

THE FUTURE OF SEA POWER

EDITED BY ANDREW FORBES

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PROCEEDINGS OF THE RAN SEA POWER CONFERENCE 2015

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ANDREW FORBES

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SEA POWER CENTRE - AUSTRALIA



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Andrew Forbes

Sea Power Centre - Australia

The Sea Power Centre - Australia was established to undertake activities to promote the study, discussion and awareness of maritime issues and strategy within the Royal Australian Navy, the Department of Defence and civil communities at large. Its mission is:

- to promote understanding of sea power and its application to the security of Australia's national interests
- to manage the development of RAN doctrine and facilitate its incorporation into ADF doctrine
- to contribute to regional engagement
- to contribute to the development of maritime strategic concepts and strategic and operational level doctrine, and facilitate informed force structure decisions
- to preserve, develop and promote Australian naval history.

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# Foreword

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The ninth biennial RAN Sea Power Conference was held on Glebe Island in Sydney over 6-8 October 2015, examining issues associated with the future of sea power.

As a simple observation, the future of sea power is influenced by myriad factors that will impact on the possible role of navies, the capabilities required by navies, and the technologies that might be used by navies.

Some of these factors include current and emerging security challenges and appropriate responses to them, including cooperative regional mechanisms and the processes for how navies actually cooperate at sea, as well as the fundamental restructuring of some navies and new operational concepts to meet the requirements of their governments.

Major advances in relevant technologies are having a major impact on naval forces and how they might conduct future operations. Importantly these advances extend beyond weapons and sensors to information technology and the impact they may have on all aspects of shipborne operations and warfighting.

An oft forgotten factor is not only a state's thinking on or about sea power issues but more importantly, whether there exists within that state a maritime culture and identity that is the bedrock of creating sea power.

This volume includes some of the presentations delivered at the conference and is a mix of academic papers and the views of expert practitioners in various fields. As with all conferences and published proceedings, no claim is made to a comprehensive coverage of the issues, rather a selection of topics to fuel further thought.

Andrew Forbes  
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February 2017



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# Abbreviations

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2RAR	2nd Battalion Royal Australian Regiment
A2/AD	anti-access/area denial
AADS	Active Archipelagic Defense Strategy
ADF	Australian Defence Force
AiIB	Asian Infrastructure Investment Bank
AIP	air independent propulsion
ANZUS	Australian, New Zealand, United States
AQAP	Al Qaeda in the Arabian Peninsula
ASBM	anti-ship ballistic missile
ASCM	anti-ship cruise missile
ASEAN	Association of Southeast Asian Nations
ASW	anti-submarine warfare
C2/ISR	command and control, intelligence, surveillance and reconnaissance
CCP	Chinese Communist Party
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCDC	Doctrine Concepts and Development Centre
DOTMPLF	doctrine, organisation, training, materiel, personnel, leadership, and facilities capability
DSTG	Defence Science and Technology Group
ECM	electronic counter measures
EEZ	exclusive economic zone
GDP	gross domestic product
GPS	global positioning system
HMAS	Her Majesty's Australian Ship
IEP	integrated electronic propulsion
IFC	information fusion centre
IFN	information network system
IMB	International Maritime Bureau

IMO	International Maritime Organization
INS	Indian Navy Ship
ISC	information sharing centre
JMSDF	Japan Maritime Self-Defense Force
JSF	F-35 joint strike fighter
LACM	land attack cruise missile
LHD	amphibious ship (landing helicopter dock)
LOSC	<i>United Nations Convention on the Law of the Sea 1982</i>
LTTE	Liberation Tigers of Tamil Eelaam
MoU	Memorandum of Understanding
MV	motor vessel
NATO	North Atlantic Treaty Organization
nm	nautical mile
OMFTS	operational manoeuvre from the sea
PLAN	People's Liberation Army Navy
QDR	Quadrennial Defense Review
RAN	Royal Australian Navy
ReCAAP	Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia
RFID	radio-frequency identification
RIMPAC	Rim of the Pacific (exercise)
ROKS	Republic of Korea Ship
RPG	rocket-propelled grenade
SLOC	sea lines of communication
SSK	attack submarine
STOM	ship-to-objective manoeuvre
UAV	unmanned aerial vehicle
UK	United Kingdom
US	United States
USS	United States Ship
USV	unmanned surface vehicle
UUV	unmanned underwater vehicle
TTP	tactics, techniques and procedures
WWII	World War II

# A Global Navy for Global Needs

Tim Barrett

Distinguished guests, ladies and gentlemen

As I speak, our newest commissioned ship HMAS *Canberra* is alongside in Townsville after completing a successful maiden exercise. For the past eight weeks she has been at sea, her flight deck busy with both Navy and Army helicopters and her dock operating her watercraft.

She carries a ship's company of 408, of which 53 are Army and Air Force. However in the last few weeks, during her 'sea series' exercise, she has carried another 634 embarked Army personnel and headquarters staff. At times this lifted to close to 1400.

Cooks have been producing 3750 meals per day. There have been 1474 deck landings conducted to date. By the end of October 2015, I expect the MH-60R Seahawk helicopter will be authorised to operate from her decks and in 2016 there will be first of class trials for CH47 Chinook and ARH Tiger helicopters on *Canberra*.

She has been carrying 60 medium and heavy army vehicles for her embarked force. She has moved more personnel and equipment in the last eight weeks than her predecessors moved in the last 5 years.

And in December 2015 we will commission a second amphibious ship (LHD), HMAS *Adelaide*.

I am very impressed by the work of those who built and fitted out this ship in Spain and in Australia. I am very proud of the men and women of her ship's company who are hard at work becoming proficient in all the new skills needed to operate such a significant new ADF capability. Before the end of 2015, she will be certified as 'in all respects ready' for operational deployment.

Bringing into service this class of amphibious ship and all the new capability they represent is an achievement of national significance.

Within that context, welcome to the RAN Sea Power Conference 2015.

For some of you it is welcome back, for others this is a first opportunity to attend this biennial gathering. To friends old and new, some of whom have come from far away to be with us, I welcome your participation in this significant international naval and maritime forum.

I welcome members of the academic community, those from trade and industry, and those who will be reporting and recording what we say here over the coming days. Your presence ensures that we who are in uniform are not just talking to ourselves, rather, we are engaging with the whole spectrum of maritime knowledge, opinion and wisdom.

As I shall emphasise, defence is a national enterprise.

For those of us in uniform, this conference is a rare opportunity to stop what we are doing in our day jobs to reflect upon our profession, to think about our vocation.

Over the next few days we can learn from national and international experts and from our peers, and remind ourselves of the context and rationale for the careers of sea service we have chosen.

I warmly welcome my international counterparts and their representatives.

We operate in partnership with our friends and allies in this region and I look forward to hearing from all the speakers who can provide insight drawn from their national experiences.

I extend a welcome to my fellow service chiefs, Lieutenant General Angus Campbell and Air Marshal Leo Davies. This is the third sea power conference at which all three Chiefs of Service speak at the opening session. This triumvirate is a reminder that we in the ADF are really beyond joint - we are increasingly operationally interdependent

Australia's strategic military focus must remain above, on and under the sea. The distances we need to traverse remain a key consideration.

Our navy operates around the region and the world meeting our government's tasking. Ultimately our peacetime task, along with other navies, is to provide what the old naval prayer calls: a safeguard for those who pass upon the seas on their lawful occasions.

In practice we are playing our part to secure the freedom of the seas so that the commerce of the world can build the wealth of nations. Trade is the basis for global prosperity.

The Australian navy has been, from its inception and will remain a global navy.

Our ships have operated - in both hemispheres and across the world's oceans - during the last century in peace and war

In 1914 the first fleet unit's ships, led by HMAS *Australia*, patrolled the Indo-Pacific and deterred raiding of our sea lanes, frustrating Germany's ability to realise its political objectives by military or naval means.

In November 1914 HMAS *Sydney* was detached from troop convoy protection duties to engage the commerce raider SMS *Emden* which was sinking ships and blocking the movement of troops and resources across the Indian Ocean. Our first naval action at sea as a nation was a victory in defence of our troops. When our sea lanes were secured our fleet headed for the North Sea and the Mediterranean.

However maintaining a global navy with a global focus remains a continuing challenge.

Australia has a continent to defend and a small population with which to do it. Beyond our shores we have legal responsibility for an area even greater than the mainland.

Not surprisingly, over most of its existence, the RAN needed to be a prudent beneficiary of the experience and investment in research and development of initially the Royal Navy, and in more recent decades, of the US Navy.

Some years ago, Rear Admiral James Goldrick, one of our conference speakers and an authority whom many of you know, identified the key problem the RAN faces in the modern era. He spoke of the recurring difficulty for medium power navies being the mismatch between the expertise that we can generate and sustain ourselves, and the wide range of capabilities that we need to operate.

He suggests that at least part of the solution may be a revival of some of the shared approaches by which the original fleet unit concept prospered.

There are many like-minded navies, culturally and organisationally similar, faced with capability problems relating to scale.

We can undertake to engage in this new era of self-reliance while acknowledging that we are in partnership with many others who, like us, need to pool their expertise and resources in order to equip, maintain and operate their navies efficiently and effectively. Necessity is the mother of invention.

We now have a new understanding of the opportunities for greater interdependence, which allows for an international approach to problems that are hard for any medium power with a medium sized navy to solve on its own.

But we have been trending this way for some time. Our regional success will be very much driven by how we build architecture around our design from the outset.

This next decade presents us with expanded opportunities for building capability in partnership with others. More than ever, technology unites us; it enables us to be powerfully and seamlessly interoperable as never before.

The government's announcement on the future of naval shipbuilding in Australia in August 2015 means the decades of building and stopping only to then restart years later - and all the waste and lost opportunity that resulted - should be over.<sup>1</sup>

A generational shift in our thinking and in our understanding of what Australians can and will do to provide for our future surface fleet has begun. This is a national undertaking by a mature country. A country that does not duck a difficult task that is well within its national industrial capacity.

But as a national strategy, continuous shipbuilding is not only about its primary purpose of building a fleet of ships. This decision also heralds investment in Australian technological industrial infrastructure. Continuous shipbuilding will be an engine of employment and stimulant to economic growth. But at a deeper level, continuous shipbuilding unites the navy and the nation in a far-reaching strategic enterprise. This is because continuous shipbuilding invests the Australian navy and the Australian nation with the means to deliver a common enterprise and at the same time to exercise a greatly enhanced global influence.

I suggest that this sea power conference is taking place at the most significant time for the Navy in Australia's modern history. I can state this with confidence because we have now reached this point of new departure in our national and our naval history where we will be recapitalising our fleet at a greater tempo than at any time since World War II.

Let me give you an image of just how significant this change will be.

Outside my office in Canberra hang the portraits of 30 of my predecessors. These photographs show the Admirals who were entrusted by Australia to command the Australian navy from 1913 to the present.

Of those thirty, fewer than five saw the Navy expand in capability during their time in office. Many saw a slow process of occasional ship acquisition. Most were hard put to hold onto what they had inherited and a few saw the fleet diminish dramatically. This was particularly true as the requirements of the nation fighting a war at sea came to an end in 1919 and 1945.

The first in this line of 30 was Vice Admiral Sir William Creswell. He was our professional ancestor. He argued and won the case for the Australian Fleet Unit against considerable opposition. He saw a fleet built from nothing, arrive in Australia in 1913, go to war, earn the praise of the British Admiralty and return home.

My point is that only Creswell, a century ago, experienced a major fleet expansion in peacetime on the scale we will see in the decade ahead for our Navy.

This building of a new navy will be a challenge. Professor Geoffrey Till has called defence acquisition 'one the most demanding forms of human activity' for good reason. Too often in the past what Till describes as 'long gestation periods and iterative tinkering with original specifications' have caused delays and cost over-runs.

Historically, once ships were operational the great challenge was to keep them that way. Availability is the critical precondition for decisive and distributed lethality. I continually argue this! Our ships need to be ready for duty, in the numbers needed, to undertake the missions we are given.

In the past too often new ships were fitted 'for but not with' all the weapons systems and sensors they needed to make them lethal. This was unwise and in the long run not cost effective either.

Our future platforms will be built and fitted with what they are designed to carry. They will be ready for service across the spectrum of operations from their first day of service. Flexibility will need to underpin our shipbuilding programs, so we can adopt new technologies as they become available throughout the life of the ship.

Development in stealth technologies, in the sphere of cyber warfare and in the domains of electronics, weapons systems, propulsion systems, automation and materials technology were impossible to predict when ships - which operate today - were designed 30 years ago.

We cannot know exactly what technology, still being developed in a research laboratory, may be available in a decade. What we do know is that we must design ships that anticipate the need for adaptation and future enhancement.

We will build the ships we need for our time and place in the world, and with our global partners, we will develop the indigenous industry to sustain our fleet indefinitely into the future. We have made an excellent start with our two Canberra class. These ships not only transform the Navy's capability they will also transform that of the ADF.

They are also fine example of international collaboration - designed and laid down in Spain and equipped and fitted out here in Australia. This has been a sensible and successful pooling of expertise.

But they are only a very impressive beginning. The first of our three Hobart class destroyers will join the fleet in 2016. They have not been without challenges but these are smart ships with state-of-the-art AEGIS combat systems and a weapons fit to match.

They will provide long-range protection and lethality. They will be the teeth of a future RAN task force and they will be in Australia's service for decades to come.

But as our ships continue to be delivered, our shipbuilding plans need to be future-focused - for an uncertain future.

As Prime Minister Turnbull pointed out only a couple of weeks ago, one of the emerging characteristics of the 21st century is the power of disruptive technologies to provide new and completely unimagined opportunities - opportunities both to discharge existing tasks better and to take on new ways of doing things.

But capturing the advantages of disruptive technologies as they emerge across the national economy is a whole-of-nation task. Innovation, including innovation in military equipment, will only be possible to the extent that each sector of the economy can leverage developments in other and possibly totally unconnected sectors.

Innovation often comes from shifting to new paradigms rather than continuing in existing ones. Connecting previously unrelated technologies is the bedrock of innovation.

As I review the pace of technological change over the span of my own career, I am amazed at the speed with which we have been able to accept technological novelty and turn it into the commonplace.

Whether it is the advent of GPS, the internet, the exponential expansion of communications systems or the power of information technology, we now assume their availability as we await the arrival of the next disruptive technology.

These technologies, and their developmental systems, are changing the way in which traditional enterprises operate. The interdependency that underpins Navy's capabilities and their support systems did not exist when I was a junior officer.

All of you attending this conference are witness to that fundamental change in Navy's basic operating system. This technological interdependency has two significant consequences. First, it forces capability managers, especially the Service Chiefs, to redefine their roles as network managers and systems operators rather than the simple owners of discrete military arsenals. It forces us away from platform-think to systems-think. Second, it forces capability managers to see the delivery of capability systems as a whole-of-nation enterprise.

Many of you would have followed with as much interest as I have the ongoing discussion about naval shipbuilding among naval experts, strategists and commentators.

What many of the commentators have missed is what I might call the 'joined up' nature of the modern defence enterprise, the interconnected nature of the skills, resources and capabilities that make up modern military power.

This interconnectedness is only going to grow. Education, skills development, innovation, and the creation of new knowledge-based industries are already central to the evolution of military capability.

Many of you here have backgrounds in naval architecture, heavy engineering, metallurgy, avionics, logistics, weapons system engineering, propulsion, and information technology. Many of us have considerable operational experience. But we are, for the most part, very conventional in our approach to capability development - evolutionists rather than revolutionaries.

Audiences at future sea power conferences may include nanotechnologists, behavioural scientists, biomechanical scientists, industrial designers and autonomous robotics engineers, not to mention creative designers and organisational theorists whose imagination will expand the scope of both agility and performance. In other words, revolutionaries will be welcome.

Today I have acknowledged the impact of disruptive technology on global affairs and the speed and agility with which we need to respond. The speed and scale of technological advance is impossible to disregard. And the ramifications are difficult to comprehend.

As you may now appreciate, we in the RAN and the ADF have a massive undertaking ahead of us. To address the range of opportunities and challenges which face us, earlier this year I launched Navy's strategy to 2018, which covers my period in office.

This is Plan PELORUS, which positions the Navy to navigate the future strategic environment and provides us with our course and headmarks. PELORUS is a strategic plan that acknowledges the changing character of global affairs, and recognises the need for a more agile, flexible and responsive navy - a fifth generation navy and beyond.

PELORUS recognises the need for technologically advanced ships to combine in the modern fleet system, to integrate seamlessly in the joint and networked environment. This is a plan which recognises the need for ships to be capable of delivering the lethal force upon which deterrence depends.

It is a hard-nosed plan that recognises the need for ships to be affordable, adaptable and available - ready to serve the nation's needs.

But PELORUS looks beyond individual ships. It recognises that, in the future, ships will only be entirely capable when they operate in fleet systems. In the future, the whole will be massively greater than the sum of its parts.

PELORUS is also about our people. They remain what they have always been, the greatest single factor in our success in operations. PELORUS addresses those serving now and those we need to recruit because they have skills we need if we are going to operate the systems we will be acquiring.

But none of the issues I have discussed so far can be addressed comprehensively unless we know what the purpose of navies are and what we may be called upon to do. So I also want to speak briefly of values and ethics.

Values stand the test of time. They draw us together and offer our profession a critical moral and ethical legitimacy. Our profession is committed to the defence of the values that unite our nation and is defined by them. Honour, honesty, courage, integrity and loyalty are the values of my navy.

Without values, and without leadership imbued with a moral sense, our profession would be purposeless.

We must never forget that sea power is not about mere power. Sea power is not about brute force. Sea power is about service at sea as a force for good. The prosperity of our nations and their citizens depend upon our ability to trade freely across the oceans and enter and leave the ports of customers and suppliers.

I recall Alfred Mahan, who wrote at the end of the 19th century that sea power at its best enables the quiet and the weak to go about their business and to sleep securely in their beds.

Mahan was speaking of the values that are elemental to the strategic purpose and the operational concepts around which the fleet is designed. Australia seeks to stand beside all other free nations in the promotion and defence of these values.

Ours is a nation with global reach and global responsibility for defending our maritime interests, and maintaining the international system upon which our way of life depends. Central to our *raison d'être* is that the Navy does this in concert with the other arms of the defence force, and alongside our friends and allies.

In the present age, as lethality is distributed across fleet systems, cooperative engagement capabilities mean that one platform can cue several, and that commanders have access to almost unimaginable destructive power.

As lethality is distributed, so is responsibility. This means, that when we operate together as the constituent elements of complex fleet systems, we must have an unabridged confidence in each other. We must share an understanding and a trust, above and beyond the level of technical proficiency.

In practical terms, we must seek every opportunity to exercise cooperatively at sea. We must take advantage of every chance to prepare collectively for the challenges that might confront us in the years and decades ahead.

Increasing regional and global connection means no state can expect to act alone to bear the burdens of security and stability. We must look to those things that unite us, rather than to those things that differentiate us, as we work together to advance good order and observance of legal norms at sea. And at the same time, we must leverage the capability differences between us to deliver the common purpose.

Australia is an alliance partner with the United States and we continue to work closely with the US Navy as we have done for decades.

Australia is reaching out to partner even more closely with regional navies. In 2015 by way of example, RAN ships have worked with Indonesian and Indian ships in very useful bilateral exercises which proved that interoperability is not only possible but increasingly normal practice.

Operating together to defeat drug smuggling and piracy in the Arabian Sea and in waters around the Horn of Africa for 10 years has had the beneficial effect of providing all of us with experience of maintaining a maritime overwatch in those formerly uncontrolled waters.

In addition to bilateral exercises and operations, the maritime security architecture is shaped and reinforced by our maritime regional forums which build cooperation and agreement, security and stability.

Speaking regionally, I refer to the Western Pacific Naval Symposium, the Indian Ocean Naval Symposium and the ASEAN Defence Ministers Meeting - Plus Experts' Working Group on Maritime Security.

Individually significant, the collective effect of these separate forums is of immeasurable importance. Each is committed to close working relationships, enhanced transparency and to the joint endeavour in which we are all engaged - the peace and prosperity of our countries and their people.

Australia and the Navy are committed to these multinational maritime arrangements and to every other opportunity we have for cooperation. Our obligation is to ensure that we advance our work together to maintain good order and justice at sea.

I have spoken today about fundamental principles, about shared problems and challenges, and about values that unite us and that inform our stewardship of the destructive power of nations.

We should recognise that we can stand together to uphold enduring and universal principles. It is our collective responsibility to ensure that we work cooperatively because we are the custodians for our governments of sea power.

We have the capacity to exercise it to provide the maritime security and international confidence that is the foundation for economic development and stability in our region.

If we do not provide security of the seas no one else can, or will, do so.

With that thought I welcome you to the RAN Sea Power Conference 2015.

## Endnote

- 1 'The Government's plan for a strong and sustainable naval shipbuilding industry', Joint Media Release Prime Minister and Minister for Defence, 4 August 2015, [www.minister.defence.gov.au/2015/08/04/joint-media-release-prime-minister-and-minister-for-defence-the-governments-plan-for-a-strong-and-sustainable-naval-shipbuilding-industry/](http://www.minister.defence.gov.au/2015/08/04/joint-media-release-prime-minister-and-minister-for-defence-the-governments-plan-for-a-strong-and-sustainable-naval-shipbuilding-industry/).



# Chief of Army

*Angus Campbell*

Distinguished guests, ladies and gentlemen, good afternoon and might I extend my thanks to Admiral Barrett and his team for organising such a worthwhile conference.

It is unusual to get all three service chiefs together at a conference, but like you, we all appreciate the importance of maritime issues to the future security of Australia and the Indo-Pacific region.

In the early months of my tenure, you might not be surprised to hear that I get a lot of advice on how to do my job. All of it is graciously received, some of it is appreciated.

My remarks today will centre on some of that advice and the reflection that coming from a people-centric fringe, there is little new in the hearts of men and women but always much to learn.

Later in the conference, Professor Michael Evans, an eminent Australian military strategist will speak on Australia's maritime culture - a presentation I encourage you to attend if you are visitors to this great southern land. In 2011, in a paper titled, 'On Military Grammar: the Australian Army beyond Afghanistan', Michael posited the Australian Army had to master three enduring, recurring roles: conventional combat, stabilisation operations and amphibious warfare.<sup>1</sup> He was and is right.

Conventional combat, in any domain, remains the benchmark from which a professional force can adjust to the requirements of a specific campaign. Stabilisation operations were as much a feature of the wider Palestine campaign in World War I as of Afghanistan today. And, in Australia's maritime approaches, when our vital interests were at stake during World War II, Australia either conducted effective amphibious operations or ceded the initiative to our enemy.

In concluding that paper, Michael offered the following advice to future chiefs:

Every future Chief of Army needs to hang on his office wall two quotations as a historical reminder of the land force's strategic constancy as an 'overseas expeditionary force'. The first is Major General Sydney Rowell's laconic January 1942 remark to the Americans that, if the Japanese were foolish enough to land troops in northern Australia, he would respond by sending for the Australian Army's Salvage Corps 'to pick up the bones [because] there is no water between Broome and Alice Springs'. The second is Prime Minister Robert Menzies' September 1950 speech to the effect that any Australian land force optimised to fight on Australian soil will always be 'the equivalent of a wooden gun'.<sup>2</sup>

In these two statements from yesterday [Michael concludes] lies the essence of strategic wisdom for the land force of today and tomorrow.

For a state dependent upon global trade, freedom of navigation and an international rules-based order, it should come as no surprise that Australia has long sought to realise its security through a maritime strategy. Looking beyond our shores is not a choice, it is a necessity.

Not as a justification for military adventurism and the careless squandering of blood and treasure, but as a considered geostrategic response to preserving and promoting our interests in extremis.

And yet, a Parliamentary Library Research Brief of 2004 titled, *Australia's Maritime Strategy in the 21st Century*, noted:

If our nature is characterised by our myths and legends, then Australia is not a maritime nation. As a people, we are happy to lie at the beach and toss pebbles at the waves, or turn our back upon it and fix our gaze on the dusty enormity of our island continent.<sup>3</sup>

Quite poetic for a library report really, and still true to a regrettable extent.

But in the ten years since this was written, I think there has been significant change, within the ADF, Australia and the Indo-Pacific; change compelling Australia to embrace a maritime culture. And I suggest, with the introduction into service of HMA Ships *Choules*, *Canberra* and *Adelaide*, the first tangible expression of that modern change is apparent.

Compared to many other armed forces, the ADF is a joint force, which is essential given our size and the scale of its defence responsibilities. But it has only become the force it is today because of the consistent, driven leadership of its commanders over at least 30 years. And everyone would agree there is more to do.

These ships form the centrepiece of a next 'forcing function', to continue toward realising a truly joint force - expert within distinct environments and seamlessly integrated in the planning and execution of operations.

Amphibious operations are often described as the most difficult and complex of all military activities. I am not sure about that. In the land environment urban warfare and counter-insurgency operations are also pretty tough, and I am sure my colleagues could cite other challenges within their environments.

But to succeed in amphibious operations definitely requires uniquely high levels of joint conception, planning, execution and support, and the margins of tolerance in amphibious operations, to avoid catastrophic error, are slim - soldiers, and sailors for that matter, just do not breath under water.

As our trials unit, 2RAR is learning, one equipment pouch too wide and you do not get out of a downed helicopter - and nor does anyone behind you.

This is an obvious point for those of you that have long since mastered the basics.

We did too, on a number of occasions and were very good at it, but Australian amphibiosity suffered from a great forgetting, and so we are learning it anew.

It is the professional rigour necessary to master amphibious operations, at every level and across all Services, which presents such a challenge and such an opportunity for the ADF.

In order to realise excellence, the ADF will take small steps, learn from others, appreciate advice and build a team of teams approach - domestically and internationally.

My greatest concern is not our ability to generate a constructive, broad spectrum amphibious capability, beneficial to Australia and our region. I am certain this will be achieved. Rather, my concern is for mastering the ability to successfully undertake a range of amphibious activities consistently, but not exclusively of those other tasks the ADF must maintain (such as conventional combat and stabilisation in the case of land forces), without periodically relearning very hard lessons.

To paraphrase Field Marshal Erwin Rommel, speaking of the British, when he was a colonel in the interwar period, but adjusted to be a chief's pre-cautionary advice to his officers, Rommel sagely noted:

the [Australians] write some of the best doctrine in the world, it [would be] [un] fortunate [if] their officers do not read it.

Lessons 're-learned' is an intolerable trade in the lives of soldiers for the ahistorical indolence of their leaders. We are better than that and the sea is famously unforgiving.

I have visited HMAS *Canberra* twice now, once with Admiral Barrett. The current 'sea series' of exercises is proving to be an outstanding opportunity to validate concepts and build our initial capability step by step. *Canberra* is a great ship and it can generate a great capability. The quality of the people assigned from each Service, especially the leaders, is immediately apparent. And most importantly, their work together is embedding a deep culture of professional excellence and joint cooperation - a culture that will enable our best.

In time, the ADF looks forward to opportunities to broaden the team, to see multilateral exercising and support operations as a routine component of our training cycle.

Right now, the question on the minds of Army's senior leadership is how to embed amphibious competence within the force. The analysis of options is being led by Major General Smith, Commander of the ADF Deployable Joint Force Headquarters.

Additionally, some worthy advice is on offer including Peter Dean's insightful 2012 paper, *Amphibious Warfare: lessons from the past for the ADF's future*, and the Australian Strategic Policy Institute's, *Beyond 2017: The Australian Defence Force and amphibious warfare*, also by Peter and Ken Gleiman.<sup>4</sup>

Both papers remind us that we were once very good at amphibious operations, in all its forms, from humanitarian assistance to assault. While change is in the wind, it is notable that students at the US Marine Corps Command and Staff College spend more time on the South West Pacific campaign of WWII (an Army not Marine land force operation) than their Australian counterparts.

The key messages from these papers, regarding dedicated command, specialist enablers, assignment of high quality personnel, and professional learning, have all been well received.

To put it simply, in terms of building Army's contribution to an ADF amphibious effect: what must be maintained as dedicated specialist expertise? What can be rotated within the general force?

The whole of force professional standards and brigade readiness achieved through Plan BEERSHEBA has greatly strengthened Army as a combat force.<sup>5</sup> This will be sustained.

Hence these essential, amphibious sustainment questions will be answered within, rather than instead of, the BEERSHEBA force generation framework.

And I look forward to discussing the options and risks arising from these questions with my senior leadership team before the year's end.

So in closing, thank you for the opportunity to share some of the advice I have received in recent months. My team and I are listening. Be assured, the Australian Army is committed to the future ADF amphibious capability, and more generally, to contributing to our national maritime strategy and the joint force it requires. The future is challenging but who would want it any other way.

## Endnotes

- 1 Michael Evans, 'On Military Grammar: the Australian Army beyond Afghanistan', *Strategic Challenges*, vol 7, no 2, Winter 2011, pp. 33-40, [www.regionalsecurity.org.au/Resources/documents/vol7no2Evans.pdf](http://www.regionalsecurity.org.au/Resources/documents/vol7no2Evans.pdf).
- 2 Evans, 'On Military Grammar: the Australian Army beyond Afghanistan', pp. 39-40.
- 3 Alex Tewes, Laura Rayner and Kelly Kavanaugh, *Australia's Maritime Strategy in the 21st Century, Parliamentary Research Brief no 4, 2004-05, Canberra, 29 November 2004, p. 4*, [http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/3L7F6/upload\\_binary/317f66.pdf;fileType=application/pdf#search=%22australia's%20maritime%20strategy%22](http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/3L7F6/upload_binary/317f66.pdf;fileType=application/pdf#search=%22australia's%20maritime%20strategy%22).
- 4 Peter Dean, 'Amphibious Warfare: lessons from the past for the ADF's future', *Security Challenges*, vol 8, no 1, Autumn 2012, pp 57-76, [www.regionalsecurity.org.au/Resources/files/vol8no1Dean.pdf](http://www.regionalsecurity.org.au/Resources/files/vol8no1Dean.pdf); Ken Gleiman and Peter Dean, *Beyond 2017: The Australian Defence Force and amphibious Warfare*, Australian Strategic Policy Institute, Canberra, July 2015, [www.aspi.org.au/publications/beyond-2017-the-australian-defence-force-and-amphibious-warfare/Beyond\\_2017\\_amphibious\\_capability.pdf](http://www.aspi.org.au/publications/beyond-2017-the-australian-defence-force-and-amphibious-warfare/Beyond_2017_amphibious_capability.pdf).
- 5 Australian Army, 'Plan BEERSHEBA', [www.army.gov.au/Our-future/Projects/Plan-BEERSHEBA](http://www.army.gov.au/Our-future/Projects/Plan-BEERSHEBA).

# Chief of Air Force

*Leo Davies*

I am delighted to be invited to address this sea power conference today. I am also really grateful to the Chief of Navy, Tim Barrett, for the opportunity to address such a diverse and distinguished gathering. And Tim, I wish you and Navy every success for this major event which showcases Australian maritime power to our friends from all over the globe.

The composition of this event speaks eloquently about the nature of the security challenges facing Australia and the ADF as we approach the third decade of the 21st century. This audience contains joint and coalition representatives as well as experts from business, think tanks and the academic world.

Increasingly, modern military forces are required to conduct so called whole-of government operations across a broad spectrum of contingencies. And in this era of fiscal austerity, any military force which aspires to maintaining its technological edge must enjoy a close, indeed a seamless relationship, with its business partners through shared research, development and experimentation. This conference brings together all these stakeholders. It is thus a very important occasion.

Likewise, this panel sends a clear message about how the ADF perceives its role in the future operating environment. The presence of all three service chiefs on this stage sends a clear signal. It makes it clear that the ADF regards professional mastery of joint warfare as its primary mission. And today, that implies delivering joint effects across the traditional land, sea and air domains as well as the emerging realms of cyber and space.

These days, it is customary to adopt the expanded definition of the 'global commons' which embraces the domains of cyber and space. So when I employ that term, as I inevitably must in a forum such as this, please understand that I am using it in that context. But in the interests of simplicity, I will simply refer to the global commons.

This reflects the current lexicon of multi-domain warfighting. And these concepts must inform our force structure and doctrinal settings in the future.

Our extant strategic guidance directs the ADF to implement a maritime strategy in the defence of Australia and our wider interests, whether in our immediate region or further afield. Of course, the ADF is keenly awaiting the release of the next Defence White Paper.<sup>1</sup> However, let me venture the opinion that I expect it to broadly reaffirm that commitment to a maritime strategy. Accordingly, the ADF will continue to develop capabilities which enable us to conduct decisive joint operations in the approaches to Australia. From such capable joint forces, we must be able to configure tailored task forces to conduct other military operations including humanitarian assistance and disaster relief.

My confidence that there will be such continuity in our grand strategic guidance is based on examination of our history as a nation. Even before we articulated a coherent maritime strategy, we consistently implemented a pattern of strategic practice which conformed to the tenets of classic maritime strategy as expounded by Sir Julian Corbett.

Australian strategic policy has always been shaped by our national culture heritage and values, as well as by our geography. While we must adapt to changes in the global political system, our history and our geography will continue to strongly influence our choices.

As one former Prime Minister, John Howard, noted, ‘We do not need to choose between our history and our geography. They operate together to shape our strategy.’ And his main protagonist, Paul Keating, framed our strategic dilemma slightly differently when he stated that Australia needed to seek its security *in* Asia not *from* Asia. I believe that our current strategic practice neatly fuses both those views.

If this sounds a bit academic for a simple airman, be assured that our national leaders have always implicitly understood the irreducible conditions for Australian security. None of them needed a PhD in international relations to conclude that, as an island trading nation, Australia’s very survival depended on unfettered access to the global commons for our security and prosperity.

Recently, I read an excellent research paper by Professor Ross Babbage, prepared for the Menzies Research Centre, in which he made this very point.<sup>2</sup> From our origins as a settler society, we have always assumed that we alone simply cannot defend our homeland nor secure our wider interests. Initially, we contributed to Imperial defence by dispatching small force elements to British colonial wars: the Maori Wars, the Sudan and the Boer War all conformed to this paradigm. Significantly, this pattern was well established even before we achieved nationhood.

As the global balance of power shifted, we then supported the United States in the maintenance of a liberal, rule-based global order. From the end of the Vietnam War until today, we have continued to seek security through the ANZUS Alliance and numerous other partnerships. However, we also aspire to a significant degree of self-reliance in being capable of defeating any credible threat to our territory.

The unifying theme in our quest for security and prosperity has been our tendency to collaborate with the dominant liberal democratic maritime power of the day in maintaining a rules-based global order. In particular, we have been reliant on the maritime power of Great Britain and the United States to guarantee freedom of navigation and good order at sea. And in the post-colonial era, we have developed vital security relationships with our neighbours in the South Pacific and Southeast Asia.

The end of the Cold War coincided with, if indeed it did not cause, the phenomenon we loosely refer to as ‘globalisation’. Again, as a simple airman, I like Thomas Freidman’s remark that ‘globalisation means stuff happens much faster than ever before’.

The unprecedented speed with which goods and information circulate has also reduced the tyranny of distance. Marshall McLuhan's global village is now a reality. The interconnected world has made us even more reliant on alliances and coalitions to ensure we meet transnational security challenges. To paraphrase the metaphysical poet, John Donne, 'No island is really an island any more'. Technology has compressed time and space to a degree that was simply unimaginable when I commenced my career. Fortunately, the very same forces which compress time and space, and which make the security environment so dynamic, also assist us in the gathering and sharing of information with our partners. It has also enhanced the reach, speed and precision with which we can project military power.

In addition to our collaboration with friends and allies to preserve our access to the global commons, Australia has traditionally sought to secure a technological edge to achieve a multiplier effect. We have never been able to rely on mass, especially in the scale of our land forces.

