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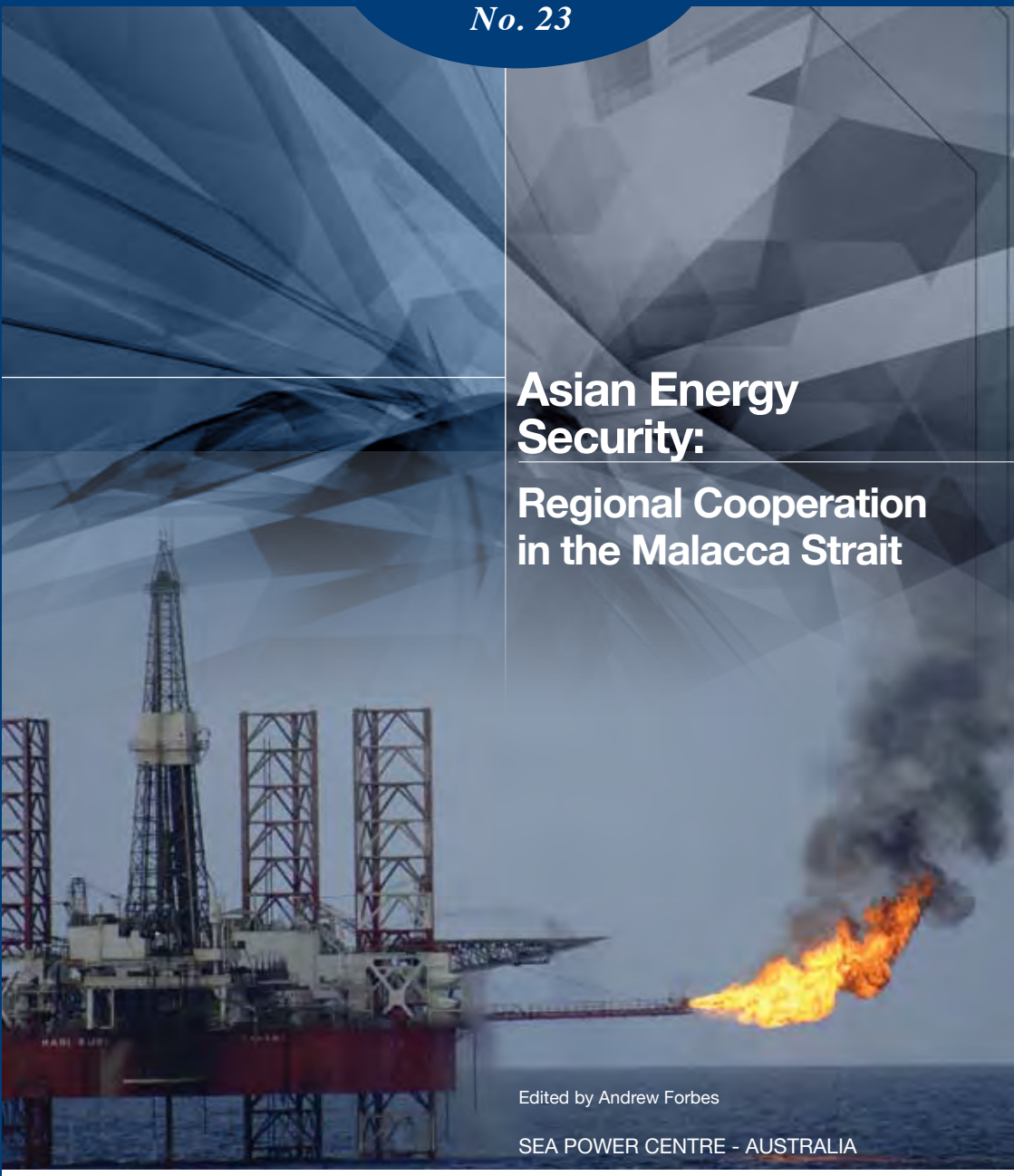

Asian Energy Security:

Regional Cooperation in the Malacca Strait

Edited by Andrew Forbes

SEA POWER CENTRE - AUSTRALIA

ASIAN ENERGY SECURITY:

REGIONAL COOPERATION IN THE MALACCA STRAIT

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Andrew Forbes
Sea Power Centre – Australia

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- to contribute to regional engagement
- within the higher Defence organisation, contribute to the development of maritime strategic concepts and strategic and operational level doctrine, and facilitate informed force structure decisions
- to preserve, develop, and promote Australian naval history.

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Papers in Australian Maritime Affairs

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Foreword

Over the last three decades, researchers at the Center for International Security and Strategic Studies (CISS) at Mississippi State University (MSU) have paid close attention to the issue of international terrorism, including the effectiveness and setbacks of international cooperation in the war against terrorism. Understandably, after 11 September 2001, we made special efforts to enhance our study of all aspects of international terrorism. Our recent research indicates that terrorist threat lies not only in the United States (US), Europe, the Middle East, and Africa, but also in Southeast Asia. There, Al Qaeda is joining forces with local Muslim extremists to create extended and dangerous terrorist networks. Although many terrorist experts claim that half of the total population of the predominantly Muslim ASEAN states – Indonesia, Malaysia, the Philippines, Thailand, and to a lesser extent Singapore – are politically moderate, we observed that lately Islamic extremist groups, like Jemaah Islamiyah and Laskar Jihad in Indonesia, Kumpulam Mujahiddin Malaysia (KMM) in Malaysia, and Abu Sayyaf in the Philippines, were stepping up activities in their respective regions. Moreover, fears are growing of terrorist attacks in the pirate-ridden Southeast Asian waterways, especially in the Malacca Strait, where more than 60,000 commercial vessels – from cruise ships to supertankers – travel through the strait each year, and are obviously potential targets for Al Qaeda. The 621 mile-long Malacca Strait is the shortest transportation route for oil tankers traveling from the Middle East to Japan, China, and South Korea, with the Phillips Channel in the Singapore Strait being its narrowest point with a width of 1.5 miles. Eighty percent of Japan's oil import comes from the Middle East via the Malacca Strait and rapidly demand for oil from China, South Korean and Taiwan will see increased tanker traffic through the strait. Thus, a terrorist attack on oil tankers transiting the strait would have disastrous consequences to the region, ranging from environmental damage and consequent impacts on fisheries, to a slow down of the North Asian economies which could flow-on to the rest of the world.

We believe the only way to counter this threat is through international cooperation, and that only through combined Australia – United States – Japan and ASEAN naval cooperation that this threat can be countered. From an operational perspective, combined United States, Australian and Japanese naval patrolling of the Malacca Strait might provide an adequate solution to counter threats to this vulnerable shipping lane. However the Indonesian and Malaysian governments have repeatedly stated that the security of the Malacca Strait is their sovereign responsibility, and they reject participation of the user states', such as the United States, Australian or Japan, military presence in the area. At the same time, the Philippines, Singapore, and Thailand are interested in receiving external support through the provision of equipment and training for air and sea patrols, radar installations and sensors. Meanwhile, there is an ongoing Trilateral Security Dialogue for developing closer cooperation with the littoral

states, where they and other user states are trying to convince the littoral states to cooperate more closely with each other.

We are convinced that a frank exchange of opinions could add to a better understanding of both sides' concern on how to handle terrorist threats, especially if it is discussed in a neutral, academic forum, such as at the CISS in Mississippi. Indeed, we came to the conclusion that our Workshop on Asian Energy Security could evolve as a Track Two informal meeting, involving semi-official representatives, interested scholars and experts. This workshop conducted a parallel dialogue process and provided recommendations that could guide the evolution of a better relationship between the user and littoral states.

Moreover, we believe that we should also deal with sea lane and ocean security issues on both sides of these straits, from the oil- and gas-rich Arabian Gulf to the Andaman Sea at the western entrance of the Malacca Strait, and from the South China Sea at the eastern entrance to Northeast Asia. These routes are, and will remain, strategic trade and energy arteries for Japan, the United States, Australia, India and China and therefore closer naval and/or coast guard cooperation between them and other affected countries is vital. We strongly believe that we should also pay close attention to China's military modernisation and its wider implications, all over the Eastern and Western Pacific and the Indian Ocean.

Based on the above research findings, the CISS organised two workshops, in close cooperation with Dr James E Auer, Director, Center for US-Japan Studies and Cooperation, Institute for Public Policy Studies, Vanderbilt University; Dr Lewis R Brown, Professor Emeritus of Microbiology and Research Professor, Biological Science Department, MSU; Mr Andrew Forbes, Sea Power Centre – Australia, Canberra; and Rear Admiral Sumihiko Kawamura (Rtd), Okazaki Institute, Japan. The first workshop, entitled *International Cooperation in the War Against Terror in Asia-Pacific Region with a Special Emphasis on the Malacca Strait* was held on 8-9 March 2006;[1] the second workshop on 1-2 October 2007 was entitled *Asian Energy Security: Regional Cooperation in the Malacca Strait*. With their help, we were able to secure a network of experts from Australia, Japan, the United States Indonesia, Malaysia, the Philippines, Singapore, and representatives from India, China and Taiwan, to address and discuss the carefully developed conference agenda. We are grateful for the valuable suggestions of Michael Richardson, Senior Research Fellow, Institute of Southeast Asian Studies, Singapore; and Dr Andrew TH Tan, Associate Professor, University of New South Wales, Sydney, Australia.

The proof of success in these workshops can be best seen in the Recommendations adopted at the final sessions of the workshops outlined below. The organiser, as well as the participants, believe that the Recommendations are practical and incorporated the special concerns of the participants. Among others, it states that all economies in our globalised world have broad mutual interests to ensure that trade of energy and other

goods continue to flow freely and securely. Moreover, major coal, oil and gas consuming economies in the Asia-Pacific region and Indian Ocean littoral should enhance mutually beneficial and amicable linkages with the major energy producers in the Middle East and Africa. It was pointed out that concerned governments should exchange information about terrorist threats and vulnerability. Moreover, the Recommendations underlined that disruption of energy flows could precipitate economic disaster. Therefore, international maritime cooperation is needed to safeguard seaborne trade. This cooperation should build on existing national, bilateral, multilateral, sub-regional, and region-wide arrangements. All countries must act as responsible stakeholders by contributing to maritime security and cooperating to ensure the free flow of trade through seas and straits. Such arrangements must be based on enhanced mutual trust, leading to better information sharing within and among governments. The workshop participants also stated that such enhanced trust and cooperation should be used to assist in enhancing energy resource cooperation mechanisms in the Asia-Pacific and Indian Ocean littoral region. Thus, both user and littoral states should assist regional partners as needed in maritime capacity-building, both for national and broader regional cooperation purposes.

For their generous financial support, I am grateful to the Japan Foundation Center for Global Partnership; the Smith Richardson Foundation; the Lynde and Harry Bradley Foundation; and The Center for International Peace and Security, NAFCO Research Institute. We would like to express our thanks also to our corporate supporters: Community Bank; Hughes Oil, Inc.; and Dr SL Sethi. Last, but not least, we could not have two consecutive and successful conferences without the strong institutional support of MSU; and I would like to express many thanks to our Center's dedicated staff led by Research Associate and Business Manager, Ms Tan Chapman and her assistant Ms Rebecca Kirkland.

Dr Janos Radvanyi
Radvanyi Chair in International Security Studies
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Mississippi State University

Notes

1 Four papers from the first workshop were published in Andrew Forbes (ed), *Australian Maritime Issues: SPC-A Annual 2007*, Papers in Australian Maritime Affairs No. 21, Sea Power Centre – Australia, Canberra, 2007, pp. 101-154.

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Rear Admiral Rosihan Arsyad had an extensive career in the Indonesian Navy. For many years he was a pilot, and commanded the tank landing ship TRI *Teluk Semangka*. His education was from the Indonesian Naval Academy, the Air Force Staff and Command College, and the Indonesian National Resilience Institute. He was the Chief of Staff of the Western Fleet and served as the Governor of South Sumatra Province from 1998 to 2003. He is the Secretary General of the National Olympic Committee of Indonesia, President of the United in Diversity Forum and Chairman of the Institute for Maritime Studies.

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Commander Andrew Brown was commissioned into the Royal Australian Naval Reserve in December 1981 into what is now known as the Maritime Operations Branch, where he has served for his entire career. He has served in a variety of trade protection and staff postings. He is currently posted to Navy Headquarters in Canberra, where his role is to advise on merchant shipping and maritime trade issues and to assist the Sea Power Centre - Australia on the development of doctrine with respect to maritime trade. In civilian life, he is a lawyer (LLM) and until recently was the In-House Counsel to and a Secretary of The Law Society of New South Wales in Sydney.

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Dr Stanley Weeks joined the SPECTRUM Group in September 2007 after 17 years at the Science Applications International Corporation, and 24 years in the United States Navy. He has extensive strategic and operational planning experience in business, defence, foreign policy, and international and regional security contexts. For 18 months over the period 2004-05, he was the Naval Advisor in Albania, developing and implementing a transformation plan for that country's navy and coast guard. He has a Master of Arts degree and a PhD from The American University, has been on the faculty of the National War College and since 1994 has been an adjunct professor at the US Naval War College.

Contents

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Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ACE	ASEAN Centre for Energy
ADF	Australian Defence Force
ADIZ	Air Defence Identification Zone
ANSTO	Australian National Science and Technology Organisation
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
ASW	Anti-submarine Warfare
bcm	billion cubic metres
CISS	Center for International Security and Strategic Studies
CPC	Chinese Petroleum Corporation
CSI	Container Security Initiative
CSCAP	Council for Security Cooperation in the Asia-Pacific
DWT	deadweight tonnage
EEZ	Exclusive Economic Zone
FPDA	Five Power Defence Arrangements
GDP	gross domestic product
GPS	Global Positioning System
IEA	International Energy Agency
ISPS	*International Ship and Port Facility Security Code*
JIT	just-in-time
JMSDF	Japan Maritime Self-Defense Force
JPDA	Joint Petroleum Development Area
LTTE	People's Liberation Front of Tamil Elam
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LRIT	Long-range Identification and Tracking
mbpd	million barrels per day
ml	million litres

MSSI	Malacca Strait's Security Initiative
MSU	Mississippi State University
mt	million tonnes
MTOFSA	*Maritime Transport and Offshore Facilities Security Act 2003*
MTSA	*Maritime Transport Security Act 2003*
MW	megawatt
NATO	North Atlantic Treaty Organization
NATOSWG	NATO Shipping Working Group
NCAGS	Naval Cooperation and Guidance for Shipping
NCS	Naval Control of Shipping
OPEC	Organization of the Petroleum Exporting Countries
PACIOSWG	Pacific Indian Ocean Shipping Working Group
PLAN	People's Liberation Army Navy
PPP	purchasing power parity
PM&C	Department of the Prime Minister and Cabinet
ReCAAP	*Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia*
RAN	Royal Australian Navy
RFiD	Radio Frequency Identification
RMSI	Regional Maritime Security Initiative
SFI	Secure Freight Initiative
SLOC	Sea Lines of Communication
SWG	Shipping Working Groups
tcf	trillion cubic feet
UAE	United Arab Emirates
ULCC	Ultra Large Crude Carrier
US	United States
US CBP	US Customs and Border Protection
VLCC	Very Large Crude Carrier
WMD	Weapons of Mass Destruction

ENERGY DEMAND AND SUPPLY

Overview of Global and Asian Energy Trends

Juli MacDonald

This chapter provides an overview of current and projected global and Asian energy trends. Given the growing demand for energy in Asia, we should anticipate that energy security concerns could be a potent driver of the strategies of Asian countries, leading to either competition or cooperation. I will start with an overview of global and Asian energy trends followed by a few observations on their potential implications for policymakers and defence planners.

The trends and data presented in this chapter are linear projections, primarily based on the Energy Information Administration reference case in *International Energy Outlook 2007*, [1]augmented by data from the 2007 edition of the *BP Statistical Review of World Energy*.[2] But we cannot assume that Asian energy trends will be linear over the next two decades; we were reminded of this in 1997 when Asian energy demanded dropped precipitously after the financial crisis with many attendant 2nd and 3rd order consequences. And today we also know that China's demand is not growing in a gradual linear progression, but has experienced unanticipated jumps in demand, which imbues these projections (and the market) with an element of uncertainty. In addition, the impact of policy changes driven by concerns about global climate change are not reflected in these projections. Moreover, this chapter does not address the possibility that major world energy suppliers run out of oil over the next 20 years as some analysts believe. An irreversible collapse of Saudi oil production, for example, could be a wildcard when examining the implications of these trends; and would be global problem, but it would likely have the most profound impact on Asia.

The Energy Information Administration uses the OECD as its framework for recording data. OECD America includes the Untied States, Canada and Mexico, while OECD Asia includes Japan, South Korea, Australia and New Zealand.

Global Energy Trends

The Energy Information Administration estimates that global energy demand will expand by 57 per cent between 2004 and 2030 (446.7 to 701.6 quadrillion BTU), increasing in step with projected increases in gross domestic product. As shown in Table 1, energy demand will be greatest in the non-OECD which will grow by 95 per cent to 2030 (207 to 404 quadrillion BTU), with the (industrialised) OECD only growing by 24 per cent over the same period (240 to 298 quadrillion BTU).

REGION	2004	2010	2015	2020	2025	2030
OECD	**239.8**	**254.4**	**265.2**	**275.1**	**285.9**	**298.0**
North America	120.9	130.3	137.4	145.1	153.0	161.6
Europe	81.1	84.1	85.8	86.1	87.5	89.2
Asia	37.8	39.9	42.1	43.9	45.4	47.2
Non-OECD	**206.9**	**256.6**	**294.2**	**331.9**	**367.8**	**403.5**
Europe and Eurasia	49.7	54.7	59.4	64.4	68.7	71.5
Asia	99.9	131.0	154.7	178.8	202.5	227.6
China	59.6	82.6	97.1	112.8	128.3	145.4
India	15.4	18.2	21.7	25.1	28.6	31.9
Middle East	21.1	26.3	29.5	32.6	35.5	38.2
Africa	13.7	16.9	19.2	21.2	23.1	24.9
Central/South America	22.5	27.7	31.5	34.8	38.0	41.4
TOTAL	**446.7**	**511.1**	**559.4**	**607.0**	**653.7**	**701.6**

Table 1: Global energy consumption/projections by region 2004-30 (Quadrillion BTU)[3]

The world's growing energy demand will continue to be met by hydrocarbons, barring some unanticipated technological breakthrough. Hydrocarbons met over 85 per cent of global energy needs in recent years and they are projected to meet even more in the future.

Demand growth, particularly in non-OECD Asia, is outpacing increased output from alternative sources such as nuclear, hydroelectricity, wind, and bio-fuels. Moreover, despite the rhetoric about shifting away from coal, the real demand for coal is increasing, and its preponderance in the energy mix will not change, particularly in Asia. The bottom line is that the world is increasing its dependence on hydrocarbons, such as oil, natural gas, and coal. Some portion of the imports of each of these energy sources is transported to or within Asia by sea.

