

THE AUSTRALIAN NAVAL ARCHITECT



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NUSHIP *Hobart* during acceptance sea trials in the Gulf St Vincent off the coast of Adelaide, South Australia, in February (RAAF photograph)

THE AUSTRALIAN NAVAL ARCHITECT

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(Australian Division)

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Cover Photo:

Catherine Hamlin, the first of six new 35 m, 400 passenger ferries under construction by Incat Tasmania for the NSW Government, during trials on the Derwent River (Photo courtesy Incat Tasmania)

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From the Division President

Happy New Year! I hope that you all enjoyed the break (if you managed to get one) and are looking forward to an exciting 2017.

I'd like to thank the organisers of the SMIX Bash in Sydney for another most enjoyable Christmas gathering of the maritime industry. I'd also like to thank the sponsors of this event as, without their support, I don't think that it would be possible to hold it. Although most of those attending were probably from NSW, there were certainly quite a few there from interstate, like myself. It's a great opportunity to catch up with people in the industry who you don't see very often. If you've not been to one of these then I strongly recommend trying to attend in the future.

I know that other Sections are thinking of arranging a similar annual event and would like to encourage these, although perhaps other such events ought to be held at a different time of the year, rather than just before Christmas.

I'd also like to congratulate Shaun Denhey, from AMC, who was the lead author for the paper which won the Walter Atkinson Award. I was pleased to be able to present him with the award at the SMIX Bash. In case you're not aware of this award, it is for the best paper first presented at a maritime conference or RINA meeting within Australia, or first published in a RINA-supported publication in Australia, during the current year. It was established in 1971 to commemorate the life, work and service of Walter Atkinson as a founding member of the Australian Branch (now the Australian Division) of RINA.

I'd also like to thank Kim Klaka, and his team of Lance Marshall and Alan Muir, who assessed the eligible papers. I know that they put in a lot of time into doing this, and we are very grateful for their work.

Members may be aware that UNSW, which has been running a very highly-regarded Naval Architecture program for a number of years, has decided that it can no longer support courses with small student numbers. Consequently, it has made the decision to suspend this program. This is potentially a serious blow to the profession in Australia, and we have written to the Dean to urge him to re-consider. Unfortunately, it seems that this is a decision that has been made by the University for all of the courses with small student numbers. I guess that this is a reflection of the importance of financial considerations to universities, rather than doing the best thing for the community at large.

By the time this edition has been published, the famous Wooden Boat Festival in Hobart will have been and gone. Enthusiasts attend this from all around Australia and from overseas. Of course, this is a very good opportunity to promote the Institution to those who are passionate about the design, maintenance and operation of classic wooden boats. We're indebted to Gerard Engel, who will be manning the London Offshore Consultants stand at this show, as he has offered to distribute RINA information there. This is a great opportunity to promote both the Institution and the profession in general.

Perhaps we should give thought to what other such events are run around Australia, and whether we could do the same thing at these. I know that when we started the naval

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Martin Renilson

architecture course at AMC, we used to attend boat shows and the like to promote that course. I often attended these, and it was amazing how many people came to speak to us who hadn't even realised that our profession existed. Getting an appreciation of our profession from the broader public would probably help with a lot of issues.

On that note, when I moved to Australia in 1983, I was quite surprised to see that naval architects were considered to be "specialists". I'm not sure why that was the case as, actually, naval architecture is probably one of the broadest engineering disciplines that there is. Which other engineering discipline covers such a wide spectrum of technical aspects that we do, including structural strength, corrosion, stability, hydrodynamics, machinery arrangement and layout, air-conditioning, accommodation design, aesthetics and, of course, the design of a major structure with no prototype to use as a test bed? At that time my brother, who is a mechanical engineer, was working for Ford on the design of the tail-gate latch for a hatch-back car. Ford had separate sections designing tail-gate latches for sedan cars and for station wagons! How specialist is that?

I also recall visiting a new shipyard in Australia (which will remain nameless) which was building a vessel to an overseas design. The people there told me that they didn't need specialist naval architects, as it was just a case of putting together pieces of steel. What they needed to do this were civil engineers, who had experience with project management, rather than specialist naval architects. I couldn't convince them that, in other countries, naval architects have prominent places in such organisations and that our profession is actually quite experienced in project management, particularly when it comes to putting together ships.

Although I think that things have improved a lot since then in this country, I still come across people who consider us to be specialists. Perhaps we are our own worst enemy here, as we're not particularly good at promoting what it is that we do and, in particular, the breadth of the profession.

We're not helped by the general feeling amongst many in the public that the maritime profession is a "sunset" industry. I even met a senior person recently who said that there is little need for ships anymore, now that things can be transported by aircraft. I know that we shouldn't be a lobby group for the industry, but sometimes I feel that we ought to get better at educating the public. If anybody has any bright ideas on how to do this then please let me know.

Also, by the time that you read this the Australasian Oil and Gas Conference and Exhibition (AOG 2017) will have been held in Perth. The Institution is a partner in this event and this year organised a two-session stream on the topics of Fixed and Floating Offshore Structures. We're extremely grateful to the WA Section for arranging this and, in particular, I would like to thank Yuriy Drobyshevski for leading the effort. This conference is run every year, so if you were not able to make it in 2017 then I hope that you'll be able to attend in 2018.

Our CEO, Trevor Blakeley, will be attending AOG again this year and is taking the opportunity to combine this with a number of other visits in Australia.

Finally, you may be aware that the Call for Papers for the Pacific 2017 International Maritime Conference is now out. Details can be found in this edition of *The ANA*. Abstracts close on 13 March and authors will be notified of acceptance by 3 April. As usual, authors can then choose to have their papers independently refereed, or not. The deadline for refereed papers is 12 June, to allow us the time to do this. If they are not to be refereed then the deadline is 24 July. The conference will be held in Sydney from 3 to 5 October. I look forward to seeing as many of you as possible in Sydney then.

Martin Renilson

Editorial

It has taken decades to persuade government of the need for a continuous program of naval construction in Australia in order to sustain the skills and resources required to operate, sustain and modernise our navy with a high level of independence from others. The present plans of the Commonwealth Government intend to do just that — starting with an ambitious program for the construction in Australia of 12 world-leading conventional submarines, twelve offshore patrol vessels which will be larger and more capable than the ships they will replace, and nine anti-submarine frigates. The program spans the life of many parliaments and encompasses many election campaigns yet the apparent bi-partisan support for the program bodes well for its success.

It is not enough to simply build ships to the design of others — the approach of 'no technical risk' which has bedevilled Australian naval construction in the past must be replaced by one which employs Australian expertise to the maximum extent possible to produce ships and submarines uniquely suited to Australia's requirements. This will require first-class engineering and project-management skills, together with the training and research programs to sustain the supply of these skills in coming decades. Readers of this journal will see that this is recognised, now, by the Government and by industry which are together forging links with tertiary

institutions and research organisations and committing substantial funds to achieve the sustainability we need.

Amongst the engineering skills we must have are those of the naval architect. As Martin Renilson points out in his column, naval architects' skills extend far beyond creating a suitable hullform and ensuring that it stays upright. The naval architect is the marine systems integrator — he/she must be aware of the needs of everything which comprises a ship and must pull together the efforts of all the other engineers with their special input to create that remarkable thing we call a ship. Australian naval architects have demonstrated that they can do exactly that. Just have a look at the record of the successful exported-oriented commercial shipbuilding industry (albeit small) which Australia has been able to maintain over the last couple of decades with little government support. Look also at the number of vessels, naval and commercial, being built overseas to the designs of Australian naval architects.

Against this background it is astonishing to hear that UNSW is suspending its naval architecture program with the possibility that it will be terminated at the end of this year. Whilst it cannot be denied that all Australian universities are under financial pressure and that the UNSW naval architecture program is, and always has been, small, now is surely the time to consider the big picture and encourage growth in the education of naval architects. Graduates in naval architecture from UNSW have made major contributions to Australia over the last fifty years and I would have expected that new generations of them would have continued to do so. I sincerely hope that it will prove possible for this decision to be reversed.

Meanwhile we naval architects should do our best to ensure that Australians at large understand the part we play in the maritime world. Perhaps it might even help if we stopped calling ships 'platforms'.

John Jeremy



LETTERS TO THE EDITOR

Dear Sir,

At a time of unprecedented wealth in Australia's universities, thanks mainly to high fee paying foreign students, it is incomprehensible that UNSW has decided to close down its world-leading Naval Architecture degree program.

Even more alarming for the Australian maritime industry are the rumours that abound about the further integration of the Australian Maritime College into the University of Tasmania. Those rumours suggest that the AMC may be allowed to gradually wither on the vine. Apparently the AMC's buildings are considered to be more appropriate and, presumably, more profitable for other UTas activities.

It seems that the UNSW authorities have decided that the naval architecture program does not meet its "KPIs", whatever they are. Given the overhead costs inflicted on universities by those same authorities, it is little wonder that small departments struggle to meet those standards. I suspect that the whole Naval Architecture program at UNSW would cost considerably less each year than the Vice Chancellor's salary alone, not to mention his considerable perks.

It is quite obvious that the UNSW authorities have failed to consider the wider ramifications of their decision. The Naval Architecture program punches way above its weight in terms of its contribution to the wider Australian economy and to our very important aluminium high-speed shipbuilding industry. Indeed, it is arguable that the latter would probably not exist were it not for the contributions of the faculty and graduates of the UNSW naval architecture program.

While it may "only" produce eight naval architects per annum, it is the program's proud boast that all of those can find good jobs in the local industry with shipbuilders, consultants or government. Many subsequently go overseas to gain further experience but almost all return eventually to boost our local shipbuilding industry. My eldest son is a classic example of that.

If the UNSW naval architecture program were to actually close, our potential naval architects would have to gain their undergraduate degrees overseas. [See note — Ed.] Apart from the fact that they tend to learn more overseas as graduates, it is inarguable that, as far as the design of high-speed aluminium craft is concerned, Australia's naval architecture programs have no peers overseas. They teach the skills that are appropriate to the particular specialties that overwhelmingly prevail here.

It needs to be emphasised that the Australian shipbuilding industry, which our graduate naval architects serve, is highly export oriented. It earns significant export dollars. It is a tremendous commercial asset for our nation and our economy. A real industry that contributes real people and real dollars to our nation's benefit. That, of course, is before we even think about the importance to our defence, particularly our navy, and our naval architects.

Compare that with the "popular" courses which our universities seem to believe are more valuable than naval architecture. Environmental management, marine biology, journalism and media studies are all soft, fuzzy, feel-good courses which are popular with students who have not been entirely rigorous with their secondary studies. They attract

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hundreds of students each year but alas, of course, most of them are unemployable except, perhaps, as baristas or waiters.

My experience, as an employer, of journalism and media-studies graduates is that they are almost uniformly useless. The content of their courses is only distantly related to industry reality. Little or no professional discipline is inculcated. The naval architecture curriculum is the opposite. Frankly, my experience convinces me that naval architects generally make much better journalists than do journalism graduates! By contrast with the "popular" courses, the eight annual naval architecture graduates have industry employers impatient to hire them.

I am fully aware that universities have to make ends meet, so they will naturally give preference to the most-popular courses. However, I also know how dependent they are on taxpayers' money. They therefore, surely, have a duty to act in the best interests of Australia as a whole and for the long term.

I trust that the UNSW Council will be persuaded to reconsider their tragic, short-sighted decision before it is too late. It is imperative for the future of Australia's wider maritime industries and, indeed, for the whole nation that they do so. If they don't, then most of our future naval architects will come here on 457 visas. How will the government of the day cope with that?

Neil Baird

Chairman

Baird Publications

[*The University of Tasmania has an active naval architecture program at the Australian Maritime College. Students can also transfer to AMC from Edith Cowan University and Flinders University after two years initial study — Ed.*]

Dear Sir,

We are moving into a new era of sailing: that of foiling. The recent boom of foiling in sailing can be partially accredited to *Emirates Team New Zealand* who, during the 2013 America's Cup, revealed high speed foiling catamarans to the public eye.

Foiling had been tested successfully on smaller boats such as the International Foiling Moth; but it hadn't really been taken into much consideration by America's Cup teams and other design companies. This is because a moth's hydrofoil has a hinged flap which increases/decreases lift according to the hull's distance from the water. This mechanism is unimaginable on a 72 ft (21.95 m) catamaran, and the America's Cup also had rules which prevented such mechanisms from being implemented. *Emirates Team New Zealand* and, later, *Oracle Team USA*, managed to design foils with no flaps, which were relatively stable and produced speeds never seen before.

It is these designs which, in fact, started the whole revolution; from there on, foiling would not be an option any more. Whether you were designing a monohull yacht, a catamaran or a 100 ft (30.48 m) trimaran, foils became in a sense compulsory. No matter what the conditions the boat will face, from round-the-world races (IMOCA 60s) to flat-water races, foils seem to be the best answer.

One might think that this is only true for racing yachts, but they are wrong! Leisure-yacht design companies are starting to embrace foiling and have come up with previously-unthinkable designs. One example would be *The Gunboat G4*, a leisure catamaran which is able to reach speeds in excess of 30 kn while maintaining a comfortable environment for the guests on board.

For the 2020 Olympic Games, a foiling catamaran is very

likely to be introduced in place of the older non-foiling version. In the end, every yacht designer, whether designing small dinghies or bigger yachts, will have to become familiar with the concept of foiling and embrace this revolution that has just begun!

Stefano Ferrighi
UNSW Student

COMING EVENTS

Australian Division AGM

This year the Annual General Meeting of the Australian Division of RINA is scheduled to be held on Thursday 23 February at the Perth Convention Centre in Western Australia and will be over by the time many read this edition of *The ANA*. The notice of the meeting was sent to members on 27 January 2017.

NSW Section AGM and Technical Meetings

The Annual General Meeting of the NSW Section of RINA will be held on Wednesday 1 March immediately following the scheduled technical meeting of RINA (NSW Section) and IMarEST (Sydney Branch) at 6:00 for 6:30 pm at Engineers Australia, 8 Thomas St, Chatswood.

Technical meetings are generally combined with the Sydney 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 remaining for 2017 (with exceptions noted) is as follows:

- | | |
|-------|---|
| 1 Mar | Robin Sandell, Principal, Sandell Consulting
<i>Network Design Strategies to Increase Efficiency and Usefulness of Urban Transport Ferry Systems</i> |
| 1 Mar | NSW Section Annual General Meeting |
| 5 Apr | IMarEST |
| 3 May | Lawry Doctors, Professor Emeritus, UNSW Sydney
<i>Hydrodynamics of High-performance Marine Vessels</i> |
| 7 Jun | IMarEST |
| 5 Jul | Steve Quigley, Managing Director, One2three Naval Architects
<i>Innovations on Wild Oats XI</i> |
| 2 Aug | IMarEST |
| 6 Sep | IMarEST |
| 4 Oct | No meeting; Pacific 2017 events |
| 7 Dec | SMIX Bash 2017 |

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*Free registration is for the exhibition and conference only.
Conference places are allocated on-site on a first come, first served basis.

* Promotional images courtesy of Woodside Energy Ltd

FAST 2017

FAST 2017, the Fourteenth International Conference on Fast Sea Transportation, will be held in France in the beautiful town of Nantes, at the Cité des Congrès on 27–29 September 2017, promoting world-wide cooperation between academia and the industry, as well as with other branches (such as aviation), with the aim of transferring knowledge and experience to sea transportation. Application of new materials, types of propulsion systems, fuel and emissions are key issues for both sea and air transportation.

The technical program will focus on high-quality papers, panel discussions and invited keynote lectures from various fields. A thorough review process of both abstracts and full manuscripts will be used to select papers whose originality, relevance, timeliness, and significance meet the standards which FAST attendees have come to expect. The conference will be conducted in English.

For FAST 2017, contributions will be prioritised, and presentations in the area of propulsion, such as electrical power, batteries, hydrogen, propulsion systems and the use of new materials will be the focus. Within the area of operations, the focus will be on safety, economy, emissions and technological innovations in equipment and decision systems.

The conference website URL is <http://fast2017.com/>

In the past, Australia has played a leading role in presenting papers to the FAST conference. Indeed, the Fourth International Conference on Fast Sea Transportation was held at UNSW in Sydney in July 1997. It is therefore hoped that Australian naval architects will again be forthcoming and prepare technical papers for this important meeting.

The deadline for submission of abstracts through the website <http://fast2017.com/call-for-papers/> is 28 February 2017. However, an extension of time of two weeks will be allowed due to the short notice. Abstracts will be evaluated for selection by the Technical Program Committee. The list of selected abstracts will be announced in April 2017 and a template will be provided to authors for submission of final papers by 30 June 2017. Final papers are expected to be between three and five pages including figures, in DOC, PPT, or PDF formats. The papers will be available to the conference attendees at the start of the event.

Principal themes for papers are:

- Hydromechanics and structures
- Design and new concepts
- Modeling and simulation
- Intelligent ships
- Intelligent yards
- Operations, safety and logistics
- Rules and regulations
- Economics

The conference will be held in conjunction with a separate conference on advanced materials. Therefore, please be careful to submit your abstract to the correct (first) event on the website.

Further information can be obtained from Lawry Doctors at l.doctors@UNSW.edu.au

Pacific 2017 IMC

The Pacific 2017 International Maritime Conference organised by The Royal Institution of Naval Architects, Institute of Marine Engineering, Science and Technology and Engineers Australia, will coincide with the prestigious Royal Australian Navy Sea Power Conference and the Pacific 2017 International Maritime Exposition which is organised by Industry Defence and Security Australia Limited. These will be held in Sydney on 3–5 October 2017 and Pacific 2017 will be held at the brand-new Sydney Exhibition Centre at Darling Harbour.

You are invited to contribute to the Pacific 2017 International Maritime Conference program by submitting an Abstract of your proposed paper relating to the following conference program topics:

- Commercial Ship Technology
- Naval Ship Technology
- Submarine Technology
- Commercial Ship Operations
- Maritime Safety
- Maritime Environment Protection, and
- Offshore Resource Industry.

Abstract submissions are now open and will close on 13 March 2017. Instructions on abstract format and guidelines are available on the conference website. Acceptance of Abstracts will be advised to authors on 3 April 2017.

Full details of registration costs and entitlements are also available on the conference website. Conference registrations opened on 20 February 2017.

For further information regarding the Pacific 2017 International Maritime Conference can be found at www.pacific2017.com.au/international-maritime-conference

HPYD6

HPYD is a series of conferences on high-performance yacht design organised by the Royal Institution of Naval Architects (RINA) 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.

Agreement has been reached between HPYD, SNAME (Chesapeake Section) and Ecole Navale (Innov'Sail) to provide a coordinated rolling three-year program of high-quality yacht technical conferences. As a result, HPYD6 will be held in Auckland, New Zealand, in early 2018 during the stopover of the Volvo Ocean Race.

The details of the program and the call for papers will be posted in 2017. You can follow HPYD on Facebook, LinkedIn or sign up for their mailing list to get 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; for technical enquiries: technical@hpyd.org.nz; or for sponsorship opportunities: sponsorship@hpyd.org.nz



The Royal Institution of
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ENGINEERS
AUSTRALIA

PACIFIC 2017 International Maritime Conference

International Convention Centre Sydney, Australia **3-5 October 2017**

PRELIMINARY ANNOUNCEMENT AND CALL FOR ABSTRACTS

KEY DATES

- Registrations Open
20 February 2017
- Abstract Submission Deadline
13 March 2017
- Author Acceptance Notification
3 April 2017
- Refereed Paper Submissions
12 June 2017
- Full Paper Submission Deadline
24 July 2017
- Early Bird and Presenter Deadline
11 August 2017
- Conference
3-5 October 2017

Organised by The Royal Institution of Naval Architects, Institute of Marine Engineering, Science & Technology and Engineers Australia, the Pacific 2017 International Maritime Conference will coincide with the prestigious Royal Australian Navy Sea Power Conference and the **PACIFIC 2017** International Maritime Exposition which is organised by Industry Defence and Security Australia Limited.

The conference program will be conducted in two streams of parallel sessions and will cover the following topics:

- Commercial Ship Technology
- Naval Ship Technology
- Submarine Technology
- Commercial Ships Operations
- Maritime Safety
- Maritime Environment Protection
- Offshore Resource Industry

Abstract submissions open from 14 November 2016 and prospective authors are invited to submit an abstract relating to the conference program topics in accordance with the instructions on abstract format and guidelines available on the conference website menu.

Abstracts are to be submitted online

<http://www.pacific2017.com.au/international-maritime-conference/>



For further information contact the

PACIFIC 2017 International Maritime Conference Secretariat at:

PO Box 4095, Geelong VIC AUSTRALIA 3220 P: +61 (0)3 5282 0543 F: +61 (0)3 5282 4455 E: imc@amda.com.au

NEWS FROM THE SECTIONS

ACT

Since the last update provided in the November edition of *The ANA*, the ACT Section has not convened any technical meetings but has held a planning meeting with the Nautical Institute (NI) South East Australia Branch to discuss further collaboration during 2017, and hosted RINA and NI members at an end-of-year dinner.

Collaboration meeting with NI South East Australia Branch

On 4 November 2016, Tom Dearling (Chairman) and Jason Steward (Secretary) from RINA ACT Section met with Prasanthen Anthipar (ACT Representative) from the Nautical Institute to discuss ideas for furthering collaboration between the two organisations in 2017. The meeting was very productive and resulted in a range of ideas for technical meetings and an agreement to structure the calendar year to achieve a balance between RINA-hosted meetings and NI-hosted meetings.

Planning work will continue during January with the aim of having a draft schedule of meetings for the year in place by February.

End-of-year Dinner

After an active year and an enjoyable celebration last year, on 8 December RINA ACT Section hosted an end-of-year dinner at the Kingston Hotel, Canberra. The invitation was extended to the Nautical Institute as well as RINA members and the dinner was well attended.

