THE AUSTRALIAN NAVAL ARCHITECT

Volume 22 Number 1
February 2018

Wild Oats XI and *LDV Comanche* manoeuvring before the start of the 2017 Rolex Sydney to Hobart Yacht Race.
Both yachts set new records for the race which was sailed in ideal downwind conditions. *LDV Comanche* was awarded line honours after *Wild Oats XI*, first across the line, was penalised for a port-and-starboard incident shortly after the start
(Photo John Jeremy)

THE AUSTRALIAN NAVAL ARCHITECT

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

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Cover Photo:

USS *Coronado* (LCS4) in the Gulf of Thailand in June 2017 during a 14 month deployment in the Pacific.

Austal USA has now delivered six of these novel warships (US Navy photograph)

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From the Division President

As has been the practice in the past, my column in this edition of *The Australian Naval Architect* is also my annual report to the members of the Australian Division.

First, I would like to thank the Secretary, Rob Gehling, and the Treasurer, Craig Boulton, for the considerable work which they have been putting in for the Institution over the years. Both do this work "behind the scenes" and my guess is that most members are not aware of all the time that they dedicate the Institution.

I would also like to thank the Council members, many of whom have been particularly active this year in supporting Division activities.

Senate Enquiry into the Future of Australia's Naval Shipbuilding Industry

In March 2017 the Institution submitted its contribution to the Senate Enquiry into the Future of Australia's Naval Shipbuilding Industry. Copies of this can be obtained from the Secretary.

The Secretary and I then gave oral evidence to the Enquiry in April, which I believe was well received. Of particular interest was the questioning from Senator Xenophon regarding the number of naval architects required to service the expected $89 billion spending on naval construction in Australia. Of course, this question is difficult to answer, but it did show that Australia may be a bit "light on" in naval architects!

Australian Naval Shipbuilding College

This is an extremely interesting development, and one in which I believe that the Institution should be involved.

The Division Council prepared a White Paper on this subject, and the education of maritime engineering professionals in general, which we sent to the Minister for Defence Industry, as well as the Minister for Education and Training. Copies of this can also be obtained from the Secretary.

Apart from a brief acknowledgement from the Minister for Education and Training, we have not had any other replies. This lack of response is quite disappointing, as I do feel that the Institution could really help the Government with such initiatives.

Interaction with AMSA

I am very pleased to be able to report that we have had some positive interaction with AMSA during the year. A number of members have expressed concerns regarding the development of the Single National Jurisdiction, and it is gratifying that AMSA is engaging with the Institution to help to overcome the teething problems associated with the new system.

The Division Council has established an AMSA Liaison Committee, comprising Dr Walid Amin, Craig Boulton, Tom Dearling, Mark Devereaux and myself. We look forward to continuing to work with AMSA in the future, and I welcome any comments from members on difficulties with the system and, in particular, on ways to improve it.

Survey of Membership

During the year the Division Council conducted a survey of all members of the Australian Division to determine what it is that they want from the Institution, what we are doing well, and what we're doing badly. As far as I am aware this is the first time that such a survey has been carried out in the Division.

Martin Renilson

The survey produced some interesting results, including the following:

a) The main benefit of membership was seen to be chartered status, with publications coming second.
b) There was a strong request for more social events and other activities.
c) *The Australian Naval Architect* is very popular, but perhaps there should be more on offshore and marine engineering systems. It was also suggested that a section on recruiting could be added.
d) Engagement with maritime bodies in Australia was seen as a high priority, with AMSA and Defence being specifically mentioned.
e) Some members suggested that they would attend technical meetings more often if times/locations were different, and over 80% of the respondents said that they'd be interested in viewing webcasts of section technical meetings online.
f) There was remarkably little interest in the questions on the website — either it is perfect now, or nobody uses it anyway!

Sections

The section technical meetings are one of the most important activities of the Institution. Of course, these are run by the section committees, but it is the job of the Division to support these Committees as best it can.

Most sections are reasonably active, and hold a number of Technical Meetings throughout the year. The Division Council has approved a change in the way that sections are financed, with funding being determined as a function of the number of members in the Section and the number of technical meetings held. Section committees are being given as much freedom as possible (within the rules) to spend their

funds on things which matter to them most, as each Section has different needs and requirements.

The Division Council has also approved an increased overall allocation to sections for the 2018 year.

I note that some of the sections have started their own LinkedIn groups. This is a very good initiative, and I would encourage other Sections to consider doing it. However, the Institution has rules for such groups, so if any section is planning to start a LinkedIn group please contact the Secretary.

I would urge all sections to keep their web pages up-to-date to maximise use of the information and improve the public image of the Division. Please direct to the Secretary any queries regarding updating.

Networking Events

The annual SMIX Bash, which was held in Sydney just before Christmas, was as successful as ever.

A new networking event, The Victorian Maritime Industry Event, was held for the first time this year. This was very successful, and attracted a wide cross section of people from industry. The format was slightly different to the SMIX Bash, and it included a number of very short "mini-presentations" which were well received.

As one of the outcomes of the survey of the members was the request for more networking events, I would like to encourage other Sections to consider what kind of networking events they could hold.

Online Section Technical Meetings

One of the outcomes of the survey of the members was that over 80% of the respondents said that they would be interested in viewing webcasts of section technical meetings online. Consequently, the Victorian Section has agreed to conduct a trial for a technical meeting soon. This is being funded by the Division Council, as it will be of most benefit to members outside Victoria.

This has been done by the NSW Section in the past, but as technology has moved on since then it was agreed to try it again.

Pacific 2017 International Maritime Conference

The IMC was held in Sydney on 3–5 October 2017. This was very successful indeed, probably the best so far. In addition to providing a strong showcase for the industry and the Institution, we benefit substantially from this financially.

The success of the conference is largely due to the huge effort put in by John Jeremy AM, and his team, including Adrian Broadbent, who chairs the Program Committee.

Industry Mailing List

The Division Council has decided to establish a mailing list of Australian maritime contacts. This will help us considerably to communicate with the many stakeholders in the industry, and help to raise the profile of the Institution in Australia.

Please contact the Secretary if you have details of people or organisations that you feel should be included in this list.

The Australian Naval Architect

Yet again we have had four bumper issues of *The Australian Naval Architect* through the year. This is often cited as being one of the most valuable features of membership of the Australian Division, and we are incredibly indebted to the editors, John Jeremy AM and Phil Helmore. I know that they put a fantastic effort into each edition, and this is greatly appreciated by the membership.

Fortunately, due to the circulation of *The ANA* to most members electronically, and the success that our Advertising Manager, Jesse Millar, has had in attracting advertisements for the journal, the cost of *The ANA* to the Division is minimal. I would like to thank Jesse for the effort that he puts into ensuring that we have sufficient advertising and to the advertisers for continuing to support the journal.

I would also encourage all members to consider advertising in *The ANA*, or for them to persuade their employers and clients to do so. The journal is very widely read throughout the Australian maritime industry, and advertising in it is particularly good value.

Financial Position

The Division remains in a strong financial position. However, although we do have adequate reserves in case of emergencies, it is important to note that our annual grant from Head office generally barely covers our expenses, as I'm sure the Treasurer will comment on in his report to the Annual General Meeting.

I would like to thank the Treasurer, Craig Boulton, for his ongoing extensive efforts in managing our finances. This is no mean task, and I am aware of the effort that he puts into it.

Concluding Remarks

I am pleased to say that the Division is, on the whole, in a very good shape and in a strong financial position. We are making quite a bit of progress with the various strategic initiatives that we have identified, and it is great that a number of members are offering to take leadership roles with many of these.

The Pacific International Maritime Conference has been particularly successful in this year and, again, thanks to the many members who put in a lot of effort to make it so.

We have some very active sections, but there are some which are not perhaps as active as they could be. I know that these sections are working on increasing their activities for next year, and I am hopeful that the change in the rules for funding sections will help with this.

Finally, I'd like to thank members of the Australian Division Council who voted for me to be reappointed for a further two-year term. I look forward to being able to work with the Council over the next two years.

Martin Renilson
President
Australian Division

Editorial

Another summer is rapidly drawing to a close and the pace of 2018 is picking up rapidly. In past weeks we have enjoyed our usual maritime holiday pursuits, the coast being one of the more comfortable places when the temperature hovers in the high thirties and the humidity climbs. Amongst the rituals is watching the start and progress of the Rolex Sydney-to-Hobart yacht race. The start this year was in light conditions, but the drama began with the *Wild Oats XI*/*LDV Comanche* incident — not resolved until after the event with a one hour penalty for *Wild Oats XI*. Non-yachties who cared to comment (and there were plenty) expressed some shock at the penalty but those of us who sail in yacht races all the time know that getting off so lightly is a Sydney to Hobart rule; in normal racing a DSQ would be the likely outcome. Most yachties also know that successfully defending the port tack boat in a port/starboard incident is something of a challenge and unlikely to succeed.

The run to Hobart turned out to be an extraordinary spectacle. The sight of the maxi yachts running downwind at speeds of up to 30 kn was spectacular. Watching the boats diving into seas at that speed made it almost possible to feel the stress in the rigs, not to mention the crews — and these great speeds were achieved in monohulls (some might say large dinghies) — foils are not permitted in the Sydney-to-Hobart (yet).

With foiling monohulls proposed for the next America's Cup series, speed on the water is certainly with us. Foiling Moths have been around for some time to surprise us conventional sailors with their silent speeds. Larger boats are soon to add to the excitement on the water. SuperFoilers, 7.9 m long with 33 m^2 sail area and capable of speeds up to 45 kn are sailing on our waters now.

This year will be a busy one for those in shipbuilding in Australia. The commercial builders have quite good order books and the naval shipbuilders will be preparing for the massive increase in workload as the OPV, future frigate and submarine projects gather momentum. Late last year the Government released a Defence exports policy aimed at encouraging Australian companies to enter the overseas defence market. We have, of course, exported defence equipment for many years, but anything which reduces the complications of the process and which helps specialised suppliers benefit from a larger market will be welcome. I do think, however, that we will have enough to do meeting our own needs for warships in coming years, and that market will remain largely domestic for some time.

This edition of *The Australian Naval Architect* is the 79th edition that Phil Helmore and I have produced in the almost 20 years since we took over the task. How time flies, they seem to come around very quickly.

John Jeremy

LETTER TO THE EDITOR

Dear Sir,

The approach to creating a proposed ship design for a client has stayed the same in the world of naval architecture for decades and, arguably, even hundreds of years. A set of requirements is put forth and a naval architecture team goes ahead to design a ship which meets their client's needs. It then follows that a simple design circle of proposed design, analysis, and modification forms a repetitive spiraling in to a final design. This is the classical point-based design method. While this design spiral has been utilised for years, a new design approach is being developed and used for highly-complex ships.

This new design process, called set-based design, is more adaptable to design requirement changes because an entire design set is created, as opposed to having only one proposed design for a ship at a time. This means that when a ship's speed requirement suddenly increases to be 2 kn higher than the original specification, another design from the design set is pulled out for slight modification instead of starting again from almost nothing in the traditional methodology.

The up-front design set requires more naval architects and engineers to create the group of design concepts for set-based design, but the design circle is never fully repeated as in point design. This set-based design is being applied for different projects by the US Naval Surface Warfare Centre, which is the centre for naval ship research and design in the USA. It is also slowly being introduced to commercial shipbuilding practices as an alternative to point-based design.

Application of set-based design in the Australian market has yet to be seen. However, as Australian designers are experimenting more and more with complex yacht designs, the set-based design approach could be a valuable method for experienced design teams for something like Sydney-to-Hobart racing teams as they rush to make tight deadlines for competition. Set-based design is still just starting to be used in shipbuilding, but could be an extra edge for a team willing to try something new in the highly-competitive yacht-racing world.

Luke Brownlow
UNSW Student

COMING EVENTS

Australian Division AGM

The Annual General Meeting of the Australian Division of RINA will be held on Wednesday 14 March at BMT Design & Technology, Level 5, 99 King Street, Melbourne, Victoria, at 6:00 pm. It will be followed by a meeting of the Victorian Section at which Rob Gehling will give a presentation on *Some Principles for Updating IMO's High Speed Craft Code*.

Formal notice of the AGM will be sent to members by email or post.

NSW Section AGM and Technical Meetings

The Annual General Meeting of the NSW Section of RINA will be held on Wednesday 7 March immediately following the scheduled technical meeting of RINA (NSW Section) and IMarEST (NSW-ACT Branch) at 6:00 for 6:30 pm at Engineers Australia, 8 Thomas St, Chatswood; see notice emailed to NSW Section members.

Technical meetings are generally combined with the NSW-ACT Branch of the IMarEST and held on the first Wednesday of each month at Engineers Australia, 8 Thomas St, Chatswood, starting at 6:00 pm for 6:30 pm and finishing by 8:00 pm.

The program of meetings for the remainder of 2018 (with exceptions noted) is as follows:

7 Mar	Sean Langman, Managing Director, and Belinda Tayler, General Manager Defence and Commercial, Noakes Group *A New Lease of Life for Sydney's Iconic Floating Dock*
7 Mar	NSW Section Annual General Meeting
4 Apr	Fletcher Thompson, PhD candidate at AMC *Robust Mission Planning for AUVs Cooperatively Inspecting Subsea Structures*
2 May	RINA
6 Jun	IMarEST
4 Jul	CMDR Alastair Cooper, Royal Australian Navy *Upgrade or Replace: A Cost Comparison of Australian Warship Service*
1 Aug	IMarEST
5 Sep	IMarEST
3 Oct	Valerio Corniani, Global Marine Segment Manager, Diab *Composite Superstructures on Car Carriers* Royal Prince Alfred Yacht Club, 160 Wolseley Rd, Point Piper
6 Dec	SMIX Bash 2018

HPYD6

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 and 2015 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.

The High Performance Yacht Design Committee has announced that HPYD6 will take place in Auckland, NZ, on 10–13 March 2018 during the stopover of the Volvo Ocean Race.

Due to a lack of high-quality technical abstracts submitted, the HPYD committee has made the decision to change the format of the HPYD6 conference. As such, there will be no publication of papers and no formal conference presentations. Instead, there will be a focus on providing a range of exciting, publicly-accessible presentations and keynote addresses delivered by some of the top designers and engineers involved in the America's Cup and Volvo Ocean Race.

Planning for HPYD7 has already begun. It will coincide with the America's Cup in Auckland in 2021, and will return to a more traditional format with a full complement of papers and speakers.

You can follow HPYD on Facebook, 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; for registrations: registrations@hpyd.org.nz; or for sponsorship opportunities: sponsorship@hpyd.org.nz

Basic Dry Dock Training Course

DM Consulting's Basic Dry Dock Training is a four-day course which covers the fundamentals and calculations of dry docking. The next courses in Australia will be held in October 2018, the date, location and venue TBA.

The course begins with the basics and safety concerns, and progresses through all phases of dry docking: preparation, docking, lay period, and undocking. The course ends with a discussion of accidents and incidents.

It is designed to be relevant to dock masters, docking officers, engineers, naval architects, port engineers and others involved in the dry docking of ships and vessels. The course is presented through classroom lectures, student participation in projects, and practical application exercises. The course addresses the deck-plate level of practical operation needed by the dock operator and the universally-accepted mathematical calculations required to carry out operations in accordance with established sound engineering practices.

"The course was excellent, straight forward and comprehensive. Instruction was great, expected 'death-by-PowerPoint, but was pleasantly surprised. I am better acquainted with dry dock basics after the course and can trust the accuracy of the training based on the extensive experience of the instructors. Thank you! Very informative, very thorough."

Topics to be covered include:

- Basic dry docking community terminology
- Calculations
- Safe dry docking procedures
- Lay period
- Undocking evolutions
- Docking Plans
- Docking and undocking conferences

- Hull boards
- Vessel stability
- Incidents/accidents

Joe Stiglich, the course leader, is a retired naval officer, qualified NAVSEA docking officer and holds a master's degree from MIT in naval architecture and marine engineering. Responsible for over 250 safe docking and undocking operations, he currently runs a series of conference and training courses for personnel involved in all phases of the dry docking industry and acts as a consultant for ship repair companies.

For further information, please see www.drydocktraining.com/.

This training will be held in conjunction with the Australian Shipbuilding and Repair Group (ASRG). Registration and payment may be made directly to ASRG. Contact Liz Hay at liz.hay@asrg.asn.au or call (07) 5597 3550.

NEWS FROM THE SECTIONS

New South Wales

SMIX Bash

The eighteenth SMIX (Sydney Marine Industry Christmas) Bash was held on Thursday 7 December aboard the beautifully-restored *James Craig* alongside Wharf 7, Darling Harbour, from 1730 to 2130. The Bash was organised jointly by the IMarEST (Sydney Branch) and RINA (NSW Section). About 185 guests came from the full spectrum of the marine industry, including naval architects, marine engineers, drafters, boatbuilders, machinery and equipment suppliers, regulators, classifiers, surveyors, operators, managers, pilots, navigators, researchers, and educators. Equally importantly, the full spectrum of age groups was represented, from present students to the elders of the marine community.

James Craig at her Wharf 7 berth, with the registration desk in action
(Photo Phil Helmore)

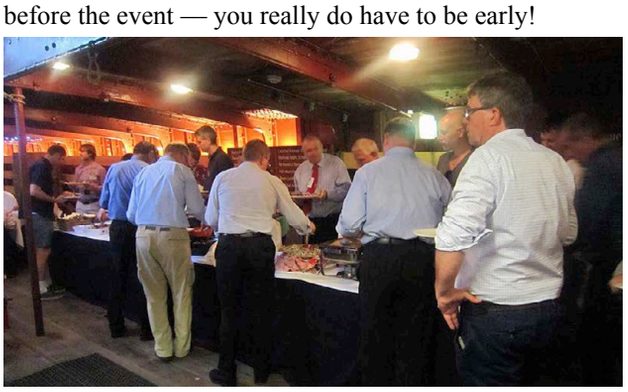
It was also great to see intrastate, interstate and international visitors in the throng, including Werner Bundschuh from Queensland, Martin Renilson, Gregor Macfarlane and Dean Cook from Tasmania, and Tim Speer from Western Australia.

Some of the crowd enjoying pre-dinner drinks and canapes on board *James Craig*
(Photo Phil Helmore)

More of the crowd enjoying pre-dinner drinks and canapes on board *James Craig*
(Photo Phil Helmore)

Sydney turned on a beautiful evening, and many partners in attendance enjoyed the view from the decks of *James Craig*. Drinks (beer, champagne, wine and soft drinks) and finger food (Peking duck pancakes, roast pumpkin and fetta tartlets, Thai-style spring rolls, parmesan-crusted chicken skewers, and salt-and-pepper prawn cutlets) were provided. A delicious buffet dinner was served in the 'tween decks (including Sydney rock oysters, smoked salmon, barbecued marinated octopus and calamari, roasted beef fillet, seasoned turkey breast, honey leg ham, roasted vegetables, pasta in pesto with pumpkin and spinach, and a selection of salads) and many tall tales and true were told.

"Early bird" pricing and credit-card facilities for "early bird" payments continue to be successful, and all tickets were sold before the event — you really do have to be early!



The buffet table in the 'tween decks
(Photo Phil Helmore)

Formalities were limited to one speech from the Chair of the SMIX bash Organising Committee, Nate Gale, who welcomed the guests on board and thanked the industry sponsors.