REGION	2004	2010	2015	2020	2025	2030
OECD						
liquids	98.9	99.9	103.5	106.8	110.3	114.4
natural gas	53.1	59.6	64.0	67.5	70.0	72.3
coal	46.6	49.4	50.7	52.1	55.5	59.3
nuclear	23.2	24.5	25.3	26.0	26.4	27.3
other	17.9	21.1	21.8	22.7	23.7	24.7
Total	**239.8**	**254.4**	**265.2**	**275.1**	**285.9**	**298.0**
Non-OECD						
liquids	69.3	84.1	94.1	103.8	113.8	124.4
natural gas	50.3	61.0	70.4	79.5	88.5	98.1
coal	67.9	86.9	100.9	115.1	127.4	139.8
nuclear	4.3	5.3	7.2	9.6	11.7	12.4
other	15.3	19.3	21.6	23.9	26.3	28.8
Total	**206.9**	**256.6**	**294.2**	**331.9**	**367.8**	**403.5**
WORLD						
liquids	168.2	183.9	197.6	210.6	224.1	238.9
natural gas	103.4	120.6	134.3	147.0	158.5	170.4
coal	114.5	136.4	151.6	167.2	182.9	199.1
nuclear	27.5	29.8	32.5	35.7	38.1	39.7
other	33.2	40.4	43.4	46.5	50.1	53.5
Total	**446.7**	**511.1**	**559.4**	**607.0**	**653.7**	**701.6**

Table 2: Global energy consumption/projections by type 2004-30 (Quadrillion BTU)[4]

Oil

World oil demand is projected to grow from about 83 million barrels per day (mbpd) in 2004 to 97 mbpd in 2015 to 118 mbpd in 2030. Again, the most significant growth will emanate from Asia and North America. It is estimated that non-OECD Asia will account for 65 per cent of the worldwide growth in oil consumption and is on the cusp of surpassing North America as the world's largest consumer.

Economies with the greatest projected oil consumption do not possess sufficient oil resources to meet their needs - projected oil consumption in the OECD countries far

outpaces their oil production, which is projected to plateau, increasing their dependence on oil imports from extra-regional sources.

In Asia a handful of energy exploration/production projects, mostly offshore, produce approximately 9 mbpd and this total production level is not anticipated to grow significantly as mature fields go offline and offshore exploration continues to be thwarted by territorial disputes. By 2030 the gap between projected consumption and production in Asia could grow to over 30 mbpd.

World oil production is projected to increase by about 34 mbpd by 2030. With production levels projected to plateau or decline in most regions of the world, projected oil production in OPEC nations, Russia and Central Asia, Africa, and Central and South America will continue to outpace regional consumption, freeing up exports for North America, West Europe and Asia. OPEC's share of total world production is projected to increase from 41 per cent in 2004 to 48 per cent by 2030; indeed, increased OPEC production will account for 65 per cent of all new production brought online by 2030. However, sustained high oil prices could slightly reduce the Middle East's dominant position by accelerating the development of unconventional oil sources, such as Venezuela's heavy oils and Canada's tar sands. Increased investment in both sources of unconventional oil is already evident.

Natural Gas

Natural gas is expected to be the second fastest growing component of world energy consumption, behind coal. Growth is projected in all regions, rising from 100 trillion cubic feet in 2004 to 163 trillion cubic feet in 2030. In particular, we will see robust growth in non-OECD Asia, Central Asia, and Russia, with non-OECD Asia projected to have the highest growth rates. Natural gas is increasingly the fuel of choice for power generation.

Seventy-five per cent of the world's natural gas is located in the Middle East, Central Asia, and Russia. As for oil, the world gas consumers in Asia, North America, and Europe are destined to be increasingly dependent on the Middle East for gas as its reserves-to-production ratio far exceeds any other region. It is also worth noting the low reserves-to-production ratio in North America, which will drive the United States to be a significant future importer of natural gas.

Increased dependence on extra-regional gas imports will transform the current natural gas markets from regional to inter-regional markets; with new consumers entering the marketplace. Three dynamics will change the market: consumption in India and China will outpace domestic production within the next decade, making them majors players in the natural gas market; new liquefied natural gas (LNG) infrastructure and tanker technology will make longer-haul shipping cost-effective. The United States will be importing LNG from Africa and the Middle East, and possibly from Asia in the future;

possible gas pipelines are connecting regional markets, such as Russia and Kazakhstan to Chinese and East Asian markets, or Iran to India, and Myanmar to China.

Coal

Coal consumption is projected to increase by 74 per cent between 2004 and 2030, and non-OECD Asia, specifically India and China, will account for 85 per cent of this growth. With abundant indigenous coal supplies both countries are well positioned to displace more expensive fuels with coal in the power generation sector. Interestingly, China is exploring innovative ways to use its abundant coal supply by investing in coal-to-liquid liquefaction technology that turns low-quality coal into diesel. The first coal-to-liquid plant is scheduled to commence production by the end of 2007.

Nuclear

A number of non-OECD Asian countries operate nuclear power plants, including China, South Korea, India, Taiwan, and Pakistan. In the past, plans for expansion have been thwarted by opposition at the local level, financial constraints, safety concerns, and proliferation risks. However, the region is poised to experience robust growth in the nuclear sector, with China, India, and South Korea all planning to build many more plants. For example, China announced an ambitious plan to build two new reactors each year through to 2020 bringing China's total number of reactors to nearly 40. India has similar plans, which may grow even larger when the Indo-United States civil nuclear energy agreement comes to fruition.

Energy Issues in Asia

Looking specifically at Asia, hydrocarbons met 92 per cent of non-OECD Asia's energy needs in 2004 and are projected to meet 91 per cent of those needs in 2030. The energy consumption mix is not projected to change significantly. Coal remains central, there is a fast growing demand for natural gas, but nuclear power is of marginal importance in Asia's total energy mix.

There are several key dimensions to Asia's demand for energy that will shape the strategic context in Asia.

First, growing energy demand in Asia is not limited to one country, but China looms largest. China's voracious demand for energy is the primary driver behind Asia's ballooning demand growth over the next two decades. China's energy demand is projected to more than double between 2004 and 2030. But India has the same demand projections; and other parts of Asia, such as Indonesia, Malaysia, and the Philippines will also nearly double in the same timeframe. In contrast, Japan's and South Korea's energy consumption is projected to remain relatively stagnant through to 2030.

Second, the Middle East will grow in strategic importance for most Asian states, which will become increasingly dependent on a single source of oil - the Arabian Gulf. Imports from Central Asia and Russia are projected to increase, but current projections suggest that they will do little to diminish Asia's heavy dependence on the Arabian Gulf in 2030.

Asian states will likely be increasingly concerned with the internal stability of their key energy suppliers - Saudi Arabia, Iran, UAE, Kuwait, Qatar, and Iraq for its potential as a major supplier. The Middle East could become a new arena of competition among the Asian consumers as they vie for influence with their oil suppliers. A competition to watch will be China, India and Japan competing for projects and influence in the Iranian and Saudi Arabian energy sectors.

Third, Asia will replace North America and Europe as the critical markets for Arabian Gulf oil. Arabian Gulf exports to non-OECD Asia are set to triple by 2030. During the same period, their exports to North America will double, but in contrast to Asia, North America and Europe will depend on oil imports from a more balanced mix of suppliers. The United States will import most of its energy from the Western hemisphere and West Africa. And Europe's stagnant demand will be met by the North Sea, Russia, and North and West Africa. We might anticipate as the Arabian Gulf-Asia geo-strategic link strengthens, United States and European influence in the region might wane, depending on how events in Iraq, Iran, and Saudi Arabia unfold. The outlines of this strategic shift is already evident with King Abdullah's first foreign trip to Asia in 2007, including visits to China, India, Malaysia, where energy agreements featured in the bilateral talks in each country. Saudi Arabia and other producers are investing in downstream projects in Asia's major markets to secure future markets for their crude oil. These deals serve to solidify and deepen economic linkages that could take on increasing strategic significance.

Fourth, the war on terrorism is also driving Asian states to move more aggressively to develop energy options outside of the Arabian Gulf to insulate themselves from instability in a region that cannot be controlled, not even by the United States. But projections suggest such diversification efforts will only help on the margins, and China's energy consumption patterns defy these projections. Indeed China, more than any other major Asian consumer, is making significant strides in diversifying its energy imports. In 2006, China imported 60 per cent of its oil from countries outside of the Arabian Gulf, including from countries in Africa, Latin America, Asia, Central Asia and Russia. The diversity of China's current export portfolio suggests that projections may not be keeping up with China's actual investment activities and energy diplomacy.

Fifth, Asia's growing energy demand is increasing the pressure on the sea lines of communication. Nearly 50 mbpd of oil is shipped by tanker. The growing number of oil tankers and LNG carriers coming from the Arabian Gulf will increase pressure on already congested strategic chokepoints; specifically the Strait of Hormuz, the Indian

Ocean, the Malacca Strait, and the South China Sea. The Malacca Strait, in particular, is a crucial chokepoint for the dangerously high number of energy-related tankers transiting it. It is projected that tanker traffic will at least double from 10 mbpd in 2004 to over 20 mbpd in 2020. To ease pressure on the Malacca Strait, future tanker traffic could be partially routed through the Sunda or Lombok straits; or to avoid a destabilised Indonesia, they can be bypassed by sailing around Australia.

However, natural gas transport cannot avoid the Indonesian archipelago, as the majority of LNG resources being exploited are centred in or around Indonesia, and the LNG carriers must also pass through the archipelago to reach the gas consumers: Japan, South Korea, Taiwan, and, in the future, China.

Sixth, given Asia's voracious demand for energy, countries will be faced with multiple energy fronts, as opposed to the one or two they faced in the past few years. For example, in a decade India could import gas from three or four directions - from the Middle East, Central Asia, Bangladesh, and Southeast Asia. Or in the case of China, its energy is already coming from all directions - the Middle East, Central Asia, the Russian Far East, Southeast Asia, Africa, and Latin America.

Seventh, these multiple energy fronts will engender significant security vulnerabilities that present a wide range of military challenges. The growing dependence on long-haul sea lanes and offshore energy resources will ensure that energy strategies increasingly have a defensive military component, particularly with a naval focus. A growing pressure to protect energy transport routes will intensify if Indonesia destabilises or if incidents of maritime terrorism in the region increase, which is also a growing concerns among the Asian states. Plans for ambitious pipelines projects, which are viewed as an alternative to dependence on the sea lanes, also present security challenges. The proposed pipelines are projected to cross rugged terrain, harsh climates, and politically unstable or remote areas. Pipelines linking the Russian Far East to China or Japan; Central Asia to China; the Caspian and Iran to India; or a complex gas pipeline network criss-crossing Southeast Asia could be targets for terrorist attacks or military competitors. This infrastructure will require protection and contingency plans for responding to disruptions. Even more vulnerable will be the expanding energy infrastructure across the region, such as refineries, LNG terminals, and sophisticated offshore exploration and production facilities throughout Southeast Asia, the South and East China seas, and the Bay of Bengal. These facilities cost millions, even billions of dollars, and in some cases, are located in remote locations, making them difficult to protect. American energy analysts argue that an attack on an LNG terminal, refinery, or offshore installation could take months to repair and bring back online and could cause severe environmental damage.

In this context, most regional militaries in Asia will face a growing energy security component to their missions. Such missions might include monitoring and protecting sea lanes from enhanced naval and missile threats as well as non-traditional threats,

and defending energy infrastructures as a way to forestall threats or blackmail. If competition for energy resources increases, states may begin to develop an offensive component to their energy strategies, with the intent of targeting another's energy security.

Asia's growing appetite for hydrocarbons confronts regional militaries will energy security vulnerabilities that will require a range of military capabilities, regional cooperation, and deliberate planning to be prepared for the potential range of military and emergency response contingencies.

I will end with a final observation on environmental security. Asian states are also vulnerable to environment security threats associated with growing sea-borne energy transport. With the growing number of tanker traffic transiting Asia's sea lanes, it is not surprising that the number of oil spills is growing. The impact of a major oil spill or multiple oil spills could be widespread, contamination of highly populated littoral regions and some of the world's most productive fisheries will have cascading economic and social impacts across the region. Major oil spills, whether accidental or deliberate, will require a regional response as no one country can respond effectively on its own. Coordinated responses require regional plans, protocols, technical interoperability among the regional coast guards and navies, and regional preparation, such as pre-positioning of remedial supplies.

Endnotes

1 Energy Information Administration, *International Energy Outlook 2007*, Washington DC, 2007.

2 BP, *Statistical Review of World Energy*, London, June 2007.

3 Energy Information Administration, *International Energy Outlook 2007*, p. 83.

4 Energy Information Administration, *International Energy Outlook 2007*, pp. 84-85.

Australian Energy Security: The Benefits of Self Sufficiency

Andrew Forbes

Australia's energy security is based on the assumption that its access to energy resources is secure: through an abundance of domestic energy resources and the ability to continue to import energy resources as required.[1] In order to maintain energy security, the Australian Government is focused on a range of domestic measures to improve the efficiency and effectiveness of its energy industry, while encouraging further exploration, predominantly in its exclusive economic zone for additional liquid energy resources. However, Australia's energy policy does not consider the potential impacts to the Australian economy if energy imports were to be disrupted, nor the balance of payment implications if energy exports were similarly disrupted. Nor does it consider the impact on the Australian economy if energy flows to major trading partners were also disrupted. Thus this energy security policy could be considered optimistic given global concerns over production and supply of fossil fuels and the global price of oil.

This paper examines some of these issues, but importantly, does not consider issues associated with climate change as Australian policy on this topic is under development. First this paper outlines Australia's energy production and current consumption. Second, it outlines Australia's energy trade to highlight the linkages between countries for economic, energy and national security. Third it outlines security issues associated with protecting Australia's offshore energy infrastructure, Australia's energy trade, and global energy trades. It concludes with ideas on how navies might cooperate to protect seaborne trade.

Australia's Energy Production and Consumption

Australia is generally self-sufficient in the majority of energy resources it requires, particularly coal, gas and oil.[2] Energy consumption is dominated by electricity generation, transportation and manufacturing – 80 per cent of overall consumption.[3] Coal is Australia's major energy source accounting for 42 per cent of primary energy consumption, and contributing 81 per cent of the fuel for electricity generation. Oil accounts for 34 per cent of primary energy consumption and contributes 98 per cent of the fuel mix for the transportation sector. Natural gas accounts for 20 per cent of primary energy consumption.[4] Renewable energy accounts for only 5 per cent of total energy consumption and is not considered further.[5] Notwithstanding this level of self-sufficiency, the major problem Australia faces is that apart from coal, which is

located close to major population centres, the majority of energy resources are found in remote locations, incurring significant distribution costs.[6]

Coal

Black coal is located in most Australian states, with the majority located in New South Wales (NSW) and Queensland (41 and 57 per cent respectively); the holdings in Western Australia (WA), South Australia (SA) and Tasmania are smaller but locally important. Only 25 per cent of black coal is consumed domestically, the remaining 75 per cent is exported. Most of Australia's brown coal is located in Victoria, with deposits also located in SA, WA, Tasmania and Victoria.[7] Brown coal mined in SA and Victoria is used for electricity generation.[8]

Uranium

Australia is assessed as having 38 per cent of the world's low cost reserves of uranium. The uranium is taken from three mines: Ranger in the Northern Territory, Olympic Dam (containing 70 per cent of known reserves) and Beverly, both in South Australia.[9] A fourth mine, Honeysuckle in SA, has the necessary approvals and should come on-line in 2008. Importantly it has been government policy for many years to restrict uranium mining to effectively three mines.

Australia does not have a domestic nuclear industry, but the Australian Nuclear Science and Technology Organisation conducts national nuclear research and through its new OPAL reactor located at Lucas Heights in Sydney, supplies radiopharmaceuticals for nuclear medicine procedures and radioisotopes that are used in medical, environmental and industrial scientific research.[10] There is as yet no indication that Australia will pursue a nuclear power option, although if it were to happen, it would lessen greenhouse gas emissions considerably.

Liquid Fuels

Australia is about 53 per cent self-sufficient in crude oil and natural gas liquid product, which is of the light variety and relatively low in sulphur.[11] Australia has a significant dependence on offshore oil and gas supplies, but did not discover commercial fields until the early 1960s, when in 1963 the oil and gas fields in the offshore Gippsland basin were discovered and entered production in 1969; the Barrow Island oil field in the Carnarvon Basin was discovered in 1964 and entered production in 1967; major gas fields were discovered in 1971 off north west Australia, first entering production in 1984; and oil and then gas were discovered in the Bonaparte Basin in the Timor Gap, between East Timor and Australia.[12]

Currently the Carnarvon Basin accounts for 63 percent of crude oil, condensate and LPG production; the Gippsland Basin accounts for 19 per cent of petroleum liquid

production; with additional crude oil and condensate coming from the onshore Cooper-Eromanga Basin straddling the borders of SA and Queensland; there are a number of other smaller producers onshore. The majority of production from the Carnarvon Basin is exported, while the Gippsland Basin production is used in local refineries.[13] Significantly much of Australia's offshore area is unexplored but is expected to contain additional oil and gas reserves.[14]

In 2005-06 the Carnarvon Basin produced 66 per cent of Australia's natural gas, with 13 per cent coming from the Cooper-Eromanga Basin and 19 per cent from the Gippsland Basin.[15] The Gippsland and Cooper-Eromanga Basins supply 90 per cent of the domestic gas market for SA, Victoria, NSW and Queensland; while the Carnarvon Basin supplies the WA gas market, but exports the majority of its product.[16] Over the past few years, Australia has signed significant contracts to supply Asian markets with LNG, such as the recent $25 billion contract with China.[17]

There is a growing commercial use of coal seam gas from black coal deposits in Queensland and NSW, feeding the Brisbane and Sydney gas markets.[18]

Transportation Energy

Transportation accounts for 35 per cent of total energy consumption and is growing at 2.4 per cent pa. In 2006-07 around 87 per cent of the product from Australia's eight refineries was automotive gasoline, diesel fuel and aviation turbine fuel; with Australia being less self-sufficient in the heavier products, such as kerosene, diesel, fuel oil and lubricants.[19] Australia's refining industry can supply nearly all of Australia's requirements, and is able to draw upon the large-scale refining capacity in Asia if necessary.[20]

Electricity Generation

In 2004-05, black coal accounted for 56 per cent of electricity generation, brown coal 21 per cent, gas 14.3 per cent, hydro 6.4 per cent and oil 1.4 per cent; by 2029-30 the sources of energy for electricity generation are forecast to be black coal 50.8 per cent, gas 22.6 per cent, brown coal 17.7 per cent, hydro 4.5 per cent and oil 0.9 per cent.[21] Clearly natural gas will only increase in importance. A recent study estimated that nuclear power would be 20-50 per cent more costly to produce than current coal-fired plants.[22]

A key focus of Australia's energy policy is to improve the generation and distribution of electricity to consumers. The electricity industry was restructured in the early 1990s, with the State owned utilities vertically disaggregated into separate generation, transmission, distribution and retail supply components.[23] It is recognised that Australia's electricity generation infrastructure is aging and that substantial capital investment is required to manage future supply with expected demand for electricity,

forecast to require $37 billion in investment by 2020.[24] An aspect of this capital investment will necessarily include cleaner coal technologies. This is the real focus of Australian energy policies.

Disruptions to Energy Supplies

Australia has experienced occasions where energy supplies were disrupted, with consequential impacts on the Australian economy.