Members made the most of the opportunity to reflect on the year completed and look forward to an exciting 2017.

Technical Meetings

ACT Section Technical Meetings for 2017 will commence in either February or March. Any RINA members from outside the ACT who would like to receive notice of our meetings, please let the Secretary know at rinaact@gmail.com.

Tom Dearling

Western Australia

In September 2016, Dr Kim Klaka gave a presentation to the Western Australia Section entitled *Safety Regulations and Guidelines for Sailing Yachts*.

Kim outlined the safety rules and guidelines applicable to recreational sailing vessels in WA. He explained what guidelines are available, where they have come from and how they work. Examples were given of where they do not work. The following conclusions were drawn:

- Regulations do not of themselves make things safer.
- Changing behaviour is the goal and the correct behaviour depends on the circumstances.
- Black-and-white regulation does not work — different circumstances require non-prescriptive regulations (“deemed to satisfy” options).
- Naval architects have a professional obligation to contribute to improving guides and regulations.

In November Mark Evans gave a presentation entitled *Offshore Decommissioning in Australia*. His presentation was intended as a regional industry wake-up call to the

wave of decommissioning opportunities which will present themselves over the next 20–30 years.

Those present gained useful insight into the regional situation and the challenges which will face the industry. They includes rigs to reef, in-situ decommissioning, stakeholder engagement, regulatory framework, environmental consideration and economics. Findings from a survey of Australian decommissioning experts were also presented to help identify the key actions which must be undertaken by the industry to maximise success.

In January 2017 Mal Waugh gave a presentation entitled *Frigate Form and Function*. Allowing form to follow function gives the designer the opportunity to optimise design ratios, such as speed–length for theoretical hull speed, displacement–length for resistance minimisation and the hullform for seakeeping. Mal’s presentation explored the potential for the total cost of ownership over the lifecycle to equal or better the attributes of a larger hullform over a densely compact hullform.

What you can “spend” 2000 tonnes on for strength, survivability and stealth is offset against construction efficiencies which drive down the unit production cost. The hypothesis “steel is cheap – air is free” was put to the test in comparing a 6000 t hullform, designed to optimum, against a 4000 t hullform, designed for function.

Troy Munro

New South Wales

Committee Meeting

The NSW Section Committee met on 7 February and, other than routine matters, discussed:

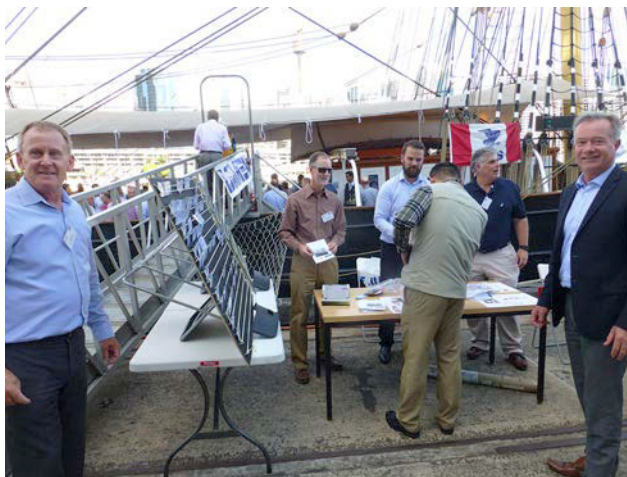
- SMIX Bash 2016: Event successful and comments generally good. One sponsorship still to come, and projections are that we will cover expenses.
- Technical Meeting Program 2017: Two late scratchings already this year in the Presentation Stakes at Chatswood Racecourse, but we have found late entries, and RINA-organised meetings are back on track (see the *Coming Events* column).
- Engineers Australia CPD Delivery: EA has new CPD requirements for groups; however, we are not part of EA and these will not apply to us; to be discussed with EA.
- Visit of Chief Executive: Program of events for the visit discussed and agreed.
- AD Council Funding Model: Proposed funding model for sections discussed.
- Recording of Technical Presentations: Viewing experience of recordings would be improved by having presenter’s slides shown side-by-side; to request from presenters.

The next meeting of the NSW Section Committee is scheduled for 21 March.

SMIX Bash

The seventeenth SMIX (Sydney Marine Industry Christmas) Bash was held on Thursday 1 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). More than 200 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.



The Welcome Committee, Bill Bixley, Adrian Broadbent, Nate Gale and Craig Boulton, welcoming Craig Hughes
(Photo courtesy Graham Taylor)

It was also great to see intrastate and interstate visitors in the throng, including Martin Renilson, Jonathan Duffy, Dean Cook and Gregor Macfarlane from Tasmania, Annette Hill, Liz Hay, Werner Bundschuh and Tom Charter from Brisbane, Karl Slater, Trevor Dove, Ashley Weir and Jesse Millar from Melbourne, and Craig Hughes from Perth.

Sydney turned on a perfect 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 (spring rolls and prawns) were provided. A delicious buffet dinner of stuffed turkey, salads, pasta and bread rolls for mains, and mini ice-creams and cheese platters to finish, was served in the 'tween decks, 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!



Some of the crowd enjoying drinks on board *James Craig*
(Photo courtesy Graham Taylor)



Sue-Ellen Jahshan, Bradley Abdilla and Rhys Williams on board *James Craig*
(Photo courtesy Graham Taylor)

Formalities were limited to

- a short speech by the Chair of the SMIX Bash Committee, Nate Gale, who welcomed the guests and thanked the industry sponsors; and
- the presentation of the Walter Atkinson Award Certificate 2015 by the President of the Australian Division of RINA, Martin Renilson, to Shaun

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Denehy for the paper Denehy, S.P., Duffy, J.T., Ranmuthugala, D. and Renilson, M.R., (2015), Mooring Arrangement Design to Minimise Berthed Ship Motions due to a Passing Ship, *Proceedings Pacific 2015 International Maritime Conference*, RINA and IMarEST, Sydney.

The lucky-door prize of a \$130 champagne Christmas hamper was drawn by Tom Charter from Damen, and won by Scott Thacker from BAE Systems Australia.

The raffle prizes of \$100 Christmas hampers were drawn by David Parmeter from Teekay Shipping, and were won by Annette Hill from Lloyd's Register International and Elizabeth Sandeman-Gay. The proceeds of the raffle will be donated to the Sydney Heritage Fleet.



Chair of the SMIX Bash Committee, Nate Gale, welcoming guests and thanking sponsors
(Photo courtesy Graham Taylor)



Presentation of the Walter Atkinson Award 2016 by Martin Renilson (R) to Shaun Denehy
(Photo courtesy Graham Taylor)



Dinner in the 'tween decks
(Photo courtesy Graham Taylor)

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

Platinum

- Damen Shipyards
- Teekay Shipping Australia

Gold

- ABS Pacific
- AMC Search Limited
- Ausbarga Marine Services
- BAE Systems Australia
- DNV GL
- Electrotech Australia
- Energy Power Systems Australia
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Bronze

- Edwards Marine Services
- Lightning Naval Architects
- One2three Naval Architects
- Shearforce Maritime Services
- Spear Green Design

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

Designing for Slamming Loads on Composite Vessels

Valerio Corniani, Marine Manager, Diab Group, gave a presentation on *Designing for Slamming Loads on Composite Vessels* to a joint meeting with the IMarEST attended by 29 on 1 February in the Harricks Auditorium at Engineers Australia, Chatswood.

Introduction

Valerio began his presentation by saying that we need to distinguish carefully between static and dynamic loads. Static loads are of a steady, fixed (and usually known) value, applied for a significant time. Dynamic loads, on the other hand, are often of short duration, the maximum values may vary significantly, are not easy to define, and may not be well known at all! They depend on the speed of the vessel, the wave height, the shape of the vessel, etc.

As examples of static loads, he quoted a crew member standing on the end of a foil at the side of a yacht, or the whole crew seated on the windward rail. As examples of dynamic loads, he quoted the loads on the bottoms of high-performance yachts and motor-driven planing craft.



Static load on the end of a foil
(Photo courtesy Wild Oats Team)



Dynamic load on yacht bottom
(Photo courtesy Rolex/Carlo Borlenghi)



Dynamic load on planing boat
(Photo from Noal Boat website)

Slamming is a dynamic load on a vessel, and energy is absorbed both by the water and by the hull structure, both depending on hull size and shape, the speed of the vessel and, of course, the sea state. Slamming loads are becoming more and more important because vessels are going faster now than ever before, and vessel bottoms are becoming flatter.

A flat-bottomed tinny, for example is fine in flat water (for which it is designed), but would behave poorly and suffer high loads in any sort of sea state. Vessels which have been designed for seagoing, often with V-shaped sections for high speed and seakeeping, behave well at sea and the loads are catered for.



Hull shape — a tinny on flat water
(Photo from Sea Jay Aluminium Boats website)



Hull shape — very different for a seagoing vessel
Wally Power 118 Yacht
(Photo from Superyachts.com website)

Hull Structure

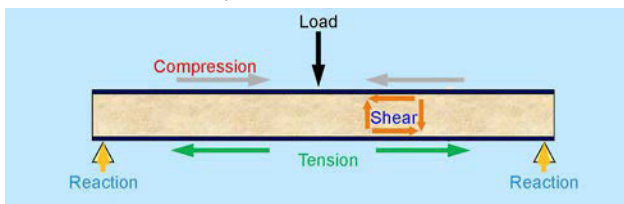
As a composite engineer, Valerio cannot tell a naval architect to design a hull with a V shape to reduce the loads. The lines of the hull are designed to suit a particular purpose and he, the composite engineer, has to design the structure to suit the loads on that hull shape.



Hull structure
(Photo courtesy Diab Group)

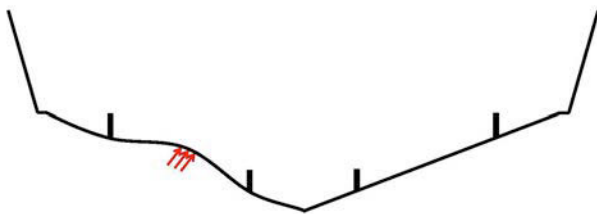
The focus tonight is on sandwich construction, and on the different materials we can use. Here Valerio passed around several example layups, including a sandwich panel, a sandwich I-beam, and a sandwich-to-single-laminate junction. These illustrated the extreme lightness and stiffness of the items.

Sandwich panels owe their strength to the separation of the skins (which take the bending loads) by the core (which takes the shear loads).

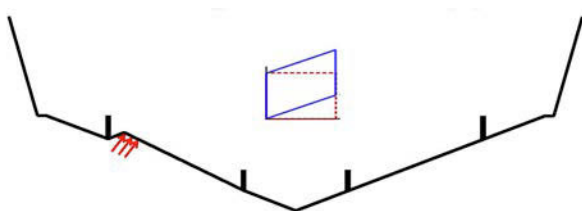


Loads in a sandwich panel
(Image courtesy Diab Group)

A slamming load in the middle of a panel causes bending of the whole panel, and the energy is mainly absorbed by the bending deformation. A slamming load close to a support, on the other hand, causes only shear and the energy is absorbed through core shear deformation.



Slamming in the middle of a panel
(Image courtesy Diab Group)



Slamming close to a support
(Image courtesy Diab Group)

Conservation of Energy

The law of conservation of energy states that “Energy can neither be created nor destroyed; rather, it transforms from one form to another.” There are many forms of energy, including elastic, gravitational potential, kinetic, thermal, chemical, electromagnetic and nuclear energy. For hydrodynamic loads on vessels, we are chiefly concerned with elastic, gravitational potential and kinetic energy.

Consider the example of dropping a ball from a balcony onto a concrete driveway. The potential energy at the balcony is first converted into kinetic energy as the ball drops. When it hits the driveway, the kinetic energy at impact is converted into elastic energy. When the ball rebounds, the elastic energy is converted back into kinetic energy which is, in turn converted to potential energy as the ball rises, and so on.



Dropping a ball onto a driveway
(Photo courtesy Valerio Corniani)

Elastic energy is governed by Hooke's Law

$$F = kx$$

The elastic potential energy is given by

$$E_{Kmax} = \frac{1}{2} F_{max} x_{max} = \frac{1}{2} F_{max} \cdot F_{max} / k = \frac{1}{2} F_{max}^2 / k$$

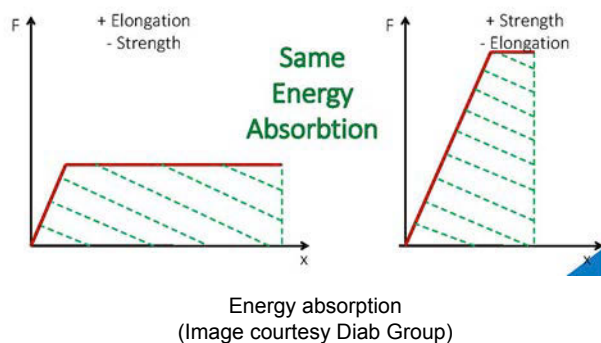
The gravitational potential energy is given by

$$E_{Pmax} = mgh$$

Equating, in the conversion from one to the other

$$mgh = \frac{1}{2} F_{max}^2 / k$$

However, energy absorption should not be confused with elongation. One material may have low strength but high elongation, while another may have high strength but low elongation, and they could both absorb the same amount of energy.



Design Rules

There is a number of design rules relevant for the design of composite structures for vessels. These include

- ISO 12215 Has lower safety factor for cores of elongation >35% everywhere
- GL Has lower safety factor for cores of elongation >35% for hull and watertight bulkheads
- ABS Has lower safety factor for cores of elongation >40% everywhere (40% is a lot!)
- DNV GL Includes approval for slamming (and is a more scientific approach)

DNV GL uses a high-speed Instron machine to determine whether a material is suitable for slamming areas.

Valerio showed graphs of shear stress vs deflection for sets of three samples tested under static and slamming loads by DNV GL, and the resulting Type Approval certificate.

Practical Tests

Here Valerio showed a testing rig constructed by Diab in Sweden for testing sandwich samples under high-speed shear loads. The rig included a slug mass of 100 mm diameter about 200 mm long which could be dropped from different heights onto the samples to simulate the slamming loads. This was followed by a video of the test rig in use.



Diab test rig
(Photo courtesy Diab Group)

There was a new trend in the Open 60 class a few years ago, when it was proposed that a single laminate skin with many closely-spaced frames would be lighter than sandwich construction, and some vessels were built this way. When they were designing the structure for the new bow for *Wild Oats XI* a while ago, they investigated this option, but decided on staying with sandwich construction, with about 40 mm core and 2 mm laminate skins in the slamming zone.

The TP52s (Trans-Pacific 52s) are very light with all Nomex hull bottoms. However, when people bought second-hand vessels to sail them in open waters, they found that they were getting failures of the sandwich construction. Nomex is very strong but stiff, and failed under the slamming loads close to the panel supports.

Conclusion

Designing for slamming loads is very different to designing for static loads. We have looked at the differences between the types of loads, and investigated the law of conservation of energy. The structure of a vessel has to be designed to take the loads imposed by slamming, and this means absorbing the energy imparted to the structure. In addition, we need to take account of the design rules relevant to the design of composite structures for vessels.

Questions

Question time was lengthy and elicited some further interesting points.

The core shear failures of the TP52s were not catastrophic. The failures were usually close to a support and so, while the laminate cracked and led to water ingress into the hull, it was usually spotted quickly. While the water ingress slowed the boat, the crew were able to make port for repairs, even if temporary. However, in the long run, the whole bottom would have to be re-laminated.

How many cycles to failure in composite structures? A good question! There is still not much mention of fatigue behaviour of composite materials. The tendency is to say that composites behave like steel in that, if you design below the fatigue limit, then the structure will be safe. Epoxy resins are usually OK for extended life, but polyester resins are more likely to degrade in strength over time. There is, as yet, no definition of the number of cycles to failure of composite structures in the marine field.

The video of the test rig in use showed the slug mass appearing to have sharp edges, and this would have affected the results. In fact, the mass had 5 mm radii on the edges, as they did not want failure by denting and this was expected to have no effect on the results. The mass was held up electromagnetically, so that it could be dropped from different heights. In their initial trials, a rubber mat under the test rig *did* affect the results until they realised what was happening, and removed the rubber mat! The test rig was designed so that they could take it to trade shows and demonstrate the properties of various layouts.

The main focus here has been on composite yachts. However, in the application to commercial vessels, lightweight construction is going to reduce energy consumption and, hence, engine emissions. In his role with Diab, Valerio is focussing quite a bit on that. Yachts and pleasure vessels in composites comprise something like 60–80% of the

market. However, the SOLAS regulations are not good for composites, as composites burn rather well. Regulation 17 says effectively that, if a structure performs as well as steel in fire conditions, then it may be used. So there is a lot of work going on now developing resins and cores which can make sandwich composites pass Regulation 17.

SP in Sweden is focussing on a risk analysis as for steel. However, the shipping industry tends to be conservative, and it is hard to change minds. It does happen, albeit slowly! The vote of thanks was proposed, and the certificate and “thank you” bottle of wine presented, by Phil Helmore.

Phil Helmore

Victoria

The Victorian Section held its AGM on the evening on 11 August 2016, hosted kindly by Jacobs Engineering Group at their offices in Melbourne’s CBD. The meeting was chaired by RINA Victoria Section Secretary, Siobhan Giles, in the absence of our outgoing chair, Andrew Mickan. Siobhan briefed the meeting on some of the highlights of the Victorian Section over the past year, including five technical meetings hosted jointly with IMarEST (Melbourne Branch) and a visit from the RINA CEO, Trevor Blakeley. The committee wishes to thank Jacobs Engineering Group, BMT Design & Technology, ThyssenKrupp Marine Systems Australia, DST Group and AMOG Consulting for supporting the visit. Trevor Dove presented the Treasurer’s report, and Karl Slater briefed the meeting on news from the RINA Australian Division Council. In addition, there was discussion regarding an increased social media presence and it was decided to elect a Social Media Manager to the committee.

A new executive committee was elected unopposed. The committee for 2016–17 is:

Chair	Hugh Torresan (DST Group)
Secretary	Siobhan Giles (BMT)
Treasurer	Trevor Dove (BMT)
Nominee to Aust. Div. Council	Karl Slater (DST Group)
Social Media Manager	Sam Hunnibell (BMT)
Committee Members	Wang Kong Brett Longmuir Lance Marshall James Nolan

The Victorian Section executive committee expresses its thanks and admiration to outgoing Section chair, Andrew Mickan. Andrew acted as RINA Victorian Section Chair for the past two years. Working primarily in the defence sector, Andrew has recently taken up an exciting posting with BMT Fleet Technology in Ottawa, Canada, where he will be working on Canadian Navy assets. We wish Andrew well in his exciting adventure.

The Role of Welding Technology in the Performance of Warships Past, Present and Future

Dr Stuart Cannon of DST Group gave a technical presentation on *The Role of Welding Technology in the*

Performance of Warships Past, Present and Future at a joint meeting with RINA and IMarEST in early August. The presentation, which was originally delivered as the 2016 Houdremont Lecture for the International Institute of Welding, discussed the benefits of welding as the main construction method for surface warships in a historical context. Moving quickly up-to-date, Stuart compared the size of early warships with their modern-day counterparts and introduced the primary types of the loads which lead to failure of the welded joints in a ship structure. The loads considered included wave loading as well as loads caused by military effects. Each loading type was explained through a number of case studies, either on full-scale ships or by carefully-designed experiments carried out by the Defence Science and Technology Group. Throughout the presentation issues were raised which provided the incentives for further research in this field.

Stuart Cannon holds the position of Research Leader, Maritime Platform Performance, in the Maritime Division of DST Group. He is responsible for research programs in Platform Systems Analysis and Performance, Advanced Materials and Fabrication Methods and Naval Power and Energy. Additionally, Stuart is responsible for all surface platform research in support of the RAN’s surface fleet as well as the future surface ship acquisitions.

Stuart is a trained naval architect who specialises in the surface warship performance. He has a bachelor’s degree in Nautical Studies from Plymouth University, a master’s degree in Offshore Structures from Cranfield Institute of Technology and a doctorate in Naval Architecture from Brunel University in London. His research ranges from the behaviour of ships in a seaway to determining the residual strength of a ship structure following weapons damage. During his employment at DST Group he has been involved in a variety of structural investigations of the fleet and has advised the DMO on projects such as the Armidale-class patrol boats, the air-warfare destroyer and the amphibious ships. He received a Chief of Defence Force Group Commendation for his work investigating the circumstances that lead to the loss of HMAS *Sydney*. Dr Cannon is a Fellow of the Australian Academy of Technology and Engineering, a Fellow of the Royal Institution of Naval Architects, a Fellow of Engineers Australia and a Chartered Professional Engineer. He is a member of Lloyds Register of Shipping Technical Committee and a member of the International Ship and Offshore Structures Congress Naval Vessel Design Committee. Stuart is an Adjunct Professor in the National Centre for Maritime Engineering and Hydrodynamics at the Australian Maritime College, University of Tasmania. In 2014 he was awarded the Vice Chancellor’s Award for outstanding contributions by adjunct and honorary position holders. In his spare time, Stuart enjoys scuba diving on shipwrecks, kayaking and cycling. Stuart lives with his wife Helena and has a young daughter, Isla.

CSIRO’s New Research Vessel, *Investigator*

Tim Asome and Marcus Ekholm, General Manager and Ship Manager respectively at ASP Ship Management Group, presented a technical presentation on CSIRO’s new research vessel, RV *Investigator*. The presentation covered the scope of work that RV *Investigator* was designed to perform, the



RV *Investigator* in Sydney Harbour in December 2016.
The ship had visited the port for a docking in the Captain Cook Dry Dock at Garden Island
(Photo courtesy Clyde Dickens)

types of research it can perform and the restrictions which are placed on a vessel undertaking such work at sea. The presentation also included a detailed look at the ship's equipment and why it has been selected and installed. A number of short videos were also presented to show how this capability was realised

RV *Investigator* is a monohull self-propelled twin-screw 93.4 m long seagoing scientific laboratory. She has capabilities in the fields of geographical, metrological, biological and atmospheric research. She accommodates up to 40 scientific staff and 20 crew for voyages which can run for up to 60 days. She was a challenge to design, build and operate when the science has no boundaries.

