THE STRATEGIC IMPORTANCE OF
SEABORNE TRADE
AND SHIPPING

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A Common Interest of Asia Pacific

Edited by Andrew Forbes
RAN Sea Power Centre

Royal Australian Navy
Sea Power Centre

Papers in Australian Maritime Affairs

No. 10   *The Strategic Importance of Seaborne Trade and shipping: A common Interest of Asia Pacific* edited by Andrew Forbes

The 'Papers in Australian Maritime Affairs' series is a vehicle for the distribution of substantial work by members of the Royal Australian Navy as well as members of the Australian and international community undertaking original research into regional maritime issues. Papers will be drawn generally from manuscripts not scheduled for publication elsewhere but that nonetheless merit extensive distribution. Candidates are considered by an editorial board under the auspices of the Director of the RAN Sea Power Centre.

Other volumes in the series are:

Foreword

Naval planners, and occasionally politicians, have long been concerned with the safety of the Sea Lines of Communication (SLOC), whether it has been for the protection of their nation's seaborne trade or logistic support for military operations. Over the past century, the predominant geographical area of concern has been the Atlantic Ocean, and the trade between the United Kingdom, Europe, and the Americas. Seaborne trade was adversely affected during the two World Wars, as were military cargoes required to prosecute the war in Europe. This was also a primary concern during the Cold War when it was recognised that the resupply routes between the United States and Europe must remain open in case of war between North Atlantic Treaty Organisation (NATO) Alliance and Warsaw Pact.

Of lesser priority initially (but perhaps of greater significance now) are the major sea-lanes in the Asia-Pacific region. Since 1945, this region has become the fastest growing and most dynamic sector of the global economy, with increasing intra and interregional seaborne trade. As an adverse economic situation in an individual Asia-Pacific country will impact on its regional trading partners and possibly have a global impact, SLOC security, which is the bedrock of Asian economic growth, becomes a global concern. While the countries of North Asia are the economic powerhouse of Asia, the Southeast Asian sea-lanes through which their trade passes, also become critical to any consideration of SLOC security. The region assumes greater importance as the Southeast Asian sea-lanes are natural choke points that could be blocked to hinder seaborne trade, and since much of international shipping is now Asian owned, the economic ramifications of any such actions are magnified. Less often considered is the economic strength of India, and its requirements for seaborne trade. As her seaborne trade may use the western entrance to the Malacca Strait, she has a significant interest in SLOC security in the Asia-Pacific.

An additional complication to the consideration of SLOC security is the continued application of historical examples to the current situation. Certainly in the first half of the 20th Century, protection of trade had, as a major consideration, the protection of one's own shipping that was transporting the necessary goods required. However, during the later half of the 20th Century and as we enter the 21st Century this is changing. Many of the trading nations now have a small merchant fleet and instead rely on international shipping

firms, registered in one country, owned by the national of another, crewed by nations of different countries, and insured elsewhere. This raises the issue of how a country can protect its trade when it does not own the ship that is transporting the goods—as it has no legal right to convoy another country's shipping—events in the 1980-1988 Gulf Tanker War are instructive in this regard.

Importantly, notwithstanding the extensive use of attacks on seaborne trade in both times of tension and war, particularly in the 20th Century—it is difficult to identify a special threat to SLOCs in the Asia-Pacific region. The issue then is not the actual threat, of which there currently appears to be none, but the potential vulnerabilities of seaborne trade. What has now come to the fore, mainly due to the coming into effect of the *United Nations Convention on the Law of the Sea (UNCLOS) 1982* is a recognition of the importance of the oceans and the development of a more holistic approach to maritime policy. To better handle the myriad of issues arising from UNCLOS, maritime and oceans policy now also encompasses SLOC security. This means that while in earlier times there may have been concerns with direct military treats to trade, this has now expanded to non-military threats, which might be just as severe. As an example, sinking ships will have an obvious impact on trade, but so will economic or environmental driven closures of international straits that extend the duration of voyages, and drive up freight costs. Pollution spills, or ship breakdowns can lead to the closure of straits that have an immediate economic impact on seaborne trade and the economics of international shipping.

While convoying of merchant ships to protect against attack was primarily concerned with movement along shipping routes (with recognition that the ports at each end of the voyage also needed to be safe), ports are assuming a greater significance in economic trade. The trend toward a few hub ports which then feed off to smaller ports create a strategic vulnerability—why attack a ship if you can attack a port and achieve a more substantial impact? Moreover, with the increasing reliance on technology, a physical attack may no longer be required if a cyber-attack through the Internet will cause a equivalent or greater level of disruption. This also opens a Pandora's box for security planners, where it usually took the capabilities of a nation state to attack shipping, albeit pirates might make an occasional foray against an individual ship, now individuals could conceivably disable ports for any reason if so inclined.

The importance of UNCLOS and other international agreements concerning the use of the sea cannot be ignored. A nation's maritime policy is also concerned with one of the fundamental drivers of seaborne trade—the status and

regulation of the shipping industry, the condition of ships transporting the goods and the working conditions of their crews. As greater attention is paid to these issues, which are fundamental to seaborne trade, changes can be expected within the shipping industry as environmental regulations are strengthened.

The papers that follow examine these issues and put forward possible solutions.

Andrew Forbes
Navy Headquarters, Canberra
October 2002

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International SLOC Conference

The objective of the Asia-Pacific International Sea Lines of Communication (SLOC) conference process is to promote awareness of the strategic importance of shipping and seaborne trade. The free movement of shipping and seaborne trade is a key security interest in the Asia-Pacific that is shared by most regional countries. Shipping traffic in the region continues to grow at a fast rate and many regional countries are highly vulnerable to any disruption of seaborne trade.

The first in the series of Asia-Pacific International SLOC conferences was held in San Francisco 1982 and subsequent conferences have been held on a roughly biennial basis in various locations throughout the region. They are hosted in most cases by a research institute or centre in the host nation. The International SLOC process is managed by the International SLOC Steering Committee. This meets roughly on an annual basis with a meeting being held 6-9 months before each conference to plan the conference and then another meeting is usually held during the conference.

Membership of the International SLOC process is informal and inclusive. All countries and entities in the Asia-Pacific interested in the security of seaborne trade and shipping are welcome to participate. There are no formal applications or election procedures for membership. Membership is usually through a relevant research centre or institute in the member country rather than on an individual basis. The only obligation of membership is the preparedness to host an International SLOC conference at some time in the future. On the basis of current or past participation in International SLOC Steering Committee meetings, SLOC members currently come from Australia, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Taiwan, Thailand, and the United States. Canada, China and India have been invited to recent conferences and they might now be recognised as members of the SLOC process. In the future, Vietnam and Cambodia could also be invited to attend.

International SLOC Conferences have been held in the following cities:

1st   San Francisco, 1982
2nd   Tokyo, 1983
3rd   Singapore, 1985
4th   Taipei, 1986
5th   Seoul, 1987

Notes on Contributors

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Peter Cozens served in the British India Steam Navigation Company Limited from 1964 to 1972, sailing in the Company's Cadetship, general cargo ships, passenger and cruise liners. He joined the Royal New Zealand Navy in 1972, retiring as a Commander in 1993 to pursue academic interests. He is a graduate of the Royal Australian Naval Staff College and Victoria University, Wellington. His research interests include Chinese maritime development, maritime strategy and oceans policy. He is currently a member of the Centre for Strategic Studies, New Zealand.

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The Hon Peter Morris concluded almost 26 years in the Australian Parliament on 31 August 1998. He was Shadow Minister for Transport from 1976 until

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Vice Admiral David Shackleton, AO, RAN joined the Royal Australian Navy in 1966 and qualified as a principal warfare officer and specialised in combat systems and aircraft direction. During his naval career he has held a wide range of appointments including: command of HMA Ships *Derwent* and *Brisbane*, Chief Staff Officer C3I to the Maritime Commander, Director General Naval Policy and Warfare in Navy Office, Director General Information Management and Director General Command and Support Systems in the Defence Acquisition Organisation, and Head Capability Development in Australian Defence Headquarters. He assumed command of the RAN on 3 July 1999.

Professor Geoffrey Till is Dean of Academic Studies at the UK Joint Services Command and Staff College. Before the creation of the JSCSC he was Professor and Head of Department of History and International Affairs at the Royal Naval College, Greenwich. In addition to many articles on various aspects of defence, Professor Till is the author of *Maritime Strategy and the Nuclear Age* and, with Professor Bryan Ranft, *The Sea in Soviet Strategy* as well as a number of other books on naval history and strategy.

Clive Williams has a background in Australian Military Intelligence. He was awarded the Medal for Gallantry for service in Vietnam and held a number of overseas intelligence appointments including the Joint Services Intelligence Staff in Hong Kong and Fort Huachuca in Arizona as an instructor in imagery intelligence. After leaving the Army in 1981, he pursued a civilian career in defence intelligence, working mainly on transnational issues. He was the Defence Intelligence Attache in Washington from 1990 to 1993 and at the time of the conference was the Director of Security Intelligence in Defence before moving to the Australian National University as the Director of Terrorism Studies at the Strategic and Defence Studies Centre. Mr Williams has an Honours degree in political science and a Masters degree in Criminology from Melbourne University and was a Chevening Scholar in the War Studies Department of the University of London in 1987.

Abbreviations

ADF	Australian Defence Force
AEW&C	Airborne Early Warning and Control
AFLC	Afloat Logistics and Sealift Capability
AIS	Automatic Identification System
AMDC	Australian Maritime Defence Council
ANIEs	Asia New Industrialised Economies
ANZIO	Australian New Zealand Indian Ocean
ANZUS	Australian New Zealand United States
APEC	Asia Pacific Economic Cooperation
APL	American President Line
ARC	Association for Regional Cooperation
ARF	ASEAN Regional Forum
ARPA	Automatic Radar Plotting Aid
ASEAN	Association of South East Asian Nations
ASW	Anti – Submarine Warfare
BBWG	Bell Buoy Working Group
BIMCO	Baltic and International Maritime Council
C4ISR	Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance
CAM	Conflict Avoiding Measures
CBM	Confidence Building Measures
CBSM	Confidence Building and Security Measures
COSCO	China Ocean Shipping Corporation
COSHIRS	Confidential Ship Safety Incident Reporting System
COWOC	Consolidated Ocean Web of Communication
CPI	Consumer Price Index
CRM	Conflict Resolution Measures
CSCAP	Council for Security Cooperation in the Asia Pacific
CSG	China Shipping Group
DDG	Guided Missile Destroyer
DEM	Defence Information Systems Network Equipment Manager
DGPS	Different Global Positioning Systems
DOD	Department of Defence
DoTARS	Department of Transport and Regional Services
DWT	Deadweight Tonnage

ECDIS	Electronic Chart Display Information System
EDI	Electronic Data Interchange
EEZ	Exclusive Economic Zone
EMP	Electromagnetic Pulse
ENC	Electronic Navigational Charts
EU	European Union
FBE	Fleet Base East
FBW	Fleet Base West
FCP	Fleet Concentration Period
FFG	Guided Missile Frigate
FFH	Fast Frigate Helicopter
FPDA	Fire Power Defence Arrangement
GDP	Gross Domestic Product
GLONASS	Global Orbiting Navigation Satellite System
GPS	Global Positioning System
GT	Gross Tonnage
HO	Hydrographic Office
IACS	International Association Classification Societies
IALA	International Association of Marine Aids to Navigation And Lighthouse Authorities
IBS	Integrated Bridge System
ICONS	International Commission On Shipping
IHO	International Hydrographic Organisation
IMB	International Maritime Bureau
IMO	International Maritime Organisation
INCSEA	Incident at Sea
IOR	Indian Ocean Rim
IOR-ARC	Indian Ocean Rim—Association for Regional Cooperation
IORCBN	Indian Ocean Rim Consultation Business Network
IORN	Indian Ocean Research Network
ISM	International Safety Management
ISP	Internet System Provider
JMSDF	Japanese Maritime Self Defence Force
LSS	Logistic Support Ship
LTTE	Liberation Tigers of Tamil Eelam
MARPOL	The International Convention for the Prevention of Pollution from Ships
MEH	Marine Electronic Highway
MHQ	Maritime Headquarters
MILF	Moro Islamic Liberation Front

MOL	Mitsui Osaka Line
MPA	Maritime and Port Authority
MRO	Military Response Option
NATO	North Atlantic Treaty Organisation
NCAPS	Naval Coordination and Protection of Shipping
NCAPSORG	Naval Coordination and Protection of Shipping Organization
NCS	Naval Control of Shipping
NIEs	Newly Industrialising Economies
NYK	Nippon Yusen Kaisha
OECD	Organisation Economic Cooperation And Development
OOCL	Orient Overseas Container Line
OPV	Offshore Patrol Vessel
OSPAR	Oil Spill Preparedness and Response
PACCOM	Pacific Command
PACFLT	Pacific Fleet
PACIOSWG	Pacific and Indian Ocean Shipping Working Group
PNTL	Pacific Nuclear Transport Limited
POCC	Port Operation Control Centre
PPP	Purchasing Power Parity
PRC	People Republic of China
RAAF	Royal Australian Air Force
RAN	Royal Australian Navy
RANR	Royal Australian Navy Reserve
RN	Royal Navy
RNC	Raster Navigational Charts
RNCS	Regional Naval Control of Shipping
RTW	round the world
SA	Selective Availability
SAARC	South Asian Association for Regional Cooperation
SAPTA	South Asian Preferential Trading Agreement
SAR	Search and Rescue
SLOC	Sea Lines of Communication
STCW	Standards of Training Certification and Watch Keeping
STRAITREP	Mandatory Ship Reporting System in the Straits of Malacca and Singapore
STUFT	Ships Taken up From Trade
SWATH	Small Waterplane Area Twin Hull
TBM	Trust Building Measures
TRM	Tension Reduction Measures
TSS	Traffic Separation Scheme

TTEG	Tripartite Technical Experts Group
UK	United Kingdom
UKAEAC	United Kingdom Atomic Energy Authority Constabulary
UNCLOS	United Nations Convention on the Law of the Sea
UNICRI	United Nations Interregional Crime and Justice Research Institute
US	United States
USN	United States Navy
VTIS	Vessel Traffic Information Systems
VTS	Vessel Traffic Service
WTO	World Trade Organisation
WWI	World War I
WWII	World War II

Australia has over 60 commercial ports

Opening Address

Opening Address

Vice Admiral David Shackleton, AO, RAN

I am honoured to open the 13th International Conference on Sea Lines of Communication (SLOC). I want to welcome our speakers, guests from overseas, and participants from Australia. I also want to extend my congratulations to the conference organisers: Professor Anthony Bergin from the Australian Defence Studies Centre, and Commodore Sam Bateman from the Centre for Maritime Policy. I am delighted that the Royal Australian Navy, Sea Power Centre has been able to assist with sponsorship for this conference. It is important for navies that they be actively involved in efforts like this.

Let me remind you of the conference objectives:

- To raise awareness of the significance of shipping and seaborne trade as defence and strategic policy concerns of countries in the Asia-Pacific.
- To identify the consequences of a disruption of seaborne trade in the Asia-Pacific.
- To identify the implications of new threats to shipping such as piracy and maritime terrorism.
- To identify the implications of technological change and innovation for the protection of shipping.
- To develop an agenda for further cooperative initiatives to ensure the security of shipping and seaborne trade in the Asia-Pacific.

This is a highly ambitious set of objectives. That the organisers could aim to achieve them is indicative of the quality of the speakers that they have enlisted from around the world and from within Australia. But before we listen to our keynote speaker, Professor Geoffrey Till, I thought that I should take the opportunity to suggest some ideas and frame some questions for you from my own perspective, as Chief of the Australian Navy.

I do not propose to recite the statistics of Australia's dependence on the sea or those that show that the Asia-Pacific as a whole is equally dependent. You as an audience would know the reasons for, and the extent of that dependence, just as well as I do. But I do want to suggest that we need to think hard and perhaps differently from the past about the nature of the security issues which relate to sea-lines of communication.

Even the term SLOC can mislead those who do not fully understand the maritime environment into focusing away from what requires to be protected towards geographic and oceanographic elements which are sometimes critical and sometimes not. As you in this audience know very well, the relationships involved are not easy to understand because they so directly depend upon the particular situation and they are interdependent. Even thinking in terms of ships alone may not be wholly correct, because it is trade that we require to protect and maintain, and trade—the 'effective' movement of commerce—is very much more than hulls saved from damage or destruction.

I use the word 'effective' deliberately, because in a commercial context, it is more often the relative effects of a problem, such as a reduction in profit margins, which determine the response rather than the absolute effects. Furthermore, like most economic activity, trade is much more susceptible to unquantifiable pyschological factors than we often like to think. Above all, though it cannot flourish where there is no confidence in the security environment within which commerce must operate.

It is because I see naval forces as playing key roles in the maintenance of that security environment, roles which are not always direct or obvious in their effects, that I am particularly impressed by the effort which has been made by the conference organisers to provide a wider context to your deliberations. The recognition that seaborne trade and international security are directly connected and inter-related in highly complex ways is fundamental to understanding the challenges that face us. We do need to understand those relationships and propagate that understanding amongst those who need to know and that includes our elected representatives as well as our merchants and military planners and strategists.

And I would here put to you one of my primary questions from my perspective as Chief of Navy. It is not how navies can contribute to assuring the maintenance of the maritime elements which sustain the right security environment, but how can we create a higher level of awareness both inside and outside the maritime world of the importance of that contribution.

Elsewhere within your program, I am also impressed by the efforts that you will be making to focus on new and emerging issues for seaborne trade and shipping. While the control of maritime trade remains as central a requirement of naval effort as it did when Julian Corbett first expressed the concept nearly one hundred years ago, we must be alert to the fact that not only the threats to maritime trade but also the mechanisms for protecting it may be changing rapidly and profoundly so.

What are those changes? And what do they mean for navies? Conflict seems an inescapable part of the human experience. But is conflict in the future likely to manifest itself as state on state warfare at sea? If it does, what will be the nature of that warfare? In other contingencies, will seaborne trade not only be vulnerable to lower level conflicts, but become a key, and perhaps a soft target?

How will technological change feature in all this? What will be the future forms of sea transport, what effect will they have on shipping flows? In what ways will technology make maritime commerce more vulnerable or secure?

In an increasingly fragile and highly stressed maritime environment, for example, what are the prospects of bulk petroleum carriers being attacked by terrorists in such a way as to cause an environmental or economic catastrophe?

One could suggest many scenarios, equally alarming and equally credible - or incredible. But, however far-fetched, we need to consider them.

And we need to consider them conscious that an increasingly complex and crowded world means that the challenges we face are themselves increasingly complex and numerous. I think that one mistake made by those who devote insufficient time to history and to establishing context is that they assume that a new problem somehow cancels out the existence of old ones.

It does not, and demonstrably so.

I believe that we have more to think about in terms of maritime security and sea lines of communication than ever before. But don't forget that, sea lines of communication are not railway lines. The oceans are vast and much navigable room remains. But archipelagoes and route chokepoints have real vulnerabilities. We must be very careful not to think that we can ignore the experience of the past, but at the same time we have to absorb and adjust to the extraordinary pace of change, perhaps nowhere more so than in the maritime environment.

The changes that we face are probably well demonstrated by the way in which this series of conferences on sea lines of communication has itself shifted progressively in focus—from Cold War issues to considering the implications of globalisation. With globalisation comes increasing interconnection—and increasing mutual dependence, whether explicitly recognised or not. We need to become much more sophisticated in our understanding of that dependence and its profound significance for the way in which we approach issues in the maritime environment.

Developing such an approach and identifying the way ahead for the region as a whole is what this conference must fundamentally be about. I am confident that you will go a substantial way towards achieving this over the next two days. I wish you well in your efforts and I look forward to hearing the results of your deliberations, and joining you for dinner this evening.

Keynote Address

A Changing focus for the Protection of Shipping

Professor Geoffrey Till

The end of the Cold War brought hope of a global peace dividend whereby the universal reduction in armed forces would mark a new era of worldwide security and prosperity. As the shadow of Superpower conflict has lifted, however, regional disputes based on national, ethnic and religious issues have flared around the world. In true Machiavellian fashion, countries such as the United States (US) and United Kingdom (UK) have placed an increased emphasis on the use of armed forces to respond to these humanitarian and security concerns. For naval forces in particular, this has resulted in a change of emphasis from sea control to power projection.

Above all the sea is, and always has been, a means of transport. Consequently there have usually been the closest of links between naval power and merchant shipping. Thus Lord Haversham:

> Your fleet and your trade have so near a relation and such mutual influence on each other, they cannot well be separated, your trade is the mother and nurse of your seamen, your seamen are the life of the fleet and your fleet is the security and protection of your trade.[1]

This was about the British case but it could apply to most other maritime countries. Merchant shipping was both a source of maritime power and something that navies naturally needed to defend. So important was this latter function of navies that Mahan came close to suggesting it was the main reason for having a navy in the first place. 'The necessity of a navy' the great man said '... springs from the existence of peaceful shipping and disappears with it, except in the case of a nation, which has aggressive tendencies, and keeps up a navy merely as a branch of the military establishment.'[2]

Accordingly great maritime wars often saw major operations in which the attack and defence of seaborne trade were major features. Indeed, in the blackest days of 1917 and 1941-43, it looked to many as though this could easily prove to be the decisive form of maritime war. Had there ever have been a third world war, the defence of Atlantic Sea Lines of Communication (SLOC) and even local SLOCs around Europe's waters would have been crucial, and certainly preoccupied NATO's naval planners. More recently, the security of the Coalition's

SLOCs for *Desert Shield/Storm* was a significant concern, although the threat was low, the political consequences of a successful attack might have been very serious.[3]

Neither is it hard to see the reason for this concern for the safety of the SLOCs. Merchant shipping was central to the health of an economy forced by largely geographic circumstances to the maritime. In the 18th Century, English country squires used to while away their idle hours by reading the monthly *Gentlemen's Magazine*–effectively the then equivalent of the *Readers' Digest*. Whenever England was at war with France (which was most of the time), there was a section at the back which listed British merchant ships lost and French and Spanish ones taken, complete with precise valuations of their cargoes, a comparative reckoning and a clear or verdict on who had won that month. It was all for the world like scoring a cricket match.

Nor was there anything reprehensible about this very commercial approach to maritime strategy since mercantile prosperity was what Britain stood for. Thus Robert Earl Nugent in a debate in the Lords in September 1745:

> Let us remember that we are superior to other nations, principally by our riches, that those riches are the gifts of commerce, and that commerce can subsist only while we maintain a naval force superior to that of other princes. A naval power and an extended trade reciprocally produce each other, without trade we shall want sailors for our ships of war, and without ships of war we shall soon discover that the oppressive ambition of our neighbours will not suffice us to trade.

> [If] our trade be lost, who can inform us how long we shall be suffered to enjoy our laws our liberties, or our religion? Without trade, what wealth shall we possess? And without wealth, what alliances can be formed?[4]

His point was that maritime trade depended on but also sustained a financial infrastructure that in turn provided the wherewithal to finance the war effort, keep the economy going and to subsidise allies. As recent studies have made crystal clear, it was this whole system that financed Britain's industrial revolution, and underpinned Britain's strategy.[5]

It is also important to remember that there has always been far more to maritime power than merchant ships. These are merely the outward sign of a vast maritime system, which also includes shipbuilding and repair, the fisheries, ports and land communications, marine insurance and a capitalist infrastructure to underpin the whole. In the 18th Century, the British Royal Navy may have been the biggest industrial enterprise in the world.[6] But it depended absolutely

on the health of the maritime economy in general and on the skilled seamen, navigators, shipwrights and artisans, shipyards and materials supplies associated with the merchant shipping industry in particular.

The merchant fleet was important for more immediate reasons too. It was the third (or the fourth, depending on whether you count the Air Force) arm of defence. Its centrality to strategic success seemed perfectly obvious. The magisterial Official History of British Merchant Shipping in the Second World War quotes one Director General as saying:

> In the end with the assistance of our American and other allies, we were able to assemble the necessary quantity of shipping for every major operation, but every major operation was, notwithstanding, either curtailed in scope or delayed in time as a result of the limitations imposed by a shortage of the suitable shipping.[7]

In fact the Official Historian goes on to cast some doubt on this proposition. But makes the point that it took major efforts and a recognition of the absolute strategic importance of merchant shipping, and everything that went with it, to ensure that this was much less the case than it might have been.

The conclusion to be drawn from this great store of hard-won experience was obvious. Merchant shipping, and its accoutrements, was crucial to the prosperity of nations, and to their safety. Naval power depended on it, protecting it was arguably second only importance as a naval imperative to protection of the homeland against invasion. Navies that forgot that did so to their nation's peril. Hence in most great maritime wars there were large scale campaigns in the attack and defence of trade involving the imposition of blockades, raiding, and a variety of *guerre de course* tactics on the one hand classic convoy-and-escort operations on the other, thus the experience of the ages.

But is it different now?

Perhaps never has this familiar view been under more challenge than it is now, as we move into the 21st Century. This is for a whole variety of different reasons. Many are economic. Others are technological, political, or strategic. Let us consider some of the more common propositions in turn.

Merchant shipping matters less financially

According to most prognostications, the volume of world trade is set to rise enormously over the next decade or two. The UK Chamber of Shipping anticipates that world seaborne trade measured in ton-miles will nearly double during this period, barring further recession. But, importantly, this does not make it more important. Despite these increases, it is the electronic web, which now

joins the world's markets that dominates the transfer and accumulation of capital.[8] This does not mean that merchant shipping does not matter, it merely suggests that it matters relatively less.

In the old days, it used to be said that a spice merchant could ship six cargoes and lose five yet still make profit when the sixth was sold. But now the continuing over-capacity of the world's merchant fleet and the great reduction in the transport element in the cost of products means that shippers are operating to tighter and tighter margins. This means they must pay increasing attention to the costs of insurance, crews, fuel charges, mortgage rates, all of which are themselves critically dependent on exchange rates which are themselves determined by a range of influences that have little to do with the terms of maritime trade.[9]

The actual operation of conventional merchant shipping is also a less important part even of the maritime economy, not least because of the increasing sophistication and diversification of its financial infrastructure and the increasing relative importance of marine resource industries. This explains why London with all its support services is still the centre of the world's maritime economy even though Britain's merchant fleet has diminished almost to vanishing point.[10]

But all this is unseen and in Britain, maritime activists worry that the *image* of sea-faring is declining too, and remain concerned about a kind of creeping sea-blindness as people travel by air, as the size of the sea-faring community and its social attractiveness diminishes.[11] In a way, the merchant shipping industry is a victim of its own success, the more shipping costs reduce (and they have gone down ten-fold since the 1980s) the less important shipping seems to be.

Merchant shipping is a global phenomenon

More fundamentally shipping connections and information technology have done much to create the phenomenon of globalisation. The fact that an average container goes around the world 8.5 times a year shows just how global the maritime economy has become.[12] It is now common for beneficial ownership of merchant hulls to be vested in shifting multinational shipping alliances. With finance extended by one country, the cargo owned by another set of companies, the ship in transit from one state to another and crewed by people from a range of other countries. So when a ship is attacked, it is often hard to tell who is being hurt, apart from the immediate victims. In such a globalised world, it may seem curiously anachronistic to expect nation-based entities like navies to be tasked with the protection of other people's property, especially

in conditions when it is not particularly easy to discover who those other people are. Shipping is best thought of a global rather than a national phenomenon needing to be treated as such.

There is less synergy between navies and merchant fleets these days

Another consequence of globalisation is the decline of the national flag fleets so often lamented by traditionalists. This raises familiar concern about the state's ability to charter essential foreign flagged or owned shipping in times of crisis. In the Gulf War, 14 of the 15 ships that transported the British 7th Armoured Brigade to Saudi Arabia were foreign but this did not seem to be a problem.[13] Nonetheless, the confidence that this problem can be solved by throwing enough money at it as easily as it was in *Desert Shield/Storm* may well prove unfounded. In a supplier's market when the required ships are scarce, prices will rise. Even so shippers may prove increasingly reluctant to risk long-term market share by breaking existing charters and contracts, whatever the short-term incentive. Merchant seamen themselves are becoming a rarer commodity, and in the future it may not prove quite as easy as it used to be to replace one crew by another if political conditions demand it.[14]

Moreover, chronic and expanding over capacity in the world shipping fleet has encouraged tighter and tighter margins. Development of a just-enough just-in-time approach to shipping now tends to increase the tension between liberalised commercial operation on the one hand and the kind of restriction and regulation inevitably associated with military use and even military protection on the other. In the old days, this was simply a question of merchant shippers being reluctant to form up into convoys because of the delays involved in assembly and the port congestion so often encountered on arrival. While these tensions may now take different forms, they are at least as acute now, especially in conditions short of war.

One illustration of this tension is the declining strategic value of much of the world's merchant fleet. Commercial pressures and the irresistible rise of the container and huge container ships like the *Sovereign Maersk* are leading to the disappearance of the smaller Ro-Ro and general freighters so useful to navies for purposes of sealift. Light though most expeditionary forces are, much of their equipment is really basically unsuitable for containerisation. Nor, often, are there the kinds of sophisticated port infrastructures needed to load and unload containerised expeditionary forces in the parts of the world in which such forces are likely to be operating. The US, to some extent the UK and some others have consequently decided that it is only wise to reduce

strategic dependence on commercial shipping, at least to some extent by setting up their own specialised military sealift fleets and by developing a particular interest in fast ships.

The same tension is evidenced in other ways too. Port authorities often exhibit less than total enthusiasm for the moving of defence cargoes, especially ordnance and ammunition through commercial facilities. In the first phase of *Desert Storm* for example only one lay berth could be made available at Savannah, Georgia for the load-out of the Military Sealift Command's fast sealift ships.[15]

Unlikelihood of serious attack

It is hard to imagine circumstances in which one state might seek, or even be able, to attack the shipping of another. In conditions short of outright war, globalisation would hugely increase the commercial and political penalties of trying to do so. An attack on any part of the world's economic system could so easily rebound on the transgressor. The much-discussed notion of China putting pressure on Taiwan by harassing its shipping for instance, might be strategically effective but would probably be very expensive in commercial as well as political terms.

Moreover, shipping is now but a part of a complex inter-modal goods distribution system involving ports, railways and roads in which the essential unit is increasingly the container being transported by a variety of means. It may well turn out to be much easier to disrupt this system by threatening the port or its approaches, or launching a cyber-attack on the computerised logistics system that keeps the process going rather than seeking to threaten the container ship on passage. But, again, the consequences of success might well turn out to be unexpectedly painful for the perpetrating state.

This does not of course exclude the prospect of isolated terrorist assaults or sporadic state-based attacks such as those that occurred during the Iran-Iraq tanker war (although it is hard to think of another example). But the strategic effectiveness of attacks of this sort may be less than it appears. The tanker war did indeed lead to very significant naval involvement but less than 2% of the shipping in the area was actually attacked, there was no shortage of tankers content to take their chance and the price of oil rose by barely 1%. Isolated terrorist attacks moreover also seem very unlikely when there are so many much easier and more rewarding targets ashore.

Finally the prospect of a long-drawn out assault on merchant shipping of the sort that occurred in the First and Second World Wars is very hard indeed to envisage, even if one could dream up some believable belligerents. Such campaigns tend to take place over time, and it is difficult to imagine conditions

in which they might re-occur, but again this does not exclude short-term and limited attacks of the sort that took place during the last two Arab-Israeli wars and Indo-Pakistan wars. But these, of course, were, by virtue of their limitations, hardly decisive for the final outcome.

A lower priority for navies

For all these reasons, Western navies at least pay much less attention to the fourth arm of defence than they used to. The merchant fleets themselves are much less an element of naval power than they were. There are fewer prospects of serious attack in times of conflict—and very importantly there are much more important things for navies to be doing in this expeditionary age.

Their emphasis these days is on two things, first, and this applies to the great majority of the world's navies, to the protection and supervision of their own local waters. This requires a multitude of smallish vessels unsuited for oceanic operation but also useful for low-intensity and constabulary tasks. Second, and this is the preoccupation of the larger Western navies, the interest is in maritime power projection against the shore, and on the battle to gain (or contest) the necessary level of sea control. This often involves some tension with the requirements of SLOC protection. In theory, sea control makes shipping safer. For instance once the British mastered the Baltic, marine insurance rates fell tenfold between 1808 and 1814.[16] But often sea control competes with SLOC protection, or even seems to make it more difficult. The Royal Navy of the 1930s, for example, is often held to have neglected the hum-drum business of preparing to deal threats to merchant shipping in favour of readying the battlefleet for its apparently more important sea control campaign. The defeat of the enemy's battlefleet sometimes seems actually to make the SLOC situation worse, as after the great battles of Trafalgar and Jutland.

Because of the contemporary preoccupation with maritime power projection, amphibious warfare vessels, aircraft carriers, tomahawk-shooters, and powerful general purpose sea control ships are all the rage rather than oceanic escorts. Admittedly expeditionary operations have a crucial dependence on integral sealift, but the value of their cargoes leads to the vessels carrying it being treated as though they were warships. Rather than SLOC defence in the traditional sense, it now seems to be more a question of integrated force protection off hazardous coasts.

Not surprisingly therefore, the general protection of trade in the classic sense does not figure largely in the doctrines of most Western navies. It takes up about 2 pages of the Royal Navy's 250 page *British Maritime Doctrine*, rather less in *Australian Maritime Doctrine* and it hardly figures at all in the US Navy's *Forward … From the Sea* family of concepts.[17]

Finally most navies are getting smaller in physical terms. Increasingly, they are composed of fewer, but bigger and more powerful units that are unsuited for such humdrum tasks as convoy protection. The suspicion arises that even the most capable of the world's navies could not protect shipping in a serious way even if they wanted to—on their own at least. Indeed, it must have occurred to some merchant ship masters to wonder who in the Gulf was protecting whom, given their relative sizes and the greater vulnerability of warships to missile hits.

So what is to be done?

If these are the challenges to traditional thinking about the defence of SLOCs, how are modern navies responding to them? And how should they?

Clearly the direct defence of shipping remains as a residual duty of navies even though it may have less salience than it did. In fact SLOC defence is often (though not always as we have seen) subsumed within the requirements of the sea control needed for expeditionary operations. It is a fundamental principle of maritime strategy through the ages that assured sea control is the best means of protecting shipping (or indeed of attacking it). It is for this reason that preparing for sea control usually takes priority in peacetime construction programs. The notion that the size and shape of navies should be based on the requirement to protect shipping is universally resisted. If we are strong, the argument goes, merchant ships will seek our protection when they need to—as the re-flagging of Kuwaiti tankers in 1987 seems to show.

Although naval strength offers this kind of indirect protection, direct defence is sometimes also necessary especially in unavoidable chokepoints and terminal areas of conflict such as the Straits of Hormuz and the Gulf respectively. During the Iran-Iraq war, some 450 ships were attacked and at the height of the campaign 60 Western and 29 Soviet warships were deployed to the area to afford protection. The Royal Navy's Armilla Patrol was by far the most extensive operation of this sort seeing some 1026 ships 'accompanied' through the Straits up to November 1988.[18] All the navies found this a complex business involving different kinds of threats (mines, air launched missiles and boghammers), difficult topographical and climate conditions, complex political arrangements with allies and restraints with the locals and always the danger of getting sucked into other peoples' deadly quarrels.

Admittedly, the scale of the Gulf operation has so far proved quite exceptional, but it may be possible to imagine smaller scale contingencies of the sort in the Asia-Pacific, in the troubled waters around Indonesia or through some confrontation between hostile neighbours (the two Koreas, China and Taiwan).

Lastly, navies will obviously need to protect the sealift and support ships that expeditionary operations depend on. The embarrassing mining of the *Bridgeton*, the Scud missile that landed on the docks at Al-Jubayl within a few yards of 5000 tons of ammunition and the fate of the USS *Cole* were salutary reminders of the safety of shipping. Even warships, cannot be taken for granted in hazardous areas and sea control capacities may need to be supplemented by theatre missile defence, mine-sweeping and port security measures.[19]

This type of 'maritime enablement' requires navies to stay alongside the merchant shipping community in a less literal way as well. It will still be necessary to take ships up from trade for example, and this demands sophisticated means of tracking developments in the shipping industry. Best commercial practice in every aspect of ship construction and operation will also always have something to offer to the efficiency of modern navies. It is hard to believe for instance defence logistics organisations could not learn a thing or two from an organisation like *Federal Express* which handles 1.5 million orders every day, world wide.

In defence of the maritime economy

The worth of ocean-based trade may be less than it was as a proportion of global market turn-over but it is still a crucial, indeed indispensable component in the economic health of the planet. For this reason, in the sensible words of one US Navy Captain, 'it is readily apparent that our economic well-being remains closely linked to the security and stability of the seas.'[20]

The maritime element of the world economy should moreover be seen as a global system characterised by countless interconnections such that a disturbance in one component will affect all the others. A hi-jacked oil tanker could founder on a distant reef, cause pollution, require naval forces to break off from their exercises, put up marine insurance rates, bankrupt a P&I club in London, rescue a Dutch salvage firm, devastate local fisheries, set local countries at odds with each other and ruin a nearby tourist resort. This kind of example shows that the maritime economy has to be thought of and treated *as a whole*.

It is therefore increasingly impossible, indeed improper to seek to disentangle merchant shipping from the rest of the total process. The defence of SLOCs is only part of the demands on modern navies in defence of the maritime economy, and is not necessarily the most important part of it at that. Navies have a substantial role to play in the defence of the system as a whole. The constructive use of maritime power should provide the best conditions for maritime trade of all sorts. It might be used to:

- defeat or deter hostile forces (whether terrorist or state based) that might threaten it

- influence political behaviour ashore by coalition-building and other forms of naval activity

- maintain good order at sea against often globalised forms of criminal activity such as piracy

- protect the maritime economy against the indirect threats posed by such illicit uses of the sea as smuggled goods, drugs, arms, illegal immigrants

- maintain free navigation against illegal encroachment

It is worth making the point that many of these are to the common interest of all states in the maritime economy. Generating agreement on cooperative anti-piracy measures in areas like the Straits of Malacca, may be slow and difficult because of the political sensitivities of local states, but it is a way of improving those relations, and that can only help maritime trade. The same can be said about the recent heads of Coastguard meeting in Tokyo which sought to improve cooperation between the Japanese, Korean, Russian and American coastguard forces in the battle against common threats like the drugs trade, pollution and so forth.[21]

The fact that this was a Coastguard-led operation under PACCOM, shows that the defence of the maritime economy is likely to require a multi-agency approach, in which navies will need to work with other maritime forces, scientific bodies, customs, commercial interests, conservation groups and so on. Because the maritime economy does not stop at the water's edge, joint action with shore-bound agencies, and of course with the other Services, appears set to increase. Finally, and most obviously, the global nature of the maritime economy will require a globalised response, navies need to cooperate with each other ever more closely. The multinational naval activities seen recently in the Gulf and the Adriatic are likely to become a common pattern across extending areas of activity.

If this approach requires some compromise on the traditional independence of outlook of navies on the one hand, it is familiar territory in other ways. That this breadth of interest would not be new for navies is suggested by the following remark:

> I don't think we ever thought very much about War with a big W. We looked on the Navy more as a world police force than a warlike institution. We considered that our job was to safeguard law and order throughout the world—safeguard civilisation, put out fires on shore, and act as a guide philosopher and friend to the merchant ships of all nations.[22]

In many ways the immediate future seems likely to see the world's navies

reverting to the wide-ranging norms of the 19th Century after the narrowly strategic pre-occupations of much of the 20th Century.

Selling and knowing the sea

Sailors, it has been remarked, live on the fringes of settled society. The Greek philosopher Diogenes did not know whether they should be counted amongst the living or the dead.[23] In some ways therefore, the biggest threat to the maritime economy is the insidious one of the ignorance and neglect of the importance of the 'sea affair' amongst the general population and some parts of government. All too often the image of the sea is associated with images of decline, reducing fisheries, environmental catastrophes, shipwrecks. Even the common phrase 'all at sea' betokens chaos and confusion. It is also true that we probably know more, scientifically, about the surface of the moon than we do about the bottom of the sea. It would seem dangerous to base, even partly, the maritime economy on such insecure foundations.