The Esso gas plant in Longford, Victoria is the primary source for Victoria's gas for domestic, industrial and commercial use. In September 1998 there was an explosion and fire at the plant which killed two people, injured eight, and stopped gas supplies throughout the state affecting four million people. The economic cost of no gas supplies for 19 days was assessed at $1.3 billion.[25]

In September and October 2003, there were serious disruptions to aviation fuel supplies to Sydney Airport which led to rationing of fuel for aircraft until additional fuel could be delivered. The cause of the problem was lower than expected output from relevant Australian refineries, problems with quality control of some fuel and delays in foreign shipments of fuel.[26] While the economic cost of this event has not been calculated, it does demonstrate problems with a just in time philosophy of fuel delivery.

In June 2008, an explosion at the natural gas facility on Varanus Island off Western Australia caused a 30 per cent reduction in gas supplies to the state, severely impacting on business, agriculture and households. Recently decommissioned coal-fired power stations had to be brought back online, and it is thought that a return to normal supplies will not occur until the end of the year.

The key focus of Australia's energy policy is to ensure reliable, competitively priced supplies of energy.[27] To this end, Australia holds about 50 day's supply of crude oil and product, as it takes about 25 days for crude oil to be sourced from Singapore.[28]

Australia's Energy Trade

Australia is a significant energy exporter: since 1986 it has been the world's largest coal exporter and from 1989 has emerged as one of the largest LNG and uranium exporters. Australia produces light, sweet crude oil which attracts a high premium on export markets, and with oil reserves located in the north and north-west with ready access to export markets, most of this product us exported.[29] The value of Australia's energy exports in 2006-07 was about $38 billion. However some energy resources are imported, either due to a lack of domestic resources or more usually, because it is cheaper to import product than transport energy supplies around Australia. This is particularly the case for northern Australia where it is often cheaper to import refined fuel from Asia, predominantly Singapore, than to supply it from refineries in south east

Australia. The energy resources Australia imports include liquid fuels, such as crude oil and other refinery feedstock, and refined petroleum products, such as gasoline, diesel and fuel oil. Energy imports in 2006-07 were about $22 billion.[30]

Significantly the Australian Government is of the view that international diplomacy and membership of international organisations, such as the International Energy Agency, is the best way in which to manage energy security.

Coal Exports

Australia accounts for about 7 per cent of world black coal production, with this coal being of high bituminous quality with low sulphur and ash content.[31] Australia has about a third of the black coal trade and nearly two thirds of the metallurgical coal trade. NSW is the major supplier of thermal coal exports and Queensland is the major supplier of metallurgical coal exports. The majority of the coal from the Bowen Basin in Queensland is exported from ports near Mackay (including Dalrymple Bay and Hay Point) and the port of Gladstone, whereas coal from NSW is exported through Newcastle and Port Kembla. Newcastle has two coal loading terminals and is the largest coal exporting port in the world.[32] The major bottleneck to continuing exports is the ability to load coal onto ships and currently there is a huge backlog of ships waiting outside NSW and Queensland ports to take on coal.

In 2006-07, Australia exported 131.92 million tonnes (mt) of metallurgical coal, with Japan receiving 48.91mt, the EU 24.85mt, India 19.56mt, Taiwan 8.03mt, South Korea 6.25mt, and China 2.97mt. Similarly 111.68 million tonnes of thermal coal were also exported, with Japan receiving 58.65mt, South Korea 15.06mt, Taiwan 16.23mt, China 3.22mt, Malaysia 3.54mt, other ASEAN 3.68mt and India 0.72mt.[33]

Liquid Fuel Exports

In 2006-07 Australia exported 15963 million litres (ml) of crude oil and other refinery feedstock. Singapore received 3751ml, South Korea 3873ml, Japan 1957ml, China 518ml and Taiwan 446ml. 2842ml of LPG was exported with Japan receiving 1821ml, China 308ml and South Korea 384ml. 1762ml of refined products were also exported with Singapore receiving 576ml, New Zealand 872ml other Pacific countries 131ml, Japan 84ml and Fiji 4ml.[34] The strategic importance of Australian energy exports to the Pacific is probably not recognised.

15.2 million tonnes of LNG were also exported but recipient countries are not recorded in published Australian statistics.[35] However in 2007, according to BP, Australia exported 20.24 billion cubic metres (bcm) of natural gas: 16.05bcm to Japan, 3.30bcm to China, 0.56bcm to South Korea and 0.33bcm to Taiwan.[36]

Liquid Fuel Imports

In 2006-07 Australia imported 25341 million litres (ml) of crude oil and other refinery feedstock. 6710ml was sourced from Vietnam, 3716ml from Malaysia, 3391ml from Indonesia, 3236ml from the Middle East, 2059ml from Papua New Guinea, and 846ml from Singapore. 18268ml of refined products were also imported, with 7666ml sourced from Singapore, 818ml from South Korea, 642ml from the Middle East, 8ml from Malaysia and 17ml from Indonesia.[37] Australia also imports natural gas from the Bonaparte Basin in the Timor Sea to supply the Northern Territory market.[38] Australia is less directly affected by events in the Middle East as Southeast Asia is the preferred region from which to import.

Uranium Exports

In 2005, Australia exported 12360 tonnes of uranium, valued at $573 million to 10 countries, including the United States (36 per cent), France (11 per cent), Japan (22 per cent) and South Korea (9 per cent). Australia has a tight regulatory regime in place for its uranium mining industry. Australia also abides by all international treaties and conventions concerning the transportation of uranium.[39] Spent fuel from the ANSTO reactor at Lucas Heights in Sydney is shipped to France for processing.[40]

Australia's Energy Security Issues

In order to maintain energy security, Australia has three concerns: security of offshore energy infrastructure, protection of Australian seaborne energy flows; and protection of global energy flows.

Australia's Offshore Energy Infrastructure

The September 2001 terrorist attacks in the United States led to a fundamental reassessment of the security vulnerabilities of the maritime transportation industry. Amendments were made to the *International Convention for the Safety of Life at Sea, 1974*, and the *International Ship and Port Facility Security* (ISPS) *Code* was introduced. On 12 December 2003, the *Maritime Transport Security Act* (MTSA) *2003* was passed and entered into force on 1 July 2004, bringing into effect the requirements of the ISPS Code for Australia.

Concurrently, a Taskforce on Offshore Maritime Security had been examining the security arrangements for offshore oil and gas facilities. On 15 December 2004, the Australian prime minister announced that the Australian Government would assume responsibility for all offshore counter-terrorism activity and the protection of the offshore oil and gas facilities. To achieve this, an additional two *Armidale* class patrol

boats were to be purchased for the Royal Australian Navy to undertake patrols in the North West Shelf (location of the Carnarvon Basin) and in the Timor Sea. Flowing from the work of the Taskforce, the MTSA was amended in June 2005 to extend Australia's maritime security regime to Australia's offshore oil and gas facilities, resulting in the MTSA being renamed the *Maritime Transport and Offshore Facilities Security Act* (MTOFSA) *2003*.[41]

In order to respond to any threat to the oil and gas facilities, a program of augmented security patrols was instituted to increase the level of security within the patrol areas to deter those who might contemplate or plan an attack on these assets. The benefit of augmented security patrolling is its apparent unpredictable timing, and location, and thus its ability to shape the behaviour of the crews of vessels in the vicinity of offshore platforms. The pulsing technique, by focusing patrol assets on specific targets for a defined and limited period of time, substantially reduces costs when compared to providing blanket air and surface coverage.

Protecting Australia's Seaborne Energy Flows

Australia's trade vulnerability is recognised in defence policy, with the Australian Defence Force (ADF) assigned a clear role in the protection of shipping. Defence policy to counter threats to shipping is to reroute ships away from threat areas, and to convoy those priority ships that cannot be rerouted using the Royal Australian Navy's (RAN) surface combatants with air cover, noting range and endurance considerations.

As demonstrated by the difficulties experienced at Sydney Airport in 2003, imports of crude oil and refined products from Singapore may be critical to the Australian economy, and certainly are to the local economies in northern Australia. Any disruptions to Singapore supplies will incur higher costs and delays in delivery as other suppliers are sourced. If supplies were disrupted by military or terrorist action, then the appropriate response would be naval, with an option being the convoying of these ships.

Australian energy exports into the region will vary in criticality depending on the trading partner's reliance on them. It would appear unlikely that a bulk coal carrier would be subjected to military or terrorist action, although a liquid tanker would be a more viable proposition. Certainly for the newly constituted LNG supply to China, these cargoes might be considered significant cargoes requiring a naval escort of they cannot be rerouted away from a known threat.

All Australian-Asian trade passes through Southeast Asia, either to the ASEAN states or to North Asia. The majority of Australian export trade to Japan transits the Indonesian Archipelago, passing through the Lombok Strait, then the Strait of Makassar into the Pacific Ocean, south of the Philippine Archipelago. An alternative route is the Ombai-Wetar Strait, then going through either the Makassar Strait or the Molucca Passage. Japanese imports are routed east of Papua New Guinea. Trade going to the north west

of Australia can transit part of the Makassar or Karimata Straits before passing through the Malacca Strait. The Sunda Strait can also be used as an alternative to the Lombok Strait, but it is a less direct route and has a number of difficulties.

More specifically, Australia's exports of crude petroleum and oil transit through the Lombok and Makassar Straits, and then via the South China Sea if bound for Hong Kong or China, or via the Philippines Sea if bound for Korea and Japan. Exports of coke and coal transit through the Lombok and Malacca Straits if bound for Burma and Europe, or they transit through the Lombok and Makassar Straits and then the Philippines Sea if destined for Hong Kong, Taiwan, Korea and Japan. The LNG trade leaves north-west Australia through the Suva Sea, Ombai Strait, Manipa Strait, and east of Obi Island through the Moluccan Passage and hence direct to China and Japan.

Thus continued access to the sea lanes in the Indonesian archipelago is critical for Australian trade.

Protecting Global Energy Flows

Australia relies upon overseas trade for her economic survival, with China, Japan, South Korea and Taiwan being major Australian trading partners. The Asia-Pacific is the most economically dynamic region in the world and is the driver for global economic growth and development, based predominantly on seaborne trade. The North Asian economies are the powerhouse of this growth and rely on energy imports from the Middle East to fuel economic growth. The Middle East supplies about 50 per cent of China's oil requirements; about 85 per cent of Japan's and about 50 per cent of South Korea's. These oil tankers could be considered critical cargoes that would require protection in the event of hostilities. Thus the global economy would be affected if North Asian energy flows were interdicted, either directly if countries were major trading partners or indirectly as a slowdown or downturn affected the global economy. It would therefore appear to be in the region's collective interests to ensure that the energy continues to flow to North Asia, and Australia would necessarily be involved in this.

Regional Naval Cooperation

As the majority of energy flows in Asia are seaborne in nature, navies would be involved in the protection of this shipping if it were threatened.

In 1951 the Radford-Collins Naval Control of Shipping Agreement was signed between the US, UK, Australia and New Zealand, aiming to coordinate efforts at protecting merchant shipping and anti-submarine warfare operations during periods of tension or war. The agreement delineated national areas of responsibility for naval control of shipping, local defence and anti-submarine warfare in the Indian and southern Pacific Oceans. Under the Agreement, the parties periodically hold exercises to test and assess common procedures, and usually take the form of NCS command post exercises.

As well as the Radford-Collins Agreement there are also international naval trade protection fora known as Shipping Working Groups (SWG). The two main ones are NATO and the Pacific and Indian Oceans (PACIO SWG). The members of the PACIO group are the US, UK, Republic of Korea, Australia and Chile. Singapore and South Africa have observer status and the US tends to look after Japanese interests. Working Group efforts are designed to ensure all participants know how each views trade protection, to develop common strategic and operational level concepts and annually to test communications links.

Conclusion

How then can countries and their navies work together to protect shipping?

Before cooperation can be contemplated, there needs to be agreement on what the actual common threats are facing each country's shipping in order to demonstrate a common purpose. From this flows the identification of possible responses to the common threat, leading to assistance in developing relevant capabilities if required. This is perhaps the most critical issue, as there is no apparent general agreement on a common maritime threat assessment for shipping in the Asia-Pacific region. Some form of common agreement between countries should progressively lead to cooperation between agencies, then bilateral and eventually multilateral naval cooperation. Interoperability is difficult to achieve but the harmonisation of procedures is a useful first step.

The key to maritime cooperation between navies is trust and understanding. Collaboration through multilateral activities provides an understanding of how each navy thinks, operates and what capabilities it possesses. It also provides an opportunity for personnel to interact, exchange ideas and professional expertise and gain an understanding of each other. Competency building through specific activities allows navies to train together to further enhance their skills. Cooperation and capacity building allow more experienced navies to pass on knowledge and expertise to other members. Importantly 'experience' is not limited to larger navies; rather it is based on specific skill sets across a range of navies.

In each region a number of countries have a natural claim to involvement in the protection of shipping transiting through their region. This is then somewhat complicated by the presence of major powers who may also intervene to protect their own national interests.

The most suitable framework for the protection of shipping in the Asia-Pacific region might be the adoption of NATO NCS standards. While it would not be possible to reach the political agreement and military integration of NATO forces, adoption of their standards would assist the Asia-Pacific as the doctrine, administration framework and training requirements already exist; they would necessarily be modified to suit the Asia-Pacific political, geographic and military capability requirements.

This is a revised version of a paper presented to the first meeting of the Council for Security Cooperation in the Asia-Pacific study group on energy security, Singapore 23-24 April 2007

Notes

1 Department of the Prime Minister and Cabinet, *Securing Australia's Energy Future*, Canberra, 2004, p. 20.

2 PM&C, *Securing Australia's Energy Future*, p. 5.

3 Australian Bureau of Agricultural and Resource Economics, *Energy in Australia 2006*, Canberra, 2007, p. 57.

4 Australian Bureau of Agricultural and Resource Economics, *Australian Energy: national and state projections to 2029-30*, Canberra, October 2005, p. 26.

5 ABARE, *Energy in Australia 2006*, p. 69.

6 PM&C, *Securing Australia's Energy Future*, p. 6.

7 ABARE, *Energy in Australia 2006*, p. 5.

8 ABARE, *Energy in Australia 2006*, p. 11.

9 Department of the Prime Minister and Cabinet, *Uranium Mining, Processing and Nuclear Energy Review*, Canberra, 2006, pp. 3, 21-22.

10 Australian National Science and Technology Organisation, *About ANSTO*, www.ansto.gov.au.

11 ABARE, *Energy in Australia 2008*, Canberra, 2008, p. 15.

12 Department of Industry, Science and Resources, *Hydrocarbon Basins of Australia*, www.isr.gov.au/resources/petr_exploration/2001/Web_basins_01.pdf (10 May 2001)

13 ABARE, *Energy in Australia 2006*, pp. 21, 23; ABARE, *Energy in Australia 2008*, p. 15.

14 PM&C, *Securing Australia's Energy Future*, p. 9.

15 ABARE, *Energy in Australia 2006*, p. 35.

16 ABARE, *Energy in Australia 2006*, p. 37.

17 PM&C, *Securing Australia's Energy Future*, p 62.

18 ABARE, *Energy in Australia 2008*, p. 5.

19 ABARE, *Energy in Australia 2008*, pp. 25, 71.

20 PM&C, *Securing Australia's Energy Future*, p. 13.

21 ABARE, *Energy in Australia 2006*, p. 45.

22 PM&C, *Uranium Mining, Processing and Nuclear Energy Review*, p. 2.

23 ABARE, *Energy in Australia 2006*, p. 45.

24 PM&C, *Securing Australia's Energy Future*, p. 11.

25 P Aitken, J Mitchell, M Northcott, M Peters, *Esso Gas Plant Explosion*, www.members.iinet.au/~jinsploj/pdf/longford.pdf

26 Department of Industry, Tourism and Resources, *Task Force Report on the Rationing of Jet Fuel at Sydney Airport September-October 2003*, www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=49F59201-F839-29D2-845BA892F-74DCBFF

27 PM&C, *Securing Australia's Energy Future*, p. 116.

28 PM&C, *Securing Australia's Energy Future*, pp. 1124-125.

29 PM&C, *Securing Australia's Energy Future*, p 118.

30 ABARE, *Energy in Australia 2008*, p. 2.

31 ABARE, *Energy in Australia 2006*, pp. 2-3.

32 ABARE, *Energy in Australia 2006*, p. 11.

33 ABARE, *Energy in Australia 2008*, pp. 13.

34 ABARE, *Energy in Australia 2008*, p. 21.

35 ABARE, *Energy in Australia 2008*, p. 21.

36 BP, *BP Statistical Review of World Energy 2008*, London, June 2008, p. 30.

37 ABARE, *Energy in Australia 2008*, p. 23.

38 ABARE, *Energy in Australia 2006*, p. 37.

39 Department of Foreign Affairs and Trade, *Nuclear Safety and transport*, www.dfat.gov.au/security/safety_nuc_shipment.html

40 Department of Foreign Affairs and Trade, *Transport of spent fuel from Australia to France*, www.dfat.gov.au/security/safety_nuc_shipment.html

41 Maritime Transport and Offshore Facilities Security Act 2003, Internet <http://comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/F8311AC193742AF6CA257084001F6DB0/$file/MaritimeTransOffshoreFacil Security2003_WD02.pdf> (21 November 2005).

Japan's Concerns Over Energy Security

Akitaka Saiki

This morning I will address the various interests and concerns that Japan has about maritime security, as well as talk about what Japan is doing to contribute to and to ensure maritime safety in the region. The international energy market is currently facing a major structural change. The new Japanese national strategy, issued by the Ministry of Economy, Trade and Industry in May 2007, predicts the high price of crude oil will continue for the foreseeable future, based on the tight supply/demand structures in the international energy market.

On the demand side, we are seeing a rapid increase of global energy demand, most noticeably in Asia; China and India, in particular, show remarkable growth, and they now have a greater influence on the international energy market. We are also now facing a possible increase in fuel demand from the transportation sector, as well as a lack of supply capacity in energy importing countries due to outdated or poor distribution infrastructure.

On the supply side, several oil and gas producing countries have been strengthening state control over energy resources and restricting foreign capital investment in their energy sectors. At the same time, the supply of energy from non-OPEC countries is declining, leading to importing countries like Japan becoming more dependent on energy imports from the Middle East. According to the International Energy Agency's 2006 statistics, about 30 per cent of the world's oil production is currently concentrated in the Middle East, and this will increase to about 40 per cent by 2030. Of course, importing countries like Japan will continue to diversify their energy usage, in order to reduce their dependency on fossil fuels. They will also, I am sure, develop various supply chains to reduce their excessive dependency on Middle East exporters. Still, oil from the Middle East will continue to remain a vital resource for the economies of East Asian states, with the majority of this oil transported by sea through the two very narrow waterways of the Strait of Hormuz and the Malacca Strait.