Tim Asome (General Manager ASP Ship Management Group) started an engineering cadetship with Howard Smith in 1993 and has worked in the shipping industry since that time. With the demise of Howard Smith, Tim spent the vast majority of his sea-going career with BP Shipping in the UK. Tim came ashore in 2005 and worked for Sembawang Shipyard in Singapore as a Ship Repair Manager before taking a role in 2007 with ASP, as the Ship Manager for the

BP-owned tankers. He had a brief stint as Ship Manager for P&O in Hobart where he looked after the CSIRO vessel *Southern Surveyor*. He returned to ASP in 2011 and, in 2012, took on the role as General Manager. Tim was actively involved in the RV *Investigator* project, being a key member of the successful bidding team which won the contract to manage *Investigator* for the commissioning phase and the eventual long-term ship-management role.

Marcus Ekholm (Ship Manager, ASP Ship Management Group) started in the industry in 2002 as a cadet at Kalmar Maritime Academy and, once qualified, served his time on tankers and general cargo/heavy-lift vessels. Marcus came ashore in 2011 and relocated to Australia where he became the Assistant Harbour Master for the Port of Geelong. Marcus started with ASP in 2013 and took on the role of Ship Manager for RV *Investigator* in 2014 before the vessel was officially delivered. Marcus continues in his role as Ship Manager of *Investigator* and looks after the everyday business of the vessel. Marcus has a team of people which reports to him including the sea staff, purchasers, accountants and crewing personnel.

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ASP Ship Management is a third party Ship Management company, they began in Australia managing vessels for predominately oil majors and mining giants. ASP also had a history with CSIRO managing the previous vessel at certain times in the vessel's life. ASP now manages RV *Investigator* for CSIRO and that role includes the technical management and crew management. CSIRO manages the scientific elements of the voyages, they schedule the vessel for research voyages and publicise the vessel's capability and lobby the government for funding as Australia's only deep-water research platform, although similar at-sea research is carried out specifically in the Antarctic regions with the Australian Antarctic Division.

Maritime Cyber Security — Hacking on the High Seas

Merchant vessels are complex machines which comprise safety-critical networked control systems. These systems are susceptible to cyber-attack which may threaten the safety of the vessel, its cargo and crew. There is a growing acknowledgement of merchant shipping as critical

infrastructure, which has led to the development of strategies and guidelines by governments and industry bodies, to protect vessels from this growing threat.

Gerd Berner, a PhD candidate at the National Centre of Ports and Shipping, at the Australian Maritime College, University of Tasmania presented a technical talk on the unique cyber threats and the challenges faced by designers, builders and operators of modern merchant ships and provided insight into strategies and guidelines for cyber security and robustness in the merchant marine environment.

Gerd has a background in maritime technology having worked in maritime electrical/electronic engineering and has worked at sea in the Australian merchant navy. When not doing research, Gerd works in information technology, as a Consulting Architect in Cyber Security in the financial services industry. Gerd has an honours degree in computing (UTas), and a master's degree in information systems security (CSU).

Hugh Torresan

CLASSIFICATION SOCIETY NEWS

DNV GL

Local Newbuilds

Despite the global downturn in newbuilds, 2016 was a busy year for local deliveries with five vessels delivered, including Austal's two troop carriers for Oman and the crewboat for Azerbaijan (special thanks to our Project Manager, Jude Stanislaus).

2017 looks set to continue on a similar theme, with Incat and Austal working on three 100 m+ car ferries, and Austal due to deliver the two Cape-class patrol boats.

These vessels, along with others built outside of Australia but designed locally, are keeping Adam Williams and Nigel Lynch nicely busy in DNV GL's local approval centre.

Overseas Newbuilds

Congratulations to the SeaRoad team as we welcome the new LNG-fuelled *SeaRoad Mersey II* to our shores. Our Melbourne and Hobart teams are looking forward to working with her in the years ahead.

LNG Fuel

Continuing with the LNG theme, we're delighted to note that Siem and Woodside have successfully bunkered the LNG-fuelled *Siem Thina* for the first time in Australia; a notable milestone. Also worth noting is the recent "Green Corridor" Project which has been signed recently between DNV GL, Woodside, Rio Tinto, MOK, SDARI, BHPB and FMG to investigate the possibility of capesize bulkers running on LNG from Australia up into China.

Farewell to Mike Mechanicos

We were sad to say goodbye to Mike Mechanicos at the end of last year as he moved into retirement. Mike has worked with great energy and enthusiasm over the last nine years to present our naval services not only to both the RAN and RNZN, but also to other navies within our region and globally. His in-depth knowledge of the navy business has allowed us to carefully work through how we can best

support our global navy network. We wish him all the best in retirement.

Elliot Thompson

In a role that we all envy, Elliot Thompson will move from his third to fourth six-month global trainee rotation in February. Having spent time in Perth, St Nazaire and Oslo, his final training period will be spent in China learning the fine art of steel renewal!

Cyber Security

Cyber security has become a concern and should be considered as an integral part of the overall safety management in shipping and offshore operations. DNV GL's recommended practice (RP) explains the 'how to do' and not just the 'what to do'. We use a structured approach to effectively assess and manage your cyber security by combining IT best practices with an in-depth understanding of maritime operations and industrial automated control systems. In addition, our RP gives guidance supporting preparations for ISO/IEC 27001 certification. The RP can be downloaded from our website www.dnvgl.com.

Tim Holt

DNV GL Sydney

DNV GL Releases New Version of Nauticus Hull

Nauticus Hull is DNV GL's software package for efficient modelling and strength assessment of ships according to the latest rule sets.

DNV GL released Version 18.5 of Nauticus Hull in January 2017. Key highlights of this latest release include:

- Support for January 2017 edition of DNV GL Rules for the Classification of Ships
- A number of enhancements and error corrections

A cycle update of GeniE V7.4 (V7.4-16) is included in the installation, with several important bug fixes.

Rolf Buøen

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FROM THE CROWS NEST

Around the World in 40 Days!

The title of Jules Verne's far-sighted book has been well and truly eclipsed by the go-fast silors.

The maxi trimaran *IDEC Sport* sailed by Francis Joyon, Clément Surtel, Alex Pella, Bernard Stamm, Gwénolé Gahinet and Sébastien Audigane won the Jules Verne Trophy, the outright round-the-world sailing record on 26 January 2017, crossing the finish line off Ouessant, France, at 0749 UTC. Francis Joyon and his crew sailed the 22°461 theoretical n°miles in 40 days, 23 h, 30 min and 30 s, at an average speed of 22.84 kn. Out on the water, they actually sailed 26°412 n miles at an average speed of 26.85 kn. They shattered the previous record set by Loïck Peyron and the crew of the maxi trimaran *Banque Populaire V* by 4 days, 14 h, 12 min and 23 s. During this round-the-world voyage, they smashed no fewer than six intermediate records at Cape Leeuwin, off Tasmania, on the International Date Line, at Cape Horn, at the Equator, and off Ushant.

Francis Joyon and his crew have become the fastest round-the-world sailors in history. Aboard the 31.5 m long maxi-trimaran, they had a remarkable achievement with some incredible daily performances along the way, such as on the fourteenth day, when they clocked up 894 n miles averaging 37.3 kn. For eight days, they sailed more than 800 n miles and seven over 700 n miles. Aboard the multihull designed in 2005 by VPLP (Van Peteghem Lauriot-Prévoist) for a crew of twelve, Francis, Clément, Alex, Seb, Gwéno and Bernard have made it all look so simple, working perfectly together.



IDEC Sport at speed
(Photo from IDEC Sport Sailing website)

And Solo Around the World in 49 Days

Thomas Coville has smashed the round-the-world unassisted solo sailing record by a stunning eight days. He crossed the official finish line off Ouessant, France, in his maxi trimaran *Sodebo Ultim'* (formerly *Geronimo*) at 1757 UTC on Sunday 25 December 2016 after a trip that took just 49 days, 3 h, 7 min and 38 s. The previous record of 57 days and 13 hours had been held by fellow Frenchman, Francis Joyon, since January 2008 in *IDEC 2*, a performance already considered exceptional at the time. Before that, the solo record was held by Britain's Dame Ellen MacArthur, who took 71 days, 14 h and 18 min in *B&Q* in 2005. Her maxi trimaran had been specifically designed to accommodate her diminutive 1.57 m stature and built here by Boatspeed at Gosford, NSW.

Colville's new record is the fourth-fastest time for any circumnavigation on a yacht, including those with as many as ten crew. *Sodebo Ultim'* is 31 m long with 21 m beam and a 35 m mast carrying up to 680 m² of sail area. After a decade and four failed attempts, Mr Coville's fifth attempt was a resounding success.



Sodebo Ultim' at speed
(Photo from sodebo.com website)

And the Power-boat Record...

Team Britannia is a multi-million pound British bid led by ocean adventurer, Alan Priddy, to design and build the fastest and most fuel-efficient wave-slicing powerboat to circumnavigate the globe for the much-coveted UIM world record, currently held by New Zealander Pete Bethune at 60 days 23 h and 49 min in *Earthrace*.

The 80 ft (24.38 m) boat, designed by Prof. Bob Cripps, former Technical Director of VT Halmatic, utilises the revolutionary wave-slicing technology, making the vessel “super-efficient” and cutting fuel consumption by up to 30%. A revolutionary fuel emulsion, a mixture of diesel, water and emulsifier from West Sussex firm SulNOx, will power it. The emulsified fuel cuts harmful emissions such as particulate matter and nitrogen dioxide.

Construction of the boat started at the beginning of June 2016, and the important hurdle of turning the boat over was passed at the beginning of December. Completion of the boat, which includes attaching the wheelhouse, flybridge and decks, along with fuel tanks, engines, jet drives and interior fittings, will continue in early 2017.

The countdown timer on the website, www.teambritannia.co.uk, shows the time remaining till the day the boat is expected to be launched, 31 March 2017. Following launch, there will be an extensive program of sea trials and record attempts prior to the circumnavigation itself which is expected to start in October.

Phil Helmore



Team Britannia
(Image from Team Britannia website)

THE INTERNET

Webcasts of NSW Section Technical Presentations

In 2011, Engineers Australia began recording selected technical presentations made to RINA (NSW Section) and IMarEST (Sydney Branch) for webcasting using Mediavisionz. The recordings were placed on the Engineers Australia website. All of the recorded webcasts up to 30 September 2014, together with hotlinks to each one, are listed at

www.rina.org.uk/NSWwebcasts.html.

In October 2014, Engineers Australia started using a new system for recording presentations, using three cameras and a hand-held microphone, with an audio technician in attendance. Webcasts were then placed on the Engineering on Line (EoL) website at www.engineeringonline.com. Our first presentation to be recorded with this new system was Graham Taylor’s presentation on *LNG — The New Marine Fuel?* on 1 October, and the presentation is up on the EoL website at www.engineeringonline.com/video/xjkrdrf/lng-the-new-marine-fuel. Details of how to access this recording were given in the February 2015 issue of *The Australian Naval Architect*.

However, in early 2015, Engineers Australia discontinued the new recording method and the EoL website for regular monthly presentations, and resumed using Mediavisionz while considering options for future recordings.

In 2015, only one recording of our presentations was made, of Warren “Skip” Miller’s presentation on *Side Lifting Foils and Support Structure on Wild Oats XI* on 1 April, and the presentation is shown, with a hotlink, on the NSWwebcasts website.

In 2016, Engineers Australia discontinued recording presentations in the Harricks Auditorium. Recordings may still be made, but must be arranged/paid for by the society using the Auditorium. We are currently investigating the option of making our own recordings. We have so far made

two recordings and are in the process of placing these on the web. We are learning and have ideas to improve the viewing experience.

Watch this space!

Phil Helmore



CQS displaying her more radical features before the start of the 2016 Rolex Sydney to Hobart yacht race
(Photo John Jeremy)

GENERAL NEWS

First Cape-class Patrol Boat for RAN

On 8 December Austal announced the roll-out prior to launch of Hull 380, the ninth *Cape*-class patrol boat designed and constructed by Austal and the first of two to be delivered to the Royal Australian Navy (RAN) in 2017.



Hull 380 after roll-out at the Austal shipyard in Western Australia
(Photo courtesy Austal)

Australian Defence Industry Minister, The Hon. Christopher Pyne MP, Senator Chris Back, and Federal Member for Canning, Andrew Hastie MP, joined Austal Chief Executive Officer, David Singleton, and Austal Chairman, John Rothwell, at the official roll out at Austal's Henderson Western Australia shipyard.

Mr Singleton said: "It is with great pride that we welcome the Defence Industry Minister here today to celebrate not only the continuing success of the Cape class as an effective maritime border protection solution, but Austal's proven shipbuilding capability.

"Austal delivered eight Capes to the Australian Border Force over 2013–15 and we will hand over Capes 9 and 10 to the Royal Australian Navy in the first half of 2017. To date, we have directly engaged 348 Australian suppliers and created and sustained 350 jobs in the delivery of the Cape-class program."

Austal's Cape-class patrol boat is a 58 m all-aluminium monohull vessel, designed to perform border-protection and maritime-security tasks, with a top speed of 26 kn and a range of up to 4000 n miles. With a crew of 22, the vessel is capable of undertaking 28 day patrols in (up to) sea state 4 with the ability to launch two boats simultaneously.

New, enhanced maritime-security and anti-mine warfare variants of the Cape class were announced at Euronaval 2016, which offer even greater capability and feature mission packages which include unmanned aerial vehicles (UAVs), unmanned surface vessels (USVs) and unmanned underwater vehicles (UUVs).

Hull 380 was launched on 9 December and underwent final fitting out before sea trials commenced in January 2017. Delivery to the RAN is on schedule for April 2017.

The second Cape-class patrol boat for the RAN, Hull 381, is due to be launched in February 2017.

Austal Wins 56 m Commercial Ferry Contract

On 16 December Austal announced the company's sixth new commercial vessel order for 2016, with the award of a €15.47 million (circa \$A22 million) contract for a high-speed passenger ferry from Förde Reederei Seetouristik (FRS Group) of Germany.



Austal's Hull 380 after launching in Western Australia.
A close inspection will reveal the name *Cape Fourcroy*
(Photo courtesy Austal)

The 56 m catamaran is a new design from Austal's Australian-based design team, adding to their successful portfolio of designs which has seen more than 22 vessels of similar size constructed for commercial ferry operators around the world since 2002.

Announcing the contract Austal Chief Executive Officer, David Singleton, highlighted Austal's successful strategy to pursue export opportunities which are strengthening Australia's shipbuilding capability.

"Export contracts such as this are integral to the ongoing development of our Australian-based design, procurement and engineering teams and provide terrific opportunities for them to share their skills and expertise in shipbuilding with our Philippines shipyard. This not only strengthens our local and overseas capabilities but, ultimately, delivers great value to our customers," he said.



The 56 m high-speed catamaran to be built by Austal Philippines for the FRS Group
(Image courtesy Austal)

Austal's new design encompasses several key innovations, including an optimised hullform which will minimise both fuel consumption and wake wash when operating on the River Elbe between Helgoland and the Port of Hamburg. The environmentally-friendly ship has been designed with several features to improve the passenger experience, with the use of energy efficient LED lighting internally and externally to create mood, ambient and decorative lighting. Large windows in the superstructure and two open deck areas will offer passengers expansive views from throughout the vessel.

The 35 kn, all-aluminium catamaran also features silicon-type anti-fouling (with no biocides which can harm waterways), a sewage treatment plant and an engine exhaust arrangement which will allow catalytic converters to remove nitrous oxides from the main engine exhaust.

The contract from FRS Group represents Austal's 6th commercial ferry order in 2016 and follows orders received from;

- 2Go of the Philippines (2 × 30 m passenger ferries),
- Seaspovill of South Korea (1 × 50 m passenger ferry),
- Mols Linien of Denmark (1 × 109 m vehicle passenger ferry), and
- Blue Sea Jet of China (1 × 42 m passenger ferry, to be constructed by Aulong, Austal's joint venture with Jianglong Shipbuilding).

Construction of the new ferry for the FRS Group will commence at Austal Philippines' Cebu shipyard early in 2017, with delivery scheduled for March 2018.

The Australian Naval Architect

Australia and France sign Inter-Governmental Agreement for New Submarines

On 20 December Australia's Minister for Defence, Senator the Hon. Marise Payne, and France's Minister of Defence, M. Jean-Yves Le Drian, welcomed the signing of an agreement on Australia's Future Submarine Program. The agreement establishes the framework between the Governments of Australia and France required for the development of the Royal Australian Navy's new fleet of submarines.

"This historic agreement builds on the strength and depth of the Australia-France defence relationship and is another significant step forward for Australia's Future Submarine Program," Minister Payne said.

"Australia's 2016 Defence White Paper established the need for a highly-sophisticated and regionally-superior submarine fleet. This fleet will, with the assistance of France, be built in Australia. The agreement signed today will enable France to transfer cutting-edge skills, knowledge and technology to the Australian Government and Australian industry to achieve a sovereign operational and sustainment submarine capability in Australia.

"Underpinning Australia's long-term partnership with French company DCNS for the design and build of Australia's future submarines, the agreement also recognises the importance of maximising Australian industry involvement in the submarine program, including through deepening partnerships between Australian and French defence suppliers. This will drive innovation, jobs and economic growth right across Australia."

Minister Le Drian said that France was committed to working with Australia to deliver a regionally-superior sovereign submarine capability. "I am pleased to sign this agreement today and I thank Australia for hosting today's historic event," Minister Le Drian said.

Minister Le Drian said that the agreement would also strengthen the broader relationship between Australia and France. "The agreement is an important milestone in the deepening bilateral relationship, including operational cooperation between our Navies, and investment in innovation and technology."

The agreement will be made publicly available through both nations' respective ratification processes.



Prime Minister of Australia, the Honourable Malcolm Turnbull and French Minister of Defence, M. Jean-Yves Le Drian, sign the Framework Agreement between the Government of Australia and the Government of the French Republic Concerning Cooperation on the Future Submarine Program
(RAAF photograph)



Five RAN Collins-class submarines alongside Diamantina Pier at Fleet Base West on 18 December 2016, with submarine crews, Submarine Force Headquarters staff and additional submarine support staff paraded on the pier (RAN Photograph)

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LNG-fuelled *Searoad Mersey II* in Service

Described by her owners as ‘the cleanest, greenest freight ship ever to trade in Australian waters’ *Searoad Mersey II* arrived at her home port, Devonport, on 16 December.

Under the command of Captain Lloyd Cahill, *Searoad Mersey II* left her German builders, Flensburger Schiffbau-Gesellschaft, in early November and sailed to Australia with stopovers for fuel and supplies in Las Palmas in the Canary Islands, Cape Town in South Africa and Fremantle in Western Australia.

Captain Cahill said she is by far the finest ship he had ever had the honour to command.

“This truly represents a new era for Australian shipping and especially for Tasmanian exporters and importers, and it leads the world with its pioneering LNG refuelling system,” he said.

“It’s a technological marvel which was conceived and championed by Tasmanians, and her environmental credentials fit so well with the image that the state is known for worldwide.”

The \$110 million project has been driven by the chairman of SeaRoad Holdings, Chas Kelly, who said “I am a proud and committed Tasmanian and to have this vessel call Devonport its home port is even more special to me.” “Tasmania has needed this vessel for the past few years and her arrival gives SeaRoad a 50% increase in our available capacity to move freight between Tasmania and the mainland, all year round.”



Searoad Mersey II
(Photo courtesy SeaRoad)

General Particulars of *Searoad Mersey II*

Length	182 m
Breadth	26.8 m
Draft	6.35 m
Speed	20.5 kn
Freight Decks	3
Stern Ramps	2
Capacity	1960 lane m, plus cars 80 trailers, 70 cassettes, 455 TEU (depending on cargo mix), 110 cars
Reefer points	150
Primary fuel	LNG

Upgrade of the Osborne South Naval Shipyard

On 7 December the Minister for Defence Industry, the Hon. Christopher Pyne MP, announced that the Department of Defence and Odense Maritime Technologies of Denmark were working together on the infrastructure upgrades needed for the delivery of the Government’s continuous naval shipbuilding program.

Minister Pyne said that Odense Maritime Technologies would work with a range of stakeholders including Defence, the South Australian Government and ASC to deliver a surface-vessel shipyard which supports both the minor and major surface-vessel programs now and into the future.

“Redevelopment of the Osborne shipyard and the implementation of the offshore patrol vessels and future-frigate programs will be carefully managed” Minister Pyne said.

“This will ensure that the air-warfare destroyer and Collins-class sustainment activities continue unimpeded.

“The Government announced in April that the \$35 billion program to build nine anti-submarine warfare frigates will commence construction in Adelaide in 2020.

“This follows the \$3 to 4 billion program to construct 12 offshore patrol vessels which will begin in Adelaide in 2018 at the Osborne Shipyard and transition to Henderson in Western Australia in 2020,” he said.

Minister Pyne said that substantial facilities and infrastructure upgrades will take place to ensure the capacity and capability of the Osborne South Naval Shipyard.

RFT for OPVs Released

The Offshore Patrol Vessel project has reached a significant milestone with the release of the Request for Tender to the three shortlisted designers at the end of November.

The Minister for Defence Industry, the Hon. Christopher Pyne MP, said that the Request for Tender will see Damen, Fassmer and Luerssen team up with Australian shipbuilders.

“We want to ensure that the tenderers’ responses maximise Australian industry opportunities through a local build using Australian-made steel,” said Minister Pyne.