Navies are in a good position pro-actively to help sell the sea in all its aspects. Strategic, commercial and environmental, because they are often in the public eye, they are inevitably involved in scientific and oceanographic exploration, institutionally they are integrated into government at the national level and operationally they are multinational at the regional, if not global, levels.

Encouraging the development, or in Australia's case the consolidation, of a proper oceans policy might become an important, if indirect, means by which navies can help to protect the shipping that is the focus of this conference.

Conclusion

While the direct defence of shipping might be less important than it was, its indirect defence through wide-ranging operations in support of the maritime economy as a whole is ever more crucial to international prosperity and security.

Notes

1   Quoted in H.W. Richmond, *Seapower in the Modern World*, Bell, London, 1934, p. 38.

2   A.T. Mahan, *The Influence of Sea Power Upon History 1660-1783*, Scrivener, New York, 1890, p. 23.

3   See Paul H. Nitze, and Leonard Sullivan, *Securing the Seas: The Soviet Naval Challenge and Western Alliance Options*, Westview Press, Boulder, 1979; also Jonathan T. Howe, 'Nato and the Gulf Crisis' *Survival* (May/June 1991).

4   Speech reported in the *Gentleman's Magazine*, September 1745, pp. 465-6.

5   See, Richard Harding, *Seapower and Naval Warfare*, UCL Press, London, 1999.

6   N.A. Rodger, *The Wooden World,* William Collins, London, 1986, p. 29.

7   Quoted in C.B.A. Behrens, *Merchant Shipping and the Demands of War*, HMSO, London, 1955, p. 479.

8   (UK) Chamber of Shipping Annual Review 1998. London, 1999, p. 25. For an eloquent review of this argument see D. Goulter and A. Goldmen 'Global Shipping Trends & Implications for Navies' in Fred W. Crickard, Paul T. Mitchell and Katherine Orr (eds) *Multinational Naval Cooperation and Foreign Policy in the 21st Century*, Ashgate, Aldershot, 1998.

9   ibid and J.H. Parry quoted in James Cable, *The Political Influence of Naval Force in History*, Macmillan, London, 1988, p. 22.

10 A point made with some vehemence by Hugh McCoy, Chairman, The Baltic Exchange: 'World Trade and the Role of the City of London' in G. Till (ed), *Seapower at the Millenium,* Sutton Publishing, Stroud, 2001, p. 179.

11 This was very much the theme of the Conference that led to *Seapower at the Millenium*, op cit.

12 'The Box that Launched a Thousand Ships' *The New Yorker* 11 December 2000.

13 Cable, op cit, p. 168.

14 See Chapter 11, 'People Problems' in *Seapower at the Millenium*, op cit.

15 Commandant US Coastguard, *21st Century Hemispheric Maritime Security : A USCG Deepwater Vision*, 7 October 1998, p. 16.

16 R. Woodman, *The Victory of Seapower: Winning the Napoleonic War 1806-1814*, Chatham Publishing, London, 1998, p. 103.

17 BR 1806 *British Maritime Doctrine* (2nd ed), The Stationary Office, London, 1999. Royal Australian Navy, *Australian Maritime Doctrine* Canberra: Defence Publishing Service, Canberra, 2000 (p. 42 mainly).

18 Anthony H. Cordesman, *The Lessons of Modern War: The Iran-Iraq War*, Vol II, Westview, Oxford, 1990, p. 544. George P. Politakis, *Modern Aspects of the Laws of Naval Warfare and Maritime Neutrality*, Kegan Paul, London, 1998, p. 567.

[19] M. Pokrant. *Desert Storm at Sea, What the Navy Really Did*, Greenwood Press, Westport, 1999, pp. 146-9.

[20] Captain Donald Jagoe, *US Naval Doctrine and Professional Military Education*, Michael Duffy et al (eds), *Doctrine and Military Effectiveness*, University Press, Exeter, 1997, p. 31.

[21] *Armed Forces Journal International*, February 2001.

[22] Vice Admiral Humphrey H. Smith, *A Yellow Admiral Remembers*, London, 1932, p. 54.

[23] Quoted in Rodger, op cit, p. 1.

Conference Dinner Address

International Commission on Shipping: Inquiry into Ship Safety

The Hon. Peter Morris

The International Commission on Shipping (ICONS) was established to conduct an inquiry into ways in which universal standards can be better implemented to ensure that all international merchant shipping is safe and environmentally responsible. Its report entitled *Ships, Slaves and Competition* was presented to the *APEC Symposium on Safer International Shipping* at Sydney on 6 March 2001.

- 'Ships' refers to the operations of international shipping, some 85-90% of which is quality shipping that complies with international safety requirements.

- 'Slaves' refers to the tens of thousands of seafarers from developing nations who are exploited, abused and ill treated in the pursuit of lower freight rates.

- 'Competition' refers to the unequal struggle between quality ships that comply with international safety requirements and the substandard ships that do not.

It is this struggle to satisfy the demands of cargo owners for lower and lower freight rates that drives the operation of unsafe ships, the inhumane treatment of seafarers and the destruction of the marine environment.

This paper briefly outlines

- what the Commission did and where it went

- who the Commission met and what it was told

- what the Commission identified as the key issues

- the main recommendations the Commission made in summary

- the actions that should be taken to effectively eliminate substandard shipping

- the advice of the early responses to the Report

Following its worldwide call for submissions in March 2000 the Commission received 126 submissions, most of which were substantive.[1] Public meetings were held in Sydney, Mumbai, Manila, Vancouver, Montreal, New York,

Washington, Miami, London and Limassol. People the Commission met included ship owners, ship managers, class, port state control authorities, trade unions, blacklisted seafarer organisations, representatives of seafarers' families, seafarers welfare organisations, Protection and Indemnity Club managements, Ministers responsible for shipping, and departmental representatives. In all the Commission met more than 400 people—their names appear in Appendix 3 of the Report. Importantly, there was ready acceptance of the Commission's independence and impartiality.

The Commission had dual roles—to enable people to put their concerns and grievances, and to enable the Commissioners to discuss with people the information they had provided. The Commission set out to identify problems associated with the safe operation of international shipping, to examine allegations of abuse, exploitation and ill treatment of seafarers and their families, and then to develop practical solutions. The Commission met quality ship operators who treated their crews well, operated good ships, ran quality businesses and wanted to see substandard shipping eradicated. On the other side, extensive information was provided to the Commission on:

- the cheating of seafarers
- their blacklisting
- the manipulation of family allotment remittances
- reduced contractual compensation entitlements linked to 'quit' claims and general releases
- placement fees for jobs

Much of the information related to Indonesian and Philippines nationals. The worst features included delayed or non payment of wages, denial of adequate food and accommodation, denial of medical treatment and rest time, physical and psychological abuses, sexual assault and abandonment. Such practices are in clear breach of International Labour Organisation (ILO) conventions and most Port State laws.

The worst abuses seemed to be associated with fishing and a separate Annex on Fishing is attached to the Report.

In a large number of cases, the welfare of the suffering seafarers is dependent on charity and port chaplains presented much of the information on their ill treatment from seafarers' welfare organisations. The port chaplains included organisations based in Canada, the US, Japan and the Philippines.

For many thousands of today's international seafarers life at sea is modern slavery and their workplace is a slave ship. Some individuals in the shipping industry seem to have been offended by the reference to 'slaves' in the title of our report. Well may they be offended, for their upset seems to originate from an ignorance of what is happening to their own employees in their own industry. Or are they suggesting that the port chaplains have imagined the suffering of the seafarers that come to their door? Who benefits from their misery and pain of the seafarers? Everyone from the shipowner and ship manager to the charterer, the cargo owner or the tourism operator if it is a cruise ship. How do we end this exploitation and inhumane treatment of working seafarers?

One solution is to name the beneficiaries, shame their actions and shut the down the infamous operations. Appalling practices have continued despite efforts by the majority of shipping operators, governments and international agencies to curtail them—because cargo owners support companies using substandard ships.

The obscenity is that the beneficiaries of the suffering include some of the wealthiest individuals and corporations on earth. They need to be held accountable for the way their cargoes are transported just as every other industry is, just as the petroleum industry is accountable for its product in tankers, whether by ship or road.

The most frequent issues raised both in submissions and discussions were:

- criticism of the performance of classification societies and the failure of flag states to carry out their responsibilities

- ill treatment and underpayment of crew, port state control, crew competency, crew availability, fraudulent certificates

- the failure of International Maritime Organisation (IMO) members to support the IMO in the performance of its duties

- an almost unanimous call for full transparency of information in the industry

- concern at the lack of competency of crewmembers

- criticism of the Convention on Standards of Training Certification and Watch Keeping (STCW) white list process

- passport holders without maritime qualifications

- non compliance with ILO conventions

- the horrors of the international fishing industry where the priority appears to be to protect the fish stocks not the fishers
- the failure to give adequate recognition to quality shipping

Classification Societies

The Commission was told repeatedly that classification societies should be required to perform to set standards and criteria. Comments were that they were inept, inconsistent, inflexible, incompetent, and involved in conflicts of interest, that they concentrated on market share to the exclusion of their responsibilities, that some surveyors lacked qualifications and that the classification societies ought to carry greater liability for their actions.

The conflict of interest allegations related to classification societies that performed services for the shipowner and simultaneously acted as delegated agent for a flag state on the same ship. There were perceptions that the International Association of Classification Societies (IACS) lacked the power or the will to improve the performance of classification societies. At the same time there was general acknowledgment that IACS constituted the greatest knowledge and skill base available on ship safety matters. Overall, there was an expectation that IACS could do much more to eliminate substandard shipping than had occurred to date.

Flag States

There were frequent requests that flag states should be made to carry out their obligations under the international maritime safety conventions. But there were no realistic answers to our question 'how can that be done?' There was a widespread view that the IMO efforts on flag state implementation had been largely ineffective, that the IMO as an organisation was hamstrung by its members and unlikely to be given the power to enforce flag state performance.

Port State Control

There was a unanimous view that port state control had become an essential element of ship safety regulation. Some saw port state control as the real line of defence against substandard shipping. There were calls for greater uniformity and consistency in port state inspections, a need to harmonise procedures and processes, better targeting of vessels for inspections, greater attention to be give to International Safety Management audits and greater effort to inspect for ILO compliance. There were consistent calls for heavy financial penalties to be imposed on owners of detained substandard ships as a deterrent.

Crew Abuse and ill Treatment

Much attention was given in submissions and meetings to the ill treatment, abandonment, cheating, exploitation and blacklisting of seafarers. This included crews of trading vessels, cruise ships and fishing vessels across the range of industry. It is clear that were it not for the support services from seafarers' welfare organisations and unions, the appalling plight of many thousands of international seafarers would be immeasurably worse. Crew competency and fraudulent certificates were matters of considerable concern and are discussed in the Report. Concern was expressed regularly about the growing shortage of competent ships officers by ship owners and the need to increase the number of new officer trainees. In developed nations shipping companies were having difficulty in recruiting officer cadets as a career at sea was increasingly seen as an unattractive career. Some quality shipping operators believed that training was the responsibility of governments. Others conducted their own induction and training programs and did not have problems in recruiting and retaining competent officers.

Transparency

The Commission was impressed by the almost universal call for full transparency across the international shipping industry. There was strong support for the expansion of the international on-line data system EQUASIS and the addition of information on charterers and major cargo owners to its database. The calls for greater transparency extended beyond the corporate veil on ship ownership and commercial operations to include information on crew illnesses, injuries and fatalities, effective accident and incident investigation procedures and public reporting of the investigations. At the moment nobody knows how many die or are injured at sea.

The Commission noted the comment that the trend towards increased litigation in shipping has run counter to the expressed need for openness and public accountability in the industry. The ritual whinges about the level of safety regulation and the frequency of port state inspections from some quarters in the international shipping industry is misdirected. Quality ship owners need to be speaking out, giving leadership on safe shipping and the prevention of disasters—so avoiding the need for more regulations—rather than leaving it to governments to react to public opinion in the face of disasters. The current situation is that 'the tail is wagging the dog' in that substandard shipping generates a demand for more and more regulation, which is imposed on the rest of the industry, which already complies with international safety requirements.

There are some voices speaking out for quality—voices like Intertanko and more recently Intercargo—but many more voices need to be heard, in unison. The number of quality operators who emphasised that in their companies the decision to provide a quality service and operate quality ships was made at top level impressed the Commission. This view was summed up well by a leading Greek shipping owner who said *'the fish stinks from the head'*.

Sadly, most of what the Commission heard about the problems plaguing seafarers in the industry is not new. These problems were detailed in the original *Ships of Shame* report to the Australian Parliament in 1992 and have been well documented in various ILO and IMO reports. Generally over the past eight years it appears that the condition of the ships have improved but those of their crews have worsened. Mostly missing from the debate about the activities of substandard shipping are the ultimate beneficiaries—the cargo owners. Competition in the provision of shipping services has been the catch cry among most cargo owners. But at what cost, whose cost?

There is an unequal struggle between quality ships that comply with international safety requirements and substandard ships that do not. OECD studies have identified the substantial cost savings to be gained by avoiding the international safety requirements. They are equivalent to 15-16% of the annual operating costs of a Handysize ship.

The Commission believes that competition in shipping services needs to be defined as:

> comparative rates for the provision of shipping services using ships that comply with all the international requirements for ship safety, management and personnel practices.

The Commission wants to see cargo owners speak out for competitive quality shipping services that do comply. Champions who will give leadership for compliance with the standards and eschew the practices associated with substandard shipping. The drive by cargo owners for lower and lower freight rates where the benchmark is shipping that does not comply must be exposed publicly. As an example of a positive initiative, the European Shippers Council has established a quality Code of Conduct for its members—this will require effective support from its member over time to ensure its success.

Recommendations

In developing its recommendations the Commission noted the strong shift towards unilateralism and regionalism. The leadership shown by the United States Coast Guard in effecting measures that go well beyond port state control

following the MT *Neptune Dorado* incident, opens up new opportunities for addressing the problems created by sub-standard shipping. The post *Erika* packages of the ascendant European Union indicate a localised approach to dealing with the dangers created by substandard shipping.

The Commission's recommendations are in two main blocks—the welfare of the people in the industry and their families and port state control activities. They are parts of an overall blueprint for action that the commission believes is practical, is achievable and will eliminate most sub-standard shipping. Many of the recommendations are matters for decision by individual administrations and do not need further international agreements. Most can be implemented in 12 to 18 months and the remainder within five years. The recommendations, as a matrix, provide an action plan for full transparency and public accountability as in other forms of transport. They include:

- stronger supervision of classification societies by the European Commission and tougher policy application by the societies to their clients

- improved flag state performance

- tighter port state controls and implementation of reward systems for quality ships

- more rigorous inspections for ISM compliance

- severe penalties for charterers and major shippers using substandard ships

- establishment of a confidential ship safety incident reporting system (COSHIRS)

- deterrent financial penalties on owners of detained ships

- reduction in multiple inspections of ships

- stricter control of manning agencies and prohibition of blacklisting of seafarers

- ending the abuse and ill treatment of seafarers and their families

- support for abandoned seafarers and seafarers welfare organisations

- lifting training and qualifications and ending fraudulent practices on crewing

- support for international agencies such as the IMO and ILO

- designation of ports of distress

The recommendations are pragmatic, achievable and with the commitment of industry and government interests, the bulk of them can be progressively implemented within 18 months. The onus is now on quality ship owners, their organisations, charterers and cargo owning or passenger customers to champion their implementation in collaboration with governments, trade unions, port state authorities and international maritime agencies. The process should be transparent as in other industries and be subject to public scrutiny.

Initial Responses

The early responses to the Report have been positive, apart from the precious comment from a few about the mention of 'Slaves' in the title. The Commission has been greatly encouraged by the prompt action of the Deputy Prime Minister of Australia, John Anderson in announcing that Australia would sponsor the presentation of the report to the coming meeting of the Maritime Safety Committee of the IMO. The Commission is also hopeful that the UK, Canada and Japan will support Australia. Mr. Anderson will personally present the report to the next meeting of APEC Ministers.

There has been a wide range of support for the recommendations from individuals within the international shipping industry. It is understood that the European Commission is also likely to support the report. The challenge now is to persuade quality operators in the shipping industry to push for the implementation of the recommendations. This is the opportunity for those who want to see recognition of quality to work with government maritime agencies to eliminate sub standard shipping.

The task of persuading industry and governments to implement the report began at the APEC meeting in Sydney on the 6 March 2001. The Commissioner will be speaking to industry at the Intertanko conference in Sydney on the 24th April, then the BIMCO forum in Beijing on the 15th May, then to the Nautical Institute in London on the 29th May. The Norship conference at Oslo on the 30th May followed by a presentation to Maritime Safety Committee of the IMO on the 4th June. Later in the year there may be an opportunity to address the OECD Maritime Transport Committee and the Mare Forum on Human Factors.

Notes

[1]   Almost all are on display on the ICONS web site at *www.icons.org*

Part | 1

Regional Seaborne
Trade and Shipping

Commercial Shipping Patterns in the Asian-Pacific Region, 1990-2000: The Rise and Rise of China[1]

1

Professor Peter J Rimmer

The Asian-Pacific region—stretching from the Kuriles to the Strait of Malacca—became the dominant arena within the world's maritime economy during the last decade of the 20th Century. Of particular moment has been the increased involvement of China, which has enjoyed impressive growth in Gross Domestic Product (GDP) between 1990 and 2000. Over the period, exports have boomed as many Asian producers have relocated to China to take advantage of its low labour cost per unit of productivity. In response, China has assembled one of the world's largest commercial fleets, risen up the league of world shipbuilders to rank after Japan and Korea, and become the largest producer of containers. Not surprisingly, given the demand created by China's industrial production, the country is expected to be the greatest single factor influencing the world's shipping industry over the next two decades. By 2020 China is expected to account for 10% of both the world's imports and exports.[2]

Before speculating on China's future role in the world's shipping industry following its entry into the World Trade Organisation (WTO) on 10 November 2001 and its attendant strategic implications, the country's increased involvement in the world's maritime economy between 1990 and 2000 needs to be reviewed.[3] Although China has become a world force in ship repair, ship demolition and shipbuilding, attention here is restricted to its role in commercial shipping.

Prior to breaking down commercial shipping into its different components—bulk and container shipping—and highlighting the extent of China's involvement in them, it is important to identify the key elements of one country's spatial structure. These are the economic core areas offering attractive market and investment sites for knowledge-intensive products and services, capital investment in seaports, airports and teleports, and bases for global network firms to manage their regional headquarter functions.[4]

Spatial Structure

An attempt was made to gauge the strength of China's core regions by calculating their GDP in terms of Purchasing Power Parity (PPP). This exercise shows that the Yangtse region focused on Shanghai is China's dominant economic core area. It has a 27% higher regional GDP than the Bohai Rim, centred on Beijing and 75% higher than the southeastern Coastal Zone focused on Guangzhou (even allowing for the inclusion of Hong Kong).

Figure 1 – Location of macro-regions and platforms in the Asian Pacific Rim
based on their estimated Gross Domestic Product adjusted for
Purchasing Power Parity (PPP), 1998
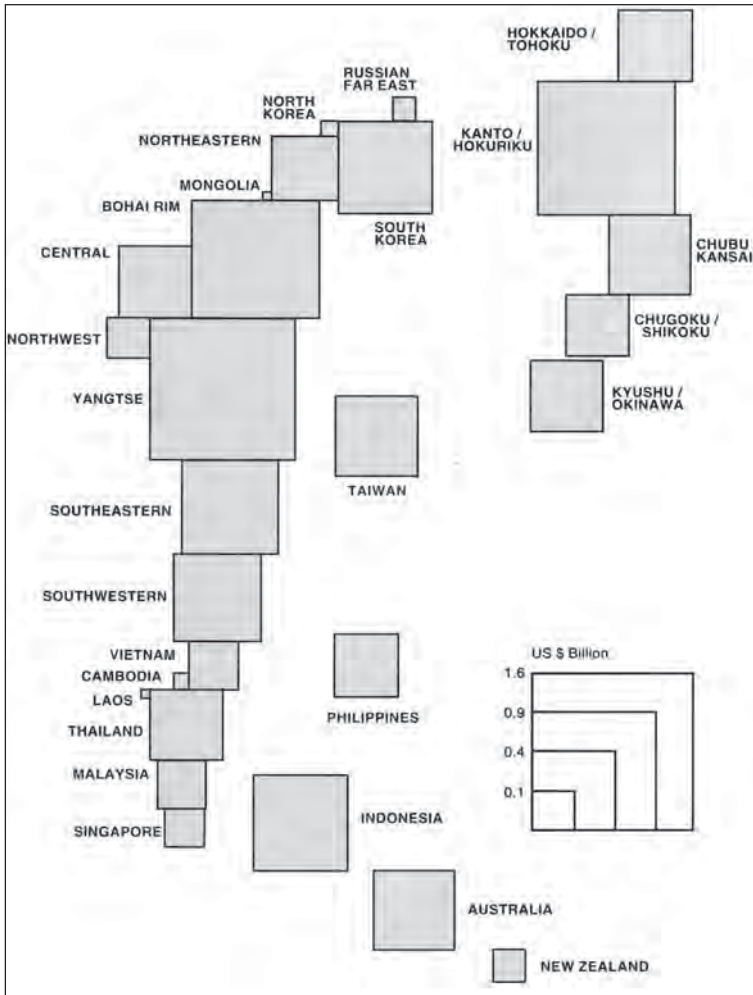
Sources: World Bank, *Entering the 21st Century World Development Report 1999/ 2000*, Washington, DC, 2000; National Bureau of Statistics, *China Statistical Yearbook 2000*, China Statistics Press, Beijing, 2000; Statistics Bureau, *Japan Statistical Yearbook 2001*, Tokyo, 2000, and other statistical sources.

These figures are even more revealing when they are compared with Japan's macro-regions. A comparison with Japan shows that the Yangtse's GDP is 6% larger than Kanto/Hokuriku. The Bohai Rim is almost as large as Kansai/Chubu encompassing both Osaka and Nagoya. Even without the addition of Hong Kong, China's southeastern region outstrips all of the other macro-regions in Japan.

When compared with the GDP of other Asia-Pacific countries, China's Southeastern region is almost on a par with Indonesia and South Korea. In addition, only the GDP of Australia, Taiwan and Thailand are greater than the economy of China's Northeastern region centred on Shenyang. The economies of the Philippines, Malaysia, Vietnam and Singapore are smaller. These relativities provide an essential background for exploring China's global and regional role in deep-sea shipping between 1990 and 2000.

Deep-Sea Shipping

Before discussing the involvement of China and the Asian-Pacific region in deep-sea shipping a distinction is made between carriers that handle commodities in bulk (oil, iron ore, coal and grain) and liners that handle general cargo on a regular schedule. Essentially, bulk operators buy *ships as assets* but container operators purchase transport and communications *networks and marketing arrangements*. While bulk carriers are still involved in the shipping business, increasingly, liner shipping is part of the wider hub-and-spoke multimodal transport system which seeks to meet the demands of manufacturers for a truly global reach in door-to-door services (logistics).

Bulk Shipping

China's share of the bulk seaborne trade in crude oil, iron ore, coal and grain is still relatively small compared with other countries in the Asia-Pacific region. Yet the surge of industrial production concentrated on the Yangtse Delta and the Southeast Coastal zone is responsible for much of the new growth in the world bulk trades. This rapid increase in demand has boosted energy and raw material supplies that have led to bottlenecks in China's ports, particularly as there has been a shortage of rolling stock to clear the rail-yards. These considerations have also revived interest in the importance of sea-lines of communication between overseas producing areas and China's major industrial processing centres. As China, the world's largest producer of coal, is a net exporter of coking coal and steam coal and its grain imports, primarily from America, are erratic, these commodities are not considered further. Attention is concentrated on crude oil movements and the iron ore trade. China has become a net oil importer since 1993 and the iron ore trade has increased markedly to meet the country's steel-making demands.

Much reliance in this study is placed on information derived from maritime research institutes. Their emphasis on forecasting short and long-term demands for major commodities, such as crude oil and iron ore, stems from the bulk shipping market adhering closely to the principles of classical economics. Trends in commodities are matched against the mid-year supply of available shipping tonnage to identify the supply-demand gap. A comparison of this supply-demand gap with freight rates provides the basis of forecasting longer-term trends in the shipping markets. When the tonnage is tight freight rates rise. Conversely, when it is slack freight rates decline. Such considerations are important as freight rates can account for over one-third the delivered price of the commodity. Given these tight margins, a few cents difference can determine trading profitability or loss on crude oil and iron ore movements.

Crude oil

Traditionally, China was an exporter of crude oil but its markets declined as refineries in Japan, Singapore, the Philippines and the United States imported stock to match new pollution regulations. As China's state oil producers were unable to meet demand stemming from increased car ownership, its refineries have had to import sweet crude oil—low in sulphur—from the Middle East and Southeast Asia. Singapore acts as an important transhipment centre for crude oil and is a major source of refined products, especially gasoline. Looking ahead, China's crude oil imports are expected to treble over the next decade and significant increases are anticipated in product imports from the Middle East and Southeast Asia.

Table 1 – Crude Oil Demand, 1990, 1995 and 2000 (million barrels/daily)

	1990	1995	2000
Asia-Pacific			
China	2.3	3.4	4.6
Japan	5.3	5.8	5.7
Korea	1.0	2.0	2.2
Other	5.3	6.8	8.5
Sub-total	**13.9**	**18.0**	**21.0**
North America	20.7	21.6	24.2
Europe	14.6	15.3	16.3
Other	16.9	14.8	15.7
Total	**66.3**	**69.9**	**77.0**

Source: Kaiji Sangyo Kenkyujo (personal communication).

The major sea-lanes used by tankers from the Middle East are the Straits of Malacca and Singapore (as shown in *Figure 2*). Tankers that exceed 222,000 DWT have to divert through the Lombok Strait. Although the three day detour adds at least US$200-300,000 per day to the voyage cost economists have argued that even if the tankers had to divert south around Australia (14 days) it would only make a small addition to the price at the petrol pump in Shanghai. Such a finding suggests that there may have been an overemphasis by strategic analysts on the sea-lines of communication.

Figure 2 – Routes taken by iron ore carriers and tankers between Australia and the Far East
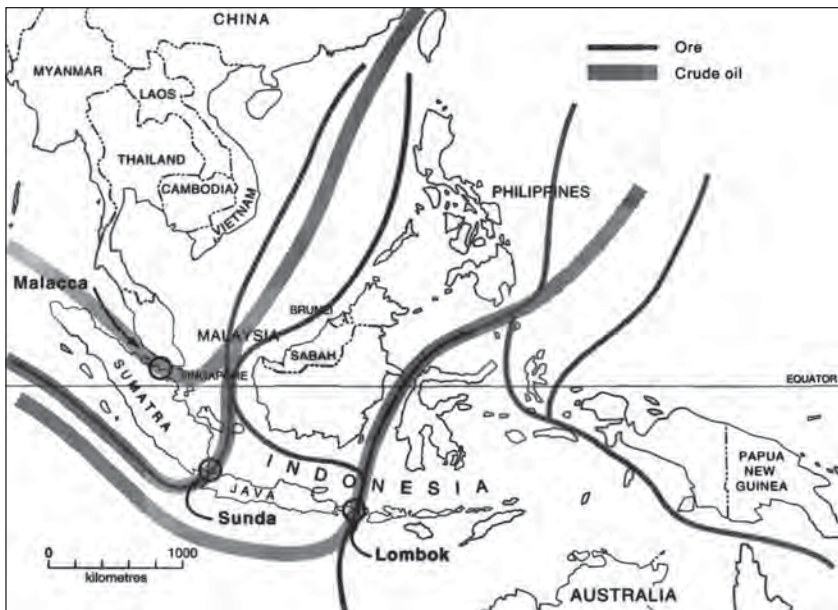
Source: P.J. Rimmer, 'Shipping patterns in the Western Pacific—the China factor', *Maritime Studies*, Vol. 94 (May/June 1997), p. 22.

Iron ore

China is the world's largest producer of iron ore but it is low grade and imports have increased to meet growing consumption in the pig iron/steel industry. Brazil has surpassed Australia as the main iron ore supplier to China with the balance being provided by South Africa, Peru and Chile for security and quality reasons.[5] Looking ahead, there is considerable potential for iron ore imports to China.

Table 2 – Iron Ore Imports, 1991, 1995 and 2000 (million tonnes)

	1991	1995	2000
Asia-Pacific			
China	19.0	41.2	54.7
Taiwan	8.4	9.2	11.5
Japan	127.2	120.3	128.9
Korea	28.9	35.0	37.9
Other	11.1	12.3	11.5
Sub-total	**194.6**	**217.9**	**246.8**
Europe	136.6	140.6	138.6
Other	26.8	43.9	45.6
Total	**358.0**	**402.0**	**431.0**

Source: Kaiji Sangyo Kenkyujo (personal communication).
Note: Rounding errors.

Ships carrying iron ore from Australia to China enter the Indonesian archipelago through the Lombok Strait and travel either via the Makkasar Strait or to the northwest of Timor before proceeding through the Banda and Molucca Seas (as shown in *Figure 2*). The heavy reliance on iron ore imports from Australia renders China's crude steel production vulnerable to any restrictions on movements through the Indonesian archipelago and has prompted the diversification of its sources to South America. Any precipitate action by the Indonesian government to close these sea-lanes would give Australia, China and the United States a common bond. This bond could be extended to combating the incidence of piracy in the Malacca Straits but this activity affects not only bulk ships but increasingly involves container vessels.

Container Networks

As there are no available origin and destination data on movements between ports we have to infer the position of China and the Asian-Pacific in global container networks between 1990 and 2000 from a variety of sources. These include analysis of port rankings, major trade routes and the itineraries of global shipping companies including those of China's leading container line. Indicative of the growing importance of China was its number of ports in the world 'Top-20' league.

Port rankings

In 1990 Hong Kong was China's foremost port (see *Figure 3*). Like Kaohsiung, Kobe, Singapore and Pusan, it offered mainline services fed by small coastal feeder services to overcome China's poorly articulated land transport systems.

By 2000, Shanghai (5.6 million TEU) and Shenzhen (includes Chiwan, Shekou and Yantian) had joined Hong Kong (18.2 million TEU) among the world's 'Top-20' ports (as shown in *Table 3*). Outside the 'Top 20' were four other ports in China handling more than 1 million TEU—Qingdao, Tianjin, Xiamen and Dalian—and Ningbo was on 0.9 million TEU. Yet only 20-25% of China's freight is containerised—contained throughput, therefore, is expected to increase markedly over the next decade.

Table 3 – China's Main Ports, 1991, 1995 and 2000 (million TEU)

Port	1990	1995	2000
Hong Kong	5.1	12.5	17.8
Shanghai	0.5	1.5	4.2
Shenzhen*	-	0.3	3.0
Qingdao	0.1	-	2.1
Tianjin	0.3	0.7	1.7
Xiamen	-	0.3	1.1
Dalian	0.1	-	1.0
Ningbo	-	-	0.9
Fuzhou	-	-	0.4

Source: *Containerisation International Yearbook,* 1991, 1996, 2001; M. Beddow, 'Top 30 ports', *Containerisation International*, March 2001, p. 93.
Note: * Includes Chiwan, Shekou and Yantian.

Figure 3 – Asian-Pacific seaports ranked among the world's 'Top-20'
in the World Container League, 1990.
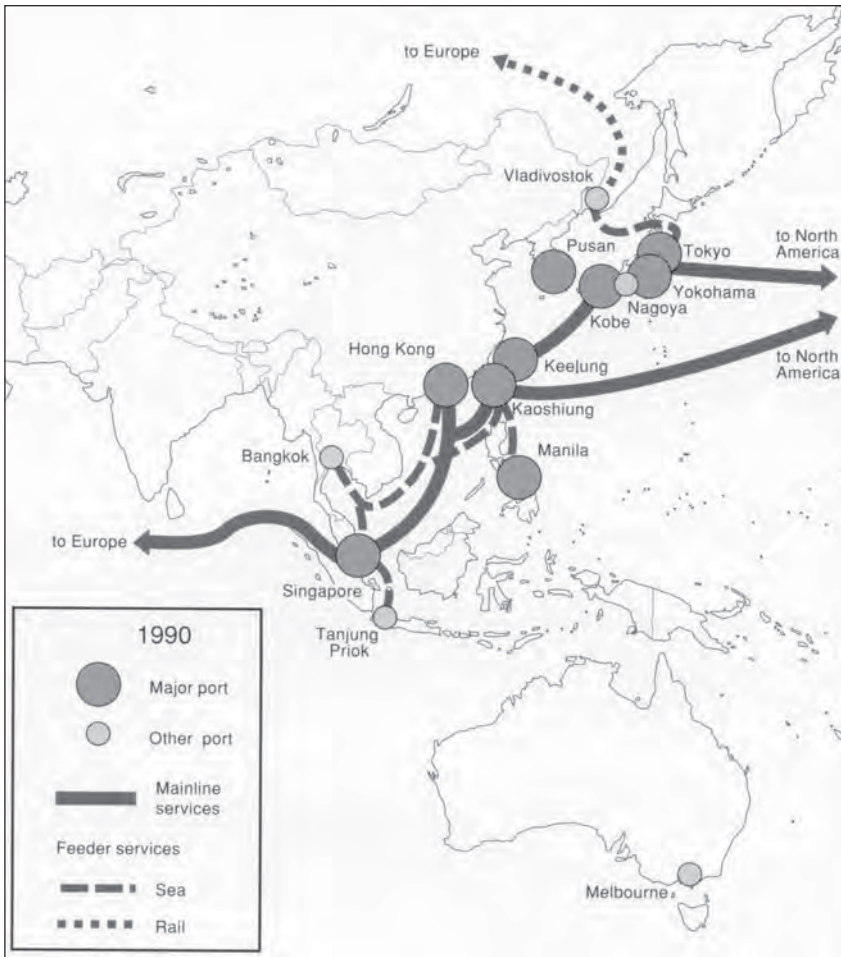
Source: *Containerisation International Yearbook*, Informa Group, London, 1991.

By 2010 Shanghai, the world's fastest growing port, is expected to handle an estimated 15 million TEU—30% of the national total.[6] Present channel depths of 8.5m limit operations because a 4000 TEU vessel requires a draught of 12.5m. The Shanghai Port Authority is planning to create a hub port with a draught of 15m by building terminals at Yangshan Island in Hangzhou Bay to accommodate post-panamax vessels of 6000-7000 TEU capacity.[7] Some 120km from existing terminals, this US$12-18 billion project will take 20 years to complete.

Global terminal operators are also orchestrating the expansion of Chinese ports because they regard the country as a strategic area for growth.[8] CSX World Terminals has interests in Tianjin, P&O Ports in Shekou (Shenzhen) and Qingdao, the Singapore PSA Corporation in Dalian, Fuzhou and Gunagzhou, and Hutchison Port Holdings in eight mainland ports including Shanghai Container Terminal, Waigaoqiao (Shanghai), Ningbo, Xiamen and Yantian (in conjunction with APM Terminals/Maersk Sealand). These operators are also extending their activities to warehousing, real-time product tracking, inventory management and distribution in China by operating logistics centres and container freight stations. Concerned that these overseas firms will dominate the main stevedoring business, the Chinese Government's Ministry of Foreign Trade and Economic Cooperation has capped the involvement of foreign investment in joint venture container port projects at 49%.

These logistics developments have been made possible by the expansion of inland container feeder networks within China (including the Trans-China landbridge) as part of a multimodal sea-land system offering door-to-door development 2,500km away from the coast (see *Figure 4*). Although operators have had some success in using dedicated barges and rail to move containers within China its inland facilities are still poorly equipped and the leasing of equipment too expensive for widespread use. Trucking is still superior to rail within a 500km radius of China's port complexes but there is still no national system for line haul operations by road.

Figure 4 – Asian-Pacific seaports ranked among the world's 'Top-20'
in the World Container League, 2000.
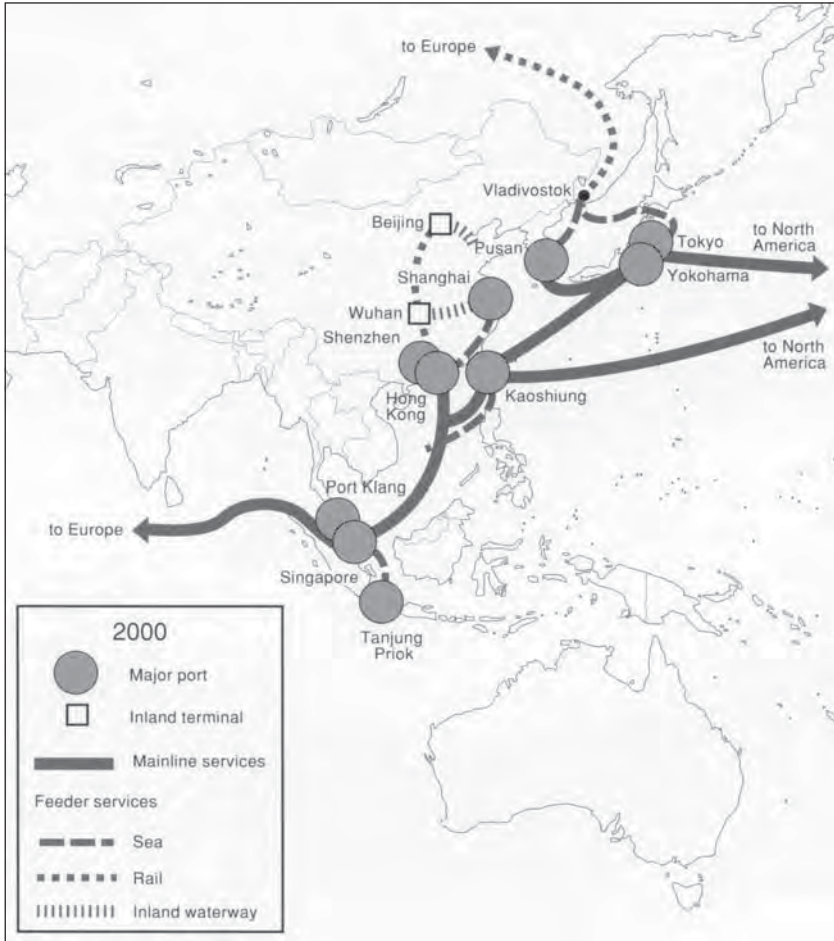
Source: M. Beddow, 'Top 30 ports', *Containerisation International*, March 2001, p. 93.

China's planners are making a concerted effort under the 10th Five-Year Plan (2001-2005) to improve the national infrastructure grid so that the movement of goods can be facilitated more speedily and cheaply. By 2005 an intermodal freight transport system will be in operation comprising a network of 'eight by eight' national rail trunks and a 'three by two' national highway grid to integrate inland container terminals with coastal ports.[9] It will incorporate the Freight Information Exchange System that will provide information on the position of trucks and cargo. This arrangement will provide the basis for re-engineering China's supply chain management to accommodate companies that outsource their logistics activities. China Merchants—the Ministry of Communications commercial arm—is planning to have 45 distribution hubs. The Company is based in Shanghai as one-third of all goods in China pass through the eastern metropolis. Already, China Merchants has a joint venture operation with the Singapore PSA Corporation, which handles flows between regional distribution centres in Shanghai, Guangzhou, Wuhan, Chengdu, Tianjin and Dalian. Efforts are also being made to streamline customs services.