Australia faces a disruptive, fluid and dynamic environment which presents complex challenges. I will now describe how Air Force conceives the geostrategic context in which we will be required to provide air and space power. I will then describe our transformation vision with a particular emphasis on how it will affect our ability to operate with the Navy. Of course, that inevitably includes how we deliver joint effects with the Army, especially those elements embarked aboard the Canberra class amphibious ships.

The entry into service of the Canberra class and the initial certification of the Amphibious Ready Element is of profound importance. It represents a level of sophistication in our ability to conduct joint amphibious operations in our region which we have not possessed since the famed OBOE landings towards the end of the Pacific War. Until recently, each of our individual Services was probably more comfortable and proficient at operating tactically with its Allied counterpart service rather than with its Australian sister Services. All of this was supposed to change after the 1976 Defence White Paper, which called for greater self-reliance in defence of our sovereign territory and regional interests. But truly joint capabilities were never adequately funded until the recent era. That was one adverse, unintended consequence of regularly providing niche contributions to allied coalitions.

However, since the crisis in East Timor in 1999, I believe that we have become a truly contemporary joint force, both in structure and even more importantly in culture and mindset. And both our strategic guidance and the evolving nature of the global system demand that we become seamlessly joint and capable of multi-domain operations.

We do live in interesting times. The state system established in the wake of the Ottoman Empire in the Middle East is fragmenting. The stability provided by autocratic states like Iraq, Libya and Syria has collapsed. In the wake of civil war and state failure, we have witnessed sectarian violence, genocide and massive refugee flows. That is why the Syrian civil war is our business. Both humanitarian doctrines of the 'responsibility to protect' and realist requirements for stability demand a response from the West.

Australia continues to support coalition operations against Islamic State. This seems likely to be a sustained commitment.

Whereas state failure and sectarian violence are the main sources of conflict in the Middle East, it is the relative strength of states that contributes to potential conflict in the Indo-Pacific. Many strategic analysts have concluded that heightened competition between states, in both Northeast Asia and the South China Sea, constitutes the greatest risk to peace in this region since the end of the Cold War. Those strategic thinkers, like Martin Van Creveld and Mary Kaldor, who so confidently predicted the end of conventional state-on-state warfare at the end of the Cold War, spoke prematurely. Nor have we seen an 'end-to-history' as predicted by Francis Fukuyama.

After more than a decade of counter-insurgency, hybrid war, and nation building operations, we have received a timely reminder that the risk of conventional war between states remains the ultimate risk for which responsible planners must prepare. High-end warfighting continues to provide the primary rationale for the existence of the ADF and it must shape our force structure and inform our doctrine. Indeed, our strategic circumstances have been radically altered by globalisation in both its technological and its geopolitical manifestations.

Yet we must also be capable of responding to natural disasters and climate events at the request of our neighbours. There were over 180 calls for assistance in response to catastrophic natural events in the Asia-Pacific alone in the past two years. We were the force of first resort for our government. Moreover, we responded to these contingencies with forces capable of high-end warfighting.

Whereas during the Cold War, our location made us a strategic backwater; today we are located at the very epicentre of geopolitical rivalry over hegemony in the Indo-Pacific region. According to Ross Babbage, Australia is both a 'hinge' and an 'anchor' in a pivotal region at a decisive moment in history. The Indo-Pacific region is the scene of increased great power rivalry. We have a direct interest in contributing to peace and stability in our own front yard.

Such a complex, dynamic, strategic environment also demands robust security partnerships. It also requires Australia to maintain balanced joint forces. That is because no single Service or capability provides a silver bullet solution. However, we must develop agile conventional forces capable of operating across all domains and surviving in a fiercely contested cyber environment. In such an environment, any credible adversary will seek to deny our use of our space assets and blind the sophisticated sensors and communications systems upon which we rely to fight.

As a professional, I will let others decide whether the very nature of war is changing or whether, as Clausewitz told us, the nature of war is constant but it is a true chameleon which adapts to the complexion of its social and political context. If you accept that premise then the proliferation of sensors and information will inevitably define the character of war.

That is why Air Force believes that 5th generation technology will have a transformative impact on warfare and military forces. In the past, air power theorists have been prone to overestimate the effect of technological advances on war. Many of us lived through a number of so called Revolutions in Military Affairs over the course of our careers. So I know I may be accused of engaging in panacea thinking or technological determinism in making the case for 5th generation transformation. But I passionately believe that the advent of 5th generation technology for the ADF is a game changer, providing that we harness it properly.

I am encouraged by the similarities between Navy's Plan PELORUS and Army's Plan BEERSHEBA. We have all arrived at similar conclusions about the demands of the modern battlespace. All of our responses are predicated on harnessing information, sharing a common operational picture and seamlessly linking sensors and shooters across all domains. The challenge now is to ensure that all of our transformation visions are compatible with one another.

Let me make it really clear that Air Force's 5th generation capability is neither synonymous with, nor confined to, the Joint Strike Fighter (JSF). The introduction of the JSF has provided the catalyst for our transformation. But it is the proliferation of sensors across our entire fleet of manned and unmanned systems that will define the 5th generation-enabled Air Force. Our transformation vision was derived from recognition of that reality. We realised that it would be folly to operate the most sophisticated fleet of manned and unmanned systems in our history if they were unable to share information with one another. By extension, we then recognised that we needed to achieve greater synergies with Army and Navy. It seems incredibly obvious but we have not always done it.

Plan JERICHO was named after a famous air raid to break down the walls of a Nazi prison camp. As the name implies, we are looking at ways to break down stovepipes. The desired end state is to create a 'system of systems'. This time we are determined to make the reality match the rhetoric.<sup>3</sup>

In conclusion, I want to focus on two areas which are likely to be of keen interest to Navy. We are striving to enhance Air Force's maritime operations capability and to develop an integrated fire control capability. Most military commitments this century have been comprised of land-centric operations against hybrid, unconventional enemies. We have predominantly employed air power in its tactical roles of close air support and air mobility. The demands of such operations inevitably eroded some of our conventional warfighting skills. And we neglected thinking about employing air power to strategic effect. In particular, some attrition of our maritime strike and sub-surface warfare skills occurred. We have been urgently remediating this capability since the return of our P-3 Orion maritime patrol aircraft from the Arabian Gulf three years ago.

However, the introduction of new platforms, including the JSF, the Poseidon P-8 maritime patrol aircraft and various unmanned aerial systems, enhances our ability to share a common operational picture across our deployed joint force, especially in the maritime domain. Through JERICHO, we aim to enhance joint air and maritime operations such as maritime surveillance, maritime strike and undersea warfare, as well as protection of the Amphibious Task Group. A key element of this will be our pervasive intelligence, surveillance and reconnaissance capability and our access to space assets which will create and share the common operating picture in real time. We *must* develop redundancy in these systems through our regional partnerships and develop the resilience of our networks, as well as train to operate without them in a worst-case scenario.

We must also ensure Air Force capabilities can provide the communications gateways or relays necessary for the surface groups to retain information control in contested denied operating environments.

In addition to technology, we need to develop truly joint doctrine and tactics, techniques and procedures. The Air Warfare Centre, to be established in January 2016, will develop and deliver joint education and training for operators, planners and commanders to develop their professional mastery of anti-subsurface warfare, maritime strike and amphibious operations.

JERICHO is as much about culture as it is about technology. I know Navy and Army believe this also. Ultimately, it is people who must make judgements and respond to the challenges of a rapidly changing environment. In that regard, I wish to place on record how impressed I have been at the response to our 5th generation transformation process from our joint partners. We have already conducted significant joint experiments with them. More are planned.

The pace of our transformation will ultimately be dictated by government funding. For that reason, I look forward to the release of the Defence White Paper and fiscal measures contained in the next budget.

For the ADF, we must continue to be consultative and collaborative to ensure that each of our capability and platform decisions contributes to joint capability. And let me stress, I am very comfortable with the direction set by the Vice Chief of the Defence Force and my fellow service chiefs in that respect.

Furthermore, I am optimistic that the First Principles Review will also help us to remove stovepipes in the way we plan force structures and procure major platforms.<sup>4</sup> We must do this in a more cooperative manner from the earliest stages and involve industry in our deliberations as early as possible. The era of wasteful 'orphan' capabilities or enablers that cannot communicate with their joint equivalents must be consigned to history.

Tim, I thank you for the opportunity to address this prestigious event. I look forward to learning more from our friends and partners as the day unfolds. And to our visitors, please enjoy this wonderful harbour city.

## Endnotes

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# The Great Game Goes to Sea: Growing Maritime Insecurity in the Indo-Pacific Region

*James A Boutilier*

The Great Game was a contest for geostrategic advantage that played out in Central Asia in the 19th century. It was waged between an established empire, Great Britain, and an aspiring imperial power, Russia. A similar competition is unfolding today between a global power, the United States, and an emerging regional power, China. While the Great Game occurred ashore, the new contest is taking place at sea. It involves not only the unprecedented rise of Chinese naval power and a regional arms race centred on missiles, submarines, and maritime air power, but an array of potentially destabilising maritime disputes. While the principals have attempted to engage one another, they have fundamentally different world views, and their relationship is characterised by deep-seated mistrust. What is more, an informal architecture of containment has emerged that has united the leading naval powers in the region in their anxiety about and opposition to China's maritime ambitions. The upshot of these developments is an increasingly brittle and problematic oceanic environment that has raised the spectre of hostilities by miscalculation or even outright war at sea.

After decades of what the Victorians would have called 'little wars' - encounters with pirates, drug smugglers, human traffickers, and terrorists - should the navies of the Indo-Pacific region begin to contemplate the possibility of more traditional, large-scale engagements at sea? The premier navy in the region, the US Navy, is rapidly being overhauled numerically by China's People's Liberation Army Navy (PLAN). Indeed, the US Navy is the same size it was during the Taft administration on the eve of World War I.<sup>1</sup> It is still a hugely powerful force, but its remit is global in nature and operations in the Indo-Pacific entail extraordinarily attenuated supply lines. Similarly, despite bravado, the Royal Navy is a mere shadow of its former self.<sup>2</sup> What is inescapable is the fact that the prevailing calculus of sea power is being altered fundamentally, and long-standing precepts, like freedom of navigation, are being challenged as never before. Collaborative efforts are, perforce, the order of the day. But will the line hold? What will be the face of battle in a multidimensional world, where the costs of naval assets are rocketing upwards, where political will is seldom resolute, and where naval technologies are evolving at a breathtaking pace? This paper analyses some of these dynamics as they not only reflect, but contribute to the increasingly parlous state of affairs in Indo-Pacific waters.

## Geo-Strategic Reorientations

It has become commonplace now to refer to the way in which in the world's centre of political, economic and military gravity has shifted from the Euro-Atlantic to the Indo-Pacific. This was - and is - a phenomenon of truly historic proportions, one characterised by its profound magnitude and uncommon speed. But it is worth focusing in more detail on the dramatic reorientations that are occurring within the context of that global transition.

The most obvious is the American rebalance to Asia. The Americans were intimately involved in the Pacific throughout much of their history, and their experience during World War II helped shape their vision of sea power, with its forward basing, submarine operations, and reliance on aircraft carriers. However, the US became deeply distracted early in this century with its wars in Southwest Asia. This was the very time that East Asia, and more particularly China, was gaining remarkable prominence. A realisation of the way in which the global balance of power was changing led the US to articulate a commitment to the Indo-Pacific region in the *2006 Quadrennial Defense Review* (QDR) and in subsequent policy statements regarding an American 'pivot' to Asia. Many commentators saw the pivot, or the rebalance, as it came to be called, primarily in military terms. The QDR had stressed the asymmetric distribution of US aircraft carriers and submarines to the region by 2020. However, the rebalance is much more comprehensive than that. It has a powerful economic component as well, in the form of the Trans-Pacific Partnership, and a diplomatic component in the form of new or revitalised ties to Asian states and regional multilateral organisations.

One of the most important axes to emerge was the one linking the United States and India. International observers were heartened by Indian Prime Minister Narendra Modi's rise to power in 2014. He is an energetic politician with ambitious foreign and economic strategies; ones that stand in stark contrast to the nation's long-standing non-alignment policies that dated back to the days of Prime Minister Nehru. During the 1990s and thereafter, India became increasingly forthright about its goal of transforming the Indian Ocean into an Indian lake, dominated by a rejuvenated Indian Navy. The Indian Navy embarked on a major building program, formally commissioned the long-delayed and heavily-refurbished Russian carrier *Admiral Gorshkov*, which they renamed *Vikramaditya*, in November 2013, and increased the production of submarines. While the Modi government has overseen an increase in trade and diplomatic intercourse with China, India remains deeply suspicious of China's long-term objectives in the Indian Ocean region. These suspicions, compounded by concerns about contentious Himalayan border issues, set the stage for an Indian reorientation towards the United States, on a global scale, and towards Southeast Asia on a regional scale.<sup>3</sup> Thus, the past decade has witnessed a significantly warmer relationship between India and the United States. One of the most important features of that relationship is defence, and more specifically, maritime defence cooperation. The latter has taken the form of defence sales to the Indian

Navy, an agreement to collaborate on the aircraft launching system that is central to India's forthcoming second indigenous aircraft carrier, INS *Vishal*, and the development of a robust naval exercise program.<sup>4</sup>

India has handled this burgeoning relationship with caution and finesse since it does not wish to be drawn into a situation whereby it has to choose sides publicly between China and the US.<sup>5</sup> Nonetheless, the body language is unmistakable. India's Act East policy has resulted in increased ties between India and states like Australia, Indonesia, and Vietnam, the last-mentioned having a long tradition of tension - if not hostility - toward China. While it could be said that the Act East policy is exclusively an Indian initiative, the fact of the matter remains that it plays into the larger power structure emerging in Asia, one that complements US interests and one which has very real maritime implications.<sup>6</sup>

In addition to forging links with India, the United States has gone to considerable lengths to reanimate its defence relations with traditional allies like Japan, Republic of Korea, and Australia. Under Prime Minister Shinzo Abe, the Japanese, who are deeply concerned about the steady and assertive rise of Chinese maritime power, have looked to increase their defence budget (although it should be noted that the Japanese increases are infinitesimal compared to the annual double-digit increases in Chinese defence spending). The Abe government has introduced two security legislation bills that, despite domestic opposition to their passage, will enable the Japan Maritime Self-Defense Force (JMSDF) to play a more active role, individually and collectively, and to participate in multilateral defence exercises like the Indian Navy-sponsored MALABAR series.<sup>7</sup> In addition, the Japanese have looked to support the Vietnamese and Philippine navies by transferring vessels to them that they could use to patrol their respective waters in the South China Sea.<sup>8</sup> Furthermore, the Japanese have forged closer ties with Australia by way of their mutual security treaty and by ongoing talks about the possibility of Japan providing the Soryu class as the template for the follow-on submarine to the RAN Collins class.<sup>9</sup>

Another noteworthy regional development is the emergence of a new and positive relationship between Vietnam and the United States. While the Vietnamese are careful to maintain their long-standing ties with Russia, the country that is supplying them with six Kilo class submarines and other defence equipment, they are - like many of their Asian neighbours - eager to expand their defence and security options by way of hedging strategies. In this case, the enemy of Vietnam's enemy is Vietnam's friend, and the Vietnamese Communist Party, which has grown increasingly exercised by Chinese activities in Vietnamese waters, has begun to forge new links with the US.<sup>10</sup> Like the Indians, the Vietnamese are not about to be drawn publicly about the potentially anti-Chinese nature of these overtures, but once again the implications are obvious. Predictably, when Vietnamese Communist Party leader Nguyen Phu Trong visited Washington in July 2015, maritime cooperation figured in the joint communiqué.<sup>11</sup>

The same holds true for The Philippines. As the insurrections in the southern Philippines have grown semi-quiescent, The Philippines has been able to focus more intently on international security issues. The centrepiece of this new focus is the reanimation and expansion of defence and security ties with the United States. High-level diplomatic exchanges between The Philippines and the US have resulted in the transfer of decommissioned US Coast Guard cutters to the small and nearly obsolescent Philippine Navy. These will be used to patrol contested areas in what The Philippines calls the West Philippines Sea.<sup>12</sup> Even more important is The Philippine's decision to make Subic Bay Freeport available to the US Navy so their vessels can be rotated through that historic harbour and the American naval presence in the South China Sea can be enhanced.<sup>13</sup>

Thus, not only has the United States sought to strengthen the existing spokes in its traditional Indo-Pacific hub-and-spokes strategy, but it has added new spokes and the structure has begun to morph into a complex spider web in which the spokes are collaborating more and more actively with one another. We see this in the Indo-Vietnamese maritime association, in the ties between Japan and Vietnam, and in Australia's provision of landing craft to the Philippine Navy.<sup>14</sup>

At the same time, there are other profound reorientations taking place in the Indo-Pacific. The most obvious, arguably, is the one involving China. Traditionally, China anticipated threats arising in the interior of Asia. The sea was seen as a barrier, and while contemporary Chinese nationalists can point proudly to Zheng Ho's gargantuan maritime undertakings, these were totally anomalous in China's seagoing history. Instead, China enjoyed coastal traffic and promoted local fishing activities, while the distant oceans seemed irrelevant to an empire that was focused inward. The spectacular growth of the Chinese economy between 1980 and 2010, and the successful resolution of almost all of China's continental border disputes changed all that. China came to realise that the predictable and untrammelled movement of cargoes by sea, and the equally important - even existential - importation of energy by the same routes were the keys to China's future. This realisation, coupled with the dramatic growth in China's shipbuilding capacity, laid the groundwork for the spectacular rise of the PLAN.<sup>15</sup>

Initially, the PLAN was very much a product of the Soviet world view, namely that navies were coastal or riverine adjuncts to land-based armies, a reality captured in its name. As the years went by and as the Soviet Union experienced its own Gorshkopian revolution, the Chinese came to realise the potential of their navy as an instrument of state power, influence, and diplomacy. Thus, a prominent feature of the last quarter century is the fundamental reorientation of China's axis of national interest away from the interior toward the sea.<sup>16</sup> Furthermore, the focus on the sea has continued to expand, and an additional reorientation has occurred as China has begun to direct its attention south and west, first to the South China Sea, and then to the Indian Ocean.<sup>17</sup> The Indian Ocean has come to figure more and more prominently in China's global design. This design has been embodied recently in Chinese President Xi Jinping's grandiose scheme to develop a new Maritime Silk Road that would facilitate Chinese seaborne commerce to the

countries of the Indian Ocean, the Mediterranean, and Europe. This initiative, coupled with an equally ambitious trans-Eurasian one belt one road trade route, is part of China's desire to begin shaping the global order on its own terms. It is also a way of promoting China's hard and soft power agendas, securing key *point d'appui* in the various corners of the ocean, and ensuring the integrity of the critically important energy supply lines that run from Africa and southwest Asia across the Indian Ocean.<sup>18</sup>

What has alarmed India is the program that China is pursuing to develop port infrastructure at critical locations throughout the Indian Ocean. For the moment, ports like Hambantota in Sri Lanka and Gwadar in Pakistan appear to be, first and foremost, commercial installations, but there is an abiding fear in some quarters in India that these ports will become forward operating bases for the PLAN in the event of hostilities.<sup>19</sup> The fact that the PLAN organised a port visit to Karachi by one of its submarines further reinforced Indian anxieties.<sup>20</sup> Similarly, Xi Jinping's visit to Islamabad in April 2015 resulted in the allocation of US\$46 billion to Pakistan by way of aid and infrastructural development. The lion's share of this money, more than \$30 billion, is earmarked for the further development of Gwadar and the construction of a pipeline that would run from Gwadar along the Baluchi coast and northeast across Pakistan to Kashgar in western China.<sup>21</sup>

This project, if it is ever realised, is part of a decades-old Chinese policy of global energy diversification. China has been seized for some time by a Malacca syndrome; namely, that it is courting real danger by relying on the steady and uninterrupted flow of oil and gas shipments through the narrow and heavily-trafficked Malacca Strait in Southeast Asia. What, they ask themselves, would happen to these vital energy imports in the event of a war at sea?<sup>22</sup> Accordingly, they have sought to diversify the sources of their energy as well as the routes by which that energy is delivered. The Gwadar-Kashgar pipeline would mean that tankers exiting the Persian Gulf would only have to steam a few hundred kilometres along the coast to reach Gwadar. Similarly, the pipeline that runs across Myanmar to southern Yunnan obviates the need for Malacca transits. Still further, China has brokered deals with the Central Asian republics and with Russia for energy. Of course, one could argue that pipelines are even more vulnerable than tankers (and this is a source of concern when it comes to the integrity of a pipeline transiting violence-wracked Baluchistan),<sup>23</sup> but from the Chinese perspective, the emerging network (enhanced by the trans-Eurasian one belt one road infrastructure proposal) gives China a modest degree of redundancy should a naval war take place.<sup>24</sup> Modest is, in fact, all it will be. If anything, China's dependence on tanker traffic is likely to increase as it struggles to meet pollution targets by reducing coal consumption.

This leaves one more player, Russia. The Russians have always been the victims of geography. Where does Russia's future lie, in Europe, in the Arctic, or in Asia? The Russians are primarily Europeans, but they are acutely aware of the enormous shift in power that is taking place beyond the vast reaches of Siberia.<sup>25</sup> Putin's hybrid warfare activities in Crimea and in eastern Ukraine are of a piece with China's activities in

the South China Sea: carefully calibrated and cunningly executed moves based on an accurate assessment of the unwillingness of Europe and the United States to react in anything more than a formulaic manner. However, in Putin's case, his timing was execrable. The Russian occupation of Crimea was followed shortly thereafter by the catastrophic collapse of global oil prices. Much of Putin's grand plan for the revitalisation of the Russian military was predicated on the assumption that oil would fetch US\$105 or \$110 a barrel. Instead, it has plummeted to around US\$50 per barrel, and with a seriously weakened rouble, Western sanctions against Russia have begun to bite with a vengeance.<sup>26</sup>

The first thing that Mao Tse-tung did in 1949, following the establishment of the People's Republic of China, was to make a pilgrimage to Moscow, the Rome of the communist world. Stalin kept Mao waiting for several weeks before granting him an audience. Now it is Putin who goes to Beijing to touch his forelock; the master has become the servant and the Russians are faced with an array of grim new realities.<sup>27</sup> They are beginning to lose their traditional defence markets in India and, to a lesser degree, in Vietnam, while, at the same time, they find themselves in a disarmingly reduced position *vis-à-vis* China. The long-term energy agreement that Putin inked with Xi, in the immediate aftermath of Crimea's annexation, was a measure of Russia's weakness, and analysts have pointed out that the deal favoured China disproportionately. Similarly, Putin's ambitions in Central Asia, in Russia's one-time 'near abroad', are being checked and he has been obliged to conflate his Eurasian schemes with Xi's one belt one road proposal. These developments aside, what is important for our purposes is that Russia has made its own pivot towards the Pacific.<sup>28</sup> An emerging pattern of major naval exercises with the Chinese is a metaphor for the new relationship between Russia and China.<sup>29</sup> Unfortunately, Putin and his inner circle have come to inhabit a world bordering on fantasy. There is a dull, reptilian resilience about Russian society, and the average Russian is prepared to put up with a great deal of discomfort as sanctions erode his standard of living, but Putin's vision of carrier battle groups is completely beyond his grasp. The Russian shipbuilding sector is dinosaurian, despite glints of technical genius, and although new generations of surface combatants and submarines are beginning to appear, the production rate is unimpressive and Putin will have to content himself with being a supporting actor in the Chinese naval drama.<sup>30</sup>

## The Protagonists

What of the principal protagonists, the United States and China? While there has been a good deal of Chinese *schadenfreude* about US tribulations, as it exits inelegantly from southwest Asia and tries to cope with a number of domestic and foreign policy challenges, the fact remains that the United States is still an enormously powerful and influential state. However, critics and even ardent supporters of the Obama government have expressed growing concern about the dysfunctionality of Congress, the apparent irresolution - if not incompetence - of the White House, and the financial woes besetting the US Navy as it wrestles with budget cuts. Although the declinists are premature

in their predictions, the United States is in the midst of relative decline in power, by virtue of the changing world order.<sup>31</sup> At its simplest, there has been an increasingly frank acknowledgement of the fact that the United States cannot be powerful in all places at all times. This reality is captured in the title of the US Navy's latest vision of naval power, *A Cooperative Strategy for 21<sup>st</sup> Century Seapower*. Indeed, if one were to trace the evolution of such documents since the Maritime Strategy of 1986, one would see the way in which the US Navy has been increasingly obliged to engage friends and allies in cooperative efforts to bring peace and good order to the ocean commons.<sup>32</sup>

China, by way of comparison, represents a bewildering array of paradoxes. It is also a powerful state, but one that is profoundly poor. It is simultaneously triumphalist (presuming that it is witnessing the inexorable decline of the United States), and deeply insecure at the same time; in fact, Russia and China share much in common in this regard. China is an emerging great power but is almost friendless.<sup>33</sup> It is eager to promote its soft power but seeks to stifle the leading modes of soft power expression. It is a communist state driven by a hybrid capitalist economy. It is the principal beneficiary of US-induced stability in the Indo-Pacific, but it is intent on challenging the very order that has underwritten and safeguarded its prosperity.<sup>34</sup> China's foreign policy is increasingly counterproductive, particularly in the South China Sea, where it has driven littoral nations closer to the United States, but it remains colossally tone deaf to its shortcomings.

If we want to understand the formulation of Chinese policies, we need to look inside the Middle Kingdom. China is at a crossroads: it has reached a point where the fundamental contradiction between the evolution of its economy and the prevailing political model must be resolved. Xi is like Louis XVI: to survive economically, he must contemplate political suicide. At stake is the Chinese Communist Party's (CCP) continued monopoly of political power.<sup>35</sup> A highly secretive political machine is being driven inexorably to be more transparent and accountable, and the Chinese elite perceive this to be a deeply threatening state of affairs. Unnerved by the 'colour' revolutions and the Arab Spring, phenomena that revealed just how fragile authoritarian regimes could be, the one thing that the CCP fears more than anything else is the inadvertent re-enactment of the Gorbachev experience. Hence the efforts to silence critics and ensure the vitality of the Party. What is particularly worrisome is the way in which appeals to nationalism are being made in an effort to buttress the CCP's legitimacy. Nationalism and insecurity are productive of a degree of ultra-sensitivity and prickliness that make inter-state negotiations with China much more challenging and unpredictable.<sup>36</sup>

Whatever the case, it appears that the Chinese can no longer defy the laws of economic gravity. The 'rise' of China was truly without parallel historically. China rose from being the 17th-largest economy on Earth to being the second in 30 years, and China's naval capacity rose commensurately. Indeed, the Chinese would maintain that the growth of the PLAN, and the greater and greater emphasis on power projection - as illustrated by China's latest Defence White Paper - is entirely justified; after all, in Mahanian terms,

to be a great nation is to be a great naval power, a fact graphically illustrated by the histories of Spain, France, Great Britain and the United States.<sup>37</sup>

One of the questions we need to ask is what will the PLAN look like in the future? If the relentless upward trajectory of the Chinese economy moderates significantly - and there has been signs that Chinese gross domestic product growth may be slowing to 7 per cent or less in 2015 - there may be a corresponding decline in the pace at which China acquires naval assets. The US Office of Naval Intelligence recently highlighted the fact that China had laid down or commissioned more than 60 naval vessels in 2014 and expected to do the same in 2015.<sup>38</sup> Can this pace be sustained, and if not, where will China's naval planners place their priorities?

## What is to be done?

In 1902, Lenin queried famously, 'what is to be done'? What were aspiring revolutionaries to do at a time when European monarchs appeared to be solidly entrenched? That same terse query applies equally today as policy planners around the world wrestle with the most important geopolitical question of the day: how are relations with China to be ordered?<sup>39</sup>

For the longest time, the United States focused on two objectives when it came to China: integrating China into the international system, and curbing Chinese adventurism. The first objective was achieved to a considerable degree, and China found itself subject to the norms and expectations of the framework of international accords laid down at Bretton Woods. Many hoped, naively, that as the Chinese middle class grew, China would become domesticated and Western liberal values would prevail. Instead, the Chinese, have become increasingly self-confident. They hunger for respect and seek to refashion the international order in their own image. The Asian Infrastructure Investment Bank (AIIB) is a recent example of the way in which China wants to have a say in the creation, character, and operation of international organisations.<sup>40</sup>

Adventurism, of course, is an altogether different issue, and current Chinese activities in the South China Sea have revealed what a challenge it is to articulate appropriate policy prescriptions for addressing these activities. Disputes have been the subject of a plethora of papers, but the key issues will suffice for this account.<sup>41</sup> The first thing to note is that, while China has ratified the *United Nations Convention on the Law of the Sea 1982* (LOS), it has caveated its ratification severely and has interpreted the Convention in a way that is clearly at odds with the spirit of the instrument. China is not alone in this regard - Brazil and India, for example, also interpret LOSC in unorthodox ways - but it is in a minority position, to say the least. Second, the so-called nine-dashed line (variously referred to as the ten- and eleven-dashed lines, although the cartographic representations do not necessarily show the lines as being coincidental), which encircles 85 per cent of the South China Sea is cloaked in definitional uncertainty. China has remained studiously opaque in terms of what the line really means, despite numerous queries to high-ranking Chinese officials. Does the line suggest that China has sovereignty over all of the land

features that lie within it? Does it mean that China sees the waters inside the line as tantamount to a territorial sea?<sup>42</sup> Third, China has enlisted the support of its coastguard and elements of its vast fishing fleet to act as proxies in confrontations over disputed territory. At one time, not so many years ago, the appearance of regional coastguards was hailed as a positive development because they were generally seen to be, by their very nature, less provocative and threatening than naval vessels. Now, what we see is the active engagement of coastguard vessels in para-naval roles and the militarisation of fishing fleets equipped with communication devices that facilitate command and control direction.<sup>43</sup> Fourth is the depressingly ineffectual nature of international undertakings when it comes to national conduct in the South China Sea. The much-vaunted 2002 ASEAN-China Declaration of Conduct in the South China Sea has proven to be little short of a farce. The Code has been ignored or subverted, and nations have ridden roughshod over the provision that called upon signatories to refrain from activities that would undermine the *status quo*, which was to be frozen at 2002 levels.<sup>44</sup> Fifth, China has completely ignored the intent of the Code with its reclamation activities. China is quite right when it argues that other South China Sea claimant states have engaged in building up geographical features in the sea (which they are permitted to do in their own exclusive economic zones), but its efforts, which are outside China's exclusive economic zone, are orders of magnitude greater than those of the others. While states like Vietnam have added a few tens of acres to their holdings, China has dredged up millions of square metres of new land.<sup>45</sup> In fact, at Fiery Cross Reef, Chinese reclamation has been sufficient to permit the creation of a 3100m-long runway, and some analysts have expressed a fear that what China has created are a series of strategic lily pads, dotted across the South China Sea, that will enable the Chinese air force to deploy air power over the entire sea. China has justified these activities on the grounds that it has historic rights to the features of the South China Sea. Unfortunately, LOSC is virtually silent on such lines of argumentation, apart from a reference to 'historic bays' and most observers agree that historical rights of the sort promoted by China would never survive even the most cursory international arbitral scrutiny.<sup>46</sup> And sixth, as James Kraska notes, the rationale for exclusive economic zones - to safeguard coastal fisheries - has been lost sight of since the nine-dashed line cuts across national exclusive economic zones throughout the South China Sea. Accordingly, he writes, 'the exercise of Chinese jurisdiction in its neighbors' EEZ is incompatible with the original design and structure of LOSC to protect food security for developing coastal states.'<sup>47</sup>

Activities in the South China Sea reinforce the need for nomenclatural precision. A submerged feature, which the majority of Chinese claims are, even when built up to the point where it breaks the surface at low tide, enjoys no territorial sea whatsoever under LOSC. Even a 'rock', which breaks the surface, is accorded only a 12nm of territorial sea, and nothing more. An island, which must be able to sustain human habitation, can entitle its owner to a 200nm exclusive economic zone, but the claims in an island cluster like the Spratly archipelago are so interlaced that realising a clear and undisputed exclusive economic zone would be virtually impossible.<sup>48</sup> Regrettably, there appears to be a

journalistic tendency to refer to submerged features that have been reclaimed as if they were islands privileged to have a full exclusive economic zone. This imprecision may play into the hands of aspiring claimants, but descriptions of 'islands', when none are to be seen, complicates the dialogue, particularly when it comes to freedom of navigation. Carl Thayer's argumentation about reclamation is particularly compelling in this regard. He maintains that the process is not one of reclamation, but of construction. Further, he opines that 'China's assertions of sovereign rights in these circumstances represent a form of legal alchemy in which China attempts to convert submerged features and rocks into naturally-formed islands.'<sup>49</sup> The general trend over the years has been to enclose more and more of the world's oceans, extending coastal state jurisdiction farther and farther out to sea. This trend is seen as threatening freedom of navigation, and the US Navy has been particularly dedicated to upholding this freedom as the waters of one of the world's most important semi-enclosed seas become increasingly contested.<sup>50</sup> Sadly, the members of ASEAN have been like so many deer in the headlights when it comes to articulating and, even more importantly, enforcing codes of conduct in the South China Sea. The organisation continues to espouse work on a new and more comprehensive Code of Conduct, but internal divisions within ASEAN, encouraged in part by China, bureaucratic foot dragging, and a lack of enthusiasm on China's part have meant that, despite years of statements on the importance of a full-blown code, ASEAN has nothing to show for its efforts.<sup>51</sup>

Chinese 'salami slicing' tactics constitute a constant dilemma for claimants and other maritime powers.<sup>52</sup> Are they to invite hostilities with China over inconsequential sandbars?<sup>53</sup> Failure to do so, however, means the steady erosion of the maritime order. Should maritime states be party to such subversion? The stakes are equally high in the East China Sea. There, the Chinese exhibited no interest in the Senkaku/Diaoyu Islands, lying northeast of Taiwan, until the early 1970s, following a United Nations report that indicated the probability of oil and gas deposits in the vicinity of these rocky outcrops. Securing an assured source of fossil fuel was an existential consideration for China as the state's appetite for energy began to soar. At the same time, there was mounting concern in China about food security, as fish stocks in the waters off its coasts began to diminish alarmingly. The Japanese were somewhat less concerned, initially, because they relied heavily on distant water fisheries, but the growth of Chinese naval power and the constraining effect of LOSC led Japan to revise its East China Sea policies markedly. This was a painful, awkward, and even dangerous process. Clashes between Chinese and Japanese vessels in the approaches to the Senkaku/Diaoyu enflamed national sentiments on many occasions, but fortunately, as James Manicom's analysis has revealed, saner heads normally prevailed.<sup>54</sup> That said, the room for error continues to shrink, and hostilities by miscalculation are not inconceivable, particularly when face and national passions are involved. In fact, Liff and Erickson cite the fact that Chinese coastguard vessels entered Japanese territorial waters (that is to say, within 12nm of the coast) over 350 times between September 2012 and May 2015.<sup>55</sup>

Broadly speaking, when we step back and look at the trans-Pacific relationship, we see that it is characterised by profound levels of strategic mistrust. A great deal of time and energy is expended in fostering high-level dialogues between the United States and China, but a long catalogue of irritants - computer hacking, espionage, human rights violations, intellectual property theft, restrictions placed on American companies operating in China, and Chinese expectations that the United States will extradite Chinese nationals accused of absconding to the US with ill-gotten gains - militates against the creation of a reassuring atmosphere of collaboration.<sup>56</sup> The upshot is that the doves are in retreat and the hawks are in the ascendant. As a consequence, the United States is moving slowly and steadily along the spectrum from engagement towards containment. Indeed, from a Chinese perspective, a full-blown American policy of containment is already in place, despite official denials to the contrary. When analysts in China look out at Asia, they feel increasingly besieged, with American forces stationed at almost every point of the compass around them.<sup>57</sup>

Fierce policy debates about what to do about China are not, of course, limited to the United States. There has been a muscular and informed debate on this issue for many years in Australia. Australia's overwhelming commercial dependence on China is constantly set over and against the stern dictates of geostrategic reality. Should Australia be continentalist or expeditionary in nature? How should Australia nuance an increasingly problematic relationship with Beijing? And what does this mean for the ADF posture in general, and the RAN force structure and deployment in particular?<sup>58</sup> These are questions of compelling national concern, as the price of iron ore sags, as politicians argue over free trade agreements, and as the media focuses on the negative features of a growing Chinese presence in Australia, such as Chinese ownership of Australian farmland and real estate.