Against this background, the importance of the Malacca Strait, along with the Strait of Singapore, has risen over the past decade. With such remarkable economic growth in Asia, the number of countries using the straits to transport goods has increased, contributing to the enormous growth of traffic volume in these straits. Because of this, the importance of safety, security, and environmental protection in these straits is increasing, and closer cooperation is needed among the littoral and user states to manage these issues. In developing a cooperative framework, Japan believes that the sovereignty of the Malacca Strait littoral states should be respected. These states should play a central role in maintaining the security of the nearby straits. It is also

essential that user states cooperate in programs and activities instigated by the littoral states, and try to share the burden of maintaining a safe and effective transport route. Dealing with the Malacca and Singapore straits requires a comprehensive approach and encompasses the fields of navigational safety, maritime security and environmental protection.[1]

Over the past few decades, Japan, as one of the major user states, has been actively cooperating in safety, security and environmental protection through both government assistance and from private industry. The Japanese Government has extended technical and financial cooperation to the littoral states. For example, the Japanese Coast Guard has dispatched experts, held seminars and conducted joint training sessions with these states. The Japanese Government has also assisted with infrastructure development, such as upgrading the wireless communications networks, developing the global maritime distress and safety system, conducting joint hydrological surveys, and developing electronic hydrological maps of the straits.

Japanese industry contributions since 1968 have totalled ¥15 billion, and have been used to finance the installation of navigational aids, oil fences for environmental protection, and training vessels for Malaysia's law enforcement agencies, among other things.

To secure maritime security of the straits, it is important for user states to cooperate closely with the littoral states with a strong focus on building up their capacity. For that purpose, we need enhanced information sharing and encourage the user states to provide support to the littoral states. Japan welcomes the *Regional Cooperation Agreement on Combating Piracy and Armed Robbery Against Ships* that came into effect in 2006. To date, this agreement has been signed and ratified by 14 Asian countries; and I hope that this mechanism will play a significant role in ensuring the maritime security of the waters in this region. Japan is supporting the operational aspect of the agreement through financial support.

With their geographical narrowness and heavy shipping traffic, the Malacca and Singapore straits are vulnerable to terrorist attack. The possibility of terrorism at sea is a serious concern all over the world. As terrorism diversifies in terms of perpetrators and techniques, the mission of counter-terrorism requires more elaborate and enduring efforts.

At the Japan-ASEAN Summit Meeting in December 2006, we agreed to launch a counter-terrorism dialogue to strengthening cooperation. At a subsequent meeting in June 2007, maritime safety was considered to be one of the top priorities, and Japan agreed to cooperate further in this area.

The Strait of Hormuz is another major transportation route for Japan, and is actually the most important chokepoint in the world, in terms of seaborne oil exports. About 17 million barrels of oil pass through this strait a day. Yet the Strait of Hormuz lacks effective international cooperation among its littoral and user countries. Or course,

I can imagine how difficult it must be to promote the cooperation with the littoral states of Oman and Iran. However, if the political situation surrounding this region deteriorates and passage through this strait is interrupted, it will have a critical impact on global energy supplies. This is another challenge that we face in terms of world energy security.

Over the past few years, the world has confronted even greater energy challenges. Energy prices remain high and volatile and are a particularly heavy burden for the economies of less developed countries. Geopolitical risks are mounting, investment costs are soaring, capital spending is falling short of what is needed to secure supply, and CO_2 emissions are growing ever more rapidly. Despite this, the International Energy Agency (IEA) is making a valuable contribution. For example, after hurricanes Katrina and Rita struck North America, much of the oil production and refining capacity in the Gulf of Mexico shut down. To mitigate the impact of these hurricanes on the global market, the IEA released 60 million barrels of stockpiled oil, equal to 30 days of world oil consumption, or about two million barrels per day. IEA members' quick response to this crisis demonstrates the collective strength of the organisation. The IEA is also going to provide advice on emergency response mechanisms and policies for gas markets, where we have seen an increase in supply tensions and a lack of transparency in this market. Since this can influence other areas, hopefully we can also discuss and deal with problems relating to gas markets. These efforts ensure there is a safety valve when an energy crisis occurs and are also useful in the context of maritime security. The first East Asian Summit (EAS) Energy Ministers' Meeting was held on 23 August 2007 in Singapore, attended by the Ministers responsible for energy from ASEAN countries and Japan, Australia, China, India, South Korea and New Zealand. The goal of this meeting was to ensure that the supply of reliable, adequate and affordable energy is available to sustain economic growth, and the Ministers agreed to greater cooperation and coordination of measures and activities in order to achieve this. This meeting was the first concrete demonstration of cooperation under the EAS framework and was a significant step towards building an effective regional energy security mechanism.

To recap some of my points: first, the current high price level of crude oil will continue for some time to come; and because of this, exporters will continue to have the upper hand, with the world becoming more dependent on oil from the Middle East. Second, it is important and beneficial for all exporting and importing countries alike, to keep the market mechanism working. An unpredictable and unstable energy market will disturb business activity and new investment, both of which are vital for continued global economic growth. Third, maritime energy security is one of the most important elements needed to ensure stable energy supplies, not only for Japan, but also for the fast growing Asian economies as a whole. Therefore, major user states, including Japan, must actively contribute to the security of chokepoints such as the Strait of Hormuz and the Malacca Strait. Japan is committed to do its share, while respecting the sovereignty

of the littoral states. Fourth, multilateral and regional cooperation should be developed. We have to build and develop effective mechanisms to cope with emergency situations. What is needed for the future is a sense of being an 'energy community'.

Notes

1 The International Maritime Organization convened three meetings in Southeast Asia under the 'Protection of Vital Shipping Lanes' Initiative to consider maritime security issues in the strait. The first meeting in Jakarta in September 2005 set out the measures the three littoral states of Indonesia, Malaysia and Singapore had put in place to address concerns, providing a basis for future cooperation between them, user states and other stakeholders. The second meeting was held 12 months later in Kuala Lumpur where the littoral states presented heir ideas about a standing mechanism for cooperation between them, user states and other stakeholders. The cooperative mechanism was agreed at the third meeting held 12 months later in Singapore. Maritime Port Authority of Singapore, *New Historic Milestone in International Cooperation for Straits of Malacca and Singapore*, 4 September 2007.

The Security of Taiwan's Energy Supply

John Tkacik

Among the major threats to the security of Taiwan's energy supply, terrorism and piracy threats in the Malacca Strait are the absolute last things on the list; an earthquake would rank higher. But at the top comes China's military which, once before, has interrupted Taiwan's energy shipments. A recent elaborate naval exercise demonstrated that China could very well do it again.

In April and May 2007, for the first time in modern Chinese history, the People's Liberation Army Navy (PLAN) conducted a series of naval manoeuvres that encircled Taiwan. On 28 April, a PLAN North Sea Fleet flotilla with two guided missile destroyers, two patrol ships and a supply ship, departed Qingdao Base and arrived in the sea near Shanghai. The destroyers and supply ship sailed eastward through Japanese waters in the Ryukyu between Okinawa and Miyako-jima into the western Pacific, then turned south into waters east of Taiwan and east again through the Bashi Channel off Taiwan's southern coast. The flotilla rejoined off China's Xisha (Paracel) Islands where the destroyers and supply ship joined the patrol ships which had sailed due south through the Taiwan Strait from Shanghai. On 11 May the reassembled fleet then turned north and sailed back to Qingdao. Again, on 18 May, two more missile destroyers and two patrol boats of the North Sea Fleet departed their base at Qingdao, sailed the same pattern and reassembled at Hainan Island naval base, returning to Qingdao on 27 May. Meanwhile, one (but possibly two) *Song* class diesel-electric submarine steamed between Okinawa and Miyako-jima waters several times in the same period. Professor Keiso Shobo, a commentator on China's military, stated that 'the PLA Navy warships mainly act in the East China Sea. For them to sail as [an] organized Fleet back and forth through Okinawa to enter the Pacific is unprecedented.' Andrei Chang, a Hong Kong military commentator for *Kanwa Defense Review* noted that the naval manoeuvres focused on two major objectives 'first, to block US forces *en route* from the Ryukyus and Guam in event of a war in the Taiwan Strait, and second to blockade and attack Taiwan's naval and air bases on Taiwan's heretofore protected east coast.'[1]

In this context, one senses that even Japan considers the PLAN to be the most likely agent of interrupted fossil fuel shipments to its thermal power plants and refineries. In April 2002, after giving notification to Japan, China began surveys for potential oil and gas in the disputed Senkaku Islands area. But when China marked out three concession areas that were on Japan's side of the standard median line between Chinese and Japanese waters, Japan protested – to little effect. In January and April 2005, China became more aggressive. The PLAN East Sea Fleet dispatched two state-of-the-art Russian-built *Sovremennyy* guided missile destroyers to the Senkakus area.[2] In the April encounter, Japan Maritime Self-Defense Force (JMSDF) P3-C maritime

patrol aircraft spotted two sleek grey Russian-made destroyers flying Chinese colours cruising toward the *Ramform Victory*, a Norwegian ocean survey vessel chartered by Japan to map out seabed hydrocarbon fields in Japanese waters. In September, the PLAN sent a five-vessel naval flotilla, including one *Sovremennyy*, into disputed waters over the Shunsho (Chinese: 'Chunxiao') gasfield, which was again tracked by JMSDF P3-C aircraft.[3] This time, the Chinese fleet was accompanied by an electronic warfare aircraft, and when Japanese P3-C aircraft or patrol boats got too close, they were locked-on by Chinese fire-control radars. It was the most forceful instance on record of Chinese assertiveness in Japanese waters.[4]

China's naval aggressiveness in Japan's Senkaku Islands area is a new factor in Taiwan's energy security equation for two reasons: first, if China is willing to confront Japan in its own waters it is certainly willing to be at least as hostile toward Taiwan; and Taiwan also claims those waters, though it has downplayed its title as a sign of goodwill towards Tokyo.

The 1996 Taiwan Missile Crisis

All of which should come as no surprise to anyone who observed China's behaviour in the so-called 'Taiwan Strait Missile Crisis'. From 8-13 March 1996, China attempted to halt all international air and maritime traffic in the Taiwan Strait by announcing that it would conduct missile tests in a target area measuring some 50-75 square miles off Taiwan's two major seaports, Kaohsiung and Keelung. Although Taiwan's merchant vessels and those of Jardine Matheson vowed to continue sailing on routine schedules around the targets and into both ports, the effect was to slow traffic to a small percentage of its normal size during the period.[5]

Consider that in the year ending 15 August 2002, a total of 259,086 civilian aircraft transited the Taiwan Air Defence Identification Zone (ADIZ) while 246,015 commercial ships transited the Taiwan Strait and the East Taiwan maritime route.[6] That is, on any single day, between 650 and 1000 major international merchant vessels ply the waters of the Taiwan Strait. Each day, one or two heavy bulk coal carriers arrive at a Taiwan power plant loading dock. Each day, at least one crude oil tanker visits, with a 150,000 ton-plus supertanker berthing at Taiwan's two offshore oil pump stations every third day. Each day, about three 100,000-ton equivalent liquefied natural gas (LNG) tankers arrived in Taiwan.[7]

The Taiwan Strait is one of the most heavily travelled international waterways in the world, and obviously, it is Taiwan's lifeline. Taiwan's largest and second largest ports, Kaohsiung (which is the world's sixth-largest container port) and Taichung, which services central Taiwan, front the strait. While not precisely on the Taiwan Strait, Keelung also has a large coal-loading facility to serve thermal plants in northern Taiwan,

with the coal largely imported from Australia. On Taiwan's eastern coast, Hualien hosts both a major naval base and a mid-sized coal port.

The complexion of Taiwan's energy security vulnerabilities is substantially different from most of the other nations of the region save Japan. Moreover, Taiwan is one of the smaller players in the region, because Taiwan's energy security is pretty fragile, and because there doesn't seem to be a whole lot of thought devoted to the problem in Taipei.

This is not to say that Taiwan's energy concerns are unimportant. Nor that the problems of energy security aren't amenable to some mitigation through rational policy prescriptions. But when compared to the energy challenges facing Japan and China, or even India, Taiwan's are on a lesser order of magnitude. Unless, of course, you consider possible wartime scenarios where China is intent on strangling Taiwan with an energy embargo.

But Taiwan itself is not a factor of only minor importance in Asia's energy equation. Taiwan is generally considered somewhere between the world's 17th largest and 20th largest economy with a gross domestic product (GDP) of about US$346 billion in 2006, and the world's 14th largest trading nation with US$420 billion in imports and exports. It controls the world's 11th largest merchant fleet.[8] And it is roughly 83 per cent dependent on foreign sources for its energy needs, and roughly 65 per cent dependent on foreign fossil fuels.[9]

Taiwan has limited domestic energy resources, a situation that has led to an increasing reliance on imports to meet its energy requirements. In 2004, imported energy accounted for 98 per cent of total energy supply, compared with 89 per cent in 1984. About 2 per cent of domestic energy needs are generated by hydropower. Another 1 per cent could be squeezed from Taiwan's small natural gas deposits. And about 21 per cent of Taiwan's electricity capacity is generated by three nuclear power stations (six units), with a fourth nuclear station possibly ready by 2012. So, theoretically, Taiwan could still generate about a third of its current electric power demand even in the face of an extended naval blockade.

Taiwan's Energy Basics

Taiwan's bill for imported energy fuels was about US$34 billion in 2006 – 22 per cent higher than in 2005, despite the fact that energy consumption only increased 2.7 per cent. What did Taiwan get for its money in 2006: 64 million tons of coal, 51 million kilolitres of crude oil equivalent, and 10.35 billion cubic meters of LNG (or about 7.5 million tons).

The vulnerabilities of Taiwan's maritime energy supply lines are quite obvious.

Doing the math – working with a typical single coal or crude oil shipment at about 100,000 tons each – that works out to about 650 bulk coal carrier arrivals, plus 360 crude oil supertanker visits and 1500 LNG carrier visits in 2006. That is about 2500 ship arrivals in Taiwan each year, just to deliver imported fuels and equates to roughly seven arrivals a day of very large capacity tankers, dry bulk carriers or LNG carriers, with a supertanker arriving in Kaohsiung every three days. Taiwan currently has ten thermal power plants that can take coal shipments directly, four refinery ports that have coastal pump stations and storage tanks and one LNG dock at Kaohsiung, with a second under construction at Tatan.

Virtually all these energy unloading ports are on Taiwan's western coast, facing China. Oh, and one other thing: when Taiwan considers the level of its import dependency, it must contemplate the fact that roughly a fifth of its coal comes from China.

Should the Persian Gulf shut down or the Malacca Strait be constricted for some reason, Taiwan would be cut off from more than 60 per cent of its crude oil imports. And 80 per cent of Taiwan's long term natural gas contracts are with Malaysian and Indonesian fields on or near the South China Sea, so Taiwan's energy supplies would be vulnerable to natural disasters, political unrest or Chinese naval interdiction in the region.

Energy Diversification

Taiwan's high dependence on energy imports is the major reason Taiwan has diversified its fuel mix. Price fluctuations in coal and oil was one of the key factors that led to the introduction of LNG into Taiwan in 1990 and is a key driver of the planned additions to gas fired generation capacity and LNG import infrastructure. However, concerns have grown over the stability of the Indonesian LNG supply, particularly after Indonesia's Pertamina cancelled ten LNG cargoes to Taiwan in late 2004 after the tsunami. Taiwan's Chinese Petroleum Corporation (CPC) has since worked to diversify its LNG supply.

In June 2005, for example, CPC signed a 25-year LNG purchase agreement with RasGas of Qatar to begin in 2008, and CPC has begun to purchase LNG on spot markets whenever prices seem economical. Taiwan's national energy policy of stabilising energy supply, that is, balancing cost-economies among fossil imports, is the top priority in Taiwan's energy strategy. As one study observes, 'Efforts to diversify the fuel mix and the sources of energy supplies can be expected to continue to influence the composition of future energy consumption. The current objectives are to continue to lower the share of oil in Taiwan's energy mix and to expand the shares of natural gas and renewable energy.'[10]

Nuclear Power Policies

In contrast with other countries in the region with similar import dependence, such as Japan and South Korea, Taiwan has not emphasised the potential role of nuclear

power to enhance its energy security, and most analysts expect the share of nuclear power to fall in the longer term. Given the mortal fragility of Taiwan's energy import structure, one might think that Taipei would devote more attention to strengthening its nuclear power infrastructure. But the ruling Democratic Progressive Party has developed a pathological allergy to anything nuclear, apparently a vestige of an earlier era of environmental consciousness. However, surprises do occur, and a combination of factors may turn this around.

In 2003, nuclear power accounted for 19 per cent of Taiwan's total electricity generation, a figure that has been nudged to 21 per cent in 2006. Taiwan has three operating nuclear plants, with a fourth under construction. Safety and environmental concerns in the ruling Party and resistance from local communities are forces that resist the re-evaluation of nuclear power in Taiwan. In October 2000, the government halted construction and scrapped the fourth plant. The public outcry and political outrage from the opposition parties was so overwhelming that the project was reinstated in February 2001 (although it had to take a ruling from Taiwan's Supreme Court that the order to halt the nuclear project violated the prerogatives of the legislature which had approved funding for the construction).

At least three factors argue for continuing with the fourth nuclear power plant and reviewing possibilities of keeping the older nuclear plants running beyond their 50-year life cycle. First is energy security – the threat of embargoes or blockades from China means that without nuclear power, all electric-powered life on Taiwan would shut down.

Second, while start-up costs are relatively high, the massive increases in fossil fuel costs globally now mean that nuclear energy is cheaper than any other fuel source in Taiwan save hydroelectric power. Although Taiwan Power Co (Taipower – the nation's only electricity retailer) announced its operating costs for nuclear power generation in 2004 were the lowest ever ($0.02/KwH), the current government has still not made a decision on the fourth plant, and there remains a desire to introduce a law that would phase-out nuclear power altogether.

Third, Taiwan is also under increasing pressure – both internationally and domestically – to address the impact of its carbon emissions on global climate change. The government initially designated natural gas as the 'fuel of choice' for electricity generation because of its relatively low carbon emission factor, but the cost of LNG has more than doubled since 2003 making it the most expensive fuel choice in Taiwan; so nuclear energy may now be a cheaper option.

Nonetheless, progress on the fourth nuclear plant is hardly speedy. The two nuclear reactor islands delivered in 2002 were only installed in March 2005. As of the end of September 2005, the project was 62 per cent complete. And in October 2005, the timetable for commercial operation of the plant was postponed for yet a third time.

One unit of the plant's core reactor, with a capacity of 1350 megawatts, was to begin operation in July 2006 and a second unit of the same capacity in July 2007.

But that was wishful thinking. In May 2007 the project was reportedly 64 per cent complete. Commercial operation of the plant is now planned for 2009 – at least according to public pronouncements from Taipower, but they have also hedged their predictions by noting rising import costs of raw materials as reasons for the delay. There are also reports of problems with maintaining and securing international contracts for the project, as a result of low compensation for losses when the project was suspended for several months in 2000-01 and the political risk inherent in the uncertainty surrounding the ruling party's nuclear policy. Taipower looks likely to delay completion of the fourth nuclear power station another two years, which will cost the Taiwanese taxpayer at least an additional US$1.8 billion in lost revenue.

There is no question that Taiwan needs the fourth nuclear plant, with its 2700 megawatts of installed capacity, to ease an electricity shortage in the north and reduce a reliance on ultra-high voltage transmissions from the south.

Recent government statements suggest that the plant will be completed, but that Taiwan will not build another plant. The current government is committed to a policy of a 'nuclear free homeland' and the Executive Yuan approved a draft bill for the promotion of a nuclear free homeland in May 2003. The bill would ban the development of nuclear weapons, gradually phase out the use of nuclear power, and supposedly boost use of renewable energy.