Trade routes

China's major container ports and their Asian-Pacific counterparts differ from those in the Southern Hemisphere (see *Figure 5*). They are located on an east-west 'Main Street' within the global hub and spoke container network designed by major shipping companies to accommodate the changes triggered by Asia's rapid industrialisation. Large mother vessels service their innovative high volume/high growth markets. Traditionally, regional traders have serviced the low volume/low growth markets in the south (including South Asia). Following the shortage of containers during the Asian Crisis of 1997-98, the larger east-west operators have extended their operations to the north-south trades linking the *cul-de-sacs*. This development has favoured the rise of hub ports or load centers at the junction between the two routes, notably Hong Kong, Kaohsiung, Pusan and Singapore.

Figure 5 – The global hub-and-spoke system.
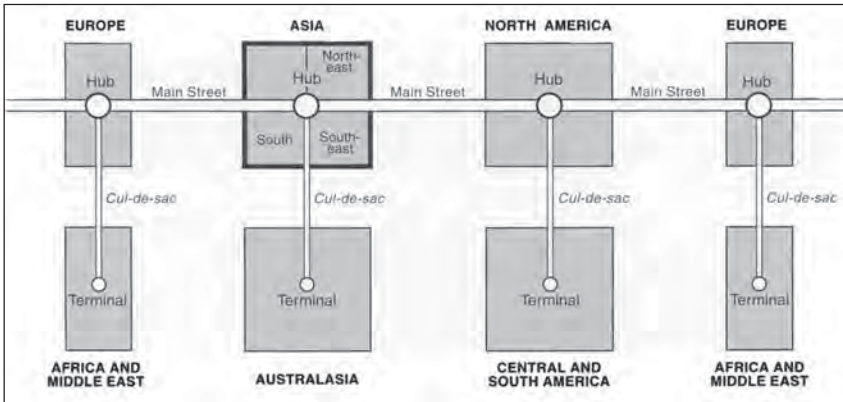
Source: P.J. Rimmer, 'Global transport: Australia as *a cul-de-sac*', in C. Shiels (ed),
   Globalisation, Evatt Foundation, Sydney, 2001, pp. 35-57.

The pivotal position of China in the global hub and spoke system is borne out by an examination of world container movements in 1999 (shown in *Figure 6*). It was involved in the Trans-Pacific (two-way trade totaling 10.7 million TEU) and the Trans-Suez route (7.4 million TEU), both of which were larger than the Trans-Atlantic route (4.1 million TEU). China was also involved in Intra-Asian movements (6.9 million TEU).

China's contribution between 1990 and 1999 can be distilled from analysis of containers on the dominant Trans-Pacific route with its imbalance in favour of eastbound over westbound (USA to Asia) cargoes (as shown in *Table 4*). Over this period both China and Hong Kong enjoyed continuous growth in trade from Asia to the USA with their combined total increasing from 613,000 TEU in 1990 to 3.1 million TEU in 1999. This contrasted with a decline in shipments from Japan and Taiwan, and the increased volume from Korea and all Southeast Asian countries, though their growth rate was affected by the Asian Crisis in 1997 and 1998.

Only China maintained a continuous growth in westbound container flows from the United States to Asia. All economies including Hong Kong suffered a marked turndown in cargoes in 1997 and 1998. Only China appeared immune from the Asia-Pacific Crisis of 1997-98.

Figure 6 – World container shipping movements by trade, 1999
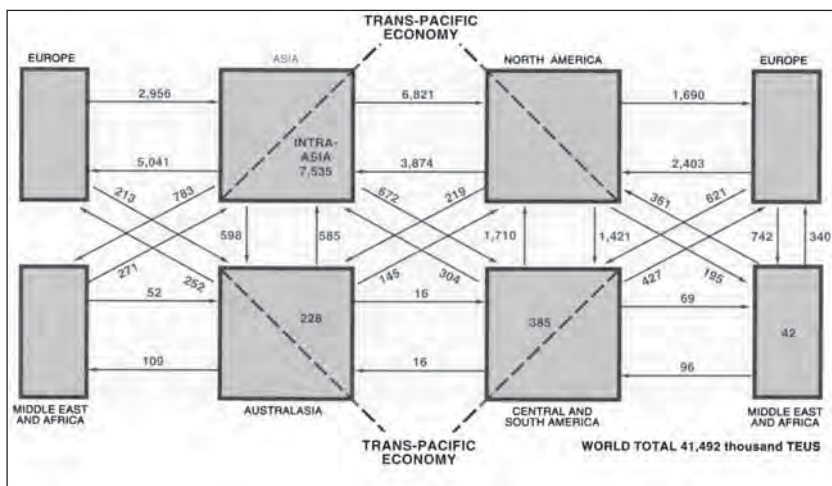
Source: Data from Kaiji Sangyo Kenkyujo (personal communication).

Table 4 – Eastbound Movements in Trans-Pacific Trade,
1990, 1995, 1999 (thousand TEU)

Origin	1990	1995	1999
China	235	1024	2180
Hong Kong	478	668	1066
Taiwan	674	564	658
Japan	835	749	791
Korea	359	285	427
Other	4571	5285	7121
Total	**3015**	**4039**	**6177**

Source: *Sekai no chiiki kai tekisen ni ugoki chosa hohokoku*, Kaiji Sangyo Kenkyujo,
Tokyo, 2000.

Table 5 – Westbound Movements in Trans-Pacific Trade,
1990, 1995, 1999 (thousand TEU)

Destination	1990	1995	1999
China	78	257	456
Hong Kong	199	457	363
Taiwan	405	416	322
Japan	868	1077	960
Korea	350	426	394
Other	3890	4628	4494
Total	**2211**	**3161**	**2953**

Source: *Sekai no chiiki kai tekisen ni ugoki chosa hohokoku*, Kaiji Sangyo Kenkyujo, Tokyo, 2000.

In the intra-Asian trade, the volume of China's shipments not only with Japan but also with the Newly Industrialising Economies (NIEs) and Southeast Asia has grown rapidly between 1990-2000. Although receipts from Japan were reduced, those from the NIEs and Southeast Asia were still expected to increase, underlining that shipments had increased to offset the impact of the Asian Crisis.

Table 6 – China's Intra-Asian Trade (thousand TEU)

Destination	1995	1998	2000*
From China			
Japan	523	576	603
NIEs	554	601	673
Southeast Asia	279	310	370
To China			
Japan	198	243	240
NIEs	423	529	558
Southeast Asia	168	237	255

Source: based on J. Fossey, 'Intra-Asia meltdown', *Containerisation International*, October 1998, p. 57.
Note: * Estimated

Shipping itineraries

China's growing reputation as a cargo generator was reflected in the inclusion of ports other than Hong Kong when the global shipping alliances were established in 1996—Shekhou and Yantian in the Pearl River Delta and Shanghai. Further Chinese ports were added to these itineraries when the global shipping alliances were reorganised in 1998. Generally, they were first ports of call or last ports of departure because, as noted, the draught at Shanghai has limited hub development. Without 15m draught Shanghai does not yet have the load centre status of Hong Kong and Kaohsiung in the Trans-Pacific services or Singapore and Hong Kong in the Trans-Suez services.

The inclusion of China Ocean Shipping Corporation (Cosco) in a global alliance with Japan's K-Line and Taiwan's Yang Ming Line in 1998 was a marked departure from past practice (Korea's Hanjin and Senator Lines were added in 2001). These developments stemmed from the creation of a specialised container arm (Coscon) in 1993 based in Shanghai and Cosco's intention to shrug off its image as a state-controlled outsider whose strategic decisions were dictated by price and market share.

Between 1990 and 2000 there was a progressive reorganisation of Coscon's routes at a time when the fleet's largest vessel expanded from 2760 TEU to 5600 TEU. Apart from its involvement in shipowner associations and overseas stock markets, the most conspicuous development was the increased number of services on trunk routes focused on its offshore terminals in Hong Kong, Kobe and Long Beach. The other feature was the pronounced growth of Coscon's intra-Asian feeder services by the mid-1990s and their subsequent rationalisation—the decline in number of services between 1995 and 2000 reflecting the introduction of larger vessels.

Table 7 – Liner Routes Operated by Cosco Container Line Ltd,
1990, 1995, 2000.

	1990	1995	2000
Trunks			
Trans-Pacific	3	1	7
Trans-Suez	3	3	6
Trans-Atlantic	0	0	1
Round-the world	0	1	1
Sub-total	**6**	**5**	**15**
Intra-Asia			
Middle East	2	1	1
Southeast Asia	6	8	2
Northeast Asia	16	23	14
Intra-China	7	22	24
Sub-total	**31**	**54**	**41**
Other	5	7	4
Total	**42**	**66**	**60**

Source: *Containerisation International Yearbook*, 1990, 1995, 2000.

The Asian Financial Crisis has prompted a revision of intra-Asian services. While the backbone corridor, the Central Asia short-sea shuttles, and Central-South Asia services survive, the Central Asia-Northeast Asia services have proceeded apace since the early 1990s with the addition of direct services with Pusan in South Korea augmenting those established between China and Japan.

With China's entry into the World Trade Organisation, Coscon is expecting strong competition from foreign ocean carriers. These include Britain's P&O Nedlloyd, Denmark's Maersk Sealand, CMA CGM The French Line, Hong Kong's OOCL (Orient Overseas Container Line), Japan's NYK (Nippon Yusen Kaisha), MOL (Mitsui Osaka Line) and Singapore's APL (American President Line). Already the foreign carriers have well-established joint venture logistic networks within coastal regions and are expanding into the interior, particularly along the Yangtse River. Thus Coscon is planning to transform its operations from a global liner service provider into a global logistics provider by diversifying

into supply-chain management and, possibly, port and terminal investment.[10] This will require investments in information technology to catch-up with the ability of its competitors to track containers.

Offsetting the emergence of Coscon as a global carrier has been the creation of China Shipping Group (CSG) as China's second national carrier ready for the country's entry into the World Trade Organisation. Originally, services were restricted to Intra-Asia routes but it is now extending to the major east-west trunk routes and the north-south trades using chartered tonnage (though it is not yet part of a global alliance). Like Coscon, it is regarded as a controlled carrier in the United States and cannot enter the Trans-Pacific trades by cutting rates without giving 30 days notice compared with 24 hours notice by its rivals as per the US Ocean Shipping Reform Act, 1999. In 2000 it was ranked fifteenth among the world's Top-20 liner operators compared with Coscon's seventh position.[11]

Looking ahead, both Coscon and CSG are anticipating that port throughput in China will rise rapidly as the movement of TEUs generally exceeds the growth in GDP which is expected to double between 2000 and 2010. Should this forecast be realised the major implication is that direct calls will be attractive at a wider range of ports and Hong Kong is likely to lose its ranking as the world's leading port in terms of throughout. Of course, such prognostications are dependent on short-term factors. These not only include shedding workers from state enterprises and removal of any preferred status accorded national carriers follow entry into the World Trade Organisation but also the strategic implications stemming from China's accelerated economic development between 1990 and 2000.[12]

Conclusions: Trade and Security

This paper has sought to highlight aspects of China's increasing involvement in the world's maritime economy rather than draw any strategic implications. Undoubtedly, China will seek to protect its coastal economic platforms and, given its dependence on sea-borne freight, its transport and communications corridors. As China has become so dependent on globalisation since the adoption of its 'open door' policy in 1978 it is likely the country will seek to avoid endangering maritime security in the Asian-Pacific region. Not only has China restructured its commercial fleet but also its ownership profile has been consolidated and centred on meeting anticipated traffic growth and engaging in the cross trades to earn revenue. Indeed, its shipowners are likely to access the new building market (not necessarily only firms in China). The extent of China's integration into the world maritime economy suggests that it would not willingly put its international trade and commercial shipping, shipbuilding and ship repair activities at risk and dislocate its economy.

Notes

[1] This paper is a revised and updated version of a paper appearing in *Ports and Harbors*, (July-August 2001), pp 25-30.

[2] E. Ion, 'China & WTO: For better of worse?' *Lloyd's List Maritime Asia*, (January/February 2002), pp. 27-28.

[3] P.J. Rimmer & C. Comtois, 'China's transport and communications firms; transforming national champions into global players', in P.J. Rimmer (ed) Special Issue on 'Restructuring Chinese Space in the New Millennium', *Asia Pacific Viewpoint*, Vol. 43 (1), 2002, pp. 93-114.

[4] P.J. Rimmer & C. Comtois, 'Transforming East Asia's strategic architecture: platforms, corridors and organisations' in S. Harris and A. Mack (eds), *Asia-Pacific Security: The Economics-Politics Nexus*, Allen & Unwin, Sydney, 1998, pp. 206-226.

[5] 'Can iron trades recover?' *Lloyd's Shipping Economist*, January 2002, pp. 23-25.

[6] Li Zhendong, 'Challenges facing ports and harbors in China in 21st Century', unpublished paper presented at the 22nd International Ports and Harbors Conference, Montreal, 19-26 May 2001.

[7] N. Dekker, 'Shanghai in deep water?' *Containerisation International*, February 2002, pp. 78-79.

[8] N. Dekker, 'Big in China', *Containerisation International*, March 2001, pp. 50-53.

[9] D. McIlroy, 'China: Faster, cheaper, stronger', *Lloyd's List Maritime Asia*, June 2001, pp. 25-27.

[10] N. Dekker, 'Chinese whispers', *Containerisation International*, February 2002, pp. 49-51.

[11] J. Fossey, 'Packing a punch', *Containerisation International*, October 2000, pp. 54-59.

[12] P. Nolan, *China and the Global Economy: National Champions, Industrial Policy and the Big Business Revolution*, Palgrave, Basingstoke, 2001.

Acknowledgements

Trade and Shipping: A Common Interest of the Asia-Pacific | 2

Ken Matthews

The *International Symposium on Safer Shipping in the APEC Region* was held in Sydney in March 2001 with the objective of developing recommendations that could be put to APEC Transport Ministers for their consideration.[1]

A broad range of interests was represented. There were some seventy delegates from Australia, Canada, the United States, New Zealand, China, Chinese Taipei, Japan, Singapore, Korea, Hong Kong, China, the United Kingdom, Denmark, the Netherlands and Russia. In addition the International Maritime Organisation (IMO), Organisation for Economic Cooperation and Development (OECD), International Transport Federation, various classification societies, maritime media, International Commission on Shipping (ICONS), the International Chamber of Shipping, Intercargo and the Baltic Exchange were also represented.

Six separate working groups, chaired by eminent representatives of the OECD Maritime Transport Committee, Maritime Safety Authority of NZ, the Maritime and Ports Authority of Singapore, the China Classification Society, the Korean Maritime Institute and Lloyds Register, were asked to develop recommendations around the following topics:

- Integration of Global Port State Control Network.
- Flag State Responsibility in Achieving Quality Control.
- International Maritime Forums and the Delivery of Safer Shipping Outcomes by APEC Economies.
- The Human Element—Education, Training and Welfare.
- Improving Maritime Administration and Resources.
- Engaging Other Maritime Related Organisations and the Power of the Media.

Substandard Shipping

The main topic of discussion was substandard shipping and ways and means of tackling the problem. Although only a small number of ships are considered to be substandard, they pose the greatest threat to life and the environment. The ships that are poorly maintained and crewed with untrained personnel continue to sail the oceans by exploiting the weaknesses in the regulatory regime.

There was consensus that the best way of eliminating substandard shipping is to continue with a global approach to setting and enforcing standards. This was seen as the best means of eliminating shoddy operators who exploit differences in standards imposed by various countries. However, it was recognised that if countries fail to meet their international obligations, pressure would continue to grow on governments to seek unilateral or regional solutions.

The recent sinking of the tanker *Erika* off the coast of France was worldwide news and starkly demonstrates the directions that governments will take when there is a perception that the international safety regime is not working. There was immediate political pressure on European governments to impose higher safety standards on vessels trading in that area. The Europeans were eventually persuaded that the appropriate body to address the problem was the International Maritime Organisation, and the onus is now on the IMO to deliver.

The IMO's position is that the primary defence against unsafe shipping is the implementation of conventions and instruments by Flag States. It is their responsibility to ensure that the ships that fly their flags are seaworthy and safe. Port state control is a secondary defence to check that rules are properly applied and put into practice by shipowners.

However the facts are that the obligation of countries to ensure that ships flying their flags are safe, is not always fulfilled. There are a number of reasons why this happens. They include the nature of shipping, the lack of expertise or resources of some Flag States and the fact that some countries use ship registers primarily as revenue raising devices.

Due to the nature of shipping it is possible for a ship flying a particular flag never to visit that country. For example a country may own a ship with headquarters in country A and be registered in country A, that is fly its flag, but trade exclusively between countries B and C.

Some smaller countries that have ship registers lack the resources or people with sufficient expertise to enforce standards that are acceptable to the shipping community at large.

It was agreed that the International Ship Management Code, properly implemented, remains the best tool for developing a safety culture and concern for welfare throughout the industry.

There was consensus that the commercial shipping industry has a poor image globally. This poor image is mainly a result of the limited understanding in the general community of the industry, which achieves a high public profile only

when accidents and pollution occur. It was agreed that the positive aspects of the industry, such as the way it underpins world trade, should be more effectively highlighted.

Port State Control

Port State control is the regulation of ships entering a country's ports to load and discharge cargo. Its purpose is to ensure that visiting ships comply with internationally agreed safety standards, and entails inspectors going on board and checking certificates and physically checking a ship.

The operation of port state control has to dovetail with the commercial operations of vessels, and this means that there has to be adequate resources and well-trained inspectors. It also raises the question of which ships to target for inspection. In Australia and elsewhere, targeting programs are being developed to make the best use of limited resources and, by avoiding unwarranted inspections, to provide some sort of incentive to the operators of quality shipping.

There was agreement that there needs to be more uniformity in the application of safety standards, particularly in the area of port state control. Besides greater communication between jurisdictions, it was suggested that there be common guidelines for port state control and common training for port state control inspectors.

There was agreement that port state control should be more efficiently targeted at high-risk ships. A culture of qualitative rather than quantitative inspections should be used to determine which ships should be inspected.

There was agreement that there should be more sharing of data among inspection authorities, thereby making it more difficult for sub-standard shipping to hide by moving from jurisdiction to jurisdiction. It was proposed that this shared data be integrated into a global database.

It was agreed that the IMO is the pre-eminent body to deal effectively with substandard shipping, and its efforts deserve strong support from all Asia-Pacific Economic Cooperation (APEC) members. The IMO's principal strengths were stated to be its wide ranging membership and its potential to deliver internationally uniform standards. It was recommended that APEC Transport Ministers give their strongest support for advancing the work of the IMO in developing measures to ensure Flag States fulfil their obligations.

Regional Shipping

Australia is a member of APEC, which is the premier organisation for promoting open trade and practical economic cooperation in the region. The combined output of APEC members accounts for almost half of world exports and more than half of world GDP. Its membership now numbers twenty-one economies covering North and South America, East Asia and Oceania. Its size and diversity rivals other major multilateral forums. In 1999 APEC economies were the destination of 73% of Australia's merchandise exports.

Due to the size of APEC and its geographic spread, talking of shipping developments in the APEC region is not too different from talking of shipping developments globally.

The region is one of the two major centres, which exert most influence over the industry (the other is the European region). The Institute of Shipping Economics and Logistics estimated that in 1999, over 40% of the world's fleet was controlled by Asian shipowners. There are a number of strong forces impacting on the shipping industry. These are global in nature and include:

- the oversupply of most types of trading vessels
- the firm push internationally to protect the environment
- the growing importance of logistics
- new information technology and communications applications

Low freight rates have been a worldwide phenomenon over the past decade. To provide some perspective to the problems facing ship operators in the region, freight rates for shipping containers in the Australia/Southeast Asian trade in 1999 were almost half of those applying in 1982. In comparison, Australia's CPI more than doubled between 1982 and 1999. Rates have increased over the past year but there is debate about the durability of these increases.

While shippers have benefited from low rates, operators have been forced to aggressively seek opportunities to cut costs. Ship operators have sought to reduce costs by exploiting potential economies of scale, trimming crew costs, lowering other operating costs, minimising tax liabilities and in some cases, putting pressure on governments to provide fiscal support.

Over the past decade there have been numerous takeovers and mergers as shipping companies sought to become larger and exploit economies of scale. In the container-shipping sector for example, it is estimated that the largest company, Maersk Sealand, owns about 10% of the world fleet. These takeover

and merger activities are of course, not unique to the shipping industry and are similar to those being experienced in many industries as the world economy moves towards greater globalisation.

Increasing the size of ships can reduce crew and other operating costs. It is not surprising that there has been a tendency towards larger ships. Taking container vessels as an example, the 1980's or third generation vessels had a capacity of about 3,000 TEU while the larger vessels of the 1990s had a capacity of about 6,000 TEU. The largest vessels being constructed today have capacities of about 8,000 TEU.

Trade growth, particularly between Asia and the US/Europe, combined with the availability of these larger ships has changed sailing patterns. The larger vessels provide east/west services while smaller vessels operate in the thinner north/south trades. Transhipment is becoming much more common and has resulted in the development of hub ports—ports which are capable of accommodating the largest of vessels and which exploit the full economy of scale potential of large vessels. Singapore and Hong Kong tussle for the title of world's busiest ports with annual throughput of about 16 million containers each. The recent announcement by Maersk Sealand to move its transhipment business from Singapore to Malaysia will have a significant effect on shipping in the region.

It is significant that very few Australian ports could accommodate the supersize container vessels now coming into service in the Northern Hemisphere.

Ship operators have also focused on minimising crew costs. Whilst there is potential to cut crew sizes with more technologically advanced ships, operators generally have opted to shift the source of their crews from developed economies to less developed economies. Asian countries such as the Philippines, and eastern European countries now provide the bulk of ratings.

The fragmented supply chain has come under scrutiny from shippers and governments. There is a trend for shippers to look for a total, door to door transport system. Ship operators, alongside others in the transport chain, are therefore competing to provide a seamless service. Similarly, there is a demand for web technologies to be applied to the interface between customers and suppliers. Shipping companies, both as customers and suppliers, are competing alongside companies from other industries to create web applications for more efficient and effective maritime transport.

There is another emerging issue affecting safety and shipping in the region, and that is piracy. There were 469 reported pirate attacks last year. This is a

rise of 57% compared with 1999 figures and nearly four and half times higher when compared with 1991. The violence used in the attacks also rose to new levels, with 72 seafarers killed and 99 injured in 2000. Many of these attacks occur in this region and coordinated action is required to eliminate this scourge of the seas.

Australian Shipping

The Australian Government's approach to shipping issues has been two fold.

As a seaborne trading nation, the competitiveness of Australian export industries is an important policy issue. Importantly, however, these export industries are not and have never been shipping services. Australia is a major user of shipping services, but has never been the major provider of these services. The Government's focus therefore has been on how to access shipping services at competitive rates and adequate levels of service. Put simply, Australia is primarily a shipper, not a shipping nation—though that does not mean that Australia is uninterested in developing its shipping industry capacity.

The Government has also taken steps to improve the competitiveness of shipping through new tax arrangements, which are forecast to save the water transport sector some $390 million per annum, including a rebate of commercial marine fuel excise. Generally speaking the Government has moved away from the provision of ongoing and direct subsidies for industries. Any special arrangements therefore need to be justified on the basis that such arrangements would be clearly in the national interest.

The Australian shipping industry has raised concerns that it is disadvantaged when competing against foreign flagged vessels through the provisions of Australian legislation relating to such things as customs, migration, income tax, ship registration, occupational health and safety, compensation and rehabilitation and industrial relations. These concerns are under active investigation by the Department of Transport and Regional Services.

During the public debate that has accompanied the Government's recent considerations of shipping issues, many in the industry and the public at large have argued that defence needs are a basic reason for having an Australian flag fleet. There is still a perception that in times of conflict, Australia would be vulnerable if it were to rely too heavily on foreign flag shipping.

It is noticeable that the public support for a local industry on strategic grounds has been greater than that from the Department of Defence. The Shipping Reform Group's report of 1997 commented that while Defence acknowledged that there was significant potential defence benefit in an Australian fleet, the benefits of having a national fleet should be based on economic and commercial factors.

Another current national interest issue is related to the issue of skills in the industry. Australia is an island continent and is a trading economy, with a large proportion of exports and imports transported by sea.

A vibrant and efficient maritime services sector is crucial to Australian international competitiveness. Many of the shore-based positions in the industry require sea going qualifications as a prerequisite to employment (marine surveyors, harbour masters, ship managers, marine pilots, regulators and terminal operators).

The ageing of employees in this sector is an emerging issue with many now approaching retirement age. Maintaining a base supply of maritime skills in Australia is a pressing issue for the continued efficiency of the maritime sector. The issue is one that will need to be addressed in the near future.

Conclusion

Australia has the potential to be an attractive area for sub-standard ships to work. Initiatives such as the recent *Symposium* assist in keeping such ships away from Australia's shores whilst at the same time not disadvantaging Australian exporters in world markets.

On shipping developments in the region, the demand for shipping has grown as trade has increased. The shipping industry is gradually moving east and there are no foreseeable factors to suggest that this movement will not continue nor is there reason to suppose that the present competitive situation will not continue. Australia is becoming increasingly aware that her national interests lie in access to efficient shipping, not in sentimental attachment to Australian flagged ships. Nevertheless, it is clearly in her interests to ensure Australian shipping, like any other Australian industry, is not disadvantaged in competing internationally.

Notes

[1] Some 60 recommendations were endorsed by the symposium for development into a submission to the APEC region Transport Ministers, and these are available on the internet. (*http://www.apec.dotrs.gov.au*).

East Asian Shipping Ownership | 3

Professor Joon-Soo Jon

An efficient logistics system supported by efficient shipping services is essential to the development of a national economy as well as the world's economy. While shipping still plays a vital role in the logistics system, the close collaboration among countries in this region is necessary to prevent potential reckless expansion of own tonnage and massive port development plans to win a hub port. Under these circumstances, the shipping industry must seek a new role.

The total shipping tonnage of the five East Asian countries (China, Japan, Korea, Taiwan and Hong Kong) has decreased, mainly due to changes in the Japanese tramper and container fleets. Furthermore, their fleet competitiveness has weakened in comparison to the costs of flag of convenience ships. In the meantime, there has been a rapid increase of intra-trade among these countries. Statistics show that the 1980 intra-trade volume in this region was 15.8% of the total trade volume, and in 2000 this had grown to 34.7% of the total. This means that the economic dependence of each country on one another is increasing, and could lead to the creation of a regional economic bloc.

Changes in World Shipping Ownership

The worldwide tramper fleet between 1998 and 1999 increased from 43,194 vessels with 451.56 million GT to 43,545 vessels with 460.014 million GT (see *Table 1*), which is a 0.8% increase in the number of vessels and a 1.9% increase in GT.

However, the average fleet in Korea, Japan and China decreased from 8,177 vessels with 34.23 million GT to 7,902 vessels with 33.23 million GT within the same time period. This is a 3.4% decrease in the number of vessels and a 2.8% decrease in GT. East Asian ownership has been decreasing year by year and the number of vessels has decreased further than that of GT, which means that the size of an average vessel is relatively larger.

In 1999, the number of registered ships in flag of convenience countries increased compared to the previous year (see *Table 2*). However in East Asia, the number of vessels had decreased radically from the previous year due to the Asian economic crisis.

Table 1 – Tramper Fleet Ownership

	1997			1998			1999		
	Ships	DWT '000	DWT %	Ships	DWT '000	DWT %	Ships	DWT '000	DWT %
Liberia	907	83,812	15.6	923	909	15.0	1,341	48,184	10.5
Panama	1,318	92,086	17.1	1,504	1,157	18.9	4,692	90,395	19.6
Greece	609	45,298	8.4	544	675	7.7	1,206	23,425	5.1
Cyprus	659	29,929	5.4	646	680	5.1	1,307	20,929	4.5
Norway	273	26,075	5.0	282	285	5.0			
Malta	559	26,325	4.9	628	512	5.6	1,480	27,450	5.9
Philippine	237	11,274	2.1	222	243	1.8			
Singapore	252	19,715	3.7	279	219	4.0			
East Asia	655	38,699	7.2	637	672	6.7	7,902	33,282	7.2
Worldwide	8,189	538,346	100.0	8,357	551,593	100.0	43,545	460,139	100.0

Source: Fearnleys, *World Bulk Fleet.*
Note: Data is based on 01 Jan of each year and only considers ships over 10,000 DWT.

Table 2 – Container Fleet Ownership

	1998			1999		
	Ships	**GT '000**	**GT %**	**Ships**	**GT '000**	**GT %**
Liberia	185	4,484	8.4	206	4,748	8.6
Panama	470	11,758	22.0	492	12,654	22.9
Bahamas	53	1,064	2.0	49	1,051	1.9
Greece	42	1,160	2.2	41	1,331	2.4
Cyprus	123	2,316	4.3	130	2,415	4.4
Singapore	160	3,060	5.7	165	3,277	5.9
East Asia	171	3,030	5.7	172	2,934	5.3
Worldwide	2,382	53,242	100.0	2,457	55,255	100.0

Source: Lloyd's Register of Shipping, *World Fleet Statistics*.
Note: The data only considers ships over 100 GT.

East Asian Shipping Ownership

East Asian fleet ownership as part of the world fleet is 28.6%, but is 19.4% in terms of the number of vessels (8,758), and East Asia has a relatively larger size of fleet than the world's average (see *Table 3*). In the case of the container fleet, it is 12.0% of the world's total fleet, but uses 28.6% of the world's containers.

Table 3 – East Asian Shipping as a Percentage of World Shipping

	Size of fleet ('000 DWT)			Number of vessels		Import export goods ('000 TEU)
	National flag vessel	Container vessel	Real ownership vessel	Tramper	Container vessel	
East Asia	61,090	6,129	209,433	8,464	294	49,631
World	281,459	55,255	732,535	43,545	2,457	173,637
% East Asia	21.7	11.1	28.6	19.4	12.0	28.6

Notes: (i) National flag vessel and real ownership vessel data is from 2000, container vessel data is from 1999.

  (ii) The number of vessel is from 1999, import/export goods from 1998.

  (iii) Fleet by DWT (except container fleet by GT).

Real Ownership Fleet. The real ownership of the fleet (national and foreign flag registered ships), was 209.4 million DWT in 1999, which is a 3.3% pa increase in tonnage since 1990 (see *Table 4*). This rate of increase is higher than the increase in world tonnage. From 1990, there have been changes in the composition of the world's fleet, where the flag of convenience fleet has increased, while the flag of the national registered ship has decreased. However, the ratio of the East Asian real ownership fleet to the world fleet has been gradually increasing since 1990.

Foreign Flag Registered Ships. Examining the composition of the East Asian fleet, the ratio of the national flag decreased from 47.6% in 1990 to 29.2% in 1999, but the ratio of the foreign flag registered ship increased from 52.4% to 70.8% over the same period (see *Table 5*). On the other hand, the ratio of the worldwide national flag registered ship decreased from 57.2% in 1990 to 38.4% in 1999, whereas the ratio of the worldwide foreign flag registered ship increased from 42.8% to 61.6%. The ratio of the foreign flag registered ship keeps increasing, which explains the reason why the competitiveness of the East Asian fleet has weakened in comparison of the flag of convenience ship in terms of cost.

Container Fleet. The East Asian container fleet at 6.13 million GT in 1999, is 11.1% of the world total container fleet (see *Table 6*). The East Asian fleet has been decreasing since the 1990s, from 22.5% in 1990 to 11.1% in 1999, but the container fleet of the four countries excluding Japan was increasing. The reason for the decreased ratio of the East Asian container fleet to the world fleet after 1990 is due to the East Asian fleet increasing by 3.8% pa, whilst the world container fleet increased by 10.7% pa. The Japanese container fleet has been decreasing since 1990 at a rate of 3.7% pa.

The point is that the Japanese container fleet is decreasing, whilst the container fleets of Taiwan, Korea, China, and Hong Kong is increasing, as a consequence there is growing parity between the fleets. In the 1980s, the Japanese fleet was overwhelmingly stronger than the others, but from the 1990s, the fleets of Taiwan, Korea, and China have overtaken it while the Hong Kong fleet is similar to the Japanese fleet. The Taiwanese fleet has expanded to more than double that of Japan.

Table 4 – Trends of East Asian real ownership fleet ('000 DWT)

		1990	1993	1995	1998	1999	Annual Increase %
East Asia	National flag	76,925	73,585	70,916	64,472	61,090	-2.8
	Foreign flag	84,526	105,075	117,732	136,023	148,343	7.3
	Sub total	**161,451**	**178,660**	**188,648**	**200,495**	**209,443**	**3.3**
World	National flag	340,889	330,196	313,307	284,970	281,459	-2.4
	Foreign flag	254,835	324,726	357,877	392,694	451,076	7.4
	Total	**595,724**	**654,922**	**671,184**	**677,665**	**732,535**	**2.6**
% East Asia	National Flag	22.6	22.3	22.6	22.6	21.7	
	Foreign flag	33.2	32.4	32.9	34.6	32.9	
	Total	27.1	27.3	28.1	29.6	28.6	

Source: (i) Lloyd's Maritime Information Services Limited.

(ii) United Nations, *Review of Maritime Transport 1990-1999.*

Note: Data is based on ships over 1,000 GT.

Table 5 – Trend of the ratio of foreign flag registered ships
in the East Asian fleet

		1990	1991	1993	1995	1998	1999
East Asia	National flag	47.6	44.4	41.2	37.6	32.2	29.2
	Foreign flag	52.4	55.6	58.8	62.4	67.8	70.8
World	National flag	57.2	53.8	50.4	46.7	42.1	38.4
	Foreign flag	42.8	46.2	49.6	53.3	57.9	61.6

Source: (i) Lloyd's Maritime Information Services Limited.

(ii) United Nations, *Review of Maritime Transport 1990-1999*.

Note: Based on ships over 1,000 GT, with the ratio based on DWT.

Table 6 – Trends in East Asia's Container Fleet ('000 GT)

	1990	1994	1996	1997	1998	1999	Annual Increase %
Fleet	5,383	6,655	7,433	6,973	7,328	6,129	3.8
World Fleet	23,900	35,102	43,097	48,859	54,087	55,255	10.7
%	22.5	19.0	17.2	14.3	13.5	11.1	

Source: Lloyd's Register of Shipping, *World Fleet Statistics*.

Notes: (i) Steel ship over 100 GT.

(ii) As of July 01 in 1991 till the end of December.

Reasons for Changes. In 1998, the East Asian container traffic was 28% of the world's total, which is in line with North America and Europe, and it is expected that this ratio will continue to increase. In liner shipping, the East Asian countries are amongst the top 10 of the world's largest container traffic. There are three reasons why East Asia has the leading position in world shipping.

- East Asia is the most fast-growing economic zone in the world. Since 1990, the economic growth rate of East Asia has been higher than the world's total, including North America and the European Union (EU), and it is expected that this will continue after 2001. Such regional economic growth has encouraged the increase of transported goods by sea in East Asia and the East Asian shipping fleet.

- East Asia is situated in the centre of the world's sea network. It is in the central location of the Asia/Europe and the Asia/North America line (in the central latitude of the world) and the intra-trade of Asia, and so it has the geographical advantage of the way goods are transported by sea. The overall transhipment cargo of the countries is also increasing.

- Excluding Japan, East Asian logistics cost (including shipping costs) are relatively lower than that of North America and the EU. This is because East Asia has the geographical advantage and also the overall logistics cost of East Asia is lower than North America and the EU, thus it gives a competitive edge to East Asia in the world shipping market.

International organisations, such as the International Monetary Fund (IMF), Organisation Economic Cooperation and Development (OECD) and International Bank for Reconstruction and development (IBRD) consider the economic growth rate of East Asia will continue to be higher than North America and the EU. Based on this prospect, East Asian shipping will keep increasing both absolutely and relative to world shipping.

While the use of flag of convenience ship has been increasing since 1990, both in East Asia and worldwide, the ratio of East Asian real fleet ownership to the world fleet has also been gradually increasing since 1990. The total East Asian tonnage was 209.4 million DWT in 1999 (an annual increase of 3.3% after 1990), and the rate increase has been a little bit higher than that of the world fleet.

Thus, it is assumed that the reason for the decreasing rate of East Asian nationally registered ships is because of the weakening competitiveness of the national flagship compared to the flag of convenience ship. The main reasons are the relative competitiveness in crew cost, taxes and capital cost of the national registered ship, which is weaker than that of the foreign flag registered ship.

East Asian Container Fleet

East Asian container traffic has been increasing at about 12.2% pa since 1990, emphasising the importance of East Asia in world trade and shipping, this increase is 1% higher than the world's total container traffic (see *Table 7*). In the 1990s, the growth rate of the Japanese and Taiwanese markets was decreasing, but Korean growth remained at about 14.4% pa. Chinese and Hong Kong markets are also increasing at an annual rate of 35.1% and 16.2% respectively, due to the fast growing Chinese economy.

Examining the East Asian national flag fleet size, in 1990 Japan was 45.9% of the total, but this sharply decreased to 28.5% in 1999 (see *Table 8*). China was

26.1% in 1990, but grew to 36.5% in 1999, implying that China has the largest national flag fleet in East Asia. In the case of the container fleet, since 1990 Taiwan has had the largest fleet but it has been decreasing in size, whereas China and Korea have continued to increase, outpacing Japan. On the other hand, in the case of the real ownership fleet, despite the fact that the Japanese fleet has continued to decrease since 1990, it was still the largest fleet in 1999. China, Taiwan and Korea increased slightly, whilst Hong Kong decreased, so it is expected that Korea, China and Taiwan will increase whilst Japan will decrease in the future.

Table 7 – Container Goods by East Asian Country ('000 TEU)

	1990	1992	1995	1996	1997	1998	Annual Increase %
China	1,204	1,506	4,679	5,238	5,797	9,877	35.1
Hong Kong	5,101	6,162	12,550	13,460	14,567	14,582	16.2
Taiwan	5,451	6,130	7,845	7,866	8,516	8,343	6.3
Korea	2,460	2,571	4,503	5,077	5,637	6,331	14.4
Japan	7,956	8,782	10,741	11,032	10,892	10,228	3.6
Total	**22,172**	**25,151**	**40,318**	**42,673**	**45,409**	**49,631**	**12.2**

Source: *Containerisation International Yearbook*, 1992-2000.

Table 8 – East Asian Fleet % Changes 1990-1999

	National fleet		Container fleet		Real ownership fleet	
	1990	1999	1990	1999	1990	1999
China	26.1	36.5	15.7	22.4	15.5	18.8
Hong Kong	4.3	10.7	10.4	21.8	18.5	15.0
Taiwan	8.8	12.4	38.3	30.3	6.5	9.4
Korea	14.9	11.9	12.4	13.3	9.7	12.2
Japan	**45.9**	**28.5**	**23.2**	**12.2**	**49.8**	**44.6**

Note: (i) National flag fleet and real ownership fleet: UNCTAD data that categorises the national flag ship and flag of convenience ship by DWT base, and only includes ships over 1,000 GT.

(ii) Container fleet: Lloyd's Registry data that categorises ship by the GT base, and only includes ships over 100 GT.

Japan. The Japanese fleet is shrinking in size in terms of the total East Asian fleet. In the case of the real ownership fleet, the Japanese fleet was 49.8% in 1990, but decreased to 44.6% in 1999. In the case of the national flag fleet, it was 45.9% in 1990 and decreased to 28.5% in 1999. In the container fleet, it was 23.2% in 1990 and decreased to 12.2% in 1999. Therefore, the relative position of the Japanese fleet has been reducing. In considering this kind of change, Japanese shipping could be evaluated as follows:

- Japan still has the dominant position in terms of fleet size (45% of the total East Asian fleet). However in the area of generating liner traffic, it only supplies 20.6% of the total demand of the region and supplies 12.2% of the total fleet. Thus, her dominant position has been deteriorating.

- The relative position of Japan in East Asia tends to be weakening sharply in fleet size. In terms of the size of the real ownership fleet, the decrease has been slowing, but in terms of the national flag registered fleet, the rate of decrease has been greater than Korea, China and Taiwan. Consequently, the overall position of Japan has deteriorating drastically.