“The Request for Tender will require each tenderer to develop an Australian Industry Capability Plan which maximises the opportunities for Australian industry participation.

“This includes how they will transition their existing supply chains to Australian supply chains, and how they will integrate local suppliers in their global supply chains.

“The project is expected to create around 400 direct jobs and is part of the Government’s commitment to the continuous build of warships in Australia.”

The Minister for Defence, Senator the Hon. Marise Payne, said that the project is on track, with construction starting in Adelaide in 2018 before moving to Western Australia in 2020.

“The 12 new Offshore Patrol Vessels will enhance our border-protection and patrol missions by providing greater reach and endurance than the existing Armidale-class patrol boat fleet,” Minister Payne said.



The Spanish Navy's frigate *Cristóbal Colón* sailing from Ferrol for deployment to Australia. The frigate is spending 120 days in Australia supporting the entry into service of the first of Australia's air-warfare destroyers, *Hobart*. *Cristóbal Colón* is expected to return to Spain in early August 2017.

Also in Australian waters is the Italian FREMM frigate *Carabiniere* which is on a promotional tour. This class of anti-submarine frigate is on offer to the RAN as a contender for the Navy's future frigate (Photo Spanish Navy)



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“These Australian-built vessels will form an important part of the Government’s investment to strengthen our maritime surveillance systems.”

“Safeguarding Australia’s maritime approaches, offshore territories and borders is essential for Australia’s national security.”



NUSHIP *Brisbane* being moved onto the shiplift at Techport in South Australia ready for launching
(Photo courtesy AWD Alliance)

Second AWD, NUSHIP *Brisbane*, Launched

The RAN’s second air-warfare destroyer, *Brisbane*, was launched at Osborne, South Australia on 15 December 2016. Over 4000 people including Government, Naval and Defence industry dignitaries, alongside AWD Alliance employees and their families, watched as the ship’s sponsor Mrs Robyn Shackleton, wife of former Chief of Navy and HMAS *Brisbane II* Commanding Officer, VADM David Shackleton AO, broke a commemorative bottle of wine on the ship’s bow and officially named the ship *Brisbane*.

Following the official naming ceremony, the ship was lowered in the Government of South Australia’s Common User Facility shiplift to float for the first time, signifying a moment of immense pride for the thousands of Australian shipbuilders and combat-system integrators who have worked on the project for more than a decade.

AWD Alliance General Manager, Lloyd Beckett, said that the launch of *Brisbane* was further demonstration of significant progress on the air-warfare destroyer project and a great opportunity to celebrate the work of Australia’s shipbuilders and system integrators.

“Today’s launch is the culmination of more than a decade of work and dedication by thousands of Australians and other members of the AWD Alliance to deliver Australia’s most complex next-generation defence project.

“It is a significant achievement and an exciting moment in the history of the AWD project, with the milestone marking the AWD Alliance’s return to budget and schedule.

“Further progress will be evident in 2017 as the first destroyer *Hobart* completes acceptance sea trials and is delivered to the Department of Defence, while the third destroyer *Sydney* completes block consolidation and hull integration,” he said.

The AWD Alliance, made up of shipbuilder ASC, mission systems integrator Raytheon Australia, and the Department of Defence, is responsible for delivering three Hobart-class DDGs and their support systems to the Navy.

AWD Program Manager, CDRE Craig Bourke, remarked on the naming of the second air-warfare destroyer.

“Destroyer *Brisbane*, the third naval vessel to carry the name, acknowledges the significant contribution of naval personnel who previously served in the first two ships of the name, including those able to attend the launch today.

“Joining them are many current serving members of the Royal Australian Navy and crew members of the new destroyer *Brisbane* who are actively contributing to the delivery of this next-generation warship to the Department of Defence.

“Over the coming months, we will continue to progress work on *Brisbane*, proving her engines and gas turbines before the ship undertakes builder’s sea trials at the end of 2017,” CDRE Bourke said.

ASC Shipbuilding CEO, Mark Lamarre, said that the launch of the destroyer was a special occasion for the ASC workforce who, through their years of dedication and effort, had brought the ship to life and, in doing so, proved the knowledge and skill of Australia’s shipbuilding industry.

“The launch of the second destroyer *Brisbane* further illustrates the highly skilled and professional naval shipbuilding capability here in Australia, with the AWD project laying the foundation for future shipbuilding work in South Australia,” he said.

“Not only are we one step closer to the delivery of this exciting new capability to the Navy, but we can take pride in the fact that Australia’s shipbuilding workforce will be able to apply key lessons from this project to future ones. It is entirely fitting that the AWD Alliance workforce is able to show off their remarkable achievements in building this impressive ship to their loved ones at the launch today,” Mr Lamarre said.

Raytheon Australia Managing Director, Michael Ward, welcomed the launch of *Brisbane* and commented on the significance of the Alliance mission-system integration capability.

“As the combat-systems integrator for the AWD project, Raytheon Australia has applied its highly-skilled Australian workforce of 320 to the AWD project over the last decade.”

“Raytheon Australia is responsible for the integration of ten major subsystems, including the Aegis weapon system, which is provided through US Foreign Military Sales, and associated delivery of more than 3500 major pieces of combat-system equipment required to establish the warfighting capability of the AWD. This will contribute to making the AWD the most lethal and sophisticated warship ever operated by the Royal Australian Navy.”



A welcoming spray for the second air-warfare destroyer for the RAN, *Brisbane*, on launching day
(Photo courtesy AWD Alliance)

“The AWD’s combat-system integration activities demand some of the most advanced engineering and project-management skills in this country. It is extremely satisfying that our strong investment in local capabilities has contributed so much to this launch milestone today.”

“The success of the combat-system integration activity is a source of tremendous pride for Raytheon Australia. Not only have we performed admirably on this project, but we have built for Australia a national asset in combat-system integration,” Mr Ward said.

The AWD project has made significant progress in 2016 with return of the program to schedule and budget, and the successful completion of builder’s sea trials for the first destroyer, *Hobart*, in September 2016.

2017 also is set to be an exciting and busy year for the program, with a number of significant events on the horizon including completion of sea acceptance trials for *Hobart*, builder’s sea trials for *Brisbane* and hull consolidation for the third air-warfare destroyer, *Sydney*.



Brisbane afloat
(Photo courtesy AWD Alliance)

NUSHIP *Hobart* starts Sea Acceptance Trials

The Royal Australian Navy's future HMAS *Hobart* sailed from the wharf at Techport Australia on Monday 30 January to begin a second round of advanced sea trials off the coast of South Australia.

AWD Program Manager, CDRE Craig Bourke, said that this second phase of trials will test *Hobart's* full suite of mission systems, involving both ship systems and combat systems.

"These trials are the culmination of all of the preceding design, production, activation, integration and test activities conducted on *Hobart* to date," CDRE Bourke said.

"Sea acceptance trials are a significant milestone for the Project as it is the first time that the AWD will be tested as a complete mission system."

In order to fully test the ship, *Hobart* will work closely with a range of fighter aircraft, surface ships and helicopters, as well as other civilian platforms in a range of simulated scenarios.

Raytheon Australia's managing director, Michael Ward, noted the complexity and sophistication of the AWD combat system which will be tested during the trials.

"Raytheon Australia is responsible for the integration of ten major subsystems, including the Aegis weapon system, which is provided through foreign military sales, and associated delivery of more than 3500 major pieces of combat-system equipment required to establish the warfighting capability of the AWD. This will contribute to making the AWD the most lethal and sophisticated warship ever operated by the Royal Australian Navy."

AWD Alliance General Manager, Paul Evans, said that the Alliance is looking forward to the successful completion

of sea acceptance trials as a pre-requisite to enable the AWD Alliance to deliver *Hobart* to the Commonwealth in mid-2017.

"On delivery of our first Air Warfare Destroyer, the Royal Australian Navy will gain a new and potent capability it has never before possessed, and the most capable and lethal warship it has ever operated," he said.

HMAS *Tobruk* to become Queensland Dive Wreck

On 2 December 2016 the Minister for Defence Personnel, the Hon. Dan Tehan MP, announced that the Royal Australian Navy's former Landing Ship, HMAS *Tobruk*, is to be provided to the Queensland Government to be scuttled in the Wide Bay area, east of Bundaberg and north of Hervey Bay. Mr Tehan said that the decision marks the final chapter for a fine Navy ship which had served Australia well since her commissioning in 1981.

"She will be fondly remembered by all those who served in *Tobruk* and those who have been supported by the many operational and humanitarian deployments she undertook," he said.

"The scuttling of *Tobruk* in the Wide Bay Burnett area will be a permanent monument to *Tobruk's* proud history and a reminder that she served as her motto intended *Faithful and Strong*."

Federal Member for Hinkler and Assistant Minister for Trade, Tourism and Investment, the Hon. Keith Pitt MP, said that the hard-fought battle for more than three years had finally paid off.



NUSHIP *Hobart* at sea during sea acceptance trials in early February
(RAAF photograph)



Tobruk leaving Sydney under tow for Queensland on 7 December 2016
(Photo courtesy Clyde Dickens)

“Christmas has come early for the Wide-Bay Burnett region. This dive wreck will not only bring domestic and international visitors to the region, it will bring much-needed long-term, sustainable jobs and a future for the next generation,” he said.

“That has always been the driver behind this campaign: more jobs for this region, with an economic boost of \$4 million per year.

“This dive wreck will, no doubt, become one of the country’s premier diving sites, potentially attracting thousands of divers each year,” he said.

HMAS *Tobruk* was built by Carrington Slipways at Tomago, near Newcastle, and provided 34 years of service to Australia, sailing more than 947 000 n miles. She was a multi-purpose, roll-on/roll-off heavy-lift ship capable of transporting soldiers, armoured personnel carriers and tanks, delivering them to shore via landing craft or directly by beaching.

Tobruk was deployed on 26 major operations, including the Sinai Peninsula, Fiji, Solomon Islands, Bougainville, the Middle East, East Timor and the Philippines. She was awarded Battle Honours for her East Timor service in 1999.

New Tool to Identify Warships’ Acoustic Signatures

The Defence Science and Technology Group (DST Group) has invested several years into developing a tool which will allow the RAN to model acoustic signatures for all classes of naval vessels.

Named Australian Rapid Assessment Tool (AusRAT), the tool was developed by DST Group in partnership with Frazer-Nash Consultancy.

February 2017

Defence scientist, Dr Stephen Moore, has played an instrumental role in the AusRAT project. He developed its specifications after researching noise and vibration mechanisms on different naval vessels.

“The ability to predict the acoustic signature during design and construction is critical to achieving the low signature requirements of a modern naval fleet,” Dr Moore said.

“External benchmarking has demonstrated that DST Group has world-class expertise in this area and identified AusRAT, in particular, as being a world-class capability.”

According to DST Group, AusRAT is a world first and is capable of being applied to any naval vessel, including both surface ships and submarines. It aims to predict acoustic signature at the concept and preliminary design stages, when only limited information is known and fast turnaround of results is required for assessing different configurations.

AusRAT can also be used to provide updated predictions during the detailed design and construction phases, and to investigate the potential impact of components not meeting their noise budget.

AusRAT will be used for the future submarine program (SEA1000) and the future frigate program (SEA5000) to predict the acoustic signature of the proposed designs and confirm that they meet Australia’s requirements.

The UK Ministry of Defence has evaluated AusRAT, through a series of case studies, endorsing the capabilities and exploring opportunities to partner with Australia and DST Group in further development.

Incat Crowther Wins Australian Export Award

Incat Crowther has been chosen as the National Winner for the CPA Australia Business Services Award. The award is given for outstanding international success in professional business services, with Incat Crowther demonstrating outstanding success in the export of engineering services.

The Australian Export Awards are a national program recognising Australian businesses for their export achievement and contribution to Australia's economic prosperity. Having won the NSW Premier's Award for Business Services in October, the company progressed to the national level.

The award was presented at a gala dinner held at the Royal International Convention Centre in Brisbane, hosted by the Minister for Trade, Tourism and Investment, the Hon. Steven Ciobo MP.

"I think the key to our success is our ability to think outside the square and give our clients vessel designs which not only look great but functionally tick all the boxes" said Brett Crowther, Managing Director.

The company designs marine vessels for clients and locations all over the world. Chances are high that you have been on an Incat Crowther-designed vessel. "Incat Crowther's success is driven by a team of energetic, practical and forward-thinking staff, who approach each project with professionalism, integrity and a 'can do' attitude", said Mr Crowther. "It's an honour to be recognised nationally for our export success."

Incat Crowther has a strong brand, both domestically and internationally, and is the most successful independent design firm in its niche. There are currently more than 100 large vessels under construction globally to Incat Crowther's designs.



Incat Crowther-designed-vessel *Muslim Magomayev* — seen here saving the lives of 30 personnel caught in an oil-platform fire in the Caspian Sea in November 2015
(Photo courtesy Incat Crowther)

Incat Crowther continues to grow thanks to its robust business model, strong and dedicated management, highly-competent and motivated employees, and a strong focus on innovative designs and customer service.

Incat Crowther continues to develop and deploy innovative solutions in response to the complex technical challenges presented by our industry. The company is at the forefront of the use of catamaran hull forms in large, fast offshore vessels,

The Australian Naval Architect

the evolution of very robust and high-capacity monohull crew vessels and fuel-efficient low-wash passenger vessels, including those with hybrid drive.



Incat Crowther-designed vessel *Kilimanjaro VI* — one of eight vessels designed by Incat Crowther and operating in Tanzania, Africa
(Photo courtesy Incat Crowther)



Incat Crowther-designed catamaran passenger ferry, one of the 18 vessels under construction for New York's new city-wide ferry service, a significant upgrade to marine public transport in that city
(Image courtesy Incat Crowther)



Incat Crowther-designed catamaran passenger ferries — three of these vessels are already in service in Singapore, providing safe and efficient public transport between Singapore and Batam
(Photo courtesy Incat Crowther)



Incat Crowther-designed *Seacor Lynx* — A 58 m high-speed ship providing specialised services for the oil and gas industry
(Photo courtesy Incat Crowther)



Incat Crowther-designed *Zenith* — a luxury 40 m aluminium-hulled motor yacht
(Photo courtesy Incat Crowther)

***Pacific Kestrel* from Incat Crowther**

Incat Crowther has announced the delivery of *Pacific Kestrel*, a 57 m catamaran crewboat for Swire Pacific Offshore (SPO). The 40 kn vessel, built by Austal Ships, is capable of transporting 90 personnel plus cargo to offshore platforms in up to Sea State 6.

The vessel features a large aft 200 m² cargo deck with integrated structural mounts and onboard support systems for the fitment of an Ampelmann motion-compensated gangway, facilitating the safe transfer of personnel to offshore platforms. Aided by a DP-2 (dynamic positioning) control system, the vessel will hold station in rough conditions during crew transfers with multiple redundancies to complete transfers in the unlikely event of a main engine, thruster or individual system failure. Similar systems are already in service on the 70 m vessels, *Muslim Magomayev* and *Rashid Behbudov*, also designed by Incat Crowther.



Pacific Kestrel being launched
(Photo courtesy Incat Crowther)

The main-deck cabin houses individual reclining seats for 90 personnel, with luggage racks and a medical treatment room. Forward of this cabin is crew accommodation, consisting of a galley and mess, laundry and access to the hulls.

The mid deck houses a further ten cabins, all with bathrooms. The wheelhouse is situated on the third deck, with forward and aft control stations and a ship's office. All accommodation spaces comply with MLC 96/ILO 92 guidelines.

Featuring Incat Crowther's proven semi-SWATH hullform, the vessel is fast and efficient. Fitted with a power train consisting of four MTU 16V4000 main engines driving Hamilton HT810 water jets, *Pacific Kestrel* met the contractual loaded service speed of 40 kn on sea trials. The vessel also has search-and-rescue (SAR) capability with an on board Fast Rescue Craft (FRC) and a chemical dispersant system for oil spill first-response capability. The vessel is



Starboard bow of *Pacific Kestrel*
(Photo courtesy Incat Crowther)

intended as a robust, versatile and cost-efficient alternative to aviation transport.

Principal particulars of *Pacific Kestrel* are

Length OA	57.6 m
Length WL	53.9 m
Beam OA	12.5 m
Depth	4.70 m
Draft (hull)	1.70 m
Personnel	90
Crew	20
Fuel oil	102 042 L (long range) 2550 L (day tanks)
Fresh water	20 368 L
Black water	8000 L
Main engines	4×MTU 16V4000 M73L each 2880 kW @ 2050 rpm
Propulsion	2Hamilton HT-810 waterjets
Generators	2×CAT C18 350 ekW
Bow thrusters	2×ZF AT2111 RT-FP 150 kW
Speed (service)	30 kn
(maximum)	42 kn
FiFi FFS	Monitor and Drenching System FRC Marine Partner 6.0
Moon pool	400 mm Integrated
Deck Crane	Palfinger PK6500M
Dynamic Positioning	Rolls-Royce Ikon
Crew-transfer system	Ampellmann Walk-to-work Stabilised Access Platform
Construction	Marine-grade aluminium
Flag	Cyprus
Class/Survey	DNV ✱1A1 HSLC Crew R1, DYNPOS AUTR, Fire fighter capability

Korora from Incat Crowther

Incat Crowther has announced the delivery of *Korora*, the first of a two-vessel repeat order following the operational success of *Te Kotuku*, delivered in 2014. The 34 m catamaran represents continued collaboration between operator Fullers Group, designer Incat Crowther and builder Q-West. A near-sister ship to *Te Kotuku*, *Korora* will operate in Auckland and adjacent coastal areas and evolves the design with the addition of a sundeck and an increase in passenger capacity to a total of 401.

The main deck features seating for 178, a large café, luggage racks and wide access doors. Also fitted are two toilets (one of which is handicap-accessible) and racks for 14 bicycles. The upper deck features 76 exterior seats and 77 interior seats. An additional bar and pair of toilets are also located on the upper deck.

The wheelhouse retains its asymmetric configuration, designed in consideration of the local operational requirements. The frequently-used starboard wing control station is enclosed for protection from the elements, whilst the port side is dedicated to crew access via stairs to the foredeck which houses palletised cargo and a deck crane.

Korora features larger engines, reflecting increased deadweight capacity and offering improved performance and engine longevity. The vessel is propelled with conventional fixed-pitch propellers and demonstrated an average speed of

29 kn at 85% MCR with typical deadweight during sea trials. A dry exhaust system is fitted which, along with the engine room air outlets, exits high above the upper deck. This configuration, which reduces corrosion, fumes and noise in passenger areas, is typical of vessels in the Fullers fleet. *Korora* will be joined by a sister ship in 2017, to bring Fuller's fleet of this class of versatile, efficient and reliable vessels to three.

Principal particulars of *Korora* are

Length OA	34.9 m
Length WL	34.8 m
Beam OA	9.50 m
Draft (hull)	1.32 m
(propeller)	1.95 m
Depth	3.05 m
Passengers	401
Crew	3
Fuel oil	11 000 L
Fresh water	3000 L
Sullage	3000 L
Main engines	2×Cummins QSK50-M each 1342 kW @ 1900 rpm
Propulsion	2×fixed-pitch propellers
Generators	2×Cummins 6B-CP 100 kVA
Speed (service)	29 kn
(maximum)	31 kn
Construction	Marine-grade aluminium
Flag	New Zealand
Class/Survey	Maritime New Zealand



Starboard side of *Korora*
(Photo courtesy Incat Crowther)



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



Top deck on *Korora*
(Photo courtesy Incat Crowther)



Main deck cabin on *Korora*
(Photo courtesy Incat Crowther)

Sentinel from Incat Crowther

Incat Crowther has announced the delivery of *Sentinel*, a 60 ft (18.3 m) catamaran research vessel, to the California Department of Water Resources. *Sentinel* is a rugged, utilitarian vessel with an efficient design optimising the use of the catamaran platform. It was built at Vigor's specialized aluminium fabrication facility in Seattle, Washington.

Sentinel's primary application is the monitoring of water quality, phytoplankton, zooplankton and benthic macro-invertebrates within the San Francisco Bay area and proximate coastline. "Vigor was honored to build a vessel which will play such an important role in protecting water quality. The innovative and efficient Incat Crowther design



Port bow of *Sentinel*
(Photo courtesy Incat Crowther)

will ensure that *Sentinel* will be on the job for decades," said Tim Kolb, Vigor's General Manager – Ballard (formerly Kvichak).

In keeping all accommodation on the main deck, *Sentinel* features a relatively wide beam which is utilised to create an efficient layout conducive to research and water-sampling activity.

Sentinel has a large partially-covered aft deck with two deck cranes and two deck winches in addition to stair access to swim platforms port and starboard. The main-deck cabin houses a large laboratory, forward of which are two twin cabins, a bathroom and galley. Forward of this is the wheelhouse with an additional fold-down berth.

A set of stairs leads from the foredeck to the roof deck, featuring an aft control station as well as a rescue boat and dedicated launch-and retrieval-crane.

The vessel has a service speed of 18 kn with two Cummins QSB 6.7 main engines producing 260 kW each.

Principal particulars of *Sentinel* are

Length OA	18.3 m
Length WL	17.1 m
Beam OA	7.30 m
Depth	2.35 m
Draft (hull)	0.90 m
(propellers)	1.10 m
Passengers	20
Crew	5
Fuel oil	17 000 L
Fresh water	470 L
Sullage	190 L
Main engines	2×Cummins QSB 6.7 each 260 kW @ 2800 rpm
Propulsion	2×propellers
Generators	2×Northern Lights M864W3
Speed (service)	18 kn
(maximum)	21 kn
Construction	Marine-grade aluminium
Flag	USA
Class/Survey	USCG Subchapter T



Starboard quarter of *Sentinel*
(Photo courtesy Incat Crowther)

Shi Zi Yang 7 from Incat Crowther

Incat Crowther has announced the launch of *Shi Zi Yang 7*, a 40 m catamaran passenger ferry to be operated by Sea's Young in Hong Kong. Built by Wang Tak, *Shi Zi Yang 7* is a 199 passenger ferry which has been designed and built to

compete in the tough domestic Chinese market where speed, comfort and efficiency are paramount.