With Taiwan's government ruling out nuclear power as a future option for electricity generation, it is likely that coal fired capacity will rise, as nuclear and coal are both effective base load fuels. The Ministry of Economic Affairs recently stated that coal could account for as much as half of Taiwan's installed capacity by 2025, compared with 32 per cent in 2004. In the shorter term, Taipower currently has four coal fired plants under construction and another seven have been approved. There are no clear indications at this stage how a significant increase in coal fired power generation would be consistent with Taiwan's emphasis on environmental outcomes.

In the short to medium term, however, Taipower plans to meet the shortfall in capacity from the delay in the fourth nuclear plant with the Tatan gas-fired plant which started generating electricity in November 2006.

Conclusion

Taiwan's energy vulnerabilities are extremely high given: its near total dependence foreign energy sources which are transported by sea; its proximity to China which harbours intense irredentist territorial claims on Taiwan and possesses the naval power to impose a blockade; its history of interrupted energy supplies from Indonesia due

to natural disasters and political turmoil; and the fact that 60 per cent of its crude oil comes from on of the world's most violent flash points – the Persian Gulf.

One would think that Taiwan's government would take pains to mitigate some of these risks, and indeed one strategy is fuel source diversification. But diversification seems only to be an answer to Taiwan's vulnerability to volatile pricing, and in the course of diversifying out of coal and into natural gas, Taiwan seems to have diversified itself into an even higher cost fuel. Moreover, for purely ideological 'green' reasons, Taiwan's ruling party seems to have talked itself out of the one energy source that would lessen the Island's vulnerability to blockades or embargos of fossil fuels and at the same time provide an answer to the most pressing 'green' issue of the age – global climate change.

There is little Taiwan can do to lessen its near-term dependence on maritime shipments of fossil fuels and hence its vulnerability to hostile naval action from its avowed enemy, China. But in the case of nuclear power, it is possible that a 'green' government in Taipei will try to overcome its nuclear allergy as a logical energy policy choice that makes security and economic as well as environmental sense.

Finally, Taiwan must begin to take seriously its own naval strategies. Unlike another Asian maritime nation that depends on seaborne trade – Singapore – Taiwan's defence spending has steadily declined over the past 8 years even as China's naval power has expanded exponentially. While Singapore's defence spending hovers at around 5.1-5.5 per cent of GDP, Taiwan's has slipped from about 4.11 per cent in 1994 to only 2.4 per cent of GDP in 2005. Taiwan's President Chen Shui-bian's current goal is to raise the defence budget from its 2006 level of 2.54 per cent of GDP to 3 per cent within three years, and eventually back to the 1995 rate of 3.5 per cent. An increased defence budget would demonstrate Taiwan's recommitment to its own defence and would reassure the United States that Taiwan is willing to stand up for itself.

The major military threats to Taiwan's energy supplies come from ballistic missiles, jet fighter attacks and submarine blockades. Secondary threats emerge from fifth-column saboteur units recruited on Taiwan from pro-China militants or infiltrated into Taiwan as sleeper cells. Within a defence budget of 5 per cent of GDP, Taiwan could meet these challenges quite easily with additional defence procurement, hardening of soft targets, firmer internal security measures, and fielding military and naval forces that could inflict commensurate pain on Chinese targets.

Taiwan does not necessarily have to erect absolute defences against these threats, but must simply achieve a military capacity to inject extremely high costs into the Chinese leadership's calculus of attack. Certainly, a Beijing decision to launch missiles into target areas near Taiwan's major seaports changes if there is a likelihood that Taiwan itself can do the same to China.

Until Taiwan makes that commitment, however, it remains highly vulnerable to Chinese military pressures. As such, cutting off Taiwan's sea lines of communications in the Malacca Strait or the South China Sea is the least of Taiwan's worries. If – or when – that happens, everybody else in South, Southeast and East Asia will have the same problem, and they will probably not be too interested in including Taiwan in their responses to the crisis.

Notes

1 Huang Jingjing, 'Zhongguo Jiandui 2 ci dadan rao Tai shiwei' [Chinese Fleet China twice sails around Taiwan in bold demonstration], Taipei *Zhongguo Shibao*, August 29, 2006, available at: <http://news.chinatimes.com/2007Cti/2007Cti-News/2007Cti-News-Print/0,4634,110505x112007082900100,00.html>. This article cites the *Asahi Shimbun* newspaper, and information on these exercises in the following paragraphs is taken from the *Asahi Shimbun* report.

2 Yang Peiling, 'Xianddaiji Quzhujian Xunxing youtian haiyu' [Sovremennyy Destroyers patrol oilfield waters], Taipei *Zhongguo Shibao*, 26 January 2005. See also Mark J Valencia, 'Pouring oil on the East China Sea; China vs. Japan', *International Herald Tribune*, 24 February 2005 available at: <www.iht.com/articles/2005/02/23/opinion/edvalencia.php>. For the April incident see 'Resources and energy - More open China a threat to Japan; China Gorging and Japan-China Resource and Energy Conflicts', *Yomiuri Shimbun*, 13 April 2005, reprinted in *Japan Focus*, at <www.japanfocus.org/article.asp?id=318>.

3 Chen Shichang, 'Dalu wu junjian xianshen 'Chunxiao'; Xiandaijian canyu, Rifang ren xi shiwei' [Five PRC Destroyers including *Sovremennyy* move into 'Chunxiao' area, Japan sees demonstration of force], *Zhongguo Shibao*, Taipei, 10 September 2005. See also Norimitsu Onishi and Howard W French, 'Chinese warships remind Japanese of challenge on seas', *The International Herald Tribune*, 11 September 2005, available at: <www.iht.com/articles/2005/09/11/news/rivals.php#>.

4 'Zhong Ri sheng youtian; Zhanjian Dapao dui Feiji; Jiefangjun paokou xiangxiang; Ri Dachen pi tiaoxin; jianyi buzhangji huitan jiejue' [Chinese Ships aim guns at Japanese Aircraft and Ships, Japan PM slams Chinese provocation, Suggests Ministerial Level Summit to discuss resolving issue], *Shijie Ribao*, New York, 3 October 2005, p. A-2. See also 'Japan wary of Chinese spy plane, ships', *Taipei Times*, 14 September 2005, available at: <www.taipeitimes.com/News/front/archives/2005/09/14/2003271561>.

5 L. Burgess and A Wastler, 'Taiwanese Undaunted by China's Missile Tests', *Journal of Commerce*, 7 March 1996, p. 1.

6 Briefing provided to members of the 'Trilateral Conference' by the Ministry of National Defense, Taiwan, 26 August 2002. (Powerpoint presentation page 7 of 16).

7 See an excellent overview by Michael C. Grubb, 'Merchant Shipping in a Chinese Blockade of Taiwan', *Naval War College Review*, Winter 2007, pp. 81-102.

8 'Taiwan's merchant fleet ranks 11th in deadweight tones', Taipei Times, 9 December 2007, p. 11, available at: <www.taipeitimes.com/News/biz/archives/2007/12/09/2003391853>.

9 Figures for this paper come from Bureau of Energy, *Taiwan Statistical Energy Handbook 2006*, Ministry of Economic Affairs, Taipei, July 2007.

10 Allison Ball, Jane Mélanie and Karen Schneider, *Natural Gas in Taiwan; prospects for LNG*, Australian Bureau of Agricultural and Resource Economics, Canberra 2006.

The ASEAN Countries' Interest in Asian Energy Security

Andrew TH Tan

Ten years ago, Ji Guoxing wrote presciently that 'energy security is of particular importance in the Asia Pacific owing to its physical unavailability to meet demand, and energy security is now becoming a fundamental cornerstone of economic policy for the Asian Pacific economies.'[1] He cited a report in the *Los Angeles Times*, which predicted that

> *some time in the next 20 years or less, global petroleum output may begin a permanent decline, even as world oil demand continues to rise … though market forces and improved oil production technology should keep petroleum flowing well into the twenty-first century, the peak of the Oil Age may come far earlier than conventional thinking now assumes.'*[2]

Ji therefore concluded that world oil production would begin to decline around 2010, and oil prices would rise in real terms.[3]

Yet, the concentration of two-thirds of the world's proven oil reserves in the Persian Gulf area means that Asia's dependence on imported Middle Eastern oil will rise. The problem, however, is that 'these supplies remain potentially vulnerable to military or political events that have nothing to do with markets, but which can have an enormous impact on oil and gas.'[4] Moreover, the fact that these oil supplies must traverse vast oceans through long and vulnerable sea lines of communication (SLOCs) that pass through the narrow and troubled Strait of Hormuz, and the narrow piracy-infested Malacca Strait on their way to lucrative Asian markets to fuel their explosive economic growth has resulted in much greater vulnerabilities to any disruption to this increasingly important resource.

To further complicate the picture, this growing dependence on oil is led by the major economic powerhouses of Asia, namely India, China, South Korea and Japan. Energy security in the Asia-Pacific region is therefore bound up with the policies and responses of great powers such as China and Japan.[5] To the extent that China's rapid economic growth and growing dependence on external energy sources is driving its strategic, foreign, defence and maritime policies, and to the degree that Japan and the United States are bound to have to respond to this growing competition for a scarce resource, it follows that Southeast Asia would increasingly become a battleground in this competition, given the presence of oil and gas deposits, as well as strategic waterways and SLOCs in the region.

In addition, the ongoing quest for energy security is in fact giving rise to greater insecurity in the region. For instance, the increasing interstate rivalries to secure energy supplies have raised the stakes in maritime territorial disputes, such as those involving disputed territory and overlapping Exclusive Economic Zones (EEZs). There are also growing concerns over maritime security, especially long and vulnerable SLOC, as well as the security of strategic waterways such as the Malacca Strait. Related to these concerns are growing anxieties over piracy and terrorism that could disrupt the supply chain. Complicating the picture is the presence of historical interstate rivalries and mutual suspicions which have limited a cohesive regional response to energy security challenges, resulting in a lack of preparedness in meeting future challenges.

The purpose of this paper is to examine the ASEAN interest in energy security. It poses two key questions: what is the energy problem in the region and what have been its consequences? How have the ASEAN states responded to the energy problem and what are the future prospects? The paper begins by examining the energy problem in Southeast Asia, with rising demand sparking a search for alternatives, a regional scramble for oil and gas with China and with each other, and heightening concerns over the security of vital SLOC, an issue that also involves external powers. The paper then goes on to examine the efforts that the ASEAN states have made in regional energy cooperation. Finally, the essay concludes with an assessment of the prospects for regional cooperation.

Energy Demand in Southeast Asia

On its part, the Southeast Asian states (comprising the ten members of ASEAN) have a strong interest in energy security for a number of reasons.

A key reason lies in the generally rapid economic growth in the ASEAN economies, despite the blips registered during the 1997 Asian financial crisis. This has resulted in the expanding demand for energy. One reason is the result of strong growth in transport, such as the increasing number of motor vehicles, which is a main driver for oil demand. However, there are other segments of national economies which are driving the demand, such as power generation, industrial boilers, residential and office air conditioning, cooking and petrochemical feedstock.

A selected comparison of primary energy consumption (oil, gas and coal) below demonstrates the steady rise in energy consumption of key ASEAN states, with the figures for China and Japan given for comparison. According to BP, world primary energy consumption increased by 2.4 per cent in 2006, with the Asia-Pacific region recording the most rapid growth at 4.9 per cent. Although this reflected the general overall economic growth of the region, including Southeast Asia, the growth was led by China, where energy consumption increased by 8.4 per cent. China thus continued to

account for the majority of global energy consumption growth. In contrast, consumption in North America fell by 0.5 per cent in 2006.[6]

Country	1990	1999	2006
Indonesia	52.3	79.6	114.3
Malaysia	21.5	38.0	67.0
Thailand	28.8	59.3	86.1
The Philippines	13.0	21.6	25.2
Singapore	20.3	29.6	50.0
China	668.0	752.6	1697.8
Japan	428.3	507.4	520.3

Table 1: Primary energy consumption in East Asia (in million tonnes oil equivalent)[7]

The key issue here is whether Southeast Asia has sufficient energy resources on its own. The picture is a mixed one. Oil is clearly still the main source of energy and in this respect, there are important oil producers in the region, namely, Indonesia, Malaysia, Vietnam and Brunei. The four countries produced 51.9, 33.8, 17.8 and 10.8 million tonnes of oil in 2006 respectively. Despite this, Indonesia's enormous growth in energy consumption has meant that it has become a net importer of oil. Whilst Malaysia has been able to ensure a generally positive oil production growth, it is predicted that it too will become a net importer of oil after 2010. Cambodia, which currently produces no oil or gas, has been the fortunate recipient of important offshore discoveries in recent years and could well benefit once they are developed.

Country	Proven Reserves (thousand million tones)	Production (million tones)
Brunei	0.2	10.8
Indonesia	0.6	51.9
Malaysia	0.5	33.8
Thailand	0.1	11.8
Vietnam	0.4	17.8

Table 2: Oil production and proven reserves in the ASEAN States (2006)[8]

Southeast Asia does have large major importers, namely, Singapore, Thailand and the Philippines. Vietnam has to import oil products as it will not have a refining capacity until 2008.

The increasing importance of regional waterways as a transit point for energy supplies being transported to the booming economies of Northeast Asia, especially China, has also provided countries in the region with some limited opportunities. For instance, as China continues to search for alternative routes for oil imports, new pipeline and port service projects in Thailand and Myanmar has or will benefit them.

Another major beneficiary is Singapore. Indeed, the key role that Singapore plays in the regional oil industry deserves mention. Singapore has already established itself as a major oil refining and bunkering centre on account of its strategic location at the tip of the Malacca Strait. It is the third largest oil refining centre in the world, is a regional storage hub, has a significant petrochemicals industry, and builds 60 per cent of new jack-up oil rigs.[9] Yet, this belies it own insecurity, given that it does not have a large domestic oil market and that countries with lower infrastructure costs, could pose a significant challenge in the future.[10]

The above short analysis points to the fact that, given the region's dependence on oil and its growing energy requirements, ensuring sufficient energy supplies and the security of those supplies, will be growing challenges for the region as a whole.

Efforts at Diversification

A number of factors have combined to galvanise the ASEAN states to diversify their energy sources. The first is the unabated rise in oil prices due to strong demand, which has put a strain on public finances due to costly fuel subsidies in some of the Southeast Asian states. There is also growing concern over the continued and growing dependence on imported oil, as security of access to reliable oil and energy sources is important for continued economic growth and political stability in Southeast Asia.

The possible uncertainties of external supply from the volatile Middle East has raised concerns over the region's preparedness to meet any energy contingencies, given the general lack of national and regional stockpiles.[11] Moreover, growing concerns over climate change and the accession to the Kyoto Protocol by a number of countries in the region have also led to greater efforts to become less carbon intensive.

At the same time, the presence of energy resources in the region, and the possibility of alternative energy transport routes through the region, have attracted the attention of external powers, particularly China, in the search for more diversified sources of energy that could lessen dependence on the Middle East or alternative transport routes that would reduce strategic vulnerabilities. For the ASEAN states, one major challenge has been the ability to secure adequate energy supplies in competition with these powers and even with each other.

The above factors have combined to galvanise national and even regional efforts at diversifying energy resources by developing alternative indigenous supplies of energy, as well as strategies to increase energy efficiency.

The intensified search for alternative energy sources has led states in the region to explore nuclear energy, bio-fuels and hydroelectricity. Nuclear energy has recently received a great deal of attention owing to plans by a number of ASEAN states to build nuclear plants. Thailand has plans for two nuclear power plants with a total capacity of 4000 megawatts (Mw) by 2020, whilst Vietnam plans to build its first nuclear power plant by 2015. Malaysia, set to become a net oil importer after 2010, has stated its interest in acquiring nuclear power plants by 2020 as part of its energy diversification strategy.[12]

The most concrete plans are that of Indonesia, which announced that it would build a 4000Mw nuclear plant near Mount Muria in Central Java, with construction to begin in 2011, and for the plant to begin operations in 2018. The decision to go nuclear in Indonesia was not smooth sailing, given the heated debates since the early 1990s about the safety of such plants, especially as much of Java is earthquake prone. However, in 1997 a Nuclear Energy Law was eventually passed by the then Suharto Government. The current Yudhoyono Government has included nuclear energy as a future source of energy in its 2005 National Energy Policy.[13] Opposition, however, continues to come from the public, particularly from environmentalist groups, that have expressed concern over inadequate infrastructural and institutional frameworks, and lack of preparedness in dealing with natural disasters.[14]

Yet what surprised everyone was Myanmar's move to develop nuclear energy with the assistance of Russia under an agreement signed in May 2007. Under this agreement, Russia's atomic energy agency, Rosatom, would build a nuclear-research centre that would include a 10Mw nuclear reactor. The entire facility would initially support medical and agricultural research. However, Myanmar had in fact been exploring means of acquiring nuclear technology for some years, with allegations of contacts with Iran, Pakistan and North Korea.[15] This should come as no surprise, given its isolation from the rest of the world on account of its human rights abuses, and the chronic energy shortages that it faces. Moreover, the Myanmar military regime genuinely believes that the United States is implacably hostile to it, and it should therefore be no surprise that it would at least explore the option of a nuclear deterrent. However, significant barriers remain before Myanmar could harness nuclear power, such as a lack of adequate infrastructure, funds, personnel and regulatory controls. Any further moves to develop nuclear power, even if for peaceful purposes, would raise suspicions of nuclear weapons ambitions and consequently attract closer scrutiny from the international community.

It is bio-fuels that have great appeal to governments in the region, as it would engage existing well-developed agricultural resources, such as sugar, coconut and palm oil.

Bio-fuel technology has been developed from two sources: bio-ethanol gasoline, from food crops such as sugar and cassava; and bio-diesel, from oil-producing crops like coconut, castor kernel and oil palm. Thailand, Indonesia and the Philippines are making earnest efforts to develop bio-ethanol (or gasohol). In fact, Thailand's program started in 1985, and it now has some 4,000 petrol stations serving alternative fuel.

As for bio-diesel, initiatives have been launched in Thailand, Philippines, Malaysia and Singapore. Malaysia's Envo Diesel program announced in 2005 is expected to produce up to 500,000 tonnes of bio-diesel. However it is Indonesia which is leading the way, with the announcement in 2006 by its Ministry of Energy to raise and invest 200 million rupiah over the next five years for bio-fuel production and distribution. Much of this will focus on palm oil. The problem with bio-fuel, however, is that already endangered forests could be cut down for such plantations, as well as the possibility that such crops could compete with food crops for scarce farmland.[16] A note of realism should also be sounded as although 'the development of bio-fuels is promising … it cannot be assumed at this stage that they will fully substitute for crude fossil fuels.'[17]

Hydroelectric power is another promising alternative source of energy, given the mountainous nature of the region, and the abundance of rainfall in the tropics. In its efforts to diversify its energy sources, Thailand has tapped into hydroelectric power in Laos and more recently in Myanmar. Indeed, the Thai MDX Group recently signed a US$6 billion deal for a hydroelectric power plant at Ta Sang in Myanmar.[18] Yet, as the consumption of hydroelectricity in Table 3 indicates, it continues to only provide a useful supplement to the electricity supply, and merely a drop in the total energy consumption of key ASEAN states. With the even lesser contribution of alternatives such as wind, solar and geo-thermal power, and the still nascent state of hydrogen power research, the ASEAN states will have to continue to rely on primary energy resources particularly oil and natural gas for the foreseeable future.