## A Brittle Environment

It is hard to resist the conclusion that, despite repeated expressions of good faith, and efforts at confidence-building, such as China's inclusion in the 2014 RIMPAC exercise, the maritime environment in the Indo-Pacific is becoming increasingly brittle and problematic. Half a decade ago, Professor Desmond Ball pointed out that there was inescapable evidence that a naval arms race had begun in Asian waters. There seems little that has taken place in the interval that would argue to the contrary.<sup>59</sup> Chinese shipyards continue to send more and more sophisticated naval vessels down the slipways. The Indian Navy is attempting to do the same, though, arguably, with somewhat less success. Japanese 'destroyers', which are indistinguishable from traditional helicopter carriers, continue to grow in number, and Indonesia has articulated an ambitious maritime program, the maritime axis doctrine, designed to enable it to exert a more commanding presence in Southeast Asian waters.<sup>60</sup>

What is particularly worrisome is the proliferation of submarines throughout the region. Everyone is getting into the submarine game. Republic of Korea, Japan, Australia, and China already have robust submarine programs, and the PLAN is reported to be adding submarines to its inventory two or three times faster than the US Navy. The Taiwanese have long aspired to operate submarines, and the Vietnamese, assisted by the Indians who have their own Russian submarine experience, are in the process of deploying their newly-acquired Kilo class. There are only scheduled to be six Kilos in the Vietnam People's Navy, but they will almost certainly complicate China's regional calculus. The Singaporeans, with their city-state the size of Sydney, have their own submarines, as do the Malaysians, while Thailand is said to be flirting with the idea of acquiring submarines from China.<sup>61</sup> Significantly, the Indonesians, with their maritime priorities, are looking to obtain submarines from Republic of Korea. Thus, the waters of East Asia, not to mention the Indian Ocean, where Indian, Pakistani, Iranian and South African boats operate, are becoming increasingly crowded and, by definition, dangerous. We need also note the tensions between the Koreas over the demilitarized zone in August 2015, when North Korea deployed 50 of its 70 submarines on patrol. Republic of Korea was overwhelmed trying to track so many boats, and it should come as no surprise that it is excruciatingly sensitive about the submarine threat after a North Korean boat sank its corvette ROKS *Cheonan* in March 2010, and after North Korea deployed espionage teams to the South by submarine in the 1990s.<sup>62</sup>

Submarines, of course, are only part of the problem. Equally worrisome is the remarkable proliferation of land- and sea-based anti-ship missiles. The Chinese have a huge inventory of these ballistic and cruise missiles, and have begun to experiment with hypersonic versions; some of these missiles, including the DF-26 'Guam killer', were on very public display at China's military parade to commemorate the 70th anniversary of the end of World War II.<sup>63</sup> Their objective is to achieve sea denial. This is a classic weaker navy strategy, reminiscent of the *jeune école* in the 19th century. What China hopes to do with these missiles is to buy time and space by denying the US Navy access to the waters that lie between the Chinese coast and the first island chain. This is a long-standing Chinese objective, enumerated decades ago by Admiral Liu Huajing. In keeping with that goal, the Chinese have given considerable play to the Dong Feng 21D, an intermediate-range ballistic missile that reportedly has a warhead that is sufficiently manoeuvrable that it can target US aircraft carriers and kill them.<sup>64</sup> Whether or not the Chinese have actually mastered the complex ballistic mechanics involved remains to be seen, but senior US Navy officers appear to be taking the threat seriously. How, then, should the US Navy react in the face of these missile threats; threats that would see the careful targeting not only of major American surface combatants, but US installations on Guam and Okinawa? The US Navy began to address that problem when it formulated the AirSea Battle doctrine. That doctrine gave way recently to a strategy entitled 'joint access', an approach that seems to be more in keeping with the emphasis on joint ventures that featured prominently in the March 2015 cooperative strategy document.<sup>65</sup> Whatever the case, the way in which the land has begun to reach farther and farther out to the sea

(and *vice versa*) has added new currency to the perennial debate about the vulnerability of capital ships, like aircraft carriers.<sup>66</sup> The mounting costs of such vessels and their air wings leads analysts to question whether an entirely new vision of sea power needs to be articulated. Are navies like the US Navy too captured by organisational conservatism and bureaucratic inertia? It is telling that the Royal Navy, starved of funds, has chosen to concentrate its efforts on aircraft carriers. So too, in different circumstances, have the Chinese. At the very time that some commentators are prophesying that aircraft carriers are about to go the way of battleships, the PLAN is beginning to build indigenous aircraft carriers. The Chinese will probably take a page from the Soviet playbook and rely heavily on the battle of the first salvo, hoping to completely disable American aircraft carrier forces. How, then, would further encounters unfold? Would the war at sea become, essentially, a war of submarine on submarine? And here, of course, allied navies like the RAN would play a crucial role.

This, in turn, leads us to another major concern: what about America's friends and allies? Were international relations to deteriorate to the point that outright hostilities occurred (which seems unlikely despite the disturbing number of friction points that exist in regional and extra-regional inter-state relations), how would the other navies in the Indo-Pacific react?<sup>67</sup> Compounding political uncertainty - where, for example, would Russia position itself in the event of naval hostilities between China and the United States? - there is the increasingly multidimensional nature of maritime engagements. The missile threat has already been alluded to, but then there are the vexing problems of cyber-warfare and anti-satellite operations, two areas that appear to be priorities for the Chinese military. Navies around the world are on the cusp of the 'unmanned' revolution, in which unmanned and autonomous vehicles will operate beneath, on, and above the surface of the sea as forerunners of a maritime 'Star Wars'. Only a few navies will have these assets in the short-term, but these vehicles are surely on their way, and they will complicate the operating environment inordinately, simultaneously supplementing existing systems and overwhelming sensors.<sup>68</sup>

## Conclusion

This paper began by suggesting that a new Great Game was unfolding in Asia, but on this occasion, sea power is the currency of the realm. Whereas the 19th century game played out ashore, the new competition for power and influence is being played out at sea. What we have is a classic confrontation between an existing hegemon and an aspiring great power. However, unlike the earlier contest, which involved Great Britain and Russia, this game entails a multitude of players, all of whom have reoriented their maritime foci to counterbalance the game-changing rise of the PLAN. Xenophobic, nationalistic, and paranoid, the Chinese see their actions as entirely justified in the face of the invidious American rebalance to the Pacific. China feels increasingly trapped by the dictates of geography and the actions of unsympathetic neighbours. Sea power affords the Chinese the ability to invade Taiwan, if necessary, to exploit maritime resources, including fish stocks where possible, and to project Chinese power around the globe, if desired. In the

absence of a clear *modus vivendi*, the United States has moved to galvanise an informal coalition of naval powers, with the unspoken aim of monitoring, shaping, and if necessary, defeating the PLAN. The United States has the inestimable good fortune of having an array of regional friends and allies, and it has sought to reinvigorate its relations with all of them, as well as bring new powers, like Vietnam, onboard. This process entails, *inter alia*, constant reassurance that the United States is in the new Great Game for the long haul. There is a deep and abiding concern in many Asian capitals that this may not be the case in practice. Naval diplomacy is one of the ways in which the US seeks to telegraph its ongoing commitment. Naval exercises are another way to forge links, encourage interoperability, and develop a critical awareness of sea power throughout the region. This conference addresses the future of sea power in what is the ultimate maritime arena. Divining the future is an enormous challenge when we have four great navies and an array of middle and smaller navies, all modernising, expanding, and interacting in the shadow of a trans-Pacific relationship fraught with mistrust, where the two powers have the sea as their principal point of contact.

## Endnotes

- \* *I am particularly indebted to Brett Witthoef for his assistance in the preparation of this paper.*
- 1 See Seth Cropsey, 'The US Navy in Distress', *Strategic Analysis*, vol 34, no 1, January 2010, pp. 35-45.
  - 2 See Claude Arpi, 'China's Military Strategy: Will the Rise of China be Peaceful?', *United Service Institution of India Journal*, April-June 2015, pp. 196-208. Arpi cites Captain James Fanell, the former director of the US Pacific Fleet's intelligence and information unit, who maintains that China will soon have some 415 warships, including four aircraft carriers and 100 submarines. See also Geoffrey Till, *Asia Rising and the Maritime Decline of the West: A Review of the Issues*, RSIS Working Paper No 205, 29 July 2010, [www.rsis.edu.sg/wp-content/uploads/rsis-pubs/WP205.pdf](http://www.rsis.edu.sg/wp-content/uploads/rsis-pubs/WP205.pdf).
  - 3 Modi announced the Act East Policy at the November 2014 ASEAN-India summit. In June 2015, within the context of the first high-level trilateral maritime security talks between India, Japan, and Australia, India agreed to hold its first bilateral naval exercise with Australia later in 2015. See Scott Cheney-Peters, 'India's Maritime Acts in the East', Center for Security & International Studies' Asia Maritime Transparency Initiative, 18 June 2015, <http://amti.csis.org/Indias-maritime-acts-in-the-east>.
  - 4 During an official visit to India in June 2015, US Defense Secretary Ashton Carter met his Indian counterpart, Manohar Parrikar, in New Delhi where they signed the 2015 Framework for the India-US Defense Relationship. See Hiroyuki Akita, 'Wary of China: India to get US Help with Aircraft Carriers', *Nikkei Asian Review*, 15 June 2015, <http://asia.nikkei.com/Politics-Economy/International-Relations/India-to-get-US-help-with-aircraft-carriers>. See also Mrityunjay Mazumdar, 'India's indigenous aircraft carrier floated out', *IHS Jane's Defence Weekly*, 11 June 2015, [www.janes.com/article/52172/india-s-indigenous-aircraft-carrier-floated-out](http://www.janes.com/article/52172/india-s-indigenous-aircraft-carrier-floated-out).
  - 5 Walter Andersen and Shrey Verma, 'Washington's India Pivot: Is it Compatible with Modi's Asian Ambitions?', *India Quarterly*, vol. 71, no. 2, June 2015, pp. 95-109.
  - 6 Following a meeting between the Indonesian Defense Minister, Ryamizard Ryacudu, and India's ambassador to Indonesia, Gurjit Singh, on 10 August 2015, it was agreed that the two countries would work together to enhance maritime security by engaging in coordinated patrols, as well as joint bilateral and multilateral exercises. India also agreed to collaborate in defence procure-

- ment, including funding, technology and technology transfers. See Prashanth Parameswaran, 'India, Indonesia to Cooperate on Maritime Security, Defense Procurement', *The Diplomat*, 14 August 2015, <http://thediplomat.com/2015/08/india-indonesia-to-cooperate-on-maritime-security-defense-procurement>.
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# The Evolving Dynamic of Armed Maritime Crime and Terrorism in the Modern Era

*Peter Chalk*

The maritime realm remains particularly conducive to the type of irregular or unconventional threat contingencies that have come to characterise transnational security in the contemporary era. A vast area covering 140 million miles<sup>2</sup>, most of this environment takes the form of high seas that lie beyond the strict control of any single state.<sup>1</sup> These 'over the horizon' oceans are fringed and linked by a complex lattice of territorial waters, estuaries and riverine systems that due to a lack of resources or will (and in some cases both) frequently lack an effective regime of coastal surveillance. Compounding matters is the largely unregulated nature of the international trading system - a trait that is designed to minimise cost and maximise turnover, but one that also inevitably exposes maritime commerce to nefarious criminal designs.<sup>2</sup> Combined, these attributes and practices have served to ingrain the planet's aquatic expanse with the same type of unpredictable and lawless qualities that Thomas Hobbes once famously wrote ensured life as 'brutish, nasty and short'.

Two transnational threats that have particular pertinence to the oceanic realm are armed maritime crime and terrorism. The former, which was once considered a scourge consigned to the annals of history, has emerged as a salient issue in several regions around the world, including the Horn of Africa, the Gulf of Guinea, and the territorial waters of several countries in Southeast and South Asia. The latter is a growing concern of security and intelligence officials, many of whom appear to believe that the next major strike against Western interests is as likely to emanate from a non-territorial theatre as a land-based one.

This paper examines the evolving dynamic of armed maritime crime and terrorism in the modern age. It discusses the scope and dimensions of these two manifestations of maritime disorder, the key factors associated with their actual and potential growth and the implications they hold for the future course of global sea power. For the purposes of analysis, the following two definitions will be used:

- Armed maritime crime is defined as an act of boarding or attempting to board any ship with the apparent intent to commit theft or any other crime and with the apparent intent or capability to use force in furtherance of the act.<sup>3</sup>
- Maritime terrorism is the undertaking of politically-motivated criminal violence - or associated activities in furtherance of such acts - within the maritime realm using or directed against vessels of fixed platforms at sea and/or members of their passengers or crew and coastal facilities and settlements including tourist resorts, port areas and port towns and cities.<sup>4</sup>

## Armed Maritime Crime

Armed maritime crime has emerged as an increasingly visible issue of national and international security concern in recent years. Between 2011 and 2015, a total of 1491 actual and attempted attacks were recorded around the world, which equates to an average of around 25 acts per month.<sup>5</sup> Although the 2015 total of 246 incidents represents a significant decline from 2011 (largely due to a sharp decline in hijackings and robberies off the Horn of Africa - see below) - armed maritime crime continues to have a marked presence in several parts of the world, particularly in the waters off Indonesia, Malaysia, Vietnam, Nigeria, India and Bangladesh (see Tables 1 and 2). Moreover, while numbers are down, it is still too early to conclude that armed maritime crime in the wider Somali Basin has been effectively neutralised, as the fundamental land-based drivers of maritime crime in that part of the world (governance voids, lack of economic opportunity/poverty and corruption) have yet to be addressed, much less comprehensively mitigated.

	Actual	Attempted	Total	%
<b>Indonesia</b>	97	11	108	44
<b>Vietnam</b>	26	1	27	11
<b>Nigeria</b>	9	5	14	6
<b>Malaysia</b>	12	1	13	5.5
<b>India</b>	13	0	13	5.5
<b>The Philippines</b>	8	3	11	4
<b>Bangladesh</b>	10	1	11	4
<b>Rest of World</b>	38	11	49	20
<b>Total</b>	213	33	246	100

*Table 1: Actual and attempted pirate attacks by location, 2015<sup>6</sup>*

Official statistics of armed maritime crime likely underplay the true extent of the problem in the modern age - possibly by as much as 50 per cent. The reason for this is that many shipowners have a vested interest to *not* report attacks for fear that doing so will merely serve to increase their maritime insurance rates. In addition, there appears to be a generic concern of vessels being laid up (and, hence, not making money) for weeks, if not months, while post-attack investigations are completed. In short, unless a robbery results in a significant loss, owner/operators generally calculate that it makes more (economic) sense to simply accept the attack as the inevitable risk of doing business in the maritime realm.<sup>7</sup>

Three main types of armed maritime crime have historically occurred in global waters. At the low end of the spectrum are robberies of ships in harbour. Maritime muggers normally carry out these attacks, taking advantage of relatively lax security procedures at many ports around the world. Perpetrators are usually armed with knives and pistols and typically target a vessel's stocks, cash and portable high-value goods with an average theft of between \$5000 and \$10,000.<sup>8</sup>

More serious is the ransacking of vessels in territorial waters or on the high seas. Well-armed gangs conduct these assaults, typically boarding a freighter with the intent to steal its cargo. In certain cases crews will be killed or thrown overboard during or after the attack - a pattern that has been common in Southeast Asia and west Africa. Not only does this have immediate implications for human life, it could also seriously threaten the safety of maritime navigation, especially if a vessel is left to drift in a congested sea line of communication.<sup>9</sup>

At the high-end of the spectrum are assaults that involve the outright hijacking of ships. Traditionally much of this activity was directed at seizing and reconverting vessels for the purpose of illegal trading. Often referred to as the 'phantom ship phenomenon', this form of piracy has followed a common pattern.<sup>10</sup> First a ship would be seized and its cargo off-loaded on to a lighter at sea. It would then be renamed and re-registered under a flag of convenience, usually using bureaus in Panama, Belize, Malta, Cyprus, Honduras, the Bahamas or Liberia.<sup>11</sup> With its assumed identity in place, the ship would take on a fresh payload (normally after offering extremely competitive terms for its transfer) that would be diverted and sold in an alternate port - often with complicity of local officials. The ship would then adopt yet another name and flag and the whole cycle of fraud would commence once again.<sup>12</sup>

Phantom ship frauds were particularly prevalent in Southeast Asia during the 1990s but have greatly diminished in recent times due to more effective and better regional intelligence cooperation. In addition, a number of states have moved to decisively crack down on the corruption that facilitated many of these swindles. This is especially true of China, which by the turn of the millennium had become increasingly concerned that criminal syndicates operating from and through its territory were serving to seriously damage the country's reputation as a safe and reliable maritime trading hub.<sup>13</sup>

Despite the drop in phantom ship frauds, hijackings remain a concern. These attacks are now generally undertaken for the more straightforward purpose of extorting money, and it is this style of armed maritime crime that characterised much of the illicit activity reported off the Horn of Africa between 2005 and 2012. According to a report from the World Bank, gangs operating in this wider vicinity earned an estimated \$400 million in ransoms during this period.<sup>14</sup> It is true that the tempo of ship seizures in the wider Somali Basin has declined to near zero in recent years - a trend that reflects more concerted moves to 'harden' vessels transiting the area, better adherence to trip advisories put out by the IMB, and the deterrent effect of international naval patrols in the Gulf of Aden.<sup>15</sup> That said, hijackings have increased markedly in Nigeria (18 actual or attempted boardings took place in 2014 and 14 in 2015), where syndicates have exhibited a capacity to operate more than 170nm from shore.<sup>16</sup>

### Dangers Associated With Armed Maritime Crime

There are a number of reasons why the international community should care about armed maritime crime. In terms of human security, attacks represent a direct threat to the lives and welfare of the citizens of a variety of flag states. Between 2010 and 2015, 3705 crew were taken hostage or held against their will. Fatalities and injuries have also been apparent, especially in the Gulf of Guinea and around the Indonesian archipelago. Overall, 28 people have lost their lives to armed maritime crime since 2010 with a further 279 subjected to some sort of physical injury or mental abuse.<sup>17</sup>

	2010	2011	2012	2013	2014	2015	Total
<b>Hostage/kidnap</b>	1201	812	611	349	451	290	<b>3714</b>
<b>Killed</b>	8	8	6	1	4	1	<b>28</b>
<b>Violence</b>	61	75	45	32	24	42	<b>279</b>

*Table 2: Types of violence committed against ship crews 2010-15<sup>18</sup>*

Piracy also has a direct economic impact in terms of insurance premiums, ransom payments, stolen cargoes, delayed trips, naval deployments/mitigation measures, and prosecutions. According to an estimate from Oceans Beyond Piracy, a dedicated research project of the One Earth Future Foundation, the combined cost of piracy off Somalia alone between 2010 and 2012 ran from a low of \$19.3 billion to a potential high of \$25 billion.<sup>19</sup>

Armed maritime crime attacks additionally have the potential to cause a major environmental disaster. The 'nightmare scenario' is a mid-sea collision between a pirated unmanned vessel and a petroleum tanker. The resultant discharge of liquid fuel would not only cause serious damage to offshore resources and marine life, if left to drift it could seriously erode extended stretches of fertile coastline.<sup>20</sup> Such effects would have particular significance to any littoral state that relies on the seas as a primary source of protein for indigenous consumption or regional export.<sup>21</sup> Moreover, if governments are viewed as ineffective in containing the environmental fall-out, it could act as a trigger

for political condemnation or even censure. The lessons from the *Deepwater Horizon* oil spill in the Gulf of Mexico are instructive in this regard. Although responsibility for the disaster lay with British Petroleum, the Obama administration's handling of the crisis generated widespread criticism from Republicans and Democrats alike.<sup>22</sup>

Finally, armed maritime crime can erode political stability and legitimacy by encouraging corruption. This has been evident in a number of states, including China, The Philippines, Indonesia, Brazil, Peru, India and Bangladesh. The range of official complicity has included everything from providing intelligence on shipping movements and manifests, to facilitating with the rapid discharge of stolen cargoes. In regions of endemic corruption, it has also extended to actually constraining coastal patrols whenever they appear to be making substantial progress in denying attacks. Nigeria represents a case in point. There, members of the navy have vigorously decried government decisions to cut their funding - alluding that such moves reflect the dissatisfaction of central members of the administration who have materially benefited by actively colluding with maritime gangs based out of the Niger Delta.<sup>23</sup>

## Factors Associated With the Rise of Armed Maritime Crime in the Contemporary Era

Global armed maritime crime has traditionally been fed by three underlying drivers: the enormous volume of freight that moves by sea (which provides numerous targets of opportunity); the increased dependence of ships to pass through narrow choke points (which has made these vessels vulnerable to mid-sea interception from fast-attack craft launched from shore); and the inherently opaque nature of the maritime environment (which has constrained options for effective policing over both high seas and coastal/territorial waters).<sup>24</sup> Its contemporary manifestation reflects the continued salience of these drivers in addition to five further contributing factors.

First, there has been an increased trend toward 'skeleton crews', reflecting contemporary advances in maritime navigation technology, the increased automation of many commercial vessels and a general desire to minimise overhead running costs. Even some of the largest ocean-going freighters today operate with crews of only between a dozen and twenty. This 'bare bones' complement has negated the option of carrying out concerted anti-piracy watches and greatly facilitated the technical ease by which boarding parties can take control of a ship they seize.<sup>25</sup>

Second, there have been competing demands for scarce security resources in the post-11 September 2001 era. In the aftermath of Al Qaeda's attacks in New York and Washington, many states moved to erect expensive systems of homeland security (either voluntarily or under pressure) that focused on tightening land and air borders and safeguarding components of critical infrastructure. Where this has occurred in countries already struggling to monitor their shorelines, it has further reduced already stretched budgets for coastal surveillance and, in turn, increased their exposure to criminal penetration.<sup>26</sup>

Third, grinding poverty and chronic governance voids in Somalia following the collapse of the Siad Barre dictatorship in 1993 provided an ideal context for the systemic growth of hijacking off the Horn of Africa that saw its zenith between 2005 and 2012.<sup>27</sup> As noted above, international naval patrols in the Gulf of Aden, target-hardening and the more risk-sensitive attitude of ships transiting these waters, has greatly helped to ameliorate the problem of illicit vessel boarding and seizures in this part of the world, at least in the short-term. However, these measures are largely premised on the faulty assumption that this particular manifestation of armed maritime crime can best be contained at its endpoint - on the sea. Until more concerted attention is given to addressing the land-based 'push' factors that lie at the root of maritime crime in Somalia (the source for virtually all of the attacks that have occurred in the region), a resurgence of incidents cannot be ruled out.

Fourth and stemming from the above, there has been increased willingness of owner-operators to pay ever-larger ransoms. Whereas in the early 2000s negotiated settlements averaged around \$150,000, by 2012 they were ranging from \$4-5 million.<sup>28</sup> Although attempts have been made to outlaw the payment of ransoms by linking them to material support for terrorism these efforts have so far been unsuccessful. Indeed, in February 2011, a UK court of appeal ruled that monies extorted from shipping companies were actually recoverable as a 'sue and labour' expense.<sup>29</sup> The shipping industry, for its part, appears to have an unwritten rule to settle as quickly as possible, calculating that even million-dollar payouts are preferable to losing entire vessels and manifests.<sup>30</sup>

Fifth has been the global proliferation of arms. The range of weapons currently available on the international black market is truly enormous, including everything from pistols and assault rifles to heavy calibre machine guns and rocket-propelled grenades (RPG).<sup>31</sup> Many of these munitions can be procured relatively cheaply (which opens up a large buyer's market), providing maritime criminals with the means to operate on a higher and significantly more lethal and sophisticated level. As Noel Choong, the Director of the IMB Piracy Reporting Centre in Kuala Lumpur, remarks: 'Five to six years ago, when pirates attacked, they used machetes, knives and pistols. Today they come equipped with AK-47s, M-16s, rifle grenades and RPGs.'<sup>32</sup>

An underlying denominator in most, if not all, of these factors is money. Shipowners have inadvertently made their vessels vulnerable to attack due to cost considerations. At the same time, they have provided a very strong incentive (through ransoms) for impoverished communities to engage in maritime crime. Littoral states have been unwilling or unable to secure their coastlines due to a lack of resources. Concurrently, the competitive nature of the global arms market has availed even poorly resourced gangs to obtain the necessary hardware to contemplate ever more audacious and complex operations.

## Terrorism

Historically the world's oceans have not been a major locus of extremist activity. Indeed according to the Global Terrorism Database, of the 98,000 incidents recorded during the past 40 years, only 199 (0.2 per cent) have taken place at sea or been directed at maritime platforms.<sup>33</sup> To be sure part of the reason for this empirical paucity stems from the fact that many organisations have not been located near to coastal regions or have lacked the necessary means to extend their physical reach beyond purely local theatres. However, there are also several fundamental requirements for conducting effective maritime strikes that due to limited resources have traditionally been beyond the operational ambit of most militant extremists available to terrorist groups. Notably these include possession of mariner skills, access to appropriate assault and transport vehicles, and expertise in certain specialist capabilities (for example, surface and underwater demolition techniques).<sup>34</sup>

Very much related to this is the inherently conservative nature of terrorists in terms of their chosen attack modalities. Precisely because groups are constrained by ceilings in finance and skill-sets, most have deliberately adhered to tried and tested methods that are known to work, which offer a reasonably high chance of success and whose consequences can be relatively easily predicted.<sup>35</sup> More specifically, in a world of finite human and material assets, the costs and unpredictability associated with expanding to the maritime realm have typically trumped any potential benefits that might be garnered from initiating such a change in operational direction.

A further consideration has to do with the nature of potential sea-based targets themselves. Because these platforms largely remain out of sight, they do not tend to be at the forefront of public interest, something that is particularly true of those within the commercial realm. Moreover unlike shopping malls, sports stadiums, train stations and hotels, most maritime venues neither abut major centres of population nor are they easily accessible to the media.<sup>36</sup> Attacking them is, thus, far less likely to attract the same level of attention or immediacy as striking on land (the one notable exception being passenger ships, which is discussed below). This general lack of visibility is important, as at root, terrorism is a psychological tactic that can only be effective if it is able to demonstrate and communicate its relevance through immediately apparent acts of violence.<sup>37</sup>

## Current Concerns

In spite of these considerations, the potential spectre of maritime terrorism remains a concern. Why? First, there has been a modest yet discernible spike in high-profile terrorist attacks at sea over the past 15 years. Notable examples include the suicide strike on USS *Cole* as it was refuelling at the port of Aden (2000), the bombing of MV *Limburg* in the Gulf of Aden (2002), the partial sinking of *SuperFerry 14* in the Philippines (2004), the assault on MV *MStar* in the Strait of Hormuz (2010) and, most recently, the RPG shelling of *COSCO Asia* as it transited the Suez Canal (2013).<sup>38</sup>

Second, al-Qaeda and its affiliates have made repeated threats to target western shipping interests in the Gulf of Aden and adjacent waterways. In 2010, for instance, the Yemeni-based Al Qaeda in the Arabian Peninsula (AQAP) declared an intention to close down the Bab el-Mandab Strait - the world's fourth busiest energy chokepoint - and place it under joint Islamist control with al-Shabaab in Somalia.<sup>39</sup> Captured files from Osama Bin Laden's hideout in Abbottabad, Pakistan revealed that the call was apparently part of a wider strategic effort to disrupt petroleum shipments to Israel, Europe and the United States in order to precipitate an 'extreme economic crisis' in the West.<sup>40</sup>

Third, potential opportunities for terrorist attacks are being compounded by acute domestic instability in key parts of the world. Libya and Yemen are two cases in point. The former lacks a unified central government, is now home to one of the world's largest loose arms caches, is developing as an important beachhead for Islamic State in Iraq and the Levant outside the Middle East and has little, if any, ability to monitor a shoreline that sits just a few hundred miles from the southern European coast.<sup>41</sup> In the case of Yemen, the rapidly escalating civil war has allowed AQAP to expand its traditional strongholds in the south and with the capture of the port city of Al Makullah in April 2015 it now has a base directly adjacent to the Gulf of Aden.<sup>42</sup> This proximity will greatly facilitate any planned attacks on vessels transiting the region en-route to/from the Bab el-Mandeb Strait and Suez Canal.

Fourth, the increasingly automated nature of many modern freighters and offshore oil infrastructure has fed concerns that these platforms are becoming more vulnerable to cyber-attacks. This has already been apparent with criminal hackers - the UK government estimates that computer malware and other malicious intrusions cost British oil and gas companies at least £400 million a year - and there is a fear that it may not be long before terrorist groups attempt to cause a spectacular mid-sea collision by remotely piloting one vessel into another.<sup>43</sup>

Finally there is growing awareness that many of the same factors driving armed maritime crime could have similar relevance for terrorism. Salient considerations in this regard include the volume of shipping that passes through vulnerable chokepoints, lax port and coastal surveillance, the continuing trend toward smaller crew compliments and the global proliferation of weaponry.<sup>44</sup>

## Rationalising Moves to Maritime Terrorism

If in fact the latent potential for maritime terrorism is rising, what would extremists have to gain by moving in such an operational direction? Three possible rationales would seem to have relevance. First attacks at sea constitute a viable means for inflicting 'mass coercive punishment' on enemy audiences. Second, maritime strikes offer terrorists an additional means for causing economic destabilisation. Third in several respects the expansive global container complex provides extremists and militants a useful logistical channel for facilitating the covert movement of weapons and personnel. Each of these potential motivational drivers is discussed in more detail below.

## Maritime terrorism as a means of causing mass casualties

The spectre of mass casualty terrorism has emerged with increased clarity since the attacks of 11 September 2001, which collectively killed nearly 3000 people. Although most concern in this regard has focused on land-based targets, certain maritime assets could also be vulnerable to such contingencies. One target that is often singled out as an ideal venue for orchestrating attacks intended to maximise civilian casualties is cruise ships. These vessels typically transport thousands of people with some of the larger ships having passenger manifests upwards of 4000.<sup>45</sup> Moreover, because companies such as Royal Caribbean, Carnival and Holland America largely cater to affluent American and European tourists, they provide a high-prestige target precisely of the sort that current transnational jihadist extremists wish to destroy.

Actually destroying a passenger liner would be an extremely tall undertaking, however, as these types of vessel are constructed with safety as the foremost priority. Hulls are double-lined and, in most cases, interiors are compartmentalised with largely (though not fully) watertight systems in place.<sup>46</sup> Overcoming these safeguards would require, at a minimum, several highly powerful bombs as well as a sophisticated understanding of the structural integrity of the intended target - particularly in terms of being able to identify locations where simultaneous explosions could be expected to cause the most damage. As a result, most commentators generally agree that if a cruise ship were to be the scene of a terrorist incident it would be an onboard attack against vacationers and/or crew rather than an outright attempt to sink the ship itself.<sup>47</sup>

Ferries constitute a different threat altogether. Although not as symbolic as cruise liners, these vessels represent the 'softest of the soft' in terms of potential mass casualty terrorism. Many of the commercial ships currently in operation move hundreds of people in a single crossing. This is especially true in the developing world where ferries are notorious for sailing at or well over designated capacity limits. As such they exhibit the same 'body-rich' environment that cruise ships do. What sets ferries apart from their 'tourist cousins', however, is that they are far more susceptible to cataclysmic attack. Several factors account for this inherent vulnerability. One major problem is that port-side security measures vary greatly at passenger terminals and even in developed littoral states such as The Netherlands, Canada, the United Kingdom and US are not nearly as extensive as those employed for cruise liners (much less aircraft). Indeed, the very need to accommodate high volumes of embarking traffic in as efficient a manner as possible necessarily precludes the latitude for carrying out concerted checks on baggage, cars, trucks and people.<sup>48</sup> Indeed instituting even minimal precautionary measures could have the effect of generating huge delays and backlogs.<sup>49</sup>

Equally vetting of those working on board ferries is ad-hoc and partial, reflecting the seasonal and highly transient nature of these personnel. Background checks, to the extent that they occur, are generally aimed at verifying past employers and rarely embrace wider criminal investigations. Throughout much of Asia and Africa it is unlikely that any consistent form of examination takes place, largely because owner/operators lack

the means (and frequently the willingness) to do so, something that is particularly true for foreign nationals. Maritime experts generally concur that the absence of effective staff/crew scrutiny represents a significant point of vulnerability for commercial ferry companies, providing extremists with an ideal opening to covertly place insiders on board vessels for strike and/or logistical purposes.<sup>50</sup>

Ferries also sail along pre-defined routes according to set departure and arrival times. By definition these schedules have to be made widely available to the paying public and, as a result, are easily accessed through a broad array of mediums and conduits, ranging from travel guides and port terminals to the Internet.<sup>51</sup> Itineraries are, in short, both fixed and highly transparent, availing terrorists with a reasonably accurate cartographic picture that can be used to gauge the point at which vessels are most susceptible to attack and interception. According to officials in Singapore, the Abu Sayyaf Group in the southern Philippines is one example of an organisation that has conspicuously planned many of its maritime assaults around information of this sort.<sup>52</sup>

Underscoring all these problems are specific construction characteristics of ferries that serve to weaken their wider structural integrity and safety. This is especially true of those that transport vehicles. Colloquially known as 'Ro-Ro' (roll on, roll off), these ships are deliberately built with large open car decks to avail the efficient embarkation and disembarkation of cars, trucks, vans and motorbikes. Unfortunately this particular design format makes them acutely sensitive to subtle shifts in their centre of gravity, largely because they necessarily lack stabilising bulkheads on their lower sections. Abrupt movements of automobiles that have been improperly secured or sudden accumulations of even small amounts of water could, under such conditions, realistically cause a ferry to list or even fully capsize.<sup>53</sup>

## Maritime terrorism as a means of causing economic destabilisation

Besides mass casualties, it has been suggested that the maritime realm offers terrorists a viable theatre in which to execute attacks that are designed to trigger mass economic destabilisation. As observed above, such a goal is particularly relevant to the global al-Qaeda 'nebula', which has repeatedly affirmed that delivering a crippling blow to the Western financial, commercial and trading system is the most effective way of waging jihad against the United States and its partner nations. This tactical bent was given concrete expression in 2004 when Bin Laden announced a 'bleed to bankruptcy' strategy that was explicitly aimed at destroying the financial and commercial lifeline that underpins the current global capitalist system.<sup>54</sup>

One of the most commonly postulated scenarios for causing economic destabilisation is an attack designed to shut down a major port or strategic chokepoint in order to disrupt the mechanics of the 'just in time, just enough' international trading system.<sup>55</sup> Because very little redundancy is built into the modern global economy (for reasons of cost efficiency), even small delays in delivery could, potentially, have large-scale ramifications, particularly for energy-critical petroleum products and perishable

commodities. As Michael Richardson, a senior fellow with the Institute of Southeast Asian Studies in Singapore observes:

The global economy is built on integrated supply chains that feed components and other materials to users just before they are required and just in the right amounts. That way inventory costs are kept low. However, because these supply chains have no excess capacity, if they are disrupted, it will have repercussions around the world, profoundly affecting business confidence.<sup>56</sup>

As with the cruise ship scenario, some qualifying remarks are necessary here. Although it is true that little surplus supply exists in the contemporary international trading system, decisively disrupting the mechanics of its operation through a campaign of terrorism would be difficult. With the exception of the Suez and Panama canals, very few sea lines of communication are truly non-substitutable and would require, at most, only 1-2 days extra steaming time in the event of closure.<sup>57</sup> Actually blocking a chokepoint would pose problems on several levels and even in the case of highly narrow straits would require several vessels to be scuttled at once - a formidable and technically demanding task.