Dinner tables in the 'tween decks
(Photo Phil Helmore)

Chair of the SMIX Bash Organising Committee, Nate Gale, welcoming the guests on board and thanking the industry sponsors
(Photo Phil Helmore)

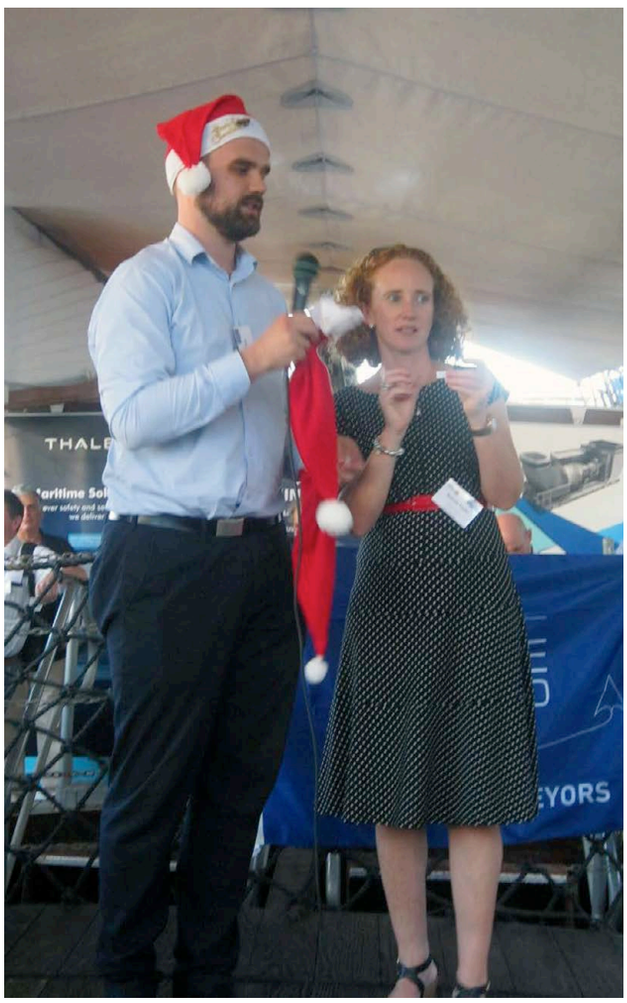
The lucky-door prize was drawn by Belinda Tayler from Noakes Group. The prize was a Moet and Chandon champagne Christmas hamper, won by Joan Porter, with the prize being delivered to her doorstep.

The raffle was drawn by Josh Day of Teekay Shipping and Tom Charter of Damen. The prizes were Christmas hampers, won by Mori Flapan and Todd Maybury, with the prizes being delivered to their doorsteps.

This year's event was sponsored by the following organisations:

Platinum

- Damen Shipyards Group
- TeeKay Shipping (Australia)



Belinda Tayler of Noakes Group announcing the winner of the Lucky-door Prize
(Photo Phil Helmore)

Gold

- ABS Pacific
- AMC Search
- Atlantic & Peninsula Australia
- AusBarge Marine Services
- Austal Ships
- BAE Systems Australia
- DNV GL
- Electrotech Australia
- Energy Power Systems (Caterpillar)
- Lloyd's Register International
- Rolls-Royce Australia Services
- Svitzer Australasia
- Sydney City Marine
- Thales Australia

Silver

- AMD Marine Consulting
- ASO Marine Consultants
- Australian International Marine Export Group
- Cummins South Pacific
- Kedge
- Noakes Group
- Spear Green Design
- Thompson Clarke Shipping

Bronze

- Edwards Marine Services
- Lightning Naval Architecture

Our thanks to them for their generosity and support of SMIX Bash 2017, without which it could not happen.

Committee Meetings

The NSW Section Committee met on 13 February and, other than routine matters, discussed:

- SMIX Bash 2017: All sponsorships received, and awaiting Trybooking settlement and payment of some invoices before finalisation of accounts, but projections are for a small surplus after last year's loss.
- SMIX Bash 2018: Preliminary booking made for James Craig for 6 December; new Chair for SMIX Bash Committee appointed.
- Technical Meeting Program2018: Four RINA presentations booked, and negotiating with a fifth for May; IMarEST have April presentation arranged.
- Technical Meeting Venue 2018: Harricks Auditorium at Engineers Australia secured as venue for eight meetings per year; an alternative venue to be given a trial run.
- Section Committee: Members to be canvassed for interest in joining the committee.

The next meeting of the NSW Section Committee is scheduled for 27 March 2018.

Phil Helmore

Acquisition of MATV *Sycamore*

Alex Robbins, MATV Acquisition Engineering Manager, Contractor to Defence, gave a presentation on *Acquisition of a Multi-role Aviation Training Vessel for the Royal Australian Navy* to a joint meeting with the IMarEST attended by 43 on 7 February in the Harricks Auditorium at Engineers Australia, Chatswood.

The Multi-role Aviation Training Ship (MATV) MV *Sycamore* is a 94 m SOLAS Special Purpose Ship designed by Damen Shipyards and built by Damen in their Haiphong, Vietnam, yard for the Royal Australian Navy (RAN). The vessel is unique, being essentially a commercial vessel providing ADF-compliant aviation training capability to the RAN.

The ship's primary role is to support maritime aviation training of Defence helicopter flight crews. The vessel is a flight-deck equipped sea-going training vessel for most types of helicopters used by the Australian Defence Force. She arrived in Sydney on 26 June 2017 and final acceptance by the Commonwealth as an Australian Maritime Safety Authority (AMSA) Special Purpose Ship was achieved on 28 July 2017. The Commonwealth has engaged Teekay Shipping (Australia) to crew, operate and maintain the vessel. Teekay established the required operating and safety certifications to enable the initial operational voyage on 4 August 2017.

MATV *Sycamore* is somewhat of an outlier within recent acquisitions, being delivered "On Time, On Budget, and On Specification". The presentation briefly explored the underlying key features of the project, covering Team Characteristics, Organisational Structure, Mission Focus, Communications and Project Strategies.

It is expected that Alex's presentation will be written up in the May issue of *The ANA*.

The vote of thanks was proposed, and the certificate and "thank you" bottle of wine presented, by John Jeremy.

Phil Helmore

The Multi-role Aviation Training Ship (MATV) MV *Sycamore* on Sydney Harbour
(Photo John Jeremy)

Western Australia

The Western Australia Section has enjoyed some very interesting presentations at recent technical meetings.

On 18 October 2017 Mike Efthymiou, Professor of Offshore Structures at the University of Western Australia, gave a presentation entitled *PRELUDE FLNG: A Story of Innovation* at the Engineers Australia Auditorium in West Perth.

A historic milestone in the Prelude FLNG Project was reached with the arrival of the floating vessel offshore NW Australia in July 2017. The vessel, with a length of 488 m, is the largest floating facility in the world and incorporates facilities for gas production, liquefaction, storage of LNG, LPG and condensates, and direct offloading of these to the market.

The presentation provided insight into this ground-breaking project, highlighting some of the new technologies which needed to be developed, matured and qualified, to enable an LNG Plant to be placed on a floating production facility to be permanently manned and operated in a tropical cyclone environment.

Prelude on station
(Photo Shell Australia)

On 15 November, two presentations were given, also at the Engineers Australia Auditorium in West Perth.

The first was by Jinzhu Xia entitled *Floating System Selection and Design for Gas Field Development.*

Jinzhu specialises in hull, mooring and riser systems. His work extensively involves concept selection, design, installation and operation of offshore oil and gas facilities such as FPSOs, semis, TLPs and spars for deep water application.

His presentation discussed field development drivers and the application of wet and dry tree floating production platforms. An emphasis was given to the unique challenges faced in producing and delivering remote, deep-water gas reserves offshore North West Australia and how floating systems are selected and designed to meet those challenges.

The second presentation was by Mark Aravidis, Acting Marine Assurance Manager for Woodside Energy, entitled *Offshore Vessel Inspection Database: Objectives and Function*.

Mark's presentation discussed the functionality of the Offshore Vessel Inspection Database (OVID), a special initiative generated within the Oil Companies International Marine Forum (OCIMF) to provide a robust web-based inspection tool and database of the vessel-inspection process. It is aimed to be supported by professional, trained and accredited inspectors, and complemented by an Offshore Vessel Management Self- Assessment protocol.

After a broad discussion of the OCIMF activities, Mark explained the OVID process, starting from the physical vessel inspections through the data management and the operator response.

On 24 January 2018, Captain Walter Purio, Chief Executive Officer, Marine Fuel Institute and Marine Advisor, Woodside Energy, gave a presentation entitled *LNG as a Marine Fuel in Australia and East Asia: Drivers and Challenges*.

The development of the "Green Corridor" bulk trade between Australia and East Asia is a strong driving force in promoting dual-fuel new builds in the shipping industry. Emissions from ships in the Asia-Pacific region have caused substantial negative outcomes for the region, with a recent Chinese study finding that 24 000 premature deaths each year in East Asia are related to air pollution from ships. Similarly, a new study has found that shipping emissions in shipping lanes in the South China Sea and elsewhere have contributed to more-intense weather events, including thunderstorms and lightning strikes.

Recent joint industry projects led by DNV GL have worked to produce a dual-fuel-powered ship design which can be adapted for purpose. The next big hurdle for the LNG marine fuel industry will be unlocking the ability to retrofit existing ships to be dual-fuel powered in an economical manner.

Programs of WA Section technical meetings and PDF copies of presentations released by the authors are available from the WA Section website, www.rina.org.uk/WASectionProgramme.

New Intact Stability Criteria for Ships Engaged in Towing, Lifting and Anchor-handling Operations

New intact stability criteria have been agreed for ships which undertake towing, lifting or anchor-handling operations. As not all ships undertake these operations, these new criteria are contained in Part B (non-mandatory) of the International Code on Intact Stability, 2008.

The new criteria enter into force on 1 January 2020 and should be used for ships after this date.

It should be noted that any new or revised Stability Information Booklets, which are received after 2 February 2018 for ships which undertake towing, lifting or anchor handling operations, will be verified by LR against these new criteria. In cases of non-compliance, the yard/owner will be advised accordingly.

For exact details of the amendment, see IMO Resolutions MSC.413(97), MSC.414(97) and MSC.415(97).

Lloyd's Register, *Class News,* No. 01/2018*,* 2 February 2018

ABS Certifies Cyberhawk for Drone Inspections of Cargo Tanks

Cyberhawk Innovations, headquartered in Livingstone, UK, a specialist in using drones — more formally unmanned aerial vehicles (UAVs) — for inspection and survey, has been certified as an External Specialist by the American Bureau of Shipping (ABS) in providing inspections for internal tanks. The certification means that the data captured by Cyberhawk's UAVs can now be used by ABS surveyors to make decisions affecting classification surveys of cargo oil tanks (COT) and other bulk storage tanks on vessels.

As part of the certification procedure, Cyberhawk completed two internal tank inspections on an Aframax-class oil tanker in Portland, Oregon. They were carried out in collaboration with an ABS surveyor, who examined all safety and inspection processes required to accept Cyberhawk's inspection technique. The two inspections were part of a larger project, involving a survey of all 14 COTs using a drone on a sister vessel. The project was completed in just six days by the Cyberhawk team.

Aside from significant time savings and efficiency improvements, the use of UAVs by experienced operators minimises risks to personnel, offering a safer, more economical solution for detailed structural inspections.

One current industry method for COT inspection on tankers is a technique called rafting. This involves filling the tank being inspected with water, allowing the ship surveyor to use a raft or dinghy to view critical inspection areas of the tank, inaccessible from the tank floor. Rafting creates a large volume of oil-contaminated water which has to be decanted from the vessel at a port which can handle such waste. Using a UAV eliminates the generation of oil-contaminated water and the safety risks associated with rafting.

ABS auditors carried out a detailed review of Cyberhawk's UAV equipment, operator training, and maintenance and inspection processes, both at Cyberhawk headquarters in Scotland and onsite in the USA.

"UAVs are enabling the next generation of marine and offshore surveys and inspections, providing less intrusive, safer and more efficient ways of assessing critical areas," says ABS Chief Surveyor, Joseph Riva. "By applying ABS guidance, Cyberhawk was able to demonstrate its ability to carry out drone inspections and surveys, which can support the class survey process and provide additional savings and efficiencies to the owner and shipyard."

Chris Fleming, CEO at Cyberhawk, said "The feedback received from the auditors confirms what we already know — that UAVs offer an incredibly efficient solution when it comes to asset inspection, across a multitude of industrial sectors. Few methods offer the same safety, time and cost advantages."

[*For those interested, there is a video of a drone inspection in progress on the website*—Ed.]

https://awards.acq5.com/post/video-abs-certifies-cyberhawk-for-cargo-tank-drone-inspections/

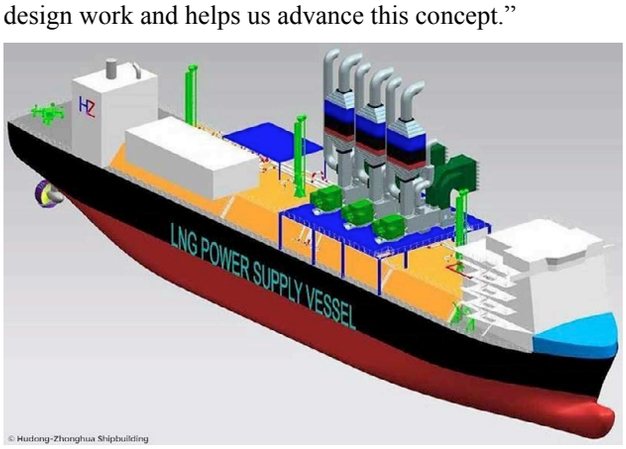
1 November 2017

ABS Awards AIP for Innovative LNG Power Vessel

ABS has granted Approval in Principle (AIP) to Hudong-Zhonghua Shipbuilding (Group) Co. for its liquefied natural gas (LNG) Power Vessel. The vessel is designed in accordance with the applicable requirements of ABS Rules and IMO Regulations.

"ABS provides the marine industry with reliable guidance to enable innovative technology development in support of more efficient operations," said ABS Vice President for Global Gas Solutions, Patrick Janssens. "Awarding Hudong-Zhonghua Shipbuilding the AIP for its LNG power vessel demonstrates the ABS commitment to help industry take advantage of clean energy to reduce cost."

"We chose ABS because of their leadership position in evaluating effective energy-storage solutions and extensive experience in gas-related projects," says Hudong-Zhonghua Shipbuilding Vice President, Jin Yanzi. "We are delighted to receive this approval from ABS which validates our early design work and helps us advance this concept."



Hudong-Zhonghua Shipbuilding (Group) Co.'s LNG power vessel (Image courtesy Hudong-Zhonghua Shipbuilding)

This LNG Power Supply Vessel integrates LNG receiver, storage, re-gasification, electric power generation and transmission, with LNG storage tank volume of 32 000 m^3 and 100 MW power capacity.

ABS provides industry leadership, offering guidance in LNG floating structures and systems, gas fuel systems and equipment, gas carriers, and regulatory and statutory requirements. ABS has extensive experience with the full scope of gas-related assets and has been the classification organization of choice for some of the most advanced gas carriers in service.

ABS Awarded Classification Contract for LNG Bunker Barge

ABS has been selected by Q-LNG Transport LLC to class an articulated tug barge (ATB) for liquefied natural gas (LNG) bunkering in North America. The vessel is scheduled to begin construction at VT Halter Marine in Pascagoula, Mississippi, in early 2018.

Q-LNG Transport's bunker barge
(Image courtesy Q-LNG Transport)

"This project represents another significant milestone for the region in the continued development of LNG infrastructure in North America, helping the maritime industry meet stricter emissions requirements," said ABS Chairman, President and CEO, Christopher J. Wiernicki. "ABS is committed to working with all project stakeholders to support safety both during construction and operations."

"We chose ABS as our class partner for this project because of their extensive understanding of LNG as fuel and LNG bunkering applications," said Q-LNG Transport President, Chad Verret. "This project will expand the LNG supply chain and play a critical role in the advancement of LNG as a marine fuel throughout the region and North America."

The LNG bunker barge, with 4 000 m^3 LNG capacity, will be owned and constructed by Q-LNG, while the operations will be handled by New Orleans-based Harvey Gulf International Marine. The barge will be chartered by Shell, and will supply necessary LNG fuel to cruise vessels throughout the south-east coast of the USA. The barge will be designed to be efficient and manoeuvrable to allow LNG bunker delivery to a range of customers.

ABS is also classing the LNG bunkering barge for North America which is currently being built at Conrad Orange Shipyard and is scheduled for delivery in 2018.

Recognising the changing landscape and increased industry focus on gas, ABS launched its Global Gas Solutions team in 2013 to support industry in developing gas-related projects. The ABS Global Gas Solutions team provides industry leadership, offering guidance in LNG floating structures and systems, gas fuel systems and equipment, gas carriers, and regulatory and statutory requirements. ABS has extensive experience with the full scope of gas-related assets and has been the classification society of choice for some of the most advanced gas carriers in service.

Craig Hughes

Recently built by Incat Australia and proving very popular on Sydney Harbour, *Fred Hollows*, *Victor Chang* and *Emerald 6* (aka *Ferry McFerryface*) taking part in the annual Ferrython on Australia Day.
Emerald 6 is to be formally renamed *May Gibbs*
(Photo John Jeremy)

FROM THE CROWS NEST

New Edition of *Marine Hydrodynamics*

MIT Press has just released a new edition of Nick Newman's book, *Marine Hydrodynamics,* which is referred to as the 40th Anniversary Edition. The text has not changed significantly, except for some corrections and a few updated references, but there are three exciting aspects:

(1) John Grue has contributed a foreword;

(2) the new edition is published as a paperback, with a corresponding reduction in the price; and

(3) it also is available as an Open Access e-Book in PDF format.

Further information about the book and contents is available on the web at

https://mitpress.mit.edu/books/marine-hydrodynamics-0

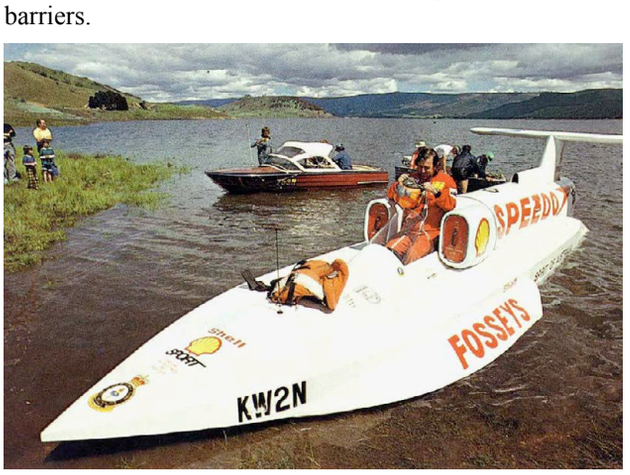
To download the e-Book it is only necessary to click on "PDF" in the box which says "This is an open access title". The size of the file is about 11 MB.

World Water Speed Record

The World Unlimited Water Speed Record is the officially-recognised fastest speed achieved by a water-borne vehicle. The record is ratified by the Union Internationale Motonautique (UIM). With an approximate fatality rate of 85% since 1940, the record is one of the sporting world's most hazardous competitions!

On 20 November 1977, Ken Warby in *Spirit of Australia* broke the world water speed record on Blowering Dam, NSW, with an average speed of 288.60 mph (464.46 km/h). The record had been previously held by Lee Taylor in *Hustler* with an average speed of 285.22 mph (459.02 km/h), set in 1967.

On 8 October 1978, Ken returned to Blowering Dam with *Spirit of Australia* and broke his own world record with an average speed of 317.60 mph (511.1 km/h), becoming the first man in history to break the 300 mph and 500 km/h barriers.



Ken Warby prepares to break his own world water speed record at Blowering Dam on 8 October 1978
(Image courtesy Warby Motorsport)

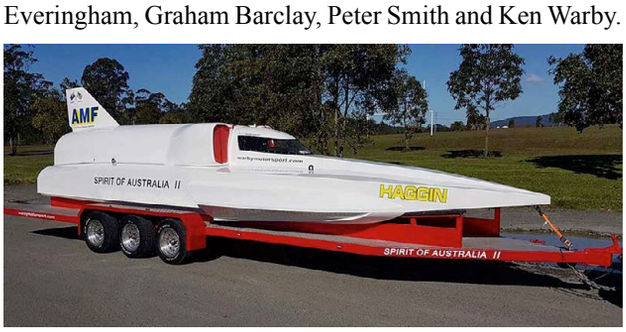
Two subsequent attempts have been made in jet-powered boats, Lee Taylor in *Discovery II* in 1980, and Craig Arfons in *Rain X Challenger* in 1989; both have died trying.

In the 1990s, Ken built a new boat, *Aussie Spirit*, with a reinforced safety cockpit. However, by the time the boat was complete, the UIM had introduced new rules requiring test samples of the cockpit structure to be tested before the boat was built. As *Aussie Spirit*'s cockpit was part of the main structure, removing it was not an option. With Blowering Dam at an all-time low of 15% capacity in 2005, a new world water speed record was out of the question. However Ken did make improvements to the way the boat planed and handled, and then did demonstration runs in Australia and USA.

Aussie Spirit at speed
(Image courtesy Warby Motorsport)

Ken Warby and his son Dave have now built a new boat, *Spirit of Australia II,* which has a UIM-compliant reinforced cockpit. The intention is to return to Blowering Dam, with Dave driving, to challenge the Unlimited World Water Speed Record.