Country	Consumption (MTOE)
Indonesia	2.3
Malaysia	1.6
The Philippines	1.9
Thailand	1.8

Table 3: Consumption of hydroelectricity in key ASEAN States, 2006[19]

Indeed, it is natural gas, which is the region's most abundant fossil fuel, which poses the best possible alternative to oil. Table 4 shows proven reserves, share of world total, and production in 2006.

Country	Reserves (trillion cubic metres)	Share of world total	Production (MTOE)
Brunei	0.34	0.2	11.0
Indonesia	2.63	1.5	66.6
Malaysia	2.48	1.4	54.2
Myanmar	0.54	0.3	12.1
Thailand	0.30	0.2	21.9
Vietnam	0.40	0.2	6.3

Table 4: Natural gas in Southeast Asia: reserves and production (2006)[20]

According to Daniel Yergin and Michael Stoppard, natural gas is 'the next prize'. They explain that the need to find sources of energy for future economic growth, as well as the environmental friendly nature of this natural resource, has resulted in the emergence of the global gas market. In addition, they point out that the ability to cool the gas and transport the resulting liquefied natural gas (LNG) by sea has opened up new markets, opportunities and sources of supply.[21]

According to the International Energy Agency (IEA), cumulative gas demand will grow the highest in Asia, more than tripling from 208 billion cubic metres in 2002 to 672 billion cubic metres in 2030.[22] In this scenario, the demand from China and India will increase markedly.

Indeed, a key source of gas imports for them will be Southeast Asia, which will equal the Persian Gulf in importance by 2030. Indonesia, for instance, has emerged as a key source of LNG, which earned the country US$6.5 billion or some 12 per cent of the country's total exports in 2003. According to the US Embassy in Jakarta, Indonesia produced 3.15 trillion cubic feet (tcf) of gas in 2003, making it the number six in world gas production. Indonesia also currently supplies some 26 per cent of the world's LNG from two production centers in Arun in Aceh and Bontang in East Kalimantan. There also remain large uncommitted reserves in Papua and the Natuna Sea. BP, in partnership with Japanese and Chinese companies, is currently developing a US$6.5 billion LNG project in Tangguh in Papua province.[23] However, Indonesia in general has, in recent years, been losing market share to other new suppliers such as Russia, Qatar and Australia. The cause has been attributed to the lack of a coordinated strategy to improve the gas infrastructure and attract new investment that would create new sources of production.[24]

Myanmar is also emerging as a key player in natural gas. It has abundant natural gas deposits and currently supplies China and Thailand. The gas comes from discoveries in the Gulf of Martaban, with new finds in the Gulf of Bengal the subject of an intense bidding war between Thailand, China and India. Myanmar is estimated to have total

gas reserves of around 88tcf, slightly less than Indonesia. Despite energy shortages within the country, Myanmar is already earning around US$400 million from the gas fields in the Gulf of Martaban. There is currently significant offshore oil and gas exploration activities by companies from China, India, Malaysia, Thailand and South Korea. In addition, China has begun building an oil pipeline from Sittwe in Mynamar to Kunming in southern China as an alternative oil transport route.[25]

Malaysia also has gas deposits, and in October 2006 signed a gas deal with the Shanghai LNG Company. Under this agreement, Malaysia will supply China with 3 million metric tonnes of LNG annually for the next 25 years through its LNG complex in Bintulu in East Malaysia.[26]

Given the evident need to rely on oil and gas for the foreseeable future, the ASEAN states have made significant investment in the exploration and production of oil and gas, as well as new infrastructure in support of these industries.

In this respect, the region's largest oil producer, Indonesia, has turned from exporter to a net importer of oil in 2004 due to the enormous growth in domestic oil demand. After years of instability as a result of the financial crisis in 1997 and the fall of the Suharto regime in 1998, there has been better strategic direction in terms of energy policy under the Yudhoyono Government. In 2005, the removal of fuel subsidies raised domestic prices by almost 50 per cent, which should have an effect on fuel efficiency and demand. Also, new investments have finally begun to flow, particularly to the Tangguh natural gas field in Irian Jaya, and with Exxon-Mobil developing the Cepu oilfield.[27]

Malaysia's strategy has been to invest heavily in other Muslim countries. Today, one-third of the revenues of the state-owned oil company, Petronas, comes from operations overseas especially in Africa. New oilfields, such as the Kikeh offshore fields, will come into operation in 2007 following the impending resolution of the disputed maritime territory with Brunei. Another big offshore oilfield, the Gumusu-Kakap field off Sabah, is due to start production in around 2012.[28] In 2007, Malaysia also approved the construction of a US$7 billion pipeline stretching some 320 kilometres, across the north, from Kedah on the west coast facing the Malacca Strait, to Kelantan in the east, facing the South China Sea. A joint venture with Indonesian and Saudi companies, the pipeline is meant to help ease congestion as well as provide a shorter oil transport alternative to the Malacca Strait. The pipeline facility would transport six million barrels of oil a day and store some 180 million barrels when fully completed in 2014, diverting some 20 per cent of oil currently traversing the Malacca Strait. This pipeline could obviously pose the potential of undercutting Singapore's role and position as a regional oil hub though this could only happen if supporting infrastructure such as ports, oil storage depots and oil refineries are also put into place.

Needless to say, Singapore, Thailand and Philippines are particularly vulnerable in terms of energy security given their heavy dependence on imported oil and energy resources. They have only tentatively begun to explore alternative energy sources but for the foreseeable future will have no alternative but to continue to rely on oil for much of their energy needs. Despite being a major oil exporter, Brunei's oil fields are heavily depleted and potential new offshore finds are problematic given territorial disputes in the South China Sea.

Vietnam is a significant oil producer, producing 17.8 million tonnes of oil in 2006. It is the third largest oil producer in Southeast Asia after Indonesia and Malaysia, and is aggressively increasing both exploration and production. Indeed, oil drilling activity has doubled since 2005, and there has been a substantial increase in foreign investment. There are offshore oilfields off northern Vietnam, and new discoveries along the south coast as well.[29]

The Scramble for Oil in Southeast Asia

The high price of oil (with benchmark crude prices reaching US$70 a barrel in mid-2007) as a result of the massive increase in demand from China, amongst other countries, has led to a scramble for energy resources in Southeast Asia. China is the world's second largest consumer of oil, surpassed only by the United States. Because of its high growth and industrial expansion, China is expected to account for one-third of the annual increase in Asia's demand for oil and half the increase in demand for natural gas, until 2025. China became a net importer of oil after 1993 and imported oil accounts for over half its needs. Its efforts to diversify sources, particularly away from the volatile Middle East, have led it to invest in exploration and production in a number of countries.[30] In the region, China has acquired natural gas from Indonesia and Myanmar, and has discussed oil pipeline projects with the latter.

But it is in the South China Sea that apprehensions over China appeared in tandem with its growing interest in offshore oil resources. The South China Sea may potentially have deposits of up to 225 billion barrels of oil as well as undetermined but possibly large deposits of natural gas. China however, has been in direct conflict with Vietnam, Malaysia, Brunei and the Philippines over the potentially oil-rich Spratly Islands. In 1992, China passed a 'Law on Territorial Waters' asserting its claims to the South China Sea and reserving for it the right to use military force to enforce its claims in the area. In the same year, China awarded Crestone, an American oil company, a contract to drill exploratory wells in an area Vietnam considered part of its continental shelf, while promising naval protection.

The member states of ASEAN, concerned over the prospect of conflict, issued a Declaration of the South China Sea in July 1992 in Manila, which called upon all parties involved in the South China Sea dispute to resolve all sovereignty and jurisdictional

issues by peaceful means. This was ignored by China, which increased its naval presence in the Spratlys, and proceeded to blockade Vietnam's oil-prospecting facilities in May 1994. In early 1995, China also occupied the aptly-named Mischief Reef in the Spratlys. This territory was claimed by the Philippines and marked the first time that China actually seized territory from an ASEAN state. [31]

In view of this incident as well as its previous propensity to use force to resolve bilateral territorial disputes, as it did when it seized the Paracel Islands in 1974, there were fears that the Spratly Islands had become a potential regional flash-point.

But this did not happen. The response of the states in the region has not been confrontation but accommodation towards a rising China. For its part, China has reaped the benefits of its sophisticated approach to its foreign policy that became evident since the late 1990s. Two developments explain this embrace of diplomacy. The first is the evident need for stability as China pursues its primary objective of economic development. The second is the emergence since the late 1990s of a new generation of diplomats and academics trained in the best Western universities that has brought an emphasis on 'soft' power. No longer was China uneasy with, or opposed, to multilateral forums dealing with the issue of the Spratlys.[32] In November 2002, China signed the Declaration on the Conduct of Parties in the South China Sea with the ASEAN states, whereby it affirmed the use of peaceful means to resolve the dispute.

This was followed by an agreement with the Philippines and Vietnam in March 2005 jointly to develop the resources in the South China Sea, with the question of sovereignty put into abeyance.[33] The Philippines also signed a series of agreements in April 2005, under which China would provide development aid to the Philippines. Unlike the United States, China also signed the ASEAN Treaty of Amity and Cooperation. The ASEAN states and China thus enjoy close relations today, a result of a pragmatic approach by both China and the ASEAN states. For the latter, China is after all in close geographical propinquity and represents enormous economic opportunities. The Spratlys issue remains unresolved for the time being; its ultimate resolution is likely, however, to be on China's terms, given that it will be in a much stronger position in the future.

Apart from the Spratlys, there are other maritime disputes and flashpoints in the South China Sea concerning oil and gas. For instance, Indonesia is developing gas fields in the Natuna islands, which is also claimed by China. Similarly, Malaysia's offshore gas fields off Sarawak in East Malaysia also fall within China's claims. Significantly, China has not raised any strong objections to these activities.

The Kikeh dispute between Malaysia and Brunei, however, arose in July 2002, when a large offshore oil field was found in the waters off Sabah in East Malaysia. The stakes are high as it is estimated to have a recoverable reserve of between 350 to 700 million barrels. However, Brunei and Malaysia both claim a 200 nautical mile EEZ, which overlap near Kikeh and nearby potentially oil rich areas. After the Kikeh find,

both countries awarded oil prospecting contracts to different companies to search two nearby areas covering some 10,000km^2 which are under dispute. This led to a tense naval standoff involving gunboats on both sides in March and April 2003, resulting in all work in the area stopping. This led to negotiations resulting in an in-principle agreement to redraw the maritime boundary on the basis of the oil claims, rather than jointly developing the area.[34] This contrasts with the approach taken by Thailand and Malaysia, which put aside their sovereignty dispute in the Gulf of Thailand to set up a Joint Development Authority in 1990 that would see revenues split equally between the two parties.

Another maritime dispute in the region that has a bearing on offshore oil and gas exploration has been the maritime boundary dispute between Vietnam and China as a consequence of overlapping EEZs. This has been settled through a delineation of their respective EEZs in the disputed Beibu Gulf in an agreement in June 2004.[35]

The one big winner in the regional scramble for oil has been East Timor. Although it is not yet an ASEAN member-state, its situation has relevance here and will be briefly examined. In 1979, Australia's de jure recognition of Indonesia's annexation of East Timor following its invasion of the former Portuguese territory in 1975 paved the way for possible joint development of the resources of the Timor Gap. The Timor Gap refers to a 135 nautical mile stretch of seabed left undelimited by Australia and Indonesia in drawing their 1972 seabed boundaries. In December 1989, the Timor Gap Cooperation Treaty defined a large three-area Zone of Cooperation for joint development, covering some 61,000km^2. Area A would be jointly developed by the two countries with the benefits of offshore oil production to be shared equally. Areas B and C, adjoining Area A, would be fully administered by Australia and Indonesia respectively.

After the East Timor crisis in 1999 which led to the territory's independence from Indonesia, the question of the Timor Gap Cooperation Treaty came to the fore. The United Nations Transitional Administration in East Timor, acting on behalf of the East Timorese people, signed an agreement in 2000 which upheld the treaty but with East Timor replacing Indonesia as the implementing party. The East Timorese Transitional Administration subsequently signed a Memorandum of Understanding with Australia in July 2001 that proposed a treaty that would formalise a Joint Petroleum Development Area (JPDA) for Area A, but with revenues split 90:10 in favor of the new East Timor. As independence drew closer in May 2002, another issue that needed resolution was the lucrative Greater Sunrise oil reservoir, which straddled the eastern lateral boundary of the JPDA.[36]

In January 2006, Australia and East Timor reached final agreement over the sharing of revenues of oil and gas deposit in the disputed area of the Timor Sea. Known as the *Treaty on Certain Maritime Arrangements in the Timor Sea 2006*, it was reaffirmed that East Timor would get 90 per cent of revenues of oil produced within the joint development area. Outside this zone and within the Greater Sunrise area, revenue

would be shared equally. In addition, both also agreed to defer for 50 years the final delineation of their sea boundaries. The net result is that East Timor could get up to US$10 billion over the life of the Greater Sunrise oilfield, as well as some US$15 billion for the oil produced within the joint development area.[37]

Security of Sea Lines of Communication

An energy-related concern in the region is the fact that the bulk of oil imports by China, Japan and South Korea transit the Malacca Strait.

The high incidences of piracy around Indonesian waters, the unregulated and insecure nature of the maritime trade, the presence of terrorist networks, and the fact that any disruption of global trade will have a devastating impact on a globalised manufacturing system dependent on just-in-time business operations (particularly by the booming Northeast Asian economies), have raised fears over maritime security in the Malacca Strait.

Unlike the aviation industry, the maritime industry is poorly regulated. There is no proper vetting or certification of shipping crew, and ships are not tracked in real time unlike aircraft. The waters around Indonesia also suffer from the world's highest incidences of piracy. Indeed, there has been a dramatic increase in such cases since the crisis of governance in Indonesia following the fall of the Suharto regime in 1998.

Since the events of 11 September 2001, these concerns have assumed increasing urgency and priority. The vital Malacca Strait is very narrow and congested (indeed, it is only 800 metres wide at its narrowest point), with a huge amount of seaborne traffic. It also lies within the Malay archipelago, which has been designated the 'second front' in the US-led Global War on Terrorism in the wake of the events of September 2001, given the presence of militant Islamist groups affiliated with or sympathetic to Al Qaeda.

Given the trend of increasing links between trans-national organised crime and terrorism, fears have been expressed that vulnerable, high risk and high value shipping, such as cruise ships and chemical tankers, could be tempting terrorist targets. Fears have been expressed that ships, and particularly containers, could also be used to smuggle terrorists as well as weapons of mass destruction. One scenario is the hijack of a chemical tanker and its use as a floating bomb to devastate ports – a maritime version of 11 September 2001.[38] An attack on a super container hub, such as Singapore, will have devastating consequences in an age of globalisation. Moreover, Al Qaeda appears to be aware of the vulnerability of seaborne vessels and has carried out maritime terrorist attacks, such as on the USS *Cole* in 2000 and a French oil tanker, the MV *Lindberg*, off the coast of Yemen in 2002.

The problem with the maritime industry, however, is vast, given that the entire logistical chain needs to be secured. This entails improving ship, container and port security. Ports in the region have therefore moved swiftly to implement the requirements of the *International Ship and Port Facility Security* (ISPS) *Code*, which came into effect on 1 July 2004. Under the code, governments, ships and ports are required to have enhanced security measures to ensure better control and monitoring of the movement of people and cargo.[39]

The region is also gradually responding to US-led initiatives designed to improve port and container security as part of preventive measures against terrorism. Under the Container Security Initiative (CSI), US-bound containers would be inspected at source by US Customs. Under a separate International Port Security Program, US Coast Guard inspectors would be permitted to inspect the region's port facilities and verify their implementation of the ISPS code.

In March 2004, the US Pacific Command also floated a Regional Maritime Security Initiative (RMSI), which was aimed at dealing with trans-national maritime threats in the Asia-Pacific region. An initial suggestion of the involvement of US special forces stationed in the vicinity of the Malacca Strait however, led to Malaysia and Indonesia expressing strong reservations due to sovereignty issues as well as domestic political sensitivities.[40] However, the prospect of an active US presence also pushed the littoral states of Indonesia, Malaysia and Singapore into declaring in July 2004 that they would cooperate more closely in carrying out coordinated year-round patrols, linked by communications hotlines, to ensure the security of the busy sea lanes in the Malacca Strait.[41] This was followed up by an agreement to conduct joint air patrols.[42] Although Malaysia and Indonesia remain opposed to foreign naval patrols and private armed escorts, there is now a consensus that they could accept foreign assistance in the areas of capacity-building, equipment and training, so long as they do not compromise national sovereignty.

The littoral states have also taken measures to improve counter-terrorism cooperation through the Five Power Defence Arrangements (FPDA) which groups Britain, Australia, New Zealand, Singapore and Malaysia. From 2005, FPDA multilateral military exercises have focused on maritime security, particularly on countering terrorist threats.[43]

In turn, the concern over maritime security has attracted the attention of external powers and increased their rivalry within the region. Whilst the United States has moved to improve maritime security in the Malacca Strait with the support of its regional allies, China has increasingly expressed concern over the ability of the US to disrupt China's access.[44] Since 11 September 2001, Japan has also moved to increase its strategic and security roles in the region, focusing on increasing maritime security in the Malacca Strait through the provision of capacity building assistance to Indonesia, and increased coast guard cooperation with regional states such as Singapore. However,

it is also undeniable that a motivating factor has been the increasing influence that a rising China will have on the region.[45]

Regional Cooperation in Energy Security

The ASEAN states have recognised that energy security is an issue that affects the entire region. Attempts have therefore been made to improve regional cooperation. In 1999, a five-year ASEAN Plan of Action for Energy Cooperation covering the period 1999-2004 was launched, involving all ten ASEAN member states. At the same time, the ASEAN Centre for Energy (ACE) was set up in Jakarta, Indonesia to better coordinate a regional approach to energy development and cooperation. The Plan of Action focuses on the following: an ASEAN power grid, a trans-ASEAN gas pipeline, coal and clean coal technology promotion, energy efficiency and conservation promotion, new and renewable energy development, and energy policy and environmental analysis.[46]

To achieve these objectives, the Centre coordinates the work of the following meetings and networks relating to energy: the Energy Efficiency and Conservation Sub-sectoral Network, the New and Renewable Energy Sources of Energy Sub-sectoral Network, the Heads of ASEAN Power Utilities/Authorities, the Senior Officials Meeting on Energy, the ASEAN Energy Business Forum, the ASEAN Forum on Coal, ASEAN Ministers of Energy Meeting and the ASEAN Council on Petroleum.[47]

Although the Centre was set up in 1999, ASEAN regional cooperation in energy has in fact been an on-going affair for a number of years. For instance, under the ASEAN Petroleum Security Agreement signed in June 1986 in Manila, the ASEAN states agreed to assist each other in cases of oversupply or severe shortages.[48] At the 22nd ASEAN Ministers on Energy Meeting in Manila in June 2004, a new five-year ASEAN Plan of Action for Energy Cooperation covering 2004-09 was adopted. A key focus of this plan is the implementation of the ASEAN power grid and the possible commissioning of up to five power connection projects that would increase electricity interconnectedness. However, it must be pointed out that although a power grid might be feasible for land states, it would be difficult and expensive to link up the rest of maritime Southeast Asia, with its archipelagic nature and many islands. The Ministers also strongly endorsed the recommendation of the Senior Officials Meeting on Energy to increase the share of renewable energy in power generation in the ASEAN region to at least 10 per cent over the next six years to 2009, in view of rising oil prices and the consequent greater pressure to use renewable energy sources.[49]

Another area of focus for the plan is the Trans-ASEAN Gas Pipeline project. Eight possible gas interconnection projects could be implemented under this plan, four of which would originate from the Indonesian Natuna gas fields. A third area of focus, on coal, includes objectives such as the environmental assessment of coal projects and the promotion of clean coal technology.

