a marine four-stroke combustion engine. The testing is made possible by a 20 MNOK grant from the Norwegian Research Council through the DEMO 2000 programme.

"This is a great example which illustrates the importance of dedicated petroleum R&D. This DEMO 2000 project is another stepping stone for reaching our ambitious climate targets and it is also aligned with our recently-published hydrogen strategy. We need to develop and use new technologies which reduce emissions. We are very happy to support development work which can lead to increased use of ammonia as a fuel in shipping and in the offshore sector. Know-how from this project will also provide important input to the development of regulations for the use of ammonia and other low-carbon fuels", said Tina Bru, Norwegian Minister of Petroleum and Energy.

Ammonia is promising as a carbon-free fuel for marine applications, in view of the maritime industry's need to

fulfil the International Maritime Organisation's vision of reducing greenhouse gas emissions from shipping by at least 50 percent by 2050. Furthermore, ammonia has huge potential for providing green energy to remote power systems, such as offshore installations on the Norwegian continental shelf.

Development work by Wärtsilä, as it prepares for the use of ammonia as a fuel, continues with this testing programme, which will be the world`s first full-scale four-stroke combustion engine test. The project will commence in the Sustainable Energy Catapult Centre's testing facilities at Stord, Norway, during the first quarter of 2021.

"We are really excited to further develop and understand the combustion properties of ammonia as a carbon-free fuel in one of our multi-fuel engines", said Egil Hystad, General Manager, Market Innovation, at Wärtsilä Marine Business.

"Ammonia storage and supply systems will be designed and developed for maximum personal safety, and in parallel with the Fuel Gas Handling System under development as part of the EU project ShipFC. This project is coordinated by NCE Maritime CleanTech, and it involves an ammonia-driven fuel cell which will be tested on the Eidesvik offshore supply vessel, *Viking Energy*", Hystad continues.

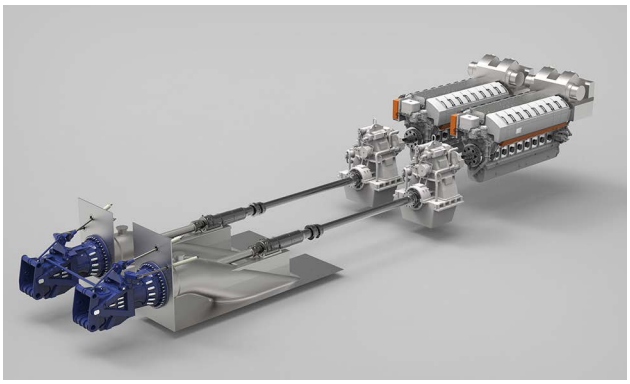
Wärtsilä, as part of its development work on future fuels, has studied the use of ammonia as a future carbon-free fuel through the ZEEDS initiative. The company's first ammonia combustions tests were commenced in Vaasa, Finland, in winter 2020, and will continue with this long-term testing at the Sustainable Energy Catapult Centre facilities in Stord.

"We are extremely pleased to be part of this project which will prove for the industry the robustness of ammonia as fuel. The project confirms our test facilities' and Norway's leading position within the testing and development of solutions for the use of maritime carbon-free fuels", said Willie Wågen, CEO of Sustainable Energy Catapult Centre. The centre is part of the Norwegian Catapult programme which facilitates a national infrastructure for innovation. The programme is run by SIVA in close cooperation with Innovation Norway and the Norwegian Research Council and financed by the Norwegian Ministry of Trade, Industry and Fisheries.

The full-scale fuel testing programme can pave the way for ammonia engines to be used in real vessel operations within a few years, and several shipowners have shown interest in this possibility. It will also provide important insights into the long-term effect of an ammonia-fuelled engine in relation to other systems and components in a vessel, including the required safety measures.

Wärtsilä High-efficiency Propulsion Solutions for Austal's High-speed ferry

Wärtsilä will provide the propulsion solutions for a new 115 m long high-speed ferry being built by Austal at the Australian shipbuilder's yard in the Philippines for Danish operator Molslinjen. It will feature four Wärtsilä 31 engines, recognised by Guinness World Records as being the world's most efficient four-stroke diesel engine, and four high-performance Wärtsilä WXJ1500SRI waterjets. Wärtsilä will also supply its state-of-the-art ProTouch bridge controls system. The order with Wärtsilä was placed in May this year. The Wärtsilä equipment will be delivered to the yard commencing in July 2021, and the ferry is scheduled for delivery in the first quarter of 2022. It will operate on the Molslinjen Bornholm route between Ystad and Rønne in Denmark.



A combination of the 16-cylinder Wärtsilä 31 engines and WXJ1500SRI waterjets, has been selected to provide the power for the new Molslinjen high-speed ferry
(Image courtesy Wärtsilä)

Every ship repairer's worst nightmare — fire in the ship. USS *Bonhomme Richard* on fire in San Diego on 12 July when near the end of a major modernisation refit
(US Navy photograph)

PACIFIC NEWS

Following my appointment by the Institution's (London) Council as Pacific Region Vice-President, this column is intended to be a regular feature to extend the relevance of this journal to members in the island countries of the South Pacific. New Zealand is not intended to be covered as the New Zealand Division has its own publication corresponding to this journal.

Since Australian and New Zealand members are already represented on RINA's London-based Council, it is up to one or more members from the Pacific island nations to put their hands up for election to that Council. For the meantime, I will attempt to represent them as an existing elected Council member, but will need regular information from Pacific island members on matters of concern to them with regard to both RINA activities and developments in the maritime industry.

I see the Pacific Region Vice-President role as including promotion of RINA activities and services to members as best I can from my desk in Canberra, given that the role doesn't carry a budget allocation that would permit more personal contact.