The design of the vessel focuses on an efficient hull form. An effectively-laid-out deck plan keeps superstructure to a minimum, with hull cross structure eliminated where not required. Coupled with a semi-SWATH hull form, the vessel's performance, comfort and efficiency are class-leading, whilst sacrificing none of the robustness associated with Incat Crowther-designed ferries.

Shi Zi Yang 7's main boarding zones are port and starboard aft, whereupon passengers enter the main cabin via an area which houses crew mess, bathrooms, luggage racks and a small kiosk. Forward of this, an open light-filled cabin features 139 seats at a spacious pitch. A pair of VIP cabins are located on the aft outboard sides of this cabin, each seating four.

Stairs lead to the upper-deck business-class cabin which has 52 generously-proportioned seats. Forward of this is the half-height wheelhouse with external bridge wing stations, providing excellent visibility and manoeuvring safety.

Powered by a pair of MTU 12V2000 M72 main engines, *Shi Zi Yang 7* comfortably achieved its contract speed on recent sea trials and leads the class in terms of fuel consumption.

Principal particulars of *Shi Zi Yang 7* are

Length OA	41.9 m
Length WL	40.0 m
Beam OA	9.50 m
Depth	3.20 m
Draft (hull)	1.20 m
Passengers	199
Crew	10
Fuel oil	7000 L
Fresh water	1000 L
Sullage	1000 L
Main engines	2×MTU 12V2000 M72 each 1080 kW @ 2250 rpm
Propulsion	2×MJP 650DD waterjets
Generators	2×Caterpillar C4.4 each 80 kW @ 50 Hz
Speed (service)	30.5 kn
(maximum)	32 kn
Construction	Marine-grade aluminium
Flag	China
Class/Survey	China Classification Society CSA Catamaran HSC, Passenger A Coastal Service Restriction



Starboard bow of *Shi Zi Yang 7*
(Photo courtesy Incat Crowther)

Cockle Bay and Blackwattle Bay from Incat Crowther

Incat Crowther has announced the launch of *Cockle Bay* and *Blackwattle Bay*. The pair of 12 m ferries are the first vessels in a new class of small low-impact ferries which respond to a need for transport to serve Sydney's rapidly-developing Bays Precinct. The vessels were built by Richardson Devine Marine Constructions in Hobart for SeaLink Travel Group.

Designed for low capital and operating cost, the vessels also generate extremely low wash. The size of the vessels was selected to perform the role of water taxis, offering services on a more on-demand basis than can be performed by larger, traditional ferries. The vessels also feature very low draft, and are capable of serving Bay Precinct areas previously overlooked by traditional ferry services.

The vessels will operated like traditional bus services, with an on-demand, hop-on, hop-off service. With the master situated adjacent to the boarding areas, operational visibility is excellent and berthing is close at hand. Boarding and disembarkation of the vessels is fast and safe, with large doors and interior seats arranged in longitudinal rows through the cabin so as to not obstruct passenger flow.

The main cabin features 30 seats, with large sliding doors aft leading to an exterior space of 15 seats. In addition to the fixed seats, the vessels can accommodate 15 standing passengers.

Cabin ventilation is by specially-designed and positioned dorade boxes which capitalise on cool sea air at water level. The reduced HVAC burden eliminates the need for a generator and keeps the vessel's displacement, fuel burn and cost to a minimum.

The vessels are fitted with a pair of Cummins QSB 6.7L main engines, driving Twin Disc gearboxes. With their optimised hullforms and efficient structures, *Cockle Bay* and *Blackwattle Bay* can operate at 18 kn with incredibly low fuel usage and are capable of a top speed of 24 kn.

Cockle Bay and *Blackwattle Bay* are further examples of Incat Crowther's ability to work collaboratively with stakeholders to provide industry-leading solutions to unique operational challenges.

Principal particulars of the new vessels are


Length OA	12.5 m
Length WL	12.5 m
Beam OA	5.00 m
Depth	1.70 m
Draft (hull)	0.75 m
(propellers)	1.00 m
Passengers	60
Crew	1
Fuel oil	544 L
Main engines	2×Cummins QSB 6.7L each 184 kW @ 2600 rpm
Propulsion	2 propellers
Speed (service)	18 kn
(maximum)	24 kn
Construction	Marine grade aluminium
Flag	Australia
Class/Survey	NSCV Class 1E

Stewart Marler

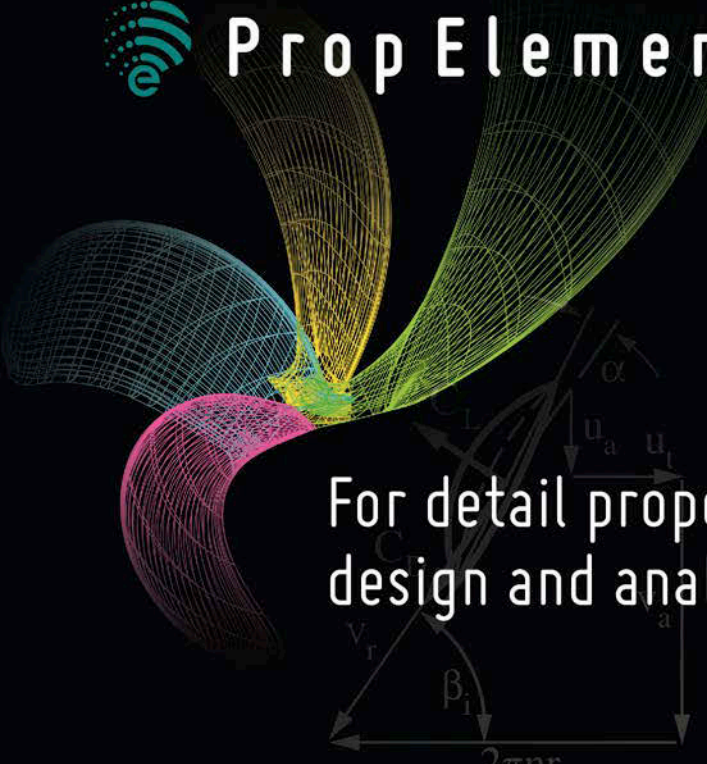


Starboard bow view of *Cockle Bay*
(Photo courtesy Incat Crowther)

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INPEX Completes Ichthys Subsea Installations

INPEX, Japanese oil and gas operator, has completed the installation of subsea infrastructure for the extraction of gas and condensate from its Ichthys gas field in the Browse Basin, about 220 km off the Western Australian coast.

According to INPEX, the subsea gathering system includes a 110 m high riser support structure, five manifolds, 139 km of flowlines, 49 km of umbilicals and flying leads, 2640 t of production and MEG spools, five subsea distribution units and a subsea distribution hub.

Subsea installation finalisation means that the project is now ready for the arrival of the central processing facility and floating production, storage, and offloading (FPSO) vessel, currently being commissioned in South Korea. Once all commissioning activities in the South Korean shipyards are finished, the offshore facilities will be towed to the field and moored for their 40-year operational life by 40 000 t of mooring chains secured to more than 25 000 t of foundation piles.

The Ichthys LNG project consists of three parts. It incorporates offshore facilities off the Western Australian coast, onshore processing facilities in the Northern Territory, and an 890 km pipeline to unite them.

Cruising in NSW

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

The following months saw return visits by most of these vessels, and December added visits by *Astor*, *Radiance of the Seas*, *Ovation of the Seas*, and *The World*. January added visits by *Crystal Symphony*, *Europa 2*, *Sea Princess*, *Seven Seas Voyager* and *Europa*, and early February added visits by *Seabourn Encore*, *Silver Whisper*, *Norwegian Star* and *Albatros*.

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

Phil Helmore



Pacific Jewel in Twofold Bay with trawler *Samantha J* inbound on 31 December
(Photo courtesy Robert Whiter)



Ovation of the Seas during her first visit to Sydney on 15 December 2016
(Photo John Jeremy)

PREPARING FOR THE GULF WAR

Hugh Hyland

Following the invasion of Kuwait by Iraqi forces on 2 August 1990, the Australian Government deployed three RAN ships to the Middle East under the military codename Operation DAMASK to enforce the economic embargo on Iraq authorised by the United Nations Security Council (UNSC) Resolution 665. HMA Ships *Adelaide*, *Darwin* and *Success* sailed from Sydney on 13 and 14 August 1990. *Adelaide* and *Darwin* were relieved by *Brisbane* and *Sydney* on 3 December. On 30 November 1990 UNSC Resolution 678 authorised the use of force against Iraq if it failed to withdraw troops from Kuwait by 15 January 1991. On 3 December the Australian Government approved the movement of RAN ships through the Straits of Hormuz and into the Arabian Gulf to become part of the largest naval force assembled since the end of World War II (and perhaps the most powerful ever) comprising six aircraft carriers, two battleships, 15 cruisers, 67 destroyers and frigates and more than 100 amphibious, logistic and smaller craft from fifteen nations. The subsequent Gulf War became Operation DAMASK II. [1]

With more time to prepare *Brisbane* and *Sydney* for deployment in harm's way, both ships were rapidly modified to improve operational effectiveness in war conditions. The modifications to HMAS *Brisbane* were particularly extensive as Hugh Hyland recalls:

In 1990 I was the Senior Design Engineer at Australian Defence Industries (ADI) at Garden Island, about a year after the transitioning of that establishment from a Naval dockyard.

On 15 August 1990 we were given a priority tasking to design the fitting of a pair of close-in weapons systems (CIWS) to our guided-missile destroyers (DDG) in the lead-up to sending one to the Middle East. These anti-aircraft/anti-missile high-rate-of-fire guns, which were in service in the Australian, American and German Navies, had never been fitted to any ships of this class before and no plans existed; however, I remembered discussing this possibility with one of the naval architects in Canberra a few years earlier, who had since died. The suggestion was to replace the port and starboard boats and davits with rigid-hull inflatable boats (RHIBS) and slewing lifting-arm davits (SLADS), and install the CIWS mounts just aft of the Ikara magazines. The CIWS magazines would be above 01 Deck and the CIWS mounts above 02 Deck. The DDGs had steel hulls with aluminium superstructures.

On 17 August we conducted a ship-check on HMAS *Brisbane*. Two days later the Chief Design Engineer left for the USA for 17 days to chase up requirements from there. Daily meetings were called, involving all the stakeholders from naval architecture, mechanical engineering, electrical/ weapons engineering, design and production, and the navy. The decision was made to fully integrate both mounts into the ship's weapons systems.

By 3 September there was still no Cabinet approval to fit CIWS, so the RAN approved the fitting of one pair to HMAS *Brisbane* from the available units — the mount then in the USA finishing an upgrade and one of the mounts for the guided-missile frigates (FFG) being built in Williamstown, with all work to be completed by 5 October. Design drawings were fast-tracked. The traditional rip-out drawings were replaced by spray cans of yellow paint used on board and we made an engineering decision to use 20 mm aluminium plate for the magazines on which the mounts would be installed before actually confirming with strength calculations. We were given until 7 September to complete these overall designs so that production could start on 10 September.

By 19 September, all but four of the drawing office staff were working on this project, with some (along with the naval architects and engineers) putting in up to 30 hours per

week of paid (and unpaid) overtime. The detailed designs were still to come, sometimes from on-board discussions and sketches in chalk on bulkheads and decks, from which the drawing office would prepare official drawings. We also used this opportunity to manufacture the magazine on one side using photogrammetry, which turned out quite well, in comparison with the traditional construction of the other magazine with "green" followed by scribing and trimming *in situ*. The preliminary weight estimate could not be developed until 21 September. In the main, drafting was manual on drawing boards, and calculations were also manual using pocket calculators.



One of the CIWS magazines about to be shipped with as much outfit as possible already completed and kevlar armour fitted (RAN Photograph)

Once the magazines were installed, the internals were fitted out using components from an FFG in refit and from one of the FFGs under construction in Williamstown. The same applied to the SLADS. The foundations were then machined on the topsides of the magazines, using the jig originally used

for the installation of Ikara in these ships in the mid-to-late 1960s. One of the problems encountered on one side during machining was due to some welding being carried out on the deck below during the day, which slightly contracted the aluminium vertically, so that the four corners were no longer in the same plane. This took a bit of calculating and re-setting, in the rain after midnight, to get the bedplate machined within 20 minutes of arc of the ship's master datum plane while still maintaining the minimum thickness requirements in what was left of the mis-machined plate. This was necessary because, whilst the CIWS mount has integrated radar, the USN requirement stipulates that other ship's radars can be used if the CIWS radar is not working.

By 8 October the second (port) CIWS was installed. Cooling was plumbed in from the chilled water main, with back-up fittings to the salt-water fire main. Some piping items for the cooling water were long-lead ex-USA, so we used compatible items from local hardware suppliers, which were intended to be changed in 12 months when the approved fittings were expected to be available (this possibly never happened).

An inclining experiment confirmed that there was sufficient stability despite all the added top weight. Work also included the fitting of IRST (Infra-red Search and Track) and radar-absorbing covers along the guard-wires (which reportedly were very un-stealthy).

Apart from commencing installation before there were

verified designs — we were literally working by our prior experience in naval engineering — there were unknowns; for example, the potential interference from adjacent whip aerials, but there was no time to undertake the usual modelling. Shut-down precautions were, however, observed to ensure that both mounts and whip aerials were not operating at the same time. Also there was no formal quality assurance, noting the lag in documentation and drawings, so checking reverted to “overseeing” by key senior staff. While the safety arcs could be set, the only aspect we could not achieve in the time available was to set to work the pop-ups so that, if the mounts were facing aft and low, they would not shoot the barrel of Mount 52 (the aft 5-inch gun) if it was elevated outboard.

The floodlighting on board all night every night during the work was indeed a sight to see.

As a further unsolicited service, we worked out what to blank on the external ventilation inlets and what to dismantle on certain internal trunking so as to gain a fully-recirculating gas citadel, albeit non-pressurised and without air-filtration units for fresh-air makeup. We did this for both *Brisbane* and the FFG *Sydney* which were to deploy together.

On 15 October both ships sailed one week earlier than originally programmed. Not only had we designed, fabricated, installed and set to work a pair of CIWS on a DDG as a world first, and a pair of SLADS, we also accomplished it in an amazingly short time, working 24/7,



Shipping the port-side CIWS on HMAS *Brisbane*
(RAN photograph)

using experienced personnel and a minimum of paperwork. On 9 November Vice Admiral Mike Hudson, Chief of Naval Staff, awarded a Commendation to the Naval Engineering Division at ADI.

Approval to fit CIWS on the second DDG, HMAS *Perth*, was received on 23 October. Work on the third and last DDG, HMAS *Hobart*, followed.

[This story clearly demonstrates why we must always maintain the naval engineering and industrial experience and capability which can respond to challenges like this at minimum, or no, notice — Ed.]

Reference

1. Nash, G. and Stevens, D. (2006), *Australia's Navy in the Gulf, From Countenance to Catalyst, 1941–2006*, Topmill, Sydney



HMAS *Brisbane* sailing from Sydney on 15 October 1990 for an accelerated work-up program before deployment (RAN photograph)

The Chief of Naval Staff Commendation (left)
(Image courtesy Hugh Hyland)

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INDUSTRY NEWS

BAE Systems Contract for AWD Maintenance

BAE Systems has been awarded a five-year \$70 million contract to maintain the RAN's new air-warfare destroyers. The contract will see BAE Systems manage the delivery of support as the ships transition out of the build phase and into service with the Royal Australian Navy.

The three Hobart-class destroyers will be based at Fleet Base East in Sydney. HMAS *Hobart* is scheduled to be delivered to the navy in June 2017.

BAE Systems Chief Executive, Glynn Phillips, said "This is a new opportunity which allows us to develop, from the ground up, a leading-edge sustainment model for the entire service life of these new ships. This will add significant depth to our national maritime sustainment business and it helps contribute to a stronger and more sustainable Australian-based defence capability."

Armidale-class Patrol Boat Contract for Thales Australia

Thales Australia has been awarded a contract for in-service support of the Royal Australian Navy's Armidale-class patrol boats.

The contract is potentially worth over \$55 million per annum and will start on 1 July 2017. The five-year contract contains possible rolling-wave term extensions out to at least 2025, when the vessels will be phased out of service.

Thales is taking over the contract from the Serco Group which was previously in charge of servicing the vessels. Serco was originally supposed to work on the boats until 2022, but the contract was terminated in 2016 after the company announced that the contract was an onerous one.

Thales will work with Austal who was responsible for the design and construction of Armidale-class patrol boats.

Praising growing defence-industry jobs in Cairns, where the boats will be serviced, the Minister for Defence Industry, the Hon. Christopher Pyne MP, welcomed Austal's strong engagement with local industry in Cairns.

Up to 21 new Pacific Patrol Boats, to be built by Austal, will also be sustained in Cairns by the Australian shipbuilder.

"Austal was awarded a \$24 million contract to provide support services for the existing Pacific-class and new Pacific Patrol Boats for an initial seven years, with support services contracted to start early 2018," the Minister said.

"I congratulate Austal on its initiative to engage with the naval industry in Cairns on this important project which will employ 13 people to support vessels locally as well as in Henderson, Western Australia."

Construction of the first Pacific Patrol Boat at Austal's Henderson facility is scheduled to commence in April 2017 with delivery of the first vessel due in late 2018.

Defence and Industry win International Innovation Award

Deputy Secretary of the Capability Acquisition and Sustainment Group, Mr Kim Gillis, has congratulated the FFG Enterprise for winning, in November, The International Association of Contract and Commercial Management (IACCM) Innovation Award for Operational Improvement.

The FFG Enterprise is a collaboration between the Capability Acquisition and Sustainment Group, Royal Australian Navy, Thales Australia and BAE Systems Australia, working together to sustain and deliver seaworthy guided-missile frigates.

Mr Gillis said that the award recognises the FFG Enterprise as the world's best practice in relational contracting and collaboration.

"Since its inception in 2014, the FFG Enterprise has completed complex maintenance periods and delivered every frigate back to Navy either on or ahead of schedule and in full seaworthy condition," Mr Gillis said.

"The FFGs are in excellent materiel condition, offering increased availability and improved efficiency for the Royal Australian Navy and Australia as a whole.

"This outcome is directly attributed to the framework put into place by the FFG Enterprise and all partners can be justly proud of the award."

The IACCM Innovation Award for Operational Improvement recognises initiatives which have delivered significant business value through improved commercial or contracting processes or practices.

Mr Gillis said that the FFG Enterprise has created an environment where competitors such as Thales and BAE can work together towards delivering for Defence on time, every time.

"This international award demonstrates how focusing Australia's Defence industries on outcomes and adopting a cooperative approach can lead to exceptional results," Mr Gillis said.

"Thales Australia and BAE Systems Australia, together with Defence have created a truly integrated and effective team and made tremendous progress over the last few years.

"This award reflects the growing maturity and relationship between Defence and its industry partners in delivering increased performance through collaboration.

"Overall it costs less and delivers more, which is an excellent outcome for Navy, Defence and Australia.

"The FFG Enterprise demonstrates how industry is a fundamental input to capability not just in the construction but, in the long term, ongoing sustainment of Defence platforms."

The FFG Enterprise will continue to deliver reliable, available and affordable FFGs through best practice industry and Defence collaboration.



HMAS *Newcastle* and HMAS *Melbourne* at sea off New South Wales in November 2016. With HMAS *Darwin* they are supported by the FFG *Enterprise* which, in November, won a major international Innovation award for Operational Improvement (RAN photograph)

Opening of DCNS Australia's Adelaide Facility

On 20 December DCNS Australia celebrated the founding of their Australian headquarters in Keswick, Adelaide, which will be dedicated to delivering the future submarine program. The ceremony was attended by the Hon. Malcolm Turnbull MP, Prime Minister of Australia, the Minister for Defence Industry, the Hon. Christopher Pyne MP, M. Jean-Yves Le Drian, French Minister for Defence and a number of parliamentarians and defence-sector figures.

"This is an important initial milestone in DCNS' decades-long commitment to the design and construction of 12 regionally-superior submarines in Adelaide," said Herve Guillou, Chairman and Global CEO of DCNS Group.



The Prime Minister inspecting a model of Australia's future submarine at the DCNS Facility in Adelaide
(Photo courtesy DCNS Australia)

"This facility, and our local Adelaide workforce starting with 50 people in 2017, marks the beginning of our relationship as part of the community," said Mr Guillou.

The facility will become operational in early 2017 to support DCNS' activities around Australia, including the transfer of technology from France to Australia, the development of the Australian supply chain, and the design of a new shipyard in Adelaide.

"We are planning from the beginning to maximise the participation of Australian business in this \$50 billion project," said Sean Costello, CEO, DCNS Australia.

"Australian industry participation is not just good for local business and the community, but critical for the transfer of knowledge and the creation of Australian sovereignty for the operation and sustainment of the submarines," he said.

The DCNS Australia Adelaide Future Submarine Facility is located at 1 Richmond Road, Keswick.

Fincantieri Australia Established

Fincantieri announced in December that it has established its local company, Fincantieri Australia, and will open a new Australian headquarters in Canberra soon.

Dario Deste has been designated Chairman of Fincantieri Australia and he will be supported by former RADM Mark Purcell.

Deste said that Fincantieri Australia will now manage the important phase of the shipbuilder's participation in the competitive evaluation process for the SEA 5000 Future Frigates program.

"Fincantieri's commitment to this project will be total and

we will deploy all of the company's strengths as a market leader. The FREMM frigate which we are offering is an absolute cutting-edge product. The company will engage with Government, businesses involved in the Australian shipbuilding industry and the supply chain, and other key players with a stake in the construction of the frigates in Adelaide, South Australia. Fincantieri Australia will be resourced with senior technical and other personnel recruited locally in Australia and drawn from Fincantieri's global network of naval shipbuilding executives," he said.