Spirit of Australia II's first public appearance was at the 2017 Forster Boatie's reunion, an event held by the Mid North Coast Speedboat Club on 1 and 2 July 2017 to showcase the history and heritage of Australian powerboat racing. With boats from the 1940s through to modern-day racing boats, they had 150-plus boats in attendance, with on-water and static displays, and S*pirit of Australia II* performed an engine run. At the presentation dinner, five Australian power-boating legends were inducted into the inaugural Australian Power-boating Hall of Fame: Fred Williams, Bert Everingham, Graham Barclay, Peter Smith and Ken Warby.



Spirit of Australia II
(Image courtesy Warby Motorsport)

Spirit of Australia II was then successfully trialled on the Manning River at Taree, NSW, during July 2017, with Dave taking the vessel out for four runs on the river at over 110 mph (177.0 km/h).

On 22 September 2017, a sign was unveiled at The Pines (the base camp area for Ken's world records) at Blowering Dam to recognise Ken Warby's world water speed records on the dam. The new sign also has a history of the world water speed record.

Spirit of Australia II underwent her first trials on Blowering Dam on 23 and 24 September 2017. The team worked on the servicing turn-around for the boat, logistical operations for the boat while at the dam, and coordinating with emergency services to ensure a safe operation. Dave took the boat out four times over the weekend but, due to the very windy and rough water conditions, testing was limited to 140 mph (225.3 km/h). The team returned to Blowering Dam in late November for more testing, and to celebrate the 40th anniversary Ken's first world water speed record in 1977.

For more information, and videos of trials of *Spirit of Australia II* on the Manning River and on Blowering Dam, visit the Warby Motorsport website, http://warbymotorsport.com/.

Phil Helmore

Team Britannia

The Team Britannia attempt to take the power-boat record for the round-the-world voyage has been hindered by delays and financial difficulties. However, officials from Team Britannia now say that they are back on track to take on the challenge, after an addition £1m sponsorship deal was secured. The cash has allowed them to fund the final phase of construction of their 80 ft (24.38 m) boat.

The vessel is being built at the Hayling Yacht Company's HQ, in Mill Rythe Lane, on Hayling Island. Designed by Professor Bob Cripps, former technical director of VT Halmatic, it will utilise innovative 'wave-slicing' technology, making the vessel super-efficient and cutting fuel consumption by up to 30 per cent. The vessel will be powered by a revolutionary fuel emulsion, a mixture of diesel, water and emulsifier. The emulsified fuel cuts harmful emissions such as particulate matter and nitrogen dioxide.

It is hoped that the vessel's hi-tech kit will help her crew beat the current record of just under 61 days. Team Britannia's attempt will see the squad circumnavigate the globe starting and finishing in Gibraltar, passing through the Suez and Panama Canals and cutting across the Tropic of Cancer and the equator with stops at Puerto Rico, Acapulco, Honolulu, Guam, Singapore, Oman and Malta. If things go well, the attempt will likely begin in October.

The News, 24 December 2017

New Solo Sailing World Circumnavigation Record

François Gabart, who left Ouessant on November 4 in a bid to set a new singlehanded round-the-world sailing record, crossed the finishing line located between Lizard Point and Ouessant on 17 December to set a new record of 42 days, 16 hours, 40 minutes and 35 seconds.

Skippering the 30 m trimaran, *Macif*, Gabart crushed the previous time taken by Thomas Coville on 25 December 2016 (49 days, 3 hours, 4 minutes and 28 seconds) by 6 days, 10 hours, 23 minutes and 53 seconds.

This was Gabart's first attempt at the record, and his time is now the second-fastest outright time, crewed and singlehanded combined. Only *IDEC Sport* (Francis Joyon and crew) succeeded in achieving a better time in the Jules Verne Trophy (40 days, 23 hours, 30 minutes and 30 seconds).

Macif covered a true distance of 27 859.7 n miles, with a true average over this course of 27.2 kn. Gabart joins an

elite group, as only three sailors to date had ever held the single-handed round-the world-record — Francis Joyon, Ellen MacArthur and Thomas Coville — while leaving a lasting impression on everyone by beating the reference times one by one on his way.

The most significant ones were the distance sailed single-handed in 24 hours (851 n miles between 13–14 November, against 784 n miles, which was his own personal best), but also with crew and single-handed combined, on the Ouessant-Cape of Good Hope section (12 days, 20 hours and 10 minutes, the Pacific Ocean crossing (Tasmania to Cape Horn in 7 days, 15 hours and 15 minutes), and Cape Horn-equator (6 days, 22 hours and 15 minutes).

"I never dreamed of a time like this," admitted Gabart. "On paper, with the weather and with what I am capable of doing with this boat, it was possible to beat the record, but in the best scenarios only by one or two days. It's quite extraordinary."

Previous non-stop records have all been in trimarans:

Francis Joyon (FRA) in *IDEC* in 2004 72 d 22 h 54 m 22 s

Ellen MacArthur (UK) in *B&Q/Castorama* in 2005 in 71 d 14 h 18 m 33 s [B&Q/Castorama *was built by Boatspeed here in Gosford, NSW*—Ed.]

Francis Joyon (FRA) in *IDEC 2* in 2008 in 57 d 13 h 34 m 06 s

Thomas Coville (FRA) in *Sodebo Ultim* in 2016 in 49 d 3 h 7 m 38 s

Principal particulars of *Macif* are

Length OA	30.0 m
Beam	21.0 m
Air draft	35.0 m
Draft (maximum)	4.50 m
Daggerboards	3
Sail area	430 m^2 upwind
	650 m^2 downwind
Designer	Van Peteghem Lauriot-Prévost
Construction	CDK Technologies and Multiplast

http://www.sailingscuttlebutt.com/2017/12/17/francois-gabart-smashes-world-record/, 17 December 2017

Macif at speed
(Photo Jean-Marie Liot)

America's Cup Class AC75 Concept Revealed

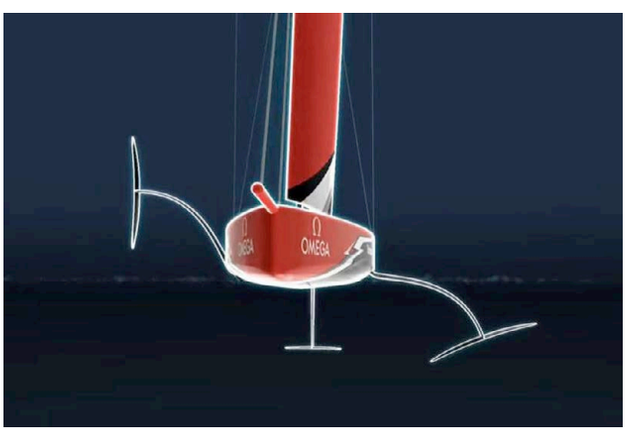
An exciting new era in America's Cup racing was unveiled on 20 November 2017 as the concept for the AC75, the class of boat to be sailed in the 36th America's Cup, was released illustrating a bold and modern vision for high-performance fully-foiling monohull racing yachts.

The *Emirates Team New Zealand* and *Luna Rossa* design teams had spent the previous four months evaluating a wide range of monohull concepts. Their goal had been to design a class which will be challenging and demanding to sail, rewarding the top level of skill for the crews; this concept could become the future of racing and even cruising monohulls beyond the America's Cup.

The AC75 combines extremely high-performance sailing and great match racing with the safety of a boat which can right itself in the event of a capsize. The ground-breaking concept is achieved through the use of twin canting T-foils, ballasted to provide righting-moment when sailing, and roll stability at low speed.

The normal sailing mode sees the leeward foil lowered to provide lift and enable foiling, with the windward foil raised out of the water to maximise the lever-arm of the ballast and reduce drag. In pre-starts and through manoeuvres, both foils can be lowered to provide extra lift and roll control, also useful in rougher sea conditions and providing a wider window for racing.

AC75 concept vessel at speed
(Image from America's Cup website)



Foils on the AC75 concept
(Image from America's Cup website)

Although racing performance has been the cornerstone of the design, consideration has had to be focused on the more-practical aspects of the boat in the shed and at the dock,

where both foils are canted right under the hull in order to provide natural roll stability and to allow the yacht to fit into a standard marina berth.

An underlying principle has been to provide affordable and sustainable technology 'trickle down' to other sailing classes and yachts. Whilst recent America's Cup multihulls have benefitted from the power and control of rigid wing sails, there has been no transfer of this technology to the rigs of other sailing classes. In tandem with the innovations of the foiling system, *Emirates Team New Zealand* and *Luna Rossa* are investigating a number of possible innovations for the AC75's rig, with the requirement that the rig need not be craned in and out each day. This research work is ongoing as different concepts are evaluated, and details will be released with the AC75 Class Rule.

The America's Cup is a match race, and creating a class which will provide challenging match racing has been the goal from the start. The AC75 will foil-tack and foil-gybe with only small manoeuvring losses and, given the speed and the ease with which the boats can turn, the classic pre-starts of the America's Cup are set to make an exciting comeback. Sail handling will also become important, with cross-overs to code-zero sails in light wind conditions.

A huge number of ideas have been considered in the quest to define a class which will be extremely exciting to sail and provide great match racing, but the final decision was an easy one: the concept being announced was a clear winner, and both teams are eager to be introducing the AC75 for the 36th America's Cup in 2021.

The AC75 Class Rule will be published by 31 March 2018.

[*There is a video of a new vessel in action at* https://www.youtube.com/watch?v=rx2qG_YMrDs — Ed.]

https://www.americascup.com/en/news, 20 November 2017

GENERAL NEWS

AWD Project Removed from Projects of Concern list

It was announced on 1 February 2018 that the air-warfare destroyer project has been removed from the Projects of Concern list following continuing improvements in shipbuilding performance.

Following an independent review by Prof. Don Winter and Dr John White and a review by the Australian National Audit Office, the project was placed on the Projects of Concern list in June 2014 due to increasing commercial, schedule and cost risks.

The Air-warfare Destroyer Reform Program resulted in Navantia being contracted in December 2015 to provide shipbuilding management services to the project.

The Minister for Defence Industry, the Hon. Christopher Pyne MP, said that due to the long-term reform arrangements put in place by the Government, the air-warfare destroyer project is now back on track.

"The remediation of the air-warfare destroyer project shows that the country is ready for the Government's continuous naval shipbuilding program, which will create thousands of jobs and secure the shipbuilding industry for future generations of Australians" he said.

The Minister for Defence, Senator the Hon. Marise Payne, said that the recent commissioning of HMAS *Hobart* demonstrated that the program is now capable of producing highly-potent air-warfare destroyers.

"HMAS *Hobart* has been commissioned into service, marking a step change in Navy's ability to fight and win at sea," said Minister Payne.

"The two destroyers, *Brisbane* and *Sydney*, are both on track to be delivered against the reformed schedule and are set to add to Navy's capabilities."

The air-warfare destroyer project joins the Collins-class submarine project in coming off the Projects of Concern list in the past six months.

Destroyer Sustainment Contract

On 13 December 2017 the Australian government announced a $20 million contract for the upkeep of the Royal Australian Navy's new air-warfare destroyers.

The contract, awarded to BAE Systems and Raytheon Australia, will see the creation of 50 new jobs at Raytheon's Macquarie Park facility in Sydney.

The announcement marks the initial $20 million subcontract for the Destroyer Enterprise, involving BAE Systems Australia as managing contractor and Raytheon Australia as the destroyers' combat-system integrator.

The new Destroyer Enterprise, an industry group led by BAE Systems Australia, will manage the sustainment of the three new ships.

The overall sustainment of the new air-warfare destroyers is expected to generate more than 200 jobs in Sydney, with further subcontracts to be finalised next year as the Destroyer Enterprise matures. These will include those between the managing contractor, the ship repairer, Thales Australia, and the ship designer, Navantia Australia.

Offshore Patrol Vessel Project

On 24 November the Government announced that Australia's 12 Offshore Patrol Vessels will be designed and built under prime contractor Lürssen. The contract for the construction of the ships was signed on 31 January 2018.

The Offshore Patrol Vessel (OPV) project is worth up to $4 billion. The OPVs will have an important role protecting Australia's borders and will provide greater range and endurance than the existing patrol boat fleet.

The project is expected to employ up to 1000 Australian workers — 400 directly and a further 600 in the supply chain.

The first two OPVs to the Lürssen design will be built by ASC Shipbuilding in Adelaide. The project will then transfer to the Henderson Maritime Precinct in WA where Lürssen will use the capabilities of Austal and Civmec to build ten OPVs, subject to the conclusion of commercial negotiations between Austal, Civmec and Lürssen. Civmec will provide the steel from Australian suppliers for all 12 OPVs.

Submarine Combat System Contract

On 25 January 2018 the Minister for Defence Industry, the Hon. Christopher Pyne MP, announced that $700 million contract had been signed with Lockheed Martin Australia for the future submarine combat-system design, build and integration, creating 200 new jobs, the majority of which will be based in South Australia.

"Today marks a further step forward in our partnership with Lockheed Martin Australia in delivering a fleet of regionally-superior submarines to Australia," Minister Pyne said.

"This contract will cover work to 2022, including the design of the combat system and procurement activities to select subsystem and component suppliers.

"These are high-tech jobs of the future, the jobs the Government has committed to creating as part of our historic $200 billion defence investment over the next decade. There will be many more to come.

"The future submarine programme remains on time and on budget, further demonstrated by this milestone event."

Lockheed Martin Australia was selected as the Future Submarine Combat System Integrator in September 2016.

The company has worked with Defence to successfully complete initial design work for the Future Submarine Combat System under an earlier contract signed in November 2016.

Australia's new offshore patrol vessels are likely to be similar to this Lürssen-built ship, owned by the navy of Brunei, which visited Australia in 2013 for the International Fleet Review in Sydney
(RAN photograph)

Austal MoU with JR Kyushu Jet Ferry

Austal announced on 8 December the establishment of a Memorandum of Understanding (MoU) between Austal Australia and JR Kyushu Jet Ferry to develop a new high-speed trimaran passenger ferry concept for JR Kyushu Jet Ferry's South Korea-to-Japan route.

The 80 m trimaran will be based on Austal's trimaran hull form, with the interior to be developed by leading Japanese designer, Eiji Mitooka of Don Design.

"This announcement caps off a great 2017 for Austal, a year in which we have had record orders for our commercial business," Austal Vice President of Sales and Marketing, Ben Marland, said.

"Following our recent contract announcement with Fred Olsen S.A. for two 117 m trimaran ferries, we are very excited about the possibilities for this new vessel," Mr Marland said.

"Executives from JR Kyushu Jet Ferry travelled to the UK and Spain to personally experience the difference in passenger comfort which our trimaran design offers," he said.

"Austal is grateful for the opportunity to develop this unique new vessel for one of Japan's busiest international routes," Mr Marland said.

The MOU signifies the joining of the parties and their intention to move towards a contract for the design, construction and delivery of a vessel with a 500 passenger capacity and top speed of 38 kn early in 2018.

JR Kyushu Jet Ferry is part of the Kyushu Railway Company and operates daily jetfoil services between Fukuoka, Japan, and Busan, South Korea.

The 80 m trimaran high-speed passenger ferry concept for JR Kyushu Jet Ferry (Image courtesy Austal).

Austal Joint Venture Contracts in China

On 22 January 2018 Austal announced that Aulong Shipbuilding, a joint-venture company between Austal and Guandong Jianglong Shipbuilding of China, has secured contracts for four new high-speed ferries.

The contracts total $20 million to design and build four 42 m high-speed catamarans for Xidao Dazhou Tourism Co. Ltd.

Announcing the contracts in Australia, Austal Chief Executive Officer, David Singleton, said that the Aulong joint venture has successfully rejuvenated Austal's sales in mainland China, with six new high-speed ferries ordered in just 18 months.

"This $20 million order is a great start to 2018, following our record sales in 2017 when we added eight commercial vessel orders worldwide, worth over $380 million," Mr Singleton said.

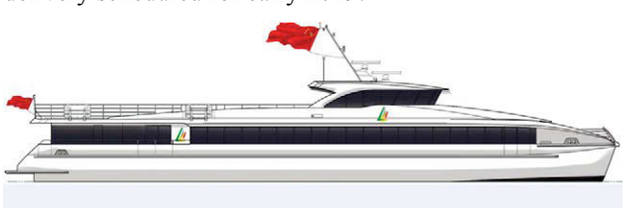
"Our strategic objective in China is to establish our joint venture, Aulong, as a highly-credible brand leader in the very large, mainland Chinese market. While the current vessels under construction and on order are relatively small by Austal standards, our work to date has been of the highest quality and we expect over the next few years that larger, more-complex vessels will be required in this market.

"Our growing shipbuilding presence in China will also allow Austal to progressively identify and manage quality Chinese suppliers which can enter our global supply chain and so create additional benefits to the company," he added.

With the benefit of Austal's extensive portfolio of high-speed aluminium ferries, Aulong is attracting new and existing customers and anticipates additional orders from mainland China in the following months.

The 42 m aluminium ferries will carry up to 399 passengers each, at speeds in excess of 20 kn and will operate from Xideo, a tourist island off Sanya City, in the Hainan Province.

Construction will commence at Aulong's Zhongshan shipyard in Guandong Province in March 2018, with delivery scheduled for early 2019.



Four 42 m ferries will be constructed by Aulong for Xidao Dazhou Tourism of China (Image courtesy Aulong)

Aulong was established in June 2016 with the aim of pursuing commercial passenger and non-military vessel opportunities in mainland China.

Austal (with 40% ownership) has licensed a number of its proven commercial aluminium vessel designs for marketing throughout mainland China and construction at Jianglong Shipbuilding's established facilities in Guangdong province. Jianglong Shipbuilding (with 60% ownership) brings local shipbuilding infrastructure, experience and expertise, with close to 1000 employees across two shipyards supporting the joint venture.

Austal Passenger Ferry Contract

On 28 December Austal announced that long-standing client and French Polynesia's leading commercial ferry operator, SNC Aremiti (part of the Groupe Degage), has awarded a $30 million contract to Austal to design and build a new 49 m high-speed passenger catamaran ferry.

This will be the fifth vessel Austal has delivered to French Polynesia since 2002. Austal has previously designed and built four vessels for the Groupe Degage comprising two 69 m monohull cruise ships, a 56 m vehicle passenger

catamaran ferry, and an 80 m vehicle passenger catamaran ferry.

”This contract not only continues a successful relationship between Austal and SNC Aremiti, but further confirms the company’s leadership position in the international high-speed ferry market” Austal CEO, David Singleton, said.

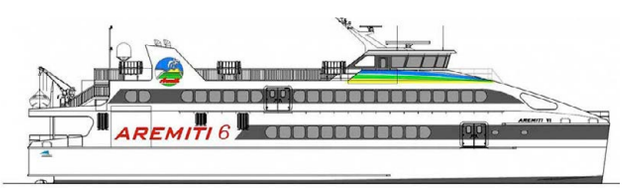
“Austal has always been an export-focused company. We have sold ships to every corner of the globe this year including Taiwan, Southeast Asia, Norway, the Canary Islands and now Tahiti. I am confident that we will continue to build on the success of 2017 for an even better 2018” Mr Singleton added.

“Austal is at heart an advanced-technology company and this next-generation high-speed passenger ferry demonstrates SNC Aremiti’s endorsement of our innovative ship design and internationally-competitive, high-quality construction,” Mr Singleton said.

“This order from SNC Aremiti caps off an incredibly successful year for our international commercial ferry business. We have added eight new vessels, worth more than $380 million, to our order book in the past 12 months, including two trimarans of 117 m in length and a 109 m catamaran. We also recently signed an MoU with JR Kyushu of Japan for an 80 m trimaran.” said Austal VP Sales & Marketing, Ben Marland.

This Austal design features seating capacity for 620 passengers and garage space for up to 30 motorbikes, small vehicles and cargo. With a top speed of 36 kn it will be fitted with Austal’s ride-control system to improve seakeeping and provide greater passenger comfort on the Papeete – Moorea route in French Polynesia.

The vessel will be designed in Australia and construction of the vessel will commence at Austal Philippines during 2018, with delivery scheduled for July 2019.



The 49 m passenger ferry for SNC Aremiti of French Polynesia (Image courtesy Austal)

Austal-built LCS Completes Acceptance Trials

The future USS *Manchester* (LCS 14) successfully completed acceptance trials in the Gulf of Mexico in December. This is the last significant milestone required by the US Navy prior to delivery of this Austal USA-built ship, scheduled for early 2018.