I have personally contacted all members in Pacific island nations outside of Australia and New Zealand, who will be emailed a link to bring their attention each new issue of this journal.

For this column to succeed as intended, it will be dependent upon contributions from those living and/or working in the Pacific Region. Members are invited to forward to me any suggestions of news items.

One such item is a recent presentation on *The Establishment of a Zero-waste Coconut Harvesting and Processing Operation in Micronesia* by Trevor Dove of BMT to a technical meeting of the ACT Section. Trevor described a project which BMT has been running since 2017 for Vital PetroCorp of the Federated States of Micronesia on the shipping part of establishing a coconut collection and processing system for a sustainable coconut products export industry handling an estimated 120 000 coconuts per day from multiple islands. BMT's role has been to deliver engineering analysis, acquisition support, vessel support and port logistic management services to the project, ensuring that the marine capability to deliver such an operation is in place. This presentation touched on the more general subject of the contributions to be made to economic development of Pacific island nations by shipping and indeed naval architects.

Another matter which needs to be given regular attention is the safety of shipping services in the Pacific, namely with passenger ferries such as relate to the tragedies with inter-island passenger ferries *Princess Ashika* (Fiji), *Rabaul Queen* (PNG — I was involved in the investigation) and *Butiraoi* (Kiribati). I note that the *Butiraoi* Commission of Inquiry made a number of recommendations with regard to the design, construction, maintenance and operation of vessels in Kiribati. One recommendation of particular interest was that there should be a qualified naval architect in Kiribati — this might not be easily implemented from a business perspective, but we will see what can be done to help in this regard.

Other issues that have come to my attention through articles by Alison Newell and Peter Nuttall in the *Fiji Sun* newspaper over recent months include, in no particular order:

- on-going concern throughout the region of the effect of climate change on Pacific island nations and the possible costs and benefits to the Pacific if a global carbon tax were to be imposed on shipping;
- the shape of cruising tourism in the Pacific in a post-COVID-19 and climate change environment;
- the economic priorities for shipping and trading in shaping the future of Pacific island nations emerging from COVID-19; and
- a suggestion that, if local industry was suitably prepared, the expenditure on the Pacific Guardian-class patrol boats could have been more effectively allocated to build a sustainable maritime support industry inside the region.

Any discussion or contributions on these or other subjects relating to the region should be directed to me at robincgehling@iinet.net.au or, alternatively, through letters to the Editor of this journal. I trust that the response is such that this is the first of many columns in future issues.

Rob Gehling

THE AUSTRALIAN NAVAL ARCHITECT

Contributions from RINA members for
The Australian Naval Architect
are most welcome

Material can be sent by email or hard copy. Contributions sent by email can be in any common word-processor format, but please use a minimum of formatting — it all has to be removed or simplified before layout.

Photographs and figures should be sent as separate files (not embedded) with a minimum resolution of 200 dpi. A resolution of 300 dpi is preferred.

VALE

Ross Hawke

It is with sadness that *The ANA* records the closure of an era of Australian shipbuilding with the passing of Ross Gower Hawke on 11 June 2020, aged 96 years. Ross was the last General Manager of the Whyalla Shipbuilding and Engineering Works before its closure. Having joined the shipyard in 1940, when the keel of the yard's first ship (HMAS *Whyalla*) was laid, his career included the entire life of that shipyard.

Ross was born on 25 July 1923 at Ashfield, NSW, to mother Grace and father Fred, an engineer. The family subsequently moved to South Australia where Fred worked on building the new railway bridge at Murray Bridge. After completing his Leaving Certificate at Adelaide Boys High School, Ross joined BHP's Adelaide office in March 1940 before moving to Whyalla as a junior clerk. He soon won an engineering traineeship commencing in 1941, becoming a junior draftsman in the Whyalla Shipbuilding and Engineering Works' drawing office and studying part-time towards his naval architecture qualifications at the Whyalla campus of the SA School of Mines (now part of the University of SA). He rose through the positions of Design Draftsman, Assistant Chief Draftsman and Chief Draftsman to be appointed Executive Officer (Technical) in 1961, about the time that the shipyard moved to all-welded construction. From 1966 to 1976 he was effectively Assistant General Manager under various titles, and then succeeded D.J. (Jock) Dalziel (pronounced "D-L") as General Manager until early 1978.

Dalziel and Hawke effectively worked as a team in managing the shipyard in its latter years. Among the yard's achievements which followed Ross' appointment as Chief Draftsman were:

- *P.J. Adams*, a 33 000 dwt oil tanker for Ampol, launched January 1962 and completed October 1962
- *Wollongong* and *Mittagong*, 16 600 dwt bulk carriers for Bulkships
- *Musgrave Range* and *Gerringong*, 21 700 dwt bulk carriers for ANL and Bulkships
- *Seaway King* and *Seaway Queen*, 3250 dwt ro-ro cargo ships for Union Steam Ship Co.
- *Darling River, Yarra River, Bogong, Iron Hunter* and *Clutha Oceanic*, 50–55 000 dwt bulk carriers for ANL, Bulkships, BHP and Clutha Developments
- *Cellana, Mobil Australis and W.M. Leonard*, 22–26 000 dwt oil product tankers for Shell, Mobil and Ampol
- *Ocean Digger*, a semi-submersible drilling rig for Ocean Drilling & Exploration
- *Kanimbla* and *Manoora*, 10 600 dwt cellular containerships for Associated Steamships (who had recently built the world's first purpose-built containership, *Kooringa,* in Newcastle)
- *Clutha Capricorn*, an 83 000 dwt bulk carrier for Clutha Developments
- *Amanda Miller* and *Arthur Phillip*, 67 000 dwt oil tankers for R.W. Miller and Botany Bay Tankers

Ross Hawke
(Photo courtesy Bruce Hawke)