"We are very happy with the team assembled so far, and all of the people who will take part in bidding for this significant naval project will have an important role.

"I make particular mention of former RADM Mark Purcell, who has joined the team and whose experience will certainly be a very significant point of strength for Fincantieri", Deste added.

Sonar Contract for Thales Australia

On 23 November the Minister for Defence Industry, the Hon. Christopher Pyne MP, announced that Thales Australia has been awarded a \$100 million contract to design a major sonar system upgrade for the RAN's Collins-class submarines.

Minister Pyne said that Thales Australia will engage other Australian-based companies, including Sonartech Atlas and L3 Oceania as well as suppliers from the United Kingdom and France to design the sonar system upgrade.

"The sonar system upgrade will install improved sonar sensor arrays aboard each of the Collins-class submarines, as well as improved signal-processing systems," Minister Pyne said.

"Under the contract Australian industry will play a key role in delivering leading-edge sonar capability for Australian submarines."

"The Australian industry component of the contract to be led by Thales Australia is worth in the order of \$50 million and will support around 50 Australian jobs in Sydney and Perth," he said.

DCNS signs Letter of Intent with Australian Indigenous Defence Consortium

DCNS has signed a letter of intent with the Australian Indigenous Defence Consortium (IDC) to explore opportunities to include Indigenous Australians and Indigenous businesses within DCNS's supply chain.

The partnership is the first agreement signed by the IDC since it was founded in March 2016. The letter was signed in Canberra by Sean Costello, Chief Executive Officer, DCNS Australia, and Adam Goodes, Chief Executive, IDC.

"DCNS Australia and the IDC see the mutual benefits associated with supporting and assisting one another in relation to our role in one of Australia's most complex defence projects, the Future Submarine Program," Sean Costello said.

"We hope to discover more about how the indigenous business community is participating in major projects in Australia, and develop effective and efficient ways of working together," he said.

Adam Goodes said that he was looking forward to supporting DCNS directly and indirectly with the nation-building future submarine program.

"We already have six Indigenous businesses providing services to DCNS across a couple of contracts," he said.

"We are excited about partnering with DCNS to flush out more long-term opportunities and contracts for Indigenous businesses that will help build sustainable capabilities and showcase the ability of the Indigenous business sector."

DCNS and the IDC have agreed to meet regularly to review the progress of their activities and identify potential opportunities in the Future Submarine Program.

Defence Innovation Hub Launched in Adelaide

On 5 December 2016, the Minister for Defence Industry, the Hon. Christopher Pyne MP, launched the Defence Innovation Hub and called for submissions through its innovation portal.

"The Defence Innovation Hub will invest around \$640 million over the decade into maturing and further developing technologies which have moved from the early science stages into the engineering and development stages," he said.

"The Hub is all about an agile and transparent approach to innovation investment with the introduction of new business practices, including refreshed contracting frameworks and innovative intellectual property policies."

Minister Pyne said that industry is invited to work with the Hub's business advisers by submitting proposals through the innovation portal at www.business.gov.au/cdic.

"The innovation portal provides transparent and timely information such as Defence's priority innovation needs," Minister Pyne said.

Once received, Defence will assess proposals submitted through the portal for ongoing management by the Defence Innovation Hub.

"Defence recognises that great ideas can originate from a wide range of participants, from industry through to academia and researchers," Minister Pyne said.

"The Defence Innovation Hub will provide an equal opportunity for all participants, from small-to-medium enterprises to prime defence contractors, to put forward their great ideas, make connections and collaborate in the development of innovative technology."

"The launch of the innovation hub is a critical part of the Turnbull Government's \$1.6 billion commitment to developing innovative technologies within our defence industry," Minister Pyne said.

The Centre for Defence Industry Capability was also launched to provide a range of advisory services to support small-to-medium enterprises in the development of proposals they wish to submit to the Defence Innovation Hub.

New Shipbuilding Facility for WA

On 16 December 2016 Civmec Limited, through its wholly-owned subsidiary Forgacs Marine and Defence unveiled plans for its new state-of-the-art shipbuilding facility, primarily targeted at Naval Defence projects, at a groundbreaking ceremony officiated by the Hon. Colin Barnett, Premier of Western Australia.

The heavy-engineering specialist is positioning itself for participation in Australia's \$89 billion naval ship and submarine upgrading program, which forms part of the Australian government's projected \$195 billion overall defence investment over the decade from now until 2025–26. The new facility in Henderson will rival the best shipyards in the world and is part of Forgacs goal to enhance Australia's profile as a globally-efficient naval shipbuilder.

The facility will be able to house ship construction and on-going maintenance under cover in a conducive and efficient environment close to Fleet Base West — the home of Australia's submarines and half of its naval surface fleet. It will be the only facility with this capacity in Australia.

Civmec, which has developed a suite of core competencies in heavy engineering, believes that these in-house capabilities, its dedicated shipbuilding facility and its securing of the strong Forgacs credibility, will position the company as a force to be reckoned with for the Commonwealth Government's upgrade and expansion programs.

At this point, the Group anticipates an overall investment in the region of \$80 million to develop the entire facility over the coming years. Design and planning have already commenced with a further more detailed focus on engineering and

geotechnical analysis occurring immediately in early 2017.

The new facility will be situated on approximately 70 000 m² of land adjoining the south side of the group's existing facility at the Australian Marine Complex in Henderson and, when operating at capacity, is expected to provide additional jobs for up to 1000 workers, as well as up to 100 additional apprenticeships and graduates.

Premier Colin Barnett congratulated Civmec on its investment. "The significant capital investment by Civmec to develop these facilities is an example of the confidence which local industry has in Western Australia's future," Mr Barnett said. "The Liberal National Government is supporting WA businesses to secure defence industry work and is committed to further growing the industry and securing local jobs for decades to come."

Civmec's Chief Executive Officer, Patrick Tallon, said, "The planning for the development of further significant facilities is all about strategically positioning the company to participate in the upcoming Naval acquisition program, the largest of its kind in Australian history and, in turn, will play a major role in the company's long-term future. We feel a standalone facility, operated by Forgacs Marine and Defence, is required to ensure that there is absolutely no adverse effect on our present valuable clients who we deliver for in our other operating sectors."

"This diversification is a natural extension of our core capabilities. The new shipbuilding and maintenance facility in Henderson will be a significant piece of industrial infrastructure, adding a new resource to the Australian maritime landscape," he added.



An impression of Civmec's new shipbuilding facility at Henderson, Western Australia
(Image courtesy Civmec)

Civmec's Executive Chairman, James Fitzgerald, said, "Henderson has already been identified by the Commonwealth as one of two suitable locations for the continuous build of naval ships. This is cause for great optimism and reflects highly on Western Australia's industrial capability and capacity, to which this planned facility will be a significant addition."

Mr Mike Deeks CSC, a former Royal Australian Navy Commodore, has been appointed the Managing Director of Forgacs Marine and Defence Pty Ltd. Mike has been with the company since September 2015.

HydroComp PropElements 2017

HydroComp PropElements 2017 — the propeller "design for performance" code from HydroComp, Inc. — is the latest build of the company's commercial software for marine propeller design and analysis. Propeller specialists will find it an essential addition to their software tools, and also tackles the component-level hydrodynamic needs of naval architects.

Why PropElements?

Still an uncharted domain for many naval architects, propeller design is an iterative process following a typical design spiral — from initial sizing through detail design. System-level propulsion design and analysis tools (such as HydroComp NavCad®) are used in early design stages to identify principal propeller parameters (e.g. diameter, pitch, blade area, number of blades) and to even make a first assessment on certain performance details, such as hydroacoustics. It is after this point that naval architects typically defer final propeller details to the manufacturer or a specialised consultant.

With the advent of custom and semi-custom propellers — commonplace for new vessel designs — naval architects now have a new set of technical challenges. These propellers differ from stock "series" or "off-the-shelf" propellers in two principal ways. They are:

- designed using contemporary foil geometries; and
- optimised and fitted to the individual vessel (or vessel type).

To take full advantage of the benefits that custom or semi-custom propellers make available — or to evaluate them in service — naval architects must look to a different kind of propeller calculation.

Of course, specialists can use PropElements to help prepare the final design for a particular application, but now with PropElements 2017 — the latest version of HydroComp's tool for wake-adapted propeller design — naval architects can become a meaningful participant in the design and analysis of these contemporary propellers at later design stages. For example, they can employ PropElements to conduct studies of alternatives prior to development of the final design, as well as to confirm and check these designs.

How PropElements 2017 works

In wake-adapted propeller design, a custom propeller is optimally matched to the unique inflow properties of the vessel, or its "wake field". (See Figure 1 below for an example of radially-averaged velocities derived from the wake field.) PropElements is able to consider axial

and tangential inflow properties, and ascertain optimised distributions of pitch and camber for prescribed foil characteristics. Of course, the propeller design process with PropElements takes into account blade strength, tip and hub loading, and cavitation. Its calculation pages include Propeller, Performance, and Strength; with supplemental calculations such as for the creation of K_T - K_Q curves. (See Figure 2 for a sample screen shot).

The foundation of PropElements is a unique distributed blade foil code, with empirical connections which allow analyses to be viscous and fully-scalable. These corrections are made possible through HydroComp's experience in hybrid empirical-numerical hydrodynamics. PropElements also supports standard nozzle styles (such as 19A, 33 and 37), with optional support for contemporary high-efficiency nozzles and tunnel thrusters.

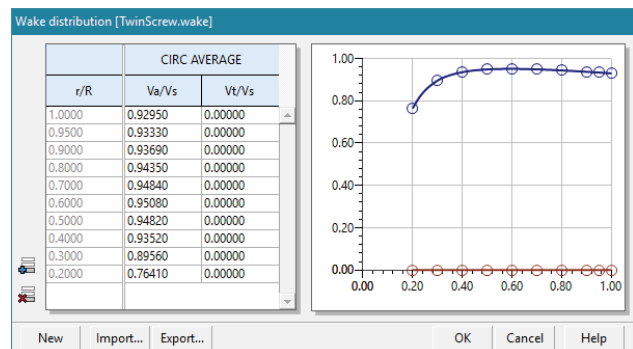


Figure 1 – Example of averaged axial and tangential velocities

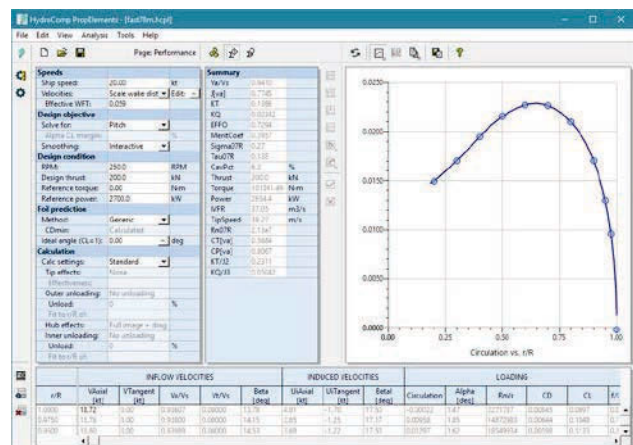


Figure 2 – Example PropElements screen shot

Detailed analysis of propeller performance

PropElements can also be applied to analysis, as well as design. The ability to investigate radial values of foil lift and cavitation number, for example, can help identify potential sources of root cavitation or blade impulse excitation. It can help evaluate tip loading (for hydroacoustics), and also be employed in forensic investigations of blade failure.

Export of K_T - K_Q curves can be applied to system level calculations in replacement of direct propeller series predictions. For example, K_T - K_Q curves from PropElements 2017 can be exported in a form which can be used with HydroComp NavCad for propulsion analysis. (Figure 3 shows the results of a calculation study with PropElements 2017).

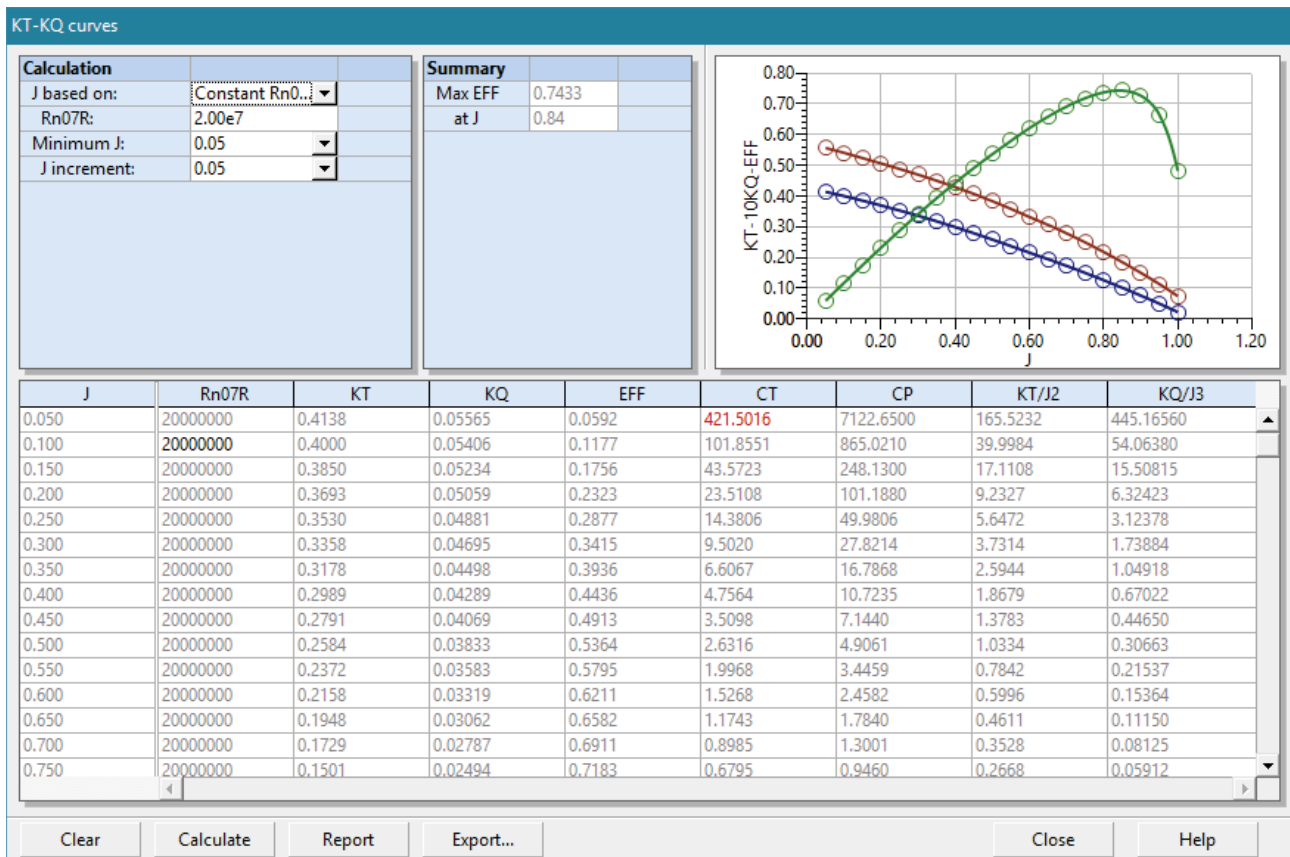


Figure 3 – K_T - K_Q calculation

Interaction with HydroComp design tools, CFD, and FEA

A number of Import and Export options make PropElements an important companion for HydroComp's NavCad and PropCad[®] software, as well as the perfect pre-processor for higher-order flow codes, CFD, and FEA. For example, early-stage performance prediction is typically conducted using NavCad. One unique NavCad feature is "Aligned Series" propeller performance, where K_T - K_Q data from model tests — or from PropElements — can be used to correlate custom propeller performance to series calculations. Then, when the propeller has gone through the "design for performance" process with PropElements, its "design for manufacture" can be completed in PropCad. CFD and FEA calculation benefit from PropElement's calculation of proper body forces.

Validation of PropElements

HydroComp conducts formal benchmark validation studies for PropElements using model test data for quantitative fidelity, and CFD studies to confirm scalability and qualitative outcomes. Two examples of these studies for PropElements 2017 are shown below.

"Pump flow" calculations

The useful domain for PropElements 2017 is not limited to marine propellers. It has also been extensively used for propeller-like pump and industrial mixer design and analysis. Novel proprietary features support accurate prediction of static high-thrust loading and corresponding "induced volumetric flow rate" for these devices.

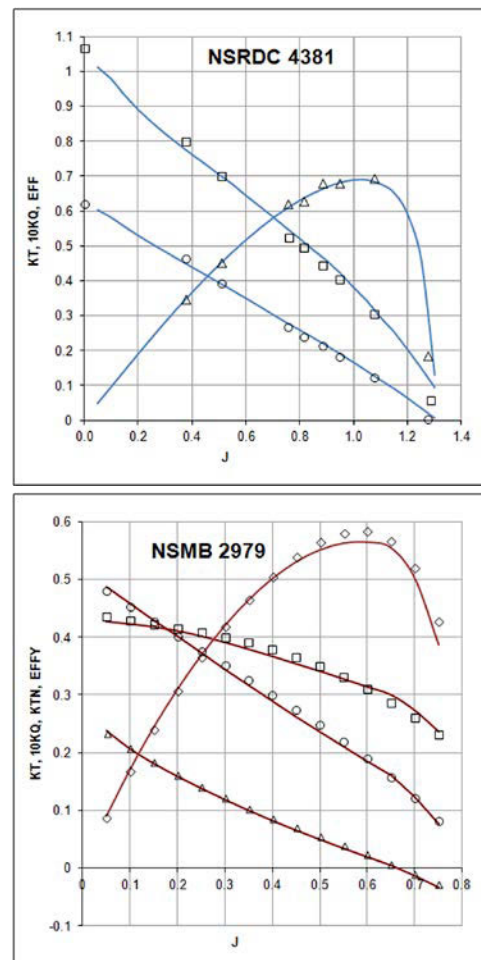


Figure 4 – Sample validation for PropElements 2017

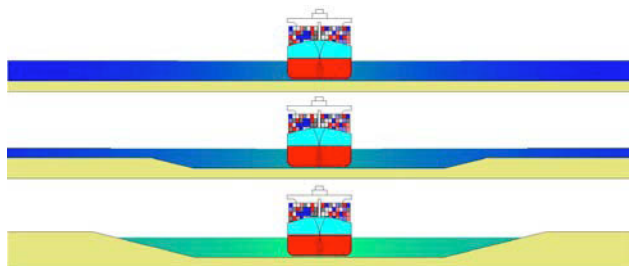
Summary

Engine power densities will grow; fuel costs will increase; and emission reduction will become more urgent — all leading to the greater use of specialised propeller designs. With more propeller builders now capable of delivering “made to order” propellers, custom and semi-custom propellers of wake-adapted design should be considered for new construction and repowering.

The widespread installation of these propellers also suggests that naval architects need the ability to analyse their performance in greater detail than has typically been available. Whether for confirmation of propeller designs for new-build projects or the post-delivery evaluation of trial performance, HydroComp PropElements 2017 should become a commonplace fixture in a naval architect’s toolbox. For more information visit www.hydrocompinc.com.

SlenderFlow Software

Perth Hydro is commercialising its suite of shallow-water ship hydrodynamics software for companies to licence and use. The software calculates flow speeds, pressure, sinkage and trim of monohulls, catamarans and trimarans, in different types of bathymetry. It can be used in ship under-keel clearance (UKC) software and ship simulators, as well as by engineers in ship and channel design. This Aussie software will be marketed internationally through www.slenderflow.com. For further information, please contact Tim Gourlay on 0416 328 883.



SlenderFlow bathymetry options
(Image courtesy Tim Gourlay)

Wärtsilä and Carnival Corporation Announce Strategic Performance-based Partnership

Wärtsilä and Carnival Corporation & plc, the world’s largest cruise company, announced on 25 January that they have signed a comprehensive, 12-year agreement which strengthens their existing partnership and joint continuous-improvement efforts to maintain the highest possible levels of cruise-ship safety and reliability. The performance-based agreement provides for shared financial incentives and exposure based on outcomes for both companies.

The value of the long-term agreement is approximately €900 million. The expected revenues for 24 months, approximately €150 million, will be included in Wärtsilä’s order book for the first quarter of 2017.

According to the agreement, all engine maintenance and monitoring work for 79 of Carnival Corporation’s vessels will be handled by Wärtsilä, and ongoing planning will be a collaboration between both companies.

The agreement includes Wärtsilä’s Dynamic Maintenance Planning (DMP) and Condition Based Maintenance (CBM).

The Australian Naval Architect

These services are based on capturing digitalised data streams from every engine, after which this data is analysed by specialists. This allows real-time optimisation of the equipment whilst predicting operational and maintenance demands. With DMP and CBM in place, vessel and fleet operations are optimised and engine overhaul intervals potentially extended. With approximately 400 Wärtsilä engines covered under the agreement, even the smallest improvements in vessel fuel consumption add up to significant annual savings in fleet operational costs.

“Our agreement with Wärtsilä extends our cooperation to a strategic partnership,” said Bill Burke, Chief Maritime Officer for Carnival Corporation. “With Wärtsilä maintaining vessels under our agreement and ensuring a high level of safety and reliability, we can concentrate on our core priority — providing great cruise vacations for our more than 11 million annual guests. In addition to reducing our costs, the long-term agreement increases safety and operational efficiency — two critical advantages in the fast-growing cruise market.”

Mutual incentives and shared risks

The long-term performance-based agreement model provides predictability of costs and incentives for both companies as remuneration is based on how the equipment performs, with the companies sharing exposure based on outcomes. For Wärtsilä, the strategic partnership encourages increased focus on research and development, manufacturing and other functions to make its products even better and more efficient.