An intense series of tests were conducted at sea during the two-day trials. Approximately 250 personal were on board operating and demonstrating the performance of all of the ship’s systems and equipment. The vessel returned to port carrying a broom on its mast signifying that a ‘clean sweep’ of successful tests was achieved.

LCS 14 will be the second Independence-variant LCS Austal has delivered to the Navy in less than six months.

Austal CEO, David Singleton, congratulated the Austal USA team on yet another LCS delivered on-time and on-budget.

“This is the fourth Austal-built ship to reach this milestone in the last 12 months. LCS 14 is now making final preparations for delivery and LCS 16 is not far behind. Shipbuilding performance in the USA is now very positive and new orders received and expected in FY2018 mean that this part of our business will continue to be a major contributor to group results for years to come” Mr Singleton said.

Austal has delivered six Independence-variant LCSs, one of which, USS *Coronado* (LCS 4), recently returned to San Diego Navy Base after completing a successful 14-month deployment with the Pacific Fleet.

The LCS program is at full-rate production and is continuing its momentum at Austal USA, with seven ships currently under construction. *Tulsa* (LCS 16), *Charleston* (LCS 18) and *Cincinnati* (LCS 20) are preparing for trials. Final assembly is well underway on *Kansas City* (LCS 22) and *Oakland* (LCS 24) and the first aluminium was cut on the future USS *Mobile* (LCS 26) on 12 December 2017. Austal recently received new construction contracts for LCS 28 and LCS 30 — two of the three LCS awarded in FY 2017.

New Ships for Tasmania

TT-Line Company Pty Ltd and European shipbuilder Flensburger Schiffbau-Gesellschaft GmbH & Co. KG (FSG) have signed a letter of intent for the construction of two new ships to replace the current *Spirit of Tasmania* vessels. TT-Line chairman, Mike Grainger, said that the companies would now commence contract negotiations and agree to final design specifications.

“FSG was endorsed by the Board after the company short listed a number of international shipyards to build the new tailor-made vessels,” he said. “As previously announced, we expect to place an order for the new vessels in the first half of the 2018 calendar year and for them to be delivered in time to commence operations on Bass Strait in 2021.”

FSG is a highly-respected and experienced shipbuilder which has constructed more than 750 vessels since it was established in 1872.

It is currently building cruise ferries for Irish Ferries and Brittany Ferries as well as ro-ro vessels for the Siem Group. The company has also recently designed and built ro-pax ferries for Canadian BC Ferries and Scottish Caledonian MacBrayne.

Rüdiger Fuchs, CEO of FSG, said “We are very happy and proud to be appointed as TT-Lines preferred shipbuilder for the build of their two next-generation passenger ferries.”

The TT-Line Board and the executive team of the company worked closely with the Tasmanian Government on vessel replacement through the Ships Replacement Sub-Committee of Cabinet, chaired by the Minister for Infrastructure, Rene Hidding, and including Premier Will Hodgman and Treasurer Peter Gutwein.

An impression of the new ships to be built for the TT-Line Bass Strait service
(Image courtesy Flensburger Schiffbau-Gesellschaft)

Names for new RAN Support Ships

On 17 November the Minister for Defence, Senator the Hon. Marise Payne, announced the names of the Royal Australian Navy's future support ships.

The new fleet replenishment ships will be named *Supply* and *Stalwart*.

Supply will be the second vessel in the Royal Australian Navy to bear the name which has its origins with the armed tender ship that accompanied the First Fleet to Australia. *Stalwart* is being named after two previous RAN ships, one a destroyer which served between 1920 and 1925 and the second a destroyer tender which served from 1968 to 1990.

The ships will be known as auxiliary oiler replenishment (AOR) vessels and will replace the current HMA Ships *Success* and *Sirius*.

Minister Payne said that great care is taken when naming vessels.

"In considering names for classes and ships, the Navy chose names with deep historical roots or names that are uniquely Australian," Minister Payne said.

"For these ships, we have been able to achieve both. *Supply* was instrumental in establishing the British colony and *Stalwart*, like the Australian Navy itself, has its origins in the Royal Navy and, subsequently, two Australian ships.

"When these ships enter service from 2020, they will be an important part of the future fleet which the government has committed to in the 2016 Defence White Paper," Minister Payne said.

Supply will be built in two years, with full operational capability scheduled for 2022.

The 33 m catamaran ferry *Bellarine Express* was delivered by Incat Tasmania to Port Phillip Ferries in December 2017
The ferry will operate a Melbourne-Portarlington service
(Photo courtesy Incat Tasmania)

Keel of Future HMAS *Supply* Laid in Spain

The first module for the first of two Australian auxiliary oiler and replenishment ships (AORs) was placed on the slipway in Navantia's Ferrol shipyard on 17 November in a ceremony attended by the Chief of Navy, Vice Admiral Tim Barrett, AO, CSC, RAN, chair of Navantia S.A., José Esteban Garcia Vilasanchez, and chair of Navantia Australia, Warren King.

The milestone is a significant moment in the AOR program, under which Navantia will supply and sustain two ships for the Royal Australian Navy from 2019. These vessels will replace the Navy's current supply ships HMAS *Success* and HMAS *Sirius*. The two ships will provide a superb logistic capability, together with significant commonality and interoperability with other Royal Australian Navy assets. The AORs are optimised to support the Canberra-class amphibious ships and Hobart-class destroyers as part of task force operations.

Australian industry is playing a key role in the construction of the AORs, with more than $120 million in Australian content as part of the program, with partner companies including Taylor Brothers, Saab Australia, Raytheon Australia and BlueScope Steel amongst others.

Navantia Australia is competing to design and build the nine SEA 5000 frigates in Australia as part of the competitive evaluation process for Australia's future frigate program.

Principal Particulars

Length	173.80 m
Beam	23 m
Displacement (full load)	19 930 t
Maximum speed	20 kn
Complement	130
Accommodation capacity	196
Propulsion plant	2 × 9000 kW
Electric plant	4 × 1460 kW

Keel laying for HMAS *Supply*
(Photo courtesy Navantia)

Keel Laid for Turkish LHD

Turkish shipbuilder Sedef has held a keel-laying ceremony for the Turkish Navy's amphibious assault ship TCG *Anadolu* at its shipyard in Tuzla, Istanbul.

Once commissioned, the LHD will be the first of its kind in the Turkish Navy. It is designed by Navantia and based on the Spanish LHD *Juan Carlos I* and Australian Canberra-class LHDs.

While Navantia built both Australian ships in Spain and transferred them to Australia once they were launched, the Turkish LHD will be built in Turkey under a transfer of technology agreement.

The contract for the future TCG *Anadolu* (L408) was signed between the Turkish Undersecretariat for Defence Industries and Navantia in 2015.

Apart from the design, Navantia is to deliver five sets of diesel generators and the IPMS (Integrated Platform Management System) which will be developed at its facilities in Cartagena.

Anadolu will be registered as a light aircraft carrier by the Turkish Lloyd and is scheduled to be delivered to the navy in 2021.

Nancy Wake from Incat Crowther

Incat Crowther has announced that the 27 m catamaran passenger ferry, *Nancy Wake*, has been delivered to the Australian public company, Sealink, and has commenced operations on Sydney Harbour. Built by Aluminium Marine, *Nancy Wake* is a 280 passenger vessel accommodating 198 passengers inside and 82 outside.

Nancy Wake is the fourth vessel of this design and is a versatile platform, with a contemporary exterior. This latest vessel includes Incat Crowther's innovative new-generation propeller tunnel which reduces draft and offers a flat transom to integrate with standard fixed- or active-interceptor systems. Fuel consumption is also reduced.

The main deck features a large open deck aft, with three bathrooms. Large double doors lead to the main cabin, where 137 passengers are seated. There is a large kiosk/bar aft, and midship boarding doors. Forward doors lead to a fully-enclosed foredeck, offering operational flexibility.

Upstairs, the mid deck seats 61 inside and 36 outside. All exterior seats on this deck are protected from the sun by the deck overhead. The roof deck seats 48.

The vessel is fitted with a pair of Yanmar 6AYM-WGT main engines, each producing 670 kW. The vessel comfortably and efficiently operates at 25 kn at a modest MCR. The efficient vessel provides a significant cost advantage operating in the highly-competitive Sydney Harbour environment.

Nancy Wake on Trials
(Photo courtesy Incat Crowther)

Port bow of *Nancy Wake*
(Photo courtesy Incat Crowther)

Principal particulars of *Nancy Wake* are

Length OA		29.3 m
Length WL		29.3 m
Beam OA		8.00 m
Depth		2.50 m
Draft	(hull)	1.20 m
	(propellers)	1.50 m
Passengers		280
Crew		5
Fuel oil		4000 L
Fresh water		1250 L
Sullage		500 L
Main engines		2×Yanmar 6AYM-WGT each 670 kW @ 1938 rpm
Propulsion		2×propellers
Generators		2×Izuzu 90 kVA
Speed (service)		25 kn @ at 85% MCR and full load
Construction		Marine-grade aluminium
Flag		Australia
Class/Survey		NSCV Class 1C

Stapem Beluga from Incat Crowther

Incat Crowther has announced the delivery of *Stapem Beluga*, the first of two ABS-classed 18 m catamaran dive-support vessels built by Legacy Marine Group of Port Elizabeth, South Africa, for Paris-based Stapem Offshore. The Marshal Islands-flagged vessel will operate in the coastal waters of Angola in support of oil and gas exploration and production.

The vessel design has been customised to suit Stapem's specific operational requirements. The aft exterior deck utilises available space by combining deck lockers and racks for diving-equipment storage with a covered dive-preparation area. The vessel has four fold-down dive ladders for water access, three swing davits for assisting divers, and one 3 t hydraulic deck crane for additional operational support. The bow design is configured for efficient interaction with the personnel-transfer ladders of offshore FPSOs and platforms. Robust closed-cell polyethylene foam-core fendering is provided around the perimeter of the vessel to protect it from damage. The main cabin has seating for 14 persons and an SL3 diving-operations panel for monitoring dive operations.

Achieving speeds in excess of 20 kn, the vessel is powered

Port bow of *Stapem Beluga*
(Photo courtesy Incat Crowther)

by two MAN D2876LE402 main engines, each coupled to a Hamilton HJ403 waterjet through a ZF 360 gearbox. Electrical power for the vessel and all dive operations is provided by two Fischer Panda generators. Other items fitted below deck include a diesel-engine driven hydraulic power unit for powering the deck crane, a caviblaster system, low pressure compressor and subsea tool system.

Starboard quarter of *Stapem Beluga*
(Photo courtesy Incat Crowther)

Principal particulars of *Stapem Beluga* are

Length OA	18.7 m
Length WL	17.0 m
Beam OA	6.00 m
Depth	2.50 m
Draft (hull)	1.16 m
Crew	2
Dive personnel	14
Fuel oil	3500 L
Fresh wWater	500 L
Sullage	500 L
Main engines	2×MAN D2876LE 402 each 412 kW @ 2100 rpm
Gearboxes	2×ZF 360
Waterjets	2×Hamilton HJ403
Generators	1×Fischer Panda 18 kVA 1×Fischer Panda 30 kVA
Speed (service)	20 kn
(maximum)	23.5 kn
Construction	Marine-grade aluminum
Flag	Marshall Islands
Class/Survey	ABS ✠ A1 (E) HSC Coastal Craft ✠ AMS

50 m Multi-mission Offshore Vessels from Incat Crowther

Incat Crowther has announced the successful speed and endurance trials and upcoming delivery of two 50 m multi-mission offshore vessels (MMOV) for the Philippines Bureau of Fisheries and Aquatic Resources (BFAR). The Bureau Veritas-classed sisterships, DA BFAR MMOV 5001, named *BRP Lapu-Lapu*, and DA BFAR MMOV 5002, named *BRP Francisco Dagohoy*, were built by Manila-based Josefa Slipways.

The primary role of the vessels is to combat illegal fishing in Philippines waters. With the local fishing industry losing billions of dollars to illegal, unreported and unregulated fishing, these floating assets will enhance law enforcement's capability to patrol and protect territorial waters. The multi-mission capability of the vessels also affords the flexibility to lead in disaster-relief and/or rescue operations, as well as to serve as a platform for fisheries research.

Notable features of the all-steel vessels include large aft working deck accommodating a rescue craft launched from a deck crane as well as 9 m RHIB interceptor craft deployed from a specially-designed well with a transom door. Ahead of the aft working deck, the main-deck superstructure includes a large deck locker and an emergency generator compartment. Inside the expansive accommodation space is a large full-service galley with adjoining freezer and cold rooms, a medical clinic with adjacent lab and cold-storage room, a spacious mess hall for the crew and a private mess hall for officers. A large conference room accommodating 36 personnel completes the efficiently arranged space.

Below deck and adjacent to the engine room, a dedicated control and equipment-storage room is provided. Ahead of these spaces, there is accommodation for 42 personnel, followed by the bow-thruster compartment and a stock room.

The mid-deck house offers accommodations for officers and engineers as well as a private conference room with capacity for 14 personnel.

The large pilot house offers plenty of desk area for navigation and communications equipment. It also has sleeping quarters for two pilots.

The vessels are powered by two Mitsubishi S16R2-T2MPTK engines, coupled with Masson MM W18000 gearboxes and two fixed-pitch propellers. Two Baudouin 6 W126S generators service the vessel's primary electrical needs, with a third unit provided for emergency services.

Principal particulars of the two vessels are

Length OA	50.5 m
Length WL	48.0 m
Beam OA	9.00 m
Depth	4.00 m
Draft (hull)	2.00 m
(propellers)	3.20 m
Personnel	60
Fuel oil	148 000 L
Fresh water	55 000 L
Grey water	8000 L
Black water	8 000 L
Main engines	2×Mitsubishi S16R2-T2MPTK each 1884 kW @ 1500 rpm
Gearbox	2×Masson MM W18000
Propulsion	2×fixed-pitch propellers
Generators	2×Baudouin 6 W126S each 280 ekW
Speed (service)	15 kn
(maximum)	18 kn
Construction	Steel
Class	Bureau Veritas
Survey	Philippine Maritime Industry Authority (MARINA) I ✠ Hull ✠ Mach Special Service-Multi-Mission Unlimited Navigation

BRP Francisco Dagohoy and *BRP Lapu-Lapu*
(Photo courtesy Incat Crowther)

39 m Ferry for the Danube River from Incat Crowther

Incat Crowther has announced that it has been contracted to design a 39 m low-wash high-speed catamaran ferry to be built by Wight Shipyard Co. in Cowes, Isle of Wight, UK, for operation by Twin City Liner on the Danube River between Vienna and Bratislava.

Incat Crowther was selected as the designer on the basis of technical capability, delivering a design solution which met stringent criteria. Incat Crowther staff viewed the operation on the Danube first-hand, affording a detailed understanding of the complex operational requirements. The resulting design has low draft, minimal wake/wash, low air draft and a hullform designed for restricted waters where high current and debris are encountered.

The hull was designed to be highly efficient and operate at level trim, giving the vessel a top speed of 38 kn and a reliable service speed of 32 kn. Performance is aided by custom-designed interceptors.

The vessel's structural design uses advanced engineering to reduce mass whilst remaining robust. A specific anchoring system has been developed to assist docking in high-current conditions.

Passengers will board the new craft via midship doors port and starboard, and enter a bright and airy main cabin capable of seating up to 185 passengers. A kiosk providing a range of snacks and refreshments is provided aft on the starboard side. On the port side, toilets are provided one of which is for disabled customers.

Above, the upper deck is accessed from a centre staircase in the main cabin as well as two staircases aft on the open deck. External seating will be provided for 29 passengers while, aft of the elevated wheelhouse, interior seating is available for 35 passengers. Being a commuter ferry as well as a cruise vessel, there will be space for 12 bicycles on the aft deck.

The vessel will be powered by a quartet of Scania DI16 main engines, each producing 809 kW, driving Rolls-Royce S40-3 water jets. Large hatches over the main engines and gearboxes allow maintenance access.

Incat Crowther's global experience provides an in-depth understanding of the regulatory framework, balancing local flag-state requirements, classification authority rules and EU directives.

Principal particulars of the new vessel are

Length OA	39.7 m
Length WL	38.1 m
Beam OA	11.1 m
Depth	1.95 m
Draft (hull)	0.80 m
Passengers	249
Crew	4
Fuel oil	8800 L
Fresh water	600 L
Sullage	1500 L
Main engines	4×Scania DI16 076M each 809 kW @ 2300 rpm
Propulsion	2Rolls-Royce waterjets
Generators	2×John Deere 4045 each 63.5 kW
Speed (service)	38 kn
(maximum)	32 kn
Construction	Marine-grade aluminium
Flag	Austria
Class	DNV GL ✠1A HSLC R6 Passenger craft E0 EU Regulation EU Directive 2006/87/EC

Stewart Marler

Starboard quarter of 39 m ferry for the Danube River
(Image courtesy Incat Crowther)

Young Endeavour leading the Tall Ships Race past *Pacific Explorer* on Australia Day in Sydney
(Photo John Jeremy)

Cruising in NSW

The summer cruise season has moved into high gear, with visits to Sydney in late November by *Pacific Eden, Pacific Explorer, Norwegian Jewel, Radiance of the Seas, Explorer of the Seas, Voyager of the Seas, Noordam, Carnival Legend, Maasdam, Carnival Spirit, Amsterdam, Celebrity Solstice, Sun Princess, Golden Princess,* and *Astor.*

The following months saw return visits by most of these vessels, and December added visits by *Seabourn Encore, Silver Shadow, Ovation of the Seas, Diamond Princess, MS Regatta* and *AIDA Cara.* January added visits by *Seabourn Odyssey*, *L'Austral* and *Pacific Aria*, and early February added visits by *Ocean Dream, Azamara Journey, Viking Sun, Europa, Asuka II,* and *Seabourn Sojourn.*

Cruise vessels operating out of Sydney have continued to call at Eden, NSW, with passengers going ashore to visit local sights and shops. *Pacific Eden, MS Noordam* (twice)*, Pacific Jewel* (twice)*, Norwegian Jewel, Oceania Regatta* (three times)*, Silver Shadow,* and *Pacific Explorer* all visited between mid-November and mid-February.

Norwegian Jewel outbound from Twofold Bay at Eden
on 15 December
(Photo courtesy Joanne Korner)

The harbour at Eden has been dredged alongside the breakwater wharf to enable cruise vessels to berth alongside, rather than anchor in the bay and having to ferry passengers ashore as they do now. Concrete mattresses have been laid on the seabed around the embankment of the dredged area to prevent scouring by the side thrusters on the cruise ships and propeller wash from the tugs. Each mattress is five "tablets" across by ten long.

Phil Helmore

Mattresses ready for deployment on the harbour bed at Eden
(Photo courtesy Robert Whiter)

HMAS Darwin Decommissioned

Twelve former Commanding Officers were onboard the Royal Australian Navy frigate HMAS *Darwin* on 27 November as she sailed through Sydney Heads into her home port for the last time.

Darwin was escorted through Sydney Heads by Navy's newest ship, HMAS *Hobart*, for a traditional "cheer ship" as she passed the fleet before being welcomed alongside Garden Island by former sailors, officers and support staff.

The Adelaide-class frigate is being decommissioned to make way for the Navy's new fleet of Hobart-class guided missile destroyers.

HMAS *Darwin*, flying her paying-off pennant, arriving in Sydney for the last time on 27 November
(RAN photograph)

HMAS *Darwin* was commissioned on 21 July 1984 and, in the course of her duties, has steamed more than a million nautical miles across the globe.

She was deployed to operations in Timor Leste and the Solomon Islands as well as seven times to the Middle East region.

On her most recent deployment to the Middle East for Operation MANITOU in 2016, *Darwin* and her ship's company completed three seizures of heroin worth $800 million off the coast of Africa.

HMAS Darwin was decommissioned in a traditional Navy ceremony on 9 December.

The Sydney Heritage Fleet's Tall Ship *James Craig* and HMAS *Canberra* taking part in Australia Day Celebrations in Sydney
(RAN photograph)

HMS *Queen Elizabeth*, the first of two 65 000 t aircraft carriers to be built for the Royal Navy, dominating Portsmouth Harbour on her commissioning day, 7 December 2017
(MOD (N) photograph — Crown Copyright)

HMS *Queen Elizabeth* arriving at Gibraltar on 9 February 2018 for her first overseas port visit
(MOD (N) photograph — Crown Copyright)

The second of the two new carriers for the Royal Navy, the future HMS *Prince of Wales*, was floated out of her building dock at Rosyth in Scotland on a foggy 21 December 2017. She and her sister ship HMS *Queen Elizabeth* are the largest warships ever built for the Royal Navy. *Prince of Wales* is expected to be completed next year
(Photo Aircraft Carrier Alliance)

The second of three Zumwalt-class destroyers for the US Navy, the furure USS *Michael Monsoor*, completed acceptance trials on 1 February. The construction of the 14 829 t, 182.9 m long ship began at Bath Iron Works in Maine in March 2010
(US Navy photograph)

HMAS AE1 LOCATED AFTER 103 YEARS

Australia's first submarine, HMAS *AE1,* has been found, ending a 103-year maritime mystery.