- *Iron Monarch* and *Iron Duke*, 14 600 dwt gas turbine-powered ro-ro steel products carriers for BHP
- *Seaway Prince* and *Seaway Princess*, 5500 dwt gas turbine electric-powered ro-ro carriers for Union Steam Ship Co.
- *Zincmaster*, a 15 000 dwt ro-ro bulk carrier for Bulkships
- *Union Rotorua* and *Union Rotoiti*, 20 000 dwt gas turbine electric-powered ro-ro container cargo carriers for Union Steam Ship Co.
- *Iron Carpentaria* and *Iron Curtis*, 47 000 dwt gas turbine-powered bulk carriers for BHP

Many of the tankers and bulk carriers in the early part of this list were the largest ships built to date in Australian shipyards; *Clutha Capricorn* retains that record to this day. It is significant that *Ocean Digger* was the only drilling rig built at Whyalla — the complexity and cost of constructing such vessels left the shipyard on a financial knife-edge, as also happened to Evans Deakin and Transfield WA, the other Australian builders which each constructed one — and only one — vessel of this type. Much of *Amanda Miller* had to be re-constructed after a huge fire on the building berth the first time around. But of all of the events associated with the design, construction and completion of all these ships, the launching of *P.J. Adams* in 1962 stands out. As the largest and most high-profile ship built to that date in Australia, nothing happened when the Prime Minister's wife, Dame Pattie Menzies, performed the naming and pressed the launching button. The champagne bottle didn't shatter, and there was a stunned silence until Ross appeared alongside Dame Pattie, armed with a long timber pole with which he managed to reach the champagne bottle and set things in motion, to loud cheers from the assembled crowd and to national media attention.

Ross Hawke (wearing glasses and wielding the pole) saving the day for Dame Pattie Menzies at the launching of *P.J. Adams* (Photo courtesy BHP)

As part of the shipyard's closure he moved to Melbourne to the position of Executive Officer Personnel and Administration in the Minerals Division of BHP until appointed General Manager of BHP Transport, covering not only shipping but also BHP's railways, including those in the Pilbara.

About this time he was a member of Lloyds Register's Australian Advisory Committee, of which he was chairman for a period.

In 1950, Ross married Barbara Herrick, a partnership which lasted 66 years until Barbara passed away in 2016.

Ross was involved in many social, service and community groups in Whyalla. He was in Apex, Lions, the Left Hand Club, Whyalla Golf Club (mainly as social member), Whyalla High School governing council, Chairman of the Whyalla Technical College Council, Secretary of the Central Whyalla Cricket Club, Treasurer of the Whyalla Cricket Association, Patron of the Whyalla Show Society and Whyalla Citizens Band, and member of the mysterious Wongapachuka Club. Barbara was similarly involved in Whyalla community activities.

Ross and Barbara came to really enjoy living in Melbourne, with numerous day trips, restaurants (Jimmy Watsons Wine Bar was a favourite for Friday work lunches) and supporting Carlton in the AFL.

Ross loved to travel. He travelled extensively with BHP, both domestically and internationally, always at the pointy end of the plane. In 1959, he travelled to the UK and Europe for a three-month tour of shipbuilding operations with close friend and work colleague, Ian Butler. There were numerous work-related trips and Barbara went along on several occasions. Later, he and Barbara went on numerous holidays, always meticulously prepared by Ross using travel guides, street directories, atlases and maps in pre-Google days.

In 1982 and with grandchildren beckoning, Ross retired from BHP. He and Barbara returned to Adelaide to live close to where he had grown up, together with time building and enjoying their Aldinga beach retreat. They re-acquainted with friends from the Whyalla years, joined the Pioneers, Probus and Police Clubs, and attended symphony orchestra concerts as well as regularly travelling further afield for holidays.

In retirement, Ross was not finished with shipbuilding as he was commissioned by the Federal Government to produce a report on the Williamstown Naval Dockyard in Victoria in 1982–83. While most of the recommendations of that report were *not* given effect, the privatisation of the dockyard was one that was implemented. Also, in the early 1980s, Ross was called upon following the bankruptcy of Adelaide Ship Construction to manage the completion of the ships on order, under the name of Torrens Shipbuilders.

Over recent years, Ross and Barbara downsized to a Leabrook retirement home. He retained his liking for a lunch and a red wine or two, often with Bob Kretschmer as driver and other Whyalla Shipyard and Steelworks colleagues such as David Woodard, Syd West, Barry Werfel, Geoff Peterson, John Bowman and Peter Allison.

From a RINA perspective, Ross remained a Fellow until he passed away, having been involved in the Whyalla Section and a Vice-President of the then Australian Branch during the 1970s.

Ross is survived by his children Rosemary, Bruce and Jenny, seven grandchildren and eight great-grandchildren. His passing was marked by a private funeral in accordance with COVID-19 restrictions.

I would like to express my appreciation for the information provided by Bruce Hawke, Rosie Guild, Graham Taylor and Ross Stacey to assist in the compilation of this *Vale*.

Rob Gehling

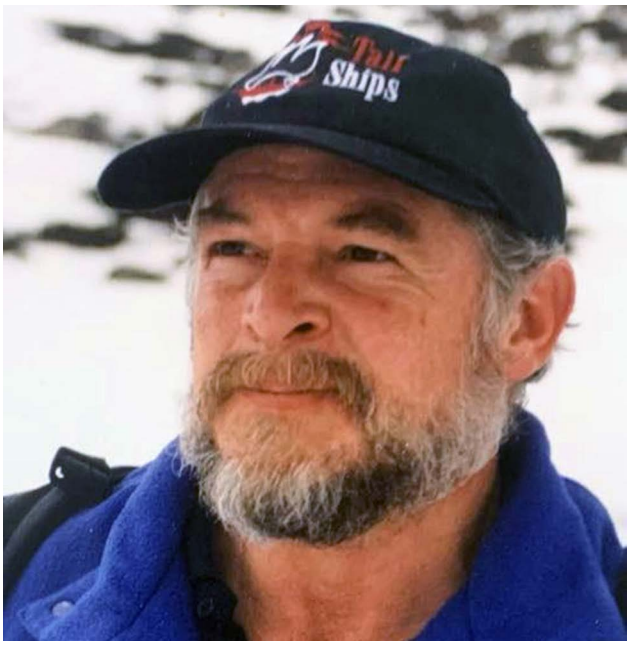
David Magill

It is with sadness that *The ANA* records the passing of David William Magill on 4 July 2020 in Batehaven, NSW.