Apart from the above, there are also three other areas of cooperation meant to improve conservation and the use of renewable energy. There are strategies for energy efficiency and conservation, involving capacity building, expansion of private sector involvement, information sharing, setting common energy standards and promoting energy efficiency in the transport sector. There are also projects relating to renewable energy, including the development of renewable energy in the energy supply, and to promote the use of bio-fuels and the use of bio-mass-based cogeneration technology. Finally, the plan also focused on improving regional energy policy and planning, through information sharing, capacity building, promoting sustainable development and concern for the environment in policy formulation, the strengthening of regional cooperation and the monitoring of the progress of the plan.[50]

Regional cooperation has also expanded beyond the ASEAN states. For instance, in 2003, an ASEAN+3 meeting (including China, Japan and South Korea) was held in Bangkok to discuss improving regional oil stockpiles. In 2004, the first ASEAN+3 Ministers of Energy Meeting issued a joint declaration on strengthening infrastructure building in the region.[51]

Conclusions

Ji Guoxing's prescient 1998 observation that 'energy security is of particular importance in the Asia Pacific owing to its physical unavailability to meet demand' accurately describes the energy problem in Southeast Asia. Of the region's two biggest oil producers, Indonesia has become a net oil importer, and Malaysia is likely to follow suit after 2010. This fact, together with rising oil prices and the continued dependence on imported oil by a number of states in the region, have led to efforts at diversification. They have focused on developing alternative indigenous sources of energy as well as strategies to increase energy efficiency. The intensified search for alternative energy sources has led states in the region to explore nuclear energy, bio-fuels, hydroelectricity and natural gas. These efforts are aimed at reducing dependence on increasingly expensive imported oil, and increasing self sufficiency in order to ensure reliable and affordable energy supplies that could sustain future economic growth and hence political stability.

The steady rise in primary energy consumption (oil, gas and coal) in Southeast Asia, as well as interest in the region for its energy resources and as a transit point for energy supplies on the part of China and other external powers, has also made the region, particularly the South China Sea with its potentially lucrative offshore oil deposits, a competitive battleground for energy. In these circumstances, the ASEAN states have found themselves pitted against each other as well as with China in the scramble for oil, particularly in disputed maritime territories. An energy-related concern, one which has attracted the attention of external powers, is the security of the SLOCs which traverse the region, particularly the narrow, crowded and strategic waterway,

the Malacca Strait. Given the context of the Global War on Terrorism, this has resulted in a number of initiatives taken by the United States, as well as the littoral states, to improve maritime security.

The ASEAN states have also responded to the energy problem through regional energy cooperation. In 1999, the ASEAN states announced a five-year Plan of Action for Energy Cooperation. This was renewed in 2004 to cover the period up to 2009. Despite competition therefore, there have been genuine attempts by the states in the region to work together to ensure adequate and secure supplies of energy for their continued economic development. Although there are disputes over maritime territories with potentially huge oil and gas stakes involved, no actual conflict has broken out, with states in the region pragmatically entering into cooperative agreements with each other or with external powers such as China and Australia in order to reap the benefits of development and cooperation.

Yet, regional cooperation has proceeded slowly with a distinct lack of speed in the actual implementation of plans. A lot has been said in the form of meetings and declarations, but many of these, in true ASEAN style, are declaratory in nature, non-binding, and have no legal force. The ASEAN way of consensus building over every issue has posed real limits to institution building and actual functional cooperation. This is due to barriers such as national sovereignty, mutual suspicions, differing national interests, and the complex and diverse nature of the energy needs and economic structures of the states in the region. Indeed, the institutional frameworks and structures necessary for regional cooperation on most issues, let alone on energy, remain on the whole poorly developed. The ASEAN Centre for Energy, for instance, was set up in 1999 but remains a small coordinating body located in Jakarta.

In the final analysis, however, there is a clear trend as far as energy is concerned: energy security will continue to remain high on the agenda of the ASEAN states, both individually and collectively. The impetus comes from the increasing demand for energy, the high price of oil, and the continued rapid economic growth in the region. This will provide a growing impetus towards a regional approach in the coming years, though there will be invariably limits to this and large external powers such as China will have an increasing voice.

Notes

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1 Ji Guoxing, 'China Versus Asian Pacific Energy Security', in *Korean Journal of Defence Analysis*, 10:2, Winter 1998, p. 111.

2 *Los Angeles Times*, 7 June 1998.

3 Ji Guoxing, 'China Versus Asian Pacific Energy Security', p. 109.

4 Robert J Lieber, 'Oil and Power After the Gulf War', *International Security*, 17:1, Summer 1992, p. 172.

5 Indeed, Ji Guoxing makes the point that 'Asian Pacific energy security is inseparable from China's energy security', 'China Versus Asian Pacific Energy Security', p. 112.

6 British Petroleum, *BP Statistical Review of World Energy June 2007,* London, 2007, p. 2.

7 British Petroleum, *BP Statistical Review of World Energy June 2007,* p. 40.

8 British Petroleum, *BP Statistical Review of World Energy June 2007,* p. 6.

9 Mark Hong, 'Overview of Singapore's Energy Situation', in *Energy Perspectives on Singapore and the Region*, Institute for Southeast Asian Studies, Singapore, 2007, pp. 2-4.

10 See, for instance, the cautionary warning in Esa Ramasamy, 'Singapore's Role as a Key Oil Trading Center in Asia', *Energy Perspectives on Singapore and the Region*, pp. 40-41.

11 A point made by Jun Tsunekawa, 'Energy Situation in East Asia and its Impact on the Strategic Environment', *NIDS Security Report*, National Institute for Defence Studies, Tokyo, No. 3, March 2002, p. 91.

12 'Nuclear Plans in ASEAN', *Straits Times*, 23 June 2007.

13 'The Nuclear Conspiracy', Editorial, *Jakarta Post*, 26 February 2007.

14 'Alternative Energy: Beware Hidden Costs', *Straits Times*, 22 July 2006.

15 Larry Jagan, 'Myanmar Drops a Nuclear Bombshell', *Asia Times*, 24 May 2007.

16 'Alternative Energy: Beware Hidden Costs', *Straits Times*, 22 July 2006.

17 Eric Holthusen, 'Bio and Synthetic Fuel', *Energy Perspectives on Singapore and the Region*, p. 304.

18 Morten B Pedersen, 'The Future Takes Form - But Little Change in Sight', in Daljit Singh and Lorraine C. Salazar (eds), *Southeast Asian Affairs 2007*, Institute for Southeast Asian Studies, Singapore, 2007, p. 234.

19 British Petroleum, *BP Statistical Review of World Energy June 2007*, p. 38.

20 British Petroleum, *BP Statistical Review of World Energy June 2007*, pp. 22-25.

21 See Daniel Yergin and Michael Stoppard, 'The Next Prize', *Foreign Affairs*, November-December 2003.

22 International Energy Agency, *World Energy Outlook 2004*, Paris, 2005, p. 161.

23 Andrew Symon, 'Petroleum and Mining in Southeast Asia: Managing the Environmental and Social Impacts', in Singh and Salazar (eds), *Southeast Asian Affairs 2007*, p. 90.

24 Report from the US Embassy in Jakarta, undated, available at: <http://www.usembassyjakarta.org/download/Natural%20Gas%202003.pdf>, accessed 10 August 2007.

25 Pedersen, 'The Future Takes Form - But Little Change in Sight', p. 234.

26 Ooi Kee Beng, 'Malaysia: Abdullah Does it His Own Vague Way', in Singh and Salazar (eds), *Southeast Asian Affairs 2007*, p. 194.

27 Vincent S. Perez, 'Who Wins in the Asian Scramble for Oil?' in *Energy Perspectives in Singapore and the Region,* p. 257.

28 Ioannis Gatsiounis, 'ASEAN Explorers Head for Deeper Waters', *International Herald Tribune*, 24 May 2007.

29 Gatsiounis, 'ASEAN Explorers Head for Deeper Waters'.

30 Manjeet Singh Pardesi (et al), *Energy and Security: The Geopolitics of Energy in the Asia-Pacific*, Institute for Defence and Strategic Studies, Singapore, October 2006, p. 19.

31 See Andrew TH Tan, *Security Perspectives of the Malay Archipelago*, Edward Elgar, Cheltenham, 2004, pp. 228-230.

32 For an excellent analysis of the new Chinese diplomacy, see Allen Carlson, 'Constructing the Dragon's Scales: China's Approach to Territorial Sovereignty and Border Relations in the 1980s and 1990s', *Journal of Contemporary China*, Vol. 12, No. 3, November 2003, pp. 677-698.

33 Perez, 'Who Wins in the Asian Scramble for Oil', p. 254.

34 Malaysia and Brunei near deal on sea-border dispute, *Biz News Databank*, 14 August 2007 <http://www.biznewsdb.com/english/newspage/newspage.asp?ID=7081475&file1=7&bulan=08&kw=wwqq>, accessed 16 August 2007.

35 *People's Daily Online*, 1 July 2004, available at: <http://english.peopledaily.com.cn/200407/01/eng20040701_148163.html>, accessed 16 August 2007.

36 Andrew TH Tan, *A Political and Economic Dictionary of Southeast Asia*, Europa, London, 2004, p. 284

37 'Australia, E Timor Sign Oil Deal', *CNN News*, 12 January 2006, available at: <http://edition.cnn.com/2006/WORLD/asiapcf/01/12/australia.timor/index.html>, accessed 20 August 2007.

38 See for instance Graham Gerard Ong, 'Pre-empting Maritime Terrorism in Southeast Asia', *ISEAS Viewpoints*, Institute of Southeast Asian Studies, Singapore, 29 November 2002.

39 See International Maritime Organisation, 'What is the ISPS Code?' available at: <http://www.imo.org/Newsroom/mainframe.asp?topic_id=897>, accessed 19 August 2007.

40 'Officials Clarify Maritime Initiative Amid Controversy', *Defence Link*, 4 June 2004, available at: <http://www.defenselink.mil/news/newsarticles.aspx?id=26341>, accessed 19 August 2007.

41 'Malacca Straits Anti-Piracy Patrols Start Next Week', *MIMA News Flash*, July 2004, available at: <http://www.mima.gov.my/mima/htmls/mimarc/news/newsflash_files/news-cut/july04.htm>, accessed 19 August 2007.

42 'Joint air patrols over Malacca Strait to start next week: Indonesia', *AFP*, 8 September 2005.

43 *The Age*, 22 November 2005.

44 Ian Storey, 'China's Malacca Dilemma', *China Brief*, Jamestown Foundation, 6(8), 12 April 2006.

45 Andrew TH Tan, 'Singapore's Cooperation with the Trilateral Security Dialogue Partners in the War Against Global Terrorism', in *Defence Studies*, 7 (2), June 2007, pp. 199-202.

46 ASEAN Centre for Energy, Introduction, available at: <http://www.aseanenergy.org/ace/background.htm>, accessed 19 August 2007.

47 ASEAN Centre for Energy, ACE in ASEAN Structure, available at: <http://www.aseanenergy.org/ace/ace_in_asean_structure.htm>, accessed 19 August 2007.

48 ASEAN Petroleum Security Agreement, Manila, 24 June 1986, at <http://www.aseanenergy.org/download/reports/energy_organisastion/ascope/ASEAN%20Petroleum%20Security%20Agreement.pdf>, accessed 19 August 2007.

49 See The 21st HAPUA Council Meeting, 10 May 2005, Vientiane, Lao PDR, available at: <http://www.aseanenergy.org/download/reports/energy_organisastion/hapua/Report-21st%20HAPUA%20Council%20%20Meeting-Final.pdf>, p. 7, accessed 19 August 2007.

50 ASEAN Centre for Energy, Work Programme, <http://www.aseanenergy.org/ace/work_programme.htm>, accessed 19 August 2007

51 Christopher Lee, 'Energy Cooperation in Asia', in *Energy Perspectives on Singapore and the Region*, p. 162.

TRANSPORTATION SECURITY AND SHIPPING ROUTES

The Economic Impact of Disruptions to Seaborne Energy Flows

Andrew Forbes

Energy derived from fossil fuels is critical to the continued economic growth and wellbeing of developed and developing countries. Oil is the world's main source of fossil fuel energy, increasingly supplemented by liquefied natural gas (LNG). Events of the last 40 years show that the international shipping industry and the global economy are affected by disruptions to the supply of oil and large increases in oil prices.

Egypt's closure of the Suez Canal from 1967-75 led to increased transportation costs and delays to oil shipments bound for Europe, as tankers had to be re-routed around Africa.[1] A result of this experience was an emphasis on the construction of increasingly larger 'super tankers', culminating in the Very Large Crude Carrier (VLCC) of about 250,000 deadweight tonnage (DWT), as it had been discovered that the economics of transporting very large volumes overcame the extra distance travelled.

The 1973 Oil Crisis saw a quadrupling of oil prices by the Organization of the Petroleum Exporting Countries (OPEC) from $3 to $12 per barrel ($10 to $40 in 2007 prices). This was targeted against Western countries that supported Israel during the Yom Kippur War, and led to inflation, stagflation when the standard monetary policies proved ineffective, and recession.

Later that decade the 1979 Energy Crisis was brought about initially by the Iranian Revolution leading to intermittent oil production, causing price rises. These price rises were exacerbated by the onset of the '1980-88 Iran-Iraq War', which saw tankers and oil and gas installations attacked during the almost decade-long conflict. Oil prices rose from $15 to $35 a barrel ($40 to $80 in 2007 prices), and shipping insurance rates increased to between 0.375 and 0.5 per cent of the tanker's insured value. Although a recession ensued, it was not as bad as that induced in 1973 as the effective price rise was smaller and national economies had begun to source oil supplies outside of OPEC, supplemented by increased LNG shipments.[2]

This paper examines the results of select macroeconomic and event-based case studies in order to outline the economic consequences of energy trade disruption, and comprises three sections: first, the paper summarises global energy demand and supply; second, it examines the international shipping industry and associated vulnerabilities; and third, it analyses case studies demonstrating the vulnerability of (and impacts upon) oil and gas infrastructure, shipping, ports and environmental spills, before considering some studies of macroeconomic impacts

A Note on Sources

In the public domain, detailed calculations of the economic consequences of trade disruptions are scarce. Often this information comprises 'commercial-in-confidence' documents held within the transportation sector, or sensitive/classified documents held by government agencies. This is particularly true of studies that model effects at a national or regional level, as the necessary econometric input-output models are highly complex and expensive both to create and maintain. Therefore analysts and interested observers are forced to rely on sparse data or extrapolate from single-event case studies in order to contribute to this neglected topic. Importantly, the available data for both international shipping and energy suffer from a time lag in publication, and use differing terminology and metrics. Thus the data in this paper should be regarded as indicative only.

Asian Energy Requirements

World gross domestic product (GDP) grew 4 per cent in 2006 and is forecast to grow 3.4 per cent in 2007. The Asia-Pacific is the most economically dynamic region in the world and is the driver for global economic growth and development, based predominantly on seaborne trade. Within Asia, Japan's growth in 2006 was 2.2 per cent and is forecast to be 2.3 per cent in 2007. China's economy grew some 10.7 per cent in 2006 and 10.5 per cent growth is forecast for 2007. India grew at 9.2 per cent in 2006 and growth is forecast at 8.5 per cent in 2007. Collectively, Southeast Asia grew at 6.0 per cent in 2006 and is forecast to grow at 5.7 per cent in 2007. The Asian economies are the powerhouse of this global economic growth, which relies predominantly on energy imports from the Middle East. Thus the global economy would be affected if North Asian energy flows were to be interdicted, either directly if countries were major trading partners or indirectly as a slowdown or downturn affected the global economy.[3]

Energy Consumption

In 2006, China consumed 7.7 million barrels per day (mbpd) of oil, of which more than half this energy demand (3.9 mbpd) was provided by imports. Thirty nine per cent was supplied from the Middle East, just over 12 per cent from the former Soviet Union, and 12 per cent from the Asia-Pacific region. Japan consumed 5.2 mbpd of oil, importing 5.2 mbpd to meet that demand and stockholding requirements (ie 100.7 per cent). Eighty one per cent was sourced from the Middle East and a further 8 per cent from the Asia-Pacific. Singapore consumed 0.853 mbpd of oil, importing 2.2 mbpd of oil (261 per cent) for its own use as well as for refining for export to other countries. Half was obtained from the Middle East and one third from the Asia-Pacific.[4]

In terms of natural gas, China consumed 58 billion cubic metres (bcm) in 2006, of which 1 bcm was imported from Australia.[5] India consumed 39.7 bcm of natural gas, importing approximately one-fifth (7.99 bcm) of that; with Oman, Qatar and the United Arab Emirates (UAE) supplying 89 per cent (7. 12 bcm). Japan consumed 84.6 bcm, importing over 95 per cent (81.86 bcm); with Oman, Qatar and the UAE supplying 24 per cent, and Australia and Southeast Asia supplying 72 per cent. South Korea consumed 34.2 bcm, relying solely on imports; with Oman, Qatar and the UAE, and Australia and Southeast Asia supplying about half each. Lastly, Taiwan consumed 11.9 bcm, importing 85.7 per cent (10.2 bcm); with Australia and Southeast Asia supplying 93 per cent (9.5 bcm).[6]

Forecast Energy Consumption to 2030

Most of the growth in the world economy to 2030 is expected to come from Asia – predominantly China and India – where regional GDP is projected to average 5.8 per cent per annum; China is projected to grow 6.5 per cent pa, and India 5.7 per cent pa.[7] Energy demand is projected to grow 3.2 per cent pa, more than doubling over the period to 2030.[8] World consumption of petroleum and other liquid fuels is forecast to be 97 mbpd in 2015, growing to 118 mbpd in 2030; with natural gas forecast to reach 4616 bcm in 2030.[9]

Looking at the member countries comprising the Asia-Pacific Economic Cooperation (APEC),[10] oil demand is expected to grow at 1.7 per cent to 2030, with natural gas demand growing at 2.4 per cent. Focusing on Asian member economies, Taiwan, Japan, Korea, Malaysia, the Philippines, Singapore and Thailand rely on the Middle East for over half of their oil imports ands this is expected to increase out to 2030.[11]

Table 1 outlines the International Energy Agency's reference case for the growth in certain countries' energy use. Japan's energy demand to 2030 increases marginally due to a shrinking population; there is stronger growth in LNG than oil, as it is a policy objective to lessen reliance on oil. South Korea shows strong growth to 2030 and remains dependent on oil. China's energy demand to 2030 is strong with over 50 per cent growth in oil demand and a near tripling of LNG demand; due to its population size, urbanisation and critically, industrialisation. Similarly, India's energy demand is projected to grow significantly with a nearly three-quarters increase in oil demand and more than doubling if its LNG requirements, due to increasing population and industrialisation.