The fate of 800 ton *AE1* and her 35 crew members has remained one of the persistent mysteries of Australia's military history. It was the first loss for the Royal Australian Navy and the first Allied submarine loss in World War I — a significant tragedy felt by our nation and our allies.

The Royal Australian Navy submarine was lost off Rabaul on 14 September 1914 with all personnel aboard.

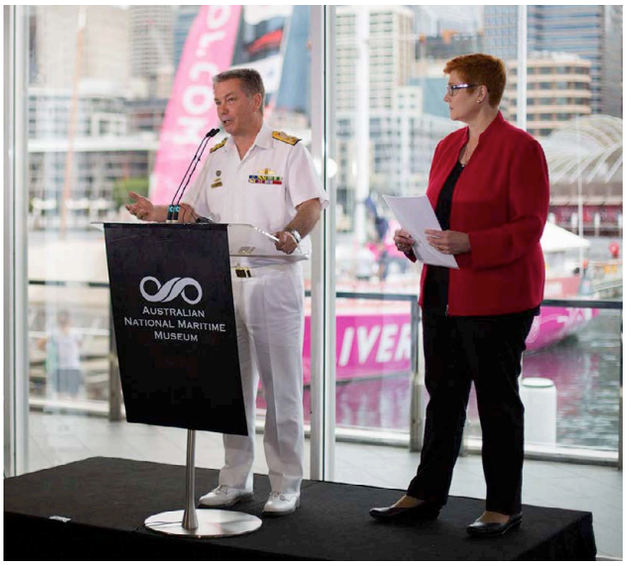
An expedition to locate the submarine took place in waters off the coast of the Duke of York Island group in Papua New Guinea before Christmas. The search vessel *Fugro Equator* located an object of interest in over 300 m of water on 19 December. Upon further inspection, the object was confirmed the following day to be the missing submarine.

The latest search for *AE1* was organised by Find AE1 Ltd and funded by the Commonwealth Government and the Silentworld Foundation. The search was conducted with the assistance of the Royal Australian Navy and a range of search groups, with assistance from the Submarine Institute of Australia, the Australian National Maritime Museum, Fugro Survey and the Papua New Guinea Government. The expedition was embarked on the survey ship *Fugro Equator* which is equipped with advanced search technology.

Following the discovery of the submarine, a small commemorative service was held by those on board the survey vessel to remember those officers and sailors who lost their lives 103 years ago.

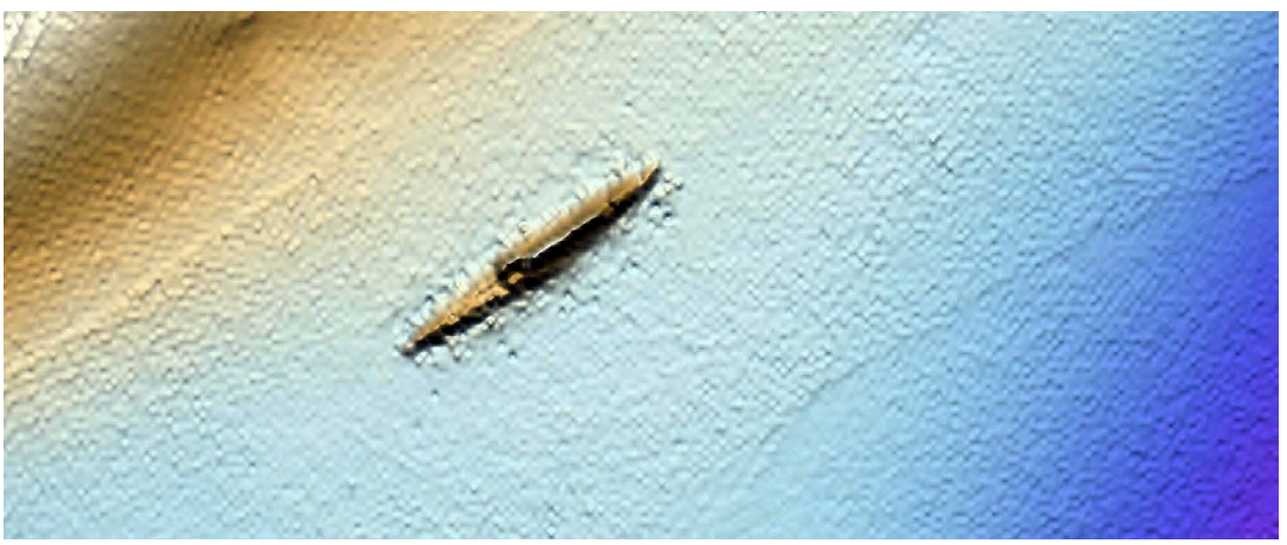
The Australian Government will work closely with the Papua New Guinean Government to consider a lasting commemoration and recognition of the crew of *AE1* and to preserve the site.

The information gained from this expedition and from the research to date will greatly assist in unravelling the mystery of the loss of HMAS *AE1*, and will be held by the Australian National Maritime Museum for future generations to remember.

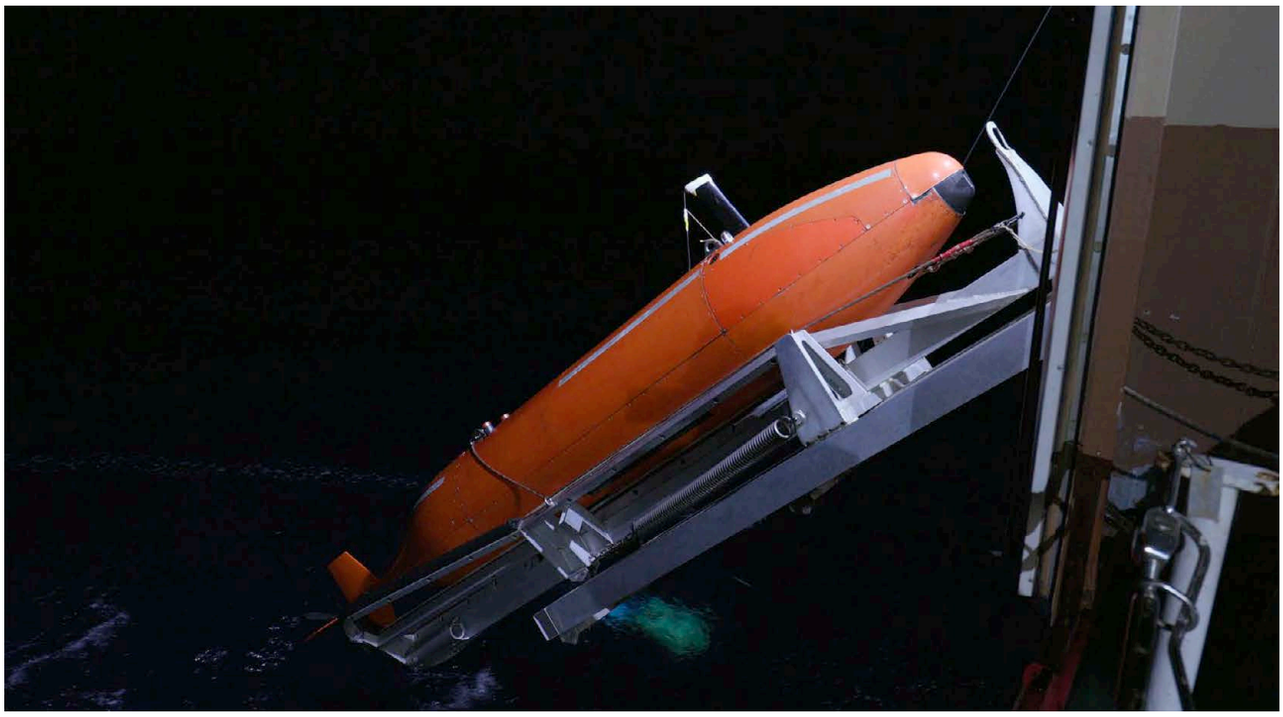


Chief of Navy, Vice Admiral Timothy Barrett, AO, CSC, RAN, and Senator the Hon. Marise Payne, Minister for Defence, at the announcement of the location of HMAS *AE1* at the Australian National Maritime Museum
(RAN photograph)

Fugro Equator
(RAN photograph)



Sonar image of AE1 on the sea floor
(Image Fugro Survey, courtesy Department of Defence)



The autonomous underwater vehicle about to be launched from *Fugro Equator* for its first, and successful, deployment in the search for *AE1*
(RAN photograph)

The conning tower of HMAS AE1 showing the two periscope standards and the submarine's surface helm
(Photograph Fugro Survey, courtesy Department of Defence)

SUMMER ON THE WATER

A regatta was held on Sydney Harbour in December to celebrate the 50th anniversary of Australia's first Admiral's Cup win. Open to any yacht which represented Australia in the series or which had sailed in selection trials, the series attraced 21 entries for the three-race event. Despite the age of the yachts (and some of their crews) competition was intense
(Photo John Jeremy)

Close racing between *Salacia II* and *Love and War* in the Admiral's Cup 50th Anniversary Regatta
(Photo John Jeremy)

Despite the grey skies, the start of the Rolex Sydney-to-Hobart yacht race on Boxing Day was the usual spectacle. Light wind and an incoming tide ensured that there were no early starters on Line 3 — this photograph was taken 9 seconds after the starting signal
(Photo John Jeremy)

The oldest competitor in the 2017 Sydney-to-Hobart was the 87 year old American yawl *Dorade* (16). Designed by then 21 year-old Olin Stephens and built under his younger brother Rod's supervision, *Dorade* has an impressive international racing record but this was her first Sydney-to-Hobart
(Photo John Jeremy)

EDUCATION NEWS

Australian Maritime College

Flying High at the America's Cup

The world of maritime engineering research can take you to amazing — even glamorous — places. A/Prof. Jonathan Binns' expertise in research and development of fast boats landed him in Bermuda and the location of yachting's biggest prize, the 35th America's Cup with top team Artemis Racing. A/Prof. Binns started working with Artemis two years ago when they wanted help in understanding how the conditions in Bermuda would affect the design of their wings and foils. The goal was to prove which of their designs would see the yacht sail faster and fly higher in the water.

He set to work with Michel Kermarec, a lead designer with Artemis, and Dr Max Haase from the Australian Maritime College to create a research program including testing procedures and analyses specifically designed for this new class of America's Cup yachts.

A/Prof. Binns is also the director of the ARC Research Training Centre for Naval Design and Manufacturing (RTCNDM), a national research training centre which brings together researchers from the University of Tasmania, Flinders University and the University of Wollongong to solve problems relating to the next generation of Australian naval vessels.

He explained how his work with Artemis applies multi-disciplinary research to the fastest yachts in the world. "We used advanced measurement and analysis technology which we've been working on since 2008. We've been refining that technology further in response to requirements from Defence Science and Technology Group over the last five years to come up with a technology package ideally suited to testing and measuring performance for these great boats," he said.

"This is a perfect example of innovating within the defence industries and then exporting to the world."

The America's Cup Class of yacht is big and fast — 15 m long, 8.5 m wide and a massive 25 m high.

With a displacement of nearly 2.5 t, it is astounding that the America's Cup yachts are now racing 100% airborne on hydrofoils — which sees the entire hull of the vessel lift out of the water.

It's also the fastest yacht race in history with speeds of up to 45 kn being regularly measured on the race course in 2017.

Having worked with Artemis to identify the best design, A/Prof. Binns was lucky enough to get to the America's Cup with them to look closely at the flow patterns experienced over the vessel's surfaces — important, as this high-speed flow defines how these boats fly around the race course.

"Each day I went out on the race course with the designers, and we'd use the delicate instruments I'd brought from Australia to measure what the air and water were doing," he said.

This work is helping Artemis understand the fluid mechanics now and in the future behind the wings in the air and in the water which make these machines fly.

"Once the designers have used this information to work their magic, the yacht flies faster."

It's a far cry from research in one of AMC's hydrodynamic facilities, but A/Prof. Binns relished experiencing the performance of both humans and machines at the world's oldest sporting trophy event.

"It is absolutely amazing to be involved at this level. The Artemis team is incredible to work with, all dedicated to the one goal: winning the America's Cup," he said.

"This regatta is like no other I've ever been to. These yachts are high-tech machines and their speeds were once thought unachievable. I'm seeing the realisation of what was once seen as an impossible dream."

A foiling catamaran at speed
(Photo Artemis Racing/Sander van der Borch)

Explosive Research to Build Safer Submarines

PhD candidate Steven De Candia is a leading example of the industry pathways training job-ready graduates to step into Australia's ambitious multi-million dollar naval shipbuilding program.

He is one of ten higher degree research students and three postdoctoral fellows to undertake a combination of research and professional training in an industrial environment, as part of the Research Training Centre for Naval Design and Manufacturing (RTCNDM).

The $3.8 million program, funded by the Australian Research Council, is a collaboration between the Australian Maritime College at the University of Tasmania, the University of Wollongong and Flinders University.

With Australia set to embark on one of the largest Defence spends ever committed, the RTCNDM partners researchers with industry and Defence and aims to produce a cohort of industry-ready broadly-skilled engineers and researchers, to work on projects which will boost the country's shipbuilding prowess.

Steven De Candia is already on that pathway. A 2015 graduate of RMIT University with a Bachelor of Engineering (Mechanical), Mr De Candia's PhD sees him working through the RTCNDM with AMC, the Defence Science and

Technology Group in Melbourne, and Babcock Australasia in South Australia.

His research, titled *The Application of Fluid Structure Interaction Modelling for Underwater Shock to Future Submarines*, looks at what happens when an underwater explosion occurs near a submarine.

Specifically, Mr De Candia is studying the effect of the large gas bubble which forms underwater post-explosion. This bubble expands and contracts underwater and, if near a submarine, can cause it to bend back and forth in a motion known as a whipping response. This sort of vessel response may last long after the initial explosion and could potentially cause damage to the hull and internal equipment.

Results from an underwater explosion experiment at a DST Group facility in Victoria are used to create computer models to run multiple scenarios and analyse how the submarines withstand the explosions.

"We can also perform "what if?" scenarios which we would never be able to do on the real vessel, like 'how much damage might occur if it takes a hit from a particular weapon, and can the vessel recover from this?'" Mr De Candia said.

It's hoped that the research work will form part of the project to build Australia's next generation of submarines, the SEA1000 future submarines, whose construction will be Australia's largest engineering project.

"All this information will ultimately go into producing requirements for future vessels to ensure that the vessels themselves and internal equipment and crew can survive the appropriate scenarios that they may encounter," he said.

"In short, improving the modelling capability means that we can make better use of the vessels we have and improve the designs for vessels of the future."

The academia-industry partnership provided through the RTCNDM is an opportunity Mr De Candia believes wouldn't have been possible, if not for the collaboration.

"I probably couldn't do what I'm doing without it; in the case of DST Group partnership they've provided the technical know-how and the experimental facilities, so really there is only very few places in the world that you can do this sort of work," he said.

"I get to work directly with the Babcock designer, and find out what their requirements are, learning from what they do and seeing how they can enhance that with the data from my experimental work."

And he's happy to recommend the industry-based PhD pathway to others, because of the invaluable combination of research opportunities and contact with end users.

"It's been very valuable to have a firsthand feel of everything from designing and running an experiment to running through all the data and, finally, putting it all together into something that someone can read and interpret," he said.

Preparing for the Future

Budding engineers have been putting their theory work into practice using AMC's world-leading education and research facilities as they compete in a series of annual undergraduate design competitions.

The major assessments for the first-, second- and third-year

students at the National Centre for Maritime Engineering and Hydrodynamics saw teams compete in four design categories — the Rat Trap Boat Race, Submarine Design, Skateboard Design and Boat Building projects.

Rat Trap Boats

The Rat Trap Boat Race challenges students to develop a vessel which can complete a 10 m course in the model test basin within 30 seconds, powered only by a single rat trap.

Student Sean Kebbell said that key design factors were the hull shape and type, propulsion methods and harnessing the power of the rat trap as effectively as possible.

"We designed our vessel using CAD and it was created using a laser cutter. This allowed our boat to be very precise, resulting in the boat going dead straight."

The vessel designed by Sean's team was a relative success, completing the 10 m in 37.5 seconds, placing them second to a fourth-year student.

Being first across the line isn't the only determinant of success, with Sean identifying the team members were definitely building skills to use in a future career, but also in life.

"From a first glance these projects are subject based, but looking back from completion they are so much more. They are projects which teach life skills and, most importantly, teamwork skills which we are always going to need when we get into industry."

Submarine Design

Third-year naval architecture students got some hands-on experience in the fast-growing naval construction sector, designing, building and testing a scale-model submarine.

This team project-based learning activity is a formal assessment of the Underwater Vehicles Technology Unit.

The model submarines had to be watertight to a depth of one metre and were assessed on criteria including their stability, navigation and diving abilities. The hydrodynamic hulls were manufactured using the numerically controlled router of the School of Architecture and AMC's vacuum moulding facility.

The teams used the towing tank to test the underwater resistance calculations of their models, before conducting commissioning trials in the survival centre swimming pool.

Lecturer Dr Roberto Ojeda said that the design project was extremely relevant to the fast-paced development of the naval shipbuilding industry, and aligns well with the future needs of the sector.

"The project enables the students to brush up on the peculiarities of the naval industry, and to see how knowledge learned in the naval architecture program can be applied to real-world design," he said.

"Other units of the naval architecture program provide the students with all the necessary tools. In underwater vehicle technology, we teach them how to apply these tools to the special case of submarine and AUV design."

Skateboard Design

Another category in the competitions is the Skateboard Design project, where students are required to design and test a composite panel suitable as a skateboard deck.

One of the submarine teams
(Photo courtesy AMC)

This project serves to introduce students to the important properties and applications of composite materials in a wide range of engineering technologies. Students are required to fine tune flexural and strength properties during the design stage in order to achieve specific properties.

The final judging is by street testing, which adds a subjective element, as no two skaters will respond to a board in the same way. A board is deemed to be successful when the flex, strength and balance suit the riders' expectations.

Lecturer Denis Lisson said that, upon completion of the project, the students have gained valuable experience in working as a team, which is so important for their future employment opportunities.

"Apart from enhancing their understanding of the underpinning principles of materials engineering, the hands-on project encourages collaboration and motivation," Mr Lisson said.

Boat Building

In the Boat Building design project, second-year students must design and construct a model boat, culminating in a wet-test simulation.

The wet test sees the vessels subjected to waves and calm water dynamic testing and stability testing.

Lecturer Fred Barrett believes that the hands-on learning is the key to success.

"I run a lot of videos to get them to tune into watching real life stuff, we don't dwell on text books. Seeing and feeling is the best way to teach, and it can keep the interest levels high," Mr Barrett said.

The importance of team work identified in all projects is a sentiment echoed by Dr Christopher Chin, Deputy Director (Students and Education), National Centre for Maritime Engineering and Hydrodynamics.

"Many employers view team dynamics, ethical awareness and leadership as high priorities," Dr Chin said.

"When working in industry, most projects are team oriented. Thus, it is important that these skills are teased out in team projects."

Solid Foundation for Naval Shipbuilding Career

It's a long way from the rural landscapes of Dalby in regional Queensland to the headquarters of one of the world's biggest defence and security companies in Scotland.

That's the path travelled by naval architect Joseph Cook, thanks to an AMC information stand at a high school careers expo in Brisbane.

The information which he picked up that day piqued his interest in maritime engineering and led to a move to Launceston in 2007 to study a Bachelor of Engineering (Naval Architecture) degree at AMC.

After graduating in 2011, Mr Cook began work as a naval architect for BAE Systems Australia at its Williamstown shipyard, working on its Landing Helicopter Dock program.

In 2016, he was seconded to the BAE Systems headquarters in Scotland as part of the company's program for engineers under 30 to develop their skills and experience working with the world's leading warships.

As a Principal Naval Architect with BAE, Mr Cook works within the resident design team developing the Australian Future Frigate concept in support of the Australian SEA 5000 Future Frigate program.