Dave Magill was born on 19 December 1952 to proud parents David and Noelle Magill at the Royal Women's Hospital in Paddington, Sydney. He was their first child and a big brother to Penny, Margaret and Tim. Noelle survives her son and is with us today.

Dave grew up in Chatswood and attended Shore (Sydney Church of England Grammar) School at North Sydney from 1965 to 1970 along with Adrian Broadbent. Dave was a star winger in the First XV rugby team. They both then studied naval architecture on Defence cadetships at UNSW from 1971 to 1974, graduating (along with Graham Rayner and six others) with Bachelor of Engineering degrees in naval architecture on 5 May 1975.

He commenced work at HMA Naval Dockyard Garden Island, and then with the Navy research base at Rushcutter's



Dave Magill
(Photo courtesy Holly Magill)

Bay for a number of years before taking up a position with the Department of Defence (Navy) in Canberra at Campbell Park offices.

Dave spent his entire career with Defence, mostly in submarines, firstly on the Oberon class and then the Collins class. He was Senior Naval Architect in charge of the Hull Systems Group, Directorate of Fleet Engineering Policy, Fleet Maintenance Branch, in 1985. He moved on to become Assistant Director within the Directorate of Naval Architecture in charge of the Submarine Section from 1987 until 1997 at Campbell Park Offices. In this role he provided design-authority support for the Oberon class and hull-systems support for the Collins project. He then moved on to the Directorate of Submarine Engineering at Russell Offices where he headed its Naval Architecture Section from 1997 until 2006, providing hull-systems support to the Collins class. After the DSME move to Adelaide, Dave remained in Canberra and finished his career in the position of Assistant Director — Submarine Systems, Directorate of Navy Platform Systems. Dave was passionate about submarines and submarine safety, always reminding his staff the importance of "keeping water out of the people tank". He retired from there in 2008, and moved to Batehaven, NSW, where his love of the sea, nature and the mountains gave him the best base within reach of his interests.

Dave was active in RINA affairs on the ACT Section Committee, becoming Deputy Chair from at least 1997 to 2004, and Chair from 2005 to 2007.

Dave married Angela in the Shore Chapel in the grounds of the school in North Sydney. Their union welcomed Dave's two beloved children; son, David Jnr and daughter, Holly. With the passing of time, Holly's two grandchildren, Imogen and Adyson, brought Dave much joy to his life. Angela and Dave have since gone their separate ways but have maintained a friendship.

Dave loved the mountains and was a keen cross-country skier. He was a long-time member of the Brindabella Ski Club and, together with his family, spent many seasons in the Club's lodges in Thredbo and Guthega. He was also Club Captain from 2000–08, organising club championships, Thredbo interclub and Balmain Cup races.

Dave was also a sailor and began his sailing career at Middle Harbour in 16 ft (4.88 m) skiffs and represented NSW at several National titles, sailing with Peter Sorenson in *Tia Maria*. In those days, just to make the NSW skiff team was an achievement. He also sailed three-and-a-half Sydney–Hobart yacht races, the first one in Nick Cassim's *Lolita* in 1972, in Stuart Lees' *Wainunu V* in 1977, and the "half" when a storm forced the yacht he was on to abandon the race and sail into Eden.

He then moved into Lightweight Sharpies. In Canberra as a naval architect, he sailed John Truelove's Sharpie *Serica* at the Canberra Yacht Club. Then, when John went farming, he sailed *Yot* at the ANU Sailing Club and competed in the 1991 series at Middle Harbour in Sydney. It was there that he connected with Chris Ablett who owned *Z* (N694) and invited Dave to go to Hobart with him for the National Sharpie titles, which he did. Although fairly short in stature, Dave took over the trapeze position. They got on well and the next year they put *Subzero* (N840) in the water for the Melbourne Carnival and followed up with *Mr Freeze* (N885) in 2000.

In all, Dave sailed with Chris Ablett for 17 seasons between 1991 and 2007, and was a long-term administrator of both the NSW and National Sharpie Associations. He served as National Secretary from 1999 to 2004 and oversaw a golden era in Sharpie sailing in Australia which included a 98 boat fleet for the National titles in Port Lincoln. He was also NSW Carnival Secretary at the 1997 Carnival at Port Kembla, one of NSW's most successful carnivals, as well as a long-term committee member on the NSW committee. He was made a life member of the NSWSSA in 2008.

In retirement he became a stalwart of the Bateman's Bay Sailing Club, and was co-founder of the Bateman's Bay Sharpie Beach-side Cabin Club. He regularly crewed on the Club's committee boat, *Clarence the Clocker,* from his early days at the Club, taking up the position of Race Officer in 2013, and was still in that position for the Bay Cup Race on 3 March this year! He also became the Club's Safety Auditor, and gave a presentation on Yachting Australia's Special Regulations for Category 4 (offshore racing) and Category 7 (inshore racing) audits at a Safety Day there in September 2016.

Colleagues say that he always had a twinkle in his eye, was fond of a jar or two and had a ready quip for anything that arose in life. He didn't always say much but, when he did, you listened. He was a kind, quiet and modest man who didn't seek attention or applause, he simply got on with the task at hand. He was one of those people who didn't want to lead the parade but, if not for him, the parade wouldn't happen! He was extremely loyal and he will be missed.