China. The relative position of Pan-Chinese shipping (China, Hong Kong and Taiwan) in East Asia has been greatly reinforced in terms of fleet size. The real ownership fleet has increased from 40.5% in 1990 to 43.2% in 1999, the national flag registered ship has increased from 39.2% in 1990 to 59.6% in 1999, and the container fleet increased from 64.4% in 1990 to 74.5% in 1999. By considering these kinds of changes, it can be evaluated as follows:

- The relative position of Pan-Chinese shipping has been greatly strengthened in terms of the size of fleet, the national flag registered fleet was 59.6% of the East Asian total in 1999, outpacing Japan.

- In the case of the container fleet, it was 74.5% of the East Asian total in 1999, and the container traffic was 66.6% of the total, thus overwhelming the Japanese market, and showing that Pan-Chinese shipping could dominate the East Asian market.

- The size of the Chinese national flag fleet was 36.5% of the East Asian total in 1999, exceeding the size of the Japanese national flag fleet. In the container market, Hong Kong possessed 27.9% of the East Asian market, outpacing Japan.

Korea. The relative position of the Korean marine transportation industry has been increasing both in supply and demand. In the case of the container fleet, both its size and demand have been increasing steadily. Only the size of the national flag fleet has been slowing down. The real ownership fleet was 12.2%

of the East Asian total in 1999, whilst the container fleet was 13.3% in 1999. On the other hand, the import/export container traffic was 12.7% in 1999, implying that the supply exceeds the demand in the national market.

Supply and Demand in the Shipping Market

The import and export volume per 1DWT of the East Asian national and foreign flagged ships is 9.4 ton, which was 4.3 ton less than the world's average cargo volume of 13.7 ton in 1997 (See *Table 9*). Nevertheless, the fluctuation in 1990 shows that the relationship between demand and supply is improving as the cargo volume of import and export per 1DWT has increased, far exceeding the world's average increase (0.3 ton).

In terms of supply and demand, the import and export volume of Korea was 17.9 ton per 1DWT in 1998, which is much more than world's average cargo volume, reaching twice the average volume of East Asia. On the other hand, the amount of cargo volume per ship of Japan was 9.6 ton, which was 4 ton less than the world's average although a little more than that of East Asia. However, the average cargo volume amount of three pan-Chinese countries was 6.7 ton, which is half of the world's average amount and 2.7 ton less than East Asia. In fact, the import and export volume amount per 1DWT of Hong Kong was only 3.7 ton. Hence, Korea had more demanding power than the world's average, whereas the other four countries had a smaller demand.

Table 9 – East Asian Import/Export Cargo by Volume (MT/DWT)

	China	Hong Kong	Taiwan	Korea	Japan	3 Chinese countries	5 East Asian countries	World
1990	6.6	2.5	11.2	14.0	9.6	5.5	8.4	13.4
1997	8.5	3.7	8.8	17.9	9.6	6.7	9.4	13.7

Note: Data evaluated from national flag and foreign flag registered ships.

In terms of the demand and supply of the container liner, the import and export cargo volume amount per GT in 1997 was 6.8 TEU, which was much more than world's average of 3.5 TEU. East Asian demand and supply was not up to the standard of the world's average, but for the liner market it was better than the world's average. The demand and supply of the world market has become worse since 1990, but in East Asia this has increased at a rate of 2.6 TEU per 1GT of ships.

On the issue of demand and supply by countries, Hong Kong and Japan have a far greater amount, reaching 16.6 TEU and 11.7 TEU per 1GT, the 3 pan-Chinese countries have 6.5 TEU, and Korea has 4.2 TEU. Among the 3 pan-Chinese countries, the cargo volume amount of Hong Kong is 16.6 TEU, but China only has 4.3 TEU. Since a considerable amount of the volume of the container cargo from China is handled in Hong Kong, the actual amount of Chinese cargo volume is much more than shown and the total amount for Hong Kong may include some part of the Chinese cargo.

In evaluating the demand and supply of the shipping markets of East Asia (see *Table 10*), we see the following characteristics: the stagnation of Japan, rapid growth of the 3 pan-Chinese countries and the gradual rise of Korea. The shrinkage in Japan and the growth of the pan-Chinese countries in the shipping markets seem to be a result of the long-term economic depression of Japan.

Table 10 – East Asian Container Cargo Volume per Ship (TEU/GT)

	China	Hong Kong	Taiwan	Korea	Japan	3 Chinese countries	5 East Asian countries	World
1990	1.4	9.1	2.7	3.7	6.4	3.4	4.2	3.6
1998	4.3	16.6	3.8	4.2	11.7	6.5	6.8	3.5

Note: Data based on domestic registered ships.

After 1990, the increase of Japanese GDP has only been 1-2% whereas the other four countries have seen a 5-6% increase. The stagnation in the Japanese economy and cargo volume, resulting in a decrease in Japanese shipping, is another reason why the logistics costs (port equipment rent, port dues, stow and storage fees) are much higher in Japan than the other East Asian countries.

By contrast, China, Taiwan, Hong Kong and Korea have had a rapid increase of cargo volume with continuous economic growth and they have expanded port facilities in order to be selected as the East Asian hub port. And as their logistics costs are lower than Japan, it seems natural that their cargo volume weight is increasing.

East Asia has good prospects on demand and supply in the shipping markets through steady economic growth, but its fleet size will continue to decrease for sometime. However its actual fleet size will continue its growth over the world's average standard. It is expected that East Asia will grow more quickly than North America or the EU.

The 3 pan-Chinese countries will expand in the shipping market and grow rapidly while Japan will continue to reduce its market share. The Chinese increase will affect Korea with more trade between them, and since the trade between East Asian countries is increasing with time, every country will be competing to be the East Asian logistics hub port.

Under this circumstance, Korea should concentrate her efforts on becoming a hub port in East Asia just like the other countries. However, Korea is still lacking the port facilities necessary for handling the cargo amount thus the need for more investment. Additionally, Korea can improve the efficiency of port management by encouraging further development of the quality of logistics service, through her strengths such as geographical advantage and low logistics costs.

The Future of East Asian Shipping

The East Asian liner shipping market is the largest in the world for container cargo, with an annual increase of 9.2% from 45,140,000 TEU in 1997 to an expected 141,800,000 TEU in 2010. These amounts are above the growth of the European (7.0%) and the American (7.5%) markets. The weight of East Asia in the world's liner shipping market will continue to grow more and more in the 21st Century because of its continuing economic growth (as shown in *Table 11*). East Asian economic growth began in Japan in the 1960s to the 1970s, then progressed to Korea, Taiwan, Hong Kong and then to China in the late 1980s.

Table 11 – Cargo handling in the 3 largest world liner shipping markets ('000'000 TEU)

	1997	2005	2010	Annual increase %
East Asia	45.14 (27.6)	97.86 (30.4)	141.80 (32.9)	9.2
EU	34.75 (21.2)	66.65 (20.7)	84.05 (19.5)	7.0
North America	26.87 (16.4)	51.84 (16.1)	68.96 (16.0)	7.5
Total	**163.74 (100.0)**	**322.00 (100.0)**	**431.00 (100.0)**	**7.7**

Source: *Containerisation International Yearbook* 1998; Ocean Shipping Consultants.

One of the key factors affecting future cargo volume is GDP increases (see *Table 12*). Most of the East Asian countries are expected to grow above the world average (except Japan which seems to be growing under the average). China has been increasing at more than 10% pa since 1994 and this is expected to continue.

Table 12 – GDP Increase

	1990	1992	1994	1997	1999	2000
World	2.4	2.0	3.7	4.2	3.0	2.6
USA	1.2	2.3	4.1	3.9	3.7	2.6
EU	3.0	1.0	2.8	2.7	2.0	2.6
East Asia	4.8	6.0	7.5	5.8	5.2	5.8

Source: International Monetary Fund, *World Economic Outlook*, 1999, p. 12.

Growth in the East Asian Container Shipping Market

Korea, China, Taiwan and Hong Kong have increased their container cargo volume by almost 8.2% pa over 5 years, the volume amount increased from 4,210,000 TEU in 1991 to 6,250,000 TEU in 1996. It is expected that they will continue to grow at the same rate in the future (as shown in *Table 13)*, their cargo volume is forecasted to reach 9,300,000 TEU in 2001.

Table 13 – Forecast of East Asian Cargo in the intra- Asian shipping market (TEU)

	1991	1996	2001	Increase (%) (1991-1996)	Increase (%) (1996-2001)
Japan	1,703,098	2,407,654	3,288,194	7.2	6.4
Korea	705,497	1,103,844	1,755,552	9.4	9.7
Taiwan	967,849	1,339,823	1,970,373	6.7	8.0
Hong Kong	832,740	1,402,177	2,308,549	11.0	10.5
Total	**4,209,284**	**6,253,501**	**9,322,668**	**8.2**	**8.3**

Source: DRI/Mercer, *World Sea Trades Services*, *Containerisation International*,
        June 1997, p. 50.

Table 14 shows that the intra-cargo volume has had an average increase of 5.8% pa over five years. And the portion of cargo volume among these countries has decreased from 62.9% in 1991 to 61.3% in 1996. Nevertheless, it does take a lot of shipping market shares among the businesses of these countries.

On the other hand, the intra-liner shipping market to China is enlarging rapidly. The cargo volume has expanded among the five countries, from 3,470,000 TEU in 1992 to 5,900,000 TEU in 1995, at an average increase of 19.3% pa (see *Table 15*).

Japan has more cargo volume bound for China than before. The amount was 240,000 TEU in 1990 and 930,000 TEU in 1996, so it had an average increase of 25.2% per year over 5 years. The Korean trade cargo volume bound for China had an average increase of 48.9% per year from 560,000 TEU in 1990 to 640,000 TEU in 1996. Taiwan, on the other hand, has handled cargo volume bound for China with an average increase of 21.6% every year from 420,000 TEU in 1992 to 750,000 TEU in 1996. The transhipment cargo volume for China from Hong Kong has also been increasing from 1,520,000 TEU in 1990 to 3,760,000 TEU in 1996, an average increase of 19.9% every year.

Table 14 – East Asian Intra Container Cargo Volume ('000 TEU)

	1991	1996	2001	Annual increase (%)
Japan	961	1,223	1,637	5.5
Export	484	840	1,124	
Import	477	382	513	
Korea	516	748	1,001	6.8
Export	343	452	605	
Import	173	296	396	
Taiwan	692	900	1,204	5.7
Export	427	591	791	
Import	265	309	413	
Hong Kong	746	960	1,285	5.6
Export	204	33	44	
Import	542	927	1,241	
Total	2,914	3,831	5,127	5.8
Export	1,457	1,915	2,564	
Import	1,457	1,916	2,563	

Source: Jong Kwan Lim, 'Operational problems and remedies for coastal services of national shipping companies', KMI, December 1995; *Containerisation International*, June 1997 p. 51.

Table 15 – Chinese Container Cargo Volume ('000 TEU)

	1990	1991	1992	1993	1994	1995	1996	Increase (%)
Japan	241.3	347.2	454.3	590.8	724.4	813.4	930.1	25.2
Korea	56.3	80.1	128.9	224.4	396.0	569.2	642.5	48.9
Taiwan	n/a	n/a	420.7	521.8	584.7	756.8	n/a	21.6
Hong Kong	1,518.0	1,773.0	2,473.0	2,851.0	3,485.0	3,760.0	n/a	19.9
Total	**n/a**	**n/a**	**3,476.9**	**4,188.0**	**5,193.1**	**5,899.4**	**n/a**	**19.3**

Source: Jong Kwan Lim, 'The effect and countermeasure for regulations about shipping service management between both coasts of Taiwan Cannel', KMI, 1996.

Note: Cargo volumes on the routes from Taiwan to China were estimated from the trade volume between Taiwan and the southern part of China on the Taiwan-Hong Kong routes.

The rapid increase of intra-shipping cargo volume among the five countries has led to the increase in transhipment cargo volume from offshore cargo volume as well as the increase in intra-trade among them. Intra-trades had risen to $997,600 million by 1997 with an average increase rate of 15% pa since 1990.

Intra-trade volume was 15.8% of the total East Asian trade in 1980 and had increased to 23.8% in 1990 and 34.7% in 2000 (see *Table 17*). A further increase in the intra-trade volume is expected, unlike the EU or North American Free Trade Agreement (NAFTA), since the production bases are spread over several countries due to increased investment, especially to China.

Table 16 – Value of East Asian Intra-trade ($'000'000)

	1990	1995	1997	Annual increase (%)
Japan	**88,077**	**179,297**	**302,357**	**11.2**
Export	52,211	109,990	183,135	
Import	35,866	69,307	119,222	
Korea	**43,087**	**84,169**	**116,412**	**15.8**
Export	20,200	40,813	63,199	
Import	22,887	43,356	53,213	
China	**67,599**	**163,616**	**200,662**	**16.4**
Export	39,589	74,252	97,196	
Import	28,010	89,364	103,466	
Taiwan	**39,227**	**82,797**	**118,595**	**15.1**
Export	18,107	42,212	64,713	
Import	21,120	40,585	53,882	
Hong Kong	**82,986**	**176,415**	**259,631**	**19.4**
Export	30,381	75,880	95,880	
Import	52,605	100,535	163,751	
Total	**320,976**	**686,294**	**997,657**	**15.0**
Export	160,488	343,147	504,123	
Import	160,488	343,147	493,534	

Source: IMF, *Direction of Trade Statistics Yearbook* 1992, 1996, 1998.

Additionally, the growth of transhipment cargo volume at intra ports could be the other reason why intra cargo volume is increasing. The main reason for this growth has been derived from the increase of transhipment volume in the ports of Hong Kong, Korea and Japan, which are the countries involved in trades between China and the outside world.

Table 17 – Weight of East Asian Intra-Cargo Volume

	1980	1985	1990	2000
North East Asia	**15.8**	**21.0**	**23.8**	**34.7**
ASEAN	13.2	14.0	12.5	15.3
EU	55.2	50.0	55.2	47.5
NAFTA	33.0	32.6	41.3	29.0

Source: Hwa Sup Kim, 'The analysis on a technical economy unification effect of East Asia', *Journal of industrial competitiveness*, vol. 2, No. 2, (September 1996), KIET, pp. 91-118.

East Asia as a Hub Port

Three of the five world's best ports and eleven of the 50 world's largest ports are situated in East Asia. All of these ports have been expanding, except for Kobe in Japan, which was once ranked 5th but after the January 1995 earthquake, has fallen to 24th. The development of East Asian ports has been dramatic, as shown in *Table 18*. For example, Hong Kong, which was once 3rd is now positioned 1st, Kaoshung in Taiwan has risen from 4th to 3rd, and Pusan in Korea has risen from 12th to 5th position.

The mega-hub ports such as Hong Kong, Kaoshiung, Keelung, Pusan, Kobe and Yokohama are attracting attention. The annual cargo volume handled by Hong Kong was 2,290,000 TEU in 1985 and 14,580,000 TEU in 1998, an average increase of 17.4% pa, thus becoming the largest mega-port in the world.

Kaoshiung port handled 1,900,000 TEU of cargo in 1985 and 6,270,000 TEU of cargo in 1998. Its capacity has grown 13.0% pa. In comparison, Pusan port handled 5,940,000 TEU of cargo in 1998 and had averaged a 16.1% pa growth since 1985. However, Kobe port had emerged as a mega-port but fell behind after the 1995 earthquake, and has been replaced by Yokohama port.

One of the newest emerging mega-ports of the 1990s was Shanghai in China. This port had handled 450,000 TEU in 1990, but had risen to 3,060,000 TEU by 1998, an average increase of 26.9% pa. Tokyo, Nagoya and Osaka ports in Japan and Keelung port in Taiwan are large sized ports, which are handling more than 1,000,000 TEU a year. Chungjin and Chungdo port in China have also augmented the amount of cargo volume handled every year since the 1990s, and are expected to exceed 1,000,000 TEU pa in two or three years. The growth of these large sized ports are the chief result of the increase of the import and export cargo volume derived from regional economic development and increased transhipment to other countries.

Table 18 – East Asian Container Port Volume ('000 TEU)

Nation	Ports	1985 (rank)	1990 (rank)	1997 (rank)	1998 (rank)	Annual increase 1985-90	Annual increase 1990-98
Japan	Kobe	1,857 (5)	2,596 (5)	1,944 (18)	1,901 (20)	6.9	-.38
	Yokohama	1,327 (7)	1,648 (11)	2,348 (13)	2,091 (18)	4.4	3.0
	Tokyo	1,004 (14)	1,555 (13)	2,322 (14)	2,169 (15)	9.1	4.2
	Nagoya	422 (35)	898 (24)	1,498 (25)	1,458 (28)	16.3	6.2
	Osaka	423 (34)	483 (38)	1,204 (30)	1,156 (36)	2.7	11.5
Korea	Pusan	1,115 (12)	2,348 (6)	5,234 (5)	5,946 (5)	16.1	12.3
China	Shanghai	202 (59)	456 (42)	2,520 (11)	3,066 (10)	17.7	26.9
	Tianjin	148 (78)	286 (62)	N/A (-)	1,018 (41)	14.1	17.2
	Qingdao	31 (200)	135 (109)	1,030 (35)	1,214 (33)	34.2	31.6
	Hong Kong	2,289 (3)	5,101 (2)	14,567 (1)	14,582 (2)	17.4	14.0
Taiwan	Kaoshiung	1,901 (4)	3,495 (4)	5,693 (3)	6,271 (3)	13.0	7.6
	Keelung	1,158 (11)	1,828 (10)	1,384 (28)	1,192 (34)	9.6	-5.2
	Taichung	16 (248)	128 (114)	842 (43)	880 (48)	51.6	27.3

Source: *Containerisation International, Yearbook 1998, 1993, 2000.*

Starting at the first 6,000 TEU container vessel, *Regina Maersk* (launched in 1996), the container ship has been constantly increasing in size (see *Table 19*). Nowadays, 6,000-7,000 TEU ships are commonly serviced on the major liner trades. At present, the prospects of the inauguration of >8,000 TEU container ships are imminent.

In terms of technology, 15,000 TEU container ships are possibly being constructed at existing shipbuilding yards. And in economic terms, these mega-ships can only call into one port in one region. Thus the competition to be the hub port of the region to accommodate these mega-sized container ships is getting fierce.

In order to be the hub port, the port has to have at least a 350m long berth and over a 15m draft and must be equipped with long reach gantry cranes to be able to cover over a 40m width of the ship.

The competition will lead to a massive investment for port development in the region, and subsequently, in the case of failure (to become the hub port) this will result in a large waste of money. And hence, there exists the urgent requirement for the wisdom to rationalise this investment and to seek for a system to allocate a role relating to port development.

Table 19 – Growth in Container Vessels (generation)

	1st	2nd	3rd	4th	5th	6th	7th	8th
Time	1960s	1970s	1980s	1984	1992	1996	2000	2005
Ship Type		Full container	Panamax	Post Panamax	Post Panamax	Super Panamax	Super Panamax	Ultra Panamax
Length (m)	190	210	210-290	270-300	290-320	305-310	355-360	365
Speed(knot)	16	23	23	24-23	25	25	26.4	-
Width (m)	27	27	32	37-41	40-47	38-40	43	55
Draft (m)	9	10	11.5	13-14	13-14	13.5-14	14.5	15
TEU	1,000	2,000	3,000	>4,000	>4,900	~6,000	~8,000	~12,500
On deck Cargo	1-2 S	2 S/8 R; 2 S/10 R	3 S/12 R; 3 S/13 R	3 S/12 R; 3 S/13 R	3 S/14 R; 4 S/16 R	6 S/16 R	6 S/17 R	7 S/22 R
Under deck Cargo	5-6 S	6 S/7 R; 6 S/8 R	7 S/9 R; 9 S/10 R	9 S/10 R; 9 S/12 R	-	9 S/14 R	9 S/14 R	10 S/18 R

Source: KMI.

Note: S – stories, R – rows.

Table 20 – Container Shipbuilding Orders (September 2000)

	TEU	Number of ships	Volume of shipping space (TEU)	Year of Delivery
Maerks-Sealand	2,226-6,600	24	111,308	2000-02
CSCL	2,474-5,762	23	106,438	2000-03
P&O Nedlloys	2,200-6,788	23	102,243	2000-03
MSC	4,350-6,730	11	71,650	2000-02
APL	2,468-5,762	15	69,320	2000-02
K-line	5,572, 5,610	12	67,168	2001-02
Evergrenn/Uniglory	1,618-6,000	14	60,698	2000-02
CMA-CGM	2,200, 6,500	10	56,400	2001
NYK	6,200	9	55,800	2001-03
Hanjin shipping Co.	4,400-6,500	10	53,100	2000-02
MOL	5,632-6,114	8	47,222	2001-02
Hapag-Llpyd	4,843, 7,200	7	43,329	2001-03
COSCO	750-5,250	10	40,700	2000-01
Yangming	5,551	6	33,306	2001
HMM	6,300	5	31,500	2001
Hamburg-Sud	3,700	8	29,600	2001
ZIM	4,800	6	28,800	2002-03
IRISL	2,500-3,300	10	28,200	2000-02
COCL	5,500-5,762	10	28,024	2000-02
CSAV	3,100	7	21,700	2001-02
Total		**228**	**1,086,506**	

Source: *Containerisation International,* Nov. 2000.

Conclusion

East Asia is the most fast-growing economic zone in the world. Since 1990, the economic growth rate of East Asia has been higher than any other country (including North America and the EU), and it is expected that this trend will continue after 2001.

With this economic growth, East Asia has continued to increase the size of its fleets (absolutely and relatively) and its seaborne trade. Since East Asia is situated in the centre of world sea networks, it has the geographical advantage for the way in which goods are transported by sea. Additionally, their overall logistics cost is lower than that of North America and the EU, and thus gains a competitive edge in the world shipping market.

International organisations such as the IMF, OECD and IBRD consider that the East Asian economic growth rate will remain higher than that of North America and the EU.

In examining the East Asian fleet size, the portion of the Japanese flag was 45.6% of the East Asian total in 1990, but it had decreased sharply down to 28.5% in 1999. The portion of China was 26.1% in 1990 but had become 36.5% in 1999 implying that China is the country that has the largest national flag fleet in East Asia.

The East Asian liner shipping market is seen as the largest for container cargo in the world and its growth of volume will be increasing by an annual rate of 9.2% from 45,140,000 TEU in 1997 to an expected value of 141,800,00 TEU in 2010. Therefore, it is evident that the weight of East Asia in the world liner shipping market will continue to grow more and more during the 21st Century.

In the meantime, we could also experience a rapid increase of intra-trade among China, Japan, Hong Kong, Taiwan and Korea. The intra-trade volume was 15.8% of total East Asian trade in 1980, increasing to 23.8% in 1990 and reaching 34.7% in 2000, meaning that the economic dependence of each country on one another is increasing. Nowadays, an efficient logistics system supported by an efficient shipping services is essential to the development of the national economy as well as the world's economy. In addition, the logistics is a new source of competitiveness of a nation and a company. These factors might lead to the formation of an economic bloc.

Moreover, a rapid adaptation to the resulting changes is required in order for shipping to survive continuously and to grow in a global competitive environment, which is becoming increasingly intensive by the day. As the scope of corporate activity is expanding to worldwide locations, factors of

production and the frequency of the physical transfer of raw/semi-manufactured materials and manufactured products have increased to a level, which are incomparable to that of the past.

Under these circumstances, shipping must seek a new role. Shipping still plays a vital role in the logistics system. The integrated transport system based on the multi-modal transport is the backbone of the total logistics system. Thus, in East Asia a greater challenge will be faced in the 21st Century.

The dynamic economic power could only be sustained by joint wisdom prevailing among the East Asian countries to tackle the problems such as reckless expansion of own tonnage and massive port development plans to be a hub port. This wisdom is strongly required to allocate the resources wisely and to allocate a role to the build up of complementary competitiveness among countries in the region.

The Sea-Lines of Communication: An Indian Ocean Perspective | 4

Vice Admiral Mihir Roy, IN

A Sea Line of Communication (SLOC) is the route taken by a ship to transit from point A to point B. In maritime and economic parlance, it should be the shortest distance, economical and allow the timely delivery of cargo. SLOCs are the arteries of a region and serve as an umbilical cord for the country's economy. But during confrontation or conflict, SLOCs become the strategic path varying in course and distance, depending on the geography of the landmass, reefs and shallows and also the locations of ports and harbours. Hence to the military, SLOCs are a maritime instrument of power with geography being the determinator for the forces being deployed to support government ends or deter adversaries. To a politician, it is the state of relations with countries located along the sea route that will develop a strategy for the security of SLOCs. Hence there is a significant link between SLOCs and geography in the context of strategy.

Ocean Trading Blocs

The current phenomenon of ocean trading blocs has found new economic complementarities and ways for expanding trade and investment. Nations soon began to recognise the mutual advantage in discussing common problems such as double taxation, state sponsored terrorism, refuge flows and narcotic trafficking across multiple borders. The necessity for dialogue, the networking of summit and ministerial meetings, two track diplomacy and business associations have all encouraged regional cooperation. Tourism, business travel, education and informatics have made significant strides. The tempo of ocean trading blocs speeded up with the setting up of the World Trade Organisation (WTO) and the liberalisation of the global economy.

The Asia-Pacific Economic (APEC) forum consisting initially of twelve countries, which was established at Canberra in 1989, has to date twenty-one economies covering North and South Americas, East Asia and Oceania which totals nearly two billion people and accounting for almost half the worlds trade. APEC has been active in recent years in furthering regional cooperation in shipping and maritime safety. Nonetheless, Australia has not encouraged India's admission into APEC.

However the ASEAN Regional Forum (ARF) which has recently accepted India as a dialogue member has started to move into the area of maritime cooperation. The Council for Security Cooperation in the Asia Pacific (CSCAP) has a strong Australian element for a Track Two process on security issues. The Maritime Cooperative Working Group affiliated to CSCAP has a representative from India. The SLOC Studies Group comprising of twenty-two countries has been functioning for over two decades with India recently nominating a representative from the Society for Indian Ocean Studies.

The South Asian Association for Regional Cooperation (SAARC) and the South Asian Preferential Trading Agreement (SAPTA) have been grounded, as Pakistan will not grant the most favoured nation status to India, which is the crux of ocean trading groups such as ASEAN, APEC, NAFTA and the EU. Hence the Indian Ocean continues to remain the only major region without a viable economic grouping and hence the importance of the emerging Indian Ocean Rim Trading bloc.

The volume of major sea trade commodities in Asia-Pacific has surpassed 15 billion tons which comprises over a third of the world's maritime trade. The Asia-Pacific region comprises 52% of earth's surface and 59% of the population, has broadly two significant sea-lanes of communication.

- The South China Seas to the Indian Ocean and the Middle East with 41,000 ships passing through every year. This is double that of ships passing through the Suez and treble the total numbers navigating through the Panama Canal (the Malacca, Sunda, Lombok, and Makassar straits are the Southeast Asian chokepoints).

- The other is through the East China Seas and the Sea of Japan to the Pacific Ocean where the strategic straits are the Tsushima, Tsugara, Osumi and Soya in North East Asia.

The Indian Ocean region is 28 million square miles, comprising 36 littorals and 11 land locked states with 1284 islands (418 are uninhabited). It contains a fifth of the world's water space, a third of world's population, a quarter of the landmass, three quarters of strategic reserves, as well as 70% of world's disasters and the largest segment of the world's poorest people. The region is a cradle of all major religions and a kaleidoscope of 'isms' such as fundamentalism, tribalism, communism, socialism, and adventurism with a collection of different political hues from democracy to dictatorship. Moreover secular India has more Muslims than Pakistan, more Nepalis then in Nepal and more Tamils than in Sri Lanka.

The Indian Ocean sea-lanes were the highways for commercial and cultural contacts from time immemorial, initially transporting indentured labour, petty shopkeepers, civil servants, hajj pilgrims and the military to ensure the flow of resources and markets to suit the needs of industrial Europe. The continental or heartland mindset formulated by the geographer Halford Mackinder continued up to the Cold War. But with the pulling down of the Berlin Wall, the removal of apartheid, the collapse of the rupee trade and the advent of competitive market-oriented economy, the environment in the Indian Ocean changed from geo-strategy to geo-economics, from conflict to commerce and also from a continental to a rimland mindset. The volatile Indian Ocean with its neo geo-politics thus became the last frontier for human sustenance and energy flows to meet the politico-economic aspirations of the people.

The emphasis also shifted from Euro-Atlantic to Asia-Pacific which was accelerated by the advent of ocean trading blocs such as APEC, ASEAN and the Indian Ocean Rim. This brought in its wake broader strategic and economic participation with an annual traffic of 70,000 ships through the Indian Ocean, of which 12,000 vessels entered the 11 major Indian ports last year. In 1998-99, Indian ports handled 272 million tons of goods, which is expected to increase to 377 million tons by 2005.

Energy Transportation

Oil is the dominant source of energy for Asia-Pacific countries. As Asia-Pacific oil consumption is much greater than production, these countries are increasingly dependent on imported oil from the Middle East. At present, oil imports account for almost 60% of Asian oil consumption, and by 2010 it is forecast that imports will account for nearly 75%. The rapid growth in regional seaborne energy trade has resulted in increased numbers of tankers and LNG/LPG carriers for servicing India's 14 refineries and 12 more by 2005, which will raise consumption and will entail more coastal traffic. There were 3810 oil tanker visits to Indian ports. The supply of energy and its unimpeded transportation hence becomes major security concerns, particularly in view of ships floating multilaterism. Keeping the SLOCs secure and unencumbered is therefore an important economic and security interest for all nations. Hence, promoting stability in the Arabian Gulf, maintaining freedom of the seas, protecting sea lines of communication, particularly in the Strait of Malacca, and other choke points in order to safeguard energy supplies will be a cooperative challenge for the countries in the Asia-Pacific region.

In respect of dry bulk trade, Australia is the principal supplier of coal to most Asian markets, US and Canada are also important supplies. China is estimated to supply between 15% and 20% of Asia's coal import need by 2001, and Indonesia is emerging as a second major coal exporter.

The 21st Century has been flagged as the century of natural gas, which will play an increasing role in the energy sector for power, fertilisers and petro-chemical industries. For the first time India will be importing natural gas transported as LNG on board ships. The major exporters are Algeria, Libya, UAE, Australia, Brunei, Malaysia and Indonesia, while the importers are Europe, Turkey, Japan, South Korea, Taiwan, India and the US.

Of all the maritime activity, none other is more strategically important then oil, gas and coal. Its denial or disruption can have severe effects on a wide spectrum of activity and hence needs to be addressed according. This dramatic increase in the volume of commerce particularly of energy supply by tankers has sharply raised the implications of disasters in the choke points of Hormuz, Malacca and South China seas on which safe and unrestricted passage Japan, Korea, Taiwan and now China are overtly dependent. For example, during the Iran-Iraq tanker war (1980-88) 543 tankers were attacked and 80 were sunk. The estimated cost of these sinkings, and the increase in hull insurance rates for tankers in the region was in the order of $200 billion, which increased oil prices from $12 to $31.

Energy supplies are both a tool for industrial development as also a weapon to limit the potential of adversaries during conflict. Therefore the direct defence of the global trading system and the security of SLOCs will be the responsibility of regional navies.

UNCLOS and Freedom of the Seas Principle – Creeping Jurisdiction

The freedom of the seas principle today is set out in the *UN Convention on the Law of the Sea* (UNCLOS), which came into force in November 1994. UNCLOS codifies the legal regime governing virtually every aspect in, over or under the seas, contributes to the building of a stable maritime regime, including navigation regime, and makes a significant development in the law of navigation. Counterbalancing the adoption of distended national jurisdiction toward the seas, UNCLOS established three important regimes in securing the freedom of navigation. These are 'innocent passage' through territorial waters, 'transit passage' through international straits, and 'archipelagic sea-lanes passage' through archipelagos, in addition to the freedom of

navigation in the contiguous zone, in the exclusive economic zone, and on the high seas. However, UNCLOS does not resolve all issues and many problems exist. The unresolved issues regarding navigation, which might be potential sources of conflicts include:

- The *innocent passage* through the territorial waters has been a much-debated issue for long in the international community as to whether the right of innocent passage applies to warships. Coastal states have been reluctant to permit passage to warships without prior authorisation or notification. The interpretation of the innocent passage norms becomes an issue in respect of the Java Sea. According to Indonesia's interpretation of these norms, 'submarines must sail on the surface, weapons and surveillance radars must be switched off and aircraft-carriers must keep their planes deck-bound.' But the US does not agree with this interpretation.

- The *transit passage* through international straits is the exercise of the freedom of navigation and overflight solely for the purpose of continuous and expeditious transit in the normal modes of operation utilised by ships and aircraft for such passage. But it has been controversial as to whether submarines are free to transit international straits submerged.

- *Archipelagic sea-lanes passage*. Indonesia recognises the authority of the International Maritime Organisation (IMO) only on matters relating to navigational aids and the safety of shipping—not on the delineation of sea-lanes. The attempt to restrict avenues and methods of routine naval passage through the Indonesian archipelago has been resisted by the US Department of Defense.

- Naval activities in Economic Exclusive Zone (EEZ). The issues are whether foreign navies are free to conduct military manoeuvres within the EEZ without requiring prior notification, or authorisation from the coastal state. And whether a state is free to place non-economic installations, such as submarine detection devices in the EEZ of a foreign state, which do not interfere with the coastal enjoyment of its EEZ rights.

- The legal issues relating to the shipment of nuclear wastes through certain ocean areas such as EEZs, territorial seas and straits. The issue of restricting the passage of vessels carrying nuclear or other hazardous cargoes through the Malacca Strait has been raised by littoral states as observed by the protests over transporting radioactive wastes from Europe to Japan.

SLOC Insecurity

As the sea-lanes in the region are proximate to the Asian landmass, and pass through narrow choke points, threats to SLOCs can be classified into two distinct security groups. The first are the external factors such as piracy, laying mines, military conflicts, territorial conflicts and disputes of some islets; the second are the overlapping naval build up and non-traditional threats such as narco-terrorism, drug trafficking and illegal migration.

There are more than 150 collisions at sea yearly due to poor visibility, radar unserviceability, hull failure, boiler explosions and above all human errors. There were 97 bulk carriers lost during the last four years with 532 casualties. In addition there were 532 incidents of piracy (Malacca Straits, South China Seas and West African coasts having the higher density).

The ongoing naval build-up by regional countries would be another threat to SLOC security. In order to ensure sea-lane security many countries in the region, including a number of medium and small states, are building up their maritime capabilities through acquisition programs. It is estimated that 200-250 major warships were originally planned for procurement by the new century. Furthermore, analysts expect that Asian countries will acquire more than 36 new modern submarines in the next decade. The region will remain as one of the most lucrative markets in the world for defence manufacturers. But it can be said with little exaggeration that the real arms race in Southeast Asia is among the suppliers, rather than the recipients. The simmering down of bipolar deterrence and the expansion of national sovereignty notified by UNCLOS has become a significant motive for smaller regional navies to modernise and expand their navies.

Pollution is another problem. The major concern is the possibility of a catastrophic oil spill. In the heavily trafficked straits such as the Malacca, there are frequent worries about the danger of major oil spills seriously disrupting, or even closing the strait. The forest fires in Indonesia that hazarded visibility in the Malacca Straits is yet another example of environmental pollution.

Regional SLOC Security Cooperation

As the sea-lanes are crucial to the survival and prosperity of the Asia-Pacific countries, the safeguarding of SLOC security is in the interests of all regional countries. Since the world's oceans are indivisible, no country can defend the wide radius of the sea-lanes by itself. Merchant ships are built in one country, owned by another, insured by a third, registered in a forth and crewed by

nationals of a fifth country, thus providing the most basic demonstration of how a nation's maritime security interest extends beyond its own waters. Therefore, cooperative approaches to the safety and protection of sea-lanes needs to be developed:

- First, the understanding of the interpretation of UNCLOS stipulation related to SLOC security needs implementation. In addition countries could reach agreements regarding cooperation for law enforcement on the high seas, guaranteeing the norms of international navigation.

- Settlement of islands' sovereignty disputes and overlapping maritime claims should be put on the national agenda. As an expedient measure, the establishment of joint patrol areas and joint development zones needs to be initiated.

- The ways of guaranteeing oil and gas import transportation security should be given special attention.

- Naval cooperation is of particular importance for SLOC security. Bilateral and multilateral naval cooperation for confidence building measures would reduce uncertainty in the maritime security environment. Concrete cooperative approaches would be worked out for the protection of SLOC, especially ways to deal with those non-conventional threats. They might include humanitarian assistance, search and rescue (SAR), avoidance of incident at sea (INCSEA) agreements, anti-piracy cooperation, cooperative maritime surveillance, and mine-countermeasures. International Fleet Reviews and exercising at sea will bring in more transparency and strengthen the emerging good order at sea among the 'band of brothers' in white.

India's Emerging Conceptual Framework

The dramatic increase in the volume of commerce flowing into and out of East Asia has sharply raised the security value of SLOCs in the Asia-Pacific region. The supply of energy is becoming more critical in East Asia, and it is likely to become a major security concern before too long. In the wake of various threats to the free flow of trade, various maritime cooperative mechanisms are being energised. The proposal for the creation of multilateral maritime regimes is also being proposed which needs to be studied and its ramification clearly understood.

India is actively pursuing the 'Look East' policy. However, the use of the navy in Asia-Pacific politics would have to be scrutinised as the demands on the navy could range from joining a multilateral maritime task force to following

a maritime arms control regime. India has already engaged in maritime cooperation at the bilateral and multilateral levels. However, there is no past precedence of the Indian Navy being a part of any multilateral military setup. These developments pose strong challenges to the policy makers in government and strategic planners.

The subject of SLOC security in the Asia-Pacific region is closely linked to the development of maritime cooperative mechanisms, the growth of the naval arms race and arms control and last but not the least, emerging trends in international relations.

It will be observed that globalisation is splintering the concept of national security and is also generating new markets for both supra-national and sub-national security which needs maritime forces to defend global trade.

Admiral Blair, US Commander-in-Chief Pacific recommended interaction among regional navies, more like commercial transactions between participants, to gain better security as a result of individual transactions—littoral warfare or expeditionary forces merits attention to gain supremacy in 'street fighting'.

However, there is a much greater possibility today for harmonising Indian, US and Australian positions in the Indian Ocean. New Delhi's approach to the Gulf has also acquired greater pragmatism and sophistication, as part of its greater diplomatic activism in the region. It has reached out to countries such as Saudi Arabia, which it had neglected in the past. It is also strengthening ties with traditional friends like Oman and consolidating the relationship with Iran, Myanmar and Vietnam. China, which is a net importer of oil, may also prefer to have secure SLOCs in the immediate future.

The 'Bridges for Friendship' program was demonstrated at the International Fleet Review at Mumbai (15-19 Feb 2001). It was attended by sixteen Naval Chiefs and dozens of flag officers from the twenty-nine nations taking part in the ninety ship review. This reflects the maritime SLOC shift to the Gulf, Hormuz, Malacca, South China Seas and Sea of Japan, which in a manner is the 'silk route' of the post Cold War world. Moreover, the presence of warships from the US, Israel, Iran and Iraq (which are currently in an estrangement mindset) is an indicator of the maritime diplomacy of ship visits. It is also a pointer to the coming of age of the fifty years old modest Indian Navy as a stabilising regional power supported by the US, UK, France and Russia for ensuring cooperative security and safety in the Indian Ocean.

Indo-US Relations

The talks held in Washington and Delhi between India and the US offered a new template for the development of the much-talked about natural alliance between these two large democracies. The broad elements of Indo-US cooperation are:

- First is energy security—India has become one of the world's largest importers of petroleum products. As its economy grows, India's reliance on the Gulf for its energy will increase. The US remains the principal external influence on the worlds petroleum market. Hence India and the US have a common interest in ensuring a steady flow of oil from the Gulf at reasonable prices.