The team's work centres on ensuring that the anti-submarine warship — the Global Combat Ship-Australia — which they are offering as part of the SEA5000 program, will meet Australian Government and Royal Australian Navy requirements.

"In my role I am constantly exposed to a diverse range of challenges which keeps me on my toes, and being part of this design team allows me to gain experience which isn't possible in Australia," Mr Cook said.

He is excited about being involved in an industry that is set to boom as Australia embarks on its quest to build the next generation of submarines, frigates and patrol boats.

"The naval shipbuilding industry appears to have a bright future in Australia so, hopefully, I can continue to play a role in future naval ship builds," he said.

Mr Cook attributes much of his success to his decision to move to Tasmania to study at AMC and access its world-class facilities.

"Studying on campus at Launceston allowed me access to all the facilities such as the Towing Tank, Cavitation Tunnel and Model Test Basin and the small class sizes allowed a positive environment for interaction with the lecturers and staff," he said.

"As my career progresses, I continue to find practical uses for the knowledge I gained at the AMC. These tools give me the ability to tackle real-world engineering issues in support of significant naval projects."

Curtin University

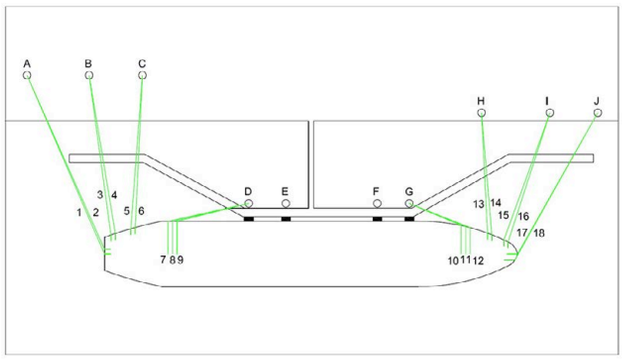
Masters in Subsea Engineering

Three of Curtin's Masters in Subsea Engineering students took on ship hydrodynamics projects in the second semester of 2017. These were

Mate Ostojic	*Wave-induced motions and loads on an LNG carrier at a terminal berth*
Chris Buchan	*The effect of loading on FPSO roll motion*
Ashley Nazareth	*Coupled wave-induced motion for a side-by-side FLNG and LNGC*

For further information, contact Tim Gourlay: tim@perthhydro.com

Tim Gourlay



Mooring arrangement for an LNG carrier
(Drawing courtesy Mate Ostojic)

Subs in Schools Technology Challenge

The National Final for the *Subs in Schools Technology Challenge* was held on 21 and 22 November 2017 at North Lake Senior High School, WA. *Subs in Schools* is coordinated by Re-Engineering Australia and aims to encourage students to pursue Science, Technology, Engineering and Mathematics (STEM) learning, careers and skills. The program is supported by industry and education partners who provide mentoring for the competing teams and judges for the competition.

The program is divided in to four levels:

- Level 1 Build a mini ROV
- Level 2 Design and build an ROV
- Level 3 Design a submarine internal accommodation space
- Level 4 Design and build a working model submarine

At the National Final, Level 2 and 4 projects were competing.

The student teams were scored on a verbal presentation, marketing, their design process, use of computer-aided design, manufacturing, compliance with the specification, and their performance in a sea trial. The sea trial for the submarine category involves navigating the submarine fully submerged through a series of gates; and for the ROV category, object retrieval and image capture.

The competition gave the students the opportunity to develop solutions for practical engineering problems. There were mixed levels of success amongst the entrants, with achieving watertight integrity being challenging for a number of teams. The top teams were very impressive and had well-considered designs. It was also great to see the students excited about careers in engineering!

The top-placing teams for Level 2, Design and Build an ROV, were:

1. The Kraken (South Fremantle Senior High School, Western Australia)
2. Alia Astra (Comet Bay College, Western Australia)

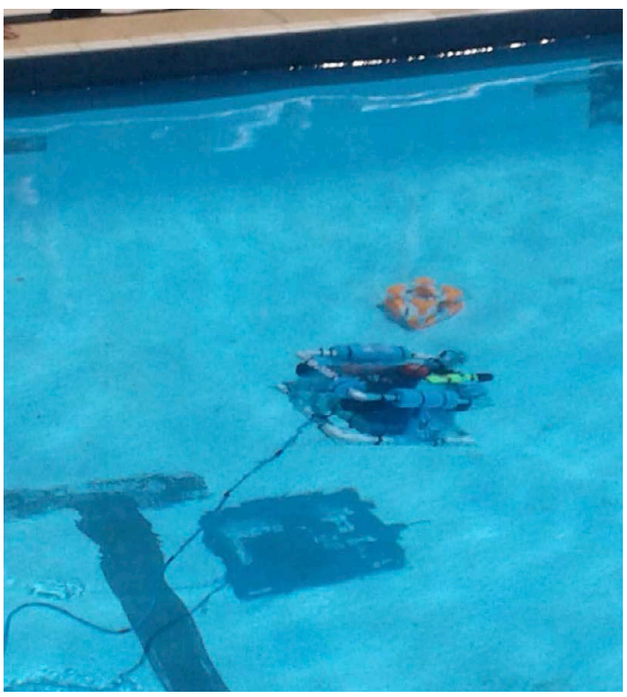
3. Heights and Depths (The Heights School, South Australia)

The top-placing teams for Level 4, Design and build a working model submarine, were:

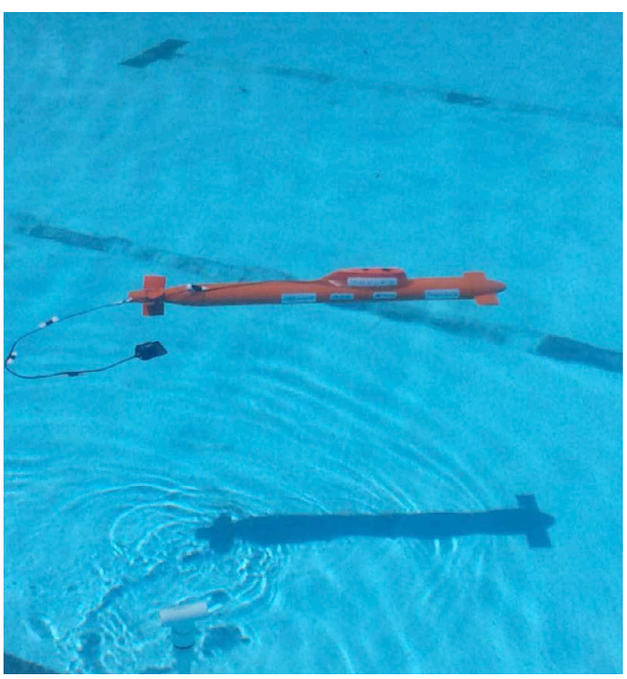
1. Aegier Group (Carlingford High School, New South Wales)
2. Salacia (St Peter's Girls' School, South Australia)
3. Black Marlin (Carlingford High School, New South Wales)

More information about the Subs in Schools program can be found at https://rea.org.au/subs-in-schools/.

Iain Lund



Contestant ROV by Aquaholics, Pinjarra Senior High School, WA
(Photo courtesy Iain Lund)



Winning submarine by Aegier Group, Carlingford High School, NSW
(Photo courtesy Iain Lund)

UNSW Sydney

Undergraduate News

NAVL Courses Taught for Last Time

In view of the impending discontinuation of the naval architecture degree stream at UNSW, some NAVL courses are being taught for the last time this year.

NAVL4120 Ship Design Project A will be taught by Phil Helmore for the last time as MECH9910 Special Topic in Mechanical Engineering.

NAVL4130 Ship Design Project B will be taught by Phil Helmore for the last time as a stand-alone subset of MECH4100 Mechanical Design 2 (which will be taught by David Lyons).

NAVL3620 Ship Hydrodynamics will be taught by Rozetta Payne for the last time as a stand-alone subset of AERO3630 Aerodynamics.

These courses will enable current Year 3 and Year 4 students to complete their degrees in naval architecture at UNSW, with outstanding non-NAVL courses to be completed next year. Current Year 2 students will complete their NAVL courses at the Australian Maritime College in Launceston.

Staff Changes

Mac Chowdhury has gone on extended long-service leave as a precursor to retirement from UNSW after 28.5 years of teaching ship structures and other NAVL, MECH and MMAN courses.

David Lyons has accepted an education-focussed role, and will be teaching composite engineering and mechanical design-type courses, as well as taking on the coordination of the undergraduate thesis for the school's 300+ students, and the coordination of industrial training for the same number.

Phil Helmore is currently on a 40% appointment and, after teaching the ship design project for the last time this year, will go on extended long-service leave as a precursor to retirement from UNSW after 27 years of teaching NAVL and other MECH and MMAN courses.

Thesis Projects

Among the interesting undergraduate thesis projects recently completed are the following:

Analysis and Optimisation of Current Intenational Moth Foil Design Through CFD

T-shaped hydrofoils are currently used as the main source of lift in International Moth sailing dinghies. Gian Maria Ferrighi has conducted an investigation aiming to build on the understanding of their performance through the use of computationa fluid dynamics (CFD) to increase the overall performance of the lifting surfaces. The analysis has been mainly focussed on three main aspects where significant improvements can be made by designers: section design, foil tip optimization and reduction of intersection drag and disturbances. These areas were optimised for current sailing speeds and compared to existing designs so that the total performance gain could be quantified and compared.

The analysis resulted in significant improvements in lift-to-drag ratios of the hydrofoil over the original design provided by a manufacturer, and provided explanations for

different design choices made by other International Moth manufacturers exploring different design avenues.
Phil Helmore

Post-graduate and Other News

Presentations by Em/Prof. Lawrence Doctors

During his recent overseas trip, Em/Prof. Lawrence Doctors made a presentation on 20 December 2017 on the subject *Unsteady Effects on Ship Resistance and Wave Generation of Ship Models in Towing Tanks* to the School of Mechanical Engineering at the University of Tel-Aviv, in Ramat-Aviv, Israel. The subject matter was work which was conducted in cooperation with Prof. Sandy Day in the Department of Naval Architecture, Ocean and Marine Engineering, at The University of Strathclyde, in Glasgow, Scotland.

Figure 1 is a photograph of the 3.000 m long Wigley model during a test in relatively shallow water in the towing tank of the Kelvin Hydrodynamics Laboratory at the University of Strathclyde. The wave reflections from the sides of the tank are quite evident. The existence of the reflections correlates with the interference on wave resistance caused by the tank sides. Figure 2 shows the corresponding computer-generated wire-frame view of the model which was used in the computer software in order to test the theory. Figure 3 is a mathematical idealisation of the velocity-time history of the motion of the towing carriage. However, much of the experimental work was performed in which the starting phase of the carriage motion was essentially one of constant acceleration.

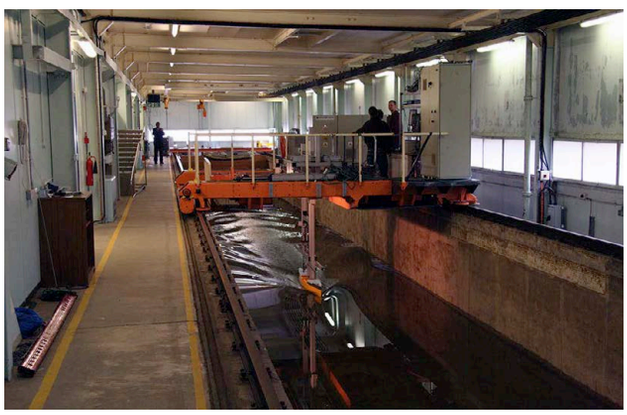


Figure 1: Wave reflections in the towing tank
(Photo courtesy Lawry Doctors)

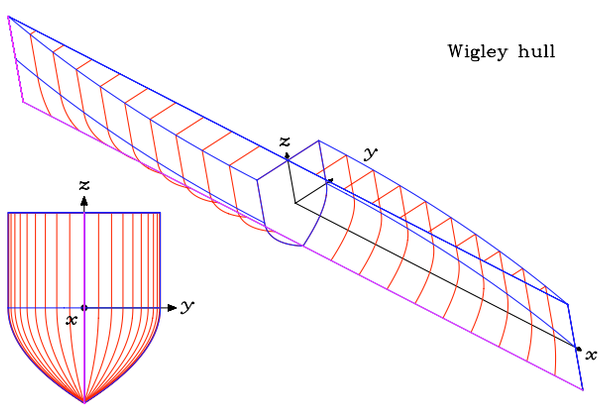


Figure 2: Wireframe view of Wigley model
(Image courtesy Lawry Doctors)

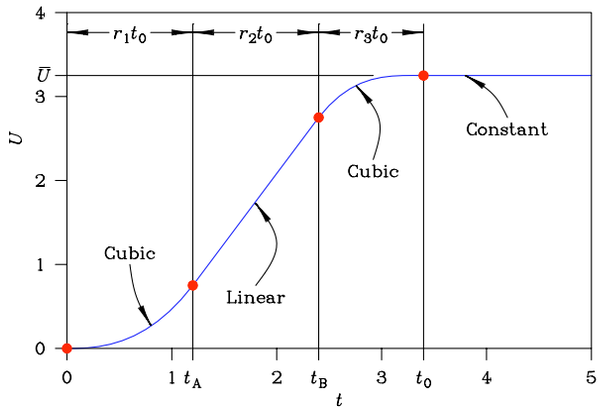


Figure 3: Idealised velocity history
(Image courtesy Lawry Doctors)

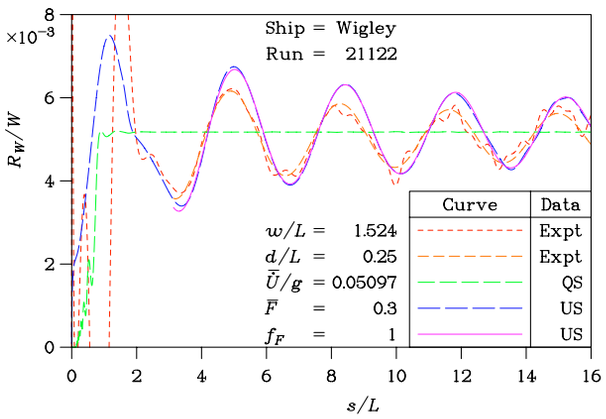


Figure 4: Temporal wave resistance at Froude Number of 0.30
(Image courtesy Lawry Doctors)

A typical set of results is presented in Figure 4. There are five curves indicating the specific wave resistance (the ratio of the wave resistance to the vessel weight) as a function of the dimensionless distance of travel of the model (the ratio of distance to the model length). The data applies to a length Froude number of 0.3 and an acceleration of $0.05g$ during the starting phase of the towing-tank run. In this example, the water depth is 0.25 of the model length and the tank width is 1.524 of the model length. The first curve is the raw experimental data which was obtained by subtracting the estimated frictional resistance from the total resistance. The second curve is the smoothed experimental data. The third curve is the traditional steady-state resistance according to the theory of Michell (1898). The fourth curve is the unsteady-theory prediction using the precise motion history of the model. Finally, the fifth curve is the smoothed version of the unsteady theory.

These results demonstrate the strong influence of the unsteady effects experienced by a ship model in a towing tank. The effects are still very evident after a relatively long tank run of 16 model lengths. The unsteady effects are even more prominent at a Froude number of 0.35 in Figure 5. There is a difference between the theory and the experiment in that there is a constant vertical shift between the two sets of results. This difference can be traced to the method of analysis in which the viscous resistance was assumed to be identical to the flat-plate frictional resistance; that is, a frictional form factor of unity was assumed in this plot.

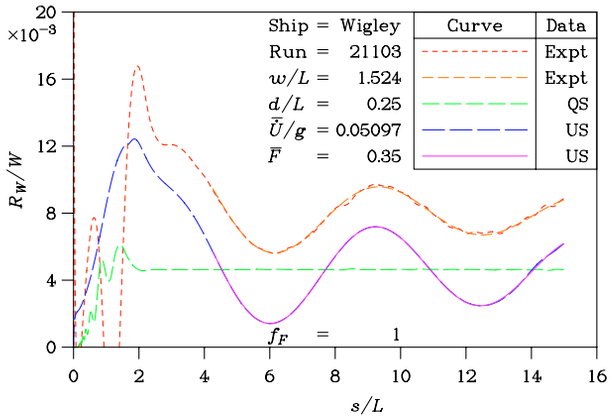


Figure 5: Temporal wave resistance at Froude number of 0.35
(Graph courtesy Lawry Doctors)

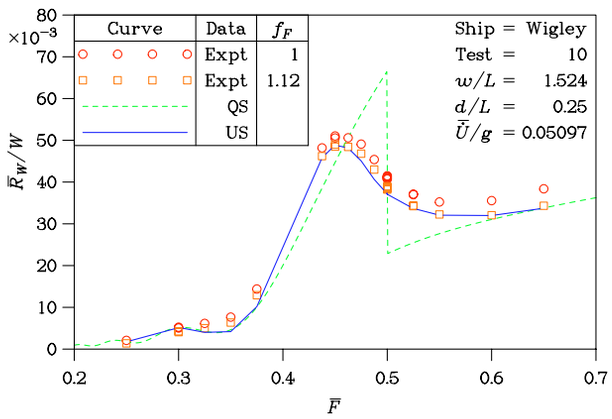


Figure 6: Predictions of pseudo-steady wave resistance
(Graph courtesy Lawry Doctors)

A pseudo-steady wave resistance can be constructed from the unsteady data and an example is presented in Figure 6. The "steady" wave resistance is plotted as a function of the Froude number corresponding to the steady phase of the towing-tank run. There are four sets of data. The first set (the circular symbols) is the experimental results in which the long-term (asymptotic) resistance has been determined by extrapolating the data to an infinite value of the time. A frictional form factor of unity has been assumed for this first data set. The second set of data (the square symbols) is based on the same extrapolation, but a frictional form factor of 1.12 has been used. This value of the form factor is consistent with other work, for example that by Sharma (1969). The third curve is the purely steady prediction using the theory of Newman and Poole (1962), which is effectively an extension of the work of Michell (1898) to the case of motion in a tank with a restricted width filled with water of finite depth. This curve demonstrates the sharp drop in resistance when the model passes the critical speed, which occurs when the depth Froude number is unity. The fourth curve is the theoretical prediction, extrapolated to infinite time; it should be compared with the second set of data with which there is excellent correlation.

The data in Figure 6 illustrates the considerably better understanding of towing-tank work that is provided when we properly take into account the unsteady influences. Finally, the linear theory can be employed to predict the frequency of the oscillation in the temporal resistance curves, evident

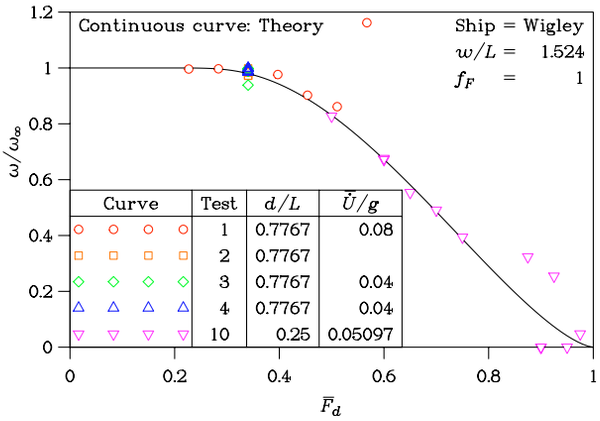


Figure 7: Critical radian frequency
(Graph courtesy Lawry Doctors)

in Figures 4 and 5. This is plotted in Figure 7. The frequency is rendered dimensionless with respect to the frequency pertinent to the deep-water case. It is plotted against the depth-based Froude number applicable to the steady part of the towing-tank run. Five sets of tests in two depths of water and various accelerations during the starting phase were considered. Once again, there is excellent correlation between theory and experiment, except near the expected problematic case when the depth Froude number is unity.

Lawry also gave a seminar on 3 January 2018, to the Faculty of Mechanical Engineering, at the Technion in Haifa. The subject was a very abbreviated version of his recently-published book, *Hydrodynamics of High-Performance Marine Vessels*.

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Lawry Doctors

ASC Teams with BMT

Australian shipbuilder ASC has signed a collaboration agreement with international engineering consultancy BMT to meet increasing demand for ASC's submarine expertise and experience.