Dave is survived by his ex-wife Angela, children David Jnr and Holly, and grandchildren Imogen and Adyson.

Holly Magill, Chris Ablett, Garry Duck, Richard Blavins, Phil Helmore

[*A number of others have also have contributed to this* Vale*, and* The ANA *would like to thank Adrian Broadbent, Graham Rayner and Tim Lyon for their memories* — Ed,]

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on the afternoon of Tuesday 16 June 2020 by tele-conference under the chairmanship of our President, Gordon MacDonald, in Airlie Beach with links to Gold Coast, Sydney, Canberra, Melbourne, Adelaide, Perth and Launceston.

This being the first meeting following the Division's Annual General Meeting, Gordon MacDonald as incoming President began the meeting by welcoming new Council members Yuriy Drobyshevski, Nathan Wallace and Alistair Smith and thanked Prof. Renilson and retiring members Dr Armstrong, Ian Laverock, Karl Slater and Kalevi Savolainen for their service.

Among the items discussed were:

Virtual Meetings

The meeting was conducted using the Institution's Zoom platform, which was also available for Section meetings. In view of the fact that all meetings would need to be virtual for the duration of the COVID-19 pandemic and that this situation removed restrictions on geographic locations of both presenters and participants, Council established a working group to eliminate clashes through coordination of meetings.

Walter Atkinson Award 2020

Following the call for nominations for this Award, Council authorised the establishment of the judging panel with a view to completing the selection process at the September Council meeting.

Indo-Pacific 2022 and IMC2022

Council noted the report that the Indo-Pacific Exhibition had been delayed until May 2022 due to COVID-19 and that the IMC would be similarly postponed. The Organising Committee was scheduled to commence its work in early 2021.

Australian Oil & Gas (AOG) Expo and Conference

Council noted that RINA would most likely conduct a conference at AOG in 2022 and agreed to further consider a strategy for assisting the WA Section in the organisation of that conference.

State Engineer Registration Laws

Noting that registration legislation was in place in Queensland and Victoria which the Institution presumed to cover naval architects, Council was informed of the passage of an Act in NSW directed solely at registration of building and construction engineers.

Next Meeting of Division Council

The next meeting is scheduled for the afternoon of Tuesday 8 or 15 September 2020.

The draft minutes of the meeting are available to Council members on the Council forum, and are available to other members by request to the Secretary.

London Council Working Group on Roles and Capabilities of Naval Architects

As a result of a query by the Division President to the May meeting of the Institution's (London) Council, I was appointed to convene a Working Group on this subject. The President mentions this work in his column in this issue.

The nub of the problem is an apparent perception among industry, employers and the public that, to the extent that these three audiences are aware of the existence of our profession, the skills of naval architects are limited to the design of ships and marine structures. Often no account seems to be taken of the naval architect's knowledge of what goes into engineering a ship and how that knowledge can, and should, be applied to project management, production planning, construction, maintenance and operation.

Discussion in the group has concentrated on the following subjects and what the Institution might do to improve the situation in relation to them:

- developing an accurate summary of the current situation;
- raising the public profile of our profession and the roles and capabilities of naval architects;
- raising the Institution's public profile,
- attracting into our profession the right students who will develop into effective leaders of industry as well as the profession,
- better training for our professionals to take a greater and more meaningful role in the shipbuilding industry and shipbuilding;
- convincing industry to make better use of naval architects and maritime engineers throughout the process of ship construction;
- identifying any attitude problem among naval architects or training shortfall with regard to enabling them to undertake broader roles; and
- any other issues.

These questions were brought to the attention of Division Council at its June meeting.

Any comments from members on these subjects should be forwarded to me by return, as the Working Group is scheduled to make its final report to the October meeting of the Institution's (London) Council.

Rob Gehling
Secretary
ausdiv@rina.org.uk
or phone 0403 221 631

Continuing Professional Development

Continuing Professional Development (CPD) is the systematic maintenance, improvement and broadening of knowledge, understanding and skills, and the development of the personal qualities, necessary to carry out professional and technical duties throughout a member's working life.

Continuing Professional Development will therefore enable the member to:

- Update professional competence, so that practice is fully in line with current requirements.
- Develop personal and management skills.

- Broaden experience leading to new career opportunities.

Continuing Professional Development can be achieved through a range of activities, both in and outside the workplace, which are related to members' careers as professional engineers. The types of activity which contribute towards members' Continuing Professional Development and their obligations as a member of the Royal Institution of Naval Architects are described in the RINA publication *Guidance on Continuing Professional Development* available at www.rina.org.uk/guidance_notes.html.

All Fellows, Members and Associate Members who are in or seeking active work are required to take all reasonable steps to maintain and develop their professional competence and knowledge after election. The Institution requires that members achieve a minimum of 35 hours of CPD activity per annum. However, it is expected that most members will exceed this amount.

The Institution requires that CPD activities should be authenticated either by mentors, employers or the providers of CPD. Some informal learning activities may be self-authenticated. The roles of the mentor, employer and the Institution in assisting members to achieve their CPD are described in the *Guidance* document.

The Institution places an obligation on its members to plan and record their CPD and to produce evidence of their CPD achievement. The Institution may request to see a member's CPD Plan and Record at any time, and when upgrading class of membership.