“We are very excited to develop our long-term partnership into a more strategic direction. Both Wärtsilä and Carnival Corporation are committed to investing significantly in this partnership as well as developing our cooperation in the long run. We are confident that, working closely together, we can improve performance in both organisations,” said Pierpaolo Barbone, President, Services and Executive Vice President, Wärtsilä Corporation.

Further improvements in energy efficiency will be a significant focus area for Wärtsilä within this agreement and a key driver for the cooperation between the two companies. Engine efficiency and fuel consumption will be measured on a regular basis, with improvements to fuel efficiency based on continuous monitoring and data analysis. Potential savings in fuel costs are counted in tens of millions of dollars per year.

Energy-saving Wärtsilä EnergoProFin Propeller Cap

Wärtsilä EnergoProFin is a state-of-the-art energy-saving solution which increases propeller efficiency and creates fuel savings of up to five percent. The solution is now available for both controllable-pitch propellers (CPP) as well as fixed-pitch propellers (FPP), yielding the same results in both propeller options. Offering the solution for technologically more-challenging CPPs was previously considered impossible in the industry, but is now made possible due to development work by the Wärtsilä hydrodynamics team.

The Wärtsilä EnergoProFin is a specially-designed propeller cap with hydrofoil-section fins on the downstream side of the propeller. It is an innovative energy-saving device



One of the largest ships in the Carnival fleet, *Queen Mary 2*, is powered by Wärtsilä diesels
(Photo John Jeremy)

which can significantly reduce a vessel's fuel consumption as well as its emission levels. Such technical innovations play a major role for ship operators who are tackling rising operating costs, as it offers an opportunity to enhance the efficiency of existing assets. By improving their energy efficiency, ship operators can increase their profitability in an environmentally-sound way.

Propeller caps with fins have existed for three decades, but their application has so far been primarily on FPPs. The view of the industry has been that applying an energy-saving device, such as Wärtsilä EnergoProFin, to the technologically more-challenging CPP would not be possible. Wärtsilä took on the development task and succeeded in creating a product which offers vessels equipped with a CPP an opportunity to reduce their energy consumption. Wärtsilä's development work was a spin-off of an EU-funded collaborative project between Wärtsilä and nine other companies.

The Wärtsilä EnergoProFin, which rotates with the propeller, is optimised for propulsion upgrades of existing vessels and, as such, can be easily mounted without the need for complex structural changes. The device is designed to minimise the losses in the vortex leaving the propeller by transforming rotational energy into effective thrust, resulting in an efficiency increase that brings up to five percent fuel savings. The payback time for the investment is, even with the current low fuel prices, generally less than two years and can be as short as less than a year.

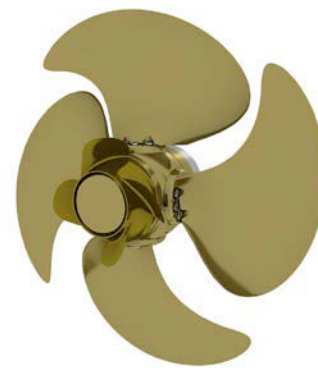
"Customers in today's uncertain economic situation need solutions that are reliable, cost-effective and easy to invest in. Energy-efficiency solutions in general are a sound investment, as their impact on both operating costs and environmental compliance is a lasting one," said Tamara de Gruyter, Vice President, Propulsion System Services, Wärtsilä Services. "We want to help ship operators optimise their existing assets, and that is exactly what Wärtsilä EnergoProFin does, now for controllable-pitch propellers as well."

February 2017

GNV values Energy Efficiency

Customers have welcomed the opportunity to improve their efficiency. Grandi Navi Veloci S.p.A. (GNV), which operates 10 international routes to and from Spain, France, Albania, Tunisia, Morocco and Malta, and five national lines within Italy, is constantly investing in the energy optimisation of its fleet. The commitment of the company to rapidly adapt its product and service, attention to market signals and the continuous technological evolution of its fleet have allowed GNV to renew and strengthen its business, consolidating domestic routes and increasing its presence in the international markets.

"The strength of our company is the extreme and constant attention to the energy efficiency of our fleet," says Antonio Campagnuolo, Marine Operations Director of GNV. "We wanted to reblade two units of our fleet. After Wärtsilä further presented the EnergoProFin to us and once we analysed its performance and the resulting energy efficiency improvements, we decided to go ahead with the reblading and have the EnergoProFin solution installed in both our units."



Wärtsilä EnergoProFin energy-saving solution increases propeller efficiency and creates fuel savings of up to five percent
(Image courtesy Wärtsilä)

SUMMER ON THE WATER



Start line 3 for the 2016 Rolex Sydney to Hobart Yacht Race with eight seconds to the gun.
Makula (A19, hull number 99) at 85 the oldest boat in the race, was sailed by Sean Langman and finished first in IRC Division 4
(Photo John Jeremy)



Sydney Harbour in summer — a fresh breeze, three dragons, a tall ship, a seaplane and a hot-water boat (sorry, motor cruiser)
(Photo John Jeremy)



A yacht ballet and dancing helicopters — HMAS *Canberra* in Sydney Cove for the Salute to Australia on Australia Day
(Photo John Jeremy)



Competitors in Division 1 (spinnaker) bearing away for a down-wind start in the 181st Australia Day Regatta on Sydney Harbour
(Photo John Jeremy)

THE PROFESSION

IMO Fuel Oil Consumption Data-collection System

Amendments to MARPOL Annex VI requiring mandatory fuel oil consumption data collection and reporting have been adopted. These will enter into force on 1 March 2018, with the first reporting period being for the 2019 calendar year.

IMO has previously agreed to address ship energy efficiency through a three-step approach:

1. Data collection.
2. Data analysis.
3. Deciding on what further measures, if any, are required.

The recent IMO MEPC 70 meeting worked on the data-collection stage and adopted amendments to MARPOL Annex VI, Chapter 4. These mean that:

- Ships of 5000 GT and above will be required to submit to their Administration annual reports on fuel consumption and transport work parameters, via a methodology to be included in the Ship Energy Efficiency Management Plan (SEEMP).
- Upon verification of the submitted data, the Administrations will issue to the ships a Statement of Compliance related to fuel oil consumption.
- Finally, the Administrations will submit aggregate data to the IMO, which will maintain an anonymised IMO Ship Fuel Oil Consumption Database.

Ships will need to use a standardised reporting format, developed by the IMO, to submit data on:

- Identity of the ship
 - IMO number

- Technical characteristics of the ship
 - Ship type
 - Gross tonnage (GT)
 - Net tonnage (NT)
 - Deadweight tonnage (DWT)
 - Power output (rated power) of main and auxiliary reciprocating internal combustion engines over 130 kW (kW)
 - Energy Efficiency Design Index (EEDI) (if applicable)
 - Ice class (if applicable)
- Fuel oil consumption, by fuel oil type, in metric tonnes, and methods used for collecting fuel oil consumption data
- Distance travelled
- Hours under way

Shipowners and operators will need to start considering the means for collecting the fuel oil consumption data which is most appropriate for each ship and updating the SEEMPs of their ships to reflect this process.

MEPC 70 adopted the text of a resolution on 2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP), which supersedes the 2012 Guidelines (MEPC.213(63)) and is expected to be published by December 2016.

The IMO is also developing Draft Guidelines for Administration data verification procedures in order to assist Administrations with the verification of the reported data and the issuing of the Statement of Compliance. MEPC 71 (May 2017) is expected to finalise and adopt these guidelines.

Lloyd's Register, *Class News No. 34/2016*, 8 November 2016



A little ship with a famous name — the Antarctic Survey Vessel *Wyatt Earp* passing an iceberg in Antarctica while working with the RAN Deployable Geospatial Support Team in January 2017
(RAN photograph)

EDUCATION NEWS

UNSW Sydney

Undergraduate News

Naval Architecture Program Under Threat

After more than half a century of successful operation, the naval architecture program at UNSW is currently under suspension with the threat of closure at the end of 2017.

We were advised in December that, as a result of UNSW's Strategy 2025 Plan, it was proposed to cease teaching all courses with enrolments of less than 25 at the end of 2017. This, of course, meant closure of the entire naval architecture program, as no NAVL course has ever had an enrolment exceeding 19. No new enrolments in naval architecture were accepted for 2017.

Subsequent advice has been circulated to our UNSW graduates in naval architecture, and consultations between naval architecture staff and industry have taken place, resulting in a number of letters expressing strong support for the naval architecture program at UNSW.

A meeting of key industry CEOs with the Dean of Engineering was arranged on 9 February. Discussion showed some possible ways forward and these options will be pursued. Watch this space!

Naval Architects' Annual Dinner

With the passing into history of the Thesis Conference Dinner, the fifth Naval Architects' Annual Dinner was held on 14 November at Giovanna Italian Restaurant in Kingsford, and was attended by most of the final-year naval architects along with staff Mac Chowdhury and Phil Helmore.



(L to R) Phil Helmore, Brett Ryall, Mac Chowdhury, Jiong Wang, James Johnston and Geoff McCarey
(Image courtesy Giovanna Italian Restaurant)

Staff Changes

Invited lecturer and Chief Engineer, Richard Sproge, decided to hang up his spurs from teaching the machinery component of NAVL3710 Ship Propulsion and Machinery. Richard had been teaching this component since 1994 when he took over from Don Gillies, i.e. a 21-year stint! Many thanks, Richard.

We were fortunate to invite, in his stead, Melvin Attack, also a Chief Engineer. Many in the industry will remember Mel as Mr Wärtsilä Australia, and (like Richard) has previously taught marine engineering at TAFE. Mel took up the reins of NAVL3710 in S2 of 2016, with positive comments on the course from the students.

February 2017

Naval Architecture Course Content Revision

During 2016 the opportunity was taken to revise the content of and, in some cases rename, the following courses:

- NAVL3120 Design of Ships and High Speed Craft
- NAVL3620 Ship Hydrodynamics
- NAVL3710 Ship Propulsion and Machinery
- NAVL4140 Design of Yachts
- NAVL4410 Ship Structures 2

in order to improve the continuity of the stream from a student perspective, and to consolidate content in order to improve the internal consistency of each course. The changes were mostly beneficial reorganisations of content (with minor additions and deletions), rather than changes to the overall content of the naval architecture stream. The changes were approved by the Faculty in S1 with final sign-off in S2 of 2016 for implementation in S1 of 2017. However, some changes were implemented in S2 of 2106 so that current students did not miss essential content.

Thesis Projects

Among the interesting undergraduate thesis projects recently completed or currently under way are the following:

Material Selection for High-speed Craft: Composites vs Aluminium

The selection of the best material for use in the manufacture of high-speed craft is not easy. Considerations include mechanical, physical and chemical properties, as well as longevity and material, manufacturing, maintenance and recycling costs. Kasyfil Aziz Ani has compared composites and aluminium, focussing on the chemical properties and strength, but also considering other properties and costs of these materials. The results show that aluminium offers good mechanical properties and workability, but composites offer weight and life-cycle cost savings.

Development of a Classification for Heritage Vessels

The Australian National Maritime Museum has a number of operational heritage vessels which are non-compliant with current survey standards/requirements for safe operation. They have organised gazetted exemptions for these vessels, with exemptions being granted on the condition that they be assessed against the applicable standard of the NSCV, non-compliances documented, and a risk-management plan combined with safe operating procedures developed and implemented to mitigate the risk.

Adela Greenbaum is researching the nature and significance of the non-compliances, and how best to mitigate the associated risk, with the output expected to be a documented process for assessing heritage vessels, and preparing risk-management plans and operating procedures to ensure safe operation. There is a number of heritage-vessel operators around the country who could also benefit from the results of this research.

Post-graduate and Other News

New Head of School

A/Prof. Con Doolan stepped down from the position of Acting Head of School and Prof. Chun Wang took up his appointment as the new Head of the School Mechanical and Manufacturing Engineering at UNSW Sydney on 1 January.

Prof. Wang received his PhD from the engineering faculty at Sheffield University. From 1995 to 2009 he was Head of Advanced Composites Technologies of the Defence Science and Technology Organisation, where his achievements included project lead for a \$6.5 million award from the US government to develop composite repair technology for the Joint Strike Fighter aircraft. From 2002–03 he held a Defence Science Fellowship at Stanford University. In 2009 he joined the academic staff of RMIT as Director of the Sir Lawrence Wackett Aerospace Research Centre. Over the past five years he has been awarded 12 ARC grants (6 as lead CI) and attracted nearly \$10 million in research funding including a number of industry research contracts. He was a Member of the College of Experts on the ARC from 2013–15. He has taught in the areas of mechanics, fracture and composites.

Prof. Wang joined UNSW Sydney in August 2016 and so had several months for Con to read him into the position and become acclimatised.

Another Name Change for UNSW

We were advised on 16 January that UNSW was undergoing a “Brand Refresh”, with the results including (among others) a change of name from UNSW Australia to UNSW Sydney and UNSW Canberra, a change in the hue of the yellow in the UNSW brand, and a change in tagline from “Never stand still” to “Australia’s Global University”.

As Em/Prof. Lawry Doctors has pointed out, this makes a total of five name *changes* for the university over its life since incorporation by Act of parliament in 1949:

The New South Wales University of Technology
University of New South Wales
The University of New South Wales
University of New South Wales
UNSW Australia
UNSW Sydney

The latest name changes appear to have resulted from the name University of New South Wales not being widely known to Americans and Europeans. However, the new potential for confusion with the University of Sydney, while seemingly obvious, does not appear to have been considered.

Phil Helmore

Australian Maritime College

AMC Principal, Prof. Neil Bose, Comments on Defence White Paper

Australia’s Defence White Paper heralds a new way of thinking in the defence realm, as changing approaches offer opportunities for our long-standing work with the Navy and maritime defence industries.

This has opened the door for the strengthening of maritime industry connections, which includes defence, at the

Newnham campus of the University of Tasmania — a collaboration between industry and university on our campus as an integral part of AMC.

At AMC, our maritime defence industry strengths have been developed over many decades. They include world-leading expertise in cavitation inception and testing that places Australia at the leading-edge in terms of work on noise signatures of naval vessels; nationally-leading expertise in the operation of survey-capable autonomous and other robotic underwater vehicles; and the training of Pacific Patrol Boat crews under contract from the Navy.

Furthermore, the Australian Research Council’s Research Training Centre for Naval Design and Manufacturing (RTCDM), was established between AMC, eight industry and defence research members, and two further universities to support the goals of Australia’s multi-billion dollar naval shipbuilding program in designing and manufacturing new fleets of submarines, future frigates and patrol craft.

This approach will strengthen Australia’s capacity to meet the needs of the major naval procurement and sustainment programs over next 20–30 years. AMC has the expertise to meet requirements for education and training of naval engineers at Bachelor’s and Technology levels, as well as upskilling existing mechanical, electrical and electronics engineers through a master’s program in naval engineering.

One of our key aims for the coming year is to expand Australia’s autonomous underwater vehicle (AUV) capabilities. AMC is rapidly developing the largest AUV expertise base in Australia and is expanding this via the procurement of the Antarctic Gateway Project’s ISE Explorer Class, 5000 m-capable AUV, which also supports facilities and sensors. AMC has expertise in the assessment, acquisition, operation and training relating to AUVs for Navy applications, and in the procurement of platforms and their sensors focusing on the non-classified components of AUV operations for Navy use.

A vital part is an industry incubator designed to kick-start innovation in the maritime industry. To date, this has included an AUV simulation capability and the manufacture of seeding materials for advanced flow measurement techniques.

There are attractive opportunities for defence as well as ocean-renewable energy, ports, and logistics industries to establish a presence close to AMC’s leading hydrodynamics test and simulation facilities.

AMC has extensive maritime simulation capability for training of navigating officers, pilots, tug masters and seagoing marine engineers. These are being expanded to include simulators to train AUV operators, and the potential for non-classified components for submariners, marine/submarine engine operations, and new surface vessel types (e.g. patrol craft).

Consolidating our long history of working with defence and defence industries is key for us and, in order to accommodate the increased defence and defence industry demand for AMC’s services, Mr Aaron Ingram (formerly CDRE, RAN) has been appointed as AMC’s Defence Maritime Program Manager.

AMC PhD Student Wins Walter Atkinson Award

An AMC Search research engineer and Australian Maritime College PhD student has been awarded the annual prize for best paper by the Royal Institution of Naval Architects, Australian Division.

Shaun Denehy was lead author on the paper *Mooring Arrangement Design to Minimise Berthed Ship Motions due to a Passing Ship*, which was awarded the Walter Atkinson Award for the best written paper presented at a RINA-supported conference or in a RINA publication in Australia.

Judging the papers on its purpose, importance to Australia, originality, rigor and comprehensibility, it was deemed to be the best presented in Australia for the year to June 2016.

Shaun received his award in person at the annual Sydney Marine Industry Christmas event on 1 December 2016. It was presented by the President of the Australian Division of RINA, Prof. Martin Renilson, who praised the paper for its application to industry.

“Shaun’s work is a very good example of a piece of applied research which is of great benefit to the Australian industry.”

The prize-winning paper details how the researchers — including Jonathan Duffy, Dev Ranmuthugala and Martin Renilson — used physical, scale-model experiments to understand how port layouts impact the way in which berthed ships are affected by passing ships.

Undertaking research in AMC’s Model Test Basin facility, the researchers were able to present different mooring arrangements to minimise berthed ship motions and recommend maximum safe speeds for passing ships.

Shaun explains how the award demonstrates the excellence of the research undertaken in this area at AMC.

“It’s really an honour to be recognised in this way,” explained Shaun, “especially as the award was totally unexpected!”

“The research we do here at AMC into the challenges that ships face in restricted-water port environments is among the best in the world, and our findings help vessel owners and port operators increase safety, efficiency and optimise port design.”

The research is part of Shaun’s PhD studies into berthed ship – passing ship interaction in restricted waters. He uses numerical and experimental modelling to understand how ship interactions are affected by port layouts and different passing ship scenarios.

His consultancy for AMC Search, the commercial arm of AMC, sees him apply this expertise to help businesses using AMC’s facilities to optimise operations and designs and innovate.

PhD target for NA Graduate

Naval architecture graduate Daniel Clayton explains that it’s his “deep and intense desire to learn” that has propelled him through his undergraduate degree — and straight into a PhD at AMC.

“In particular, my enjoyment of the challenges presented by my final-year research thesis drove me to pursue further studies in a PhD,” explained Daniel.

His PhD research will involve simulating an explosion next to a frigate and then observing the effects which this blast

has on the longevity of the vessel.

He explains how the research builds on his academic interests and aligns with his career ambitions.

“Research in this area interests me as it affords me the opportunity to build upon my knowledge in numerical analysis, along with a few other fields and skill sets that I have touched upon during my undergraduate studies.

“I am also thoroughly excited to be able to become involved in the SEA5000 Future Frigate Program — which is looking at the acquisition of nine high-capability frigates for the Royal Australian Navy — as I have always wanted to pursue a career with Defence in some capacity.”

Throwing himself into university life, Daniel has also been active outside the classroom, holding various positions including Treasurer and President of the Students’ Association. He explains why he was inspired to get involved.

“My motivation came from my attendance at the Seafarers Bar during my first year at AMC, where I was enthralled by the opportunity to talk to my lecturers and other staff members in a relaxed and inviting environment.

“It made a profound impact on me to know the staff in a way that I hadn’t experienced before outside AMC, which motivated me to join up and see what I could do so far as ensuring there that continued to be opportunities for students and staff to mingle.”

Reflecting on his time as an undergraduate, Daniel singles out his time on *Bluefin*, AMC’s training vessel, as his most memorable experience.

“The trip offered an unparalleled opportunity to gain insight into the significance of my studies, along with a great chance to see the effects of design decisions in a real-world setting.”

As he begins his PhD, he hopes to be able to balance his various interests — and thanks those that have helped him get there.

“My aspirations are to be able to try and find some kind of balance between continuing research involving numerical analysis, and research into the defence sector.

“I’d like to sincerely thank the great number of staff I have met at the AMC during my studies who have gone above and beyond to assist me in all manner of ways outside of the lecture theatre.”



Daniel Clayton
(Photo courtesy AMC)

Submarine Contract Welcomed

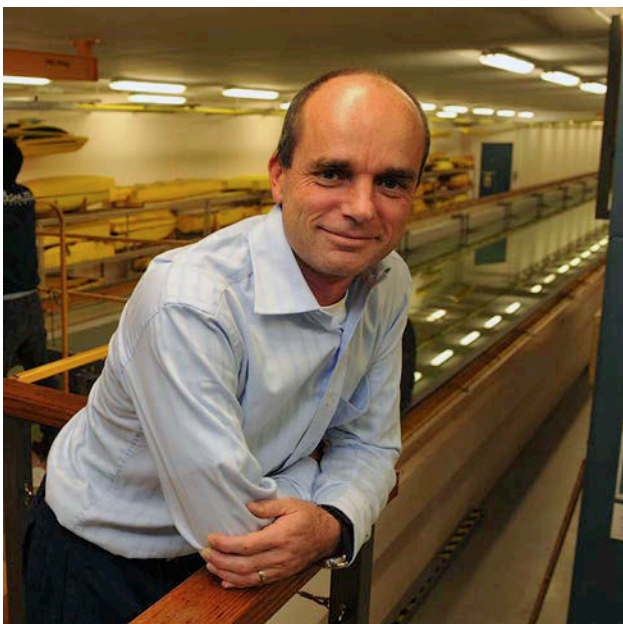
A/Prof. Jon Binns has welcomed the recent formal agreement between Australia and France to build 12 modern submarines in Australia for the RAN. Submarines are extremely complex to design, engineer and build: 1600 subcontractors are required to achieve the task, compared to 550 to build a Boeing 777 and 600 to build a frigate. Being fully submerged in the ocean environment makes even simple tasks complex, with every element of the submarine demanding extreme accuracy.