The 12-month collaboration agreement, signed at ASC's submarine headquarters at Osborne, South Australia, will strengthen ASC's roles as builder and sustainer of Australia's Collins-class submarine fleet.

"Under this agreement, ASC will be better able to meet increasing demands for our work on the Collins-class fleet, as well as our growing role in the future submarine space," said ASC's chief executive, Stuart Whiley.

Last year ASC secured a further five-year performance period for the sustainment contract for the Collins-class submarines. ASC has a submarine workforce of approximately 1200 and is the Collins-class Design Authority, conducting submarine sustainment, enhancements and upgrades at its sites in Osborne, South Australia, and Henderson, Western Australia. ASC is also part of the Future Submarine Project Office, currently providing approximately 28 seconded staff.

"BMT has a long-standing pedigree in global submarine design and support and we are excited by the potential for this agreement to provide real opportunities in Australia's growing submarine platform sector, especially in supporting the Collins-class fleet, which will remain in service well into the 2030s," BMT Business Development Director, Rob Steel, said.

The collaboration agreement was signed on 24 January and runs for 12 months.

BMT Wins Job Creator of the Month for Local Industry

Last November BMT was named 'Job Creator of the Month' by BenchOn for supporting local industry. The award is part of an on-going initiative to improve utilisation within the Australian defence industry, where under-utilisation increases costs, reduces job stability and decreases business growth.

BenchOn's Job Creator of the Month aims to encourage the creation of 1000 new full-time positions this financial year by matching highly-skilled, under-utilised employees from one company to the short-term requirements in other companies. The overall objective is to tackle under-utilisation where businesses traditionally have problems with business development, focusing on short-term contracts to stay afloat rather than strategic, long-term contracts.

Peter Behrendt, Managing Director at BMT, commented "We are delighted to accept this award and assist with BenchOn's objectives of supporting local industry and small businesses. This award reflects our strong ongoing commitment in supporting Australian engineers for the Australian Naval Enterprise."

Tim Walmsley, CEO of BenchOn, commented "BMT have been leading the way in this campaign and we are proud to have a company of their calibre supporting our efforts to create a more robust industry which can grow jobs for the future. We encourage the rest of industry to follow BMT's lead by joining us in the pledge."

BenchOn is a Queensland company which seeks to solve the problem of employee underutilisation which is costing the Australian economy billions each year in lost productivity. Within industries which are heavily contracts or projects based, underutilisation increases costs, reduces job stability and decreases business growth. To address this problem, BenchOn has developed a Software as a Service (SaaS) marketplace solution which matches idle staff to short-term contracts from reputable companies and Government agencies.

Agreement to Create Australian Power and Propulsion Team

BAE Systems announced on 21 December that it has signed an agreement to create an Australian Power and Propulsion Team (P&P Team).

The P&P Team, which includes David Brown Santasalo, L3, Naval Group, MTU/Penske and Rolls-Royce, each an original equipment manufacturer (OEM) of power and propulsion systems, has committed to work collaboratively with BAE Systems to transfer knowledge and capability to Australia with the potential to create hundreds of new highly-skilled jobs.

Since P&P systems are key components in the design of modern anti-submarine warfare frigates, the objectives of the P&P Team for future programs will be to:

- transfer technology and intellectual property to ensure that Australia becomes a regional leader in the construction, maintenance and development of electrical power and propulsion systems;
- create hundreds of Australian jobs through the growth of manufacturing, assembly, test and integration of P&P equipment systems in Australia and set up and/or expansion of local OEM offices in Australia;
- work with local companies, including SMEs, to help develop their capability to support the development of P&P systems;
- partner with Australian academic institutions to develop the next generation of engineers who will work on P&P systems as part of the SEA 5000 program and explore the potential for technical innovation of P&P systems;
- investigate the potential for the creation of physical, onshore test and integration facilities to enable operational and maintenance training, and leave an enduring facility as a focus for Australian P&P capability; and
- create pathways to developing a viable P&P systems export industry, positioned to sell into naval shipbuilding programs around the world.

The P&P Team will work to deliver intellectual property and expertise, making it available to industry for defence purposes and creating a collaborative team structure focused on delivering the best P&P solutions to the nation.

Working with the Commonwealth Government and the Royal Australian Navy, P&P Team members will bring their combined expertise of test and proving power and propulsion systems on such platforms as the Royal Navy's Queen Elizabeth-class aircraft carriers, optimising the test, training and maintenance solutions for future Australian naval vessels.

BAE Systems SEA 5000 Managing Director, Nigel Stewart, said "Between our respective companies we have significant global expertise in power and propulsion systems. We are all committed to further developing these technologies in Australia to help create and sustain advanced manufacturing jobs and to help develop skills which will be attractive not just in Australia but for the global market."

Rob Madders, General Manager Australia & New Zealand, Rolls-Royce, said "Growing Australian capability through the construction and maintenance of the complex systems which enable a naval frigate to operate, requires the OEM to commit to fully transferring required technical information. Through the P&P Team, Rolls-Royce and the other companies which BAE Systems has assembled for its P&P Team, will do precisely that."

BAE Systems is also partnering with Australian academic institutions to develop the next generation of engineers who will work on P&P systems as part of BAE Systems' contract for the SEA 5000 program should BAE Systems bid be successful, and explore the potential for technical innovation of P&P systems for the benefit of Australia's sovereign defence industry.

The Commonwealth is expected to announce a decision on the selection of the SEA 5000 frigate by mid-2018.

Navantia Australia Partners with Taylor Bros for SEA 5000

On 31 January 2018 Navantia Australia announced a new contract with Tasmanian firm Taylor Bros, embedding a Taylor Bros team into Navantia Australia's Design and Production teams for the SEA 5000 program. The Integrated Product Team will identify feasible solutions to meet the mixed messing requirements for the future frigates and scheduling of work. The project commenced at the end of January.

Navantia Australia and Taylor Bros will partner on this project, from the design stage right through to turnkey habitability. The final building specifications for accommodation will meet Lloyd's Register's Naval Ship Rules requirements, DEF (AUST) 5000 (Maritime Requirements Set) and the Commonwealth of Australia's SEA 5000 Ship Requirements.

Navantia Australia's Managing Director, Donato Martinez, said "We are very pleased to be continuing our relationship with Taylor Bros, to produce a modern state-of-the-art design which provides safe, comfortable and functional accommodation on board our F-5000 proposed future frigate for the Royal Australian Navy, building on the lessons learned from the Hobart-class design, planning and production activities."

Phillip Taylor, Taylor Bros Commercial Director, said "We are looking forward to working with Navantia Australia to develop innovative ways to make shipboard life easier. We have become a specialist in outfit accommodation services to the marine industry and have developed a prefabrication approach to projects for defence which enables delivery on time and within budget."

Prefabrication is advantageous as it increases efficiency and productivity and reduces the risk of delay from weather and other variables, compressing the project schedule and reducing the project cost.

Mr Martinez noted "Taylor Bros' familiarity with Navantia's naval designs and strict design criteria enables us to efficiently integrate cutting-edge solutions seamlessly into the F-5000 design. Both teams working in the same digital environment, brings all the manufacturing knowledge to the design process. This allows Navantia Australia to design minimising supply-chain management, planning and production costs from Ship 1 and achieve learning curves as the best in our industry or even improve them. "

Over the past decade, Navantia Australia has established partnerships with over 200 Australian companies.

Navantia, Saab and CEA Join Forces for Canada

In December a Navantia-led team submitted its tender for the Canadian Surface Combatant (CSC) program, with global defence and security company Saab as the Combat Systems Integrator (CSI) and CEA Technologies providing key elements of the proposed solution.

With a strong heritage in designing and building frigates and destroyers and proven technology transfer in global programs, the Navantia team believes that it offers the best capability for the Royal Canadian Navy and the Canadian shipbuilding industry.

"The team of Navantia, Saab and CEA demonstrates the potential of Australia's sovereign shipbuilding enterprise and underlines Navantia's genuine commitment to Australian industry as well as our belief in the competitiveness of Australian-developed capability," said Navantia Australia Chairman, Warren King.

"Navantia's partnership with Australia on the Hobart-*c*lass destroyers has provided the RAN with the most capable warship it has ever operated. Over the last decade Navantia Australia has grown into a genuinely Australian shipbuilder and we have built partnerships with industry, government, academia and vocational training institutions. Navantia is proud to now have the opportunity to lead this major Australian export opportunity. The total value of the CSC program is over $57 billion and the partnership between Navantia, Saab and CEA demonstrates the strong potential of Australian industry and vindicates the Australian Government's focus on building sovereign capability", he said.

Navantia Spain has been working closely with Saab Australia, and CEA on the CSC program. The capability of both companies will provide a significant technological edge for the Royal Canadian Navy. Saab had to prequalify for the Combat System Integrator role on the Canadian Surface Combatant program.

"That Saab was the only local Australian company that

qualified as a viable combat system integrator for the Canadian Surface Combatant program, demonstrates the high capability of our local workforce and the credibility of the naval solutions which we have delivered to the RAN and to export markets. The confidence of the Australian Government in mandating Saab combat system and tactical interfaces across the whole RAN fleet demonstrates the strength of our capability" said Saab Australia Managing Director, Andy Keough.

"Saab's expertise in developing high-quality solutions for Australian programs in partnership with Navantia, CEA Technologies and others allows us to provide a low-risk high-capability solution for Canada, which will be fully interoperable with partner navies such as the United States and Australia as well as other NATO allies", concluded Patrick Palmer, Head of Saab Canada.

The submission of the CSC bid is also a significant moment for CEA Technologies, providing further opportunities for global partnership and recognition of the radar expertise which the company has built in Canberra.

"We are excited about the opportunity to collaborate with Canada in the CSC program," said CEA Technologies CEO, Merv Davis.

"We can deliver a mature radar which is outperforming the expectations of the RAN and has substantial potential for future growth. Building partnerships through international programs such as CSC is an opportunity for CEA to continue to develop our innovative solutions. We are proud to be able to provide our Australian technologies to our international partners and allies" he said.

Under the CSC program, the Royal Canadian Navy will acquire up to 15 frigates to replace the Iroquois-class destroyers and Halifax-class frigates. Construction of the frigates will begin in the early 2020s.

Airspeed to work with Navantia

On 13 December Navantia Australia announced a new contract with South Australian composite company Airspeed. Airspeed will conduct design studies into the use of composite materials on Navantia Australia's ships proposed for the RAN's SEA 5000 program.

Airspeed is one of Australia's leading companies in the design and manufacture of composite structures. Under this contract, Airspeed will develop options to introduce composites into Navantia designs.

"Navantia Australia is committed to investing in technically innovative solutions which offer maximum efficiency of materials, cost effectiveness and, most importantly, deliver superior performance for the Royal Australian Navy," said Navantia Australia Managing Director, Donato Martinez.

"Part of building a sovereign national shipbuilding capability is partnering with Australian companies to develop new technologies and materiel applications, such as composites, which can be rapidly incorporated into existing designs. We are nurturing our industry partnerships to face the challenges of new and evolving requirements in the near future".

"The Future Frigate program is one of the most significant defence projects in Australia's history," said Airspeed Managing Director, Steve Barlow. "Airspeed has practical, demonstrated and local design-and-build capabilities in composite materials and we're excited about the prospect of working with Navantia Australia on their proposed F-5000".

Rolls-Royce Reorganises

Rolls-Royce has announced that it is reducing its current five operating businesses to three core units based around civil aerospace, defence and power systems.

This means that the naval marine and nuclear submarines operations will be incorporated into the company's existing

defence business, while civil nuclear operations will become part of the power systems business.

"It will allow us to better capitalise on our relationships with defence customers and our market-leading widebody position within civil aerospace, while strengthening our technology capabilities across a broad range of power generation applications," the company said. "We would expect the subsequent restructuring to deliver an additional reduction in costs and assist us in improving performance from our core businesses and the whole group."

The company added that it doesn't anticipate job cuts as a result of the restructuring.

"Building on our actions over the past two years, this further simplification of our business means that Rolls-Royce will be tightly focused into three operating businesses, enabling us to act with much greater pace in meeting the vital power needs of our customers," Chief Executive, Warren East, said. "It will create a Defence operation with greater scale in the market, enabling us to offer our customers a more integrated range of products and services. It will also strengthen our ability to innovate in core technologies and enable us to take advantage of future opportunities in areas such as electrification and digitalisation."

Rolls-Royce expects these changes to take effect during the first quarter of 2018.

Defence Streamlines Service Provider Arrangements

The Minister for Defence Industry, the Hon. Christopher Pyne MP, announced on 5 February that Defence had entered into Major Service Provider (MSP) agreements with four Australian industry-led teams to more effectively engage with industry.

Minister Pyne said that the MSP agreements represent a fundamental change in how Defence's Capability, Acquisition and Sustainment Group (CASG) service providers work together to acquire and sustain capability for the Australian Defence Force (ADF). The Major Service Providers will support CASG in tasks like workforce planning and management, industry and supply-chain management, and longer-term partnerships to better deliver capability.

"The agreement actively encourages healthy competition in the market, including fostering a viable and vibrant small-to-medium enterprise (SME) sector for above-the-line subject matter expertise," Minister Pyne said.

"Not only does this arrangement recognise industry's importance as a fundamental input to capability, but it will also deliver better value for money to the Commonwealth."

Minister Pyne said taht this has been achieved through an interactive and competitive dialogue process with industry, including the four successful MSP teams led by Jacobs Australia, Nova Systems Australia, Kellogg Brown & Root (KBR), and Downer EDI Engineering Power.

"The MSP agreement will also ensure that an enhanced and sustainable capability exists within both Defence and industry to support current and future Commonwealth work requirements," Minister Pyne said.

"All the MSPs provided a competitive price for the delivery of services and are committed to working with, growing and developing the Australian Defence industry sector."

By mid-2018 a further tranche of service provider arrangements will be delivered. The new Defence Services Support panel will make available the expertise of over 350 SMEs to support Defence in delivering capability.

Further details of the four MSPs involved in the agreement, which came into effect on 1 February 2018, can be found online at www.defence.gov.au/casg/DoingBusiness/Industry/Industryprograms/MSP.

Launch of Defence Export Strategy

At the end of January the Government released a new Defence Export Strategy. The document sets out the policy and strategy which the Government hopes will make Australia one of the top ten global defence exporters within the next decade.

The Defence Export Strategy includes several initiatives and new investments, such as:

- A new Australian Defence Export Office. The office will work hand-in-hand with Austrade and the Centre for Defence Industry Capability to coordinate whole-of-government efforts, providing a focal point for defence exports.
- A new Australian Defence Export Advocate to provide high-level advocacy for defence exports and work across industry and government to ensure that all efforts are coordinated.
- A $3.8 billion Defence Export Facility administered by Efic, Australia's export credit agency. This will help Australian companies obtain the finance that they need to underpin the sales of their equipment overseas. It will provide confidence to Australian Defence industry to identify and pursue new export opportunities, knowing that Efic's support is available when there is a market gap for defence finance.
- $20 million per year to implement the Defence Export Strategy and support defence industry exports, including $6.35 million to develop and implement strategic multi-year export campaigns, an additional $3.2 million to enhance and expand the Global Supply Chain program, and an additional $4.1 million for grants to help build the capability of small and medium enterprises to compete internationally.

This strategy is intended to give Australian defence companies the support they need to grow, invest and deliver defence capability and make Australian defence exports among the best in the world. Australia has many defence industry success stories — Thales' Bushmaster and Hawkei protected mobility vehicles, and sonars, Austal's ships and engineering and CEA's world-beating radar, amongst many others.

The Defence Export Strategy can be downloaded at www.defence.gov.au/exportstrategy.

SSI Releases Software Upgrade

The latest release of SSI's ShipConstructor software includes 57 new features, 154 improvements and a major "Wishlist" item completed to enhance MarineDrafting.

The latest release continues to demonstrate why it is a leading ship design/engineering program for streamlining frequently-encountered manual work.

Additionally, enhancements to EnterprisePlatform PublisherLT now make it easier for a user to import, export, and share customised operations. This makes it easier for users to customise PublisherLT to suit their specific needs.

Upgrade highlights include:

- More options for view-generation in MarineDrafting.
- Improved revision and task support when creating, deleting or modifying structure parts and stocks.
- Easy Import and Export of EnterprisePlatform Operations.
- Multiple new features for ShipConstructor subscribers are now available in the Subscription Advantage Pack.

More information can be found at www.ssi-corporate.com/product-services/release-information/3229-release-information-shipconstructor-2018-r2-1

Wärtsilä Launches New Tilted Retractable Thruster

Wärtsilä has launched the Wärtsilä WST-24R, the industry's first tilted steerable thruster with combined electric retraction and steering.

Enabling excellent auxiliary manoeuvring in station-keeping or dynamic-positioning (DP) operations, the Wärtsilä WST-24R provides first-class reliability, as well as easy installation, integration and maintenance.

One of the most notable features of the new thruster is the gearbox, which has an 8° tilted propeller-shaft configuration. This significantly reduces thruster/hull interaction losses, thereby producing up to 20% more effective thrust than conventional non-tilted thrusters and enabling lower fuel consumption. This extra effective thrust directly contributes to the advanced DP capability of a vessel.

Replacing the existing LMT 1510, the Wärtsilä WST-24R thruster offers more than 10% added unit thrust as a result of the increased power density. This, combined with improved hydrodynamics and the dedicated Wärtsilä thruster nozzle design, reduces the environmental impact of the propulsion system. The Wärtsilä WST-24R can also be delivered to comply with clean notations and is optionally compatible with the US EPA's VGP2013 regulations. The overall result of this development has been to create benefits to the customer in both performance and efficiency.

The Wärtsilä WST-24R has also been designed to achieve reliability with fewer components. All systems are easily accessible for maintenance, while the combined steering-retraction seals, designed to have no oil-to-water interface to reduce environmental risk, can be replaced from inboard. The steering is electric, rather than hydraulic, further enhancing the capabilities of the system, and the new retraction system is lightweight and safe with self-locking electric actuation.

The unit is particularly suited to applications in shuttle tankers and offshore support and construction vessels, providing them with safe and efficient operations.

Wärtsilä's Energy Storage Solution

Wärtsilä has agreed to retrofit the world's first energy storage solution on board a large offshore supply vessel. *North Sea Giant*, one of the world's largest and most advanced subsea construction vessels, will be fitted with an energy storage system which reduces the vessel's energy consumption, operating costs and exhaust emissions.

The retrofit energy storage system improves the operational efficiency and environmental footprint of *North Sea Giant*, responding to key requirements of Norwegian North Sea Shipping AS, the owner of the vessel. The solution provides power redundancy and increases responsiveness of vessel operations.

Typically, a vessel with dynamic positioning uses two or more engines simultaneously to secure back-up power. This means that the engines' loads run low. By using a hybrid/battery system to provide the needed back-up power, the operational engine can be used closer to its optimal load. In addition to the hybrid/battery solution, the agreement signed in August 2017 includes transformers, filters, switchboard, shore connection equipment, upgrades of existing components and commissioning.

"For us is it important to reduce environmental emissions and modernise the vessel to make it more competitive. In addition, with a more efficient vessel, we will save fuel expenses. The estimated reduction in emissions is 5500 t CO_2, 30 t of NO_x and 1.2 t SO_x per year. After Wärtsilä had retrofitted our ship *Atlantic Guardian* in 2014, we really understood how much fuel can be saved by improving the vessel's efficiency. Efficiency also saves time, because you only need to refuel every second or third port visit," says CEO Hallvard Klepsvik, North Sea Shipping AS.

Close Cooperation with the Classification Society

North Sea Giant is a DP3 vessel. The ship is listed in the most advanced category of vessels which apply dynamic positioning. Installation of an energy-storage solution into a class DP3 vessel has never been carried out before and requires a redefinition of applicable classification rules. Therefore Wärtsilä and North Sea Shipping AS are working in close collaboration with the DNV GL classification society.

North Sea Giant
(Photo courtesy Wärtsilä)

National System for Domestic Commercial Vessel Safety

Work is on track for AMSA to start delivering national system services from 1 July 2018. We are working closely with state and territory marine safety agencies to ensure a smooth transfer of services so that vessel owners, crew and surveyors can continue to access services when they need them.

To support industry's transition to a national system, Australia's transport ministers agreed to provide more than $100 million in funding and committed to phase in cost recovery gradually to allow time for industry to adjust and prepare for the changes. This also includes no levy being charged in the first year while services transition and are standardised across Australia.