RINA Council and Committee Members

To keep members up-to-date with who is doing the hard yards on their behalf in Australia, current council, section and committee members are as follows:

Australian Division Council

President	Gordon MacDonald
Vice-president	Violeta Grabovska
Secretary	Rob Gehling
Treasurer	Craig Boulton
Members nominated by Sections	
	Alistair Smith (ACT)
	Cameron Whitten (Qld)
	Adrian Broadbent (NSW)
	Yuriy Drobyshevski (WA)
	Nathan Wallace (Vic)
	Peter Dandy (SA&NT)
	Michael Woodward (Tas)
Members elected or appointed by Council	
	Walid Amin
	Jim Black
	Gerard Engel
	David Gonzales Pastor
	Gordon MacDonald
	Jesse Millar
	Matthew Williamson

AMSA DCV Liaison Working Group

Joint Chairs	Violeta Grabowska and Rob Gehling
Members	10 (names confidential)

ACT Section

Chair	Warren Smith
Deputy Chair	Peter Hayes
Secretary	Lily Webster
Assistant Secretary	
	Alistair Smith
Treasurer	Kristoffer Grande
Nominee to ADC	Alistair Smith
Members	Ray Duggan
	Martin Grimm
	Suzanne Sigalas
	Ahmed Swidan
	Alan Tat

NSW Section

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Editor	Martin Renilson
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	Phil Helmore

The Australian Naval Architect

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Changed contact Details?

Have you changed your contact details within the last three months? If so, then now would be a good time to advise RINA of the change, so that you don't miss out on any of the Head Office publications, *The Australian Naval Architect*, or Section notices.

Please advise RINA London, *and* the Australian Division, *and* your local section:

RINA London		hq@rina.org.uk
Australian Division		
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	Tas	gregorm@amc.edu.au
	Vic	keeganparker@thrustm.com
	WA	rina.westaus@gmail.com

Phil Helmore

NAVAL ARCHITECTS ON THE MOVE

The recent moves of which we are aware are as follows:

Ben Adamson has moved on from Braemar Technical Services (Offshore) and has taken up the position of Shipping and Construction Lawyer with HFW (formerly Holman Fenwick and Willan) in Perth.

Alistair Allan moved on from Defence in 2007 and, after a number of posts, in 2018 started his own consultancy, Albatross Consulting, in Melbourne.

Richard Dunworth has come out of retirement and is back working part-time in the Ship Hydrodynamics Cell in the Navy Technical Bureau of the Department of Defence in Canberra.

Hasan Farazi has moved on within DNV GL and has taken up the position of FIS and CMC Manager in Sydney.

Alex Law has moved on from Incat Crowther and has taken up the position of Senior Naval Architect with BMT Defence & Security Australia in Sydney.

Tim Lilienthal has retired from the Australian Maritime College and is getting used to the pace of life as a retiree.

Alvin Lim has moved on from Sembcorp Marine and has taken up the position of Senior Designer/Naval Architect with Penguin Shipyard International in Singapore.

Wade Limpus continues as Consulting Principal with EML Australia in Sydney.

Magnus Lindgren has moved on within DNV GL and has taken up the position of Principal Surveyor in Oslo, Norway.

Constantine Ling continues as Senior Project Superintendent with Bumi Armada Navigation in Miri, Sarawak, Malaysia.

Jonathan Ling has moved on within Berjaya Dockyard (the family business) and has set up a new dockyard, complete with its own 30 000 dwt dry dock, now taking up the position of Sales Director in Tanjung Manis, Sarawak, Malaysia. Jonathan takes care of all newbuild and repair business, and handles the technical part of projects and yard matters and, in fact, the job scope is pretty wide.

Kate Linley took two years leave of absence from AMSA in 2007 to take up the position of Technical Officer in the International Maritime Organisation secretariat in London, which included acting as Secretary of the DSC (Dangerous Goods, Solid Cargo and Containers) Sub-committee. Returning to AMSA in Adelaide, she has now been promoted to the position of Senior Port Marine Surveyor and Examiner of Masters and Mates.

Anthony Livanos has moved on from Austal and is now consulting as Pelagos Marine in Broome, WA.

James Livesley moved on from AMW Professional Services in 2017 and, after two years at Thales Australia, returned to AMW Professional Services to take up the position of Engineering Manager in Darwin.

Christopher Lloyd-Jones has moved on within the Aveo Group and has now taken up the position of Maintenance Manager in Sydney.

Dougal Loadman has moved on from the Royal Navy and has taken up a position as a naval architect with Babcock in the Devonport Dockyard, UK, mainly doing structural design on various vessels.

Brett Longmuir has moved on from ThyssenKrupp Marine Systems Australia and has taken up the position of Business Development Manager with Australian Maritime Technologies in Melbourne.

James Loram, a recent graduate of the Australian Maritime College, University of Tasmania, has taken up a position as a naval architect in the Ship Structures Cell in the Naval Technical Bureau of the Department of Defence in Canberra.

Cameron Lowry has moved on from KT Maritime Services Australia and has taken up the position of Head of Sales—Ship Repair with Grandweld Shipyards, Dubai, United Arab Emirates.

David Lugg has recently retired from AMSA, and is enjoying the change of pace of life as a retiree. Apart from the usual house and garden maintenance, reading and walking the dog, he is a keen sailor, racing an International 14 (a double-handed development-class dinghy), and is busy fitting a set of hydrofoils to the centreplate.

Max McCann, a recent graduate of UNSW Sydney, has moved on from One2three Naval Architects and has taken up a position as a naval architect with McConaghy Boats in Gosford, NSW.

Robert McConachie has moved on from Rio Tinto and has taken up the position of General Manager Commercial with Coronado Global Resources Inc. in Brisbane.

Gordon MacDonald moved on after a three-week retirement from BMT Design &Technology in 2016 to take up the position of Safety Lead, SEA 5000 Hunter Class Frigate Program Ships Acquisition — Surface Combatants Branch in Melbourne, and has recently added President of the Australian Division of RINA to his portfolio.

Stuart McDonnell has moved on within OMV and has taken up the position of Senior Project Manager—Deepwater Projects in Stavanger, Norway.