Major ports such as Rotterdam, Vancouver, Singapore, New York and Los Angeles are also largely immune to wholesale closure both on account of their size and the rigorous security standards they enact. Even if a full suspension of all loading/offloading functions did occur, ships could be fairly easily diverted (albeit at a cost) to alternative terminals, thus ensuring the continued integrity of the inter-modal transportation network.<sup>58</sup>

That said, while long-term or widespread disruption to global commerce, trade and finance is unlikely, it is possible that an act of maritime terrorism could cause temporary economic damage. The suicide strike on *Limburg* in 2002 is a good example. Although the incident only resulted in three deaths (including the two bombers), it directly contributed to a short-term collapse of international shipping in the Gulf of Aden; led to a 48 cent per barrel rise in the price of Brent crude oil; and due to the tripling of war risks premiums levied on ships transiting the Gulf, resulted in a 93 per cent drop in container terminal throughput at the Port of Aden that cost the Yemeni economy an estimated US\$3.8 million a month in lost anchorage revenues.<sup>59</sup>

### **The maritime environment as a theatre to facilitate the terrorist movement of weapons and personnel**

Approximately 112,000 merchant vessels, 6500 ports and harbour facilities and 45,000 shipping bureaus constitute the contemporary international maritime transport system, linking roughly 225 coastal nations, dependent territories and island states.<sup>60</sup> This expansive network, which caters for around 90 per cent of commercial freight, has been the focus of considerable attention by maritime security analysts and intelligence officials, largely because it is widely seen to represent a viable logistical conduit for availing the covert movement of terrorist weapons and personnel. There are at least four factors that underscore this perceived vulnerability.

First, the sheer volume of commercial goods and commodities that is moved by container ships effectively eliminates the possibility of comprehensive checks once cargo reaches its port of destination. Experts universally acknowledge that trying to inspect all incoming freight - or even a significant random sample - without unduly interrupting the contemporary dynamic of oceanic exchange is neither possible nor economically tenable given the number of boxed crates involved.<sup>61</sup> Even in terminals with advanced x-ray and gamma scanning technologies, inspection rates remain minimal. In the United States, for instance, a mere 10 per cent of the roughly 6 million boxed crates that arrive in the country every year can be expected to have undergone some sort of scrutiny; this equates to roughly 1 to 2 containers out of every 20.<sup>62</sup>

Second, the highly complex nature of the containerised supply chain creates a plethora of opportunities for terrorist infiltration. Unlike other freight vessels that typically handle payloads for a single customer loaded at port, container ships deal with cargoes from hundreds of companies and individuals, which in most cases, are received and transported from in-land warehouses characterised by varied (if not highly questionable) on-site security. For even a standard consignment, numerous agents and parties would be involved, including the exporter, the importer, the freight forwarder, a customs broker, excise inspectors, commercial trucking firms and/or railroad, dock workers, possibly harbour feeder craft and the ocean carrier itself. Each point of transfer along this spectrum of movement represents a potential source of vulnerability for the overall security and integrity of the cargo, providing terrorists with numerous openings to pack boxed crates with weapons or otherwise tamper with their contents.<sup>63</sup>

Third, and directly bearing off the above, is the rudimentary nature of the locks that are used to seal containers. Existing devices offer little, if any protection, and often consist of nothing more than a plastic tie or bolt that can be quickly cut and then re-attached using a combination of super-glue and heat.<sup>64</sup> Most commercial shipping companies have been reluctant to develop more resistant mechanisms given the costs involved.<sup>65</sup> Moves to develop so-called 'smart boxes' equipped with GPS transponders and RFID that emit signals if they are interfered with have run into similar problems and had not, at the time of writing, been embraced with any real degree of enthusiasm by the international maritime industry.<sup>66</sup>

Fourth, the effectiveness of point of origin inspections for containerised freight is highly questionable. Many resource constrained states in Asia and Africa fail to routinely vet dock workers, do not require that truck drivers present valid identification before entering an off-loading facility and frequently overlook the need to ensure that all cargo is accompanied by an accurate manifest. Even richer nations in Western Europe and North America are not devoid of these types of deficiencies. Privacy regulations in The Netherlands, for instance, severely limit options for comprehensively vetting dock workers without first gaining their permission. In the words of one Dutch expert: 'I would be amazed if harbour employees at Rotterdam, Antwerp or Amsterdam were required to undergo any form of mandatory background criminal check.'<sup>67</sup> In the United

States, some 11,000 truck drivers enter and leave the Long Beach terminal in Los Angeles with only a standard driver's license. Even Singapore, which runs arguably one of the world's most sophisticated and secure commercial maritime terminals, does not require shipping companies to declare goods on their vessels if they are only transiting through the country's port.<sup>68</sup>

## Conclusion: Implications for the Future of Sea Power

Historically, the main role of sea power focused on ensuring freedom of navigation and protecting sovereign trade routes from interference by another state's marine forces. In many ways these functions are being marginalised by the security exigencies of the modern age, most of which revolve around asymmetric and irregular non-state threats. At the same time the increasingly globalised nature of maritime commerce is now more dependent than ever on efficient, integrated supply chain networks that have very little, if any, redundancy built into them. This so-called 'just enough, just in time' inventory system remains inherently susceptible to exogenous (criminal/terrorist) shocks resulting from either deliberate or accidental disruption. Established navies have an obvious interest in re-orienting their strategic mandates so they are better situated to help reduce these vulnerabilities and, in so doing, garner greater operational relevance for their day-to-day activities.

It is true that naval forces are already involved in a number of civil-military operations to counter sub-state transnational threats. Two prime examples are the global drug trade and irregular migration. In the former case, the US Navy has long worked with the US Coast Guard to enforce counter-drug missions in the so-called transit zone, a large body of water that embraces the Caribbean, Gulf of Mexico and the eastern Pacific Ocean. Equally the European Union's Maritime and Analysis Operations Centre - Narcotics, which was set up in 2007 to disrupt Latin American cocaine shipments bound for Europe, is routinely able to draw on military/naval assets to support law enforcement interdiction and seizure functions in the Atlantic Ocean. With respect to irregular migration, navies are now playing an increasingly visible role in addressing illicit people flows across the central and eastern Mediterranean Sea. Indeed all of the major national and international coastguard and border security task forces that have been set-up to intercept smuggling boats in this region have dedicated sovereign marine assets attached to them, including Italy's *Mare Sicuro*, the European Union Naval Force-Mediterranean and the European Border and Coast Guard Agency patrol networks Poseidon and Triton.<sup>69</sup>

However with the exception of the multinational flotillas that have been instituted to protect commercial vessels from pirate and militant attacks in the Gulf of Aden, navies have played only a relatively minor role in countering armed maritime crime or terrorism. There is considerable scope to expand their operational ambit so they are able to take on more comprehensive mission sets to offset these two challenges.

The most logical manner by which a state's navy could help counter militant and criminal threats at sea is through the provision of assets that help to amplify the mitigation

resources of civilian agencies. There are a number of things that could be usefully done in this regard. Surface patrol boats could be employed for a variety of purposes, including port security, coastal monitoring and search, seizure and interdiction sorties.<sup>70</sup> Unmanned drones could be highly instrumental in generating ‘over the horizon’ surveillance that could, in turn, be leveraged to facilitate the early identification of rogue or suspicious vessels. Sailors could be embedded in marine police/coastguard teams to augment boarding squads and/or assist with the screening of criminal or terrorist suspects. Specialist naval units could also be deployed alongside other security personnel to enhance protective measures for underwater gas pipelines, oilrigs and other components of offshore energy infrastructure.

For the foreseeable future the main function of naval power will remain focused on safeguarding a state’s sovereign interests from conventional threats on the high seas. However, these forces have proven their worth in helping countering asymmetric sub-state challenges such as the global drug trade and irregular migration. Given the actual and potential consequences stemming from armed maritime crime and terrorism, a strong case can be made for extending the remit of navies to play a more concerted and comprehensive role in mitigating the multifaceted challenge stemming from criminal and militant threats at sea.

## Endnotes

- 1 This equates to some 2.42 times the planet’s terrestrial surface area.
- 2 Rupert Herbert-Burns, ‘Terrorism in the Early 21<sup>st</sup> Century Maritime Domain’, in Joshua Ho and Catherine Zara Raymond (eds), *The Best of Times, the Worst of Times: Maritime Security in the Asia-Pacific*, World Scientific Publishing, Singapore, 2005, p. 157.
- 3 This is the definition used by the International Maritime Bureau (IMB). It is broader than the conceptualisation of piracy adopted under the *United Nations Convention on the Law of the Sea 1982* (LOSC), which restricts its focus to attacks that only take place on the high seas. The latter delineation is problematic as the majority of criminal maritime incidents occur either in territorial or coastal waters. The definition also abolishes the traditional ‘two-ship’ requirement for classifying an incident, meaning that attacks from a raft or the dockside would also be counted as an act of armed maritime crime.
- 4 This definition is based on a conception first developed by the Council for Security Cooperation (CSCAP) Working Group on Transnational Security. Although broad, it captures the essential manner by which the maritime realm can be leveraged to support the operational and logistical designs of terrorist groups.
- 5 IMB, *Piracy and Armed Robbery Against Ships: Report for the Period 01 January-31 December 2014*, London, January 2015, pp. 5-6; IMB, *Piracy and Armed Robbery Against Ships: Report for the Period 01 January-30 June 2015*, London, July 2015, pp. 5-6.
- 6 IMB, *Piracy and Armed Robbery against Ships: Report for the Period 01 January-31 December 2015*, p. 7.
- 7 As Noel Choong, Director of the IMB Southeast Asian office in Kuala Lumpur, Malaysia observes: ‘A lot of ships, when nothing [major] is stolen, they do not want to report because [there is] a lot of paperwork, a lot of hassle. Sometimes, the shipmasters want a clean record. The bad thing is if they do not report another ship is going to get robbed’, cited in ‘Safer Waters: Global Piracy on the Wane. But Reported Attacks on Singaporean Ships and in Southeast Asian Waters Remain High’, *Today*, 26 March 2014.

- 8 Peter Chalk, 'The Evolving Dynamic of Piracy and Armed Robbery in the Modern Era', *Maritime Affairs*, 5/1, Summer 2009, p. 3.
- 9 See, for instance, Mark Valencia, 'Piracy and Terrorism in Southeast Asia', in Derek Johnson and Mark Valencia (eds), *Piracy in Southeast Asia*, ISEAS, Singapore, 2005, pp. 80-81.
- 10 In a number of instances shipowners were also thought to have arranged the hijacking of their vessels in order to defraud hull insurers.
- 11 For an overview of flags of convenience and how they have been exploited for criminal and terrorist purposes see Catherine Meldrum, 'Murky Waters: Financing Maritime Terrorism and Crime', *Jane's Intelligence Review*, May 2007.
- 12 Chalk, 'The Evolving Dynamic of Piracy and Armed Robbery in the Modern Era', pp. 3-4. For more on the mechanics of the phantom ship phenomenon see Jayant Abyankar, 'Phantom Ships', in Eric Ellen (ed), *Shipping at Risk*, International Chamber of Commerce, London, 1997, pp. 58-75.
- 13 In the mid-1990s, for instance, many shipping companies threatened to boycott ports in southern China as a direct result of the high incidence of phantom ship attacks that were taking place in the so-called Hainon-Luzon-Hong Kong 'terror triangle'. See Robert Beckman, Carl Grundy-Warr and Vivian Forbes, 'Acts of Piracy in the Malacca Straits', *Maritime Briefing*, 1, 1994; Kazuo Takita and Bob Couttie, 'ASEAN Pressured to Act Against Pirates', *Lloyds List*, 29 May 1992; and Michael Pugh, 'Piracy and Armed Robbery at Sea: Problems and Remedies', *Low Intensity Conflict and Law Enforcement*, vol 2 no 1, 1993, p. 11.
- 14 'Horn of Africa Piracy "Netted \$400m" From 2005-12', *BBC News*, 2 November 2013, [www.bbc.co.uk/news/world-africa-24783828](http://www.bbc.co.uk/news/world-africa-24783828).
- 15 Naval flotillas in the Gulf of Aden include Combined Taskforce 151 (CTF-151), the European Union's Operation ATALANTA, and NATO's Operation OCEAN SHIELD. For more details on these deployments see Peter Chalk, 'Piracy off the Horn of Africa: Scope, Dimensions, Causes and Responses', *Brown Journal of World Affairs*, Spring Summer 2010, pp. 97-100.
- 16 IMB, *Piracy and Armed Robbery against Ships: Report for the Period 01 January-31 December 2013*, London, January 2014, p. 21. See also Joe Brock and Jonathan Saul, 'Nigerian Offshore Attacks Surge As Pirates Advance, Violence Increases', *Reuters*, 21 February 2013; and '70 Pirate Attacks in 2014 So Far - Dryad', *Trade News Wire*, 10 April 2014, [www.tradenewswire.net/tag/70-pirate-attacks-in-2014-so-far-dryad/](http://www.tradenewswire.net/tag/70-pirate-attacks-in-2014-so-far-dryad/).
- 17 IMB, *Piracy and Armed Robbery against Ships: Report for the Period 01 January-31 December 2014*, p. 11.
- 18 IMB, *Piracy and Armed Robbery against Ships: Report for the Period 01 January-30 June 2014*, p. 11; *Piracy and Armed Robbery against Ships: Report for the Period 01 January-30 June 2015*, p. 9.
- 19 Jonathan Bellish, *Economic Cost of Somali Piracy*, One Earth Future Foundation, Denver, 2012, p. 7. The World Bank arrived at even higher figure of \$18 billion - tallied just for the year 2012; see Teo Kermellotis, 'Somali Pirates Cost Global Economy "\$18 Billion a Year"', *CNN*, 12 April 2013, <http://edition.cnn.com/2013/04/12/business/piracy-economy-world-bank/>.
- 20 See, for instance, Greg Chaikin, 'Piracy in Asia: International Cooperation and Japan's Role', in John & Valencia, *Piracy in Southeast Asia*, p. 127; Jayant Abyankar, 'Piracy and Ship Robbery: A Growing Menace', in Hamzah Ahmad and Akira Ogawa (eds), *Combating Piracy and Ship Robbery*, Okazaki Institute, Tokyo, 2001; and Valencia, 'Piracy and Politics in Southeast Asia', in Johnson & Valencia (eds), *Piracy in Southeast Asia*, p. 114.
- 21 Any state that suddenly finds itself in a position where it is unable to provide staples such as fish confronts the danger of mass protests and violence. Although not marine related, the 2008 Asian rice crisis is indicative of the sorts of problems that could arise.
- 22 See, for instance, 'Obama Draws Bipartisan Criticism for Using Oil Spill to Push Energy

- Policy', *Fox News*, 16 June 2010, [www.foxnews.com/politics/2010/06/15/obamas-pitch-energy-speech-gulf-crisis-infuriates-republicans/](http://www.foxnews.com/politics/2010/06/15/obamas-pitch-energy-speech-gulf-crisis-infuriates-republicans/); and Neela Banerjee, 'Report Critical of Government Response to Gulf Oil Spill', *The Los Angeles Times*, 6 October 2010.
- 23 Author interviews with Nigerian Navy officials, Abuja, September 2008. See also Stephanie Hanson, *Combating Maritime Piracy*, Council on Foreign Relations, 27 January 2009, [www.cfr.org/publication/18376/combating\\_maritime\\_piracy.html](http://www.cfr.org/publication/18376/combating_maritime_piracy.html).
  - 24 Since the end of World War II, seaborne trade has doubled every decade. See David Rosenberg, 'The Political Economy of Piracy in the South China Sea', in Bruce Elleman, Andrew Forbes and David Rosenberg (eds), *Piracy and Maritime Crime*, Newport Paper no 35, Naval War College Press, 2010, [www.usnwc.edu/Publications/Naval-War-College-Press/-Newport-Papers/Documents/35.aspx](http://www.usnwc.edu/Publications/Naval-War-College-Press/-Newport-Papers/Documents/35.aspx); and Bellish, *The Economic Costs of Piracy*, p. 6. Major chokepoints include the Panama Canal, the Suez Canal, the Strait of Hormuz, the Strait of Bab-el-Mandab, the Malacca Strait, the Bosphorus Straits, the Gibraltar Straits and the Gulf of Aden. The high volume of shipping that passes through these bottlenecks necessarily forces vessels to significantly reduce speed in order to ensure safe passage (in the Bosphorus Straits, for instance, at least six accidents occur every 1 million transit miles), which dramatically increases their exposure to attack. See, for instance, Ali Koknar, 'Maritime Terrorism: A New Challenge for NATO', *Energy Security*, 24 January 2005.
  - 25 See for instance 'Stormy Waters: Q&A Counter-Piracy', *Jane's Homeland Security Review*, October/November 2009, p. 19.
  - 26 Peter Chalk, *The Maritime Dimension of International Security: Terrorism, Piracy, and Challenges for the United States*, RAND Corporation, Santa Monica, 2008, p. 12.
  - 27 An average Somali fisherman earns around \$650 a year from legal trawling, whereas the potential pay-off from a single hijacking could be as much as \$10,000. See, for instance, Lesley Anne Warner, 'From Sea to Shore', *Journal of International Peace Operations*, vol 5, no 4, January-February 2010, p. 13.
  - 28 'Ransoms to Pirates Remain a Spiraling Illegal Tax on the 90% of World's Goods That Move By Sea', *Maritime Executive Newsletter*, 11/97, 16 May 2013; Manoj Nair, 'Marine Piracy Losses Hit a Record \$7b Last Year', *Gulf News*, 7 February 2011; and John Payne, 'Piracy Today: Fighting Villainy on The High Seas', *The Wall Street Journal*, 8 April 2010.
  - 29 Eoin O'Conneide, 'Ransoms Get Green Light', *TradeWinds*, 28 January 2011, [www.tradewinds.no/andalso/article574970.ece](http://www.tradewinds.no/andalso/article574970.ece).
  - 30 Peter Chalk, Laurence Smallman and Nicholas Burger, *Countering Piracy in the Modern Era: Notes from a RAND Workshop to Discuss the Best Approaches for Dealing with Piracy in the 21<sup>st</sup> Century*, RAND Corporation, Santa Monica, 2009, p. 6. In addition to the possible loss of a ship and its cargo, owner/operators realise that the longer negotiations last, the longer their vessels will be out of operation and not making money
  - 31 For a concise overview of the dynamics of the global proliferation of light weapons and their impact on sub-state violence and criminality see Gideon Burrows, *Kalashnikov AK47*, The New Internationalist, Oxford, 2006.
  - 32 Interview, IMB, Kuala Lumpur, August 2006.
  - 33 Global Terrorism Database, [www.start.umd.edu/gtd/](http://www.start.umd.edu/gtd/).
  - 34 See Paul Wilkinson, 'Terrorism and the Maritime Environment' and Brian Jenkins, Bonnie Cordes, Karen Gardela and Geraldine, 'A Chronology of Terrorist Attacks and other Criminal Actions Against Maritime Targets', both in Eric Ellen (ed), *Violence at Sea*, International Chamber of Commerce, Paris, 1986.
  - 35 This point is directly taken up by Bruce Hoffman in his 'The Contemporary Terrorist Mindset:

Targeting, Tactics and Likely Future Trends', *ciao Working Papers*, October 1997, [www.ciaonet.org/wps/hob03/](http://www.ciaonet.org/wps/hob03/).

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- 37 For a discussion on this aspect of the terrorist phenomenon see Peter Chalk, *West European Terrorism and Counter-Terrorism: The Evolving Dynamic*, Macmillan, London, 1996, Chapter 1.
- 38 The attack on *SuperFerry 14*, left 116 people dead and remains the most destructive maritime act of violence in modern-day terrorism.
- 39 In 2013, an estimated 3.8 million barrels of oil a day passed through the Bab el-Mandeb Strait northwards to markets in Europe and the Americas and southwards to consumers in Asia. 'Al-Qaeda Vows to Block Strategic Al-Mandeb Strait', *Jamestown Foundation Terrorism Monitor*, 19 February 2010.
- 40 Ken Dilanian, 'Al-Qaeda Wanted to Attack Tankers, Bin Laden Files Show', *Los Angeles Times*, 21 May 2011.
- 41 See, for instance, 'That It Should Come To This', *The Economist*, 10 January 2015.
- 42 Saeed Al-Batati and Kareem Fahim, 'War in Yemen is Allowing Qaeda Group to Expand', *The New York Times*, 16 April 2015.
- 43 Jeremy Wagstaff, 'All at Sea: Global Shipping Fleet Exposed to Hacking Threat', *Reuters*, 23 April 2014. Comments made during the 6<sup>th</sup> Annual NATO Maritime Interdiction Operations Training Center Conference, 'Energy Security', Crete, 2-4 June 2015.
- 44 Comments made during the 6<sup>th</sup> Annual NMIOTC Conference, 'Energy Security'.
- 45 The world's two largest cruise ships, the Royal Caribbean's *Oasis of the Seas* and *Allure of the Seas*, are each able to hold up 6296 passengers.
- 46 It would be impossible to construct a cruise liner that has a fully compartmentalised watertight system in place as the recreational and luxury-oriented nature of these vessels necessarily requires an on-board configuration that is open and accessible (within the constraints of allowable safety limits).
- 47 Interviews with maritime security analysts, London and Kuala Lumpur, September 2005.
- 48 In Britain, for instance, cars and coaches are inspected on a random, selective basis. Freight vehicles are rarely, if ever checked. As one former defence intelligence official opined: Ferries are their own worst enemies: [the industry is] designed to transport a high volume of people as conveniently, cheaply and quickly as possible. Most operators simply do not have the infrastructure - or willingness - to carry out a comprehensive regimen of security checks. Author interview with former UK defence intelligence official, London, September 2005.
- 49 The Port of Dover on the English south coast provides a case in point. In the immediate aftermath of the July 2005 London underground bombings, all motorists leaving the terminal for Calais in northern France were subjected to a slightly more rigorous regime of pre-departure scrutiny and examination. Although individual inspections and questions generally took no more than a few minutes per vehicle, combined they served to create tailbacks that extended over four miles. Interviews with UK Customs and Excise officials, London, September 2005.
- 50 Author interviews with maritime analysts and intelligence officials, Singapore, London, Amsterdam and Washington DC, August and September 2005.
- 51 In the UK, for instance, the schedules and itineraries of all ferry companies operating out of the country can be accessed via [www.ferries.com](http://www.ferries.com).

- 52 Interviews, Ministry of Home Affairs and Ministry of Foreign Affairs, Singapore, September 2005.
- 53 According to one US-based maritime security analyst, as little as a foot of water accumulated in a single location could upset a ship's centre of gravity through the so-called 'free surface effect'. Interview, Washington DC, August 2005. It should be noted that certain countries have moved to address this specific structural vulnerability. In the UK, for instance, ferries are now constructed with drains in their car decks to prevent the free-surface effect. Many also have additional buoyancy devices, such as air-filled tanks strapped to either side of the vessel.
- 54 See Matthew Hunt, 'Bleed to Bankruptcy', *Jane's Intelligence Review*, January 2007, pp. 14-17; 'Bin Laden: Goal is to Bankrupt the US', *CNN.com*, 1 November 2004, [www.cnn.com/2004/WORLD/meast/11/01/binladen.tape/](http://www.cnn.com/2004/WORLD/meast/11/01/binladen.tape/); and Douglas Jehl and David Johnston, 'In Video Message, bin Laden Issues Warning to US', *The New York Times*, 30 October 2004.
- 55 Author interviews, Control Risks Group and Lloyd's, London and Amsterdam, September 2005. See also Catherine Zara Raymond, 'Maritime Terrorism, A Risk Assessment: The Australian Example', in Joshua Ho and Catherine Zara Raymond (eds), *The Best of Times, the Worst of Times*, World Scientific Publishing, Singapore, 2005, p. 179; and Martin Murphy, *Maritime Terrorism: The Threat in Context*, Adelphi Paper 388, International Institute of Strategic Affairs, London, 2007, p. 20.
- 56 Michael Richardson, *A Time Bomb for Global Trade*, ISEAS, Singapore, 2004, p. 7.
- 57 By contrast, re-routing around the Cape of Good Hope as opposed to transiting through the Suez Canal would lengthen a vessel's journey by around three weeks, adding an estimated \$1.5 to \$2 million to an average shipment in terms of extra fuel, time and labour.
- 58 Chalk, *The Maritime Dimension of International Security: Terrorism, Piracy and Challenges for the United States*, p. 23.
- 59 Ben Sheppard, 'Maritime Security Measures', *Jane's Intelligence Review*, March 2003, p. 55; Richardson, *A Time Bomb for Global Trade*, p. 70; and Herbert-Burns, 'Terrorism in the Early 21<sup>st</sup> Century Maritime Domain', p. 165.
- 60 Interviews, Lloyds of London, London, September 2005. See also Herbert-Burns, 'Terrorism in the Early 21<sup>st</sup> Century Maritime Domain', pp. 158-159 and OECD, *Security in Maritime Transport: Risk Factors and Economic Impact*, Paris, July 2003.
- 61 Interviews with maritime experts and intelligence officials in Singapore, London and Amsterdam, September 2005. See also John Fritelli (et al), *Port and Maritime Security: Background and Issues for Congress*, RL31733, Congressional Research Service, Washington DC, 30 December 2004, p. 4; Catherine Zara Raymond, 'Maritime Terrorism, A Risk Assessment', in Ho & Raymond, *The Best of Times, the Worst of Times*, p. 187; N Brew, 'Ripples from 9/11: The U.S. Container Security Initiative and Its Implications for Australia', *Current Issues Brief*, no 28, 2003, p. 5; and Customs and Border Protection, *Fact Sheet: Cargo Container Security - US Customs and Border Protection Reality*, October 2004, [www.cbp.gov/linkhandler/cgov/newsroom/fact\\_sheets/2004/5percent\\_myth.ctt/5percent\\_myth.doc](http://www.cbp.gov/linkhandler/cgov/newsroom/fact_sheets/2004/5percent_myth.ctt/5percent_myth.doc).
- 62 Robert Block, 'Security Gaps Already Plague Ports', *The Wall Street Journal*, 23 February 2006.
- 63 Fritelli, *Port and Maritime Security*, p. 9; James Hoge and Gideon Rose (eds), *How Did This Happen*, Public Affairs, New York, 2001, p. 188.
- 64 See, for instance, J Saunders, 'Marine Vulnerability and the Terrorist Threat', International Chamber of Commerce, London, 2003, p. 4.
- 65 A standard seal can be purchased for a few cents if ordered in bulk, whereas more robust versions might run to several hundreds of dollars.

- 66 Interviews with Department of Homeland Security liaison officials, US Embassy, Singapore and London, September 2005. In bulk order form, these types of technologies would cost at least US\$500 per container. Shipping companies have also been reluctant to make such investments given that even more advanced boxes cannot offer anything approaching 100 per cent infallibility.
- 67 Interview with Dutch maritime security analyst, Amsterdam, September 2005.
- 68 This is largely due to a fear that if declarations on all cargoes were made mandatory irrespective of whether or not Singapore was the final port of call, the resulting red tape would deflect trade north to Malaysia.
- 69 Comments made during the 'Collaborative Responses to Maritime Threats in the Mediterranean' Conference Athens, 8-12 June 2015.
- 70 In the United States, for instance, Coast Guard Law Enforcement Detachments (LEDET) have routinely deployed from American (and partner nation) warships in accordance with the provision of laws that specifically permit the employment of defence assets in the role of law enforcement. See Mark Salonia, 'The U.S. Navy's Future in Drug Interdiction', [www.globalsecurity.org/military/library/report/1990/SMJ.htm](http://www.globalsecurity.org/military/library/report/1990/SMJ.htm), p. 5.



## Enhancing Regional Cooperation: Approaching the 10th Anniversary of ReCAAP

*Yoshihisa Endo*

As ReCAAP approaches its 10th anniversary in 2016, it is timely to reflect on why and how it came into being. From this we can assess whether it has been successful in achieving its mandate.

You may recall that from the 1990s there were increasing concerns over piracy and armed robbery at sea in Southeast Asian waters. These concerns were two-fold: the impact on seafarers whose ships were being attacked (injuries, trauma and loss of life), as well as the economic impact on both the shipping industry (financial losses and higher insurance premiums) and to a global economy heavily reliant on seaborne trade. The continuing threat to shipping led to the Lloyd's and London insurance market Joint War Committee to declare, in June 2005, that the Malacca and Singapore straits were a 'war risk' zone for insurance purposes, with some vessels avoiding that area completely; the war risk designation was subsequently lifted in August 2006.

During this period there was increasing concerns from a variety of states over what could or should be done to ameliorate the situation. At the Regional Conference on Combating Piracy and Armed Robbery against Ships held in Tokyo in April 2000, three documents were adopted:

- The Tokyo Appeal called for the establishment of an information network of all relevant government agencies.
- The Asia Anti-Piracy Challenge 2000 statement welcomed the Tokyo Appeal and emphasised the necessity for mutual cooperation amongst competent authorities.
- The Model Action Plan stipulated actions to be taken to combat piracy and armed robbery against ships.

Building on these initiatives, the Asia Cooperation Conference on Combating Piracy and Armed Robbery against Ships was held in Tokyo in October 2001. This conference looked at cooperative efforts that could be pursued to combat piracy in Asia and recognised that a regional cooperation agreement should be considered to take countermeasures against piracy, and that a group of experts should be established to examine the content of such an agreement.

Based on these findings, then Japanese Prime Minister Junichiro Koizumi proposed at the ASEAN+3 summit in Brunei in November 2001 the convening of a working group of government experts to examine the drafting of an anti-piracy regional cooperation agreement at the government level; this was approved by summit attendees. After a series of negotiations, the agreement was finalised on 11 November 2004 and came into force on 4 September 2006.

ReCAAP is the first government-to-government agreement to enhance regional maritime security by addressing incidents of piracy and armed robbery in Asia. The Agreement aims to enhance multilateral cooperation amongst its contracting parties. Convinced that greater information sharing is the key to the prevention and suppression of piracy and armed robbery against ships in the region, the ReCAAP Information Sharing Centre (ISC) was established and launched in Singapore on 29 November 2006. The ISC is managed by a Governing Council comprising a representative from each contracting party that meets at least annually to determine policy on all aspects of ReCAAP activities. The role of the ISC is to be a platform for information exchange on piracy and armed robbery incidents, as well as conducting an analysis of the pattern and trends of such incidents. The ISC functions by collecting data from all its contracting parties, partner organisations and the maritime community. The raw data is critically analysed and disseminated to all relevant parties in a timely and strategic manner. The process of reporting and disseminating information has been successful in stemming the rise in piracy.

Under the ReCAAP Agreement, each signatory designates what we call a ‘focal point’, which has several important roles, and while appearing similar to a ‘point of contact’ their role is much wider and heavier.

They manage responses to piracy and armed robbery incidents within their territorial waters and jurisdiction. They act as an external point of information exchange among other focal points and with the ISC. They facilitate their state’s law enforcement activities. They coordinate surveillance and enforcement for piracy and armed robbery with neighbouring focal points. All the stakeholders in each of the contracting parties are supposed to be under the coordination of their designated focal point, whereby the receipt of information concerning piracy incidents should lead to quick responses.

We operate under three pillars: information sharing, capacity building and cooperative arrangements. Let me briefly explain the three key pillars respectively.

The objective of information sharing is to provide situational awareness and to enable the ISC to make accurate assessments to assist authorities in deploying their resources more optimally, and to enable shipowners and masters in planning their voyages and adopting good practices when transiting areas where there have been a high number of reported incidents.

A crucial component in facilitating information sharing between the ISC and ReCAAP focal points was the establishment of a 24/7 secure web-based information network system (IFN) in 2006. The IFN was overhauled in 2012 to enhance its user interface and automation, which facilitates prompt information sharing. In 2012 the ISC launched an IFN mobile app and in 2014 a RECAAP mobile app to enable greater accessibility to incident reporting and sharing, as well as to facilitate communication with ReCAAP focal points and the shipping industry.

With timely and accurate reporting by ReCAAP focal points, the authorities and shipping industry have enabled the ISC to alert mariners, make accurate classification and value-added assessments that are shared with all stakeholders in the form of periodical reports, incident alerts, updates, discussions, forums and conferences.

The ReCAAP focal points form the backbone of the ISC, which in turn devotes considerable resources towards building the capacity of the focal points as well as their network. This is done through annual capacity building workshops, focal point senior officers' meetings, cluster meetings and visits to focal points. This has enabled the focal points to have a better understanding of their roles within the ReCAAP focal point network, and to fulfil these responsibilities as best they can. Greater operational ties amongst the focal points have led to prompt information sharing and reporting, resulting in the arrest or perpetrators or the successful recovery of hijacked vessels.

As an inclusive international organisation, the ISC projects itself as a specialist agency facilitating cooperative arrangements among contracting parties, governmental and non-governmental organisations, shipping industries, maritime and research institutes which share the ISC mission of enhancing regional cooperation. These cooperative arrangements also take the form of networking opportunities and working relationships with other stakeholders through participation in anti-piracy conferences, international conferences and other forums. Over the course of a decade, the ISC has built an extensive network of partnerships with industry, academia and marine-related organisations. The ISC has five memorandums of understanding (MoU) with the:

- International Maritime Organization (December 2007)
- Baltic and International Maritime Council (April 2010)
- Asian Shipowners Forum (August 2010)
- International Association of Independent Tanker Owners (May 2012)
- International Criminal Police Organization (November 2012).

These MoU enable the ISC to collaborate with these organisations on capacity building and training programs as well as joint projects on measures to prevent or suppress piracy attacks, attend their meetings and vice versa, and information exchange and mutual support on piracy and armed robbery incidents in Asia.

The ISC also has standard operating procedures with Singapore's information fusion centre (IFC) (December 2007) and with the Djibouti Code of Conduct ISC (November 2011) to facilitate information sharing, participate in information exchange exercises to validate linkages among the participating operations centres and attend each other's meetings.

Importantly, ReCAAP itself cannot become a large entity. What we need is to establish a wide and in-depth ranging network by making the most of the existing expertise of other stakeholders to create 'synergy' amongst us.

Having outlined how ReCAAP came to be and how it operates, what has it achieved over the past decade?

In its early years there was a decline in the number of incidents reported, with the lowest number of incidents (96) reported in 2008. The number of incidents fluctuated over the years in certain locations and against particular ship types. The number of incidents was at its peak in 2010 with 167 recorded, comprising robberies onboard ships plying the South China Sea, onboard ships anchored or berthed at certain ports and anchorages, and robberies onboard slow moving tug boats. Incident numbers declined in 2011 and 2012 due to the improved situation in the South China Sea and stepped up enforcement at ports and anchorages, but mitigated by a surge in incidents involving the hijacking of tug boats for resale and continued robberies onboard tug boats. Increasingly where enforcement was stepped up in one location, perpetrators would target vessels in other locations that were subject to fewer patrols. An example of this occurred off the port of Pulau Nipa where anchored ships were regularly robbed during 2013, but improved markedly in 2014 as a result of the concerted efforts by local authorities. Instead, ships underway on the eastbound lane of the traffic separation scheme in the Singapore Strait (northeast of Pulau Nipa in the Phillip Channel) were targeted. Over the same period and into early 2015, there was a rise in the number of small tanker hijackings and the siphoning of ship fuel/oil. In 2014 there were 12 actual and 3 unsuccessful attempts to siphon fuel/oil from ships. The ISC conducted a detailed analysis of these incidents and produced two reports. To June 2015, there were another 8 incidents but no reported incidents since then.