- Secondly, with the volatility of the oil market and the growing dependence of East Pacific and Southeast Asia on the energy resources of the Gulf, the safety and security of the sea-lanes between the Gulf and energy consuming nations has become a vital necessity. India, which straddles the SLOCs and the choke points of the Straits of Malacca and Hormuz and the US being the principal seapower, need to cooperate to keep SLOCs safe and secure by promoting political stability and commercial viability.

- Finally India, the US and ASEAN countries have a major interest in promoting political stability in a region that is threatened by fundamentalism, cross border terrorism and drug trafficking from both the Golden Crescent and the Golden Triangle. Equally important for India is the reality that dominance in the Gulf, which is home to a large number of Indian expatriate workers and a big market for Indian goods and services, by a distant power like the US may be preferable to the exercise of hegemony by one of India's neighbours.

India on the other hand has discarded its old diplomatic baggage on the 'India zone as a Zone of Peace'. It is one thing to demand that outsiders get out of the Indian Ocean and another to create a security structure that addresses the concern of the weaker states especially after 11 September 2001. India was almost the first country to join the international coalition led by the US against terrorism.

Indo-Australian Relations

President Nelson Mandela gave a kickstart to the Indian Ocean Rim—Association for Regional Cooperation (IOR-ARC) during his state visit to Delhi in January 1995, where he declared that

> 'the natural urge of the facts of history and geography that Nehru spoke of should broaden itself to include exploring the concept of an Indian

Ocean Rim for socioeconomic cooperation and to improve the lot of the developing nations in multilateral institutions such as the United Nations, Commonwealth and the Non-Aligned Movement.'

An inter-governmental conference was consequently held in Port Louis from 29-31 March 1995 and was attended by seven Indian Ocean Rim (IOR) countries—South Africa, Australia, India, Mauritius, Kenya, Singapore and Oman (M-7). In the spirit of transparent regionalism, it was agreed to promote sustained and balanced growth of the peoples of the participating countries with clear linkages to human resource and trading institutions. The need to formulate and implement programs of economic cooperation including *inter alia* the expansion of trade, tourism, direct investment, scientific and technological exchanges was spelt out along with the necessity to lower barriers towards the free and enhanced flow of goods, services, investment and technology within the region. It was also agreed to encourage the close interaction of trade and industry with academic institutions to strengthen cooperation and dialogue among members in international forums on global economic issues. And lastly, there was unanimity to build and expand mutually beneficial cooperation through a consensus-based evolutionary and non-intrusive approach.

The Track II discussions as proposed by Australia and India, nevertheless, got off to a healthy start with 13 research projects being approved by the Indian Ocean Research Network (IORN) as well as the formation of the Indian Ocean Rim Consultation Business Network (IORCBN). Funding for the Indian Ocean Centre at Perth as a Track II dialogue was later withdrawn after the elections. It is suggested that both India and Australia resurrect the IOR-ARC and ensure that the SLOCs for movement of shipping are secured which will be of significant advantage to Indian Ocean economies.

Looking to the future, the object is to promote better understanding in the key areas of strategic and defence planning as well as South Asian regional security including nuclear and non traditional security issues in the wider Asia-Pacific region with emphasis on bilateral security matters between India and Australia:

- The need for a continuing Indian Ocean security strategic dialogue between the two Governments.

- Closer cooperation in promoting multilateral security forums by:
    - Confidence building measures (CBM)
    - Conflict avoidance measures (CAM)

- – Trust building measures (TBM)

- – Conflict resolution measures (CRM)

- – Confidence building and security measures (CBSM)

- – Tension reduction measures (TRM)

- Enhanced contact between respective armed forces especially in the maritime area and for peacekeeping requirements. In Australia, it would be seen that defence and national security agencies are still resisting a larger role for outside agencies.

- Cooperation on a range of transnational security issues including environmental problems such as deforestation, lack of water, and disaster management.

- Closer maritime cooperation between Australia and India to promote stability, safety at sea and a cleaner Indian Ocean for ensuring the SLOCs for scarcer energy supplies.

- Bilateral relationships to enhance trade, involvement and other economic interaction.

- Joint maritime cooperation for search and rescue and anti-piracy operations.

- Problems of illegal immigration and people trafficking.

- Share information on all aspects of security planning and law enforcement intelligence.

- Joint production and development of military hardware and spares as negotiated by both countries which is a quick fix economic glue for both countries.

Conclusion

Maritime security is therefore linked to maritime cooperation such as an interlocking regional mechanism from the Indian Ocean to the Pacific with regional navies such as India, Japan and Australia playing their rightful role.

An articulate maritime analyst stated at the International symposium in Mumbai that Regional Power is like sex appeal. No matter how often India admires herself in the mirror she will not be regarded as a regional maritime power until she accepts regional responsibility. She cannot merely be content with regional interests and hence must demonstrate her capacity and capability to export strategic security for the stability of the region.

Moreover, if globalisation succeeds in a democratic country with a free market economy where poverty and illiteracy are major roadblocks, then it will be a global pattern benefiting the majority of developing countries. US National Security Adviser, Condoleezza Rice emphasised 'India's potential as 'a democratic stabilising force in South Asia and India's role in economic development as it becomes a major economic player'. There is nonetheless a wide chasm between the US Department of Defense's view of security and US industries vision of business opportunities on the populated Sub-Continent.

Hence maritime stability for safer and secure sea-lanes is a total response of a nation to its surrounding environment and is therefore subordinate to economic, budgetary and developmental interests. It must perforce be in harmony with the mindset of the participants in the Asia-Pacific region.

Part | 2

Safeguarding Seaborne Trade

Archipelagic Sea-lanes and Transit Passage Through Straits: Shared Responsibilities are Essential to Implementation | 5

Jay L Batongbacal

This paper shall present an overview of the outstanding concerns of archipelagic states regarding the right of archipelagic sea-lanes passage, and deal with the parallel issues with strait states as regards the right of transit passage. These issues and concerns are primarily implementation issues for the Law of the Sea Convention, and possible solutions to these issues will be recommended. Hopefully, the international community will gain a closer understanding of the problems of archipelagic and coastal states, and thereafter join with the latter in seeking ways and means of implementing the Convention in a manner most fair and acceptable to all concerned.

In the Southeast Asian context, archipelagic sea-lanes and straits for international navigation share common characteristics, they are mostly located within or astride geographic archipelagoes, and are commonly inhabited with large populations living in less than ideal socioeconomic conditions. The Philippines, as a compact archipelago, is a useful reference point as it represents an extreme in the possible characteristic conditions bordering archipelagic waters and straits for international navigation. From this extremity we may easily derive the possible issues that will be involved in the implementation of Part III and IV of the Convention now and into the foreseeable future.

Special Characteristics of an Archipelagic Environment

The physical environment of an archipelago is an extremely complex system, even more complex than the coastal zone of continental states that have been the subject of much scientific research for the past several decades. The geographic fragmentation of islands and enclosed waters creates extremely unique and disparate conditions in so many areas, due to the very diverse combinations of environmental factors that can exist in any given area. Physically, the distribution of natural resources such as minerals is uneven, and there is a wide range of resources that can be found in different islands of the archipelago.

More importantly, islands are unique ecosystems in themselves, research on islands has been the basis of much of our understanding of ecological and biological processes such as evolution and speciation, competition and character displacement, and island biogeography.[1] High biodiversity and endemicity are most likely to occur on islands.[2] Indeed, the Philippines ranks sixth among the biodiversity 'hotspots' of the world (second in Southeast Asia), with about 40% of vertebrate species being unique to certain islands.[3] There is an equally high endemicity in fish and invertebrates in lakes and river systems,[4] while the biodiversity profile of the open seas is still unknown.

The islands also create enclosed and semi-enclosed spaces of marine waters, which also tend to host unique conditions and therefore also make it likely that their environments are even more biologically diverse. The marine waters serve as links between the islands in terms of chemical and biological transfers, in addition to the physical effects of flowing waters. For example, the climate patterns on islands are determined more by the conditions of the surrounding sea than by any of their surface features.[5] Thus, the land and water components of an archipelago are also highly interactive.

But because islands and enclosed waters also represent limited geographic space, each unique area can be considered as a very fragile environment easily susceptible to changes in environmental conditions. The carrying capacity for various activities is much more limited, and terrestrial flora and fauna are unable to expand due to the lack of land area. Marine flora and fauna, on the other hand, are even more vulnerable to changes in the delicate ecological balance that is commonly found in marine ecosystems.

Overlaid on the physical environment described above is Philippine society, which has acquired equally distinct 'archipelagic' characteristics. The Filipino population is about 76 million, but the total land area of the country is only 300,000km^2. This means a population density averaging about 280 people per km^2. Of 7,107 islands, only about 470 are bigger than 1.6 km^2 in area. About 60% of the protein intake of Filipinos come from fish and other aquatic resources directly taken from the sea not only by commercial fishing vessels, but also by artisanal fishermen.

Water: A Barrier and Link

The marine component of the archipelago acts as both a barrier and link. Water enables easy access to all the islands for both man and animal, whether of domestic or foreign origin. Round and within the perimeters of the archipelago, a vessel may be able to access any of the over 600 government ports and 340 private ports of entry that form part of the domestic distribution chain for goods and people across the nation.[6]

This situation makes it very difficult to implement the traditional control valves of government for interaction with foreign states. Customs, immigration, quarantine, defence and security procedures are usually focused around a few distinct ports of call, but in an archipelagic context these are practically impossible to effectively distribute without a means for limiting the terms of access into the archipelagic waters. Thus, smuggling and illegal migration have been seen as problem for the archipelago for years, especially in the areas adjacent to other states.

The interceding waters also act as a barrier to management efforts on a national scale. The logistical requirements for any system of managing the archipelago are compounded by the need to move through a mixed environment setting of both land and sea. The offices of government are divided into thirteen administrative regions spread among the islands, and within each island each agency can essentially work autonomously of the central office.

The terrestrial boundaries of islands effectively concentrate land-based environmental impacts within, while the islands themselves also create enclosures around marine environmental conditions. This containment effect magnifies the actual and potential impacts of environmental conditions, and changes to those conditions, upon the fragile and sensitive human and non-human habitats in the archipelago. Water can transmit or convey adverse impacts like pollution easily and rapidly across large distances, and enclosures increase the possibility that effects may accumulate over time. Such impacts are immediately and directly felt by the local population, most of whom reside in the coastal areas of the archipelago. The island setting limits the mobility of and available space for these populations, and thus they must bear the brunt of any adverse ecological changes.

Why the Philippines Equates Archipelagic Waters with Internal Waters

Historically, the Philippines has always treated archipelagic waters as internal waters, even though the legal and official documentation apparently describes them as more akin to territorial waters. Although its signature and ratification of the Law of the Sea Convention should be deemed to have settled the legal debate over definitions of terms, the Filipino perspective must always necessarily begin from the same foundations that have guided its positions in the Law of the Sea negotiations. There is no question that the Philippines intends to comply with its obligations and duties under the Convention, however, it is how these obligations and duties may best be carried out while protecting the interests of the country in light of its unique characteristics that are taking

longer to determine. This historically grounded perspective is actually founded on very practical considerations, and will likely colour the manner and means by which the Philippines will implement Part IV of the Convention.

The archipelagic waters have always been viewed as highways of communication and transportation between the islands that are essential to bringing the disparate people and local territories together under one state.[7] Thus the preservation of these waters as extensions of the land territory and protection from foreign intrusion has been equated with the preservation of national security. To the Filipino mindset, the marine waters are no different from the land, and therefore the management of those waters should be closer to the internal water regime than to the territorial sea regime.

The local use of waters is extensive for fisheries and transportation. More than a million passenger or cargo boats and artisanal fishing boats take to sea on a daily basis,[8] most of which are small wooden-hulled vessels. Up to 98% of domestic trade in goods is carried on by seaborne transportation, not only through large cargo vessels, but even through the small *banca* (outrigger boats) that carry goods and people between islands, villages, and municipalities. People move across the islands unprotected in open pumpboats, which are able to reach practically any point of the archipelago without need for very expensive port infrastructure. Coastal villages are directly dependent on the use of the marine waters for subsistence, throughout the year. Only the typhoon seasons prevent artisanal fishers from daily seeking a major portion of their food and livelihood from the ocean.

Aside from continuous use, much of the archipelagic waters are also perceived as internal waters due to their proximity to the coastal settlement areas. Visual perceptions are an important element in attitudes about the sea, and the fact that most of the archipelagic waters are always directly within sight of a large segment of the population allows them to be seen as integral parts of the land territory. Any activities within the visual field of the people, especially those undertaken by foreign vessels, are naturally expected to be subject to the government's full control.

A number of maritime threats plague the marine environment. Geographically, the Philippines is located in the typhoon belt, which makes it prone to maritime accidents. Vessel-source pollution incidents occur frequently, many of which are classified as mystery spills that are likely to have been due to operational discharges. Destructive fishing methods such as dynamite and cyanide fishing are a major problem, and the remaining coral ecosystems are under continuing threat. Mangrove forests have been rapidly depleted in the past decades, while

foreign fishing boats are regularly reported to have been found encroaching not only in the islands in the South China Sea, but also within the territorial sea of the main archipelago. Incidents of piracy, smuggling, and drug trafficking are also regularly faced by law enforcement agencies.[9]

Activities of Commercial Vessels

Innocent passage within archipelagic waters has been taken as granted even in the formative years of the archipelagic doctrine. The existence of the right does not present any greater or lesser threat to the exercise of Philippine sovereignty over archipelagic waters than before. The freedom of movement, at least of commercial vessels, through Philippine waters and straits has always been respected.[10] But, as with other nations regarding commercial vessel activities within their territorial seas, archipelagic states are concerned with issues of regulation of vessel-source pollution, regulation of access to ports and harbours, and opportunities for unauthorised resource use within archipelagic waters.

On vessel-source pollution, concern has been raised over the legal anomaly (attributed to a mistake in drafting) of the archipelagic state having less enforcement jurisdiction over foreign vessels in matters of pollution than a non-archipelagic state in its territorial sea, or the archipelagic state itself in territorial waters adjacent to archipelagic waters.[11] Apprehensions have been raised over whether this means that an archipelagic state has less rights and competencies over pollution matters within archipelagic waters. This is particularly concerning considering that regulation of vessel source pollution is an over-riding concern in the management of maritime traffic.

However, the absence of explicit jurisdictional competencies in favour of the archipelagic states with respect to archipelagic waters is actually unnecessary, since the starting point for determining such competencies is the sovereignty of the archipelagic states. The rights, duties and obligations under Part IV must be interpreted to elucidate the specific points that the archipelagic states concede to the international community. In exchange, everything else outside of the terms and conditions of Part IV must be deemed to have been recognised by the international community as being the prerogative of the archipelagic state by virtue of the former recognition of sovereignty over archipelagic waters.

Environmental management imperatives require closer attention to be paid to maritime traffic within the fragile archipelagic waters. Marine environmental protection is especially recognised as a tool for ensuring the sustainability of the vital coastal habitats of fish and aquatic resources. At the national level, the National Integrated Protected Areas System Act authorises the government

to establish protected seascapes.[12] At the local level, the 1998 Philippine Fisheries Code requires the cities and municipalities to set aside at least 15% of their municipal waters for purposes of fish refuges and sanctuaries as part and parcel of basic fisheries management.[13]

Of greater concern is the interaction between foreign vessels and the inter-island domestic shipping activities. On one hand, the danger of collision is quite real in the busy waters of the country. One of the worst maritime disasters in the world involved a collision between the MV *Do–a Paz* and MT *Vector*, a foreign tanker off the coast of Mindoro in 1987, resulted in the death of more than 4,000 people. In 1994, 140 people died when the MV Ferry *Cebu City* collided with a foreign oil tanker. An inordinately large number of maritime disasters has been recorded in Philippine waters for decades.[14]

In the past, these disasters have been attributed, among others, to weaknesses in regulation, lack of adequate manpower for ensuring compliance with safety rules and regulations, absence of facilities and aids to navigation, and lack of an appropriate vessel traffic management system. The government continually attempts to improve the safety and efficiency record of the maritime industry, but the resource requirements for managing the enormous water area of the country is an extremely difficult challenge.

Illegal fishing and other unauthorised marine resource uses within archipelagic waters is another challenge. Although the Convention mandates the archipelagic states to give due regard to or recognise traditional fishing rights and other legitimate activities of an adjacent state within the archipelagic waters, such uses must be subject to bilateral agreements. To date, the Philippines has no such bilateral agreements on account of a constitutional provision reserving the use and enjoyment of the marine wealth of the country exclusively to Filipino citizens.[15] Reports of foreign vessel intrusion into Philippine waters have become more and more frequent, especially in the last decade—this led to the inclusion of a provision against poaching by foreign vessels in the 1998 Fisheries Code.[16]

Military Vessels and Aircraft

Perhaps the most highly contentious issue is the passage of foreign military vessels within archipelagic waters. One reason why this issue is considered most significant is the fact that most archipelagic waters of the Philippines which are used by foreign vessels are also astride the major population centres of the country. And most archipelagic waters that have been used by foreign vessels are within the visual range of the coast. Thus, the local citizens are able to see clearly the kind of vessels that pass through the waters, and

certainly unannounced naval vessels with their obvious weaponry will instantly cause concern among the people. The mere presence of military vessels, in the Philippine setting, serves a political purpose, especially in times of tensions or hostilities.

Submarine navigation in the 'normal mode' is a particular safety concern. The waters are teeming with the activities of fishing and cargo boats, fishing nets and gears of all types, and fish aggregating devices. These form hazards to shipping both on the surface and under the water. Any submarine navigating under water in archipelagic waters runs the risk of getting caught on the fishing nets or fish aggregating devices that are scattered by fisher-folk in deep water. And the recent *Ehime Maru* tragedy is not an isolated incident, the *Washington Post* reported on 12 July 1989 that from 1983 to 1989, the submarines of the USN had been involved in 42 collisions in various parts of the world. The likelihood of collision is even greater in Philippine waters, considering the concentration of commercial and fishing vessels.

Similarities between Archipelagic States and Strait States

In Southeast Asia many of the most important straits used for international navigation such as the straits of Malacca and Singapore are actually straits located within or astride geographic archipelagoes. The environmental and social conditions surrounding these waters and straits are basically similar. Straits bordered by more than one country have the added difficulty of being subject to the sovereignty and jurisdiction of more than one country, necessitating international cooperation and coordination. Not only the bordering states are obligated to engage in cooperation in order to maintain the safety of international navigation in the straits, user states also have the duty under Article 43 of the Convention to cooperate.

Considering the more confined geographic boundaries of straits, the concerns of archipelagic states regarding fisheries resources, and access through the state's borders are not similarly shared by strait states. What has taken prominence, however, is the issue of maintenance of safety of navigation and protection of the marine environment within straits for international navigation. This is on account of the burdens upon the strait states imposed by increased maritime traffic, higher vessel density and use brings with the associated risks of vessel collisions and other maritime casualties in the constrained area of the strait. The costs associated with maintaining safety of navigation include the logistical requirements for navigational aids, monitoring and surveillance, hazard prevention, search and rescue, and environmental costs arising from contingencies and impacts. In recent years, the rise in piracy

and sea robbery incidents has also entailed more stringent law enforcement patrols. For developing nations, these costs are frequently very high compared to the costs of other goods and services that must be provided to the national population that impact directly on their welfare. Thus, Malaysia and Indonesia have attempted to seek the assistance and cooperation of user states in sharing or absorbing these costs. Otherwise, they will unable to provide the full range of services required to properly manage and maintain the safety of navigation within the area of the straits.

Subtle Distinctions between Archipelagic Sea-Lanes and Transit Passage

Straits within archipelagic waters are not subject to the regime of straits for international navigation. As these straits do not allow international navigation 'between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone,' a vital characteristic of straits under Part III.[17] An interpretation that would make both Part III and Part IV regimes applicable to straits within archipelagic waters at the same time would not be correct, because if there is no difference between the two regimes, then questions of good or bad faith in negotiations may be raised. It is clear, however, that certain conditions must be present in order to engage the Part IV regime, chief among those is the delineation of archipelagic baselines.

Both transit passage and archipelagic sea-lanes passage share three common elements:

- non-suspendability of passage
- right of navigation in normal mode
- right of overflight

While admittedly sharing such characteristics, it must be made clear, however, that the right of archipelagic sea-lanes passage and the right of transit passage are distinct legal regimes, and there are subtle differences in those regimes that are particularly important to an archipelagic state.

Sovereignty over Archipelagic Waters

It must be emphasised that the archipelagic waters are under the sovereignty of the archipelagic states. Questions are usually raised about the status of the waters on either side, of the axis lines of the archipelagic sea-lanes passage, since they are not internal waters because state sovereignty is not complete by being subject to the provisions of Part IV; and neither are the waters exactly like territorial waters because the right of passage cannot be suspended. On

the other hand, neither can the same waters be high seas, since vessels within archipelagic waters do not enjoy full freedom of navigation and must be traversing the waters in normal mode only for the sole purpose of continuous, expeditious, and unobstructed transit.

Articles 49(1) and 49(2) of Part IV clearly state that the archipelagic waters are subject to the sovereignty of the archipelagic states. Maintenance of sovereignty in all respects other than those expressly stated in Part IV, presumes the primary jurisdiction of the archipelagic states even over waters subject to the right of archipelagic sea-lanes passage. The Convention does not speak of a distinct maritime zone within archipelagic waters equivalent to the width of the sea-lane; Article 53 states only that the archipelagic states may determine, by means of axis lines, routes in which the special right of archipelagic sea-lanes passage shall be recognised. While distinct maritime zones connote at least a determinate two-dimensional space, axis lines indicate ideal trajectories. Therefore, it is clear that Part IV does not provide for the cession of strips of archipelagic waters to the control of the international community or any of its members, it is not a special corridor in the seas with distinct characteristics. The terms of the Convention at most describe a kind of easement in favour of transient foreign ships and aircraft for the purpose of expediting passage. As long as such ships and aircraft are permitted to exercise continuous and expeditious passage along these trajectories, the archipelagic state is entitled to take any other measures necessary to protect its sovereignty from passage which may be deemed prejudicial to the peace, good order, and security of the state.[18]

The express recognition and reinforcement of the archipelagic states' sovereignty over archipelagic waters, including the sea-lanes, and all resources contained within the archipelagic baselines are important, also because without archipelagic waters, the waters beyond twelve nautical miles of the coastline may be only subject to the regimes of the contiguous zone and exclusive economic zone. On account of the recognition of the archipelagic, state's sovereignty over archipelagic waters, it is reasonable to assume that other than the concession of passage rights to foreign vessels under Part IV, all other powers and jurisdictions on matters other than those provided in Part IV remain within the exclusive competence of the archipelagic state. There can be no question, for example, as to the power of the archipelagic state to create marine protected areas within archipelagic waters, or exclusion areas for so long as such do not result in impediment to passage through the archipelagic waters. In case of doubt as to whether the archipelagic state is entitled to exercise a particular right or jurisdiction, the recognition of sovereignty of

the archipelagic state over the waters places the rules of interpretation in favour of the archipelagic state.

'Rights' Distinct from 'Freedoms'. Part IV speaks of a 'right' of navigation and overflight,[19] while Part III confers a 'freedom' of navigation and overflight.[20] This implies that, the right of archipelagic sea-lanes passage is a presumed grant by the archipelagic states of certain rights to foreign ships, therefore, the modalities of exercising such rights are subject to the exclusive competence of the archipelagic states so long as the minimum condition of non-impairment of passage is maintained. Freedom of navigation is not the foundation for determining the extent of rights and duties of foreign vessels within archipelagic waters, but rather the sovereignty of the archipelagic state, which is obliged under international law only to permit continuous, expeditious, and unobstructed passage, anything more remains subject to the sound discretion of the archipelagic state.

Sea-Lanes Where the Right may be Exercised. While transit passage is enjoyed as a matter of right through straits used for international navigation without geographic qualification,[21] the right of archipelagic sea-lanes passage is enjoyed only through designated sea-lanes.[22] While this may not be much of a distinction when considering single-strait situations, it makes a very great difference in the Philippine geographic situation where there are multiple straits, which may be linked by any combination of sea-lanes. This allows the Philippines far greater flexibility in the regulation of passage through archipelagic waters, certainly far more than in a single-strait situation contemplated by Part III. Outside of the designated sea-lanes but within the archipelagic waters, the regime of innocent passage applies, upon which the archipelagic state may exercise its rights, duties, and obligations described in Part II, Section 3 of the Convention.

Identification of Normal Passage Routes. While ships exercising the right of archipelagic sea-lanes passage are expected to exercise the right in 'normal passage routes for international navigation', and in the absence of designated archipelagic sea-lanes they may exercise the right in 'all routes normally used for international navigation', ships exercising the right of transit passage are not subject to such a qualification.[23] This distinction is important to the Philippines because of the existence of an inter-island route network for domestic transportation that overlaps with the international routes that traverse the heart of the archipelago. The lack of a definition in the Convention of the term 'normal passage route' and 'route normally used' for international navigation combined with the archipelagic states' primary and exclusive

competence over prescribing the terms and conditions under which the right of archipelagic sea-lanes passage is to be exercised, allows the Philippines an amount of discretion in determining which route should be subject to the right of archipelagic sea-lanes passage particularly if the route is actually an inter-island route.

Guides For Locating Passage Routes. Whereas the route through which the right of transit passage may be exercised is not subject to limitation, the archipelagic sea-lanes are established by axis lines that can keep ships and aircraft from passing too close to the coast of the archipelagic states, and while theoretically a ship or aircraft may deviate to a maximum of twenty-five nautical miles to either side of the axis line, they cannot come closer to the coast than 10% of the width between the nearest points of the bordering coastlines.[24] In the Philippine situation, this difference allows it a greater degree of flexibility in protecting the coasts of the islands adjacent to the archipelagic sea-lanes from intrusion. Rather than having 50-mile-wide air and water corridors traversing the archipelago, the Philippines may reasonably limit the physical extent of archipelagic waters through which the right of archipelagic sea-lanes passage may be recognised on the basis of practical and reasonable considerations of vessel and aircraft safety. The 25-mile deviation appears to be only an allowance for navigational purposes, which is necessary especially to avoid collisions of ships or aircraft, and does not prevent the archipelagic states from prescribing a shorter distance in view of the situation.

Conclusions

It must be conceded that a certain measure of control is necessary in order to protect the legitimate interests of the coastal (archipelagic and strait) states from the adverse effects of the use of their waters by the international community. These states cannot ignore the responsibilities of managing the archipelagic sea-lanes and straits used for international navigation, because to do so would increase their own risks and only magnify the impacts of intensive maritime use. The preservation of freedom of navigation to the greatest extent possible within the water areas of these states entails costs on their part, both conceptual (in terms of cession of jurisdiction) and actual (in terms of logistical and administrative costs). The international community, on the other hand, which benefits from the use of the waters of the archipelagic and straits states have a moral obligation to compensate these conceptual and actual costs either directly or indirectly. The interests of the international community have already been fleshed out, embodied, and protected in the Law of the Sea Convention. Now the task at hand is to in turn respect and protect the legitimate interests of the coastal states affected.

The recognition of the right of transit passage through straits used for international navigation, and of the right of archipelagic sea-lanes passage through archipelagic waters, were among the most contentious issues during the negotiation of the Convention. They were not clearly established under customary international law prior to the signing of the Convention, and the right of passage bearing the closest relevance to either was that invoked under article 16(4) of the Territorial Sea Convention which provide for non-suspendable innocent passage through straits used for international navigation.[25] The contest for these particular passage rights were specially long and drawn out. For the archipelagic states it represented the culmination of battle for an idea that first saw light in the early 1950s, while strait states may have viewed it to be an expansion of the norm acknowledged in the 1949 Corfu Channel Case.

With the entry into force of the Convention and its near-universal recognition by the world community, the issue of recognition of such rights has been settled. But now that states are faced with the practical problems of the implementation of the Convention, it is clear that the settlement of the legal issue of recognition of the right does not likewise settle the practical issues of its exercise. Archipelagic states are now faced with basically the same management issues that they had anticipated years ago and which they had vainly hoped would be resolved by recognition of a high degree of control over the waters. Coastal states bordering straits used for international navigation have found that compliance with their obligations have brought about operational needs and necessities requiring the cooperation of the international community.

In order to adequately respond to the issues at hand, and give due regard to the interests of all parties concerned, it is apparent that both the international community and the archipelagic and strait states must share respective responsibilities in the maintenance of the navigational regimes that they agreed to under Parts III and IV of the Convention. The coastal states bear the responsibilities of maintaining the archipelagic waters and straits open to international maritime trade, and in turn, the user states bear the responsibilities of exercising their navigational rights in a manner that does not adversely impact upon the marine environment of the coastal states. All of them must cooperate and contribute to each other's efforts in that regard, as the discharge of those respective responsibilities, also entails the recognition of duties and obligations. Without the recognition of shared responsibilities, the coastal states shall be placed in the most unfair and disadvantageous position of helplessly absorbing all of the adverse impacts of the international community's use of their waters. This can only lead these states to impose a more restrictive regime or, in the extreme case, closure of those needed routes in order to protect the interests of their constituencies. Certainly, this is a situation that the world community did not intend and should avoid.

Notes

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21 United Nations, Articles 37-38.

22 ibid, Article 53(1).

23 B. Kwiatkowska, op cit, pp. 47-48.

24 United Nations, Article 53(5); B. Kwiatkowska, op cit, p. 51.

25 See R.R. Churchill and A.V. Lowe, pp. 87-90.

Re-routing Options and Consequences | 6

Rear Admiral Kazumine Akimoto, JMSDF

Approximately 4.4 million years ago in Africa, when the apes first ventured out of the forest onto the plains and began to walk on two legs, the ancestors of the human race were born. The great journey of humans as they searched for safer, more fertile places to live reached as far as the southernmost tip of the American continent. In time, man also ventured further afield in search of the fruits of the sea eventually trading with others across the seas—this saw the emergence of a seafaring population.

A long time ago in Southeast Asia, the area of sea now dotted with many small islands was once a single land mass called Sundaland. When, 20000 years ago, global warming melted the ice caps in the Northern Hemisphere and raised the level of the earth's oceans, parts of Sundaland were submerged, creating islands. At this point, people began to cross the sea by boat in droves, some of whom settled in Japan having reached it on the Kuroshio Current. This is the archaeological hypothesis for the origins of the maritime peoples of the Asia-Pacific region.

The very beginnings of civilisation can be found in the history of the relationship between humanity and the sea. As traders travelled, using various sea routes, different ethnic groups met, different cultures mingled, and the world became one. Those ethnic groups and nations, which established maritime transportation and conducted trade on the oceans, became economically prosperous. The existence of these routes on the sea, or sea-lanes, was founded on the principle of free passage.

Today, humanity has entered a new era in its dealings with the sea. The end of the Cold War has eliminated the previous balance of sea power. The globalisation of economic activity is breaking down national borders in the shipping industry, and the legal structures on maritime exploitation are changing as a result of the *UN Convention on the Law of the Sea* (UNCLOS). A paradigm shift in the maritime world is taking place leaving a strong impact on the sea-lanes. Like a spider spinning a web in mid-air, the sea lines of communication (SLOC) form a web that, when integrated with the various distribution systems, forms an organic complex that props up the logistic support systems that are so

essential to the world economy. The term *Consolidated Ocean Web of Communication* (COWOC) would perhaps be more appropriate to describe this new world.

In this paper, the seas surrounding both Southeast Asia and Southwest Asia (the sea belt located at the Southeast Asia edge of the Eurasian Continent) is called *the Eurasian maritime world*.[1] The objectives of this paper are to examine the shipping industry in that area, to obtain a clear understanding of its weakness from a security perspective, and to provide references that will help us to look at ways to improve the stability of sea-lanes.

Sea-lanes of the Eurasian maritime world and their points of convergence and focus

The sea-lanes in the Eurasian maritime world can be roughly divided into the following three areas:

- Arabic coast line – Indian Ocean – Southeast Asian sea area – Northeast Asian sea area

- Oceania sea area – Southeast Asian sea area – Northeast Asian sea area

- Africa – Indian Sea – Oceania sea area – Northeast Asian sea area

Sea-lanes are like the stems of a lotus plant: in the open seas outside the port of departure, these lanes gradually become wider, then converge at bottlenecks such as straits. After passing through the bottleneck, they diverge once more, before finally focusing in on other ports to collect cargo. After the Cold War, the dangers at these points of convergence and focus became apparent, and these dangers became recognised as threats to sea-lanes.

The points of convergence and focus such as straits and other bottlenecks are sometimes described as chokepoints,[2] while hub ports, which are used as distribution centres, are called focal points.[3] These terms have been adopted for this paper, which will provide a picture of the geographic positions of both the chokepoints and focal points of the sea-lanes in the Eurasian maritime world.

Chokepoints

There are five chokepoints in the Eurasian maritime world:

- Malacca/Singapore Strait

- Sunda Strait

- Lombok and Makassar Straits

- South China Sea

- East China Sea

In some cases, the Sunda Strait and the Lombok and Makassar Straits should be considered together as the Indonesian archipelagic waters. Of these five chokepoints, the South China Sea refers to the area surrounded by the east coast of Vietnam, the Spratly Islands, the Bashi/Luzon Strait and Hainan Island. The East China Sea is the sea area bordered by Taiwan, the Diaoyu/Senkaku Islands, Kyushu, the Tsushima Strait, Cheju Island, and the east-coast of China, south of Shanghai. It may be more appropriate to refer to all of these locations as seas or waters, with the exception of the Malaca/Singapore Strait, rather than points, but given their strategic importance and their instability as points of convergence, they have been classified as chokepoints.[4]

Hub Ports

Hub ports, which have developed as maritime distribution terminals, act as distribution centres linked to land and air transport, and as such play a central role in the logistic support systems that prop up the global economy. The following four hub ports will be examined:[5]

- Singapore

- Hong Kong

- Kaohsing

- Pusan

The Current Condition of World Shipping

The world shipping market is broadly divided into two categories—bulk shipping and container shipping.

A bulk carrier is a ship used to transport crude oil, iron ore and other bulk cargoes in large volumes. The cargoes are broadly divided into two categories— dry cargo and liquid cargo. Dry cargo includes iron ore, coal, grain and other, minor bulk cargoes such as steel and timber. The total volume of dry cargo transported in 2000 in the world shipping market was 1901.1 million tons, and the total tonnage used to carry these cargoes was 257.9 million tons (DWT). The total volume of liquid cargo (crude oil) transported around the world in 2000 was 1762.8 million tons, and the total tonnage used to ship it was 234.3 million tons.

According to estimates made by the research group of Nippon Yusen Co. Ltd., the total tonnage of bulk carriers required to meet the global dry cargo demand of 1901.1 million tons would be 247.3 million tons. The total tonnage of crude tankers required to meet the global demand for crude oil in the world would be 223.6 million tons.[6]

These estimates show that there is a surplus of 10.6 million tons of dry cargo tonnage and a surplus of 10.7 million tons of crude tanker tonnage in the world's bulk shipping market. Simply put, there is an over-supply of bulk carriers. *Table 1* shows the volume of maritime cargoes and the necessary tonnage in major bulk shipping.[7]

Table 1 – Major Bulk Shipping (2000)

	Volume of Maritime Cargoes ('000'000 tons)	Required Tonnage ('000'000 tons)
Iron Ore	448.0	65.9
Coal	518.9	52.8
Grain	230.9	32.6
Crude Oil	1,762.8	223.6

Source: *Zusetsu Kaiun Shikyo no Kaiko to Tenbo*, compiled by Nippon Yusen Research Group (Japan Shipping Exchange, Inc, July 2001).

Container ships currently account for approximately 40-50% of all voyages by liners that regularly ship cargoes of industrial parts and finished products. As of the beginning of 2001, the world's commercial container fleet numbered some 3800 vessels and handled 5.3 million TEU of cargo.[8]

Recently, the trend has been to build bigger container ships. Whereas most container ships in the 1990s were less than 5000 TEU, most ships today are between 5000 and 7000 TEU. In 1999, the largest ship ever built was commissioned, with a capacity of 9800 TEUs. It is predicted that we will eventually see ships with capacities of 12,000 to 18,000 TEU, which will inevitably mean that container ports will have to become mega-ports if they are to handle such huge vessels.

Hub Ports

With the growing trend towards container ships in the liner sector of the shipping market, faster distribution and processing of larger volumes has become possible. This has led to more manufacturing of products in multiple countries,

spurring on the development of the global economy. The hub ports that handle container ships are gradually becoming more systematised. Moreover, as networking on a global scale develops between hub ports, the feeder service networks that link the hub ports with regional ports and land and air transport systems are gradually taking on the shape of hub and spokes. In this process, shipping must be seen not simply as a system for sea transport, but as an essential sub-system of the Total Logistic Support System that props up the global economy, similarly to computer networks. In this way, the SLOC are gradually taking on characteristics that may be better served by the description COWOC.

Some observers have predicted that by 2010, container shipping will account for 70% of maritime transportation. Today, it is essential that the liner market maintain firm distribution systems. Just in time will become even more important as bigger and bigger container ships are built for the liner market. Any disruption of distribution systems, no matter how temporary, could have a devastating effect on economic activity.

Table 2 – Cargo Volumes Handled by Four Major Hub Ports
of Eurasian Maritime World

Hub Port	Cargo Volumes Handled
Singapore	1.7 million tons
Hong Kong	1.7 million tons
Pusan	7.0 million tons
Kaohsing	6.5 million tons

Source: *Containerisation International* (March 2001)

Threats at Chokepoints and Hub Ports

The maritime world has experienced many paradigm shifts throughout its history. Today, the paradigm of the sea is being altered greatly by the following five changes:

- the disappearance of the power balance on the sea and changes to naval strategies

- the increasingly borderless nature of the shipping world, due to the globalisation of economic activity

- changes to the basic structures of maritime laws due to the UN Convention on the Law of the Sea

- the shift in the ocean regime from a global unipolar structure to a regional multipolar structure

- the diversification of interested parties concerned with the sea

These five changes have caused the following new forms of instability:

- disputes between states over sovereign rights to resources or the establishment of national-jurisdiction waters

- the increasing complexity of sea-lane defence due to the multi-nationalisation of the shipping world

- differences in opinion between coastal states and nations that use the sea over freedom of the sea, sea control, and about the use of the sea for peaceful purposes and shipping activities

- an impediment to free passage due to excessive jurisdictional claims and concerns about the division of the oceans

- the impact on peace of the destruction of resources and the environment resulting from inappropriate sea control

The Eurasian maritime world is a major artery of the Ocean Web of Communication, containing more than 100 straits, seven seas and two waters that are used for international navigation. Those with particular significance in security terms are the five chokepoints. In addition to the disputes and risks resulting from the new factors of instability mentioned earlier, there have long been many other potential and tangible threats around these chokepoints. These include terrorist acts and internal instability due to historical ethnic and religious conflicts or poverty. As well as, disputes between countries over the sovereign rights to territories and islands.

Also, the hub ports that support the global economy are all located in developing countries or regions, which do not necessarily have the requisite defence capabilities needed to protect them against acts of destruction or military attack.

Threats to Chokepoints and Hub Ports

The following situations could severely restrict or completely circumvent the passage of ships through the chokepoints and hub ports of the Eurasian maritime world:

- natural disasters

- man-made disasters (accidents etc)

- restrictions to passage due to excessive claims of sovereign or jurisdictional rights

- transnational crimes at sea (including piracy and armed robbery)

- terrorist acts at sea or in ports

- international or internal armed conflicts

Although no defence or security implications *per se* would arise from natural or man-made disasters, it is obvious that any large-scale disaster at a chokepoint would be an extremely serious disruption. For example, in any given day, 150 ships pass through the Malacca/Singapore Strait and 58% of their cargo is crude oil.