Scott McErlane continues as rotation Chief Engineer on the 61 m Feadship luxury motor yacht *Mylin IV*. He also does about five months a year with Pye Barker Fire, and tutors engineering science in the evening once a week in Fort Lauderdale, Florida, USA.

Gregor Macfarlane continues as Manager of the Towing Tank and Model Test Basin at the Australian Maritime College in Launceston, and has recently added Secretary of the Tasmanian Section of RINA to his portfolio.

David McKellar continues as Senior Engineer Sewage Treatment and Receiving Environment with TasWater in New South Wales.

Michael O'Connor has moved on from Naviculus in France and has taken up the position of Design Manager with Taylor Bros in Hobart, and has joined the Tasmanian Section Committee of RINA.

James Rintoul moved on with DT when the company transitioned to AQKA in 2017, maintaining his position of Technical Director in Sydney.

Peter Rout has retired from the Australian National Maritime Museum, and is getting used to the pace of life as a retiree by enjoying his yacht.

Suzanne Sigalas, a recent graduate of the Australian

Maritime College, University of Tasmania, has taken up a position as a naval architect in the Ship Hydromechanics Cell in the Naval Technical Bureau of the Department of Defence in Canberra.

Gianluca Viluce Correa, a recent graduate of UNSW Sydney, has taken up a position as a naval architect with Lightning Naval Architecture in Sydney.

Mal Waugh has moved on from Anzac-class frigate sustainment under the Warship Asset Management Agreement and has taken up the position of Technical Director with the Naval Construction Branch in Henderson, WA, leading a team undertaking build assurance for the Commonwealth, where the first product line under continuous naval shipbuilding is the SEA1180 (Arafura class) Offshore Patrol Vessels.

Lily Webster has moved on from the Ship Structures Cell within the Naval Technical Bureau in the Department of Defence, and has taken up the position of Naval Architect in the Hydromechanics Cell in Canberra.

David Whittaker has moved on from the AWD Project with ASC Shipbuilding and transferred to BAE Systems, currently undertaking the Diploma of Digital Technology program run by Flinders University and TAFE SA at their combined Tonsley site in Adelaide.

Richard Whitaker moved on from several America's Cup teams and, in 2008, joined DOF Subsea in Perth, where he has now taken up the position of Lead Naval Architect.

Malinda Wickramaarachchi continues as a naval architect with Sofraco Engineering in Sydney.

Daniel Wong continues as Managing Director of Fulsail Shipyard and Director of Megalodon Marine in Sibu, Sarawak, Malaysia.

Gabriel Wong continues as Inspection Coordinator for Region Diversified (S) and, in addition, has taken up the position of Naval Architect with Offshore Technology Development in Singapore.

SBLT Isabella Yan, a recent graduate of UNSW Sydney, has completed her Engineering Officer Application Course at HMAS *Cerberus* in Victoria, and has now posted to Training Authority Submarines at HMAS *Stirling* in Western Australia for training as a submariner.

Richard Young moved on from Gradco many moons ago and, after some time with Life Saving Victoria and Gippsland Water, has taken up the position of Shutdown Planner with UGL-ExxonMobil in Sale, Victoria.

Renjie Zhou has moved on from Incat Crowther and has taken up the position of Acceptance Engineer with Birdon Group in Sydney.

This column is intended to keep everyone (and, in particular, the friends you only see occasionally) updated on where you have moved to. It consequently relies on input from everyone. Please advise the editors when you up-anchor and move on to bigger, better or brighter things, or if you know of a move anyone else has made in the last three months. It would also help if you would advise Robin Gehling when your mailing address changes to reduce the number of copies of *The Australian Naval Architect* emulating boomerangs.

Phil Helmore

FROM THE ARCHIVES

A SHIPBUILDING MILESTONE

Trouble with the bottle at the launching of a ship can be a distracting and unwelcome, if minor, event which sometimes gets more attention in the press than the shipbuilder would prefer. In this edition of *The ANA* we recall (on Page 53) the efforts of the late Ross Hawke to free the recalcitrant bottle at the naming by Dame Pattie Menzies and launching of the Ampol tanker *P J Adams* at the Whyalla shipyard on 10 January 1962. Video of the bottle rescue can be found on the Internet [1]. Of course, if something must go wrong at a ship launching, trouble with the bottle is to be greatly preferred over some of the other possibilities.