With the funding agreed, we are working to finalise the national system fees and levy charges, taking into account feedback from the levy consultation in 2016. We have recently released a proposed levy model, including the subsidised charges for the next five years on our website. AMSA is working with advisory group members to finalise the draft model. This model will then be subject to final Australian Government approval and will not become law until legislation is passed.

In the meantime, state and territory agencies continue to provide national system services on behalf of AMSA. We welcome your feedback by filling out the web form on the Contact Us page on AMSA's website.

AMSA is also in the process of streamlining the survey regime for domestic commercial vessels. The final Regulation Impact Statement (RIS) setting out AMSA's preferred options is now available on our website.

The proposed changes are designed to align survey requirements with risk, meaning that high-risk vessels and operations will continue to have frequent surveys, while low-risk vessels will move to lower survey levels. This will reduce the regulatory burden on industry, while maintaining a high safety standard.

There will also be new processes for moving vessels into different survey categories depending on individual performance at survey and during compliance inspections. This change will see poor-performing vessels surveyed regularly, but give safety-conscious owners and operators an incentive to maintain their high standards.

From 1 July 2018, the new survey regime will simplify the regulations and save industry time and money. AMSA plans to implement the new survey regime through Marine Order 503 and the proposed changes will be open for public consultation in April and May this year.

Go to www.amsa.gov.au/domestic for more information, advice and updates about these changes, or follow us on Facebook.

Dan Glover
AMSA Media Liaison Officer

ROYAL INSTITUTION OF NAVAL ARCHITECTS

AUSTRALIAN DIVISION

ANNUAL GENERAL MEETING

Notice is hereby given that the Annual General Meeting of the Australian Division of the Royal Institution of Naval Architects will be held on Wednesday 14 March 2018 at BMT Design & Technology, Level 5, 99 King St Street, Melbourne, Victoria, at 6:00 pm.

AGENDA

1. Opening
2. Apologies
3. To confirm the Minutes of the AGM held in Perth on Thursday, 23 February 2017
4. To receive the President's Report
5. To receive, consider, and adopt the Financial Statements and Auditor's Report for the year ending 31 December 2017
6. Announcement of appointments to the Australian Division Council
7. Adoption of amendments to the Division's By-Laws
8. Other Business

R C Gehling
Secretary
12 February 2018

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on the evening of Tuesday 12 December 2018 by teleconference under the chairmanship of the President, Prof. Martin Renilson in Launceston.

The meeting had a full agenda and some of the more significant matters raised are outlined below.

President for 2018–2020

Council elected Prof. Renilson for a further two years, the maximum permitted under the By-Laws, commencing from the completion of this year's Division AGM.

Industry Mailing List

Council undertook to develop a contact list to facilitate its contacts with industry.

Survey of Members Expectations

Following its consideration of the Committee report on this matter, Council agreed to pass on detailed responses to Section Secretaries and the editors of *The ANA*.

AMSA Liaison

Council is preparing a submission to AMSA in response to problems with the National System raised by members.

Update of Policy/Procedure Documents

Council agreed with draft amendments to be voted on by the AGM in March.

Joint Board on Naval Architecture

Council noted a verbal report on the Board meeting held earlier that day. Of particular note was that Bruce Howard of EA had been elected to chair the Board for the next two years under the Agreement between RINA and EA. Jesse Millar joined the Board as tha RINA member replacing Jim Black.

Video Recording of Technical Meetings

Council agreed to the purchase of a video camera by Victorian Section for recording their technical meetings, notwithstanding the low viewing rate experienced with presentations from NSW Section meetings.

Next Meeting of Council

Council tentatively agreed to its next meeting being held on Tuesday 13 March 2018.

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.

Finally, and as we go to press, nominations of Division Council members for 2018–2020 are still to be received from Qld, NSW, ACT, Tas and SA-NT Sections.

Rob Gehling
Secretary

Free Papers for Members

Members should be aware that they are entitled to four free copies of RINA papers each year. This includes papers from previous transactions, conferences, etc., and is especially useful if you are interested in just one or two papers from a particular conference as you don't then need to buy a copy of the entire proceedings.

Papers published by RINA are searchable on the RINA website www.rina.org.uk; click on

Publications>Search Publications and Order.

The procedure for obtaining a free copy is to email your request to publications@rina.org.uk, with the subject line "Member's Free Paper", and specify the author(s) and year, the title of the paper, where the paper appeared (transaction year/volume, conference name and year, etc.) and, finally, your name and RINA membership number.

Free Places for Student Members at RINA Conferences

RINA also makes available two free places for Student Members of RINA at conferences organised by the Institution, including the Pacific International Maritime Conferences in Sydney.

The procedure for obtaining a free student place is to email your request to the Chief Executive, Trevor Blakeley, at tblakeley@rina.org.uk, and specify the conference, your name and membership number.

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 Div.		ausdiv@rina.org.uk
Section	ACT	rinaact@gmail.com
	NSW	rinansw@gmail.com
	Qld	m-dever@hotmail.com
	SA/NT	danielle.hodge@defence.gov.au
	Tas	mfsymes@amc.edu.au
	Vic	andrew.mickan@dsto.defence.gov.au
	WA	rina.westaus@gmail.com

Phil Helmore

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

Neil Fleck

It is with sadness that *The ANA* records the passing of Douglas Neil Fleck on 8 July 2017, aged 84.

Neil was born to Cyril and Juanita Fleck on 6 December 1932 at Thirroul on the NSW south coast, and was one of three children. His father was a District Engineer with NSW State Rail, and so the family moved around quite a bit, residing in Griffith for Neil's high school years. On leaving school before his 15th birthday, Neil's first job was gardening at the Dubbo hospital. He went on to serve a five-year apprenticeship with Poole & Steel (a major Australian engineering, railway rolling stock manufacturer and shipbuilding company) in Balmain, NSW.

On becoming a journeyman, Neil heeded the call of the sea and embarked on a career as a marine engineer in the merchant navy. Over the ensuing years he travelled the world working for a variety of shipping companies, both Australian and foreign. After rising to the position of Chief Engineer, Neil left the sea in 1959 and married Felicity Bondfield; they had a son, Michael, and three daughters, Margaret, Louise, and Jennifer.

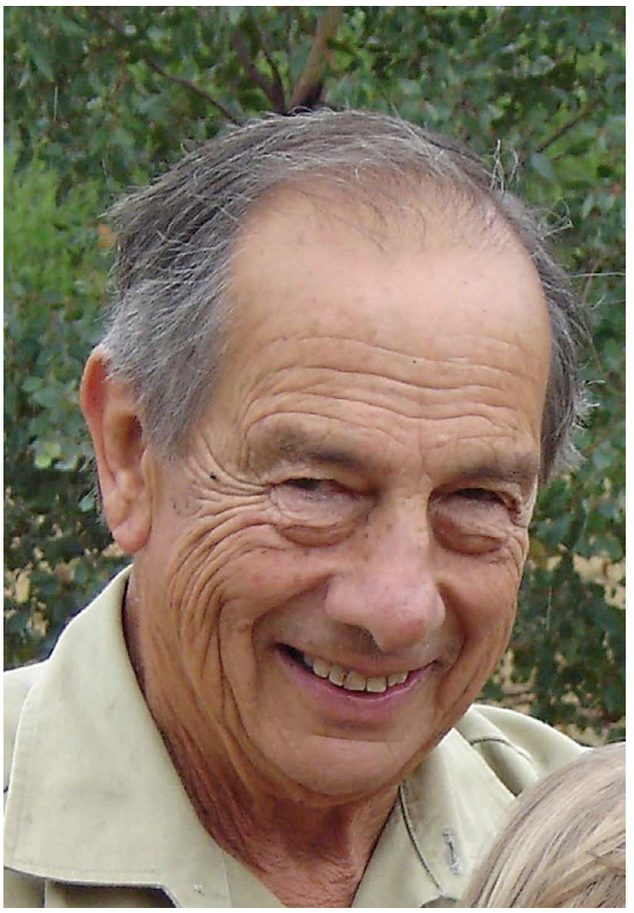
Shortly after Felicity and Neil married, they moved to London where Neil studied for his Extra First Class Certificate in Steam and Motor. On their return, Neil had a short stint working on the Newcastle harbour dredges, after which he became a teacher in marine engineering at the Newcastle Technical College from 1962 to 1968. It was at this time that Neil met Tom Barnes, also a teacher at the College in shipbuilding.

With Carrington Slipways becoming a major player in the Australian shipbuilding scene during the late 1960s, Neil and Tom formed the partnership of Barnes and Fleck, Naval Architects and Marine Engineers, in 1968 to provide technical assistance to Carrington Slipways. However, while establishing the consultancy, Neil also found time to complete a Bachelor of Science (Engineering) Degree at the University of Newcastle, graduating in 1970.

Barnes and Fleck established a quality design service, soon sought after by many Australian shipyards, along with some overseas yards. They worked on a variety of small craft designs ranging from Sydney Harbour ferries to workboats, but they quickly established an expertise in tug design.

The 1970s were challenging times for naval architects and marine engineers in the design of tugs. New propulsion systems, along with increasing power demands, required a radical rethink of hullforms and arrangements to ensure that tugs could safely fulfil their tasks. One initiative developed by Barnes and Fleck was the design of wheelhouses for all-round visibility. Tug designers around the world subsequently copied their wheelhouse arrangements.

Although a marine engineer by profession, Neil easily moved around in the world of naval architecture, becoming a member of RINA in 1974. As an example of Neil's capability, he carried out the sideways launching calculations for a number of vessels built by Carrington Slipways. Also, during the 1970s when computer programming was in its relative infancy, Neil developed a program to calculate a vessel's hydrostatic properties and cross curves.



Neil Fleck
(Photo courtesy Louise Fleck)

Following Tom Barnes' retirement, Michael Pearson, a former President of the Australian Division of RINA, became an active partner in Barnes and Fleck.

Neil also found time during his career to attend and speak at various International Tug Conferences.

But it was not all work and no play for Neil. Throughout his life he enjoyed sketching, oil painting and sculpting in clay. In the early 1970s he found the time to build a sabot sailing boat for his son in their backyard.

Neil, in both his private and professional lives, was an achiever. He was always prepared to help others in order promote Australian shipbuilding.

With the closure of Barnes and Fleck in 2002, Neil moved to Tambar Springs in NSW for a well-deserved retirement, becoming a gentleman farmer and raising beef cattle.

The funeral service was held in the Chapel of C.R. Smyth at Cessnock, NSW, on 17 July 2017.

Neil is survived by his wife Felicity, son Michael, daughters Margaret, Louise and Jennifer, grandchildren Thomas, Patrick and Laura, and sister Marie.

Lindsay Emmett

NAVAL ARCHITECTS ON THE MOVE

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

Trent Adams has moved on from One2three Naval Architects has taken up the position of Naval Architect/Project Coordinator at Echo Yachts in Henderson, WA.

Bronwyn Adamson has moved on from her position as Chief Engineer on a 60 m motor yacht home ported in Nice, France, and has taken up a position as a naval architect with Rolls-Royce Australia in Sydney.

Campbell Baird has moved on from his position managing the Fremantle office of One2three Naval Architects and has taken up the position of naval architect in their office in Sydney.

John Benjamin continues with Thales Australia and has taken up the position of Technical Manager—Above Water Systems at Garden Island in Sydney.

Jonathan Binns continues at the Australian Maritime College and has taken up the positions of Associate Dean Research and Director of the ARC Research Training Centre for Naval Design and Manufacturing in Launceston.

Gordon Blaauw continues with Austal Ships and has taken up the position of Design Manager in Fremantle.

Neil Bose has moved on from his position as Principal of the Australian Maritime College, and has returned to Memorial University to take up the position of Vice-President (Research) in St. John's, Newfoundland and Labrador, Canada.

Craig Boulton continues as Director and Principal Naval Architect of ASO Marine Consultants in Sydney.

Tony Brogan moved on from DNV GL in 20126 and is now consulting in risk management, technical safety and winterization to the maritime and offshore industries in Glasgow, UK.

Werner Bundschuh has retired from his position as Director Vehicle and Vessel Standards, Marine Safety Queensland, Department of Transport and Main Roads, in Brisbane.

Lauchlan Clarke has taken up the position of Quality Assurance Officer with Incat Tasmania in Hobart while he completes his doctorate at the Australian Maritime College part time.

Sean Cribb has moved on within McAlpine Marine Design and has taken up the position of Senior Naval Architect/ Director in Fremantle.

Chris da Roza has moved on from DMS Maritime and has taken up the position of Engineering Manager with Thales Australia in Sydney.

Tony Elms continues consulting as Elms Australia, and specialising in large gyroscopes and ship stabilisation, in Fremantle.

Jon Emonson has moved on from BAE Systems Hydrographic Support and has taken up the position of Senior Naval Architect with BAE Systems Engineering Services in Melbourne.

Mike Fitzpatrick continues with Robert Allan and has now taken up the position of President and CEO in Vancouver, Canada.

Sammy Free has obtained his Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal) and has taken up a position as a naval architect with Austal Philippines in Balamban, Cebu, Philippines.

Gary Goetz moved on from AMOG Consulting in 2016 and has taken up the position of Outfitting Design Lead with Navantia Australia in Adelaide.

Riley Graham moved on from BMT Design & Technology in 2013 and, after some time at ThyssenKrupp Marine Systems Australia, has taken up the position of Outfit Engineer with Navantia Australia in Melbourne.

Steve Harler moved on from Helix Well Ops SEA in 2013 and took up the position of Business Acquisition Manager with Sapura Energy Well Services in Perth.

Alley (Alan) Jani moved on from Deniz Ship Design and Service in 2016 and, after a year at Rahil International, has taken up the position of Consultant with KCG Holdings in Sydney.

James Johnston, a recent graduate of UNSW Sydney, has moved on from ASO Marine Consultants and has taken up a position as a graduate naval architect with Thales Australia at Garden Island in Sydney.

Bryan Kent has moved on from Porter Equipment Australia and has taken up the position of Industrial Sales Representative with CRC Industries in Sydney.

Dean Kos moved on from NQEA Australia in 2010 and has taken up the position of LHD SPO Certification and System Safety Manager with the Capability, Sustainment and Acquisition Group of the Department of Defence in Sydney.

John Lee has moved on from DNV GL after many years in the Fremantle, Dubai and London offices and is now evaluating opportunities.

Regina Lee has completed her Bachelor of Surgery/Bachelor of Medicine degree at the University of Notre Dame, as well as a Postgraduate Diploma in Education at Bond University, and has now taken up a position as a medical doctor with UNSW Health in Sydney.

Geoffrey McCarey, a recent graduate of UNSW Sydney, has taken up a position as a naval architect with BAE Systems at Garden Island, Sydney, working on the AWD Program.

Justin McPherson continues as Managing Director and Naval Architect at International Maritime Consultants in Fremantle.

Robert Maher moved on from the Department of Transport in WA in 2014 and has taken up the position of Principal Naval Architect with the Australian Maritime Safety Authority in Hobart.

Vesna Moretti has moved on from consulting and has taken up the positon of Engineering Manager on the Collins Submarine Program with the Department of Defence in Adelaide.

Jeremy Nolan has taken up the position of Naval Architect with Commercial Marine Solutions in Melbourne.

Bernie O'Shea has moved on from Transport for New South Wales and has taken up the position of Design Manager with Silver Yachts in Fremantle.

Rozetta Payne has moved on within the Naval Technical Bureau and has taken up the position of Cell Lead in the Ship Structures Cell in Sydney.

Chris Ramsay moved on from Brisbane Ship Constructions in 2008 and, after some time at Strategic Marine, has taken up the position of Design Engineer with Echo Yachts in Henderson, WA.

Simon Robards has moved on from Roads and Maritime Services and has taken up the position of Manager Operations East with the Australian Maritime Safety Authority in Sydney.

Umberta Salvarani has moved on from Spear Green Design and is now consulting as Umberta Salvarani Interior Design in Sydney.

Peter Samarzia has moved on within PMBDefence and has taken up the position of Warrant Holder for Submarine Naval Architecture on the Sea 1000 Project in Adelaide.

Mitchell Stubbs has moved on from Leap Australia and has taken up the position of Analyst with Coras Solutions, a company consulting to Defence, in Sydney.

Dauson Swied has moved on from One2three Naval Architects and is now enrolled in a Master of Science degree in advanced mechanical engineering at Imperial College in London, concentrating on aluminium sheet forming.

Thor Schoenhoff continues with ONA Group, and has now taken up the position of Operations Manager in Perth.

Mike Warren has moved on within ASC and has taken up the position of Build Strategy Manager in the Future Submarine Program in Adelaide.

Cameron Whitten moved on from Oceanic Design and Survey in 2015 and, after some time at Incat Crowther and Longitude Engineering in the UK, has taken up the position of Naval Architect with Sea Transport Solutions in Runaway Bay, Qld.

Horden Wiltshire has moved on from his role as CEO at Soprano Design and has taken up a position on the board of defence software company Acacia Research and as the Command Consultant with Naval Group in Adelaide.

Dan Wupperman has moved on from Friedrich Lürssen Werft and has taken up a position with Espen Øino International in Monaco.

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.

Phil Helmore

FROM THE ARCHIVES

HMAS *Supply*

1962—1985

The recent start of construction in Spain of a new underway replenishment ship for the RAN to be named *Supply* recalls the previous ship of the name, a Tide-class tanker which served in the Royal Australian Navy (RAN) from 1962 until replaced by HMAS *Success* in 1985.

The need for a fleet tanker arose as a result of mobilisation planning in early 1951 when the Government was concerned about the risks of a new world war in the foreseeable future. The ordering of a tanker from the United Kingdom at an estimated cost of £2.6 million was approved in August 1951, and one of the new Tide-class vessels was ordered from Harland and Wolff in Belfast that year. Overseas construction was adopted as it was regarded as quicker. The ship was laid down on 5 August 1952 and launched as *Tide Austral* on 1 September 1954. The ship was completed on 17 May 1955, with a considerable cost overrun to £3.13 million.

By 1955 the prospect of mobilisation had receded and the RAN attempted without success to sell the ship. In March 1955 the Admiralty offered to crew and manage the ship as part of the Royal Fleet Auxiliary, and RFA *Tide Austral* remained on loan to the Royal Navy until 1962.

During her time with the Royal Fleet Auxiliary, *Tide Austral* served in the Atlantic, Mediterranean and the Far East. On 7 September 1962 she reverted to the RAN, briefly becoming HMAS *Tide Austral* until she was renamed HMAS *Supply*. *Supply* arrived in Australia on 6 December 1962 and went into refit at Cockatoo Island.

Tide Austral entering the water in Belfast on 1 September 1951 (RAN Historical Collection)

HMAS *Supply* enduring some Bass Strait weather in 1983
(RAN photograph)

Supply had a busy time with the RAN in Australian waters and the Far East, including supporting RAN ships on passage to Vietnam. One of her more contentious tasks occurred in June 1973 when she was sent to the waters near Tahiti in support of New Zealand Navy ships *Otago* and *Canterbury* which had been sent there to protest against French nuclear weapons tests at Mururoa Atoll. The following year she was one of the RAN ships sent to Darwin for relief efforts after cyclone Tracy.

In a major refit from 16 December 1970 to 16 November 1971, HMAS *Supply* was fitted with an enclosed upper bridge and her forward fuel tank was converted for the carriage of AVGAS, including a surrounding cofferdam and dedicated pumping system, in order that she could supply this fuel to the carrier HMAS *Melbourne* which was then operating Grumman S2E Tracker aircraft which had AVGAS-fuelled piston engines.

Plans to replace *Supply* with a more modern and capable replenishment ship began as early as 1966, but did not gain momentum until the mid-1970s. Her replacement, HMAS *Success*, was commissioned on 16 April 1986 and HMAS *Supply* was decommissioned on 16 December 1985 and subsequently sold for scrap.

In her time, HMAS *Supply* was the largest ship in RAN service. She had a full load displacement of 26 473 t, an overall length of 177.69 m, a beam of 21.64 m and a maximum draft of 9.75 m. She was propelled by a single screw driven by Pametrada steam turbines of 11.2 MW for a speed of 16 knots.

During her service with the RAN, HMAS *Supply* steamed 667 421 n miles at an average speed of 12.84 kn and completed 3401 underway replenishments at sea.

STS *Young Endeavour* passing HMAS *Canberra* on Sydney Harbour on Australia Day. *Young Endeavour* recently celebrated the thirtieth anniversary of her arrival in Australia as a gift from Britain for Australia's Bicentennial. Since 1988 *Young Endeavour* has given more than 13 000 young Australians the experience of a life time (Photo John Jeremy)