Restrictions to passage from excessive claims of sovereign or jurisdictional rights are growing as the result of coastal states adopting systems that disregard the basic principles of UNCLOS. Disasters and military force are not the only things that can sever sea routes. Many of the claims to national-jurisdictional waters of the coastal states go far beyond the Convention's provisions. Some countries have established military warning zones, and others have declared measures that obstructed the right of warships to pass through their territorial waters in safety. One country even claims an exclusive zone of 285 miles. With complete disregard for the countries that use the sea, this kind of creeping jurisdiction is eroding the freedom of the sea.

Transnational crimes on the sea include piracy, which UNCLOS defines as:

> any illegal acts of violence or detention, or any act of depredation, committed for private ends ... directed: (i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft (ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State ...[9]

The vast majority of such acts of piracy occur inside territorial waters. Pirates evade their pursuers by escaping from one state's territorial waters to another. Thus, piracy cannot be controlled without international cooperation. In 1992,

Indonesia, Malaysia and Singapore, the three countries with jurisdiction in the Malacca Strait, started collaborative patrols and began to exchange information.[10] This led to a considerable decline in the number of pirate attacks in the Malacca Strait, but the incidence of piracy in the Indonesian archipelagic waters subsequently increased in direct proportion.[11] Many of the coastal nations have invoked UNCLOS to claim that criminal acts within territorial waters are not acts of piracy but domestic crimes that the coastal states themselves should control. This attitude is contributing to the difficulties in establishing a coordinated response by the nations of the region. The International Maritime Bureau (IMB) defines piracy and armed robbery of vessels as 'an act of boarding or attempting to board any vessel with the intent to commit theft or any other crime and with the intent or capability to use the furtherance of that act', and has called for a more realistic approach. The difficulty of finding a common definition is testament to the gravity of the piracy problem.[12]

More attention must be paid to the issue of terrorism on the sea and in ports, as a problem that is likely to grow in the future. There had been no major incidents since the 1985 hijack of the *Achille Lauro* by Palestinian guerrillas. In 2000, however, several conspicuous sea terrorist acts took place including the bombing of the USS *Cole* in Aden Port, and the illegal confinement of European tourists by Abu Sayaf guerrillas in the Philippines. The hijacking of a container ship or an oil tanker, or the occupation or destruction of a hub port, if such an incident were ever to occur, would have an enormous impact on the global political and economic situation. The only countries in the Asia-Pacific region to ratify the Convention of Rome[13] on international cooperation against hijacking are China, Australia, the US, Canada, India and Sri Lanka; the vast majority of the Southeast Asian nations have yet to ratify it.

Hypothetical scenarios for chokepoints being cut off due to international conflicts include tension in the South China Sea over territorial rights to islands or the development of submarine oilfields, an armed conflict between China and Taiwan, a crisis on the Korean peninsula and oil embargoes imposed to resolve such a crisis. The territorial dispute in the South China Sea involves six countries and regions, with an unpredictable future as there are no signs of any agreement on code of conduct guidelines to prevent conflict. As a threat to focal points in the region, it is easy to envisage either Kaohsing or Hong Kong becoming a target of destruction in a Sino-Taiwanese war. Although an armed conflict between the countries of Southeast Asia is virtually unimaginable, one unstable country's domestic politics, such as that of Indonesia, could easily spillover to affect other countries whereby chokepoints within that country's jurisdictional waters are closed or a hub port located in a certain country is destroyed.

Detours around chokepoints

The potential to make a detour in the event of a blockage in one or more of the Eurasian maritime world's five chokepoints, and the losses incurred as a result of the detour, are examined below.

Blockage in Malacca/Singapore Strait

If the Indonesian archipelagic waters were open, ships could enter the South China Sea through the Sunda Strait, or take a route east of the Philippines via the Lombok-Macassar Straits. In the case of a shipment of crude oil from the Gulf to Japan for example, in comparison to the route through the Malacca/Singapore Strait, the detour would add about three days to the voyage. Also, an additional fifteen or so tankers would be required to secure the necessary volume of crude oil transport for peacetime requirements.

Blockage in South China Sea

Once more, based on the premise that the Indonesian archipelagic waters are open, ships could navigate to the east of the Philippines via the Lombok-Macassar Straits. The delay in transporting crude oil from the Middle East to Japan and the number of additional tankers required would be the same as in a blockage of the Malacca/Singapore Strait.

Blockage around the Indonesian archipelago

In this case, the Sunda Strait and the Lombok-Macassar Strait would be blocked, and it may also be impossible to navigate through the Malacca-Singapore Strait. The only detour available would be to go around the south of Australia. In the same example of transporting crude oil from the Middle East to Japan, this would add two weeks to the voyage and an additional eighty or so tankers would be needed to fulfil peacetime crude oil transport requirements.

Blockage in East China Sea

A possible detour in this case would be to go around the east of the Japanese archipelago. In the example of transporting crude oil from the Middle East to Japan, no detrimental effect can be detected in this detour. Incidentally, very few ships use the Taiwan Strait, with almost all ocean-going vessels passing through the Bashi Strait before entering the East China Sea from Taiwan's east.

Impact on Shipping of Chokepoint Detours

Quantitative estimates of the economic losses that would be incurred by such detours differ according to the calculation methods and premises used. Some estimates of the potential losses to Japan from disruption of shipments of crude oil from the Middle East to Japan are $87.9 million if the Malacca/Singapore Strait were blocked, $200 million if the South China Sea were closed, and $1.2 billion if the Indonesian archipelagic waters became impassable. To what extent such losses would affect the Japanese economy is something that would have to be considered in terms of the economic situation at the time, so it is impossible to make an arbitrary general judgment. Nevertheless, if the Malacca/Singapore Strait and the Indonesian archipelagic waters were blocked, then all crude oil and other freight bound for Japan would have to make a detour around the south coast of Australia. This would have a significant economic impact not only on Japan but also on many other countries, including the countries of Southeast Asia and South Korea. Although the US would also feel an economic impact, of even greater concern would be the security implications to the US in the restrictions on the movements of its navy and the effect of such restrictions on its strategic relations with China.

The extra freight costs involved in such detours would not be significant. The greatest expense would be the costs of chartering new ships to supplement the shortfalls resulting from delays in delivery. In terms of crude oil, however, Japan does have a domestic stockpile. If that stockpile could be used to cover the shortfall without having to resort to additional tankers, Japan should be able to manage for about twelve months even if the tankers had to make a detour travelling via the south coast of Australia. Also, as mentioned above, there is significant surplus capacity of crude oil tankers. Thus, the considerable number of under-utilised crude oil tankers could move to areas of new demand. The new charter costs would experience an initial sharp increase, but market principles would eventually prevail and costs would settle down to appropriate levels.

In the case of container shipping, however, the situation is dramatically different. If container ships were forced to take detours that result in delivery delays, this would impose serious losses on the world economy. In container shipping, raw materials and products are shipped from regional ports in containers and are gathered together at the hub ports. They are then allocated to coastal shipping or land transportation. With the demands for swift delivery, large-scale turmoil in manufacturing processes could be expected to result from any delays in delivery. The blockage of any chokepoints would undoubtedly affect the economies of many countries in a short period of time.

Weaknesses of the Hub Ports

The hub ports are the heart of the Ocean Web of Communication, and the destruction of their systems, for whatever reason, would incur immeasurable economic losses. Also, unlike chokepoints, in the case of hub ports there is neither the possibility of a detour if there is a disruption nor are there any alternative ports. Ships enter the Port of Singapore at the rate of almost one vessel every two minutes. It would be virtually impossible to redirect all of these ships to other ports. Today, with the global economy moving as one, the effects of the paralysis of a hub port would know no bounds.

Sea-Lane Defence in a New Maritime Era

In the event of an obstructed sea-lane due to a blockage in one of the chokepoints or an inaccessible hub port, the following points should be noted:

- For chokepoints, detours are possible but only for the three major ocean sea-lanes, and coastal routes would still be disrupted. As things stand today in sea transport, which should be described as a COWOC, even the breakdown of the functions of just one coastal sea-lane would affect the economies of many countries.

- One cannot make any sweeping generalisations about the economic losses and the acceptability of detours around chokepoints. In terms of bulk shipping, surplus vessels and crude oil stockpiles may help those countries with spare economic capacity to escape significant losses. The losses due to a disruption in container shipping, however, would have a negative impact on the global economy.

- If a chokepoint were to be cut off by an international armed conflict, terrorist attack, criminal act or other similar reason, the establishment of detours would likely be the safest option. Nevertheless, freedom of navigation is an essential requirement for the survival and progress of nations. It is something that must be given to all ships in obeisance of UNCLOS and its related agreements, as well as other international agreements for the protection of resources and the environment. Such an event is not a question of merely making a detour if the sea-lane is blocked, but one that should be seen as a situation that demands responses in terms of defence power.

- The required solutions are the stabilisation of the security environment, the maintenance of order around the chokepoints and hub ports, and regional approaches to the strengthening of defence positions.

Conclusion

In Greek history, the ancient Phoenicians built boats from Lebanese cedar and crossed the Mediterranean Sea to trade with other peoples. It is said that around 1200 BC, they passed through the Strait of Gibraltar, travelled down the western coast of Africa and around the Cape of Good Hope to the Arabian Sea. After a history of battles in the Mediterranean between sea powers and land powers and between the various sea powers; such as in the Battle of Salamis, the Punic Wars, and the Battle of Lepanto, the Spanish and the Portuguese emerged as renowned sea travellers and began their great voyages across the ocean, using the sea-lanes to unite Earth.

As the sea-lanes brought prosperity to the maritime nations, defence of the sea-lanes became their navies' primary duty, and the importance of sea control began to be recognised. The Netherlands and Great Britain rose and fell over their domination of the sea. In both the First and the Second World Wars and throughout the years of the Cold War, the fundamental structure of the order of the sea's use was intrinsically linked to naval activities and strategies.

The collapse of the Cold War structure served to deprive the maritime world of a balance of power, which acted as a system of stabilisation. At the same time, the borderless trend in the shipping industry also gathered pace, and the sea-lanes were plunged into a world of chaos. When UNCLOS came into force, sea control came to impose certain restrictions on the freedom of the sea. Various systems were established and agreements exchanged, and not only nations but a variety of other entities came to have an influence on these systems and agreements. With this, all kinds of values started to encroach into the maritime world. The basic structure of the order of the sea's use has been shaken, and the maritime world is encountering a new paradigm.

The weaknesses of the sea-lanes in terms of security have a number of root causes. These include differences in opinions about the freedom of the sea and sea control between the traditional users of the oceans and the coastal nations who possess jurisdictional rights of their adjacent waters, disputes over marine resources in and around the sea-lanes, terrorist and criminal activities arising from poverty and suppression, and from the various dangers that have been born from the very chaos of the sea-lanes themselves.

The sea-lanes of the Eurasian maritime world are major arteries of the Ocean Web of Communication. They are the sites of chokepoints and hub ports that, despite their strategic importance, are unstable in terms of security. The time has come to consider new ways to stabilise the sea-lanes in line with the new paradigm of the maritime world.

Notes

1. For details of the Eurasian maritime world, see Kazumine Akimoto, 'Eurasia Kaiyo Sekai to Sea Lane Boei—Keiyo Sekai no Paradigm Shift' [The Eurasian Maritime World and Sea Lane Defence—The Paradigm Shift in the Maritime World], *Hato*, No. 149 (July 2000).

2. John H. Noer*, Chokepoints: Maritime Economic Concerns in Southeast Asia*, National Defense University Press, Washington DC, 1996 refers to the points of convergence of routes in sea-lanes as chokepoints.

3. Daniel Coulter, 'The Present State of the World's Sea Lanes and Its Security Implications,' *Asia Taiheiyo Chiiki ni okeru Kaijo Kotsumo wo Meguru Shomondai* [*Problems in the Sea Transport Networks of the Asia-Pacific Region*], a report compiled by the Ship and Ocean Foundation. Coulter refers to the hub points where sea transport networks meet as 'focal points'.

4. The same classifications as in *Chokepoints*.

5. Coulter also chose the same four hub ports.

6. Figures for volume of maritime cargoes and required tonnage obtained from *Zusetsu Kaiun Shikyo no Kaiko to Tenbo* [*Past and Future Outlook of Shipping Market Explained in Graphs*], compiled by Nippon Yusen Research Group, Japan Shipping Exchange, Inc., July 2000.

7. ibid.

8. *Sekai no Container Sentai oyobi Shuko Jokyo 2000 Ban* [*World Container Ship Fleet and State of Use, 2000 Edition*], compiled by Nippon Yusen Research Group Japan Shipping Exchange, Inc., July 2000, p. 1.

9. United Nations, *United Nations Convention on the Law of the Sea*, United Nations, New York,1982, Article 101.

10. When in pursuit of a suspected pirate vessel, these countries inform the police authorities of the neighboring country before the target vessel enters the latter country's territorial waters and ask them to continue the pursuit (commonly known as hot hands off, after the term hot pursuit.)

11. *Higashi Asia Senryaku Gainen 2000* [*East Asian Strategic Concepts 2000*], National Defense Institute, 2000, pp. 81–84.

12. The International Maritime Organisation of the United Nations is currently considering anti-piracy measures in the Maritime Security Committee (MSC). As part of these deliberations, it prepared a final draft definition of piracy and armed robbery in June 2001.

13. *Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation*. Deliberated after the terrorist attack on the *Achille Lauro* in the Mediterranean Sea in 1985, passed in 1988, came into effect in 1992.

Part | 3

Implications of New Technologies

Too Many Eggs in Too Few Baskets? Reflections on Trends in Ship Design and Implications for Military Operations

7

Peter Cozens

The age-old maxim and often quoted '*time and tide wait for no man*' has an important truth for mariners. In some respects trends are like tides, they come and go, ebb and flood but have a logic of their own and given Newton's laws of gravity, are unstoppable. In a maritime context, those who choose to ignore the power and rhythm of tides and to a certain extent, trends in maritime development, are a risk not only to themselves, but more importantly, are a menace to others. Keeping a weather eye open to changes and trends in all aspects of sea use is therefore a vital interest to all prudent users of the sea and ocean, for whatever purpose.

About two hundred years after the death of King Canute in 1035, Henry of Huntingdon recorded a yarn which although fanciful has an important message for today. During his reign this sailor King united the Kingdoms of Norway, Denmark and England under his rule. His fleet controlled the sea lines of communication in the Baltic, the North and Irish Seas and also the English Channel. He was an extremely shrewd statesman and consummate politician. His courtiers and advisers were impressed with his wisdom and power. An apocryphal story goes that these people eager to find favour ascribed fabulous powers to him including that of being able to turn back the tide if he commanded it to do so. Canute, the sailor King appreciating the foolishness of his advisers, ordered his throne to be placed on a sandy beach below the high tide mark when the tide was out, and then sat down and waited for the tide to flood with his courtiers and advisers in attendance. As the tide rolled ever nearer, so the story goes, he commanded the waters to retreat. As is well known, the royal feet got wet and no doubt his advisers were humiliated and made to look very stupid indeed.[1] The lesson of this myth is to ensure that advice about maritime affairs and analysis of maritime trends rendered to our respective political leaders is based on fact, seamanlike prudence and without the cant of image makers and other benders of logic.

To address all trends in ship design and implications for military operations is well beyond the limits of this paper, with the changes from Hobs, Wherries, Luggers, Sampans, Dhows, Junks, Feluccas, and Clippers to RoRo's, OBO's, Reefers, STUFT and Container Ships it is clear that it is a huge subject. This paper examines two unusual types of cargo carrying vessel and their high value cargoes, and some trends in container shipping that suggest greater capacity, specialisation and speed. The ships under consideration are:

- MOX carriers

- the proposed conversion of the Russian *Typhoon* class submarines to carry cargo

- the new generation of container ships

- superfast waterjet powered ships

- multi-role amphibious and replenishment ships

From this eclectic mix there emerges a disturbing theme indicating a greater concentration of high value cargo, both commercial and military, into fewer hulls. Is this indeed a situation of too many eggs in too few baskets?

MOX Carriers

Arguably, one of the most important developments in cargo carrying is that of the MOX carrier. MOX is a nuclear fuel manufactured in Europe, comprising a mixture of uranium and plutonium oxides.[2] MOX has been used in electric power generation in Europe for the past three decades. In February 1997 the Japanese Government stated that it would start using this type of fuel in its commercial nuclear reactors and that it expected to have some 16 to 18 reactors operational by 2010.

The radioactive material is in pellet form, which is loaded into corrosion resistant rods and then assembled in casks weighing between 80 and 100 tonnes. These casks are then loaded into ships specifically designed for the purpose of carrying nuclear fuel. There are five of them in the PNTL Fleet, *Pacific Swan* 1979, *Pacific Crane* 1980, *Pacific Teal* 1982, *Pacific Sandpiper* 1985 and *Pacific Pintail* 1987. Although these ships were designed and built some time ago, it is only recently that they have begun to carry MOX fuels from Europe to Japan.[3] Inherent in their design are the following features:

- double hulls to withstand damage and remain afloat

- twin engines and propellers—with independent controls

- radiation monitoring systems

- additional damage control and fire fighting systems

- enhanced buoyancy

- duplicated navigation, communication, electrical and cooling systems

The ships' officers and crews are highly qualified and experienced mariners, and meet all the requirements of the International Maritime Organisation (IMO), the International Atomic Energy Agency and other regulatory authorities for the carriage of radioactive substances including the 1988 US-Japan Agreement for Cooperation Concerning Peaceful Uses of Nuclear Energy.[4]

These ships will sail in tandem with another, as mutual escorts to transport MOX cargoes from Europe to Japan. They are armed with naval guns and carry a specially trained force of security experts, the United Kingdom Atomic Energy Authority Constabulary (UKAEAC), for on-board protection. These armed security specialists are said to be highly experienced and operate independently of the ship's crews. They are responsible for maintaining constant surveillance and physical protection of the cargo, and are obliged to act in accordance with relevant national and international laws and regulations. Two hourly position reports are made to a central controlling authority.[5]

In addition to these measures the Japanese Coastguard, previously the Japanese Maritime Safety Agency, operates a vessel specifically designed to give escort to these ships. Details from *Jane's Fighting Ships* reveal that the *Shikishima* displaces 6,500 tons, has a range of 20,000 miles at 18 knots, is armed with 35mm cannons, and carries two Bell or Super Puma helicopters.[6]

The need for special protection for nuclear cargoes is perhaps self-evident— however it does throw up some interesting questions. Is it the financial value of MOX cargoes that warrants these security measures? Clearly the scope for financial disaster associated with a catastrophe for cargoes of this type is pretty high. Are there other cargoes that likewise merit extraordinary security measures? Is it the concentration of a commodity into a relatively small unit that gives a cargo a special security treatment? Are we to expect this phenomenon of high security and close escort for special cargoes to broaden into other types of cargo carrying? What is the financial and economic value of a typical MOX ship's cargo? And, could high value cargoes now be a determining issue in giving other ships special protection?

Russian *Typhoon* Class Submarine

An idea that has enormous implications is the notion of transporting cargoes underwater. A recent article in the *New Scientist* journal suggested that super-cavitating craft could travel at very high speeds underwater. Cavitation has

been the curse of many naval architects, however, the phenomenon could be turned to an advantage not only for weapons such as torpedos but for sizeable ships. The physics of super-cavitation are being studied and within a few years we may witness experimental commercial craft.[7] Using submersibles as cargo ships, particularly for the carriage of oil, is an idea that has been around ever since the development of the first nuclear powered submarines. At that time, some planners considered the delivery of Alaskan oil (under the ice) to California using 50,000-ton submarines rather than by a pipeline. It gained more than just a cursory look in the 1970s during the oil price shocks. However, further investigations of the economics of the proposal revealed that it was not viable and the scheme was shelved.

About 22% of the world's supply of nickel, 60% of the world's palladium, 40% of platinum and significant amounts of copper and cobalt are produced by the workers of the Russian city of Norilsk, situated within the Arctic Circle. The smelted metals are shipped to the port of Dudinka 350 miles up the Yenisei River that flows north into the Kara Sea. These cargoes are loaded into ships that follow icebreakers across the Kara Sea to the ice free port of Murmansk. From there the cargoes are transhipped into other vessels for destinations around the world. In a way the ice is a choke point for the movement of these valuable cargoes, especially if the icebreakers are deployed for use elsewhere. Faced with this possible problem, the young Russian tycoon who bought the RAO Norilsk Nickel Company in 1997 used some lateral thought and initiated a project to use submarines to transport his expensive metals.

The *Typhoon* class submarine displaces 26,500 tons submerged and given its colossal bulk and reserve buoyancy it can break through up to 3 metres of Arctic ice from below.[8] Three of them were built and have been earmarked for destruction under the arms reduction treaties. A year ago the submarines' designers came up with a plan costing about US$80 million each in which a *Typhoon* could be adapted, by removing its missile and other armament silos, to carry 10,000 to 15,000 tons of cargo. The sheer bulk of these vessels lifts and parts the ice from below, a task requiring less energy than that of a conventional ice breaker which uses its weight to break the ice from on top. Submarines can also travel much faster underwater than a surface ship transiting an ice field—much more quickly than a conventional icebreaking convoy. If three of these ships were used it heralds a more efficient and probably more economical means of shifting some of these valuable commodities. It will be some time before the project is finalised, however, there are experts and enthusiasts who support the scheme in both Russia and the US.[9]

A number of interesting questions arise from this development. If these ships are indeed converted to cargo carriers they would be the first nuclear powered cargo ships since the problematic *Savannah*. Will they be able to enter ports outside Russia or will they be confined to Russian waters only? They could of course travel to the east through the Laptev and East Siberian Sea or under the Arctic Ice and through the Bering Strait to enter the Pacific and ports within the Asia-Pacific. What international safety regulations will cover their operations and could they indeed still be used for military purposes? Norway and Russia have reached an agreement to build a ship for the transporting of containers holding spent nuclear fuel. It seems as if there is a real commitment to manage nuclear problems—apparently both countries will invite other industrialised countries to make contributions to the project that will cost US$20 million. Its aim is to reduce the radioactive threat in the Arctic.[10]

Some Developments in Container Shipping

The innovation of containerisation in the late 1960s and early 1970s displaced conventional shipping and by the 1990s, most liner routes around the world had become containerised. Containerisation has changed port operations and made the movement and handling of cargo much more speedy and efficient. However, efficiencies are always being sought and intense competition between the world's major shipping companies and consortia is self-evident. Professor Keith Trace of Monash University records that there have so far been four generations of container ships.[11] The largest in 1985 were capable of carrying 4,500 TEU. He also suggests that the container shipping markets were oversupplied with ships for most of the 1970s, 1980s and 1990s.[12] The implication of this previous oversupply in available container shipping for military operations is that the movement of military cargoes for specific tasks was not necessarily an onerous problem, for example Ships Taken Up From Trade (STUFT) and the Falklands Campaign. However, there are signs that container ships are going to become increasingly specialised for specific routes and dedicated trades including sophisticated terminals. Some of these larger ships will soon carry loads of between 10,000 to 12,000 TEU. There is a compelling logic, as Professor Trace reveals, that capital and operating costs per container slot decrease as the size of the ship increases. He cites evidence from Lloyds that estimates a 6000 TEU container ship would cost only 50% more to build than a 3000 TEU vessel, its fuel would cost only 30% more but the size of crew would remain about the same.[13]

These ships are also going to be much quicker through the water and therefore savings can be made by the employment of fewer vessels and seafarers shifting the same amount of cargo. This means fewer ships available for charter and a

decreasing pool of experienced and competent mariners. Concurrent with the development of huge Round the World (RTW) ships are smaller specialised vessels that feed regional hubs from where the RTW units load and discharge their huge cargoes. It is not the limits of naval architecture that restrict the size of these new mega-carriers but rather the physical dimensions of ports and waterways. The London *Financial Times* suggests that the Panama Canal needs to expand, although about 92% of the world's shipping fleet can use the canal, some 60% of container ships ordered since January 1999, because of their size are unable to fit through.[14] Ports are likewise becoming increasingly specialised and sophisticated to operate the cranes and distribution systems necessary for the efficient throughput of containers—it is axiomatic that capital investment in plant is higher than before.

The race to build bigger ships has started in earnest. Nippon Yusen KK has ordered four larger container ships from Ishika Wajima-Harima Heavy Industries in addition to the five ordered in February 2000. The new ones are 6,200 TEU vessels, making this the largest order worldwide. They are expected to cost Y6-8 billion each. Nippon Yusen plans to start introducing the ships from the latter half of 2002 on shipping lines in North America and Europe. Mitsui OSK Lines and Kawasaki Kisen Kaisha have each ordered eight large container ships since September 1999.[15] To give an idea of how the Asia-Pacific region is developing the so-called hubbing concept, Pacific Carriers has placed an order worth between US$60-$70 million with Chinese shipyards for the supply of six vessels. The contract includes a deal with a yard in Zhejiang, China, for the supply of four 520 TEU containerships. The vessels will be used by PACC Container Line, a subsidiary of Pacific Carriers which operates seven feeder services linking ports in Malaysia, Indonesia and Singapore. In addition a further two 2500 TEU multi-functional container ships have been ordered from Zhejiang Shipyard with delivery scheduled for this year.[16] Professor Trace has also advised that P&O (and partners) intend to introduce 4,200 TEU container ships onto the Australasian trade in 2002.

Container transport is becoming much more sophisticated then ever before. Container ships will soon be following schedules as tight as that of the international airline system and with little spare capacity for special military sealift in support of quickly developing operations.

Superfast Ships

Yet more technological developments herald the passing of propeller driven ships in favour of gas turbines driving pumps that expel water from the stern of the ship below the waterline through water jets. For example, INCAT of Hobart has produced a number of high-speed catamaran passenger vessels.

However Rolls Royce has on its drawing boards the design of a fast ship capable of crossing the Atlantic in three and a half days at an average speed in excess of 40 knots in any weather but with a wake 6 metres high. Early indications are that these ships will weight something in the order of 36,000 tonnes.[17] It will necessarily be some time before these ships are operational but the demand for the quicker transit of containerised cargoes to market and therefore lower shipping costs implies that they will become as familiar as contemporary container ships are today.

Multi-role Amphibious and Replenishment Ships

The trend towards more specialised container ships, dedicated to particular routes and ports reduces the flexibility of using them for the movement of military cargoes particularly to remote areas and in support of military operations. There is a demand for navies to acquire vessels able to support military operations, for example, fleet tankers and oilers are a necessary part of naval operations—nowadays specialised ships capable of carrying troops, their equipment and logistic train are becoming a necessary ancillary for military operations. Designing ships capable of supporting all the roles expected by naval staffs taxes the imagination and skills of naval architects:

• RoRo capabilities

• heavy lift cranes and sophisticated cargo handling facilities

• an embarked hospital

• a command centre with a sophisticated C4I suite

• technical workshops together with artificers and technicians

• to operate barges, landing craft and lighters

• heavy helicopter operating facilities

• space for a significant load of troops

• an ammunition carrier

• to carry disaster relief stores and water making capabilities

• an electrical generating capability for shore facilities

• a sovereignty patrol capability

Concentrating all these facilities into one hull is clearly testing the bounds of seamanlike prudence. It also amply demonstrates a desire to move away from what the specialised trends in commercial shipping are demonstrating, that is, nowadays ships are being designed for specific purposes rather than multi-

roles. For example, the advent of car carriers, the demise of general-purpose cargo ships, LPG gas carriers, chemical carriers and the like, are specific to their respective tasks. The idea of multi-role ships presents difficulties for naval planners.

There are lessons in history that we should all acknowledge for their seamanlike prudence, including hazards associated with the ever-present influence of politics and military, rather than naval command on maritime affairs. The Spanish Armada in 1588 was assembled and outfitted under the autocratic direction of Philip II, and commanded by gentlemen soldiers who regarded their mariner brothers-in-arms with disdain. The intended mission of the Armada was to land a fully equipped military force in southeast England, together with an Army from the Spanish Netherlands under the command of the Duke of Parma to overthrow the Queen of England, Elizabeth I. The expedition failed due in part to bad weather, the harrying tactics of the English (who lost no ships), and to the unfortunate command and structure of the Spanish Fleet. It was the issue of command at sea and the design and operation of ships that was so important to the English victory. The English ships were unemcumbered by soldiery and their means of fighting, unlike the ponderous Spanish Galleons manned by soldiers who wanted to grapple with their enemies hand to hand. But where did these ideas come from? We now know that the conduct and command of seafaring operations by knowledgeable and experienced mariners is a vital element of successful maritime/military operations. Sir Francis Drake on his famous round the world expedition, court martialled for mutiny and treason, the gentleman soldier Sir Thomas Doughty, who had meddled in the expedition's operation he was subsequently convicted and executed. He thought he knew better about the conduct of the expedition, because of social rank and political standing, than the seafaring men of humble origin but long experience. Drake's voyage of three years around the world, in which he brought a fortune home for his Queen and country, demonstrated the virtues and necessity of seafaring and ship design expertise. Thereafter, English sea captains have always been given sole command of their ships. Likewise, through the Corps of Naval Constructors, they have also expressed down through the ages their own opinions of what ships should be—not floating forts loaded with all sorts of expeditionary that may come in handy—but ships tailored for specific rather than multiple roles.[18]

The Canadians started work on what has become known as the Afloat Logistics and Sealift Capability (AFLC) project in 1992. The genesis of this scheme came from the central staff, which recognised the need for enhanced capabilities in supporting forces deployed ashore and the ability to sealift military cargo

including military vehicles. The sealift function was seen as being quite useful for short notice where the contracting of suitable commercial ships could be difficult. The 1994 Canadian Defence White Paper gave rise to an ALSC ship with the following characteristics:

- Strategic sealift—three ships, each with 2500 lane metres of vehicles, containerised stores, spares, ammunition, lubricants and oils.

- Joint Force Headquarters command and control—working space for 50-75 personnel and communications facilities to support a JFHQ acting in the role of a National Command Element on board.

- Disaster Assistance Response Team in support of humanitarian/disaster relief ashore.

- General Support with medical and dental facilities, helicopter operations and rest and recreational facilities.

- The ship to have a self loading and unloading capability independent of jetty facilities and be capable of underway refueling concurrently with any strategic task.

- The study suggested great flexibility in how the ships could be configured to meet specific operational requirements, including modular payloads.[19]

The study recognised the likely high capital investment in ships of this class. As a consequence the proposed ships will be built to commercial standards rather than military specifications in an effort to reduce costs, studies indicate that savings of 30% are possible. Nonetheless, safety standards including higher damage control features for vital systems will be incorporated. The intended ships are quite large, about 28,000 tons displacement, length overall about 200 metres, range 10,000 miles at 15 knots, cargo capacity 8,000 tonnes, 2500 RoRo lane metres and equipped with four helicopters.[20]

The procurement process is divided into three discrete phases, the first was the development phase expected to be completed in March 2001, the second is the project definition lasting until 2005 and the third, detailed design and construction which is expected between 2006 and 2010.[21] This project is understandably complex and time consuming—it illustrates quite clearly that the idea of taking ships up from trade is not necessarily an optimal solution for military operations. The fact that it will take about 18 years from recognition of the problem to delivery of a ship indicates how very carefully the whole project has to be considered, developed and managed. Clearly it is a very considered approach to an intricate set of problems. Given the caution and prudence demonstrated so far there is a reasonable chance of a favourable outcome.

The New Zealand Government's approach to a similar set of objectives was to purchase a mercantile ship and convert it for use in support of military operations. The project definition stage was completed in 1989 for a Logistic Support Ship (LSS) to carry the New Zealand Army's vehicles and stores wherever required, a disaster relief role in the Southwest Pacific and for civil defence purposes in New Zealand. After studying the market the Naval Staff recommended the purchase of the *Mercandian Queen II*, she was acquired in 1994. Detailed plans for its conversion to its new roles included the provision of flume tanks to improve its seakeeping and stability in a seaway when lightly loaded. Before this work was carried out, the ship was used for other purposes and soon gained an unenviable reputation for her lively performance at sea.[22]

The Government shelved this conversion plan, as they perceived the ship to be unable to perform the tasks for which it had been acquired. The advice of the Corps of Naval Constructors appears to have largely been ignored, as there was absolutely nothing wrong with the ship nor indeed with the intended modification and proposed conversion other than the imposition of short term capital costs. It should be noted that two New Zealand coastal shipping companies, PACIFICA and Strait Shipping employ similar ships: the *Spirit of Competition* and the *Kent* for the transport of commercial cargoes around the New Zealand coast. However, the ship, HMNZS *Charles Upham* was chartered for use elsewhere. The shortsightedness of this unhappy saga came to light when the New Zealand Defence Force needed to shift the New Zealand Army's equipment at relatively short notice to East Timor in support of the recent UN operations. In the event a cargo ship was chartered and the Army's equipment successfully delivered to the theatre of operations but some time later than operationally desirable. The New Zealand Government has now disposed of the *Charles Upham* and is apparently busily engaged studying the configurations of a so-called multi-role ship.

Conclusion

Merchant ships on RTW routes are getting larger and the value of their cargoes increasing. Smaller but highly specialised ships service hub ports—these ships have dedicated wharfage and cargo handling facilities. Both types of ships are run on tight schedules not unlike those of airlines. It is reasonable to surmise that merchant shipping in emergencies is unlikely to be available for military use at short notice. (There are of course other difficulties associated with chartering and insurance.) The value of typical cargoes is high. A container of chilled New Zealand beef on present market rates is estimated to have a value in excess of NZ$200,000. In other words, a container ship leaving New Zealand bound for East Asia could have a cargo value of up to NZ$100 million and the

mega-ships of the next generation a value of over NZ$250 million. The larger container ships transiting the world on RTW routes will likewise have more valuable cargoes measured in hundreds of millions of dollars. Are these cargoes more valuable than those of a MOX carrier? Will they require close escort in times of tension? If close escort is required what sort of naval ship will be needed? What sort of escort would be required for the super fast water jet propelled ships acting in support of military operations such as HMAS *Jervis Bay* and other new super fast cargo ships travelling across oceans in excess of 40 knots? Likewise will the ALSC ships require extremely close escort, in the air above and for surface and sub-surface threats given the value and specialised nature of their cargoes?

There are two different conclusions to be drawn. The first is that there is a trend towards highly specialised shipping carrying extremely valuable cargoes. The MOX carriers, the proposed conversion of the world's largest class of nuclear powered submarine, high-speed water jet cargo shipping and the demonstrated trend of building mega-size container ships underscore this contention. The MOX carriers already have close escort both onboard, plus travelling in tandem with one another and the added dedicated escort of a *Shikishima* class LPH from the Japanese Coastguard. It remains to be seen if there is a need in times of tension for similar measures for the large container ships. If this is indeed the case then what sort of ships need to be designed, built, and operated to offer optimum protection? The second conclusion is that navies are grappling with the difficult and complex issue of supporting military operations using multi-role ships. A glimpse at the Canadian solution suggests a class of ship that will take several years of detailed study and design before it becomes reality. These ships too, will necessarily be extremely valuable because of the cargo and facilities they carry—they too require sophisticated and close escort and the fact that replacements will be hard to come by. It is not an unlikely prediction that large SWATH ships capable of speeds in excess of 50 knots in all weathers with the ability to operate helicopters will feature prominently as the new generation of escort. That is one of the implications we have to consider as merchant shipping continues to become more and more specialised and as naval multi-role ships become extraordinarily valuable assets.

King Canute knew that he could not turn back the tide even though his sycophantic advisers, in order to gain favour, suggested he could. In the present climate it is more important than ever that we give our political leaders factual advice about trends in merchant shipping and ships used in support of military operations and how best to underwrite their security. Commercial shippers and naval planners must be wary of putting to many eggs into too few baskets.

Notes

[1] L.M. Larsen, *Canute the Great*, AMS Press, New York, 1970.

[2] Its big problem is that the plutonium content could, after some further refinement, be used in nuclear weapons.

[3] *Transport of MOX Fuel from Europe to Japan*, Information File, June 1999, BNFL, COGEMA, ORC.

[4] ibid.

[5] ibid.

[6] Janes Information Group, *Jane's Fighting Ships*, 1999-2000, p. 394.

[7] Duncan Graham-Rowe, 'Faster than a Speeding Bullet', *New Scientist*, No 2248 (22 July 2000), pp. 26-29.

[8] *Jane's Fighting Ships*, p. 558.

[9] Christopher Pala, 'And Now for the Really Big One', *Bulletin of the Atomic Scientists*, (March/April 2001), pp. 20-22.

[10] *Inzhenernaya Gazeta*, 13 June 2000.

[11] Keith Trace, *For 'Tyranny of Distance Read Tyranny of Scale': Australia and the Global Container Market*, Department of Economics, Monash University, A Paper Presented to the Australasian Economic and Maritime History Conference, Wellington 22-25th November 1998.

[12] Keith Trace, *Globalisation of Container Shipping: Implications for Australia*, A Paper Presented to the 1999 Australian Liner Shipping Conference, 1-12th November 1999, Le Meridien at Rialto, Melbourne, p. 4.

[13] ibid, p. 5.

[14] *Financial Times* (London Edition), 12 July 2000.

[15] *Asia Pulse*, 9 June 2000.

[16] *Singapore Business Times*, 29 November 2000.

[17] Mark Robins, *New Scientist*, Volume 167, Issue 2256, (16 September 2000), p. 19.

[18] David Howarth, *The Voyage of the Armada—The Spanish Story*, Collins, London 1981, pp. 92-93.

[19] Naval Logistics, 'ALSC: An Affordable Solution to a Complex Requirement', *Warship Technology*, October 1999, p. 5-7.

[20] ibid, p. 6.

[21] ibid, p. 7.

[22] The ship was incorrectly ballasted.

Review of Recent Significant Technologies and Initiatives Implemented to Enhance Navigational Safety and Protect the Marine Environment in the Straits of Singapore and Malacca

8

Parry Oei

The Straits of Singapore and Malacca are the second busiest waterways in the world and recognised as a waterway used for international shipping. It is along the shortest route between Europe and Asia via the Suez Canal. These straits are important as many countries depend on them for unimpeded navigational access for trade and transit.

Physically, the combined length of the Singapore and Malacca Straits is about 580 nautical miles and the narrowest width is off the southern tip of Singapore where it is slightly more than a kilometre. Numerous shoals and other navigational hazards mark the Singapore and Malacca Straits. Aids to navigation are installed to mark these dangers and demarcate the deep-water route of minimum 23 metres depth.

The issue of navigational safety within these straits is of concern to the littoral states of Indonesia, Malaysia and Singapore. Within the Singapore Strait, about 1000 vessels report daily to the Port Operation Control Centre (POCC). With the heavy traffic any major accident would affect port operations, marine activities and the marine environment. Coupled with the high percentage of marine accidents attributed to human error, the littoral states regularly review, consult, improve and implement measures to enhance navigational safety in these busy waterways.

The experience of three major oil spills in the straits over the last twenty-five years has instilled into the littoral states the need to adopt a pro-active approach to enhance navigational safety and to prevent marine environment disaster.

This paper examines the coordinated efforts and contributions by the littoral states to enhance navigational safety in the Straits of Singapore and Malacca.

It also focuses on the technologies implemented for precise navigation and to further improve information communication flow between vessels and the shore-based centres, in particularly by the Port of Singapore.

Tripartite Technical Experts Group (TTEG)

In the early 1970s, the governments of the littoral states agreed to form a body to coordinate efforts to enhance the safety of navigation in the Straits of Singapore and Malacca. The agreement led to the formation of the Tripartite Technical Experts Group (TTEG) in 1975. The TTEG has made significant strides in the enhancement of navigational safety in the straits. Many in the shipping community have and continue to recognise that the TTEG plays an essential role in maintaining maritime safety for these two waterways.

The littoral states recognise the International Maritime Organisation (IMO) as the international authority on shipping and it is consulted on proposals affecting international shipping using the Straits. For example, the IMO has been consulted on the establishment of the Routeing System covering a traffic separation scheme (TSS) for the safe navigation of deep draft vessels at the One Fathom Bank off Port Klang, the Singapore Strait, and off Horsburgh Lighthouse. Within the TTEG, the process for the proposal required the drafting and promulgation of rules for navigation, harmonising the chart datum of the three states, and the conduct of a tidal and current observation survey. It was through close cooperation of the three states, and with financial and technical assistance from Japan (which is a major user of the straits), that the Routeing System was adopted by the IMO. It was successfully implemented in May 1981, and was revised and re-implemented in December 1998.