To raise awareness in, as well as to assist the shipping industry on best practices, the ISC produces regular periodicals and special reports the most recent being the *Guide for tankers operating in Asia against piracy and armed robbery involving theft*, in collaboration with the IFC and the S. Rajaratnam School of International Studies. Previous publications include the anti-piracy poster, prepared in collaboration with the Baltic and International Maritime Council (2011), the *Tugboats and Barges Guide* in collaboration with the IFC (2012), and the maritime security planning chart with the IFC and the UK Hydrographic Office (2013).

Over this period ReCAAP was subjected to negative press reporting, alleging it was downplaying the number of reported attacks through its classification system, was blaming others for the increased number of attacks or was not cooperating with other agencies. The unfounded allegations arose from a fundamental misunderstanding of the role of ReCAAP and its reporting methodology compared to other reporting centres. Put simply, the ISC classifies each incident according to the level of violence used and the economic loss involved. However, other reporting centres do not classify incidents and count an incident of petty theft from a ship at anchor or in a port as equivalent to a major ship hijacking. With the vast majority of incidents in the region being ones of petty theft, such reports give a distorted picture of the true threat of piracy in the region, which may lead to incorrect policy recommendations for governments. The media often prefers

using the absolute figures which presents an exaggerated view of the threat, rather than the more accurate and objective reports from the ISC. There is a need for industry to recognise that the role of the ISC is to provide both governments and industry with accurate and timely information on the actions necessary to counter the threat of piracy and sea robbery. An effective system of maritime domain awareness and information sharing is required in the region to identify and track suspicious personnel and vessels. The shipping industry is encouraged to ensure that every incident is reported to coastal authorities, that merchant vessels follow best management practices for ship security, and adhere strictly to regional law enforcement agencies, port authorities and customs authorities in order to prevent illegal fuel transfers and theft.

Now, after almost a decade of operation, ReCAAP has steadily developed and is considered to be a successful model of regional cooperation for others to emulate. Its membership has also expanded from the original 14 Asian states to 20, including four European states plus Australia and the United States. Although this membership appears small, it represents between 60-70 per cent of global population and gross domestic product. Further, there are several states, such as France and Germany that are interested in joining ReCAAP. When taking into account its relatively short history, ReCAAP has developed steadily while facing new challenges.

It is often said that ReCAAP is an organisation. But in what sense is it unique compared with other inter-governmental bodies? This can be summarised with three key words: small, slim and soft.

ReCAAP is small in that its information sharing centre is manned by a small number of staff, only 16 personnel, compared with around 700 in the International Maritime Organization (IMO). Its annual budget is as little as US\$2.5 million including administrative expenses, while the annual IMO budget is US\$55 million. ReCAAP is slim as it has no patrolling vessels, no reconnaissance aircraft and no weapons. Its only hardware is a car. In other words, it does not have hands and legs, only information and its computerised network system. ReCAAP is soft as it does not impose legally binding duties, nor law enforcement on its members, with due respect to their sovereignty. It expects and encourages them to volunteer action. These three words seem to give us the key for ReCAAP success, if any.

While there have been challenges for us to overcome over the last nine years, thanks to the strong support of our members and our stakeholders, we have made good progress and we will be able to celebrate our 10th anniversary in 2016. Our member states have begun intensive discussions about the future of ReCAAP for the next decade. We organised two additional Governor's meetings in December 2014 and November 2015, and discussions will continue towards the tenth Governing Council meeting in 2016 where we expect to agree upon the future direction and activity of ReCAAP.

So far, there is a broad consensus among the Governors on our goal that in another 10 years, ReCAAP should be a centre of excellence in the field of information sharing, and that ReCAAP should be looked upon as a reliable, dependable and capable partner.



# The Future Navy Powered by Science and Technology

*Alex Zelinsky*

Australia is a maritime state 'with our home girt by sea'. It relies on the numerous sea lanes to the north to enable its commerce whilst at the same time; we are seeing a significant economic growth to the Asian economic region. Economic growth is also driving change in China and all Asian states with a clear shift in the economic centre of power from Europe to Asia in the 21st century. Australia is in the midst of this shift, which will be a defining feature of the 21st century. Along with this change there is a notable shift in the military emphasis in the Asian region. This is driven by the expansion of China into the Asia-Pacific area, changes in the military engagement of Japan, and the development of the military capabilities of many other Asian states.

The development of the Asia-Pacific region has also been accelerated by the rapid growth and access to advanced technologies for all states. The availability of mobile phone technology and satellite technology, for example, has advanced domestic development but also has significant military implications. Many military developments are now more likely based on the adaption of domestic technology and so the application and availability of these technologies 'evenly to all' is a reality; what differentiates states is the ability to understand the fundamental science of the technology and to exploit its strengths and weaknesses for military applications.

The complexity in this analysis is that the threats of today are unlikely to be the threats of tomorrow. Agility is therefore the key. It is into this military, political and economic environment that the RAN will operate. Assured freedom of action is paramount and to achieve this, the Navy needs access to relevant and world class science and technology.

Science and technology support for the future Navy contributes to:

- strategic decision-making
- achieving operational goals
- defence capability development
- understanding and preparing for game changing technologies
- analysis to understand future and emerging threats.

## Decision Superiority

Decision superiority is the ability to make and implement more informed and more accurate decisions at a faster rate than your adversary. Information has always been critical to a successful maritime engagement, but the decision-making cycle is rapidly shortening and information systems are becoming exposed to degradation or attack. Cyber threats are growing and attacks on command and control networks and computer systems are proliferating rapidly. Achieving decision superiority requires information dominance, which is achieved by denying or manipulating an adversary's information and assuring the security of your own. Information dominance also enables operations across a coalition's joint forces and large mission areas. Integral to this is information flexibility, access to data from a wide range of sources, network resilience, integration of sea and air platforms and advanced electronic warfare and intelligence/surveillance/reconnaissance capabilities.

The science and technology that supports decision superiority is based on superior situational awareness using specialised as well as commercial and military off-the-shelf sensors, coupled with advanced and hardened communication networks. Advanced machine reasoning and learning needs to be developed further to enable real-time, rapid and automated decision making for C2/ISR in big data environments and the merging of these with sensor systems. Advanced data fusion and information integration coupled with advanced computing, based on optical and/or quantum technologies and open and flexible architectures, are required. This includes protected communication networks hardened against cyber and electronic attack, such as protected satellite communications. Capabilities to sense, visualise and then understand the cyber and electromagnetic domains are required and may be delivered using current technologies.

These sensors will likely be large arrays distributed across single ships and task groups, and include space-based systems. Sensors will enhance situational awareness using passive techniques, such as passive radars or passive coherent location, which exploit the signals in the environment for detection, tracking and imaging without any electromagnetic emissions. These sensors will be linked to advanced electronic warfare self-protection systems, including both onboard and off-board systems. The miniaturisation of electromagnetic sensors has enabled development of sensors to operate in new frequency bands and a significant increase in data volume, along with their deployment on low cost autonomous vehicles. The military-useful parts of the electromagnetic spectrum are growing and advanced analytical techniques and computational resources will be required to exploit this. Finally, the value of the data can only be realised if it can be represented, processed, shared and interpreted within relevant context and with assurance.

## Undersea Warfare

Undersea warfare is driven by the need for assured access to the underwater and littoral environments by submarines and other underwater platforms. This can only be assured

if the platform has the ability to sense and predict the relevant properties of the ocean environment, and the ability to detect, identify and classify threats, including mines, submarines and surface ships. This is achieved through the use of real-time sensor systems, advanced data processing and strategies to exploit the changing environmental picture. The ability to detect threats requires another group of advanced sensors that provide a high resolution picture of the threat system. These systems need to be integrated into a framework to enable real-time decision-making.

The science and technology required to support future undersea warfare includes development of long range sensor systems that are able to detect, classify, locate and track threat submarines. These systems will include advanced acoustic sensors (fixed and relocatable seabed arrays), advanced superconducting magnetic sensors (airborne or space-based), air-deployed multi-static coherent sonobuoy fields, and electro-optic/radar sensors.

DSTG's patented fibre-optic laser seabed acoustic sensors are an example of existing technology. In the future, the number of sensors per fibre in the towed array will increase, giving greater performance. Some sensors are likely to be deployed on long endurance loitering unmanned vehicles or space-based systems. Autonomous underwater vehicles with advanced synthetic aperture sonar will be used for mine detection. The use of autonomous vehicles will require cooperative vehicle autonomy, and advanced onboard processing, analysis and decision-making. Whilst some aspects of these technologies exist, developments in robotics, machine learning, cognitive learning and adaptive recognition will all drive the success of these systems.

These systems will only be successful if an ability to measure and predict the highly variable underwater environment is available: without an awareness of the effect that the undersea environment has on our sensors, and on those of our adversaries, we will not know where our sensors are 'blind', or will not be able to outmanoeuvre our enemies. Defence is currently working with CSIRO and the Bureau of Meteorology to improve our undersea environmental predictions, and with Australian industry to put superior operational tools onto our warships.

## Mission Survivability

The more survivable a platform is the more missions it can undertake, and the greater the likelihood that it will complete its mission successfully. The survivability of a maritime platform is the combination of its susceptibility (can it be detected and engaged by threat sensors) its vulnerability (the likelihood of it withstanding damage) and its recoverability (the ability to control damage and recover all or part of the capability). Any naval platform should be capable of protecting itself against a defined range of threats, but the evolution of advanced threats requires new technologies to ensure survivability. Increasing access to advanced surveillance systems means the likelihood of being detected and classified is increasing significantly. Increased use of longer range, precision, advanced, affordable weapon systems threatens platform survivability.

Threats may also be asymmetric, including biological or chemical in nature. Signature reduction and management is fundamental to reducing susceptibility, but the use of hyperspectral sensors increases the complexity of the solutions required. Increased shock and blast 'hardening' of the platform structure assists with reducing vulnerability, but platform design is becoming more crucial as threat weapons incorporate advanced targeting capabilities. Recoverability after a weapons strike will become more automated with fire suppression and flooding systems remotely and automatically activated.

From another perspective, having own sensors that can see further than your opponent, and by having superior weapons makes the platform more survivable.

The likelihood of a platform being detected can be reduced through the use of advanced signature management treatments. Active radar absorbing materials which frequency hop based on the threat frequency will become commonplace. The use of low emissivity coatings will reduce the infrared and the thermal signatures of the platform. However, the development of advanced countermeasures also needs to be part of the equation, along with advanced tactics. The ability to design stealth into the platform is a reality and this will continue into the future. DSTG is conducting research into many of these technologies using new materials for signature management.

Critical to survivability is the ability to detect and to engage the threats. Detection will require new sensor and surveillance systems that can search the environment quickly, classify the object detected and then bring the weapon systems to bear to defeat the threat. These sensors are likely to be passive to ensure that the platform controls its own emissive signature. Automation of this process will be needed due to the short times involved in the engagement. This will require improvements to and automation of 'non-cooperative target recognition' processes. The ability to engage these advanced high speed threats requires weapons or effectors that are agile and have a degree of automation. Use of advanced weapons such as laser, rail guns or electromagnetic pulse systems will become the norm. Currently these weapons are being deployed by the US Navy. They have the advantage of being nearly instantaneous, low cost (per shot) and having an 'infinite magazine'.

The reduced response time will drive automation of the engagement chain but it needs to go beyond the single effector to automation of multiple effector responses. Part of this is the development of lethality assessment functions to assess the ability of each effector to defeat a threat, and the weapon-target assignment in which effectors are allocated to threats, sequenced in time to achieve maximum probability of survival. The use of advanced computing hardware and algorithms will enable this development. Much more effective and automatic coordination of soft and hard kill will be required.

Recovering a platform after damage requires new ways of thinking and understanding of recovery systems and of human behaviour and performance. Next generation recovery systems may include: automated damage isolation, use of autonomous vehicles and robots for detection and response to damage events, and 3D-printing of repair parts. However, the degree to which automation will replace the human in recovery actions

is likely to be incremental, particularly in command and control systems. DSTG is developing an integrated survivability assessment capability model to assess the impact of new technologies like these, and command and control procedures and processes.

## Joint and Combined Maritime Operations

To be fully prepared for a range of operations from constabulary to peacekeeping to warfighting, navies need to operate successfully as single units, task groups and with joint and coalition forces. Under Plan PELORUS, by 2018, Navy will generate and deploy self supported and sustainable maritime task groups capable of accomplishing the full range of maritime security operations. These task groups will be self-contained with submarine, afloat support, aviation, mine counter measure and/or rapid environmental assessment capabilities as required by the mission.

Measuring and understanding these capabilities, identifying capability gaps and generating innovative concepts, doctrine and procedures will be essential to fully exploit their combat potential. New technologies will improve effectiveness and resilience. Networking increases efficiency in surveillance operations and in warfighting missions. Unmanned and off-board systems provide new opportunities and methods of achieving effects.

To support, understand and exploit this type of change, increased operations research and analysis support will be required. Modelling and simulation, war gaming, exercise analysis and operations analysis will be essential to measure warfighting effectiveness and to generate new tactics, techniques, procedures and command and control concepts. Capability decision-making will be supported by experimentation, systems analysis, advanced mathematical modelling and data analysis. The strategic application of long endurance unmanned and autonomous systems will be required to support force level operations. New technologies such as cube satellites, high bandwidth laser communications, and advanced electronic warfare all show promise in enhancing networking across the force. New sensor systems and systems for surveillance, data collection, analysis and fusion will be required to maintain a warfighting advantage.

## Power and Energy

Power and energy are key enablers for all maritime platforms. The available power and energy technologies have a direct impact on speed, endurance (for submarines), signatures, weight, stability and use of advanced directed energy weapons and phased array radars. The reliability of power systems can impact on platform availability, and maintenance requirements have a clear effect on through-life costs. Many technology challenges are limited by power and energy technologies. For example, autonomous underwater systems are severely limited in range and persistence due to energy constraints, particularly important to Australia given the size of its maritime zones. Required technology solutions include increased power density systems, lower cost, increased reliability and efficiency, increased portability and improved energy storage and distribution systems.

The science and technology required to achieve power and energy requirements for the future fleet will be based on novel energy reduction and efficiency technologies (such as waste energy harvesting from marine diesel engine turbochargers) and higher density energy storage technologies (such as integration of existing lithium-ion products and/or use of other emerging energy storage technologies). These technologies are maturing quickly for commercial vessels and need to be explored for their applicability to naval platforms. More efficient power generation through integration of maturing commercial technologies such as high temperature superconducting electric machines should also be considered for their benefits in naval platforms. High energy and pulsed energy systems, however, require the development of novel storage, switching and control systems and the associated thermal management technologies. There will be a move towards renewable energy and biofuels and the use of fuel cells as their efficiency increases and costs decrease. Finally, in the drive towards all these technologies, safety considerations must be central for Defence, especially for the integration of new energy storage technologies.

## Seaworthy and Airworthy Fleet

To ensure a maritime capability that delivers operational outcomes, the fleet needs to be both seaworthy and to have an airworthy capability. Seaworthiness focuses on assuring operational effectiveness, safety and environmental protection. Airworthiness addresses the suitability for flight of an aircraft from the perspectives of technical airworthiness (design, manufacture and maintenance) and operational airworthiness (safe operation).

The science and technology required to achieve a seaworthy and an airworthy fleet includes tools and assessment methodologies for areas such as structural integrity analysis, failure analysis mechanisms, materials science, corrosion mechanisms and predictive tools. The methodologies assessing the service life of a platform or life-extension of an existing platform exist but these need to be advanced by incorporating life usage data from structural health monitoring systems and simulation tools accurately modelling as-designed, as-built, as-repaired and as-deteriorated structures. These would be complemented by new sustainment strategies such as novel repair techniques, risk based maintenance and inspections. It is expected that future science and technology efforts will include diagnosis and prognosis of structural health, and developments in passive, latent and active systems, including their sensors and actuators. DSTG has active programs in structural health prognostics for both naval ships and aircraft. Further, application of self-healing and smart materials for naval and air platforms will be investigated.

Environmental compliance requires compliant emissions from propulsion systems, coatings and biofouling technologies. Although much of this technology already exists and is used on naval platforms, we know that evolving environmental legislation will drive technology to develop new solutions such as new fuel chemistries. The ability of

the human operator is paramount to onboard safety and this requires analysis of human fatigue, human systems integration, including decision support systems, autonomous systems to manage workloads and health and fitness. Finally the fleet requires tools for assessing the reliability, the availability and the maintainability of systems. This requires new sensor technology, collection and analysis of big data and robust predictive models and tools.

## Delivery of the Science and Technology

The navy of tomorrow will require much of the science and technology that has been outlined above. The challenge is how it will be delivered and how the Navy will have the ability to exploit the technologies. DSTG is a national leader in the delivery of scientific advice and innovative technology solutions to the ADF. DSTG provides expert and impartial advice in support of operations, in support of the current fleet and the acquisition of the future fleet. DSTG focuses on that science and technology where it has extensive, unique domain knowledge, where it has scientific excellence, or where Defence must maintain a sovereign capability. Core to this strategy is the essential role of external partnering to strengthen the ability of DSTG to integrate knowledge innovation for Defence. DSTG leverages world leading science, technology and innovation through collaboration with industry, universities and international agencies. It collaborates, burden shares, cooperates and exchanges information as elements of building the capability and the capacity as an innovation integrator.

DSTG has been very successful in the past in delivering science and technology solutions to the RAN. Examples include support to the remediation of the *Collins* class submarine (hull structural assurance, radar signature management, fatigue testing, remediation of combat system issues), support to the acquisition and operational use of the Mk48 heavyweight torpedo (research on data processing algorithms and tactics through advanced simulation, validation of torpedo defence/countermeasure systems), co-development of the Nulka anti-ship missile decoy technology, stealthy treatments for ships, *Armidale* patrol boats serviceability, unmanned underwater autonomous systems for environmental assessment and mine detection and undersea warfare technologies such as novel sensor systems and signal processing innovations and understanding of computing architectures. The group will continue to deliver science and technology to the RAN to aid in achieving the goals of Plan PELORUS and Plan BLUE.



# The Operational Impact of New Naval Technologies

*Milan Vego*

It will be better to offer certain considerations for reflection, rather than make sweeping dogmatic assertions.<sup>1</sup>

Rear Admiral Alfred T Mahan, USN

A war at sea (and also in the air) is generally much more affected by technological advances than is war on land. The main reason for this is that naval warfare revolves around platforms, and their associated weapons and sensors. Evolution of naval warfare was largely the result of various technological advances. The combat potential of a navy is to a greater degree dependent on the quality of its ships and weapons than is the case with armies. In general, a navy with superior technology has much greater chances of success than a numerically stronger but technologically inferior opponent.

Naval technological advances have affected all components of naval art. They had the greatest effect on naval tactics, less on operational art, and the least on naval/maritime strategy. New technological advances have the greatest effect on the methods of tactical employment of single platforms and their weapons/sensors and single naval combat arms (surface forces, submarine forces, naval aviation, naval special forces, coastal defence forces). New technologies have also considerable effect on the theory and practice of planning, execution, and sustainment of major naval/joint operations and maritime/littoral campaigns. The foundation of any major naval/joint operation is combined naval arms tactics, that is, employment of two or more naval combat arms and combat arms of other services aimed to accomplish operational objectives as part of a maritime/littoral campaign. Naval technological advances exercise influence on maritime strategy through naval operational art. The operational impact of new naval technologies should be deduced from their impact on naval tactics. This means that one's analysis should encompass wide ranges of technological advances in regard to design and type of naval platforms, their weapons and sensors, and information technologies. Obviously, the biggest problem is how far ahead to predict these advances. The longer the perspective, the more difficult it is to accurately predict their impact on operational art. The optimal solution is perhaps to focus one's analysis on the technological advances that are currently on the drawing board or under development.

## Technology and the Character of War at Sea

The single most important influence that affects the character of war at sea is new technological advances. Despite some claims to the contrary, changes in the character of war at sea were the result of only a few revolutionary inventions such as steam and nuclear propulsion, internal combustion engine, submarine, airplane, mine, torpedo,

and missiles, undersea cable, wireless telegraphy, radio. The advent of any radically new technological development in the past led many observers to believe that it would make all the previously existing technologies essentially obsolete. And in each instance, whether it was the introduction of some new naval platform or weapon system, the changes in the conduct of war were far less than their proponents had predicted. Most of the great technological advances were in fact result of the proper integration of existing and diverse inventions, as the advent of the *Dreadnought* battleship in 1906 shows. In contrast to other battleships, *Dreadnought* obtained greater combat power by mounting uniform 12-inch guns as the main armament, combined with a state-of-the-art fire control system and thereby enabling twice the effective range and twice the hitting power of existing battleships.<sup>2</sup> *Dreadnought* also had heavier armour with better protection against gunfire, torpedoes, and mines; and greatly improved watertight integrity. This first all-big-gun ship was also the first battleship fitted with steam turbines, providing a top speed of 21 knots and longer endurance. The result was a huge increase in the combat potential of the British battle fleet so that other major navies of the day had to meet the new standards in battleship design or remain hopelessly ineffective.

In some cases, the original purpose of an invention was changed to something very different. For example, the initial purpose of iron armour was to provide protection to the ship's crew from enemy shells. However, after the advent of a gun capable of perforating the ship, the purpose of the iron armour was changed to that of providing protection to the ship as a whole. The improvement of an accepted weapon may result in the appearance of an entirely new one. For example, the airplane was originally intended for scouting but later became a bomber.<sup>3</sup> Likewise, the submarine was initially used for the defence of naval bases/ports and the coast, but during World War I, it became one of the most effective and terrifying platforms for attacking merchant shipping.

In an era of rapid technological change, there is a great and perhaps understandable temptation to conclude that superior technology will somehow ensure success in combat and win wars. Experience shows that despite the introduction of ever more lethal and longer-range weapons, the nature of war has not changed. What has changed, sometimes drastically, has been the methods of conducting war, and thereby its character - but not the nature of war itself.<sup>4</sup> Also, it is forgotten that there is usually a rather large gap between the assumed potential of some new technology and its real capability. There is also often a considerable gap between technical feasibility and operational utility: if a given capability is technically feasible, that does not always mean it is operationally useful in combat.

## Surface Ship/Submarine Design

The trend towards modularisation of naval platforms, their propulsion systems, and weapons and sensors will continue. This, in turn, will greatly affect the number and type of naval platforms. The main purpose in applying modularity is to reduce the ship's construction cost and construction time (20-40 per cent), increase the number and diversity of the ship's roles, provide greater flexibility and simplicity for upgrades in the

ship's later life, reduce the number of systems, and lower maintenance costs.<sup>5</sup> Modules can be built and tested in parallel with each other. They also reduce the risks in the integration of components. Hull, mechanical and electrical costs are also reduced (4-7 per cent). Modular construction generally reduces life cycle and maintenance costs.<sup>6</sup> Modularity allows greater choice in the selection of available onboard systems. It also offers greater flexibility because the ship's roles can be changed within hours at a base or during a planned maintenance in a shipyard. The cost of mid-life conversion is greatly reduced. Modular design also offers considerable cost savings for training personnel and reduced logistical stocks.<sup>7</sup> The major deficiencies in applying modular design are a higher initial design effort, rigidity in the ship's design thereby possibly negatively affecting innovation, greater ship's weight and increased space requirements.<sup>8</sup> Maintaining ship stability under varying load configurations can be complicated.<sup>9</sup>

The US Navy and the Royal Navy are currently the leaders in the development of integrated electric propulsion (IEP) for their new large surface combatants. This system uses electricity generated by gas turbines or diesel generators to power electric motors that turn either propellers or water jet impellers. IEP is a variation of the combined diesel-electric and gas propulsion system for naval vessels. One of its greatest advantages is that it eliminates the need for clutches and thereby reduces or eliminates the need for gearboxes. Among other things, IEP offers decoupling of the engines from the hull and thus significantly reduces the ship's acoustic signature.<sup>10</sup> Other advantages include a reduced ship life cycle cost; increased ship stealthiness, payload, survivability and power.<sup>11</sup> The electric powered ships can use new propeller/stern configuration such as the padded propeller. This, in turn, can reduce ship fuel consumption by an estimated 4-15 per cent.<sup>12</sup> Potential disadvantages include higher near term cost, increased technical risk, increased system complexity, and less efficiency in sailing at full power.<sup>13</sup>

New advances in submarine design include smaller but far more effective reactors and further stealthiness of nuclear-powered submarines. The new advances in battery and fuel cell technology will be highly suitable for the conventionally-powered attack submarines (SSK), unmanned underwater vehicles (UUV) and other undersea systems, allowing long-duration operations. The power output of fuel cells could well double or triple in the next few years resulting in even greater performance.<sup>14</sup> Some SSK will use lithium-ion batteries instead of air independent propulsion (AIP). In the near future AIP will be valuable primarily as a low-speed, long endurance adjunct to the underwater performance of conventional submarines. There is little short-term prospect for AIP to become a primary propulsion alternative to either diesel or nuclear power.<sup>15</sup>

The trend toward increased numbers and capabilities of various unmanned vehicles (UAV/USV/UUV) will continue. The UAV will be used not only by surface combatants but also submarines. The UAV will be used for reconnaissance/surveillance of a large part of the ocean/sea area, and attacks on the enemy's smaller surface combatants and commercial ships. Potential missions for the USV include reconnaissance/surveillance, submarine detection/tracking, armed escort, mining, mechanical/influence

minehunting/neutralisation, and amphibious landing supply.<sup>16</sup> The UUV will be used for underwater reconnaissance and surveillance, and mine reconnaissance/clearance.

The current trend in major navies for numerically small battle fleets composed of large and highly capable (but also high cost) ships will actually further enhance the importance of operational art. Experience shows that the predominant, or even worse, exclusive focus on tactics and superior technology is not sufficient in winning a war against a strong opponent at sea who thinks operationally and strategically.

Since the early 1990s, the trend in naval construction was in designing multi-purpose rather than single- or dual-purpose warships. This is particularly the case in the design of large surface combatants such as cruisers, destroyers and frigates. The main reason for this situation is the enormous rise in construction costs for both large and small surface combatants and submarines which forced navies to reduce the number of ships in service. This, in turn, increased demands to add new missions to the existing platforms. Another reason was that new technological advances such as the open software standards, plug-and-play systems and autonomous remotely-operated vehicles allowed naval designers to configure ships to carry multi-mission modules.<sup>17</sup> There is also a firm belief, at least in the US Navy, that the new information technologies led to the enormous increase in the ship's combat power. However, the view that technology by itself can substitute for the number of platforms is based on misplaced confidence in the power of technology.<sup>18</sup> Obviously, multi-purpose ships offer a solution to how to maintain one's capabilities despite greatly reduced numbers of ships in service. Yet multi-purpose ships cannot have the optimal capabilities in all mission areas. There is also a major problem of maintaining crew training and proficiency onboard a multi-purpose ship compared with single- or dual-purpose ships.

## Anti-Surface Warfare

The trend in blue-water navies towards having larger and more capable but also more costly surface combatants will probably continue. The medium and smaller coastal navies would acquire smaller but increasingly more capable light frigates, multi-purpose corvettes and fast attack craft. Large surface combatants will be armed with the longer range anti-ship/land attack missiles (ASCM/LACM) and longer range and more lethal guns. Small surface combatants will be primarily armed with the ASCM and small calibre automatic guns.

The number of advanced and quiet SSK will most likely increase in the foreseeable future. Submarines will be fitted with AIP and will have a reduced indiscretion rate. The submarines will be armed with longer range and more lethal/precise missiles and heavy torpedoes. Operations by large submarines in the confined waters of the littorals will be increasingly risky. The detectability of submarines will increase in the future. Although there have been some remarkable advances in recent years in reducing submarine radiated noise, these efforts are probably reaching the limits of what is technically possible. This is especially true for the SSK.<sup>19</sup>

Today, conventional ASCM and LACM provide military and political authorities with an ability to conduct precision strikes against distant targets.<sup>20</sup> Surface ship and submarine launched long-range missiles combined with carrier-based attack aircraft are the principal platforms to conduct strikes deep into an enemy's littoral. The long-range LACM poses a serious and ever present threat to the survivability of one's forces, naval/air bases and ports, and coastal installations/facilities. This threat is bound to considerably increase in the future due to the introduction of missiles with much longer range, higher speed, stealthiness, precision and lethality than those in service today. There will be a similar trend for the ASCM. Both LACM and ASCM will be more survivable and much more difficult to counter by one's air defences. The capabilities of anti-ship missiles will steadily increase in the years ahead. The new ASCM will have longer range, higher speed, and lethality. They will be increasingly difficult to effectively counter because they will be smaller in size and built to reduce their radar cross signature. The new ASCM/LACM will be fitted with electronic countermeasure devices and be capable of avoidance manoeuvres in their terminal phase.

Major efforts are underway to make torpedoes stealthier. A torpedo that can approach its target covertly will make it more difficult for the target to deploy its countermeasures timely and effectively.<sup>21</sup> The new generation of torpedoes are less noisy because they are fitted with skewed fibreglass or carbon composite blade counter-propellers.<sup>22</sup> Carbon fibre is reportedly ten times stronger than steel and five times lighter. Covert homing techniques such as low probability intercept and low probability of recognition waveforms and single processing techniques as well as advanced passive technologies are under development. If successful, these techniques will result in a significant reduction of radiated noise.<sup>23</sup>

In the future, the greatly increased range, lethality, and precision of a ship's guns will significantly enhance the capabilities of naval forces in both fleet-on-fleet engagements and in providing surface fire support during amphibious landings and to ground forces operating on the coast. For example, the US Navy is currently developing a new 155mm/62 (6.1-inch) calibre automated advanced gun system with the effective range of about 100nm. This gun was originally designed to be installed onboard the DDG-1000 Zumwalt class destroyers. It will fire the new long range land attack projectile. Concurrently with the development of new guns, the US Navy made significant efforts to develop several new projectiles with increased range and higher accuracy. The EX 171 round was initially developed to extend the range of 5-inch guns to about 63nm. The new revolutionary development is the rail gun. The US Navy successfully tested its 10.64 megajoule rail gun in February 2008. This gun uses a magnetic 'rail' instead of a chemical propellant like gunpowder to fire projectiles at a speed of Mach 7, to a distance of about 190nm or ten times the range of contemporary naval guns. The projectile will hit the target at a speed of Mach 5, destroying it with kinetic energy instead of conventional explosives. The program was initiated in 2006 and is planned for completion in the 2020-25 timeframe.

In the future, longer-range, more lethal, and highly precise weapons will further enhance the importance of strike, which will most likely replace naval battles as the principal method to accomplish major tactical and even operational objectives at sea. Netting will allow one's forces to carry out a series of powerful strikes by geographically widely dispersed platforms against targets many hundreds or even thousands of miles away. In operational terms, major naval/joint operations will consist largely of attacks and strikes. Maritime/littoral campaigns might be shorter in duration than those conducted in the past.

Perhaps the most important new development is the reported Chinese success in designing anti-ship ballistic missiles (ASBM) capable of hitting and destroying aircraft carriers at sea. The medium-range Dong Feng (East Wind) DF-21C and intermediate-range DF-26 are fitted with manoeuvrable warhead that can be used against large surface combatants. These missiles pose a potentially grave threat to the survivability of US Navy aircraft carriers, and reportedly have an effective range of 1650-1750km and a speed of Mach 10. The DF-21C missile can carry up to a 2000kg penetrating, high-explosive warhead. The missile is fitted with an active radar seeker and image recognition system. This missile is fitted with a manoeuvrable warhead incorporating passive/active radar for terminal guidance. Reportedly the missile has a low radar signature and hence it is difficult to detect in a timely manner. The missile's circular error probable is 40-50m. It can reach a carrier group within 12 minutes of being launched. The missile has stealthy features. Its trajectory can be changed, thereby making it more difficult for a defender to plot an intercept course. The DF-21C is capable of hitting a moving ship, such as an aircraft carrier, with a fairly high degree of accuracy. If these claims prove to be true, then the US Navy will have serious problems employing its carrier strike groups within the effective range of the DF-21C because there are no known defences against such a weapon. Very little is known about the new DF-26 missile except that its effective range is about 3000-4000km. It has been reported that the Chinese are also developing a new over-the-horizon radar that can detect large ships such as aircraft carriers up to 3000km away.

The emerging threats in the littorals will greatly increase risks for aircraft carrier operations. Currently, US carrier-based fighter/attack aircraft can conduct strikes from a distance of up to 200nm. However, in several areas, notably the western Pacific Ocean, long-range ASCM launched by surface combatants, aircraft, submarines, and from the coast can pose significant threats to aircraft carriers operating within their effective range. The new Chinese ASBM would increase that threat to 900nm and more. This, in turn, would force to carriers to operate beyond these ranges. The F/A-18E/F Hornet has a normal unrefueled range of about 570nm, while the range of the F/A-18C is even less. Hence launching strikes from beyond a distance of 900nm would require air-to-air refuelling for all aircraft participating in a strike.<sup>24</sup> The threat posed by Chinese ASBM is very serious and requires multi-layered defences including both hard and soft kill systems. The current AEGIS ballistic missile defence system might not be adequate to neutralise this threat. Perhaps this system might be greatly enhanced by free electron lasers, which accelerate beams of electrons to near the speed of light in a racetrack-

like accelerator, and use powerful magnets to 'wobble' electron beams to generate high-energy beams of lesser protons. Potentially, they can be used for interdicting hardened targets such as incoming ballistic missiles, and re-entry vehicles. They have a unique ability to tune their beams to different wavelengths so that they can better transmit through the dense, humid atmosphere in the maritime environment.<sup>25</sup>

Recent advances in direct energy weapons offers perhaps the most radical changes in the defences of surface combatants and aircraft against the threat posed by enemy aircraft and missiles. The main advantage of direct energy weapons is that they can reach the target at a speed of 300,000m/sec. Their beams are not affected by gravity or atmospheric drag. They generate extremely precise effects. They can be tailored to generate a wide range of lethal and non-lethal effects.<sup>26</sup> The amount of energy generated by direct energy weapons can be adjusted. They are cost effective because they can be used repeatedly. And they can be used either as weapons or sensing devices.

All direct energy weapons emit electromagnetic radiation in the form of photons that travel at the speed of light. Enemy missiles could be engaged kilometres away in less than one millisecond and disabled or destroyed within a few seconds. A single direct energy weapon defensive system can engage several incoming aircraft, missile, mortars shells, or artillery rounds.<sup>27</sup> Importantly it can also increase the mission duration of air refuelable aircraft that currently carry expendable conventional munitions, and increase the time on-station of deployed naval vessels because their magazines would not require periodic replenishment at a port facility.<sup>28</sup> A combination of direct energy weapons and lethal systems could increase the number of defensive engagements per salvo attack and thereby reduce the potential for enemy leakers to hit their targets.<sup>29</sup> Direct energy weapons could possibly be very effective in the defence of surface combatants and aircraft carriers against swarms of fast attack craft, inexpensive UAV, and guided rockets, artillery, mortars and missiles.<sup>30</sup> However, direct energy weapons alone will be insufficient to counter the challenges posed by enemies possessing advanced precision guidance weapons.<sup>31</sup> The US Navy is currently exploring tactical solid state lasers to counter multiple surface and air threats such as small boats and UAV. It integrates a tactical laser system with a Mk38 machine gun system. Another concept would integrate a 25KW fibre solid state laser onboard H-60 helicopters to engage surface targets.<sup>32</sup>

## Anti-Submarine Warfare

The character of the submarine threat and operating environment has dramatically changed since the demise of the Soviet Union. Instead of facing a large number of Soviet nuclear-powered submarines on the open ocean, SSK operating in the littorals have emerged as the most serious threat to the survivability of one's forwardly deployed naval forces and military/commercial shipping. Although the overall number of submarines declined in the past two decades, their capabilities in terms of range, endurance, quietness and diversity of weapons increased considerably. The emerging threats to forwardly deployed naval forces and naval bases/ports are mini-submarines, swimmer delivery vehicles, remotely operated vehicles and autonomous underwater vehicles.