Binns is the Director of the ARC Research Training Centre (RTC) for Naval Design and Manufacturing, which addresses this complexity by connecting researchers based in universities, government and industry with students across the maritime space.

Nine of the thirteen RTC researchers are directly tackling problems which could impact on the efficient design, construction and sustainment of this next generation of submarines. Their focus includes reducing vibrations and noise, minimising the build-up of organic matter on vehicle sensors, using robots to efficiently inspect fuel tanks, and reducing the corrosion that degrades submarine parts.

Whilst the precise integration of the results of these research projects to the final submarines may not be clear at this stage, that is the nature of research. The real bang for buck comes with capability building. The researchers driving these projects will be able to transition from industry, to government, to university, whilst scoring highly for each stakeholder.

To support this agreement between the two nations, we have the commitment, infrastructure, people and training to make sure that Australia makes the most of these opportunities now and well in to the future



A/Prof. Jonathan Binns
(Photo courtesy AMC)

New Defence Innovation Partnership

On 27 January the Minister for Defence Industry, the Hon. Christopher Pyne MP, announced the establishment of the Defence Innovation Partnership between the Defence Science and Technology Group and South Australian Universities.

“This new partnership will enable Defence to further leverage science and technology expertise from South Australia’s leading academic institutions and industry,” Minister Pyne said.

In 2016 the government opened the Centre for Defence Industry Capability based in South Australia and launched the Innovation Hub.

These two initiatives are designed to nurture and grow Australia’s defence industry and provide a leg up for small-to-medium enterprises with innovative ideas to improve our defence capability.

“This new partnership between the DST Group and the South Australian university sector aims to create a centre for future defence-related research networks in South Australia.

“It will provide a platform for industry and universities in South Australia to undertake joint cross-disciplinary research, solving Defence’s technology challenges,” the Minister said.

This initiative is consistent with the 2016 White Paper which called for greater alignment across the defence innovation sector through closer cooperation with industry and academia.

A similar initiative has already been implemented in Victoria, and discussions with other interested states are underway.

Minister Pyne said that the benefits of this partnership, included better communication of Defence’s science and technology priorities to industry.

As the coordinator and innovation integrator of Defence’s research and development activities, the DST Group would be a key player in the partnership, contributing up to \$150,000 per year for research projects as well as seconding a senior researcher.

Flinders University Signs Submarine MOU

Flinders University and four of France’s leading Graduate Schools of Engineering have entered into an academic and research cooperation agreement relating to Australia’s Future Submarine Program.

The agreement between Flinders and a consortium comprised of ENSTA ParisTech, École Centrale de Nantes, CentraleSupélec and École Polytechnique was signed at a ceremony witnessed by South Australia’s Minister for Higher Education and Skills, the Hon. Susan Close, and the Deputy Chief Executive of DCNS and General Manager of Australia’s Future Submarine Program, Marie-Pierre de Baillencourt.

The Memorandum of Understanding (MoU) will foster joint research projects, student and staff exchanges, and a new wave of Australian-French innovation and entrepreneurial projects related to the Future Submarine Program to be centered in Adelaide, South Australia.

Flinders University's Deputy Vice-Chancellor (Research), Prof. Robert Saint, signed the MoU at DCNS Headquarters in Paris, saying "it will foster an exchange of research and technical expertise that further strengthens the University's maritime related programs".

"This MoU signed with our new French partner institutions, recognises the high regard in which Flinders' capability in the areas of defence and maritime research is held. The agreement will enhance our defence-related endeavours and contribute to South Australia and Australia's economic transformation," Prof. Saint said.

The French members of the consortium have welcomed the agreement as a further recognition of the global value of their defence research strengths.

"Our alliance has a proud history of productively working with DCNS, the successful bidder for Australia's future

submarine program. The establishment of this consortium with Flinders University will foster an exchange of knowledge between Australia and France in relation to this project, and harness some of the world's best research minds to ensure that DCNS's vessels set the standard for technological innovation," the consortium members say.

Mr Alain Guillou, DCNS Executive Vice-President of Human Resources and Operations, welcomed the agreement.

"Innovation is at the heart of DCNS's Future Submarine Program plans. We would like to congratulate Flinders University and the French institutions on this exciting development which ties communities for the long term", he said.

The MoU creates a "Group of Scientific Interest" involving the five institutions, and further cements the friendship between France and Australia.

VALE

Keith Harper OAM

It is with sadness that *The ANA* records the passing of Keith Harper, a long-time member of RINA. Keith died peacefully on 7 August 2016 and is survived by his wife Colleen and his two daughters.

Keith spent his entire career of forty-four years with the then Department of Navy and, subsequently, the Department of Defence. He was almost sixty years old when he retired in 1985 and afterwards spent thirty years in retirement living on the Gold Coast in Queensland.

Keith commenced his career by serving a five-year apprenticeship as a Ship and Boat Builder at HMA Naval Dockyard, Garden Island, in Sydney. He progressed from there to the position of Ship Draughtsman in the Ship Drawing Office and then Dockyard Project Supervisor. In 1960 he took up the position of Senior Naval Architect on the Naval Overseeing Team at Cockatoo Island, watching over the construction of HMAS *Stuart* and HMAS *Stalwart*.

After undertaking six months' training in Bath, UK, in submarine refitting in 1960, he returned to Australia to oversee the refitting of four of the Royal Navy's T-class submarines for the British MoD (Navy) at Cockatoo Island. Following that, he spent three-and-a-half years in the UK with the RAN Oberon-class submarine project, of which twelve months was spent in Bath and two-and-a-half years at Greenock where our O-class submarines were built.

Keith returned to Canberra in 1967 to take up the position of Design Manager for the RAN's Oberon-class submarines. While in Canberra, Keith also took on the task of Design Manager for the RAN's Collins-class submarine project, and managed the engineering input into the project tender documents for the construction of the Collins-class submarines in Australia.



Keith Harper with his OAM
(Photo courtesy Colleen Harper)

Before retirement in 1985, Keith was awarded the Order of Australia Medal for his specialist services in the field of submarine design and technology for the Royal Australian Navy.

Keith will be missed by many.

Brian Robson

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on Thursday 1 December 2016 by teleconference under the chairmanship of our President, Dr Martin Renilson.

The meeting had a very full agenda and some of the more significant matters discussed during the meeting are outlined as follows:

Division Vision Statement

This statement having been finalised, Council commenced populating the list of members to be responsible for liaison on various subjects and undertook to seek nominations from Sections to complete this list.

Survey of Members Expectations

Further to initial discussions at Council's previous meeting in September, our Vice President, Jesse Millar, was requested to develop and circulate a survey.

Australian Naval Shipbuilding and Repair Capability

Since its previous inquiry into naval shipbuilding by the Senate's Economic References Committee lapsed with the calling of the July 2016 Federal Election, that Committee has instigated a further inquiry on the subject and has invited the Division to make a submission by 3 March 2017. Council agreed that the submission, to be coordinated by the President, should largely reflect the submission to the lapsed inquiry but should take into account subsequent changes in policy settings such as the adoption of a continuous shipbuilding programme.

AMSA Domestic Vessels

Council noted that full service delivery by AMSA would be delayed 12 months to 1 July 2018 as announced in the Transport and Infrastructure Council Communique relating to its meeting of 4 November 2016.

London Council Meeting on 18 October 2016

The President reported that the main outcome was approval of the review of the Institution's technical committees, which the Chief Executive summarised in detail in the October/November 2016 issue of *RINA Affairs*.

Timing of Council Meetings

In response to a request for Council meetings to be held outside business hours to avoid scheduling clashes for members, Council agreed to investigate holding its next meeting at a later time.

Next Meeting of Council and Annual General Meeting

Council tentatively agreed to its next meeting being held in conjunction with the Division's Annual General Meeting. As subsequently advised in the notice emailed or mailed to all members, the AGM will be held in Perth at 2.15 pm (WST) on Thursday 23 February 2017 and, accordingly, the Council meeting will be at 5 pm WST on Tuesday 21 February 2017.

Membership

In closing, I regret to advise the passing of some of our long-standing members:

- Keith Harper MRINA, who passed on to me his collection of the Institution's *Transactions* over 35 years ago, passed away in November 2016 on the Gold Coast.

- D. J. "Jock" Dalziel MRINA (joined in 1951) passed away in Melbourne on 21 January 2017. He was General Manager of the Whyalla Shipyard when I commenced there in 1971.
- Geoff Hodge FRINA (joined 1959) passed away on 30 January 2017 in Melbourne. I well remember that he was Senior Principal Marine Surveyor at the Department of Transport in Melbourne before the move to Canberra in 1981.

The Division extends its condolences to the families of these respected members.

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 Division	austdiv@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

NAVAL ARCHITECTS ON THE MOVE

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

Owen Eckford has moved on from the Kowloon Motor Bus Company, and has taken up the position as a Transport Consultant in Alstonville, NSW, providing advice on various aspects of the public transport industry.

Tim Gourlay has moved on from Curtin University and has set up his own consultancy Perth Hydro in Perth., but maintains his links to Curtin as a research associate with the Centre for Marine Science and Technology. Friends can check out the services offered by Perth Hydro and contact details at www.perthhydro.com.

Bing Zheng Ho, a recent graduate of UNSW Australia, has taken up a position as a combat officer in the Royal Singapore Navy in Singapore.

Antony Krokowski continues consulting as Aquamarine in Brisbane, and now includes Teir 1 Multinational Mining Co. among his clients, for whom he is providing Superintendent/ Site Representative (Newbuilding Marine) services in Vung Tau, Vietnam.

Anthony Livanos has moved on from Nauti-craft and has taken up the position of Naval Architect Coach at Austal Ships in Cebu, the Philippines.

Gordon MacDonald has moved on within BMT Design & Technology and has taken up the position of Associate in Airlie Beach, Qld, contracting to D&T currently supporting the SEA 5000 Future Frigate project.

Mike Mechanicos has retired after nine years with DNV GL, following about twice that with Navy Engineering Division, DMO and as Director Navy Certification in the Department of Defence in Canberra, and time before that at sea as an engineer.

Vesna Moretti has moved on from Crondall Energy and has set up her own consultancy Moretti Marine Design & Services in Perth.

Dmitry Sadovnikov moved on from Austal Ships in 2008 and, after some time at AMOG Consulting, Crondall Energy Consultants and Intecsea, in 2012 took up the position of Principal Naval Architect, Technical Authority, with Woodside Energy in Perth.

Mervin Sagario moved on from Stewart Marine Design in 2008 and took up the position of Design Naval Architect with MIS Ship Design in Cairns.

Peter Samarzia has moved on from consulting and has taken up the position of Naval Architect on the SEA 1000 Project with PMB Defence in Adelaide.

Joanna Shea (nee Theleritis) moved on from the Department of Education and Training in Victoria in 2007 and took up the position of Business Operations Manager at Pout-a-Licious Skin and Laser in Melbourne.

David Shelton has moved on within VicRoads and has now taken up the position of Executive Director Registration and Licensing in Melbourne.

Richard Sheppard moved on from the Australian Defence Force in 2004 and, after two years at Jewel Finance, took up the position of Managing Director with inSynergy Property Wealth Advisory in Sydney.

Nicolas Siohan has moved on within Gurit, and has taken up the position of Project Engineer in Nice, France.

Karl Slater has moved on within the Defence Science and Technology Group, and has taken up the position of A/Group Leader Naval Architecture and Platform Systems Analysis in Melbourne.

Damien Smith continues consulting as Damien Smith Design in Fremantle.

Michael Smith continues as a Senior Surveyor with Lloyd's Register in Sydney.

Warren Smith continues as a Senior Lecturer at UNSW Canberra.

James Smithers has moved on within Parsons Brinckerhof and has taken up the position of Senior Management Consultant in Sydney.

Allan Soars continues as Technical Director with AMD Marine Consulting in Sydney.

Jaime Sotelo has moved on from Qinetiq Australia, and has taken up a position as Senior Project Manager with Beca in Sydney.

Colin Spence moved on from McAlpine Marine Design in 2006 and, after some time at Falconer Bryan Australia and London Offshore Consultants, has taken up the position of Senior Project Engineer with DOF Subsea in Perth.

Jude Stanislaus has moved on within DNV GL and has taken up the position of Senior Surveyor/Project Manager in Perth.

Jason Steward has moved on from BMT Nigel Gee in Southampton and, after some time at Nova Systems in Canberra, has taken up the position of Engineering Manager in the Specialist Ships Acquisition division of the Capability Acquisition and Sustainment Group, Department of Defence, in Canberra.

Sandy Tickle has moved on from Dolleina and has taken up the position of Commercial Manager with A.J. Tickle Maritime Holdings in Newcastle.

Alexander Walter has moved on from the Royal Australian Navy and has taken up a position as a Senior Maritime Engineer with BMT Design & Technology in Sydney.

Gabriel Wong has moved on from Pape Engineering and has taken up the position of Inspection Coordinator at Region Diversified (S) in Singapore.

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

Phil Helmore

FROM THE ARCHIVES

TREASURES FROM TROVE

Graham Rayner

An interesting article taken from the Australian National Library's digitised archive Trove — trove.nla.gov.au

A letter from Captain Henniker of the barque *Madras* to Mr Robert Kerr of Launceston, giving an account of the ship's voyage from Launceston to Calcutta and, in particular, a description of a lightning strike low on the ship's hull which would normally have spelt disaster. The spelling, punctuation and grammar are as they appeared in the old *Australian*, of Saturday 7 November 1840, Page 2, but with paragraph breaks inserted to help reading. The endnotes and voyage diagram are mine.

Calcutta, 5th July 1840

My Dear Sir,

I addressed you on leaving the Tamar on 7th April, and then hoped to have been the first vessel to have communicated with you from Calcutta little anticipating the misfortunes and consequent detention we have met with. First, contrary winds and calms prevented our reaching Break-Sea Spit, until 21st April, and on the 26th, at anchor under Cape Sandwich, we capsized our windlass and broke all the iron pawls; were afterwards detained in the Straits by heavy gales, and did not reach Booby Island till the 6th of May; and on the 20th May, in latitude 11 degrees south, longitude 108 degrees 15 seconds east, our voyage was near being brought to a close by a flash of lightning striking the ship on the broadside, about two feet above the water, on the larboard side, by the gangway; the explosion that followed was most awful; the decks were burst up from side to side, and both the skylights on the quarter-deck blown all to pieces, and in an instant dense volumes of smoke were rolling up every hatchway and skylight, as well as through the broken-up deck. Every man was knocked down but not seriously injured, and we were soon alive to our danger; the whole of our ammunition was stowed near the spot where the ship was struck and now on fire; indeed, as it afterwards appeared, were knocked out of their position by the shock. We soon succeeded in reaching the barrels and getting them overboard, and shortly afterwards extinguished the fire.

On the smoke clearing away a little, imagine our consternation at finding a large hole blown through the side about two feet above the water, of one foot in length by eight inches in width, and that the wall planks and part of the topsides for several feet before and abaft this hole, rent and torn from the timbers; bolts of the knee fastenings knocked inwards two inches, the inside lining and spirketting planks blown inwards from one-half to one and a half and two inches from the timbers, and six feet of one blown away altogether. The electric fluid had then passed along one of the deck beams, shivered and broken it on the opposite side, and passed out right through the ship's opposite side, and in its passage entered the lockers round the mainmast, and destroyed twenty dozen of beer and wine, swept and tore away every shelf and pantry locker, and cleared the sideboard of every article of crockery and glass; in fact, our cabin deck, from the mainmast to the after-cabin windows, was completely covered with fragments of crockery, &c., and pieces of plank, kegs, cases, &c.; of stores that were blown from the two store cabins, the bulk's-heads of which were blown down, and everything near much burnt; even the ship's

timbers were charred, as also the beam along which the electric fluid passed.

Our main royal mast and top-gallant mast were shivered to pieces. Chain sheets melted and run to small pieces, slings of mainyard struck and broken, main topmast, trestle-trees knocked away, and much other damage done aloft; but this was a separate stroke of the electric fluid, and occurred about five minutes before the other more serious one. We were about three thousand miles from Calcutta, and but four or five hundred from Batavia; yet, after getting sheets of felt and a hide of pump leather nailed over the most seriously injured parts outside, finding the vessel made no water, and consequently judging that the damage had not extended below the water-line, I made all sail and continued on my voyage to this port. We now have her in dock, and find the fastenings and planks injured even below the third streak of copper; she will come out again quite a new ship, so you need not fear damage to your cargo.

On May 31st, we were in latitude 5 degree south, longitude 86 degrees east, and from thence were nine days kicking about in a calm, with rain and occasional very heavy squalls, but directly against us; and such heavy and cross swell and sea on, that before we reached the latitude of 15 degrees (the calm having been succeeded by very heavy, blowing weather), we had lost nearly two suits of sails. On May 16th [1], in latitude 17 degrees 37 minutes west [2], and longitude 85 degrees 20 minutes east, we fell in with the wreck of a country sloop, and at some risk to my crew I hoisted out our pinnace and relieved nine poor fellows from their most miserable condition; they were nearly exhausted, having been blown off the coast about Vizagapatam [3] seven days before; on the second day they were water-logged and dis-masted, and had since been floating about, nearly under water, with a gale of wind and heavy sea, and not a particle of food, fire, or drop of fresh water, and scarcely a rag to cover them. The head of the police took charge of them on our arrival here.

On 17th May, at five hours P.M. I spoke a brig at anchor (the H C. P. V. *Coleroon* [4]), on the pilot station off Point Palmyras, but could not obtain a pilot in consequence of the heavy sea then running; we therefore anchored near her in the hope of procuring a pilot on the following morning, but before day-light it was blowing a perfect hurricane; we had taken the precaution of sending down all top-gallant yards and masts, and even the topmast, with the rigging and gear of all kinds, and had run the jib boom in to ease the ship. We were riding with 100 fathoms of best bower chain; yet, from the severity of the gale and heavy swell, expected every

minute the cable would part; about 8 a.m., on the 18th, away went the windlass and bitts. &c., and the ship then rode quite comfortably by the bare end of the chain well secured to the mainmast; on the 19th June the gale abated and we were fully employed fitting riding bills from a new topmast and other spars, and at 6 a.m., on the 20th, slipped the chain and made all sail, got a pilot soon afterwards, and at 8 a.m., on the 23rd ultimo, moored off Calcutta, Addison, with the *Eudora* [5], following in thirty-six hours after.

To Robert Kerr, Esq.

End Notes

1. Captain Henniker, or the journalist transcribing his letter, made a mistake here and later on, when he refers to meeting with the pilot vessel *Coleroon*. The month was more likely June rather than May, otherwise the schedule of events and the vessel's positions make no sense.

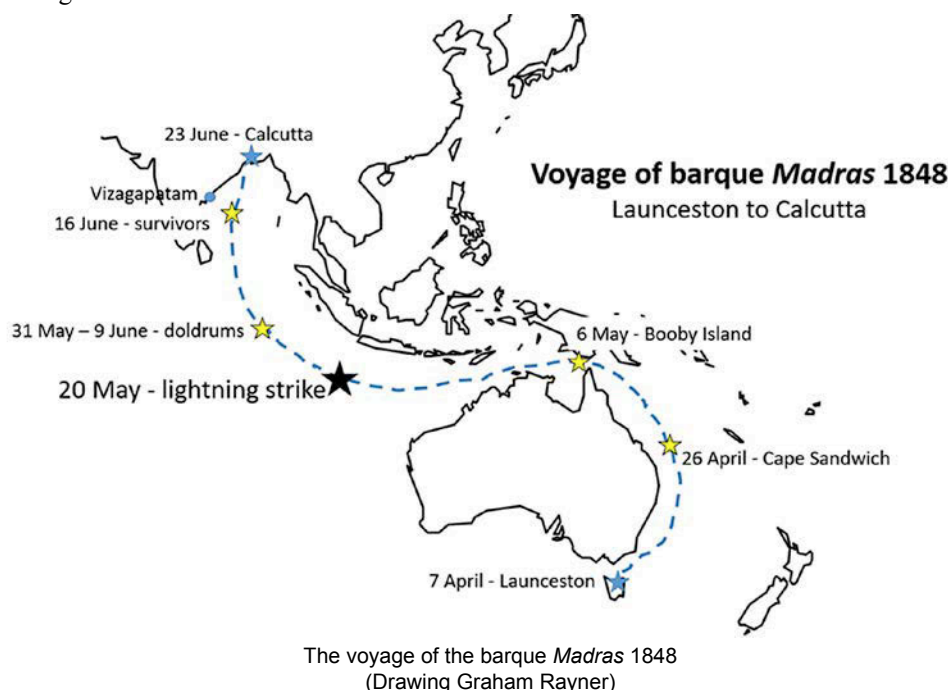
2. Another error — more probably Henniker — the latitude should be north or south, not “west”. It makes more sense to be north — making the encounter a few hundred miles SE

of Vizagapatam. South would put the two vessels well into the Indian Ocean and it is unlikely either the sloop would have drifted that far south in a week, or that *Madras* would travel so far west before turning north towards Calcutta.

3. Vizagapatam is an Indian Ocean port city about halfway up the Indian coastline.

4. HCVP *Coleroon* may be taken to be “Honourable Company Pilot Vessel” *Coleroon*. *The Indian Mail* (May-Dec 1848 — a register for all British colonies in the east, far east and Australia) refers to the “HEIC’s pilot brig *Coleroon*” — which would make more sense, since HEIC was the acronym for the Honourable East India Company. The HEIC, or EIC was often simply referred to as “The Honourable Company”. The ship was probably named after the river and region of the same name in SE India.

5. *Eudora* was captained by a chap named Addison. Contemporary records of the day refer to ship and captain together and the two are mentioned together in records of ship arrivals in Sydney that year.



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.

NUSHIP *Hobart* heads to sea from Adelaide
on 30 January 2017 for acceptance sea trials
(Photo courtesy AWD Alliance)