Straits of Singapore and Malacca

Other recent milestones achieved by the TTEG include the implementation of STRAITREP (a mandatory ship reporting system) and a Four-Nation Re-Survey of Critical Areas and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in the Straits.

The maintenance of safety of navigation in the straits remains one of the key challenges of the TTEG as traffic in the straits is expected to rise. This would impose a greater burden on the littoral states in ensuring navigational safety and the protection of the marine environment. Based on past records, users of the straits would be pleased to know that the IMO and other relevant international authorities such as the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) would be consulted on proposals affecting navigation in the straits, including the use of technologies to enhance navigation safety.

Recent Technologies Introduced in the Straits

Besides measures such as mandatory reporting and the extension of the TSS, the use of the latest technologies has been one of the main tools used by Singapore to cope with the high traffic density and confined waters in the straits. Some examples of the technologies are:

Differential Global Positioning System (DGPS)

In October 1997, Singapore set up facilities to broadcast differential global positioning system (DGPS) corrections to provide higher order and consistent positional accuracy. Singapore continues to maintain the DGPS service so as to provide positional accuracy of ±10m even with the announcement by the US to remove the selective availability (SA) on global positioning system (GPS) with effect from 1st May 2000. With the removal of SA, the accuracy of the GPS has improved from ± 100 metres to ± 20 metres.

Primarily, the GPS does not meet the IMO's specification of within ± 10 metres within a 95% probability. The accurate positions are especially important for precise navigation, especially in shallow confined waters and in areas where the littoral states share common maritime boundaries such as the Straits of Singapore and Malacca.

High positional accuracy of DGPS is obtained by measuring the difference between the signals from GPS satellites with a reference station at a known position. The DGPS correction values are determined and sent to vessels with DGPS receivers. These correction signals are transmitted on the medium frequency. The DGPS corrections are transmitted without charge to the maritime community and could be received at a distance of at least 200km from Singapore.

Electronic Chart Display and Information System (ECDIS) and Electronic Navigational Chart (ENC) Data

ECDIS is an advanced ship-borne electronic navigational tool for improving navigational safety and preventing marine accidents. It could be integrated into sensors such as the GPS/DGPS, echo sounder, speed log and gyrocompass for the conduct of safe navigation. The ECDIS uses electronic navigational charts (ENC), which is a geographical information system (GIS) containing charted and relevant nautical information produced or authorised by national Hydrographic Offices. The IMO adopted the performance standards for ECDIS and approved it as a paper chart equivalent in November 1995.

When integrated with the GPS/DGPS, the ECDIS can provide 24-hour real-time positioning and navigation assistance under all weather conditions, thus

preventing grounding and potential marine pollution. The automatic real-time updating of the ship's positions on the ECDIS allows the mariner more time to keep vigilant visual look out instead of being buried in chart work. It can also be integrated with an Automatic Radar Plotting Aid (ARPA) to provide anti-collision audio or visual alarms.

The ECDIS is especially effective in confined waters such as the straits, where the traffic density is heavy and there is poor visibility during haze condition, when there are forest fires, or adverse weather conditions.

Vessel Traffic Information System

In October 1990, a radar-based tracking system known as the vessel traffic information system (VTIS) was set up to monitor the traffic in the Singapore Strait. Incorporated into the VTIS was a voluntary reporting system for vessels transiting the strait. About 85% of the vessels participated in the reporting system.

Port Operations Control Centre

The VTIS and the reporting system were useful as they facilitated the exchange of essential traffic information to other vessels. For example, VTIS would generate timely alerts to vessels that were heading into dangers, thereby preventing accidents. Last year, the Maritime and Port Authority of Singapore completed a S$20 million programme to upgrade the existing VTIS at the Tanjong Pagar POCC and a new POCC established at PSA Vista, which is fully equipped with a state-of-the-art VTIS.

Automatic Identification System (AIS) Transponder

The IMO adopted the performance standard for a universal Automatic Identification System (AIS) transponder in May 1998. The AIS transponder implementation would be in phases with the first phase commencing on 1 July 2002. Vessel's positions in the AIS transponder are derived from the vessel's GPS receiver. Vessels equipped with AIS transponders would facilitate easy identification and exchange of information such as position, speed, course and other data between vessels and with VTIS centres. The AIS transponder would also prevent mistaken identity by a radar-based system, which has a risk of 'target swap'. In addition, the port authority could easily identify and respond quickly to the vessel involved in a potential emergency situation.

Singapore successfully conducted a pilot test on the AIS transponders from April to June 1999 to evaluate the performance and effectiveness of AIS transponders in enhancing navigational safety. Integrating the AIS transponders as one of the sensors to the ECDIS will be evaluated next. With the integration,

the AIS transponders would provide value-added information and assistance to mariners. It could present situational pictures showing the locations and identity of other vessels equipped with AIS transponders and at the same time ascertain the navigable waters and the dangers within the vicinity. As both the ECDIS and AIS transponder would most probably be sharing a common GPS or DGPS receiver, the possibility of positioning or geodetic datum errors would also be minimised.

The integration of AIS with ECDIS would improve the confidence level of mariners as it reduces voice communication and facilitate safe movements in the straits.

Initiatives to Complement the Technologies

Mandatory Ship Reporting System in the Straits of Malacca and Singapore (STRAITREP)

The STRAITREP was drawn up by the three littoral states in accordance with the IMO guidelines and criteria. The objectives are to:

• Enhance safety of navigation

• Protect the marine environment

• Facilitate movements of vessels

• Support the Search and Rescue (SAR) and Oil Pollution response operation

The operational area of the STRAITREP covers the Straits of Malacca and Singapore between 100° 40'E and 104° 23'E. It is further divided into nine sectors and each sector is assigned with a VHF channel. Integrated with the VTIS, the STRAITREP provides information to vessels on specific and critical situations that concern navigational safety at no cost to the users.

The STRAITREP was adopted by the IMO in May 1998 and put into force on 1 December 1998. Since its implementation, Singapore receives about 30,000 reports each month from vessels transiting and calling at the Port. With the STRAITREP, the Authorities have been able to provide traffic information, navigational assistance/advice and assistance in the coordination of search and rescue.

Marine Electronic Highway (MEH) for the Straits

The MEH has been approved by the Global Environment Facility and World Bank for implementation in 2001. A grant of US$350,000 has been provided for the development of a project brief and the IMO has been appointed the Executing Agency for the project.

The purpose of the MEH project is to use innovative technological tools to create, network and maintain a marine information infrastructure that would benefit public and private sector stakeholders. The project aims to develop essential tools for marine pollution prevention and control, marine environmental planning and management, and navigational safety.

The first Project Steering Committee comprising of members from the three littoral states and IMO representatives was held in March 2001 to discuss the implementation of the MEH. Singapore will be hosting a regional workshop where a Regional Action Plan will be formulated taking into consideration the respective national plans.

SHARED Program

In March 1997, the MPA and the United Kingdom Hydrographic Office collaborated to demonstrate the use of the world's first combined ENC/RNC (Raster Navigational Charts) database with ECDIS on board three international container vessels: the *Katrine Maersk*, the *Sovereign Maersk*, and the P&O NedLloyd *Shenzen Bay*. The demonstration covered the shipping routes between Southampton and Hong Kong via Singapore. The demonstration was then called the Singapore, Hong Kong, Admiralty Raster and ENC Demonstration. Besides the Hydrographic Offices (HOs) of the United Kingdom and Singapore, the HO of Hong Kong SAR also participated in the initial demonstration.

The main objective of this demonstration was to assess the safety, effectiveness and usefulness of integrated ENCs and RNCs with ECDIS for safe navigation. Additionally, it also aimed to demonstrate the practical exchange of electronic hydrographic data between national HOs. The demonstration has proven to be successful as well as useful, and the ECDIS initially installed are still on board two vessels and invaluable feedback from these ships is still being received.

With the success of the demonstration, the SHARED concept was extended to more HOs and renamed the SHARED Program with the first informal SHARED Program Meeting held in January 1998 in Singapore. The HOs participating in the Program has increased in number to more than ten: Australia, Canada, Chile, China, Hong Kong SAR, Indonesia, Japan, Malaysia, the Philippines, South Korea, the UK, the US and Singapore. With more demonstration projects extending to other parts of the world, several other HOs have expressed interest in participating in the SHARED Program.

In May 2000, the SHARED Program extended its demonstration beyond commercial shipping vessels. The Republic of Singapore Navy vessel RSS *Endurance* was fitted with a locally developed ECDIS and official ENCs and

RNCs for her circumnavigation of the world. Through the SHARED Program, the framework for the integration and delivery of official chart data covering the entire round the world route of *Endurance* was provided and integrated. ENCs and RNCs were provided by Canada, Indonesia, Malaysia, the US, UK and Singapore.

SHARED Program Round-the-World Demonstration

The SHARED Program recognises that the strength of ECDIS lies not only in its GIS capability but also in its versatility to be used for other applications in any country where IHO S57 data is available. The ECDIS technology provides a framework and platform for other navigational and non-navigational products. However, the priority task identified during the SHARED program meetings was to increase the maritime community's awareness of sources of official data, distributors and ECDIS manufacturers. In this respect, Singapore has been tasked to establish a web-site to serve this purpose.

Meeting International Obligations

Under the United Nations Law of the Sea Convention 1982 (UNCLOS), littoral states with rights to extended sea space, ie. territorial sea, EEZ or continental shelf, are obligated to (Article 194(1)) undertake either 'individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source'.

Recognising the obligations under UNCLOS, littoral states face problems with surveillance and enforcement of the large expanse of sea space. Hence, the littoral states have turned to the use of technologies such as VTIS, DGPS, ECDIS and satellite remote imaging to meet these obligations. The combined technologies and measures such as mandatory reporting have resulted in better coverage and effectiveness in enforcement. An example of technologies applied in the various areas of the marine industry such as fisheries where AIS transponders are installed onboard licensed fishing vessels.

Two of the practical difficulties of detecting illegal discharge from vessels are night time and the distance from the shore. To overcome these difficulties, technologies such as VTIS, DGPS and satellite remote imaging play a major role in the enforcement of requirements of MARPOL 73/78 and other international Conventions. For example, a significant achievement was made in January 1997 when the Singapore authorities successfully prosecuted a Singapore registered vessel, *Song San* anchored outside Singapore waters for illegally discharging oil and polluting Singaporean waters and coastline. The owners

and Master of the vessel were also charged under the Prevention of Pollution of the Sea Act. Besides evidence from conventional investigations, VTIS display and satellite images were submitted to the Court as evidence identifying the vessel *Song San* deliberately discharging oil into the sea in mid-August 1996 under the cover of darkness. Oil samples from the vessel were subsequently taken from the vessel and found to match the samples taken from the surrounding waters.

In considering the sentence, the Court took into account several factors. The owners and vessel had not maintained the mandatory oil record books of the vessel as required under Annex 1, Regulation 20 (Oil record book) of MARPOL 73/78. The offences were aggravated by the fact that Singapore is the world's busiest port, and being strategically located makes it particularly vulnerable to pollution. In addition, the increasing marine and leisure activities raised the need to keep the waters pollution free. More importantly, the offences were committed in total disregard of any concern for the marine environment.

The use of technologies extends beyond navigational safety and emphasises the need to be prepared and ready to combat oil spills. Indonesia, Malaysia and Singapore are members of the Oil Spill Preparedness and Response (OSPAR) project with technical assistance and equipment supplied by Japan. In addition, a Revolving Fund was established for the Singapore and Malacca Straits in 1981. It is a reserved fund provided by Japan for use in clean-up operations.

Main Benefits of Technologies and Initiatives to Users and Littoral States

The technologies and initiatives that have been implemented in the straits have been in conformance with international conventions, guidelines and standards specified by the UNCLOS, IMO, IALA and the International Hydrographic Organisation (IHO).

Some of the main benefits derived from the technologies and initiatives that have been implemented for the straits to enhance navigational safety and protect the marine environment are:

- Availability of continuous high positional accuracy of ± 10 metres under all weather conditions provided by the DGPS for precise navigation.

- Adoption of standard geodetic datum for charting and positioning system such as the ECDIS and DGPS ie local datum is replaced with the World Geodetic System 1984 (WGS 84).

- Increase mariners' confidence in navigating in confined waters through the use of ECDIS/ENC for route planning, monitoring and displaying of chart information.

- Reduction in voice communications with the aid of the VTIS as vessels are automatically tracked, which facilitates easier identification and dissemination of information/warning to vessels heading into danger. Voice communication could be further reduced with AIS.

- Provision of updated hydrographic information on shoals, wrecks and obstructions in the straits

- Clearly defined east and west bound traffic routes throughout the entire stretch of the straits.

- Provision of traffic and navigational assistance and advice to vessels.

- Prompt assistance in the coordination of search and rescue.

The technologies and initiatives implemented have been transparent to the users. More importantly, the right of navigation through the straits has never been undermined or compromised.

Concept of Burden Sharing

Presently, the maintenance of aids to navigation, conducting of hydrographic surveys and combating of oil spills rest mainly with the littoral states bordering the Singapore and Malacca Straits. To date, only Japan has provided some funding to support these activities.

The rising number of marine accidents and pollution in the busy waterways used by international shipping has led to some littoral states advocating the concept of burden sharing. In a study conducted by the Sakura Institute of Research in 1999 on the traffic flows in the Straits of Malacca and Singapore, it quoted International Monetary Fund statistics linking growth rates of economies in the region to trade trends. It argued that based on the research and statistics, littoral states could justifiably seek funding support to defray the costs of these services provided to users of the straits.

Singapore together with the IMO has taken the initiative to jointly organise international symposiums to identify and discuss possible models for burden sharing. Whilst this issue is being debated, the littoral states are left with the burden of funding the maintenance of services essential for safe navigation.

Conclusion

Enhancing navigational safety and protecting the marine environment are major challenges for the littoral states in the straits. Recognising that there is an urgent need to reduce the risk of marine incident in the area of high traffic density and confined waters, littoral states in the straits have cooperated and implemented several major initiatives such as TSS, STRAITREP and hydrographic surveys. At the same time, there has also been investment into technologies such as VTIS, ECDIS, ENC and DGPS to facilitate the safe navigation of vessels. In the process of implementing the technologies or initiatives, the littoral states have always recognised and consulted the IMO and other international authorities on issues affecting users of the straits.

The implementation of these technologies and initiatives is aimed at providing better positional accuracy and chart information for navigation. Furthermore, it facilitates timely exchange of information between vessel and shore-based centres. All these have benefited both the users and the littoral states

The investment in technologies and initiatives is designed to enhance navigational safety and protect the marine environment benefiting both the users and littoral states. It may be timely for users and littoral states to step up discussions on the concept of burden sharing.

Part | 4

New Threats to Shipping and Seaborne Trade

Cyber-threats to Maritime Trade and Port Infrastructure | 9

Dr Wei-Ming Ma

The maritime transportation system's efficiency and convenience is essential to strengthen a nation's economy, security, and quality of life. In order to achieve this, the sea lines of communications (SLOC) must be open, accessible and convenient to all people. During the past decade, the increasing use of automated systems and devices has stimulated unprecedented prosperity, with the ultimate goal to attain full automation of maritime and port operations.

In the meantime, the maturing of the information age has also led to new types of threats and vulnerabilities to critical infrastructure. Critical infrastructure is those systems whose incapacity or destruction would have a weakening impact on the defence or economic security of the nation. Critical infrastructure relating to maritime trade includes information and communications, transportation, waterway systems, emergency services etc. The function of critical parts of a nation's economy, government and national security now depend upon computer-managed information networks, and this infrastructure increasingly relies on interconnected information systems and networks.[1]

In recent years, most nations have faced unprecedented competition in international trade, with a demand for a rapid marketing of products and a real-time response. A sound transportation system, of which maritime communications plays a crucial role, is necessary. The adoption of information technology, which improves the competitiveness and efficiency of both port and maritime services, has become one of the key factors to success in modern business.

Cyberspace is the information space consisting of the sum of all computer networks and is the common thread that runs through the nation's critical infrastructure, from the electric power grid, to waterways, to the military etc. In cyberspace, national borders no longer exist; electrons do not stop to show their passports.

Before World War II the oceans served as defensive firewalls to protect the homeland from enemy attacks. Nowadays, cyber-attacks can be conceived and planned without detection, and then mounted in a matter of minutes or even seconds, without revealing the identity and location of the attacker. The age

of cyber-attack presents a new challenge to SLOC protection and to the military. With the characteristics of simple attack, low cost, high efficiency and drastic effect, a cyber-attack covers a wide range.

The main objective of this paper is to promote a greater understanding of the cyber-threats to maritime trade, raise awareness of these issues as well as to prepare to fight such attacks. The maritime industry's dependence on computer and information applications is examined, the possible impact of cyber-attack on maritime trade is described and options to protect against such attacks are proposed.

Maritime Industry Reliance on Information Technology

Changes in the volume of ships and the patterns of traffic in ports have highlighted the need for information systems that can provide port and ship operators with the tools to manage their systems safely and efficiently. Reliable electronic information systems are becoming increasingly important and the demand for better maritime information systems is expected to grow. Changes are also taking place in ship crew sizes, operational practices, and navigational technology, the trend is to reduce ship crew sizes and rely more on automated equipment.

Recent advances in information technology could greatly improve the safety and efficiency of the maritime trade and the routine operations of ports and ships. The safety of maritime transportation is a major factor in international trade and the economic well being of most countries. This safety relies on the quality of the information systems that are adopted by the ports and ships.

Automatic Control Systems

Some of the most urgent needs of mariners are for accurate, real-time information about harbour and waterways conditions (water depth, weather, currents and tides). If this information is inaccurate, then the ship is at risk. Both ship safety and transportation efficiency depend on the availability of hydrographic data and traffic management information. Greater use of information technology on the ship can promote economic and safe operation, reduced costs, and solve the problem of a global shortage of well-trained merchant crews.

The US Department of Defense originally developed the Global Positioning System (GPS) for military applications. The 24 geo-stationary GPS satellites are used increasingly world-wide to provide position, velocity and precise time, 24 hours a day, anywhere in the world for civilian aircraft, ships and handheld units used by campers. Although GPS provides precise navigation data, its vulnerability to a cyber-attack has not been assessed.

An electronic chart is a digitised version of a paper nautical chart, with a graphic representation of water depth, shorelines, topographical features, aids to navigation, and hazards. The electronic chart display information system (ECDIS) receives position data from radio navigation instruments and integrates them with a voyage plan and hydrographic database to provide real-time display of the ship's position with respect to the chart and voyage plan.

An automatic identification system (AIS) can send ship information (identification, position, heading, length, beam, type, draft, and hazardous cargo carried) to other ships, as well as to the shore. The receiving stations can display the locations of all AIS-equipped ships on an electronic chart or on a radar screen.

The integrated bridge system (IBS) applying current information technology is already installed on many merchant ships and warships to improve the efficiency of the navigation process and safety.[2] The IBS generates synergies from the network of ECDIS, automatic radar plotting aid, ship-control display systems, automatic steering control system, main engine room control, onboard weather route system, navigation sensor systems and echo sounder, as shown in *Figure 1*.

Figure 1 – Onboard Integrated Bridge System
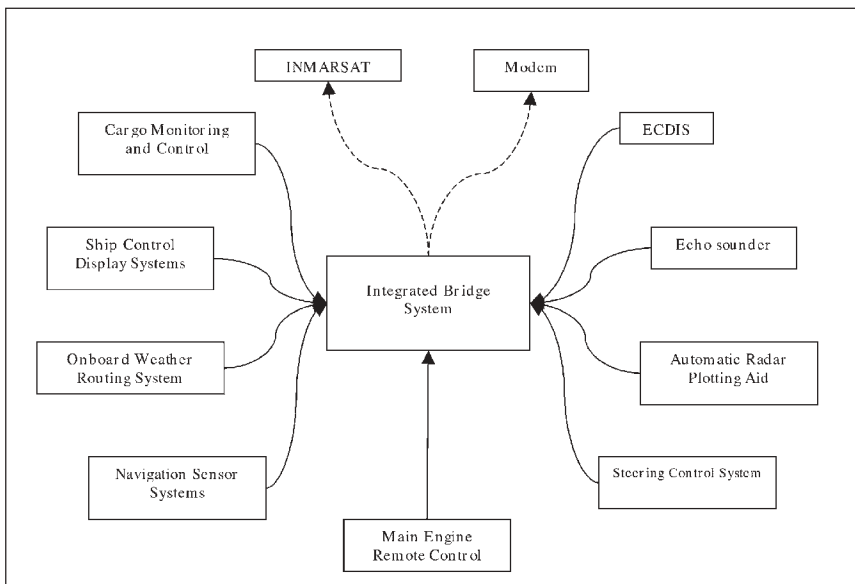
The bridge system can also connect to the shipping companies or other computers using satellite communication (INMARSAT) or modem via the Internet. Any modification to an electronic chart or to a Marine Notice can be upgraded via the Internet or by a disk file.

Port Services

The functions and services of port operations have evolved from 'rapid loading and unloading' to 'rapid cargo withdrawal and delivery to cargo owners'.[3] In meeting these challenges, important international ports such as Singapore and New York, have introduced electronic data interchange (EDI) as a means to transmit port operations information and documents. Through rapid computer processing, human error is reduced, operational efficiency is improved and the goal of rapid cargo distribution is attained.

EDI was developed for streamlining port and maritime operations, improving operation flow and to upgrade handling efficiency through integrating information technology and telecommunications applications. EDI is the paperless, electronic transmission (through telecommunications networks) of commercial documents in standard format directly from a company's computers to those of another company. EDI reduces the need for re-entry of data and minimises human error. It improves document-processing efficiency and enhances the quality of information processing between companies. The major components of EDI include the EDI standard, software, hardware, network and the information exchange centre. The EDI standard UN/EDIFACT provided by the United Nations is in worldwide use.

Applying information and telecommunication technology, port and maritime information can be interchanged, transmitted, processed and analysed among computers and networks of relevant units such as the Department of Transportation, Customs, shipping companies, cargo owners, financial institutions and the Harbour Bureau. For example, the PORTNET used in Taiwan's Keelung Harbour is an EDI as shown in *Figure 2*.[4] The Trade-Van Network, developed by the Financial Department, Republic of China provides regular service between the companies of EDI, data base inquiry, e-mail and packet switching. The financial EDI network connects financial institutions, the Harbour Bureau and other users.

Figure 2 – PORTNET Architecture
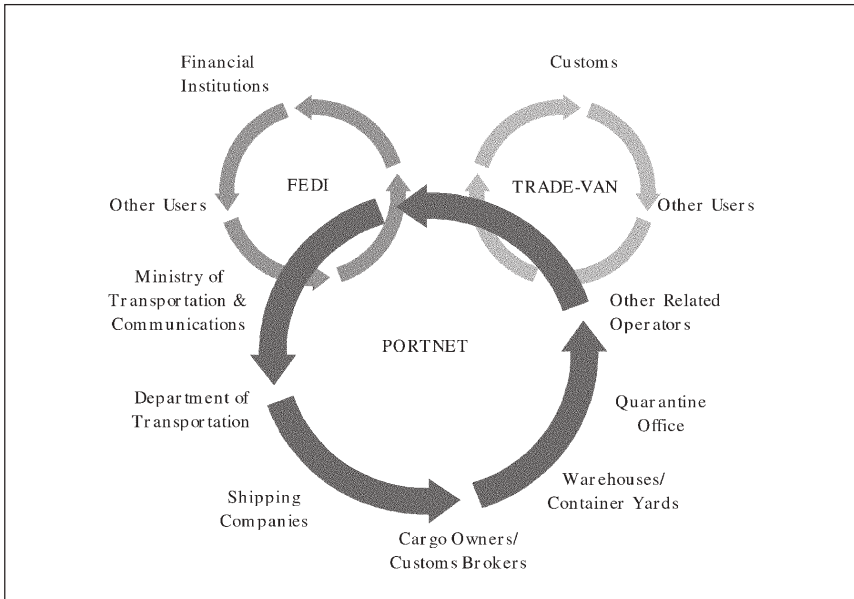
Vessel Traffic Services

Vessel Traffic Services (VTS) are designed to improve the safety and efficiency of vessel traffic while protecting the environment. The VTS provided in major ports around the world incorporates ECDIS, electronic navigation chart applications, ARPA radar, harbour video monitoring systems, vessel traffic management control to monitor vessels arriving and departing the port.[5] These functions provide vessel traffic information, navigation safety aids, navigational assistance and emergency services.

VTS has the capability of interacting with the traffic and responding to traffic situations developing in the VTS area, which is approximately 40km out to sea from port. The US Coast Guard reported that the VTS had assisted the safe movement of over 30,000 vessel transits and 5,000 deep-draft vessels annually in the Port of Los Angeles-Long Beach.[6]

Naval Operations Centre

The primary mission of a navy is to safeguard the security of territorial waters and maritime trade. In peacetime, a navy is responsible for marine reconnaissance and patrolling and the escort of ships. In wartime, its mission

is to carry out counter-sea blockades, harbour defence and surface interception operations to ensure command of the sea and protection of the shipping routes.

Naval operations and harbour defence are integrally conducted using command, control, communications, computer, intelligence, surveillance and reconnaissance (C4ISR) systems in the naval operation centre. The automatic command system in the Centre integrates the information gathering system, the information transmission system, the information processing system, the information display system and the operational decision-making system with the naval commander, as shown in *Figure 3*. The information gathering system collects naval intelligence, surveillance and reconnaissance data from radar, sonar, satellites and AEW&C aircraft. The information transmission system uses optical fibre cable, cable, satellite, radio and microwave. The information processing system extracts, classifies and analyses the information. The information display system shows the processed information in text and graphic form. All these systems are connected by tactical data links, and these links are vulnerable to cyber-threat.

Figure 3 – Navy Automatic C4ISR System
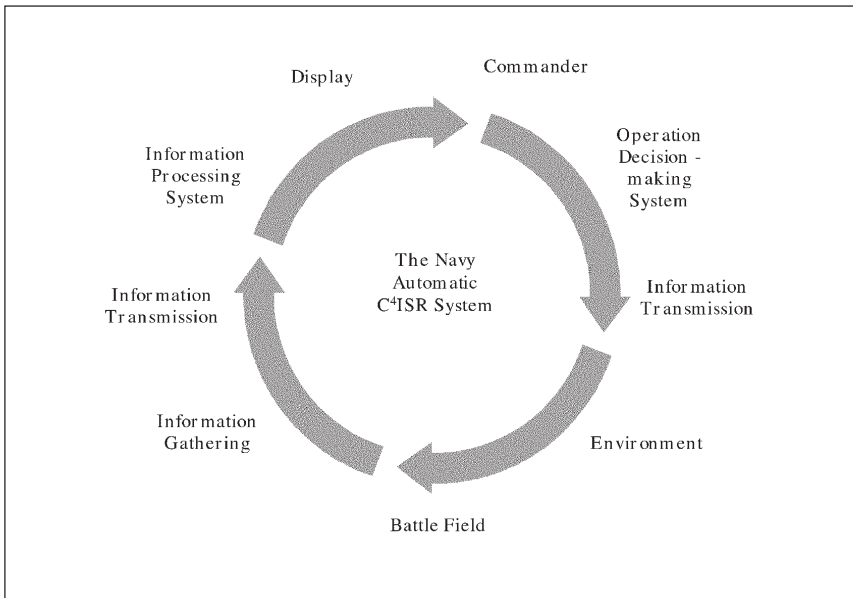
Cyber-threats to Maritime Trade and Port Infrastructure

One major difficulty that distinguishes cyber-threats from physical threats is determining the system being attacked by whom, why, how and from where. This difficulty stems from the ease with which individuals can hide or disguise their tracks by manipulating system logs and directing their attacks through networks in various countries before hitting their ultimate target. Potential threats can be from an enemy, foreign intelligence services, terrorists, insiders and displeased employees. A potential enemy has the capability to conduct information warfare through an attack on the C4ISR system in the opening phase of a war to numb the attacked party's directing capabilities.

Foreign intelligence services have adapted to using cyber tools as part of their information gathering and spying tradecraft. Terrorists are known to use information technology and the Internet to formulate plans, raise funds, spread propaganda and to communicate securely. Insiders consist of employees, former employees, contractors and others with the right to access an organisation's information resources. This group is generally considered to be an organisation's biggest threat and may be motivated by monetary gain or revenge. About one half of company respondents to a survey reported malicious activity.[7] The displeased insider is the principal source of cyber-threat. Insiders do not need a great deal of knowledge about computer intrusions, because their knowledge of their victim's systems often allows them to gain unrestricted access to cause damage to the system or to steal system data.

While remote access once required a fair amount of skill or computer knowledge, the recreational hacker can now download attack scripts and protocols from the Internet and launch them against victim sites for the thrill. Thus while attack tools have become more sophisticated, they have also become easier to access and use; an attack can be launched from an Internet cafe.

C4ISR

Unlike the familiar national security threats of the past century, cyber-attacks can come from anywhere in the world. They can originate from any location, can disguise their origins and transmittal routes, and can do so instantaneously. Without firing a shot or crossing a border, an enemy with the right tools and techniques can damage critical infrastructure and information security. This can directly harm business by disrupting operations and eroding consumer confidence. Serious problems can lead to major disruptions throughout the economy and also delay military response times.

Potential enemies are developing and running information warfare programs because they cannot counterbalance the military power of an opponent, and

because they believe that without a direct military conflict, the information operation causes less negative effect to the international community. They also believe that information operations are a way to strike at a country's reliance on information technology to control critical government and private sector systems. For example, an enemy could use unconventional measures, including the propagation of computer viruses on an opponent's information systems, and the propagation of rumours on the Internet to try to discomfort the targeted population with a bloodless war. Such cyber-attacks do not cause any disruption to military effort, but are signs of much more serious physical attacks.

Common information security gaps, including a lack of training, have existed for years and continue to be exploited by some military units. According to a US Defense Intelligent Agent System report, of 9000 computer systems considered to have unbreakable security, 88% were successfully attacked by hackers, with only 4% of those attacks being detected in real-time. In another example, the United States Department of Defense brought together a group of hackers who managed to access the nominated computers within 15 minutes without detection by system administrators.[8] It is also reported that hackers attack the Ministry of National Defense website at least three times a day.

The commercial off the shelf technology that has been used by the military around the world is simply not safe from potential cyber-threats. A computer virus is a very small program designed to spread unnoticably by attaching itself to other executable program code, which acts as a host for it. The host code could be office applications, utility programs, games or special documents created by a word processing program that contains embedded computer instructions called macro commands, which are not standard text electronic mail. These contain executable code that runs automatically when the e-mail message is opened. Macro viruses reside in word-processing and computation programs that are carried in documents attached to e-mails.[9]

E-mail is one of the most popular network services with relatively low risk, but that does not mean it is risk free. Accepting e-mail ties up computer time and disk space, making one vulnerable to 'denial of service' attacks, although with proper configuration, only the electronic e-mail service will be denied. The computer viruses spreading unpredictable and denial of service attacks have shown just how vulnerable information systems are to relatively unsophisticated methods of attack. Trojan horses and computer viruses such as the recent Melissa virus are instructive as another attacker might use a similar mechanism to propagate a more targeted, more hostile code to sea line communications.

Electromagnetic pulse (EMP) weapons emit broadband pulses and produce a sharp, pulsed electromagnetic radiation that spans two or more decades of frequency. The effect is to disable or destroy electronic equipment that the radiation impinges upon—the target might be a computer, tele-communications receiver, navigation system, or alarm system. The EMP weapon can be broadband or narrow-band, directional or undirectional, and single pulse, repeated pulse or continuous wave. The EMP transient field typically produces a high-voltage spike on exposed cables and wiring—this will disrupt or damage exposed semiconductor circuits. Devices in this category include nuclear EMP, flux generator EMP and spark-gap devices. Of these, nuclear EMP devices are the most powerful and damaging, producing both electrical breakdown and thermal damage.[10]

Automated Control Systems

At present the security of the port management information system depends solely on the design of the mainframe.

Forno has outlined the problems experienced by the USN's Aegis cruiser USS *Yorktown*, which was dead in the water for several hours due to a basic programming problem.[11] The problem was due to bad data being put into the computers which caused them to try to divide a number by zero. It seems the *Yorktown's* computers were not designed to tolerate such a simple failure.[12] This incident is representative of what an adversary could do to a warship without firing a missile or conventional weapons.[13]

Telecommunications Systems

Microwave communications can be easily jammed. An 8-watt jammer, costing less than $4000 from a Russian company could repeatedly jam the microwave signals from the GPS or GLONASS over a 200km radius. These Russian made jammers would give terrorists and other adversaries a tool for disrupting aircraft navigation systems, GPS-guided cruise missiles, and other GPS-reliant systems.[14] A 5-watt Air Force transmitter that cycled incorrectly, jammed GPS signals out to 300km in New York State and this continued for two weeks before being corrected.[15] If a potential enemy intrudes into the Data Link, gains access to an opponent's GPS system to introduce incorrect data, then information errors will occur.

In 1998, an international group of hackers claimed to have stolen a suite of programs used to run classified US military networks and satellites. The software, called the Defense Information Systems Network Equipment Manager (DEM) was taken from a Windows NT server operated by the US DOD. The hackers said the software was used to monitor and manage military computer-related

equipment, including routers, repeaters, switches, military communication networks and GPS satellites and receivers. They claimed the DEM software could be used to monitor or shut down military links or to track GPS.

As an example of the impact of satellite vulnerability, a communications satellite lost track of Earth and cut off service to nearly 90% of the 45 million pagers in the US, which not only affected ordinary business transactions but also physicians, law enforcement officials, and others who provide vital services. It took nearly a week to restore the system.[16]

Other Port Infrastructure

Disabling the transportation computer systems operating in ports could degrade vital national interests—economic prosperity and military readiness. A cyber-attack on a port's switching systems could also make it impossible to deploy military forces at the pace specified in operational plans.[17]

The undersea telecommunications cable linking the continents was ruptured on the sea floor between Singapore and Taiwan recently, causing major ISP delays, slow access or no access at all.[18] Although telecommunications returned to normal after several hours, the telecommunications companies compensated their customers for loss of access by reducing their monthly rental fee. The cause of the damage to the undersea cable is unknown and could include a ship's anchor or an earthquake.

Protection from Cyber-threats

The vulnerabilities of information exchange on the Internet include assuming the identity of another person to transmit information, altering contents of the information, repudiation of the receiver or sender, and stealing the contents of the information for another person.

The security policies applying to information technology are identified authentication, information integrity, exchange non-repudiation, and confidentiality. Defensive information warfare is concerned with risk management, not risk avoidance at all costs. The principles of protection from cyber-attacks are the following:

- network isolation
- secure environment
- backup systems and software upgrades
- system firewalls and hardware configuration
- education and cooperation

Network Isolation

The information networks of critical departments such as transportation and defence should generally be divided into two parts. One is the Intranet, which should not link to the World Wide Web. The other is the Internet, which provides the public with information about the department. The network should be constructed in such a way that there is a physical partition between the two with the security system functioning to prevent any invasion of the inner network.

Secure Environment

As the Internet is becoming the major information exchange method between organisations and companies, attacks against the PORTNET and EDI information will most likely come via the Internet. A secure environment on the Internet with digital signatures, security certification and personal identification is required before EDI should be transmitted over the Internet. This will involve the use of encryption technology, where plain text is transformed to cipher text in the encryption process, and reversed in the decryption process. Some of the algorithms used in this process are the symmetric cryptographic algorithm with secret key and the asymmetric cryptographic algorithm with secret and public key pair.

Backup Systems and Software Upgrades

Although the automatic control system is highly reliable it can fail. In the event of an emergency, it should be possible to transfer the automatic control system to a backup site and have it operational within a short period of time. Computer backups also provide some level of protection against planned attacks, accidents and natural disasters. Regular updating of anti-virus software and firewalls by the system administrator, as well as the use of a confidential encrypted database will ensure the security of the network as well as the confidentiality of the data.

System Firewalls and Hardware Configuration

A firewall is a component or set of components that restricts access between the protected network and the Internet, or between other networks. An Internet firewall is most often installed at the point where the protected internal network connects to the Internet. It serves multiple purposes, restricting the ability of people to enter or leave the network at a carefully controlled point and by preventing attackers from gaining access to the network's protective systems.

The networks power supply and linkages to other systems is at risk of an EMP strike. As fibre-optic cable is immune to any kind of EMP attack, the network

connections need to be replaced with such cabling. The power supply needs to be protected against high voltage spikes or high frequency radio voltages injected into the power supply.[19]

Education and Cooperation

There are risks in connecting to the Internet: the data or information stored on computers, resources and the computers themselves. The three basic categories of attacks on information systems are intrusion, denial of service and information theft. Intrusion is the most common form of attack, where intruders use the computers as if they were the legitimate users. A denial of service attack is where the attacker's aim is to prevent use of the computer. An information theft is where an attacker steals the data or information from the computer network.

One study has estimated that 55% of all security incidents are actually the result of new or untrained users doing things they should not.[20] It is not uncommon for companies to accidentally destroy their own data or release it to the public, firewalls are not designed to deal with this kind of problem. Since there is no known way to protect against accidents or stupidity, systems administrators need to control network activities, for example, multi-player games on the Intranet should be safe, but should not be allowed via the Internet.

Users need to be educated as to what data is for internal use and what is available for external use. As long as users have been properly trained, and the e-mail service is isolated form other network services then denial of service attacks should only have a limited impact.

As the private sector owns most of the national infrastructure, safeguarding this infrastructure from cyber-threat requires effective cooperation between the private and public sectors, as a country's economic well-being, national defence and vital functions depend on the reliable operation of these systems.[21] A country needs to develop an information warfare capability focusing on security and counterattack across various information systems, military intelligence systems and weapons systems to be able to both investigate and frustrate possible information attacks. Use of the private sector in developing an information warfare capability not only increases combat power, but also enhances industry.

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Unlawful Activities at Sea: An Australian Perspective | 10

Clive Williams MG

This paper will focus on the Asia Pacific region and examines a range of unlawful maritime-related activities, particularly as they affect Australia, including:

- Illegal Immigration
- Narcotics Trafficking
- Arms Trafficking
- Illegal Fishing
- Environmental Crime
- Maritime Terrorism
- Maritime Piracy

Illegal Immigration

This takes two forms: *covert* and *overt*. Covert applies to immigration that is generally conducted with forged documentation, usually by air—so it falls outside our area of interest today. There have been some well publicised covert attempts to enter by boat on the east coast of Australia, mainly by ethnic Chinese, but these are believed to have all been unsuccessful—insofar as no-one apprehended in Australia for being here illegally has been discovered to have arrived covertly by boat.

The other form of illegal immigration is the overt kind, mainly by economic refugees who arrive by boat from Indonesia on our west and northern coasts and offshore islands, and immediately seek refugee status on the basis that they will be persecuted if they are returned to their home country. Most of these are Pakistani, Iranian, Afghan, and Iraqi nationals, as well as Kurds who have no homeland. They are well briefed on their legal rights, to claim that they have come from Afghanistan or Iraq, and have been coached on what questions they will be asked, and how to respond. There were 5,868 illegal arrivals in 1999-2000, 4,175 by boat, up from 224 in the same period ten years ago. Boat entry to Australia is well organised, mainly by people smugglers operating out of Indonesia and Malaysia. To date, sea containers do not appear to have been used for people smuggling into Australia. Stowaways on ships can however pose general problems for shippers related to potential health risks and violence to crew, cargo contamination, landing fines, and incarceration costs.