Since the early 1990s, the emphasis in anti-submarine warfare (ASW) had shifted from deep water open-ocean to the littorals. The use of traditional acoustic detection sensors is much more complex in the littorals because of the great variations in temperature and salinity, influx of fresh water, and background noise. Today, detection of a SSK in shallow waters of an enclosed or semi-enclosed sea endowed with many islands or archipelagos poses almost insurmountable difficulties. Destroying enemy submarines was in the past and will remain for the foreseeable future a protracted struggle that will require disproportionately large resources and time. While the role and importance of technology cannot, and should never be underestimated, it is very much doubtful that projected or future technological advances will change the very character of ASW. Destroying or neutralising hostile quiet conventional submarines in the littorals will be much harder and more time-consuming than open-ocean ASW against large and relatively noisy nuclear-powered submarines.

The effectiveness of passive sonar will continue to erode. Submarines will become quieter.<sup>33</sup> Miniaturised sonar technologies will reduce detection thresholds.<sup>34</sup> A submarine or UUV could emit sound to drown out its own radiated noise or deploy decoys to create false targets. Against active sonar, a submarine can use acoustic jamming similar to airborne electronic warfare systems against radar.<sup>35</sup> The emergence of non-acoustic techniques show great promise in detecting minute changes on the ocean surface caused by a submarine or the wake it leaves.<sup>36</sup> Lasers and light emitting diodes can support non-acoustic ASW by bouncing light off the submarines hull similar to active sonar.<sup>37</sup>

The focus of future ASW research and development will be on sensors over weapons, and networks over platforms.<sup>38</sup> In network-ASW, acoustic sensors onboard surface ships and submarines are part of a much wider network of sonars dispersed over a large geographical area. A group of widely dispersed off-board sensors would operate as a single sonar system organic to a group of ships rather than an individual platform.<sup>39</sup> The use of networked-ASW is still largely an unexplored area, and it has been never tested in combat. One problem with the use of netted sensors is the requirement for a very large bandwidth due to the need to transmit huge amounts of data to be processed by humans onboard ASW platforms. Like mine warfare, the success in ASW cannot be ultimately won without superior technology. Because of its inherent complexity, ASW requires, as in the past, the employment of all naval combat arms and combat arms/branches of the other services. It would also require support and participation of other government agencies, the scientific community, and support of the public.

Success in ASW cannot be ultimately achieved without a high degree of centralisation at the operational and strategic level of command. Yet, tactical commanders must be given sufficient freedom to act within the boundaries of the higher commander's intent; otherwise, it is not possible to exercise initiative in the course of combat. ASW also requires the closest degree of cooperation between a navy and the other services. Air force and in some cases also the army can make a substantial contribution in the successful struggle with the enemy submarines. ASW cannot just be won by better

tactics and superior sensors/weapons. It requires operational perspective from higher commanders and their staffs. While tactical excellence is critical for success, the struggle for control of the sub-surface cannot be won without a larger and much more important operational framework. Without an operational concept, no sound operational level ASW doctrine can be developed. A sound operational level ASW doctrine should also envisage participation of the other services and land-based aircraft in particular can contribute in the conduct of ASW.

## Amphibious Warfare

Landings on the opposed shore in some parts of the world could pose much greater risks for the attacking force than was the case in the recent past. The primary anti-access capabilities in the littorals are land-based fixed-wing aircraft and helicopters; quiet, conventionally powered submarines; small surface combatants armed with anti-ship missiles, torpedoes, or guns; ASCM launched from ships, submarines, and from the shore; mines; UAV; coastal missile/gun batteries; and tactical ballistic missiles. In addition, small stealthy surface craft armed with low-technology small-calibre guns, short-range rockets, or even suicide bombs can threaten not only commercial shipping but in some cases even larger surface combatants. This situation led some US defence officials to doubt the possibility of conducting amphibious assaults in the future. However, these views are not supported by historical evidence. The need to project maritime power ashore was a constant in almost all wars at sea. What was different were the methods of projecting that power. The anti-access/area denial capabilities might look formidable but that does not mean they cannot be overcome.

The US Marine Corps capstone concept expeditionary manoeuvre warfare incorporates operational manoeuvre from the sea (OMFTS), ship-to-objective manoeuvre (STOM), sustained operations ashore, and other expeditionary operations. The OMFTS envisions moving a Marine Air-Ground Task Force or its parts directly to the assigned operational objective deep in the enemy's rear. Such an action would be carried out without stopping to seize, defend, and build up beachheads or landing zones. The STOM is the main tactical component of OMFTS.<sup>40</sup> It is aimed at creating the prerequisites for the insertion of follow-on army and air forces and also multinational forces on the hostile shore.<sup>41</sup> Sea basing is the principal enabling concept for OMFTS/STOM, and other expeditionary warfare concepts. The sea base of the future is described as manoeuvrable, scalable aggregation of distributed, networked platforms that enable the global power projection of offensive and defensive forces from the sea. It includes the ability to assemble, equip, project, support and sustain those forces without reliance on land bases within the joint operations area.<sup>42</sup>

## Mine Warfare

Currently, advanced (also called 'smart') mines are fitted with multiple sensors. They can be activated by sensing the target's magnetic, acoustic, pressure, underwater electric potential, and extremely low frequency electromagnetic signatures, either singly or in

combination. These mines can distinguish decoys and be set to respond to the signatures of specific types of ships or submarines and, theoretically, even individual ships. The explosive charge of modern mines is roughly twice as powerful as those fitted in their predecessors 50 years ago. The instrument section has been reduced by 20 per cent, allowing the fitting of more advanced actuating mechanisms. The lethality range of sea mines has increased from a dozen feet to almost half a mile through the use of mobile warheads. These mines can be propelled either through buoyancy or a propulsion system. Mobile mines can be straight-rising, 'vectored', or homing. Buoyancy-propelled mines are most effective in shallow water and against slow-moving ships or submarines. In contrast, rocket-propelled mines are three times faster than buoyancy-propelled mines. They also can be used at depths of up to 200m. Modern mines can be wirelessly and remotely controlled (acoustic, electro-magnetic, and radio frequency). They also increasingly difficult to detect and neutralise because of their stealthy features (sand burial, coatings, irregular shapes, non-magnetic casings, close tether moorings).

Current trends are toward increasing lethality ranges by using torpedo-propelled mines and using deeper anchor depths; improved target discrimination by using microprocessor controlled triple influence target detection devices and improvement of target libraries. Mines are increasingly more difficult to detect because of their standoff employment.

### Impact of Information Technologies

The enormous advances in information technology in recent years have elevated information as a common link among the factors of space, time, and force. Some military theoreticians and practitioners go even further and claim that information has emerged as a fourth factor in addition to the three traditional operational factors.<sup>43</sup> Information will increasingly affect each of these factors, both individually and in combination. Although information will not have the same quality as these three factors, its influence could be decisive for the success of a military effort at any level. Therefore, information must be fully considered by commanders at all levels.<sup>44</sup> In fact, it can be argued that information today is an integral part of one's combat potential/combating power and hence a part of the factor of force. In the future, the importance of information will increase exponentially. Information will have a completely new quality and will significantly change the traditional factors of space, time, and force. Therefore, information must be fully considered by commanders at all levels of command.<sup>45</sup> Yet information is essentially useless unless it contributes to sound decision-making in combat.<sup>46</sup>

Computer power is expected to grow exponentially in the next 10-20 years. Computing speeds will be more than 1000 times faster than today's supercomputers. New storage techniques such as nanotechnology-enabled memory will vastly increase the capacity to store and transmit data.<sup>47</sup> Information system vulnerability will steadily increase. Among other things, opponents will be able to manipulate satellite communications. They will be able to disrupt or block information required for decision-making. Methods of attack will include cyber and the employment of electro-magnetic pulse devices to infiltrate and disrupt networks.<sup>48</sup>

Information technologies already have a considerable impact on the conduct of operational warfare at sea. This is particularly the case concerning all phases of the struggle for sea control. In the information era, the struggle for sea control must be accompanied from the very beginning by all-out efforts to obtain or deny information superiority. This should be an integral part of the operational concept for obtaining/maintaining sea control. In general, information dominance can be described as one's ability to make quick and sound decisions, assisted by technical capabilities in collecting, processing, and disseminating an uninterrupted flow of information while at the same time exploiting or denying an enemy's ability to do the same. The struggle for control of cyberspace is analogous to the struggle for sea control. It is simply a myth, and a dangerous one, that one could achieve full and absolute control of the cyberspace for any length of time. Such control is inherently relative, incomplete, and highly tenuous and it is in a constant state of flux. A weaker side at sea might in fact have greater ability to achieve information dominance than its stronger opponent; the opposite could also be true. Because the extent of cyberspace is essentially limitless, one cannot achieve general or local control as in the struggle for sea control. Like sea control, one's control of the cyberspace can be permanent or temporary. A *permanent control* of the cyberspace exists when the stronger side dominates the electro-magnetic spectrum for the duration of war. At the same time, the weaker side is unable to achieve such a control for any lengthy period of time and cannot interfere with the use of cyberspace by the stronger side. In a war between two strong opponents a more likely outcome of the struggle is a temporary control of the cyberspace. Such a situation is highly unstable as the advantage can shift rapidly from one side to another.

Control of cyberspace can vary from limited to absolute. A limited control of cyberspace pertains to one's ability use cyberspace only for a certain purpose. This means that the stronger side was successful in destroying or neutralising some key elements of the enemy cyberspace capabilities. Normally, a state of disputed or contested control of cyberspace would exist in the struggle between two strong opponents. It is less than absolute control and more than limited control. This situation would be characterised by rapid and sudden changes in the situation in cyberspace.

Current and new information technologies will have a significant impact on the factors of space, time, and forces in warfare at sea. Among other things, the factor of space will encompass not only the traditional land, sea, and air space, but also information space or cyberspace.<sup>49</sup> The existence and increasing importance of the fourth dimension - cyberspace - will further blur the boundaries of the theatre. Some critically important elements of operational functions that rely on computer networks will be physically located many hundreds or thousands of miles away, whether in outer space or on the ground. This, in turn, will make it exceedingly difficult for operational commanders and their staffs to exercise command and control and to successfully defend and protect various elements of their information systems.

In the future, the factor of time will be further compressed. Simultaneously, the new information technologies will have the capability to absorb, evaluate, use, transmit, and exchange large volumes of information at high speeds to multiple recipients. Multiple sources of data will be correlated faster than ever. Decision cycles will be much shorter than they are today.<sup>50</sup> Changes in the dimensions of space and time will considerably increase the tempo of events at sea.<sup>51</sup> The side that wins the struggle for time and has the information advantage and reaction dominance is in a position to surprise the enemy and obtain the initiative. Information dominance is the principal aim, to ensure an advantage in terms of time and achieving freedom of action.<sup>52</sup>

New information technologies will allow a significant and, in some cases, drastic reduction in the time needed to plan, prepare, and execute major naval/joint operations. In the future, information on the disposition of one's naval forces will be rapidly and accurately disseminated and portrayed through the use of digital technology - reporting, voice, data, imagery - and potentially could provide reliable signal support and accurate and timely collection, processing, dissemination, and display of the operational situation. This would allow the naval operational commander to see and communicate throughout the battlespace. The commander will be able to clearly communicate his intent and concept of operations throughout the chain of command.

Network-centric warfare advocates argue that one of the great benefits of netting one's naval forces is the significant increase in the forces' combat power. They contend that platform-centric warfare generates only 'combat power', while network-centric warfare generates 'increased power'. They asserted that in the information era, power comes from information, access, and speed, while in the industrial era it came from mass.<sup>53</sup> However, it is extremely hard to measure the gain in the combat potential of netted naval forces. The traditional elements of combat potential, such as raw firepower and mobility, are easier to quantify. The problem of estimating true combat power is complicated by the presence of so many intangible factors that elude any form of quantification. In a networked force, all the gain in combat power can be significantly reduced and even eliminated by micromanagement and excessive centralisation. Also, poorly educated forces and incompetent commanders and staffs invariably reduce one's combat power.

The steady and ever-increasing power of computers and global network connectivity has resulted in the enormous ability to process and distribute essential data, such as intelligence and other information. This, in turn, has significantly increased the potential effectiveness and diversity of methods used for deception at all levels. One of the methods the deceiver can use is to deliberately saturate the deception target with a vast amount of essentially useless information, overwhelming the ability to process the information received. This also drastically reduces the time available for one's information system to properly and timely process, analyse and disseminate the resulting intelligence. A direct information attack can aim at planting false information in the enemy's database - for example, creating a false order of battle.<sup>54</sup> The key for success in this deception method is to determine what fictions will produce the desired actions from the potential attacker or defender. Then these fictions must be created and sustained over time to produce

the desired reactions from the deception target. The attacker can also use so-called logic bombs to incapacitate the opponent's information system. Such a 'bomb' can lie dormant until it is activated by some event, such as a specific date or a random number, and then destroy or substantially damage the opponent's information system. Another deception method that can be used today is a conventional attack against an aspect of an enemy's information system, such as his computer network's 'server farms' or telephone switching facilities. The array of potential targets is enormous, and the more the enemy relies on information technology, the greater his vulnerability to such attacks.<sup>55</sup> Hence, the weaker side also has a significant ability to plan and execute deception by exploiting the inherent vulnerabilities of sophisticated technology to even the most basic measures of camouflage and concealment. Simple deceptions can be effective against certain types of information attack, while far more sophisticated methods would be required to counter the efforts of highly sophisticated intelligence organisations.<sup>56</sup>

As in the past, traditional theatre-wide functions - specifically, operational command structure, intelligence, command and control warfare, logistics, and protection - will remain indispensable in ensuring the success of campaigns and major operations. The new technological advances will significantly influence the way military forces are organised for combat. Operational command echelons will be the most critical link for planning, preparing, executing, and sustaining major operations and campaigns. At the same time, technological dependence on modern command and control and information systems also creates vulnerabilities and sources of disruption.

The new technological advances will substantially increase one's ability to obtain accurate, timely, and perhaps relevant intelligence regarding the enemy's tangible capabilities - both military and non-military. However, one's ability to know, with any degree of certainty, the enemy's intentions or actions will not improve any time soon. In the past, increases in the volume of information led to further decentralisation of intelligence, because the lower command echelons did not have either the resources or the time to digest the vast volume of information necessary for the commander to make decisions.

Another serious problem that may defy solution is the ever-growing collection of all kinds of information that cannot be either processed or transmitted in a timely manner. This information overload can result when there is too much information for the commander and his staff to timely process and place into the proper context. It can also result when technical systems cannot quickly transmit relevant information to users. Among other things, one's commanders can be overwhelmed by a vast flow of information, especially if they are not properly trained.<sup>57</sup> The greatest challenge that needs to be resolved is not to overwhelm the user with vast volumes of raw data and unprocessed information. The critical problem is sorting out relevant from unimportant information.<sup>58</sup> The situation is even more serious if networks are used primarily to pass data instead of processing it into information. In that case, the sheer amount of data that the diverse sources collect and transmit to users will most likely overwhelm the processing capability of lower command echelons.

Yet processing more information may as easily saturate commanders and their staffs with a flood of indigestible data. This, in turn, means that the theatre-strategic level of command, which has much greater capabilities for processing information, will further centralise decision making at all levels. Another problem in the application of network-centric warfare is information overload. The stronger the opponent and the more intensive the combat, the larger the amount of information that must be collected, processed, and evaluated. Information overload is not only a matter of insufficient radio frequency bandwidth; it also means that too much information must be processed and evaluated. One possible solution for this growing problem is to provide each commander with information pertaining to his area of responsibility plus his area of interest. This means that intelligence should filter the available information and then be transmitted to the next lower level of command.

The network-centric environment has a number of technical and human limitations that have the potential to significantly and adversely affect the employment of one's forces in combat. The entire network-centric warfare concept is based on the collection, processing, and dissemination of vast volumes of information. Hence, its success is predicated on having an extremely complex network of interoperable sub-nets and systems working well. Reliance on network information could slow one's force tempo, because incoming traffic can considerably slow down decision-making. Information overload could also slow the tempo, by overwhelming processing capabilities. Radio frequency bandwidth is another limiting factor today that can considerably reduce the rate of information transmission. This problem is easier to resolve than that of the limitations of the human brain. Among other things, limitations in bandwidth can be solved by using powerful space-based lasers and terrestrial fibre-optics communications.

An increase in situational awareness is limited by the human ability to process data. A human brain can be overwhelmed by the amount of information available.<sup>59</sup> As technological advances proceed at an extremely rapid pace, a vast amount of information will be generated within an ever-decreasing time window. So far, the human decision-making cycle has not kept up with advances in technology. The human factor can, in fact, become the weakest link in the decision-making process. This problem can possibly be resolved if appropriate and timely actions are taken to adopt advanced techniques in processing and displaying information to be assimilated by the commander and his staff. Otherwise, technology will increasingly become a problem, not a solution. As a result, the new information technologies can actually increase, not reduce, the fog of war and friction.<sup>60</sup>

The problem of accurately evaluating intangible factors of the enemy's situation, such as the will to fight, combat motivation, unit cohesion, and morale and discipline, is not likely to be resolved, regardless of technological advances. Computers, no matter how capable, will not be able to resolve all the uncertainties in the actions and interactions of either side in a conflict. In the future, the need to have accurate, timely, and relevant human intelligence will be significantly increased. This will especially be the case in the post hostilities phase of a campaign and in low-intensity conflict.

Information obtained from the military information infrastructure is an integral part of the factor of force. However, the operational commander also uses non-military information acquired from the global information infrastructure. Information affects one's force morale, discipline, unit cohesion, and combat motivation. It can also considerably influence the morale of the population and, hence, the state's will to fight. This, in turn, directly or indirectly influences the political leadership and the operational commander. Therefore, information is always present as one of the most important considerations in making strategic or operational decisions. Only with better intelligence and more timely information can the operational commander make sound decisions in combat. More capable systems for command and control allow one to obtain, transmit, evaluate, and present actual information faster. The struggle for the information advantage is a problem not only of media relations, but also of obtaining and then maintaining information dominance over the adversary.

There are several new technologies under development aimed at greatly improving existing logistical support and sustainment. In the near future, the trend will be toward greater automatization of naval logistics functions to reduce the need for manpower and much faster and more accurate tracking of inventories. Supplies will be moved through the logistics system with minimum human intervention.<sup>61</sup> The horizontal and vertical movement of cargo onboard a ship will be highly automated and integrated and thereby greatly minimise delays. Automation will potentially eliminate all manual inventory tracking.<sup>62</sup> Current technologies allow a ship's crew to know the location and the type of cargo onboard. However, the knowledge of logistical supplies onboard other ships is lacking; hence the need for total asset visibility.<sup>63</sup> RFID technology is highly effective but there are also some major problems (reflection and multi-path nulls) that preclude its use in ship passageways and holds.<sup>64</sup> Internal cargo handling will be greatly improved. The movement of cargo and weapons from the shipboard unload point to stowage spaces (strike-down) and from stowage place to the offload point for transfer to another ship or to shore (strike-up) will be automated.<sup>65</sup>

Traditional underway replenishment methods are relatively effective but there are also some problems. Supplies are sometimes hastily stowed and that often requires the ship's crew to devote considerable time and effort to store them properly. The new technologies and procedures will be available in the near future to enable resupply points and logistics ships to know the configuration of each ship, the ship's storerooms, strike down reroutes to allow packaging, labelling and sequencing of deliveries for efficient strike down and storage. The new technologies will make it possible to deliver supplies to combatants in war fighter-ready status just as commercial retail firms are delivering merchandise shelf ready or rack ready.

The blue-water navies will most likely rely in the future on the small number of the larger and more capable platforms but serving more clients for a greater variety of deployments.<sup>66</sup> The smaller navies do not have resources to build and maintain large and high-cost logistics ships. Some smaller navies have in service a relatively large number of auxiliary vessels, but they are having great difficulties in replacing these ships on a one-to-one basis. Hence, they are trying to acquire fewer but larger multi-purpose support vessels.

Operational protection will require steadily greater resources because of the need to protect not only military forces and facilities in a given theatre, but also the civilian population. One of the increasingly difficult problems will be protection of information, because the range of capabilities available to hostile states and groups, or even individuals, is bound to increase in the future. This problem will be quite complex and complicated, because the operational commander will find it extremely difficult to protect elements of information systems located at great distances from his theatre.

## Conclusion

As in the past, new naval technological advances will affect the character of war at sea but not its nature. Despite some influential views, naval technology can never replace operational art. It can only change the methods and procedures in the combat employment of naval forces and aviation. Obviously, their greatest effect will be on naval tactics and the least on naval/maritime strategy. In operational terms, new technological advances will have the greatest effect on planning and executing major naval/joint operations. Perhaps the single greatest operational impact will be new information technologies. This will be particularly true in obtaining/maintaining and denying sea control, and exercising control of the sea. Yet experience conclusively shows that advanced technology by itself is insufficient to secure victory against a strong and resourceful enemy unless it is combined with superior leadership, morale/discipline, and unit cohesion, combat training, and the will to fight. Materiel represents the means not the ends in naval warfare. Human nature has changed little despite the vast changes in naval technologies. All wars are fought by humans. The human element is the most important element of warfare in general, and war at sea was not in the past and will not be in the future an exception.

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# A Hybrid Navy for 2020: The Sri Lankan Strategy

*Sirimevan Ranasinghe*

The geostrategic significance of Sri Lanka in the Indian Ocean is recognised by the global maritime community. With an ever increasing dependency on the oceans for resources and trade, and due to its geographical positioning, Sri Lanka has been entrusted with the huge responsibility of protecting the vital sea lines of communication that run to its south.

In discussing the future of sea power from a Sri Lankan perspective, I will cover our recent operational experience and how we are planning for the future.

## Present Day Asymmetric Threats

As we are all aware, the maritime domain is dynamic in nature and managing affairs in it, is a huge challenge for any navy. The vastness of the ocean space and the inability to conduct surveillance over every square inch of it, are some of the challenges navies face. The Falklands War (1982) is the last known major conflict between two states involving maritime elements. Since then, no state has manoeuvred naval fleets against another.

Yet, there have been quite a number of maritime-related incidents in various parts of the world. Since 1982, the Sri Lanka Navy has been the only navy to engage in actual military operations. As you know, Sri Lanka was successful in using the traditional composition of a small navy to evolve over time to defeat its enemy - the maritime capabilities of the Liberation Tigers of Tamil Eelam (LTTE) - which were once considered undefeatable.

Even though naval battles among states are highly unlikely to occur in the future, there are a number of asymmetric threats that navies currently face. I mention two in particular.

I would rate the use of suicide boats against naval assets as a major threat. These boats are small and hard to detect by most sensors. If you are lucky, you will be able to see them at a very close range during the day. But the possibility of detecting them at night will be very low. These suicide boats can take any shape, size and the enemy has the luxury of choosing the time, place and mode of attack against a naval platform. An innocent looking fishing vessel, a jet ski, a pleasure boat or any other specially designed small fast boat can easily be converted to a lethal suicide boat, carrying high explosive to inflict heavy damage.

The use of humans as a torpedo or a similar device is another threat. This can be a highly stealthy tool used in places where vessels have to manoeuvre at slow speed. Such a device can carry a sufficient payload to deliver a lethal blow and detection of it when in water will be extremely difficult.

## How the Sri Lanka Navy Responded to LTTE Maritime Asymmetric Tactics

The attention paid to maritime strategic issues today is comparatively high when compared with the situation that prevailed in Sri Lanka in the early 1980s. We paid a heavy price because we did not pay serious attention to protecting our surrounding seas. The LTTE was capable of forming a *de facto* army, navy and a small air force due to their success in ferrying much needed military hardware via the sea.

In the latter years of the conflict, the Navy quite rightly identified the strategic importance of destroying the LTTE centre of gravity - its international maritime network. LTTE small attack craft were capable of fighting simply because their supplies were arriving on a regular basis. The destruction of its international shipping network had a significant bearing on the land victory. With help from friendly states, we had accurate and real-time intelligence on the LTTE ships carrying the lethal military hardware required for their terrorist activities on land. However the locations of these ships were found to be far beyond the capabilities of our Navy to respond.

Except for a very few individuals, no one in the naval decision-making hierarchy believed that our ill-equipped fleet could sail that far. Some argued that the fleet would not be able to cover half the distance required. The naval leadership then took one of the most critical decisions in the history of the Sri Lanka Navy.

In the end we managed to transform our fleet, which was dominated by a large number of fast attack craft, very few offshore patrol vessels and old merchant vessels, to do the unthinkable and return safely. Many maritime security experts cite the Navy's contribution in destroying the LTTE floating armouries as the pivotal point in the conflict, and for that matter, the key enabler in winning the war.

## Theory Applied in Battle

The LTTE presented a significant challenge to the Navy at sea by using suicide boats, swarming tactics, stealth attack craft and various other innovations we had never experienced before. Even though control of the sea was not lost, naval units were taken by surprise during these initial encounters, and experienced severe losses. The Navy reacted to the LTTE using a similar strategy and tactics to theirs. This required the Navy to be proactive rather than reactive. We used quite a number of innovative tactics especially in the final stages of the conflict. Out of many such innovations, the small boat operations introduced by the Navy took the LTTE Sea Tigers by surprise. The Sri Lanka Navy built a large number of small boats that could deliver lethal fire power and were capable of rapid manoeuvre at speeds over 50 knots. The introduction of the Rapid Action Boat Squadron manned by the Sri Lanka Navy's elite Special Boat Squadron led to the annihilation of the LTTE attack craft and suicide boats.

The famous engineer, Frederick Lanchester's celebrated 'square law' equation was practically tested in one of the most daring maritime hostile environments one could imagine. Lanchester showed that for aimed fire, the number of fighting units is more valuable than their fighting quality. He further stated that a commander is better off with twice as many units of force than with twice the rate of effective fire power. This equation was developed for air combat but used infrequently in naval combat. The Sri Lanka Navy proved his theory to be true in the final phases of the conflict with the LTTE.

### Limitation of Asymmetric Warfare Tactics by Navies

LTTE maritime capabilities no longer exist and I doubt the existence of any other terrorist group having similar capabilities to use maritime asymmetric tactics against a navy. Even though the LTTE is no more, the danger is that the range of innovative maritime asymmetric tactics they introduced, are readily available for interested parties to acquire. An example of this is the USS *Cole* incident where the tactics used in that attack were quite similar to one particular attack carried out by the LTTE Sea Tigers on a Sri Lankan naval vessel.

Like small arms, and improvised explosive devices available on the open market, a wide range of battle proven innovative tactics introduced by the LTTE are known by many. If interested parties start imitating these tactics to their advantage, what will be our response? These are some of the issues to which we need to pay attention.

### The Small Boat Threat: How Realistic is it?

Based on the Sri Lanka Navy's experience against the LTTE, I see two probable courses of action should small boats be used. First, small boats disguised as typical fishermen in certain traffic-congested areas can easily target merchant ships. As 90 per cent of world trade is by sea, an attack on an oil tanker, chemical tanker or cruise liner will have a devastating global impact. As an example, if a non-state actor really wanted to jeopardise Sri Lanka's seaborne trade, they could attack a Triple-E container ship using a small boat at the entrance to Colombo harbour. Delays in harbour operations for a couple of days will have an enormous impact.

Second, a naval fleet can also be easily targeted by small boats especially in chokepoints. A naval ship is particularly vulnerable when entering and leaving harbour - this is where a small boat or a similar craft could target a naval vessel - and a single such attack could easily have a major impact. Pirates active in various parts of the world could easily adopt these tactics and pose a threat to merchant vessels as well as naval vessels engaged in counter-piracy operations. The costs involved in taking precautionary measures would be considerable.

It is important to bear in our mind that even though we do not have a visible enemy at sea, it does not in any way mean our seas are safe and secure. We do need to prepare for the unforeseen, and the possible threats that could emerge.

## The Hybrid Navy

In support of the Sri Lankan government, the Navy has to closely monitor the evolving maritime security situation, emerging challenges, and importantly, the tactics required to counter them in an effective way. With the possible future expansion of our exclusive economic zone, the task of the Sri Lanka Navy will broaden. With these responsibilities, many think the Navy has to expand in size.

Today, the role that Sri Lanka Navy has to play to secure the seas made it consider how best it can use extant platforms to meet current and emerging challenges. The current composition of the naval fleet is: 4 offshore patrol vessels, 65 fast attack craft, 11 fast gun boats, 6 landing craft, 160 arrow boats and 73 inshore patrol craft. This is an unbalanced fleet to face the emerging challenges in our maritime domain.

Obviously there is a strong reason for this unbalanced fleet. The Navy was primarily developed to face the challenges of the LTTE Sea Tigers. Its prime focus since the mid-1980s was to fight the LTTE. It constructed a large number of small boats of various sizes with various capabilities to counter LTTE swarming tactics.

Although it is unlikely the Navy will have to fight an external enemy at sea, it does need to understand that maritime security threats and challenges are becoming more complex, that most illegal actors are tied into a wider network, and that the damage they could cause a state is immense. A navy can have the most advanced sensors, weaponry, technology and other assets, but it cannot be on permanent alert when facing illegal actors that can decide the place, time and mode of an attack. The 11 September 2001 terrorist attacks on the United States and 2008 Mumbai attack bear testimony to this.

Facing these challenges required us to examine our military and maritime strategies to determine what naval assets are required. For the Sri Lanka Navy, purchasing larger platforms quickly is a huge challenge; even if ship construction started today, those ships would not be available for operations for at least five years. We could wait for these platforms to be delivered, but those who use the maritime space for illegal activities will not wait until we are ready. We are effectively left with only one option, which is to use what we already have.

The main maritime security issues the Sri Lanka Navy faces include maritime terrorism and piracy and the illegal smuggling of weapons, drugs and people. As maritime terrorism and piracy are unlikely to occur on the deep seas on a regular basis, littoral states have a significant challenge in addressing the above three major threats. The question here is how best we can use our existing fleet to address these threats in a more effective way.

It is in this context that we looked into forming a 'Hybrid Navy' by 2020 to face these rapidly evolving maritime security threats and challenges. The Sri Lankan hybrid navy will comprise frigates, offshore patrol vessels, fast gun boats, fast attack craft, arrow boats, inshore patrol craft and a fleet air arm with surveillance capability, either independently formed or as a part of the Air Force. I strongly believe that the littoral navies will greatly benefit if they could bring in smaller vessels to their fleets in order to increase the manoeuvrability, fire power, penetration capabilities, flexibility and agility in the face of modern maritime security challenges.

On quite a number of occasions, small boats have shown that they are capable of penetrating the most advanced of maritime defence layers. I believe that a navy would be able to yield better results by utilising the 'hybrid concept' against maritime terrorism, piracy and illegal smuggling.

## Conclusion

In conclusion, I would like to once again reiterate the fact we are highly unlikely to see naval fleets fighting each other. The future maritime threats are becoming rapidly complex and lethal in many ways. The question we have in our minds is how best we are going to face the current as well as emerging maritime security challenges.

To address this question in one of the most practical ways, the Sri Lanka Navy is focusing on using its present fleet with a few additional larger platforms. The concept of combining smaller fleet units with bigger vessels allows the Sri Lanka Navy to utilise its own small boats tactics to address present and future emerging maritime security issues with agility and flexibility. And importantly, we are ready to share our experiences with the rest of the world.

When such a formation is operating in the littorals, it will send a strong signal to those who are planning to use our maritime space and freedom for illegal activities.

I could not find a better saying conveying that message, than what Sun Tzu said a long time ago:

The art of war teaches us to rely not on the likelihood of the enemy's not coming, but on our own readiness to receive him; not on the chance of his not attacking, but rather on the fact that we have made our position unassailable.



# A Nation Turns to the Sea: The Philippine Navy and its Twin Pillars

*Romeo Nebres*

This morning I will discuss the twin pillars of the Philippine Navy's strategy: the Active Archipelagic Defence Strategy and Sail Plan 2020. But to provide some context for understanding these pillars, let me first outline the strategic environment facing The Philippines.

The Philippines is an archipelago, comprising 7107 islands with a coastline covering some 11,339nm. It lies strategically between the West Philippine Sea and the Pacific Ocean, as well as in the middle of coastal states lined-up along the western Pacific rim, stretching from the Korean peninsula in the north, to ASEAN and Australia in the south. Hence, it is at the crossroads of the Pacific. The Philippines also lies at the apex of the coral triangle which is the primary reason for its rich marine biodiversity. Our geological make up and geographical location stresses that The Philippines is a maritime nation. The mastery of seas and oceans is our history, our identity, and our destiny.

For an archipelago that is home to more than 100 million Filipinos, there are numerous concerns that affect our national security and international relations which need to be effectively addressed in order to achieve national prosperity. Of primary concern are the challenges to our territorial integrity and maritime security: internal security issues, natural and man-made disasters have been a perennial challenge, including: cyber security and regional/global peace and security challenges; and as a maritime nation, the Philippine Navy plays an important role in protecting our country and our strategic maritime interests.

As an archipelagic state, the strategic maritime interests of The Philippines include: freedom of navigation, shipping security, the protection of maritime and offshore resources, the welfare of Filipinos overseas, and developing our maritime industries and technology support base; as well as contributing to maintaining regional peace and security.

Let me now discuss the background to these strategies.

Conceptually, the Philippine Navy, like many navies, uses the Ken Booth model of the trinity of naval roles, and as such, we have three interrelated roles, that tailor-fit the four defence mission areas of the Armed Forces of the Philippines, as shown in Table 1.

Naval Roles	Defence Mission Areas
Military Role	Territorial defence, security and stability (MA 1)
	Force-level C2, support and training (MA 4)
Constabulary Role	Internal security, including maritime security and counter-terrorism (MA 1)
	Disaster risk reduction and response (MA 2)
	Support to national development (MA 1)
Diplomatic Role	International humanitarian assistance and peacekeeping operations (MA 3)
	International defence and security engagement (MA 3)

*Table 1: the roles of the Philippine Navy and associated mission areas*

To support the national military strategy, the Philippine Navy has identified a number of naval objectives to achieve its mission and attain its vision towards becoming a strong and credible navy. These objectives include:

- secure sovereignty, defend territorial integrity and protect maritime interests
- contribute to the defeat of internal security threats and support national development, security and stability
- contribute to regional and international peace and stability
- support the disaster management efforts of the government.

And as you can see, this relates back to the three roles of the Philippine Navy and defence mission areas.

To achieve the naval objectives (ends), the Philippine Navy recalibrated its plan for the development, maintenance and general employment of its fleet-marine units. Thus, the Active Archipelagic Defense Strategy (AADS) was conceptualised and developed as a naval strategy. AADS establishes the basic linkage between the Philippine Navy's desired ends and the ways and means to achieve these ends.

## Active Archipelagic Defense Strategy

The Active Archipelagic Defense Strategy is the operational strategy of the Philippine Navy. It refers to the proactive control of our seas and the denial of its use to an adversary, capitalising on the archipelagic configuration of our country. It involves control of

critical maritime areas and the deployment of assets that optimises their capabilities and firepower. AADS comprises three mutually supporting strategic concepts namely: maritime cooperation, maritime situational awareness and maritime operations, which I will discuss in turn.