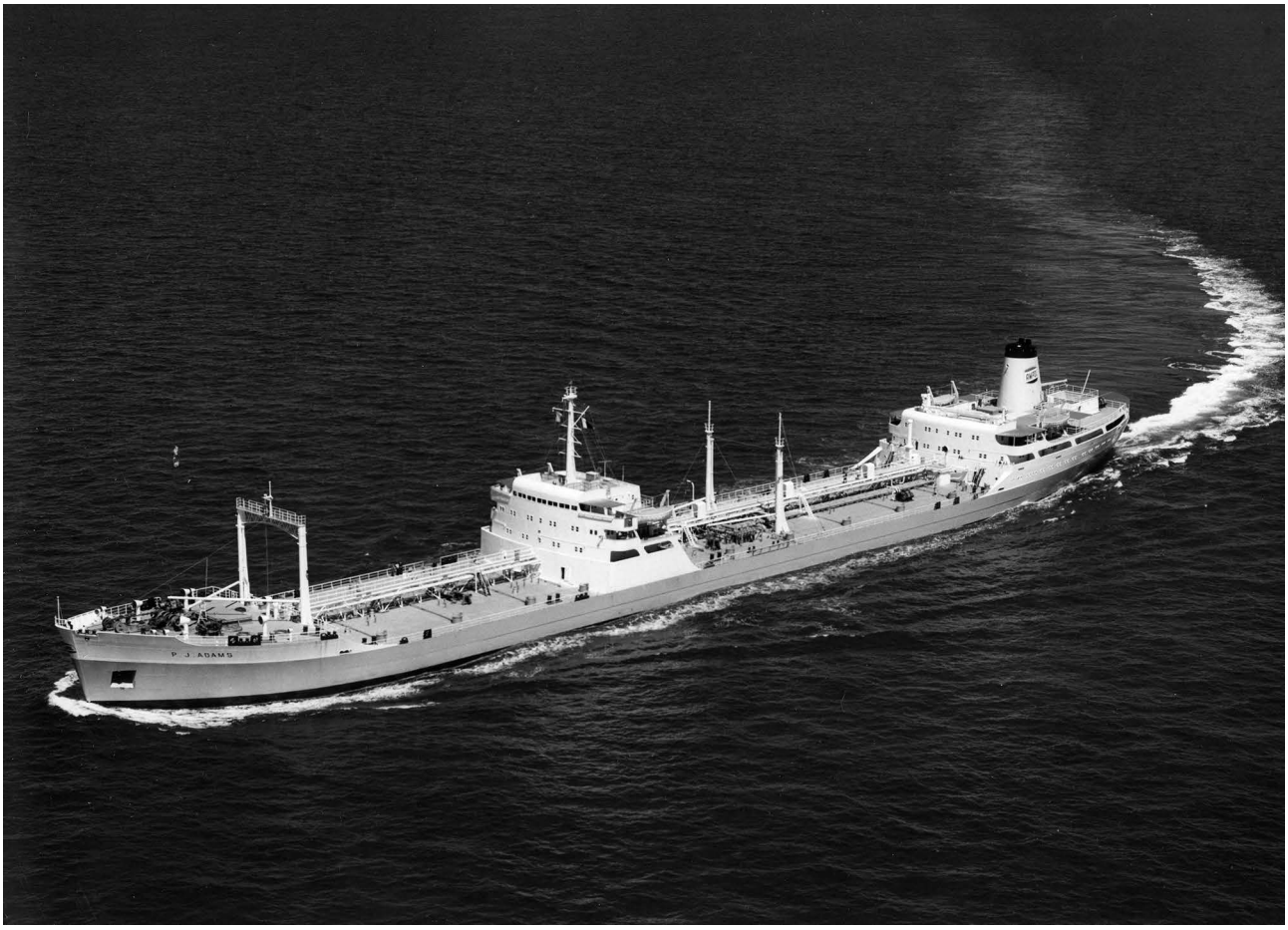
The launching of *P J Adams* was remarkable for a much more important reason. The ship was then the largest ship ever built in Australia. Named for Ampol's Deputy Chairman the ship, of 33 753 t deadweight, was described at the time as a 'super tanker'. Ordered from the BHP shipyard at Whyalla, she was laid down as the yard's Ship No. 35 on 26 April 1960 and completed on 29 October 1962. She was 202.7 m long overall, 26.7 m in beam and was propelled by a Parsons steam turbine on one shaft delivering 9321 kW for a service speed of 16 kn.

The Prime Minister, Sir Robert Menzies, spoke of the ship at length (he often spoke at length) in a public meeting in Whyalla on 24 May 1963.

"The *P J Adams*, the biggest tanker ever built in Australia — and I hope not the last — the *P J Adams* was built by the Broken Hill Proprietary Company at these yards. It meant an enormous development in the yards, it meant enormous employment and it was built when the company [*Ampol* — Ed.] said 'we would like to have it built in Australia. We would like a Commonwealth subsidy.' My Government has been subsidising shipbuilding for coastal business at the rate of 33% for the last seven years. Before that, it was 25%.... And they stipulated, and I quote their precise words: that they would be prepared to have the ship built here, provided the Commonwealth Government agreed that they could register the ship as a British ship at the Port of London.

"Now, to add to this, we having said 'Yes, we will accept this proposition' — we didn't do this in a hurry — we had to balance the impact it might have on the employment of seamen in Australia against the impact it would have on the employment of hundreds, and therefore the livelihood of thousands of people in Whyalla. (Interjector — £4 million) Don't bemuse yourself with millions. You are only imagining them. (Laughter).

"The price was a little over £4 million; we subsidised it to the extent of £1 million. The ship was launched — I was



The new Ampol tanker *P J Adams* on trials in 1962
(J C Jeremy Collection)

there for the launching. It is the greatest single shipbuilding achievement in the history of Australia and when it was launched an agitation began among the seamen, among the more intransigent of the relevant union, and they came to me and they said: 'Look, won't the Commonwealth compel the company to register in Australia? Now, you know, I don't care for this kind of thing. The Government had undertaken with the company that, if the company would build the ship here, even losing something on it, and we subsidised it, we would agree to the company registering it in London because this was the condition on which this job would be done here and I am not in the habit of entering into obligations of that kind and then tearing them up because someone threatens to call a strike" [2].

P J Adams was transferred to the Australian Register in 1966. In 1970 she was rebuilt in Japan. She was lengthened to 245 m overall and the tank configuration was changed. Her deadweight was increased to 56 688 t.

In 1979 the ship was sold to Grace Navigation and renamed *Ocean Freedom*. On 8 August 1980 she arrived at Kaohsiung, Taiwan, for breaking up by Kao Feng Iron & Steel.

John Jeremy

1. www.gettyimages.com.au, video 653276976
2. https://pmtranscripts.pmc.gov.au/sites/default/files/original/00000749_0.pdf

Launching of *P J Adams*
(State Library of South Australia)

The start of the winter sailing season on Sydney Harbour was delayed by COVID-19, but a shortened season was organised by the Sydney yacht clubs. Most races were sailed in very light winds. Here *Zen* (5200N), *KOA* (52152) and *Krakatoa* (8383) tack down wind during the CYCA winter race on 12 July as storm clouds brew in the west. (Photo John Jeremy)