Narcotics Trafficking

Most of the heroin imported into Australia comes in sea cargo containers offloaded in Sydney. It is then distributed throughout Australia by Vietnamese and Chinese gangs operating out of the western suburbs of Sydney, particularly the Cabramatta area. The points of origin of the heroin are the Golden Triangle and the Golden Crescent and it arrives via Macau, Jakarta and Singapore. Throughout the region, heroin has a very substantial knock-on effect in creating other crime to pay for the heroin. Cannabis is the most commonly used illicit drug in Australia. Most is grown in Australia, but importations occur by sea from India, Tanzania, Turkey, South Africa and the US. Other drugs arriving by sea include amphetamine-type substances (such as ecstasy), cocaine, pharmaceutical and performance enhancing drugs. In 2000, the UK, Malaysia, the Netherlands and Indonesia were the most common points of origin or transhipment for importations into Australia of ecstasy. Cocaine entered mainly through airline passengers, private yachts, air cargo and sea cargo; originating from the US, Argentina, South Africa and the Netherlands. The use of cocaine is increasing in Australia, including speed-balling—the mixing of heroin and cocaine. During 1999-2000 record seizures were made by Australian Customs. NSW, and the Cabramatta area, again feature as the major distribution points.[1] Suspicions of narcotics on a ship can result in detention of the vessel for detailed search, fines against the owners if drugs are found and legal proceedings that could delay the vessel in port.
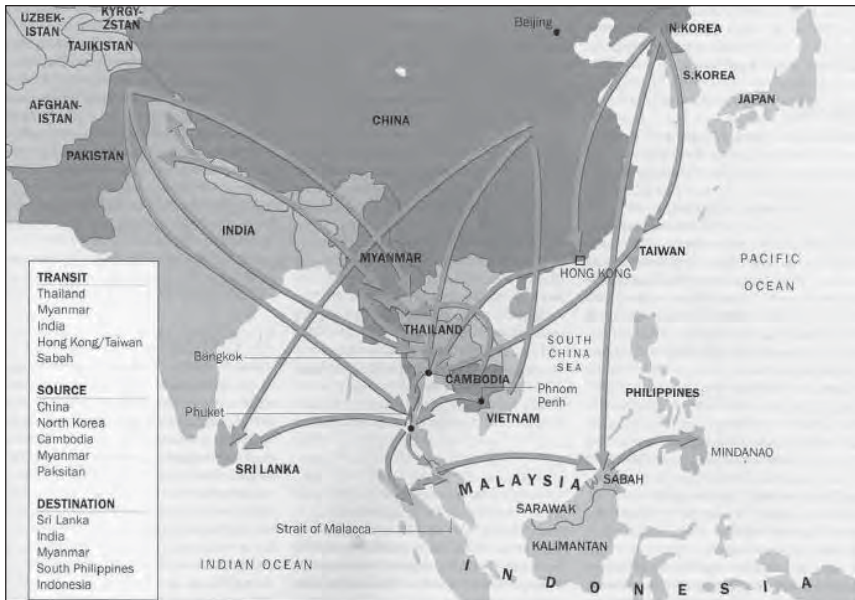
Arms trafficking

Clearly sea containers provide the best method of illegally trafficking arms. In the good old days they were always labelled as containing tractor parts. There is ample evidence of ongoing arms trafficking by sea into the southern Philippines and Sri Lanka and, more recently, into Maluku and other areas of Indonesian internal conflict. Apart from the interception of a consignment of weapons bound for Fiji in 1988 and PNG in 1997 (the so-called Sandline affair), there has been little evidence of any significant importations into Australia or the Southwest Pacific. Most of the maritime trafficking originates from areas of former conflict, such as Indochina or the Koreas, where weapons are readily available, or from producer countries such as Thailand, China, Russia, the former Yugoslavia and the Ukraine.

Illegal Fishing

International illegal fishing as it affects Australia can take a number of forms:

- from large scale professionally organised illegal fishing around Australia's McDonald, Heard and Macquarie Islands in the Southern Ocean

Small Arms Trafficking Routes in South Asia

TRANSIT
Thailand
Myanmar
India
Hong Kong/Taiwan
Sabah

SOURCE
China
North Korea
Cambodia
Myanmar
Paksitan

DESTINATION
Sri Lanka
India
Myanmar
South Philippines
Indonesia

- to deliberate encroachments of the EEZ by fishing trawlers from Taiwan and South Korea

- to theft of protected marine life by local Indonesian and PNG fishermen in northern border waters

Fish stocks in the Asia-Pacific region are under increasing pressure. The Far East consumes more fish than any other region. Japan, for example, with 3% of the world's population, catches 15% of the world's fish. Illegal fishing throughout the Asia-Pacific region exploits any area where there is a lack of territorial control, with little regard for conservation necessities, poaching of protected fish species is common. In the case of some smaller South Pacific states political corruption has already allowed external over-exploitation of fishing stocks to occur.

Environmental Crime

There is currently no reliable data on the extent of maritime environmental crime in the Asia-Pacific region. Crimes that damage the maritime environment and endanger wildlife are becoming increasingly transnational and organised in nature. The United Nations Interregional Crime and Justice Research Institute

(UNICRI) is currently undertaking an ambitious research project to explore the scope and nature of organised crime's involvement in environmental crimes. The project aims to explore the scope and nature of the illegal transport, storage, dumping, and trans-border trafficking of domestic waste, toxic waste, nuclear materials and ozone depleting substances, as well as the illegal traffic in endangered animals, plants and their products. The project will identify the modalities of infiltration of organised crime into legitimate trade, as well as the techniques and routes used for illegal trafficking. The existing data will be critically reviewed in order to form a reliable platform for new initiatives and for the revision of existing laws or enforcement strategies to specifically counteract the involvement of criminal organisations in crimes against the environment. The envisaged duration of the project is two years.[2] Not covered by the report are common environmentally damaging activities such as dumping of rubbish overboard, flushing of bilges and tanks, and discharge of pollutants. Even inadvertent or accidental pollution by vessels in territorial waters or in port can now result in very substantial fines, compensation demands in the millions of dollars, and temporary impounding of the vessel concerned.

Maritime Terrorism

Maritime terrorism, which differs from piracy in that the motivation is political or ideological, rather than criminal, is confined to two areas in Asia—Sri Lanka and the southern Philippines. The Sri Lankan Tamil separatist group, the Liberation Tigers of Tamil Eelam (LTTE), better known as the Tamil Tigers, has regularly conducted attacks on shipping, mainly Sri Lankan coastal shipping and Sri Lanka Navy vessels, since the group became active in the 1970s. One attack with machinegun fire on a Panama-registered bulk carrier off Sri Lanka in 1998 resulted in the death of thirty-three crew and the wounding of seventeen others. The Muslim separatist group, Abu Sayyaf, has been active in the area of the Sulu Archipelago since 1991. Its maritime activity is primarily directed at the capture of foreign nationals for profit and publicity, the most recent case being its kidnapping of foreign nationals from the Malaysian resort island of Sipadan in April 2000. The Sulu archipelago has of course been a pirate's den for hundreds of years. The Moro Islamic Liberation Front, or MILF, based in Mindanao, has also undertaken attacks on Philippines shipping, mainly by placing bombs on domestic inter-island ferries being used to transport members of the Armed Forces of the Philippines and Christians to and from Mindanao.

Maritime Piracy

The global piracy situation has been worsening over recent years, both in terms of numbers of incidents and levels of violence. The number of piracy incidents worldwide for the past three years was 1998 (202), 1999 (300), and 2000 (469)—an all time high. And there is probably significant under-reporting of incidents. Of the 469 attacks worldwide last year, 305 (or 65%) occurred in Asian waters. The level of violence in Asia has also been increasing, with 50 crew and passengers killed and 21 missing in 2000, as part of a global figure of 72 killed and 26 missing. The Asian incidences of piracy in 2000 occurred in the following waters: Indonesia (119), the Malacca Straits (75), Bangladesh (55), India (35), Malaysia (21), the Philippines (9), Thailand (8), and Vietnam (6). These areas are also high-risk for private yachts. Looking in more detail at the 2000 data, and considering successful and attempted attacks, 62 of these attacks occurred while vessels were under way, as opposed to berthed or anchored. There were a further 73 attempted attacks on vessels under way. There were three incidents in 2000 involving Australian flagged vessels.[3] There are essentially three kinds of pirates operating in Asian waters:

- Criminals from the local area in groups of up to 20, who prey on vessels to steal money, valuables and ship's property.

- Criminal gangs who rob the crew and steal the cargo.

- Criminal gangs who take over the vessel, re-flag it, steal the cargo, and run a phantom ship.

The first kind invariably operates with the full knowledge of corrupt local officials, particularly in Indonesia. The pirates will generally not offer violence if the crew does not resist. The latter two kinds operate as well-organised transnational criminal enterprises, prepared to use extreme violence. They depend on corrupt officials, particularly in south China, to be able to market the cargoes and stay in business. Of the 305 Asian attacks last year, eight fell into the latter two categories.

Conclusions

The main problem area for the Asia-Pacific region, in terms of freedom of seaborne trade, is maritime piracy. In those areas where arms are not already freely available, maritime arms trafficking can have a significant effect on regional stability. For coastal countries like Australia, which rely on maritime activities and the maritime environment for their well being, the main maritime problem areas are narcotics trafficking, illegal immigration, illegal fishing and environmental crime.

Notes

[1]   See Australian Bureau of Criminal Intelligence, *Australian Illicit Drugs Report 1999-2000*, 2001.

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Part | 5

The Protection of Seaborne
Trade and the Role of Navies

Security of East Asian SLOCs and the Role of Navies | 11

Professor Seo-Hang Lee

With the growing interdependence of the world, it is hard to imagine a coastal nation that does not, in some important ways, depend on the sea to carry out its essential trade. The idea that the seas are of vital importance to nations has been addressed eloquently by many scholars and writers. For instance, John N Moore once wrote that for many centuries the majority of countries in the world have depended on the free passage of goods across the sea for their existence.[1]

At the regional level, East Asia encompasses a huge maritime area and is not an exception to this dependence. Over the past few years, the East Asian region has recorded the highest economic growth rate in the world, and one of the fundamental characteristics of this growth is that it is based on seaborne trade.

In East Asia, the heavy dependence on seaborne trade has led to a significant increase of shipping carrying exports to other parts of the world as well as within the region itself. Almost all East Asian countries are dependent on the security of the sea lines of communication (SLOC), and the protection of merchant shipping both in times of peace and war is a task which no country in the region can ignore. The end of the Cold War and the dissolution of the Soviet Union have reduced or significantly changed the perceived threat to the SLOCs. However, the draw down of US forces has tended not only to reduce its capability as the principal defender of the SLOCs but also to create discomforting strategic uncertainties. Such a strategic scene has important maritime implications and provides countries in the region with the challenging task of protecting SLOCs. In seeking to protect their coastlines and maritime trade routes from attack, East Asian navies are turning increasingly to submarines that are difficult to detect and armed with weapons that can sink even the largest warship.[2] In recognition of these issues, this paper will examine the major sources of threat to East Asian SLOCs and the role of navies in enhancing SLOC security.

Vital Importance of East Asian SLOCs

Perhaps the most powerful factor boosting the importance of East Asia's maritime environment is the rapid rise of the region's economy. East Asia has achieved remarkable economic success in the past two decades. In particular, it has the

fastest growth rate among all regions of the world since the 1980s. Asia's newly industrialised economies (ANIEs), namely the Republic of Korea, Taiwan, Hong Kong and Singapore have consistently grown since the 1980s, largely because of the successful pursuit of export-led development policies. The newly developing countries in East Asia, such as Thailand, Malaysia, Indonesia and China have also successfully adopted export-led development strategies following the example of Japan and the ANIEs. Accordingly the pattern of growth in these countries resembles the ANIEs. These newly rising East Asian economies have grown much faster than other developing countries in the world in the past ten years. The World Bank once predicted that by 2020, seven of the world's 10 largest economies (in purchasing parity terms) would be located in Asia, while only two will be in Europe.[3] The uncertainties about recent regional developments would encourage many to be somewhat cautious about this prediction. However, the geo-strategic implications of the general trend are profound.

The principal source of growth in these economies has been their outward-looking and open-development strategies. Thus, the rapid economic growth of East Asia has been paralleled by a significant increase in its external trade. Over the past two decades the external trade of East Asia increased nearly twice as fast as world trade in general and has already surpassed that of North America. Moreover, the economies of East Asia are growing far more interdependent, trade between them is growing much faster than their trade with other regions of the world. Clearly, the economies in the region are feeding off each other far more than ever before in order to sustain their high rates of growth. In the late 1990s, it is reported that intra-regional trade in East Asia accounted for more than 40% of its total external trade.

If East Asia and North America are grouped into one area, namely the Asia-Pacific, the external trade of this enlarged region becomes similar in volume to that of the European Union (EU). It is predicted that during the 21st Century, the Asia-Pacific region will account for more than half of total world trade. It is noteworthy, moreover, that Asia-Pacific international trade already corresponds to more than 60% of its overall external trade, similar in proportion to that of the EU. This means that the Asia-Pacific region has already achieved a degree of trade interdependence and economic integration, generating the highest percentage of world trade volume.

A primary consequence is that, because nearly all of this trade is carried by ship, the growth of shipping tonnages and container loads in the Asia-Pacific has been very rapid and significant. In this regard, it is noteworthy that in 2000, eight of the 10 busiest container ports in the world were located in the Asia-Pacific region.

The speed and sheer mass of this region's economic growth, the rapid rise in the regional economic interdependence, and the concentration of the linkages in vast volumes of the sea traffic highlight the critical importance of shipping in this region. Shipping routes are sometimes rightly described as the arteries of the regional economy. In the Asia-Pacific, an uninterrupted flow of shipping is critical to most regional countries' economic health and prosperity, and to some countries' very survival. The security of shipping or SLOCs is, therefore, an important and increasingly critical strategic interest in this region.

Major Threats to East Asian SLOCs

Despite the very importance of SLOC security in East Asia, it is apparent that the sea-lanes are vulnerable, not only are they proximate to the Asian landmass, but more importantly, because they pass through narrow chokepoints. Maritime traffic from Japan and Korea to the south transits either the Taiwan Strait or the Bashi Channel between Taiwan and the Philippines. Ships sailing from the east-coast of Korea or the west coast of Japan must first traverse the Korea Strait. Ships of many nations sailing from the northern Pacific Ocean to the Indian Ocean or the Persian Gulf must either pass through the narrow Strait of Malacca or one of many Indonesian passages. At every one of these chokepoints, they could be subject to an attack from submarines, aircraft or mines.

In the past, the principal threat exerted to the SLOCs in East Asia was obviously that of the Soviet Union. With the end of the Cold War and the dissolution of the Soviet Union, such a threat to the SLOCs was substantially reduced. One should, nevertheless, not be surprised if the security of merchant shipping constitutes a continuing problem. For one thing, there remains the potential for a wide range of low-level threats, which include terrorism, piracy, the narcotics trade, and refugee flows. Obviously such threats are often criminal in nature and do not usually result in destructive confrontation between nations. What is more important, however, is the prevailing strategic uncertainty resulting from the disruption of the Cold War stability, which could pose a serious threat to the East Asian SLOCs in the longer term. This development and its maritime implications are something that calls for careful scrutiny. Indeed, the security of the East Asian SLOCs is the subject that deserves continued attention.

Maritime Territorial Disputes

It has been pointed out that disputes over territory have been the most important single cause of war between states in the last two or three centuries. As one scholar has noted, there is some kind of sanctity about state boundaries. It is often stated that there is a psychological importance to territory that is

quite out of proportion to its intrinsic values: economic or strategic. Thus, territorial disputes inevitably involve serious threats to international peace and security, including SLOC security. The danger of confrontation is all the more obvious when important natural resources are at stake. In this sense, the existing maritime territorial disputes in East Asia, unless carefully dealt with, could end up as major threats to SLOCs. In realistic terms, an interruption to SLOC security could arise as a side effect of armed clashes between coastal states engaged in pressing claims to maritime jurisdiction particularly those to mid-sea islands.

Currently, there are several major maritime territorial disputes in East Asian seas, which could erupt as threats to SLOC security. According to an October 1996 opinion poll conducted by the *Far Eastern Economic Review*, many Asian people believe that the next regional war would be over territorial disputes and natural resources.[4] There is no doubt that the military confrontation over territory and natural resources necessarily involves the threat or use of sea mines, hence a serious threat to the East Asian SLOCs.

Coastal State Issues—Interdiction of Navigation and Extended Maritime Jurisdiction

On the basis of limited historical experience in East Asia, coastal state issues could be another major threat to SLOC security in the region. In particular, the potential threats to shipping through international straits could arise from:

- coastal states' attempts to control freedom of passage for national security reasons

- domestic instability in coastal states

- contention among neighbouring countries regarding overlapping maritime claims

In East Asia, there are a number of straits with international significance. The Straits of Malacca, the Sunda Strait and the Lombok Strait are the main passage between the Indian and Pacific Oceans. The latter two fall into the archipelagic waters of Indonesia, while the former is part of the territorial sea of Indonesia and Malaysia. In these straits, any attempt to hinder or block passage of ships by coastal states, if the experience of the Suez Canal and the Gulf is any guide, could pose a threat to regional SLOC security. In this regard, it is noteworthy that Indonesia has sought to designate three special sea-lanes running in a north-south direction that international shipping could use with minimal restrictions to pass through its archipelagic waters.

Extended maritime jurisdictions or the excessive maritime claims by coastal states would be even more risky. In 1977, North Korea proclaimed a 50-mile military boundary zone for the purpose of defending its national interests and sovereignty. Its location is up to 50 miles from the baseline territorial sea in the east (the Sea of Japan) and to the boundary line of the economic zone in the Yellow Sea. In this zone (on the sea, in the sea and in the sky), according to the proclamation, acts of foreigners, foreign military vessels and foreign military planes are prohibited. Civilian ships and planes are allowed to navigate or fly only with appropriate agreement or approval. In addition, civilian vessels and planes in the zone are not allowed to conduct acts for military purposes or acts infringing upon economic interests. Thus the military zone in jurisdictional terms appears even more exclusive than the territorial sea where foreign vessels are entitled to innocent passage.

Similarly, China has for more than 30 years announced restrictions in coastal areas well outside its territorial sea for military purposes. Currently there are two security zones proclaimed by China in the Yellow Sea. One is a Military Alert Zone extending west of a line from the North Korean-China border, at the mouth of the Yalu River to a point off the Shandong Peninsular. This zone includes the Bo-Hai and legitimately claimed territorial sea as well as an area that other states consider to be High Seas. Entry into this zone is only with the express permission of Chinese authorities. The other Military Exclusion Zone is in the vicinity of Shanghai and entry is forbidden even on innocent passage, without specific permission.

The idea of establishing a maritime zone for defence or security purposes could be justified as an exceptional measure of self-protection in times of emergency, based on Article 51 of the UN Charter. However, the idea of a permanent zone is inherently difficult to accept, since such an extended maritime jurisdiction interrupts freedom of navigation.

Piracy

Piracy is one of the newly emerging threats to regional SLOC security. In particular, there has been a significant increase in regional piracy with the Asian Financial Crisis. According to the data released by the Regional Piracy Centre, two thirds of all the world's reported cases of piracy occur in the Asia-Pacific, with Southeast Asia accounting for the majority of them.

In general, piracy attacks in East Asia take the form of intruders coming alongside a ship underway, usually during the night, boarding it and then taking possession of whatever cash and negotiable valuables come easily to

hand. The notable feature of this type of attack is the degree of skill that is used to board the ship, coupled with the fact that violence is not normally used unless resistance is offered.

In recent years, three noticeable characteristics were found in regional piracy attacks. First the pirates are becoming increasingly well equipped. They usually use small speedboats and often have modest radar systems to help them locate their targets. Access to machine-guns, mortars and grenades have become easier, heightening the potential for violence during raids. Second, pirates in this region sometimes seize a merchant vessel, dispose of the crew by setting them adrift or even killing them, then bring the stolen ship into port. There the vessel is repainted, given a new name and provided with fake registration documents. Once refurbished, the 'phantom ship' offers its service to careless cargo owners. Third, pirates in this region are becoming increasingly organised with support networks. That is to say, piracy in the region tends to be more sophisticated and can be considered as a lucrative crime, supported by organised criminal gangs. Hence, transnational crime syndicates, who often commit other transnational crimes such as illegal drug trafficking and human smuggling, have masterminded some attacks.

These are totally new trends and developments compared to what has been called 'Asian piracy' in the past, where ships are boarded and cash and valuables stolen from the ship's safe and crew with a minimum of force.

Piracy poses real dangers, not only to the lives of crew, but also to other ships in heavily travelled areas (200 ships, half of them tankers, enter the Straits of Malacca and Singapore each day). These new trends in regional piracy suggest that acts of boarding any vessel with the intent to commit theft or other crime pose a serious threat to SLOC security and have broader implications for regional security.

Oil Spillage and Marine Pollution

The East Asian region contains two huge semi-enclosed seas: the Yellow/East China Sea encompassing 362,000 square miles, and the East Sea (Sea of Japan) encompassing 445,000 square miles. In terms of marine pollution, the following general observations need to be made. First, the littoral and adjoining areas have the heaviest population concentration in the world. Second, these areas have one of the heaviest concentrations of industry in a coastal zone in the world. Third, this area has a very heavy concentration of shipping routes, with its susceptibility to pollution from collision, groundings, discharges from tank cleanings, leaks or human error a major concern. Finally, there is a considerable potential for oil and gas deposits offshore.

With these conditions, the region obviously faces the potential of large-scale deterioration, which could interrupt the navigation of ships. The coastal waters of the Yellow/East China Seas already suffer from heavy contamination caused by dangerous cargo pollutants and from the fast growing industrial activities of the coastal states. The East Sea is also showing serious signs of pollution, and large coastal areas (mostly off Japan) are already heavily polluted. As public and national awareness of the importance of the environment grows, marine environmental degradation could constitute a serious potential source of threat to regional SLOCs.

There are also many other sources of threats to regional SLOCs that cannot be ignored. East Asia, and Northeast Asia in particular, is an area of high military tension yet one where the littoral states have managed to coexist with relatively few incidents. The existing significant military preparations in the region have the potential to spark open conflict, thus posing a threat to SLOC security. For instance, China conducted 10 days of guided missile launches and heavy artillery tests in the East China Sea just north of Taiwan in August 1995 and March 1996 respectively, which seriously threatened SLOC security and civil aviation.

Measures to Protect East Asian SLOCs

The best way to maintain the security and safety of SLOCs is to avoid or neutralise the possible sources of threat. In practical terms, consultation is necessary to establish a cooperative mechanism among regional states, in order to avoid or neutralise possible threats.

Over past years, there have been various suggestions concerning the means of cooperation to keep regional SLOCs safe. The Institute of Strategic and International Studies in Kuala Lumpur proposed the concept of a Regional Maritime Surveillance and Safety Regime for Southeast Asian waters. This proposal could provide the medium for monitoring illegal activities, sharing information (including surveillance information), combating piracy, enhancing maritime safety and controlling pollution. Indeed, some of this agenda has already moved off the conference table into reality with the July 1992 signing of an anti-piracy accord between Indonesia and Singapore. These countries are now coordinating surveillance and patrolling in the Malacca Straits and adjacent waters.

Recently, Rear Admiral Sumihiko Kawamura of Japan proposed the establishment of an international cooperative SLOC security scheme, placing the US at its core (key strategic player) and having the Asia-Pacific countries share the responsibilities of areas and functions in accordance with their capabilities and geographic conditions. Rear Admiral Kawamura suggested the US maintain

sea control throughout the Pacific Ocean, that protection of shipping, surveillance, and Search and Rescue (SAR) in the Northeast Pacific, South Pacific or Association of South East Asian Nations (ASEAN) area be conducted by the relevant regional states, and surveillance of coastal seas and local shipping protection be conducted by the littoral states.[5]

Given the increasing need for the establishment of an international cooperative scheme for East Asian SLOC security, such a multilateral burden sharing system seems to be warranted. To achieve this, many political, military and economic difficulties will have to be resolved.

In addition to the establishment of such a scheme, the urgent task of all East Asian regional states is to endeavour to build a stable and secure maritime regime, as well as implement maritime confidence building measures. The stable maritime regime is a prerequisite not only for enhancing security at sea but also for further maritime cooperation among regional states. Along with such efforts to build a stable regime, various maritime confidence and security building measures should be explored, considering the changing maritime context. The most urgent tasks by which regional states should endeavour to strengthen SLOC security are listed below.

First, recognising the importance of freedom of navigation to the maintenance of seaborne trade in East Asia, regional states are encouraged to develop cooperative approaches to the maintenance and protection of SLOCs. Such cooperative approaches might begin with exchanges of information and training in such areas as humanitarian assistance, SAR, marine safety, and law and order at sea. The information exchange should include likely threats to, or security incidents concerning the SLOCs. An example is the Regional Piracy Center in Kuala Lumpur, which collates and reports on acts of piracy.

Second, it is important to enhance the openness and transparency of the maritime regimes of regional states under the *United Nations Convention on the Law of the Sea (UNCLOS)* 1982. The provisions of UNCLOS as confidence building measures, where for example, the Convention assists to clarify the outer limits of coastal state claims to sovereignty and jurisdiction over adjacent maritime areas. UNCLOS also encourages maritime cooperation as States are to reach cooperative agreements in determining their maritime boundaries and are to cooperate with respect to utilising their exclusive economic zones.

Third, the maritime security context in the region requires measures to reduce the risks at sea. Maritime and security building measures have the objective of reducing the risk of maritime conflicts and misunderstanding/miscalculation of military activities at sea. Such measures include the sharing of information

and the exchange of personnel, as well as operational cooperation, such as surveillance.[6] In East Asia, maritime confidence and security building measures could have enormous rewards if they could be put into practice, bilateral and multilateral naval cooperation would reduce uncertainty in the East Asian maritime security environment, which in turn would significantly enhance regional SLOC security.

Notes

1   Cited in J.R. Morgan, 'Strategic Lines of Communication: A Military View', in J. Van Dyke, L. Alexander and J. Morgan (eds), *International navigation: Rocks and Shoals Ahead?* Law of the Sea Institute, University of Hawaii, Honolulu, 1988, p. 54.

2   *The International Herald Tribune*, 15 January 2001.

3   World Bank, *Global Economic Prospects and the Developing Countries*, Washington DC, 1994.

4   *Far Eastern Economic Review*, Special Issue, 31 October 1996.

5   *Sankei Shimbun* (Tokyo), 8 May 1996

6   For more details on maritime confidence and security building measures which can be applied to the region, see Seo-Hang Lee, 'Changing Strategic Environment and Need for maritime Cooperation in the North Pacific: New Roles for Navies', in Fred W. Crickard, Paul T. Mitchell and Katherine Orr (eds), *Multinational Naval Cooperation and Foreign Policy into the 21st Century*, Aldershot, Ashgate. 1998, pp. 119-131.

The Protection of Seaborne Trade An Australian Perspective | 12

Commander Bill Hoogendoorn, RANR

Australia is an island continent in a maritime region. This strategic geographical feature plays a dominant part of the nation's security policy, as Australia is almost entirely dependent on sea lines of communication.

The Asia-Pacific region is and will remain dependent upon sea transport for both raw materials and manufactured goods. Economic and industrial growth is driving an increasing demand for raw materials and complex compounds (such as chemicals) that can only be transported by sea. Within this region, Australia is a major raw material exporter and has a growing dependence upon petroleum imports.

Australia's prosperity depends upon commercial engagement with other nations, and along with other regional nations, is vulnerable to the disruption of seaborne trade. A number of regional nations (Japan, South Korea, and the Southwest Pacific islands) are highly vulnerable to any disruption of sea transport.

Sea transport follows recognised trade routes (or SLOC), that have been established over many years of use, dictated by geography, port location, navigational hazards and weather. In the Asia-Pacific region, these trade routes are confined by straits through archipelagos and island chains. The open ocean trade routes are vulnerable to interdiction, while straits and associated chokepoints are vulnerable to closure. The protection of these SLOC is vital for the safe movement of sea transport.

Seaborne trade may be subjected to a range of threats, varying in intensity from open warfare between nations to piracy (on the high seas) and armed robbery (in territorial waters). This threat spectrum is wide and significantly increases the difficulties in ensuring the unhindered passage of sea transport. The passage of merchant shipping, free from threat or hindrance requires a close relationship between the Australian Defence Force (ADF) and the maritime industry.

Naval Control of Shipping

An Imperial system for controlling and protecting merchant ships evolved during and following World War I. The British Admiralty worldwide trade protection system was formally adopted by Australia in 1921. By the outbreak of World War II, this system had been well developed into a two-tiered method

of trade protection. The first tier involved advice to merchant shipping on recommended trade routes. The second tier involved mandatory routing, reinforced in high threat areas by use of escorted convoys. The trade protection system operated under the title Naval Control of Shipping (NCS). NCS was taken up by the major Allies in WWII and established as a global trade protection system. After the end of the war, NCS was embraced by the North Atlantic Treaty Organisation (NATO) and embedded in NATO doctrine. Australia, while not a member, adhered to NATO NCS doctrine.

In 1951 the then Commander-in-Chief of the US Pacific Fleet, Vice Admiral Radford, and the Royal Australian Navy's Chief of Naval Staff, Vice Admiral Collins, executed an agreement as to how the United States Navy (USN) and the Royal Australian Navy (RAN) would interact in the Indian and southern Pacific Oceans. This agreement was the cornerstone of, amongst other things, allied NCS exercises in the Australian, New Zealand, Indian Ocean and (US) Pacific Fleet (ANZIO PACFLT) areas until the mid-1980s. Although it was technically a procedural document, it effectively put in place an allied naval command and control structure for the ANZIO PACFLT area. From a RAN perspective, the Radford/Collins Agreement remains a key bilateral defence agreement that is of significance to the safe passage of friendly shipping through affected SLOC, and it places an onus upon Australia to maintain a capability for protection of international trade.

In Australia, the RAN has been involved in maintaining NCS capacity and skills by being involved in both bilateral and multilateral exercises. In the recent past these have been through annual NCS exercises in the ANZIO PACFLT area in the 1970s, carrying names such as RIPCORD and ROLLER COASTER. Countries participating in these exercises were Australia, New Zealand, Canada, the UK and the US. Australia, New Zealand and the US participated pursuant to the Radford/Collins Agreement, Canada as a result of its defence relationship with the US and the UK due to its residual role and influence in the region.

In the early 1980s the NCS exercise series changed. Within the ANZIO PACFLT area the ROLL CALL series was developed and conducted in even years. In the odd years, another exercise series (EXPANDED SEA) was developed, usually a worldwide exercise (often dovetailed into NATO exercises such as WINTEX, TRADE WIND and TRADE DAGGER). The EXPANDED SEA series was utilised by the US to involve regions such as South America and US forces in the Middle East. It was at this time that France (having a significant presence both in New Caledonia and Tahiti) was invited to participate.

In 1986 a diplomatic dispute between the US and New Zealand over the former's nuclear powered and nuclear armed warships led to the effective lapse of the Australia—New Zealand—United States (ANZUS) Treaty. The ANZUS Treaty had been considered a key defence alliance in the ANZIO PACFLT area, and New Zealand's withdrawal from it immediately had an affect on the relationships between the USN and the RAN on the one hand and the Royal New Zealand Navy (RNZN) on the other. The USN announced that it could no longer participate in any exercise (including NCS) in which the RNZN was involved, and the RAN accepted that when it exercised with the USN it was unable to exercise with the RNZN. As a consequence the RAN conducted bilateral NCS exercises with the RNZN under the FAIRWAY BUOY exercise series and currently under the TASMANEX series.

As a consequence of New Zealand's position, a new exercise series had to be developed and the BELL BUOY series came into being. Countries participating in the BELL BUOY series originally were Australia, Canada, the UK and the US. France was again invited to participate and has done so, but only on a few occasions. Originally the series also dovetailed into a NATO exercise (again, usually WINTEX) but with the collapse of the Eastern Bloc and the decline and end of the Cold War in the years commencing 1989, the exercise began to stand-alone. In 1989 the first two observer nations, Chile and the Republic of Korea participated.

Since its inception in the late 1980s the BELL BUOY series has itself changed in character. With the collapse of the Soviet Union as a maritime threat, particularly in the ANZIO PACFLT area, the annual planning for the exercise moved from a global to a regional scenario. In its original form, BELL BUOY was based on allied nations acting against a powerful, common threat. In its revised format, BELL BUOY was based on several allied nations not only exercising together to train their own forces, but to also be aware of the NCS procedures of their allies.

Naval Coordination and Protection of Shipping

Within the ADF, the RAN is responsible for the activities associated with the coordination and protection of maritime trade. This occurs at two levels: advisory and operational.

At an advisory level, this occurs through the Australian Maritime Defence Council (AMDC). The Deputy Chief of Navy chairs the AMDC, and its members include representatives from relevant areas of the ADF and Department of Defence, the Department of Foreign Affairs and Trade, peak shipping, ship

operating, stevedoring and port organisations. It also includes the Australian Minerals Council representing the major bulk commodity exporting industries.

At an operational level, this occurs through the Operations Division of Maritime Headquarters (MHQ). The Chief Staff Officer (Operations) in MHQ is the National Manager and Category Sponsor for Naval Coordination and Protection of Shipping (NCAPS). The NCAPS Organisation is manned entirely by members of the Australian Naval Reserve, has a national focus with representatives in most major Australian ports, and has the following roles:

- Support for the planning and conduct of (real-time) ADF operations, involving:
  - routine peacetime activities
  - increased tempo activities (East Timor, Solomon Islands).
- Support for the planning and conduct of ADF exercises, involving:
  - NCAPS objectives for specific exercises (BELL BUOY, TANDEM THRUST)
  - Maritime industry liaison when required for exercises.
- Maintenance of interoperability with NATO and other Allied nations on protection of trade, involving:
  - Australian representation as a member of the Pacific and Indian Ocean Shipping Working Group
  - Preservation of the ADF capability to implement NATO NCS procedures if required.

Australian Capability to Support the Protection of Maritime Trade

Australian Government defence policy is contained in Defence White Papers, the latest of which was published in December 2000. *Defence 2000—Our Future Defence Force* defines Australia's military strategy and states *inter alia* that the *'key to defending Australia is to control the air and sea approaches to our continent'*. In order to satisfy this strategic interest, the ADF is required to maintain maritime capabilities (air and naval forces) that can exert Sea Control and Sea Denial. The requirement to achieve Sea Control is an essential element of almost every operation undertaken by the ADF and can be described as the *'protection of sea lines of communication'.*

Military Response Options (MROs) are developed to meet the strategy requirements set by government guidance and are generally expressed in terms of capability. The protection of strategically important maritime traffic is an approved MRO and may be described as *'the capability to plan for, and implement, the safe passage of friendly shipping through affected SLOCs'*.

In order to ensure the safe passage of friendly shipping through affected SLOCs, the ADF requires the capability to exert Sea Control and the capability to coordinate with the maritime industry. The capability to exert Sea Control is spread across relevant Navy capabilities and the RAAF. The maritime industry coordination capability is provided by NCAPSORG.

ADF Relationships with Regional Neighbours for the Protection of Maritime Trade

NCS exercises have involved a number of countries. In the lead up to these exercises, participating nations met to plan and coordinate the exercise and then met after the exercise to discuss the actual outcomes against those envisaged, including matters relating to interoperability. As time progressed and the Cold War diminished in importance, the meetings gradually evolved into a forum that discussed matters not associated with exercises.

The BELL BUOY Working Group (BBWG), was established in the early 1990s to advance NCS doctrinal and procedural issues in the Pacific and Indian Oceans. In 2000 it was agreed by participating nations that the BBWG ought to be separated from the exercise series and it was restructured as the Pacific and Indian Ocean Shipping Working Group (PACIOSWG). The PACIOSWG is the forum in which participating nations discuss and reach consensus on how NCS doctrine and procedures are applied and exercised in the Pacific and Indian Oceans. Combined exercises may take the form of events in the BELL BUOY exercise series or the incorporation of NCS activity into other events. The terms of reference of the PACIOSWG are:

- consider other NCS doctrinal and procedural issues raised by member's nations

- review recommendations made in the international Post Exercise Report for the previous BELL BUOY or other combined exercise if any issues warrant PACIOSWG attention

The members of the PACIOSWG include those who have traditionally participated in NCS exercises: Australia, Canada, Chile, France, the Republic of Korea, the UK, and the US.

The US, Canada and the UK are also members of the NATO Shipping Working Group which allows the PACIOSWG to be kept informed of NCS-related issues in that forum. Additionally Singapore and the Republic of South Africa are attending Exercise BELL BUOY 01 in Chile later in April 2001 as observers (and as potential observers and, in time, as members of the PACIOSWG). Membership of the PACIOSWG is open to all nations, but to join they must obtain the agreement of all member nations. The PACIOSWG meets annually in the country that is to host the next BELL BUOY Exercise.

Today the BELL BUOY exercise series has two main strengths. Firstly, it is the only 'vehicle' that enables nations in the ANZIO PACFLT area and, more broadly, in the Pacific and Indian Oceans Rim to ensure that each participating nation understands how every other participant views NCS and what procedures it has in place to conduct NCS or NCAPS operations. Secondly, it has spawned the PACIOSWG, one of only two multinational groups that meet to discuss matters of common interest in the area of the protection of maritime trade, at the strategic and operational levels.

SHIPPING MOVEMENTS
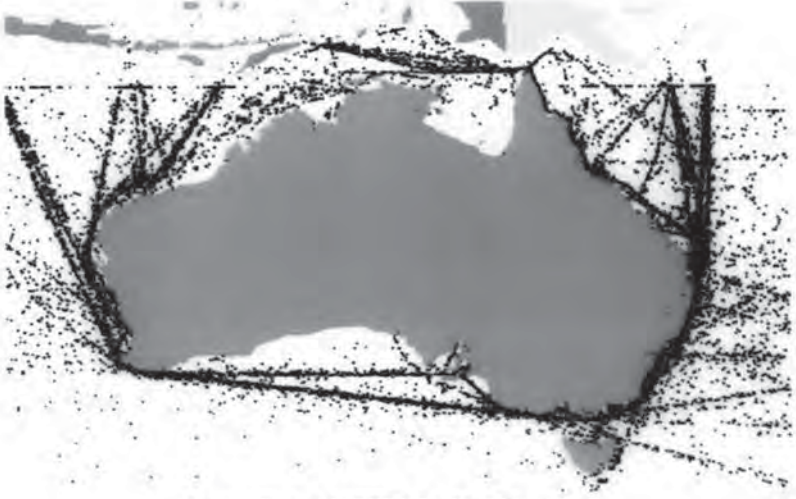
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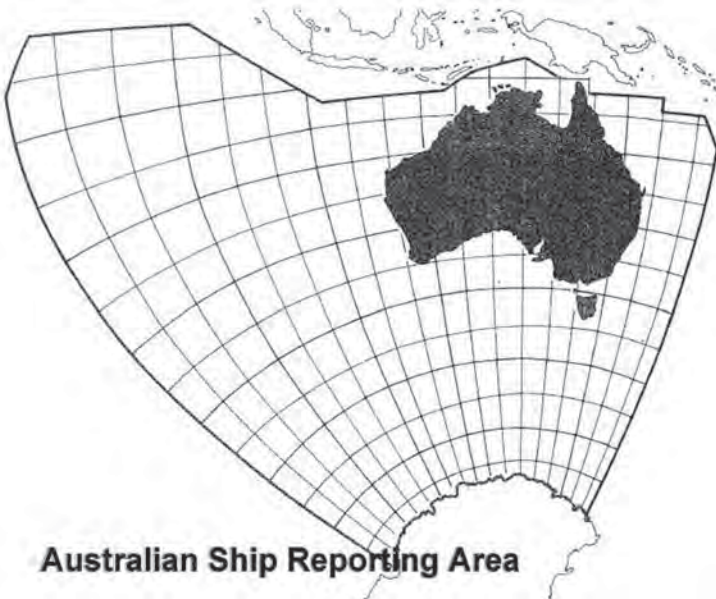
Australian Ship Reporting Area