Maritime cooperation supports the military, diplomatic and constabulary roles of the Philippine Navy. Thus maritime cooperation, in the AADS context, is a force multiplier, leveraged against essential capability gaps. Maritime cooperation is basically our ability to operate jointly with the other services (army and air force), with other government agencies in an inter-agency setting, and networking with global and regional partners in a multinational and coalition setting. Maritime cooperation supports and complements maritime situational awareness and maritime operations to fill in our capability gaps in these areas as we continue to develop these capabilities. Our objective with maritime cooperation is to develop inter-agency coordination, enhance service interoperability, and establish partnerships and alliances for enhanced maritime situational awareness, maritime operations, and collective response against armed aggression.

Maritime situational awareness refers to the 24/7 knowledge obtained from the integrated collection, analysis and exchange of information that relates to the maritime environment which are all used to support decision-making. The effective integration of the navy's constabulary and military roles, which relies on the ability to know and assess the activities occurring in the five domains: surface, undersea, air, land, and cyberspace is at the heart of this strategic concept. Our objective is to ensure effective maritime information support in order to facilitate effective decision-making for maritime operations and support to national and regional cooperation for maritime security, development and governance. To support maritime situational awareness, we must perform the following functions: which are the collection of data through all-source information systems, establishment and maintenance of the common maritime operating picture, providing a secured network support to operating units, and engagement with the other services and partners for collaborative assessment.

The strategic concept of maritime operations does not rely on parity of forces but on effective manoeuvre. It is our joint ability to know and employ tiered and calibrated responses that constitutes our unilateral action for the defence of The Philippines. It involves a range of naval operations across the full conflict spectrum, allowing the Navy to concentrate its effort on key roles and functions to most effectively meet strategic defence priorities and to address scenarios of concern. Our objective is to deter potential adversaries from conducting land or maritime aggression; deny their use of Philippine sovereign waters during hostilities or conflict; and suppress, destroy and defeat the threat through a tiered and calibrated employment of maritime forces. These tiered maritime operations encapsulate naval diplomacy, the notional deployment of assets, unified national rules of engagement and rules on the use of force, and national calibrated response; establish naval presence, establish selective sea control, and the strategic deployment of forces.

## The Sail Plan 2020

While AADS is our operational strategy, as a force provider, the Sail Plan 2020 created in 2006, is our developmental or enterprise strategy that covers the long-term plan for the development of the Navy's capabilities required to effectively execute the AADS. It includes phased and synchronised development of doctrine, organisation, training, materiel, personnel, leadership, and facilities (DOTMPLF) capability packages.

In its charter statement, the Philippine Navy envisions becoming a strong and credible force by 2020. Executive Order 292 prescribes the mandate of the Philippine Navy 'to conduct prompt and sustained naval and maritime operations in support of the Armed Forces of the Philippines' mission'. The core values of the Philippine Navy as an institution are honour, dedication, patriotism, solidarity, leadership, and professionalism.

Sail Plan 2020 contains 12 strategic objectives the Philippine Navy needs to address:

- develop highly competent and motivated professionals
- develop sound and appropriate maritime doctrines
- achieve a responsive naval reserve force
- adopt a dynamic and responsive naval organisation
- attain adequate financial resources
- ensure balanced financial programs
- adopt a responsive naval support system
- develop reliable naval facilities
- develop responsive naval capabilities
- optimal level of operational readiness
- secured maritime environment
- highly satisfied stakeholders.

These 12 strategic objectives are further categorised into three thematic areas: mission responsiveness, maritime security, and maritime prosperity.

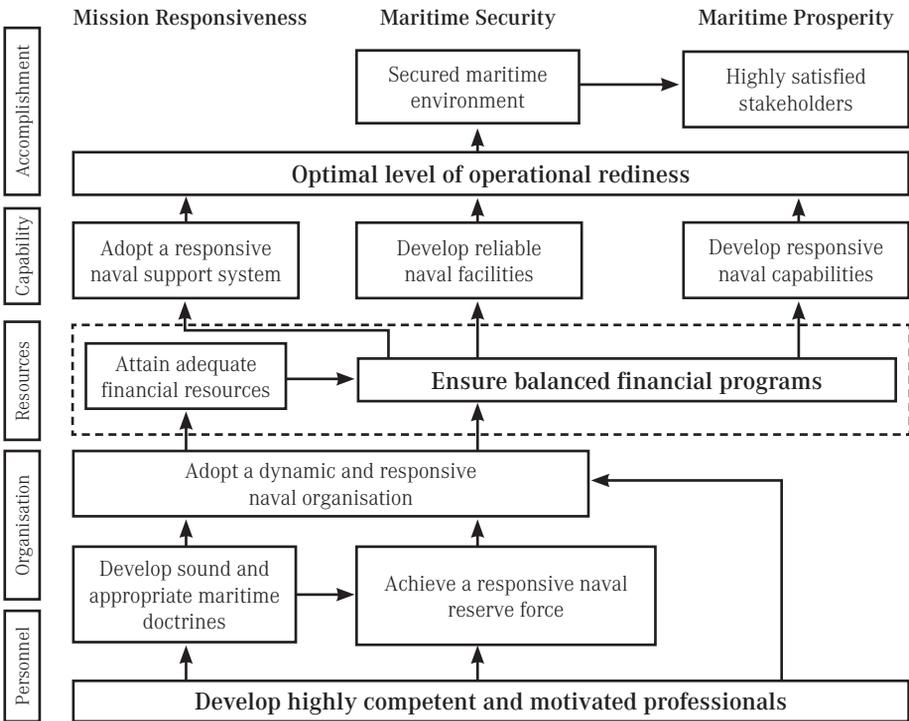


Figure 1: The Philippine Navy Sail Plan strategy map

The Sail Plan strategy map tells the story of how the Philippine Navy intends to achieve its vision. It provides the organisation with the direction and prioritisation of effort and resources for developing its capacities and capabilities. It also provides all navy units with a clear picture of the inter-relatedness and dependencies of objectives everyone needs to address through their respective tasks and initiatives in order to achieve the 2020 vision.

Let me now discuss the dynamics of the twin pillars.

### The Twin Pillars

On one hand, AADS via its maritime strategic concepts of maritime cooperation, maritime situational awareness and maritime operations, determines our operational concepts, which drive capability development, and determining DOTMPLF requirements. Using these DOTMPLF requirements, capability-force mapping is implemented. The Philippine Navy force structure is then determined, focusing on a detailed force design and objective table of organisation and equipment.

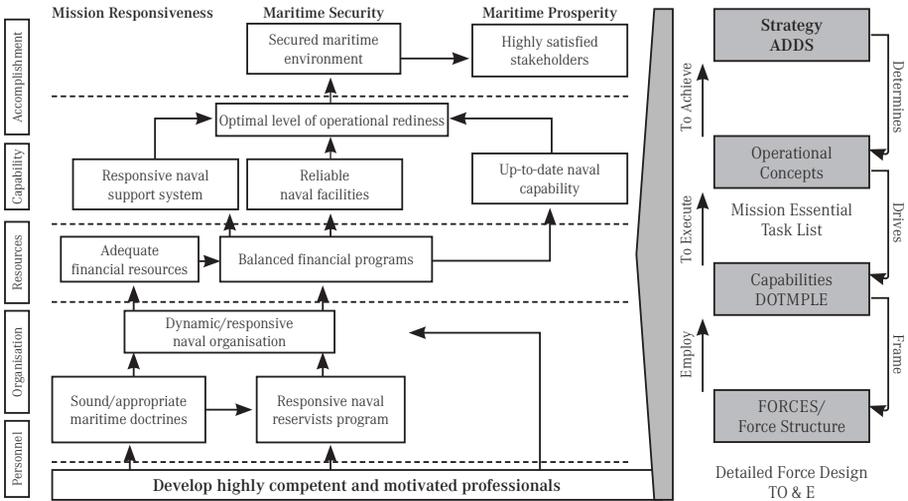


Figure 2: The Philippine Navy Capability Force Mapping

On the other hand, the Sail Plan draws from AADS the capabilities required to execute both the strategic and operational concepts as encapsulated in the detailed force design based on DOTMPLF requirements and objective table of organisation and equipment. The Sail Plan cascades through the entire navy organisation. Using the performance governance system, which translates the developmental strategy into executable and measurable programs and projects for the entire navy to perform, the summation of the outputs of all Philippine Navy units through these strategic initiatives, are capable combatant forces with high degree of operational readiness that can perform and sustain strategy-driven, capability-based maritime operations.

As depicted in Figure 3, the twin strategies will transform the current legacy navy. It can be described as an inshore territorial defence navy having primarily coastal defence capabilities with limited capability for offshore territorial defence. Through the framework of the twin pillars, the Philippine Navy enters a transition stage, from the present navy to the next navy - an offshore territorial defence navy, characterised by relatively high level of capability for defensive operations in all our maritime zones

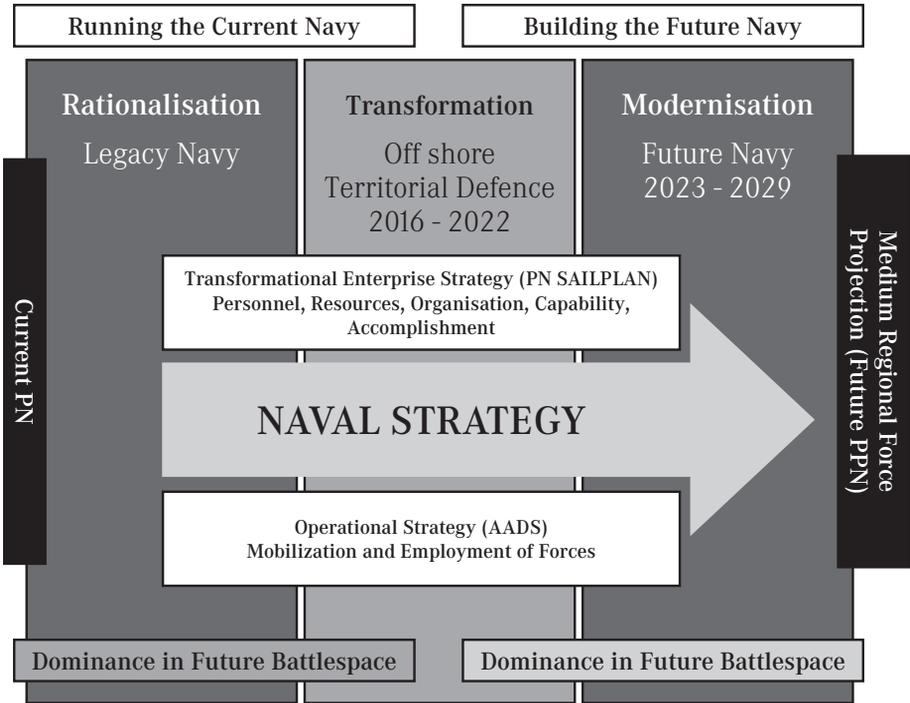


Figure 3: Philippine Navy conceptual framework

## Conclusion

As we know, the sea is a domain shared by all states, which have a stake in it as a medium of travel, trade, and for resources. Thus, all states, as responsible members of the international community, have a responsibility to maintain peace and order within it.

But we face emerging maritime security challenges such as climate change, international crime and terrorism, piracy, and illegal migration etc. These issues cannot be resolved by one state alone with its own navy. Meeting these challenges requires a collective effort from the world's navies for a more enduring solution. This implies an increase in the versatility of assets and capabilities of states and navies to address emerging maritime security challenges.

The Philippine Navy is cognisant of the need to close its capability gaps, and to fulfil its international obligations as a responsible member of the international community. Thus, it aims to be a capable partner in coalition operations. However, coalition operations are a complex matter, since cultural and operational challenges have to be taken into account.

Recognising the emergence of non-traditional maritime challenges, and the need to operate in the four domains of warfare, the Philippine Navy requires multi-role assets capable of projecting force and fire from ship-to-shore, and the ability to exploit the cyber domain and maintain a persistent presence in support of rapid deployment of forces in contingency situations. Lastly the Navy must be able to operate in the surface, sub-surface, aerial, and cyberspace domains, and within a shared battlespace in a joint, combined, and inter-agency setting.

The Philippine Navy aspires to have these operational characteristics realised in the medium-term, of aiming to be a reliable coalition partner, flexible, network-enabled, and 4-dimensional, through the institutionalisation and effective execution of our twin pillars: the Active Archipelagic Defense Strategy and the Sail Plan 2020.

## A View from The Bridge Wing: Building Partnerships and Strengthening Cooperation

*Brad Williamson*

The maritime challenges of today and those we will face in the future demand the ability of naval units from multiple states to be able to work together to achieve success. Successful interactions between navies at sea are built in advance, through exercises and planned engagements that develop the requisite skills that may be called upon when real world situations dictate. Successful integration relies on developing some of the key building blocks of operations, namely: individual unit competence, common procedures (doctrine; and tactics, techniques, and procedures (TTP)), integrated technology, and robust interoperability training. When working in real world operations, or when conducting exercises with the intent of assuring allies and partners or dissuading potential adversaries, interactions must also have a unified message regarding the purpose and nature of the operation or exercise.

While the requirements for successful operations and exercises are well understood, the realities of diverse acquisitions systems, languages, national procedures, and national priorities make building partnerships and developing cooperation more complex.

One of the key elements for successful engagements is affording on-scene commanders great leeway in the development of the interaction within a broadly developed set of guidelines. By doing so, commanders may review the key building blocks described above in order to ensure that the best interaction possible is developed. When interactions are developed at too high a level, they usually do not fully account for the roadblocks associated with the building blocks of operations, and therefore lead to programs that are not executable in the manner desired. Allowing on-scene commanders to develop operational or exercise programs, with the implicit (and explicit) support of their superior commanders, allows the flexibility required to ensure the best possible program is developed.

Units must possess the essential skills to be ready for integration with other units. This does not mean that all units need to possess the same capabilities. Differences in national mission sets and priorities will always mean that variance in inherent platform capabilities exist. The imperative is to ensure that the unit is capable and prepared to operate to the extent of its inherent capabilities in a professional and robust manner. Where material and/or personnel limitations preclude the full use of these capabilities, it should be communicated to all involved units and commanders as the plan is developed.

The use of common procedures is the lynchpin of successful integration. Inherent technological and other impediments can be greatly overcome by ensuring a detailed understanding of common procedures is instilled across operating units. In some cases these procedures are formalised between navies well in advance (such as Allied Tactical Publications), in other cases they are developed for a specific exercise or operation. In any case, they must be present, agreed upon, trained to, and if required, updated, to ensure each unit is operating from a mutually understood set of procedures.

Installed systems for integrating units should be used to the greatest extent possible. Link, chat rooms, and other automated systems for the near-real time exchange of information between units allows for the best integration of information across units. Still, while interoperable communications and automatic data transfer systems certainly make the sharing of critical information easier and more reliable, lack of these systems cannot be used as one of the roadblocks for integration and cooperation. Commanders and individual units must understand the capabilities and limitations of other units and ensure that communication and other paths for information flow are utilised to bring each unit into the team. Resolving issues during exercises and training events will ensure that critical elements required for integration are better understood should units be asked to work together during real world operations.

Operating together in robust multi-warfare exercises provides the critical training required to build common understanding of procedures and one another's capabilities. Integrated training of surface, air, and sub-surface units, as well as integration of shore infrastructure and ground units, is crucial to developing the mutual understanding required for success in real world operations. Allowing on-scene commanders the flexibility to develop exercises to bring differing units into the program promotes understanding and forces units out of the comfort zone of what they already understand. Discovering issues during exercises and training events (while operating in a controlled environment) will allow TTP to be refined to resolve these issues. When done in a crawl, walk, and run methodology, the severity of risk to the safety of participating units can be properly mitigated. The result will be that the overall risk to mission when conducting real world operations together in the future is dramatically reduced.

Both planned exercises and real world operations today demand a unified message that clearly articulates purpose. It is not enough today to simply conduct an operation in a professional manner and hope that its intent is clearly understood by the diverse audiences who may have interest in it or be affected by it. It is, therefore, imperative that a unified message is agreed upon by all involved in the exercise or operation. Perhaps more importantly, it is not enough that this message be vetted through associated military organisations. It must be briefed and agreed upon through the highest possible levels of civilian leadership as well. Diverging messages provide a gap, through which, those potentially opposed to the partnering/cooperation can drive a wedge to cultivate division among participating states. A positive example of this was seen in counter-piracy operations where naval units from a diverse group of states came together under a common theme to dramatically reduce piracy in the Indian Ocean and Gulf of Aden.

While myriad issues exist that restrain our ability to build partnerships and strengthen cooperation, we cannot use them as roadblocks to prevent developing the building blocks of operational success required to operate together at sea. As mariners and naval personnel, we will always have more in common with one another than those who do not know what it means to operate at sea. We must work together at every opportunity to develop common understanding that will allow us to work together seamlessly in the real world operations to which our national leaders assign us. Our success will be dictated by the individual unit competence, common procedures, integrated technology, and robust interoperability training we have conducted in advance and bolstered by the unified message of our leaders.



# Australian Rendezvous: Maritime Strategy and National Destiny in the 21st Century

Michael Evans

In order to thrive in the twenty-first century, a country with an interest in the use of the sea needs to develop and implement a coherent maritime strategy - galvanizing the sea power of the state and society.<sup>1</sup>

In national security affairs what often marks Australia's experience is an insular imagination, a feature that is most striking when it comes to understanding the importance of the sea. Despite being an island-continent dependent on seaborne trade, Australia has undergone a two-century long adolescence in appreciating the significance of the sea in strategy. This situation is largely due to the historical circumstances of European settlement and the dominance of first Britain, and then the United States, at sea in the 19th and 20th centuries respectively. The great umbrella of British and American naval power has long allowed Australia to adopt an attitude of *mare incognitum*. As a result, although the country is 'girt by sea', the most important aspect of Australian identity is not a sense of island-awareness but a continental consciousness that manifests itself through a literature that celebrates landscape and a martial tradition that upholds the exploits of soldiers.

Yet, in the first quarter of the 21st century, there is growing evidence to suggest that Australia's historical indifference towards the significance of the sea is being eroded by the geopolitical transformation of the Asia-Pacific region into the world's new economic heartland. In January 2013, the Gillard government's national security strategy reflected this transformation in global power by stating, 'we are entering a new national security era in which the economic and strategic change occurring in our region will be the most significant influence on our national security environment and policies'. Similarly, Australia's 2012 Asian White Paper notes that, 'as the global centre of gravity shifts to our region, the tyranny of distance is being replaced by the prospects of proximity'.<sup>2</sup> More recently, the 2016 Defence White Paper affirms that 'the geography of the archipelago to Australia's immediate north will always have particular significance to our security'.<sup>3</sup>

Regional strategic change and Asia-Pacific proximity mean that Australia will have to develop a new appreciation of the importance of a maritime environment - a process which will require a revolution in Australian geopolitical thinking. To paraphrase Leon Trotsky: Australians may not be very interested in the sea, but the sea is increasingly interested in them. In the decades ahead, the combined forces of global networks, the economic dominance of Asia and its Indo-Pacific trade routes - alongside the emergence of a powerful China as a strategic competitor of the United States - will demand of Australia a maturity of outlook in maritime security matters that has, to date, been missing in the national psyche.

This paper argues that, if Australia is to ensure both its future geopolitical interests and its economic prosperity, the country must make a strategic and philosophical compact with its Asian oceanic domain. A rendezvous between cultural history and physical geography must be forged on the anvil of enhanced maritime awareness. Such a process will be both challenging and unpredictable, and will require a difficult and protracted journey of geopolitical re-orientation throughout the course of the 21st century. Given that Australia's strategic history is so firmly based on an ideology of 'great and powerful friends' and on the physical isolation of the island-continent, it is a journey that is by no means assured of reaching a successful destination. Any national re-orientation in geopolitical thought will need to involve two vital maritime facets. First, Australia must acquire a greater understanding of the workings of maritime strategy - an awareness that embraces a systemic view of sea power - and one that is appropriate for an age dominated by the international political economy of globalisation with its interconnected trade, financial and information networks.

Second, and perhaps most importantly, Australia must seek to underpin a maritime strategic outlook with a national narrative on the importance of the sea to the country's destiny in a globalised age. If the nation is to undertake a geopolitical re-conception of itself not merely as a vast continent but as an island-nation at ease with the promise of economic prosperity emanating from Asia then, it must view the seas around it as highways to a prosperous future. It is through embracing full-blooded maritime thinking that Australia can best shape its future as an open society. This is a challenge that will surely test the Australian people's capacity for re-invention by accelerating a long-delayed rendezvous between continent and island and between history and geography.

### **The Burden of the Past: Australia's Need for a Systemic View of Sea Power**

The enduring paradox of modern Australian history is one of an island-continent inhabited for over two centuries by a largely Anglo-Celtic people without a significant maritime identity. A popular book by the Australian writer, Tim Winton, perhaps unconsciously captures this paradox in its very title, *Island Home: A Landscape Memoir* and celebrates 'how the land makes who we are'.<sup>4</sup> While most Australians reside on the littoral and an effective Royal Australian Navy (RAN) has existed for over a century, neither a coastal lifestyle nor possession of an array of warships, is synonymous with a historical appreciation of the strategic value of the oceans. Unlike its mother country Britain, a natural sea power, Australia possesses no cultural affinity with the sea. Instead, a pervasive sense of sea-blindness - 'the inability to connect with maritime issues at either an individual or political level' - is evident in much of national life.<sup>5</sup>

The timelessness of the 'immortal sea' as celebrated in England's literature by writers from Wordsworth to Conrad has no counterpart in Australia. Rather, in Australian literature, the sea is replaced by the vast interior of a 'timeless land' as described in the work of writers as varied as Eleanor Dark and Ion Idriess. The Great South Land's dependence since 1788 upon the dominant liberal Western maritime powers, first Britain and then the United States, has long acted to absolve Australians from developing both

significant naval power and a mature appreciation of sea power. The poet, AD Hope, writes of a vast continent in which Australians resemble, 'second hand Europeans [who] pullulate timidly on the edge of alien shores'.<sup>6</sup> It is an outlook that facilitates both strategic dependence and philosophical insularity - both of which reflect the impact of the Federation era ideal of 'a nation for a continent and a continent for a nation' - by which '[Australia] seemingly forgot that it was an island that the sea both isolates and joins to the wider world'.<sup>7</sup>

In the 19th and 20th centuries, given that maritime security was assured by Western great power protectors, Australia's contribution to upholding a favourable international order - from the Boer War through the two World Wars to Vietnam was based on deploying mainly land force contingents. The Australian experience of war has long been defined in the national imagination by volunteer soldiers at Gallipoli and on the Western Front and is symbolised by the power of ANZAC mythology. While army-centric expeditionary warfare of the kind seen in Afghanistan and Iraq is unlikely to disappear from Australia's 21st century defence arsenal, the country needs to consider the maritime component of strategy in much greater breadth. This is because the tide of global economic development towards offshore Asia - with its checkerboard of archipelagos, peninsulas and island chains - is increasing the imperative for a sophisticated grasp of joint forces employing a maritime strategy. While this approach is still in its infancy, the importance of the maritime domain has been conceded by the strategic direction and force structure imperatives of recent defence documents including three Defence White Papers in 2009, 2013 and 2016.<sup>8</sup>

The May 2013 Defence White Paper concluded that, 'Australia's geography requires a maritime strategy. Such a strategy is seen as essential in deterring attacks against Australia and contributing to the security of our immediate neighbourhood and the wider region'.<sup>9</sup> Accordingly, since 2009, long-term capability acquisition has concentrated on re-equipping the RAN for a larger blue-water role - including a welcome return to capital ships in the form of two large amphibious ships. The combination of new destroyers and amphibious ships for the RAN and a new combined arms amphibious approach by the Army through Plan BEERSHEBA - alongside plans for new submarines - can be seen as an attempt at generational change towards the use of the sea in Australian strategic thinking.<sup>10</sup> The 2016 White Paper attempts to give flesh to the bones of future capability by setting out 'the most ambitious plan to regenerate the Royal Australian Navy since the Second World War', pledging a revived naval shipbuilding industry and promising that defence spending will reach 2 per cent of gross domestic product by 2020-21.<sup>11</sup>

To bring RAN capabilities into the 21st century, an estimated A\$195 billion will be required to refit the Australian fleet over the next decade or more - including a commitment to building 12 new 'regionally superior submarines', nine new frigates and an array of patrol vessels - and all of this funding must be found from within a national budget under severe pressure from falling revenues, rising debt and increasing social welfare and health care costs.<sup>12</sup> Although the latest Defence White Paper is accompanied

by a ten-year investment plan designed to culminate at 2 per cent of gross domestic product over the next five years, it remains to be seen whether funding can be sustained at the political level in the years ahead. In Australia's defence discourse, the beginning of wisdom for any analyst is an ability to discern between rhetorical aspiration and consistent policymaking. In this respect, the omens are not encouraging for the latter. As the country's leading defence budget specialist, Mark Thomson, bluntly puts it, 'planning defence spending on 2 per cent of GDP is a horse's arse'.<sup>13</sup> Air Marshal Sir John Slessor's pithy warning on defence spending is highly relevant to Australia: 'it is customary in democratic countries to deplore expenditures on armaments as conflicting with the requirements of social services. There is a tendency to forget the most important social service a government can do for its people is to keep them alive and free'.<sup>14</sup>

Compounding the challenge of defence spending is the operational malaise that has gripped the Australian political system since 2010 - a malaise which has led not just to five prime ministers in five years but to the appointment of six defence ministers in eight years. Given such flux, and the publication of the 2016 Defence White Paper notwithstanding, there is no guarantee that domestic political economy will be capable of matching Australia's strategic ambitions over the next decade.<sup>15</sup> If the demands of a difficult budgetary and policy environment were not enough to test Canberra in defence matters, Australia is further challenged by two other crucial issues: a rapidly shifting geostrategic environment in the Asia-Pacific region and increased American expectations of Australia's role as an ally in that region.

Australia is located in an Asia-Pacific geostrategic environment that reflects the most dynamic economic region in the world. Led by the rapid rise of China, the region currently accounts for 40 per cent of global gross domestic product and two-thirds of global economic growth. By 2050, it is estimated that Asia will represent half of the world's global economic output. Eight of the world's ten busiest container ports are in the Asia-Pacific region with almost 30 per cent of the world's maritime trade passing through the South China Sea annually. In 2014, two-thirds of Asia's oil passed through the Indian and Pacific oceans and Asian seaborne trade is likely to double in volume by 2035. By 2040 there is expected to be a 56 per cent increase in global energy demand, so making the security Asia's sea lines of communication such as the Malacca and Lombok straits vital to the global commons of the 21st century.<sup>16</sup>

In Australia's 'front yard' of Southeast Asia, the ten countries of ASEAN now number 620 million people with a combined gross domestic product estimated in 2012 to be worth US\$2.2 trillion, a figure that is estimated to double on present trends by 2022.<sup>17</sup> Both Australia and the countries of Southeast Asia vividly reflect the rise of China as an economic behemoth. China takes 29 per cent of Australian exports and is the nation's largest trading partner. Meanwhile, direct Chinese investment into the ASEAN countries is over 60 per cent - a situation that when combined with China's growing military strength - is likely to make Southeast Asia a zone of global strategic importance for the first time since the middle of the Cold War. A new and uncomfortable equation of

Chinese economic influence and growing military might is likely to face Australia and the ASEAN nations over the next three decades with unknown consequences.

Not surprisingly, the economic and strategic transformation of the Asia-Pacific has attracted sharp attention from Australia's key defence ally, the United States as reflected by a clutch of recent documents.<sup>18</sup> In March 2015, the US Department of Defense released *A Cooperative Strategy for 21<sup>st</sup> Century Seapower* which seeks to address a shifting Asia-Pacific balance of power. The document notes that Asia's defence spending now eclipses that of Europe and that American security and prosperity are 'inextricably linked to the immense volume of trade that flows across the Indian and Pacific Oceans'. The document calls for a 'global network of navies' both to ensure *mare liberum* (freedom of the sea) and to hedge against China's emergence as a maritime rival.<sup>19</sup> In an interconnected world that pivots on Asia-Pacific trade, the *Cooperative Strategy* seeks to embed American and allied sea power into a 'cooperative systemic strategy', one that integrates allied and partner naval forces into the guardianship of the liberal political economy of globalisation as symbolised by the countries of the American-inspired Trans Pacific Partnership. A systemic approach to sea power embraces deterrence, sea control, power projection, maritime security and 'all-domain access' and seeks to link US and partner naval capability to the realms of political, diplomatic and economic influence.<sup>20</sup>

This systemic approach is further reinforced by *The Asia-Pacific Maritime Security Strategy* of August 2015 which outlines a comprehensive approach to enhancing America's efforts to 'safeguard the freedom of the seas, deter conflict and coercion, and promote adherence to international law and standards'.<sup>21</sup> Four lines of effort are highlighted: strengthening US capabilities in the maritime domain; building the maritime capacity of allies and partners; leveraging military diplomacy to reduce risk and build transparency; and strengthening the development of an open and effective regional security architecture.<sup>22</sup> The report is a clear response to what the document calls 'China's rise as a political, economic and military actor [as] a defining characteristic of the 21<sup>st</sup> century'. Between 2012 and 2015, China's defence budget doubled making it the second biggest spender in the world after the United States. From 2001-11, China's average annual defence spending increase was over 10 per cent with a 12 per cent increase for 2014-15.<sup>23</sup> In the face of such statistics, *The Asia-Pacific Maritime Security Strategy* sketches a broad, complex Sino-American relationship that falls short of incipient conflict but one that contains both elements of cooperation and competition.<sup>24</sup>

The most novel aspects of the American desire to reinforce the regional balance of power involve a commitment by Washington to a new Southeast Asia Maritime Security Initiative designed to build the capacity of ASEAN countries alongside the notion that there is a 'strategic convergence' between India's 'Act East' policy and the US rebalance to the Asia-Pacific region - that will assist in hedging against the growth of China's influence in the Indian as well as the Pacific oceans.<sup>25</sup> Since the publication of *The Asia Pacific Maritime Security Strategy*, there has been a November 2015 joint statement creating an ASEAN-US Strategic Partnership aimed at upholding a rules-based regional

architecture in the Asia-Pacific. In February 2016, a US-ASEAN special leaders' summit meeting was held at Sunnylands in California during which President Obama declared the US relationship with Southeast Asia to be on 'a new trajectory' of security and economic cooperation.<sup>26</sup>

The final American document that must be considered is the January 2016 bipartisan report by Washington-based Center for Strategic and International Studies entitled, *Asia-Pacific Rebalance 2025*. The latter is an exhaustive study which argues that, despite announcing a 'pivot' to the Asia-Pacific in November 2011, the United States has not yet crafted an effective strategy towards the region that aligns ends and means.<sup>27</sup> The report simply accepts China's rise as a *fait accompli* noting that by 2030, the PLA Navy is likely to acquire multiple aircraft carrier strike groups, a situation that may well transform the geopolitics of offshore strategic Asia. As the authors rather bleakly acknowledge, it is likely that, within 15 years 'the South China Sea will be virtually a Chinese lake, as the Caribbean or the Gulf of Mexico is for the United States'.<sup>28</sup> To counter a swiftly shifting balance of maritime power, the report envisages an enhanced role for American allies and partners in the Asia-Pacific such as Australia. Referring specifically to Australia the report notes, 'as the United States rebalances to the Asia-Pacific and redistributes its military presence, Australia's value as a political ally and military partner - combined with its geographical location - are reinforcing its strategic importance to the United States'.<sup>29</sup>

The unmistakable message for Canberra is that Australia's regional role - rather like that during the maritime campaign in the South West Pacific in World War II - is likely to become more important to the US than at any time since 1942. Australia is seen both as a maritime sanctuary against long-range ballistic missile attack on US fleet elements and also as a safe launching pad for rapid deployments by American joint forces to critical areas throughout the Asia-Pacific.<sup>30</sup> The report notes that Australia is the key geostrategic link between the Pacific and Indian oceans with ports such as Darwin in the Northern Territory, HMAS *Stirling* in Western Australia and northern air bases at Tindal and Scherger providing potential facilities for American naval and air assets. As it puts it, Australia's geopolitical importance is 'now more central to the US [and] Washington's expectations of Canberra are growing'.<sup>31</sup> For the first time in 40 years, these expectations are centred on the region:

Canberra's assistance is increasingly required in the Asia-Pacific region itself... As maritime security challenges in the Asia-Pacific intensify, the US-Australia alliance is likely to have more of a regional focus than it has in recent decades and a stronger emphasis on cooperation in the maritime realm. To help manage shared challenges, the United States will increasingly rely on Australia for some critical capabilities.<sup>32</sup>

Such capabilities are likely to embrace support for an expanded Marine presence in Darwin to include a Marine Air-Ground Task Force; use of counter-air and surveillance assets; expanded strike roles and an array of unmanned systems.

The conjunction of strategic change in the Asia-Pacific and pressures of Alliance burden-sharing are likely to act to put pressure on a greater Australian contribution towards a forging a systemic maritime strategy. As Geoffrey Till has written, Australia must support a collaborative and contributory strategy simply because the country 'is thoroughly enmeshed in a global sea-based trading system, not least as a major supplier of commodities to China. A threat to the system's operation represents an indirect threat to Australia's interests'.<sup>33</sup> While the 2016 Defence White Paper concedes the importance of naval capabilities and of working with the US and other allies to uphold an interconnected rules-based global order with free access to the global commons, it falls short of embracing a conceptual framework for a systemic maritime strategy.<sup>34</sup> Indeed, most of the strategic content of the document is descriptive rather than conceptual with no mention of the term maritime strategy in its pages.

Instead, the document prefers to embrace what it calls three interrelated strategic defence interests (a secure Australia; a secure region; and a global rules-based order). 'Australia's security and prosperity', the document states, 'is directly affected by events outside our region and is not just linked to our geography or confronting threats solely in our maritime approaches'.<sup>35</sup> An optimist might argue that such a statement is evidence that, like Molière's Monsieur Jourdain, who was astonished to discover he was speaking prose, the authors of the White Paper are articulating the basics of a systemic maritime strategy but without acknowledging such a situation. Given the serious lack of balance between resources and capability in its 2009 and 2013 precursors, the 2016 White Paper's focus on investment and modernisation over strategy is understandable. As the document concedes, what really matters is that 'modernising our maritime capabilities will be a key focus for Defence over the next 20 to 30 years'.<sup>36</sup>

Unfortunately, the by-product of such a strong capability commitment is that it perpetuates the long Australian tradition of confusing naval warfare with maritime strategy. Put bluntly, embracing a systemic maritime strategy poses an intellectual challenge to the Australian Defence Force (ADF) in general and to the RAN in particular. Like many Western peer navies, Australia's naval profession has long been geared towards operational warfighting and platform management rather than maritime thought and strategy. In the RAN it is seamanship, engineering skills and technological mastery of a complex naval profession that determines careers not strategic knowledge and the intricacies of sea power theory. The words of Winston Churchill when First Lord of the Admiralty apply as much to the RAN as to its parent, the Royal Navy: 'the seafaring and scientific technique of the naval profession makes such severe demands on the training of naval men that they have very rarely the time or opportunity to study military history and the art of war in general'.<sup>37</sup>

As a result, too much of Australia's current sea power debate is concentrated upon statistics and technology - on numbers of submarines, the uses of large amphibious ships and the huge financial expense such capabilities entail. There is far less appreciation of the intersection between political economy and strategic rationale in terms of ends,

ways and means. It is unclear to anyone but a specialist where an undersea warfare capability and amphibious operations actually fit in modern naval warfare - and more importantly, what these capabilities mean in a broader strategic context. For example there has never been a strategic analysis in the public realm justifying the requirement for 12 conventional submarines - the number outlined in the 2016 Defence White Paper. This is a remarkable situation given that the next 30 years are likely to witness rapid technological developments in robotic submersibles, sensor systems and mine warfare at sea alongside 'mix and match' naval vessel modularisation, space-based surveillance and open-systems architecture. What these new capabilities may mean for long-term national maritime strategy is largely missing in Australia's strategic debate.<sup>38</sup>

If, as one leading sea power analyst has suggested, 'in the second half of the century, it is possible that the majority of warfare and routine operational tasks will be conducted remotely by unmanned and robotic applications' then the long-term implications need to be carefully debated in Australia over the next few years simply because their strategic and economic implications may be transformative.<sup>39</sup> The rise of machine warfare at sea has profound consequences for a country like Australia given the realities of low demography, budget restraints and a vast seaboard of 36,000km. In the public interest, there needs to be a campaign of intelligible debate that is designed to relate political economy to technological development and national strategy. Future naval capabilities from platforms through to robotics and unmanned underwater vehicles to ballistic missiles and precision strike regimes must all be viewed in the context of a systemic approach to maritime strategy. Discussion of Australian maritime affairs must not be allowed to continue as strategy by slide rule in a blur of capability statistics and naval jargon that is incomprehensible to the educated citizen.

Yet another reason for the lack of maritime strategic thinking in the ADF emanates from RAN complacency. With the possible exception of the loss of carrier aviation in the 1980s, the RAN has never faced the strategic crises of the Australian Army in the 20th century. In the bleak inter-war years of the 'Singapore Strategy' and again in the difficult 'Defence of Australia' strategic era of the 1980s and 1990s, the Army came close to losing national relevance - in the form of being denied, or stripped, of a combined arms capacity - the acme of professional status in any effective land force.<sup>40</sup> An equivalent situation for the RAN would have been a history marked by notions that no naval vessels were ever required beyond coastal patrol craft. In general terms, the near-death experiences of strategic relevance experienced by the Australian Army in the 20th century, have given its officer corps a far keener interest in strategic affairs than RAN counterparts. This is surely one explanation for the historical weakness of Australian maritime strategy.

What has been said about the US Navy from the Cold War to the dawn of the new century can easily be applied to the RAN: 'The Navy saw its purpose as being contingent operationally, and not instrumental strategically'.<sup>41</sup> Indeed, the contemporary RAN shares the crisis of identity that naval analyst Geoffrey Till identifies as afflicting most of the navies of the world's liberal democracies. It is a crisis of identity that arises from

two contending views of naval development: a traditional modern, or operational model on the one hand, and a more systemic postmodern strategic model on the other hand. The modern model of a navy draws on a narrow Mahanian reading of warfighting to the effect that peer competition between navies will always determine a contest for command of the sea because what matters is hardware and firepower.<sup>42</sup> In contrast, the postmodern model involves a broader geostrategic reading of Mahan's writings on sea power in which leading Western navies view themselves as collaborative defenders of a favourable global system.<sup>43</sup> Neither model is mutually exclusive nor new to naval history, but in 21st century conditions which one to prioritise depends on a combination of philosophy and resources.

In the new millennium, if a given navy's leadership views American-led globalisation as impermanent, a temporary phase of cooperation that does not invalidate great power rivalry, then it is likely to emphasise the modern model based on operational warfighting. If however, a country's naval leaders view American-led globalisation as something more permanent - in effect a beneficial interconnected geopolitical order that must be upheld - then navies are likely to shift toward a more postmodern outlook based on a cooperative strategy that is designed to maintain a successful system.<sup>44</sup> Ideally, of course, a navy should seek to embody both mastery of naval warfighting and a systemic view of sea power in its intellectual arsenal but given the realities of resources that limit scale and force structure such a synthesis is often elusive. This is true of Australia where investment in maritime capabilities and shipbuilding is now focused on repairing the past neglect of previous White Papers and enhancing modern naval warfighting skills rather than on refining a cooperative maritime strategy. In the years ahead, much of the energy of the contemporary RAN will be absorbed by the task of mastering innovation in the form of new ships and submarines. As one observer notes, for the first time in its history, the RAN 'is on the verge of being able to generate a maritime-task force-similar to that which the Royal Navy can currently employ'.<sup>45</sup> Not surprisingly, Plan PELORUS, the Australian navy's vision of the future, describes its main mission as being 'to fight and win at sea'.<sup>46</sup>

Over time, however, Australia will need to increasingly embrace the details of a systemic maritime strategy simply because it has an existential stake in helping to uphold the American-led global order that has produced seven decades of security. Like their American counterparts, one of the main tasks facing 21st century Australia's uniformed professionals will, in the words of Admiral Mike Mullen, to 'rid yourselves of the old notion - held by so many for so long - that maritime strategy exists solely to fight and win wars at sea, and the rest will take care of itself'.<sup>47</sup> In Australia, a similar view has been echoed by a recent Chief of Navy, Vice Admiral Ray Griggs (currently Vice Chief of the Defence Force) who in 2012 called for the creation of 'a maritime school of strategic thought' in Australia.<sup>48</sup> The fact that such a school was considered by a naval chief not to exist is stark testimony of an immature appreciation of sea power in the Australian defence community. Grigg's successor as Chief of Navy, Vice Admiral Tim Barrett, has continued the initiative to cultivate a maritime school of strategic thought by reinforcing

Plan PELORUS and suggesting that a modern RAN needs to be 'a national enterprise, bringing together the private and public sectors of the economy to deliver a fundamental security objective - security above, on and under the sea'.<sup>49</sup> Nonetheless, the forging of a strategically-sophisticated approach to the use of the sea - an anticipatory maritime strategy - is likely to be a protracted test of the intellectual resources of both future ADF professionals and the small Australian maritime strategic studies community. Given the tectonic shifts that are occurring in the Asia-Pacific strategic environment, it is a task that is so important to the national interest that it can no longer be avoided or delayed without incurring risk.

## Developing a National Maritime Narrative: Australia's Need for a Geopolitical Re-conception

In 1957, the geopolitical thinker, Saul Bernard Cohen predicted that Australia's destiny was to become the southern anchor of offshore Asia. Revisiting this proposition 40 years on in 1999, Cohen had not changed his mind writing, 'the question now is not whether Australia *is* Asian but how it can best adjust to *being* Asian'.<sup>50</sup> Cohen's proposition was not aimed at diminishing Australia's history of European settlement or at demeaning its Anglo-Celtic cultural identity. Rather, he sought to signal Australia's need to find a synthesis between history and geography - an approach that is surely best facilitated by cultivation of an outward maritime outlook. Australia can only prosper if it helps to uphold an open world economy with access to international trade and investment; the nation must simultaneously engage in Asia but also exploit its extensive cultural-historical ties with the US and the British Commonwealth. In short, there needs to be a reaching-out strategy not a drawing-back strategy, and one based on a sense of national confidence not parochialism.<sup>51</sup>

Reflecting on Australian economic history, a former Labor government adviser, John Edwards, observes that the resilience of the Australian economy has always depended 'not on Australia's distance from the world economy or caution over foreign borrowing, but precisely on its integration into the global economy and particularly its integration into a global financial system'.<sup>52</sup> Edwards goes on to ponder the changes wrought by the long economic boom of the 1990s and first half of the 2000s:

What happened [in Australia] was an economic expansion so sustained, so deep and widespread in its impact, so novel in its characteristics, that the lives of Australians, their hopes and plans, their work and leisure, their wealth and incomes, *the way they saw themselves and their country and the ways it related to other countries, even the way they thought about their past, began to be changed by it.*<sup>53</sup>

Edwards is surely right that an economically transformed Australia faces the challenge of forging a new national narrative in the decades ahead. It is unclear when and how this will occur. Some contemporary observers of Australia such as the British writers, Nick Bryant and Simon Winchester, register scepticism on the subject; others, such as

the Australians Michael Fullilove and Asher Judah, are more optimistic and promote the idea of an outward-looking 'larger Australia' as being more than possible.<sup>54</sup> For Bryant and Winchester, Australia remains in thrall to a past drawn from a history of European settlement marked by apprehension about the forbidding size and harsh interior of a continental-island and a tendency for a small Anglo-Celtic population situated in the vast Asia-Pacific to fear abandonment from its European antecedents. The result has been an ingrained attitude of dependence - internally on state and federal government largesse and externally on the great Western naval powers. Both writers identify a national outlook that is insular - what the poet James McCauley once styled as 'a faint heart within a fair periphery' - creating a penchant for self-doubt tempered only by a spirit of resilience.<sup>55</sup>

Bryant argues that, with the shift in global economic power from the Atlantic to the Pacific, for the first time in its history, Australia is situated nearer the centre rather than the periphery of global economic and geopolitical activity. While the country 'is in the right place at the right time', its future prospects remain hampered by the chronic insularity of a political class whose approach inhibits any sense of national vision from emerging. Bryant cites the view of the leading international historian, Niall Ferguson, who after a visit to Canberra compared the tone of the capital's political proceedings to that of a municipality: 'More like Strathclyde Regional Council than a debate for the leadership of a major power in the Asia-Pacific'.<sup>56</sup> The national narrative remains archaic - hamstrung by parochial interests and by an obsolete 'vocabulary of peripheryism' - which recalls an older and much smaller Australia of the 20th, century rather than the cosmopolitan and larger country of the 21st century.<sup>57</sup> Similarly, Simon Winchester identifies 'an awful undertow' of complacency and small-mindedness at work in the political life of contemporary Australia - a situation that keeps the country 'pinioned and fettered' to a past that has largely disappeared - but whose long shadow acts as form of stasis so preventing any serious contemplation of the challenges of the future.<sup>58</sup>

Some of the above criticisms by foreign observers have been confronted by Australian writers such as Michael Fullilove and Asher Judah both of whom have called on Australians to confront the future with greater boldness and imagination. Like Bryant and Winchester, Fullilove bemoans the 'small country politics' that bedevil Australia and which elevate personalities over policies so diminishing the domestic intellectual foundations of both foreign and defence policy-making at a time of global strategic change.<sup>59</sup> He calls for a 'larger politics' based on greater sense of Australian self-confidence that welcomes greater immigration, a more muscular military and a more assertive foreign policy. 'Australia', Fullilove contends, 'is not a middle power. Australia is a significant power with regional and global interests - and we should act like one'.<sup>60</sup> For his part, Asher Judah suggests that in the early 21st century, Australia is at a crossroads. The country faces the choice of becoming a dynamic Euro-Asian state engaged in region and globe or of facing the fate of a state that failed to live up to its potential - namely Argentina. In 1910 Argentina was the most vibrant country in Latin America and the tenth wealthiest country on earth. Over the next half-century the country's political

class degenerated creating an insular spiral of debt, bureaucracy and dysfunctional government that crippled its potential. A century later, in 2010, Argentina was 62nd in the world in terms of wealth.<sup>61</sup>

Surveying an Australia in which a combination of growing debt, low demography, unresponsive government and unsustainable welfare payments risk eroding prosperity, Judah writes, 'in Australia today, we find ourselves in a position similar to Argentina in the first quarter of the 20<sup>th</sup> century'.<sup>62</sup> It is significant that Judah believes that Australia's salvation lies in re-conceiving itself as an island state - less as a partially settled continental country - than as 'an archipelago of population islands', an urban aorta of coastal centres and hinterlands that generate 62 per cent of national economic activity. Australia masquerades as a continental nation when, in fact, it is 'an efficiently organised and arable archipelago' boasting the 12th largest economy in the world; the ninth largest international stock exchange; \$2 trillion worth of investment and the fifth most traded currency on the planet. Trade with Southeast Asia totalled over \$100 billion in 2014 and almost two-thirds of Australia's exports now pass through the South China Sea. The national challenge is to overcome a legacy of continental inwardness and inhibition in favour of a confident and outward vision that is more relevant for an island-nation intimately connected to the world economy.<sup>63</sup>

It is not necessary to accept Judah's bleak Antipodean Argentina analogy to appreciate the importance of his call for a geopolitical re-conceptualisation of Australia as an 'archipelagic powerhouse'. Like Fullilove, Judah believes the latter vision can only be achieved by a combination of skilled immigration, engagement in the Asia-Pacific region and a culture of dynamic entrepreneurship - a mixture that will create an outward-looking Australia of perhaps up to 48 million people by 2045.<sup>64</sup> The engine of prosperity for Australia is likely to be a new global middle class tripling in number from 1.8 billion in 2015 to 4.9 billion by 2035 and much of this growth - fuelled by urbanisation, maritime trade and educational demand - will be in the Asia-Pacific. To exploit such a lucrative mass market Australia must look outward, towards the sea while the country will require a political class capable of both the vision and the confidence to overcome the current policy challenges of demographic weakness, productivity decline, and faltering governance.<sup>65</sup>

While preparing Australia to meet the challenges of an Asia-Pacific economic future will require a statesmanship and policy sophistication that transcends the realm of maritime strategy, the reality of oceanic geography will increase the importance of a national maritime awareness. There are two areas in which those concerned with Australia's maritime identity and geopolitical destiny can make a major contribution in explaining the role of the sea to both policy-makers and the electorate. The first area concerns the need to create an Australian National Institute for Maritime Affairs (NIMA). It beggars belief that a country with Australia's huge exclusive economic zone of ten million km<sup>2</sup> (10 per cent of world's oceans); a search and rescue zone of 53 million km<sup>2</sup> - alongside dependence on foreign trade, offshore territories and borders and sea lines of

communication - does not possess such a national body. Such an Institute is necessary in order to tackle the malaise of national 'sea-blindness' and to assist in defining a long-term future relationship between the nation and the sea in a manner which integrates diverse naval, commercial and shipping activities together. A national institute could serve as a centre for excellence on all matters connected to the promotion of Australia's maritime domain from state issues and shipbuilding through to border protection and an array of economic links with Southeast Asia and the Pacific Islands.

It would also be a major asset in developing a 'conversation with the country' to highlight the importance of all the elements that constitute the maritime domain. As one Australian maritime analyst has written:

Perhaps the most outstanding task [in Australian maritime affairs] is for a narrative to be developed that explains the importance of the safety and security of Australia's maritime domains to the nation's broader national security interests and economic well-being. These matters have not been well-articulated to the broader public in a comprehensive and comprehensible way... [What is needed] is a story that draws the strands together.<sup>66</sup>

What the 2012 Asian White Paper calls the 'prospects of proximity' in Asia must become part of a broader maritime narrative embracing the political establishment as well as diverse security analysts, scholars, business and industry groups. The aim must be to explain to the nation how long-term engagement and cooperation with the economic players of the dynamic Asia-Pacific rim will enhance both national prosperity and physical security in the 21st century. In maritime affairs, the most pressing challenge for Australians is one of imagination; to confront what might be called Australia's second self as an island-nation. The need is to articulate an over-the-horizon perspective that grasps that the future stability of the regional geopolitical architecture is directly related to seaborne trade and national prosperity. 'The starting point for such a project writes Paul Battersby 'is not simply to reconcile Australia's history with its geography but to *re-imagine* them'.<sup>67</sup>

A second area of attention concerns the role of the Defence establishment in providing expertise and knowledge that promotes an effective maritime dimension in national strategy. There is a need for the ADF in general, and the RAN in particular, to explain in clear and compelling terms the advantages to Australia of a maritime-systemic strategic approach and to explain the character of sea power and the role of joint forces in the new millennium. It is a major weakness that the current ADF lacks a central joint service and futures analysis centre along the lines of the successful British Ministry of Defence's Doctrine Concepts and Development Centre (DCDC) located at Shrivenham. For too long, the ADF has been content to rely on single-Service studies centres, which no matter how useful they may prove at the operational level, are too narrow in their focus and have little impact on higher-level joint strategic analysis.<sup>68</sup>

In a globalised security era, when the RAN has returned to capital ships, the Army is busy converting itself into an amphibious force and the Royal Australian Air Force (RAAF)

is re-equipping with the F-35 joint strike fighter, the Service studies centres need to be carefully linked to a new joint studies organisation dedicated to the strategic level of research and analysis. A joint studies organisation is required to help promote two important strategic realities: the first reality is that a national maritime outlook involves more than a navy and embraces all of the armed services. The second reality is that a maritime strategy must strive to be 'whole-of-government' in character and include not only the military but other instruments of national power ranging from diplomacy to the market economy. As one analyst explains:

A maritime strategy that translates into real political, diplomatic and economic benefit nowadays is one that enables a country to exploit the advantages of globalisation in all its forms. As well as providing the ways in which threats to the country are deterred and defeated, armed forces are actively used to further a country's commercial and national interests in the wider world.<sup>69</sup>

It is this holistic, joint service approach that needs to be vigorously pursued by the Australian armed forces. 'A maritime strategy', the American naval strategist, Peter D Haynes reminds us, 'has always been more directly concerned with the relationship between the state and global markets ... A maritime strategy ties [together] economic, political and security interests'.<sup>70</sup> To help bring about such unity of effort, the creation of a DCDC-style research and analysis organisation, suitably adapted for Australian conditions, is surely a critical defence requirement in the years ahead.

## Conclusion

In August 1950, during a visit to Australia the British philosopher, Bertrand Russell, urged Australians not to be shackled by their past or to 'acquiesce in the comfortable certainty of a moderate competence' but to pursue a splendid enterprise 'inspired by a golden vision of a possible future'.<sup>71</sup> The Australia of today is, of course, very different from that of 1950 but at a time when much of the political class is trapped in a coma of suspenseful indecision, Russell's 'golden vision' seems more relevant today than 65 years ago. The first half of the 21st century is likely to see a transformed world and to yield a complex and globalised seascape - one that is at once competitive and unpredictable with the global population expected to reach nine billion by 2045.

The central region of economic and strategic activity will be the maritime geography of Asia-Pacific. Increasingly, Australia's history and geography will require synthesis not separation - for in terms of geopolitics and economics, if not in cultural values - Australia's future lies north through the seas of the Asia-Pacific. Australia is not by identity and history an Asian country but in geography and economics it is drawn inexorably towards an Eastern orbit. Such a situation requires a statesman-like diplomacy of careful balance that melds core civilisational values with the economic needs of prosperity. The alibi of cultural kinship with the West that has facilitated so much of Australia's strategic dependency must, in the decades ahead, become tempered by a much greater spirit of strategic independence - an independence that is facilitated by a rendezvous with an

Asian geopolitical destiny conceived in outward maritime terms. It is a rendezvous that is in all its essential features a philosophical challenge - one that must blend a number of opposites into a new national tapestry: an Anglo-Celtic history with an Asia-Pacific geography; regional defence imperatives with the demands of globalisation; a cherished American security alliance with closer Chinese economic relations; and the integration of older continental and expeditionary military traditions within a more integrated maritime strategic framework.

In the Asia-Pacific century ahead, navigating and balancing such competing demands will require inspired political leadership. While the latter may seem unlikely given the insular politics of the present, it is not beyond the ingenuity of future generations of Australians to forge a 21st century country that unites the enduring cultural values of the West with the new economic wonders of the East. Such an endeavour will require an outward national spirit of maritime activism - and perhaps even a spirit of Antipodean buccaneering - in which the surrounding seas are seen less as draw-bridged moats for security and more as open highways to prosperity. In 1912, the poet, Bernard O'Dowd, in a celebration of continental consciousness, called Australia the 'Eldorado of old dreamers' - at once a temple to be built, a scroll to be written upon and a prophecy to be fulfilled.<sup>72</sup> The challenge before Australians in the new millennium is both different and similar: it is to recognise its continental *alter ego* in the form of island-consciousness and yet still to seize the O'Dowdian vision of Eldorado - only this time in the rhetorical form of a younger dream - one of a maritime destiny with its promise of limitless horizons.

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# The Future of Sea Power

*James Goldrick*

If we accept the definition that sea power is the ability to use the sea, then any examination of its future must focus on just what that use will be in the years ahead. It is inevitable that such an examination will need to cover both the general and, in terms of states and their behaviour, the particular. I therefore want to emphasise that the views I express are entirely my own and not made as the representative of the Australian navy or government.

My fundamental argument today is that the maritime domain will continue to be vital to global economic life and for the projection of national power, but that it will be marked by increasing complexity, sometimes verging on chaos, while there will be developing tensions between emerging international concepts of governance and sovereignty - some driven by the development of offshore facilities and others by the needs of the environment - and classical ideas of the freedom of the seas.

The role of states will remain central, but the demands of safety, efficiency and security against non-state threats will bring about greater international controls over and monitoring of the movement of shipping and of maritime activities in general. Environmental and resource management requirements will be another factor in this process, and will have similar effects on fisheries and other marine industries, a trend that will not only be manifest within national maritime zones, but on the high seas.

This drive to greater governance will not go unchallenged. We have to accept that the prospect that environmental degradation and climate change will be highly disruptive, particularly in many of the highly populated and sea-dependent littoral zones of South and East Asia and that it will be very difficult to control the second and third order effects. Collective management and regulation are already in something of a tail chase of the problems which they seek to alleviate. The race may become not only much faster, but proceed on many different paths.

Furthermore, while computers, beacons and remote sensors promise increasing transparency and the end of an era in which ships could operate where eyes 'never looked', cyber capabilities open to both state and non-state actors suggest that the ideals of 'maritime domain awareness' may never be realised and will often be significantly compromised, in both peace and conflict.

At the same time, traditional great power naval competitions are re-emerging after a quarter-century hiatus as part of wider geo-strategic rivalries. These in part will produce their own counter-effect to increasing controls because of the inherent requirements of naval forces for freedom of manoeuvre. There is also a serious concern, particularly in the West, over the possibility, typified by the events in the South China Sea, that the drive to greater governance could be perverted into a form of 'creeping sovereignty' with territorial concepts over-taking legitimate maritime and naval practice.

I will speak in more detail on these challenges, but first let me assess the way in which the use of the sea will develop. Arguably, we are still seeing a continuation of a process which has been evolving since the beginning of what is now termed the 'age of Vasco da Gama'. If the flowering of the first era of globalisation was based upon the triple expansion steam engine then the ocean going cargo vessel and the telegraph formed the second which will continue to flourish through a combination of the container and the Internet. The first era allowed the creation of 'just in time' economies in relation to food and raw materials; the second has allowed the further refinement of 'just in time' boundaries in relation to those bulk cargoes, while supporting the development of an unprecedented level of the distributed manufacture of components integrated with centralised assembly.

Ships provide by far the cheapest mechanism per ton-mile for the long distance transportation of containers - and the cost is steadily being driven down by the increasing size of the liner container ships that dominate the oceanic trade. A similar drive applies to bulk carriers. Size is not the only cost-reducing factor, however. Perhaps the clearest demonstration of the extent to which efficiencies have been achieved in recent decades has been the significant drop in the emissions of new-build ships in relation to miles steamed. My own assessment is that the drive to even greater efficiency in waterborne movement has yet to be exhausted, particularly as intelligent use of wind and solar power may allow bulk carriers, for example, to reduce their fossil fuel consumption dramatically. Other types of ship could benefit, even warships. The Irish navy has been doing some interesting experiments in this line on its patrol vessels.

Thus, even with the realisation of China's ambitions for the development of its own heartland as well as central Asia - and Russia for its own eastern provinces and the economic community it seeks to foster - it is likely that the relative advantages which ships have over land transport, even railways, will be maintained.

What will change in terms of cargo movement will be the patterns of growth - and the trade routes of greatest growth. My assessment is that the trans-Pacific and East Asia-Europe shipping levels will stabilise, with only moderate long term expansion. What will increase significantly, with the development of the Asian middle class, is the movement of trade around Asia, particularly between India, China and ASEAN, as well as the energy and resource flows into Asia. But I will add a note of caution. While I believe that the increase in Asia-focused activity will be significant, it will not continue to increase at the rate experienced over the last decade, given China's emerging problems and the

challenges faced by states like India. Even less certain are the future growth patterns for South and Central America and Africa. Despite the potential of these continents, the constraints on progress are significant.

I will add that there is an emerging tension and that is the cost of the facilities required for the very big cargo ships, as well as the physical limitations on the ports and harbours which they can enter. The hub and spoke concept, with a few great entrepôts, has its logic, with feeder ships taking cargoes to smaller ports. However, if smaller hulls can manage to reduce their own costs through innovative technology, particularly in wind and solar propulsion, we may see some interesting developments.

One cost-saving innovation which needs to be opposed is the full automation of ships, which seems to be the subject of examination by more than one major shipping company. The logic of remote control in terms of reducing expenses (and ending the drudgery of long sea passages for mariners) is obvious, but such a system would create extraordinary opportunities for the ill-disposed.

The future of global fisheries is even less clear. The extent of global over-fishing and the general collapse of many key fish stocks are, in my opinion, yet to be fully acknowledged. They may vie with increases in sea levels as the greatest global threat to stability in the populated littorals. There are local and even regional success stories of environmental management and sustainable exploitation (such as the Baltic), but there are many more of uncontrolled and devastating damage. There can be no doubt that the inability of many developing states to manage their own maritime zones combines with the lack of proper governance of much of the high seas to present a fundamental problem for the world as a whole. Climate change and environmental degradation - ironically much more often the result of human action on land than at sea - only worsen the prospect.

The need for collective action on fisheries and maritime environmental management remains urgent, even if progress has been made in some areas. Indeed, the nature of that progress - based on consensus and then commitment on the part of many states - suggests that the drive for collective action has to become a much higher priority. If, for example, the regulatory effort of the members of the *Convention for the Conservation of Antarctic Marine Living Resources* (CCAMLR) has achieved a much more sustainable approach to the exploitation of Patagonian and Antarctic toothfish, it has been the imposition of global port controls which has seen, at least for the moment, the effective end of the illegal fishing vessels, epitomised by the scuttling of the *Thunder* in the South Atlantic after a chase by the Sea Shepherd environmental group. I will make a side comment that I regard this effort against what is a form of organised crime as a much more useful activity by Sea Shepherd than their activities against the Japanese whalers. Activists need to understand that nationalism remains, however sadly, a much more powerful motivator than the environment.

But I would also add that more capable states need to redouble their efforts to build maritime governance capacity in poorer states - and provide it when the challenge is beyond the reasonable power of a small state. Environmental groups may also have a

role here - Greenpeace has been doing some useful work in the Indian Ocean and in the Pacific. There will always be the need to be sensitive to the questions of sovereignty involved, but the way in which this can best be achieved is to ensure that the priority for capacity building goes where it most matters - to the people concerned.

It is problems such as I have described that mean that the future maritime domain will be the theatre for a contest between control and license, between the historical experience of the sea as a global commons with very few restrictions on its users - and those which did exist came into being almost always by consensus - and its evolution into a highly regulated environment much more akin to the situation in the air and on land

My view is that we *must* move to this much more closely regulated maritime environment. However, creating the level of assured and secure awareness that would be required to make the world's oceans a governed regime represents much more of a challenge than many realise.

This derives from a misunderstanding of many in the global community as to the way in which the sea is used - and just how big the sea is. In part this is the result of the way that maritime activity has become less visible to people even as it has become more important. International air travel is one factor, but so are the changes in seaborne commerce. We have an example of this effect here in Sydney, which is no longer a working harbour in the way it was half a century ago, when six or seven merchant vessels would berth every morning. Apart from cruise ships, the commercial effort is now largely out of sight - and also out of mind - in Botany Bay. The United Kingdom, which has also suffered the decimation of its fishing industry and its navy and the collapse of a seagoing workforce, is perhaps the most extreme example of the loss of national maritime consciousness which can result.

But maritime strategists have not helped by the use of terms such as 'sea lines of communication'. I have long disliked the expression because I have been to sea often enough to know that there are no lines on the water. What we are talking about is ships and the shortest navigable distance between two points, not maritime railways. But I now realise that the word 'communication' is also all wrong, because to anyone born in the last quarter century - and many older people - it implies the near-instantaneous, electronic exchange of information, not the movement of materials.

I also think that the expression 'chokepoints' is of little help when considering global maritime problems. There is, in reality, only one real maritime chokepoint for the world as whole and that is the Strait of Hormuz. Every other international strait, even that of Malacca, may be a chokepoint for the local nations, but is in fact a 'capacity point' for shipping and trade as whole. The price to avoiding a blockage is in longer voyages and longer voyages require additional tonnage to achieve the same movement of cargo. The question that must always be asked in a crisis is - does global shipping have the spare

capacity to make up the difference?

I also believe that too many commentators have come to think of the sea as some sort of transparent space, totally apparent to the observer. I call this the 'fallacy of Google Earth'. The failure so far to locate the wreckage of the lost Malaysian Airlines Flight 370 has been one demonstration of the lack of consistent surveillance over many areas, but the truth is that even in the narrow seas and the littoral, where distances are much shorter, being able to know what is going on has a level of difficulty akin to that encountered in contested urban environments. Hence the problems encountered by so many states in monitoring their own maritime zones, even those in which the strength of the national flesh matches that of the national spirit.

The reality is that we depend largely upon a combination of emissions and compliance to know what is going on. Most of the data sources of what passes for maritime domain awareness in fact rely upon reports by beacons or other mechanisms, such as the now compulsory automatic identification system. While this has achieved considerable advances in increasing the degree of understanding of what is happening at sea, there is already evidence that many of the data sets are deliberately corrupted by commercial interests or criminal gangs. Similar problems have long been experienced with the equivalent vessel monitoring systems which fishing vessels are required to operate as a condition of their licenses to operate within other states' exclusive economic zones.

Furthermore, much destructive activity in the maritime domain comes from what could be termed the 'grey', sea-focused economies of developing states, in small, often primitive craft or in larger vessels which have the most basic of equipment. Admiral Dhowan reminded us, India alone has some 240,000 craft which fit these categories. Fundamentally, their effective management needs the equivalent of the policeman on the beat, not just the eye in the sky, as well as close cooperation between authorities at sea and those in harbour.

I want to dwell a little on the subject of offshore facilities, whether for oil and gas drilling or for activities such as wind power. Such assets do need to be protected. Indeed, it is fair to say that land based ideas of fixed asset security do and should be applied to them. But, no artificial facility, however large, however costly and however important for its owner generates sovereignty. Placing platforms or wind turbines cannot be an excuse to close off sea areas and the need to provide their security outside the territorial sea must not be allowed to interfere with the freedom of operation of naval forces - or of other legitimate

commercial or subsistence activities.

In military terms, the contest between what are now termed anti-access, area denial (A2AD) systems and seaborne maritime forces shares some of the characteristics of the civil situation. A2AD fundamentally depends upon the achievement of a sufficient level of awareness, both in terms of time and precision in location, to render approaching naval forces so vulnerable to attack that they cannot achieve their missions without suffering unacceptable losses. I endorse the intervention of our colleague from the Chinese navy earlier in this conference to the effect that A2AD is really a modern form of coast defence and has legitimacy in such a context. The point, of course, in the old contest between the 'fort and the warship', is that the range of engagement has got steadily greater.

There can be no doubt that A2AD systems represent a serious threat to naval surface forces in particular. But it is much less clear whether they represent an existential one. First of all, A2AD systems are instruments for high-intensity warfare, while naval surface forces, with or without their amphibious elements, have utility across the spectrum of conflict. The classical military, diplomatic and constabulary roles of navies remain to be fulfilled.

Second, even in high-intensity conventional conflicts, the correlation of forces is extraordinarily difficult to predict, and will remain so. Trying to gain some idea of what will happen is probably the major preoccupation of naval planners and war gamers in more than one continent. The difficulty for both sides is that A2AD and maritime operations are both, in their modern forms, highly dependent upon networks for command and control, surveillance and targeting. Any high intensity conflict will see these networks becoming targets in their own right and the disruption and resultant unavailability of communications networks and remote sensor and intelligence feeds may well become the rule rather than the exception. Surface and seaborne air force operations and tactics will evolve - and are evolving - in ways that focus much more on covert, deceptive, in-and-out deployments and strikes to an extent that has not been seen since the height of the Cold War when the Allied navies sought to subvert the Soviet ocean surveillance system - and to attack its sensors and weapons. The modern A2AD system may have mobile weapon launchers, but it will inevitably have vital fixed sensor, command and communication elements which will become targets in their own right. Operational concepts for the use of aircraft carriers will owe much more to the 'Doolittle Raid' on Tokyo in 1942 - and the covert passage of USS *America* from the western Atlantic into Vestfjord during Exercise OCEAN SAFARI in 1985 - than the recent air base operations in the Arabian Sea.

The situation of A2AD may well become analogous to that of the sniper in trench warfare - looking for the exposed head or limb across no man's land, while trying desperately hard not to become the subject of attack himself. Mobile, surface borne forces, on the other hand - to continue the analogy - may well operate much more on the lines of trench raiders, attempting to remain covert, to distract and deceive, to achieve surprise and strike a hard blow and retire before the defence can assemble and respond. Thus, in

many ways, we are indeed seeing a return in maritime warfare to the concepts current at the end of the Cold War. What will be different will be the technologies involved and the mechanics (and physics) of their interaction.

What is clear is that major surface combatants and amphibious units are not going out of fashion just yet. Indeed, there is a new drive to greater size in terms of surface combatants that may itself be recognition of their utility across the spectrum, a utility based on the fundamental nature of sea power, the carrying capacity of ships. In contemporary terms, this translates to weapons, sensors, helicopters, landing and boarding parties and platform endurance. In the very near future, it will extend to unmanned vehicles which can be deployed, recovered, serviced and re-deployed under, on and above the water.

My personal view is that such 'swarms' may also have the potential to provide the surface ships concerned with the bubble of awareness in three dimensions (and, arguably, in three environments) that will assist their survivability in high intensity warfare. In a contest of both cyber and kinetic elements, such local networks are likely to prove much more robust than systems which span space and the continents. Unmanned vehicles will also provide manned surface ships and submarines with agents of action and influence - systems which can be deployed into the areas of highest threat, establishing which areas are safe and what is going on within them, even if they lack the capability to conduct engagements in their own right - and many are likely to have that level of capability as well.

But there will also be a fight to prevent A2AD becoming incorporated into legal regimes and it is here that I see a potential nexus between offshore industry and military interest that needs to be avoided. Not allowing the current Chinese interpretation of foreign military operations within exclusive economic zones will be central to the ability of navies to retain much of their utility across the spectrum of conflict. I expect that the United States will continue to contest this matter in the South China Sea in particular.

It may be, of course, that China's increasing global interests will bring about a change of mind within China on the subject, if only because such constraints within other state's exclusive economic zone will create excessive limitations on the freedom of manoeuvre of an increasingly capable Chinese navy. Although some casuistry has already been employed to justify Chinese operations in other exclusive economic zones on the basis that the states concerned have failed to promulgate the necessary national legislation to exclude the military operations of others, this is not a legally sustainable approach.

I should add that, while I have concerns over some directions of Chinese strategic thought, I do not see a direct parallel between the Chinese navy and the Imperial German Navy of the Tirpitz era and I do not think that the comparison is helpful. There are two key differences. The Chinese navy does not represent a stake pointed at the heart of the United States in the way that the German High Sea Fleet did to Great Britain. The second is that it is devoting resources to the creation of global capability in a way that the Germans failed to do with their handful of overseas cruisers. And, despite my worry over the nature of China's activities in the South China Sea, I regard the deployed presence of

the Chinese navy in distant waters as being much more positive than concerning, since it can represent the manifestation of China accepting its responsibilities as a global trading power, one which is critically dependent upon but also a vital contributor to the global maritime system.

One of the greatest successes of the 20th century, which has underlain so much of the peaceful progress of the last 70 years, was the United States' acceptance of the burden of protecting the global system in place of the United Kingdom. Perhaps the greatest hope for the 21st century will be that such protection can become an even more collective effort than it is now.

In conclusion, complexity, challenge and the potential for chaos are indeed inseparable components of the future of sea power, just as they are for the globe itself. But, however difficult prediction of the future actually is, I can assert one constant. The sea will continue to matter for man and it will need to be used by man.