It is important to note that not all of this increased oil demand is for consumption. The expanding capacity of oil refineries enables some Asian countries to process crude oil into refined products for export; an example is Singapore, which refines oil-based products for many countries including Australia.

	2010	2015	2020	2025	2030
Japan	23.5	24.1	24.6	25.0	25.4
Liquids	10.5	10.5	10.5	10.6	10.7
Natural Gas	3.8	4.0	4.2	4.3	4.5
South Korea	9.6	10.8	11.8	12.5	13.4
Liquids	4.7	5.1	5.3	5.6	5.8
Natural Gas	1.2	1.3	1.5	1.5	1.7
China	82.6	97.1	112.8	128.3	145.4
Liquids	19.3	21.5	24.4	27.8	32.1
Natural Gas	3.3	4.3	5.4	6.6	8.1
India	18.2	21.7	25.1	28.6	31.9
Liquids	5.5	6.6	7.4	8.2	8.9
Natural Gas	2.0	2.3	2.9	3.6	4.3
World	511.1	559.4	607.0	653.7	701.6
Liquids	183.9	197.6	210.6	224.1	238.9
Natural Gas	120.5	134.3	147.0	158.5	170.4

Table 1: Energy projections to 2030 (quadrillion British thermal units)[12]

Energy Supply

The Persian Gulf countries produce over a quarter of the world's oil while holding over half of all crude reserves. Ninety per cent of Persian Gulf oil is transported by tanker through the Strait of Hormuz into the Indian Ocean. Fifteen million barrels per day (mbpd) transit the strait, of which 13 mbpd is bound for Asia. LNG exports from the Persian Gulf come from Oman, Qatar, and the UAE; while those from Africa predominantly use the Red Sea and come from Algeria, Egypt, and Libya, with Nigerian exports primarily bound for Europe and North America.

Oil tankers exiting the Strait of Hormuz, and oil and LNG tankers/carriers departing from African ports, are predominantly on the open ocean when transiting the Indian Ocean, except where Strait of Hormuz traffic skirts the Malabar Coast near Bassas de Pedro off India before passing Dondra Head near Sri Lanka. Tankers from the Red Sea skirt the island of Suqutra before transiting via the Eight Degree Channel to Dondra Head, and around the Andaman and Nicobar Islands near the entrance to the Malacca Strait.

Southeast Asia contains the major international sea lanes for trade, with 30 per cent of world trade, including 80 per cent of Japan's oil, 50 per cent of all North Asian oil

and 66 per cent of LNG transiting the Malacca Strait each year. In 2006, 18,195 tankers stopped in Singapore, comprising 13,342 oil tankers, 1487 LNG and Liquefied Petroleum Gas (LPG) carriers and 3366 chemical tankers.[13] There is considerable intra-regional trade in LNG, through which Australia, Brunei, Indonesia and Malaysia transport natural gas throughout the region, and LNG pipelines link Singapore with Indonesia and Malaysia, and Thailand with Myanmar. This region also has a complicated maritime geography, adjoining territorial seas and unresolved boundary delimitation issues.

Forty one thousand ships transit the South China Sea each year, which comprises about a quarter of global shipping. Shipping traffic becomes more congested as LNG carriers from Australia and Southeast Asia begin their transit to North Asia through the East China Sea and Yellow Sea.

Clearly, the economic prosperity of Asia, and hence the world, is inextricably linked to the supply of energy, which is transported primarily by sea.

International Shipping

Seaborne trade is a particularly important component of world trade, as there are geographical constraints impeding land transport in many countries, and often it is a cheaper form of transport for covering long distances while carrying large volumes of goods. Since the end of World War II there has been major growth in world trade, and between 1950 and 1995 the volume of seaborne trade grew from 0.55 billion tons to 4.3 billion tons.[14]

Table 2 outlines the size of the world merchant fleet, which continues to expand with the growth of seaborne trade. Oil tankers comprise nearly 40 per cent of the world fleet (with bulk carriers being a similar percentage), while LNG carriers constitute a very small, but expensive and critical component of the fleet. At the beginning of January 2006, the 354,219 deadweight tonnage (DWT) of oil tankerage comprised 36.9 per cent of total shipping DWT, and LNG tankers stood at 24,226 DWT, comprising 2.5 per cent of total DWT.[15]

Year	World Fleet	Oil Tankers			LNG Tankers	
	(DWT)	(DWT)	(%)	Surplus (%)	(DWT)	(%)
1995	734,917	267,651	36.4	10.4	14,691	2.0
2000	798,995	282,458	35.4	4.8	17,334	2.1
2005	895,843	336,156	37.5	1.4	22,546	2.5

Table 2: Size of world fleet (thousand DWT)[16]

Crude oil and processed products are shipped over shorter distances, or via congested waterways in tankers in the 32,000 DWT and 80,000 DWT range. Otherwise crude

oil is transported in bulk by VLCC (between 200-3000,000 DWT) or by Ultra Large Crude Carrier (ULCC), which usually exceed 300,000 DWT, to regional oil refineries for distillation into finished products.[17]

Table 3 provides a historical survey of the global seaborne trade in oil since 1970, showing the progressive increase in global consumption of oil – both crude and refined products. Associated with the increase of crude oil shipments to Asia is the ability of those countries to refine it into finished products. In 2005 world seaborne trade reached 7.11 billion tons, with Asia comprising some 38.8 per cent. Thirty four percent (2.42 billion tons) was tanker cargo, of which 1.86 billion tons were crude oil shipments.[18]

Year	Tanker Cargo	Goods Loaded		Goods Unloaded	
		Crude	Products	Crude	Products
1970	1442	1109	232	1101	298
1980	1871	1527	344	1530	326
1990	1755	1287	468	1315	466
1995	2049	1527	344	1530	326
2000	2163	1665	498	1728	542
2005	2422	1857	565	1854	573

Table 3: Oil seaborne trade (million tons)[19]

Natural gas cooled to below -260°F condenses to liquid and occupies 1/600th the volume of its gaseous state, making it more suitable for transport by ship. LNG carriers are specially-designed, very large vessels with a double hull, containing several massive refrigerated tanks that are sealed and insulated to prevent leaks. They have radar, global positioning systems and automatic distress systems and beacons to protect their cargo.[20] However, the demand for qualified LNG carrier officers and engineers exceeds supply, so notwithstanding the continued construction of LNG carriers, it is not evident these can be effectively crewed.[21] As of July 2007, there were 235 LNG carriers in operation and 133 on order.[22]

A specific security concern associated with LNG carriers is the possibility of a catastrophic explosion or fire that could devastate a port and its surrounds; this prospect resulted in the United States Department of Homeland Security including them in a list of potential terrorist targets.[23] There are three possible scenarios. A pool fire may occur if LNG spills near an ignition source – if the combustible gas-air concentration is right, the evaporating gas will burn. As the LNG pool expands, so does the fire, which is very intense and far hotter than an oil or gasoline fire. Importantly, such a fire cannot be extinguished and will only end when all the LNG has been consumed. If LNG spills but does not immediately ignite, the evaporating gas will form a vapour cloud that may drift from the spill site. If the cloud then achieves the right gas-air concentration,

it becomes volatile and again prone to ignition with disastrous consequences. A LNG spill on water could theoretically heat up in what is called a flameless explosion; but this event is less likely to occur than a pool fire or a flammable vapour cloud.[24] Notwithstanding these 'possibilities', LNG carriers are relatively safe as the conditions necessary to create a fire are difficult to achieve, thus the major vulnerability of LNG is actually ashore.

LPG is manufactured when refining crude oil, or is extracted from oil and gas streams as they emerge from the ground. LPG is predominantly propane or butane and is used for heating, cooking and in transportation. In May 2007, there were 196 LPG carriers in operation and 86 on order.[25]

Maritime Security Regulation

In December 2002 the international community agreed to amendments to the *International Convention for the Safety of Life at Sea* (SOLAS) *1974*. A new chapter was included in SOLAS – Chapter XI-2 *Special Measures to Enhance Maritime Security*, and the *International Ship and Port Facility Security* (ISPS) *Code* was also introduced. The aim was to create an international legislative framework for regulating and assessing the security of international shipping and associated port facilities. Oft forgotten is that ports may also be attacked from land. So an aspect of the ISPS Code is to ensure the physical security of the port through fences, surveillance, patrols and restricted access to authorised personnel only, such as implemented by Australia's recent Maritime Security Identification Card scheme.[26]

Diversion Costs

The Strait of Hormuz consists of two 3 km wide channels for inbound and outbound tanker traffic, as well as a 3 km wide buffer zone. If the strait was to close, some oil could be transported via pipelines to ports on the Red Sea, but entailing longer routes and increased costs. Conversely, if the Malacca Strait was closed, almost half of the world's fleet would have to travel further, greatly affecting shipping availability and requiring a substantial increase in vessel capacity. Global shipping costs would rise markedly in the short term due to freight costs increasing and an excess of demand. In the long run, as the size of the global shipping fleet adjusted to demand, the impact would be route specific due to increasing freight costs.

The short term consequences of sea-lane closure are dependent on the size of the traffic diversion, that is, how many ships are diverted and how far they have to detour. If a sea-lane closure diverts enough traffic far enough, freight rates must increase, whereas a small amount of traffic diverted a small distance may be absorbed if there is excess capacity. However, Table 2 shows that the 'surplus' in oil tanker DWT has been decreasing over the past decade. Longer voyages would reduce the availability of international shipping, thereby driving up freight rates. After the 11 September 2001

terrorist attacks on the United States, maritime shipping rates increased by 5-10 per cent in the following fortnight, but these were soon reversed.[27]

While this implies the shipping industry can handle such disruptions in the long run, this is not the case for commodities. The LNG trade depends on rapid transport to the shore infrastructure before the gas degrades. Any delays to scheduled delivery would have a two-fold impact. First, reducing the quality of the gas delivered (which might affect the energy infrastructure and/or future export contracts); and second, where an economy is geared to just-in-time deliveries for energy products, delays could severely impact the general economy.

Moreover, while it has always been an option for importing countries to diversify their suppliers in case of disruption, natural gas is traded under long-term contracts of about 20 years or more, which inextricably links seller and buyer to an extent greater than for oil.

Economic Consequences

The economic impact of trade disruption to the international community has become increasingly critical, as many industries worldwide have adopted a just-in-time production philosophy, relying on goods to be delivered as required, rather than holding large inventories that are drawn from first. Thus disruptions to deliveries will have major impacts that flow through a nation's economy and then to their trading partners. This is particularly the case if energy trades are affected, as transportation, manufacturing, and power generation are critically reliant on the timely supply of raw energy.

A number of sectoral case studies follow to provide an indication of indicative costs that might be used by analysts to extrapolate trade disruption costs.

Oil and Gas Infrastructure

While many analysts focus on the sea lines of communication for the transportation of energy, the production, refining and distribution of oil and gas within countries is also a critical factor in energy security. The brief country studies that follow highlight the vulnerability of the oil and gas infrastructure, and the impacts that disruption may cause.

Iraq

The Khawr al Amayah and Al Basrah oil terminals (KAAOT and ABOT) located just south of the Al Faw Peninsula account for at least 85-90 per cent of Iraq's GDP. After the 2003 Iraq War, Coalition naval forces assumed responsibility for ensuring their security using frigates and patrol boats. A terrorist attack on 24 April 2004 using dhows, fishing

boats and speedboats led to a two-day shut down of the facilities, which is estimated to have cost US$28 million. Consequently the price of oil spiked on world markets resulting in a further loss to the global economy of approximately US$6 billion. As a result of the attacks, the initial security zone of two nautical miles was supplemented with a 3000 metre warning zone and a 2000 metre exclusion zone.[28]

Saudi Arabia

Attacks on Saudi Arabia's land-based oil installations, led the government to create a 35,000 strong security force at a cost of US$4-5 billion to protect this critical infrastructure.

United States

In late August 2005 Hurricane Katrina shut down oil and gas production in the Gulf of Mexico – a source of 25 per cent of US crude oil production. Some facilities were closed ahead of landfall, and others were damaged, resulting in lost production of about 2 mbpd. Out of about 4000 production platforms, 37 were destroyed and four were extensively damaged (requiring up to six months to repair). To manage this production shortfall, 30 million barrels from the Strategic Petroleum Reserve (holding about 700 million barrels) was loaned to refineries, and the International Energy Agency announced a drawdown of 60 million barrels from European and Asian stocks, which was released at the rate of 2 million barrels a day.[29]

Australia

Over the past decade Australia has experienced three events where energy supplies were disrupted, with consequential impacts on its economy. While these were not major catastrophes, they provide an indication of the consequences disruptions may have to consumers and the local economy.

The Esso gas plant in Longford, Victoria is the primary source for Victoria's gas for domestic, industrial and commercial use. In September 1998 there was an explosion and fire at the plant which killed two people, injured eight, and halted gas supplies throughout the state, affecting four million people. About 1.3 million households and 89,000 businesses were affected, with lost export earnings of A$200 million. The economic cost of no gas supply for 19 days was assessed at A$1.3 billion. In a class action resolved in December 2004, A$32.5 million was awarded to businesses that suffered property damage or economic losses from the accident; however the court refused to consider reimbursing consumers for the impact of non provision of services. On a more personal level, Esso workers and family members received A$1.4 million in compensation for psychological stress.[30]

In September and October 2003, there were serious disruptions to aviation fuel supplies at Sydney Airport, which led to rationing of aircraft fuel until additional supplies could be delivered. The cause of the problem was lower than expected output from Australian refineries, problems with quality control of some fuel and delays in foreign shipments.[31] While the economic cost of this event has not been calculated, it demonstrates the commercial vulnerability of a just in time philosophy for fuel delivery.

On New Years Day 2004, an explosion at the Santos gas processing plant at Moomba, South Australia cut the gas supply to New South Wales and South Australia by 70 per cent (the usual gas supply at that time of year was 350-400 terajoules a day reduced to 120 terajoules a day). Both state governments instructed some of their largest industrial customers to reduce their gas consumption, leading to a shutdown or curtailed production in the period immediately after the explosion. Alternative sources were found to meet the shortfall, with Victorian gas fields increasing their supply from 80 to 180 terajoules of gas a day. On 6 January gas output at Moomba was increased to 150 terajoules a day (a little less than 40 per cent of usual supply) and by 9 January was restored to 170 terajoules a day. The insurance claim associated with the Santos explosion that covered business interruption and property damage was A$231 million.[32]

Linked to concerns over the increased possibility of maritime terrorist attack against Australian offshore oil and gas installations, in 2004 the Australian Government approved the purchase of two additional *Armidale* class patrol boats (from the 12 already on order for border protection duties) specifically to patrol critical energy infrastructure on the North West Shelf. These planned patrols supplement the long running naval patrols off the oil rigs in Bass Strait (between mainland Australia and the island of Tasmania), to ensure that merchant shipping does not enter the 'Area to be Avoided' and accidentally collide with the rigs.

International Shipping

Shipping is vulnerable to attack or disruption by a variety of groups with differing means and motives, including pirates and criminal gangs (potentially state-supported), terrorist groups and, least likely at the moment, nation-states.[33] These groups may engage in attacks on ships; the hijacking of cargo, the actual ship and increasingly the ships' crew (for ransom); sinking ships, either to block narrow passages, port entrances or other focal points, or to create an environmental disaster; using the ship as a weapon, either to attack land infrastructure through a collision or explosion, or by incapacitating the crew so that the ship continues underway along a busy strait, risking collision with other ships.[34]

Specific ship types are vulnerable to some threats more than others. Oil tankers have high economic value and could be hijacked for their cargo, or turned into an explosive

weapon; the move to double hulls might have a positive mitigating effect here, limiting the ability to breach the hull. LNG carriers also have a high economic value, but are difficult to set on fire, as the conditions necessary to ignite a vapour spill are very limited; however, they are at heightened risk when they are loading/unloading in port. Bulk carriers have a lower economic value but as larger ships they can be used as weapons (especially if carrying fertiliser) to crash into other ships/infrastructure, or could be sunk to block access to ports.[35]

Iran-Iraq War 1980-88

During this conflict a stalemate on land focused both countries' military efforts on each other's energy production facilities and international shipping. 411 ships were attacked in the Strait of Hormuz, resulting in about 400 mariners killed and tens of millions of dollars damage. The economic cost of these attacks was estimated at about $2 billion, of which almost a quarter – about $450 million – was for ships trapped in port when hostilities broke out.[36]

Sea Robbery/Ship Hijacking

Piracy and sea robbery,[37] impacts upon international shipping in a variety of ways. There is increased violence against ships' crews including occasional deaths, increased insurance rates for ships transiting specific areas such as off Somalia and in Indonesian waters, increased costs for ship owners if they decide to improve ship protection, and actual losses incurred and associated insurance claims, with all these costs being passed on to the consumer.

Endemic piracy off the Somali coast has the potential to impact tankers leaving the Red Sea. The use of mother ships, from which smaller boats operate to attack targets, extends the range of sea robbers/pirates, complicating tanker security as crews must remain vigilant for longer periods at the beginning of their transit. Critically, pirates have been found operating up to 320 nm off the coast, placing them on the high seas and enabling international action to be taken against them.[38]

Within the Malacca Strait, it is cross-strait traffic that is being robbed not international shipping, with the majority of attacks occurring when the ship is berthed or at anchor. It is also important to note that shipping in the Malacca Strait has not been re-routed even when sea robbery attacks were high, calling into question how seriously shipowners consider the security threat in the strait.

Two examples are considered below: the MV *Danica White* was hijacked to ransom the crew, while the MV *Petro Ranger* was hijacked for both cargo and ship.

The MV *Danica White* while transporting building materials between Dubai and Kenya was hijacked in international waters off Somalia in June 2006, using three small boats operating with a mother ship. The US Navy gave chase until the ship entered Somali

territorial waters, when under international law and its own rules of engagement; it was not allowed to proceed. The crew were released after 83 days captivity when a US$1.5 million ransom was paid.[39]

On 16 April 1998 the *Petro Ranger* left Singapore bound for Vietnam, carrying 9600 tonnes of diesel and 1200 tonnes of aviation fuel valued at A$3.2m. She was hijacked three hours outside Singapore's territorial waters, was 'renamed' *Wilby* and reflagged from Singapore to Honduras. Six days later, while transiting to her new destination of Hankow in China, some of the diesel was discharged into a 2000 and a 4000 tonne vessel, and four days later more diesel was discharged into a 1000 tonne vessel; in all, 5000 tonnes of diesel was stolen leaving cargo valued at A$1.75m. On arrival in China, it became apparent the pirates wished to register the ship as the *Wilby* and then sell it for its insured vale of US$16 million. The original crew managed to escape and alert the authorities, and while the ship was eventually returned to its original owners, the Chinese Government kept the remaining aviation fuel valued at US$1.2 million.[40]

Ports

Similar in concept to the vulnerability of oil and gas infrastructure, ports where oil tankers and LNG/LPG carriers load and unload are vulnerable to damage – either through natural disaster or by attack from the sea or from land. As noted earlier, to address the possibility of attack, a range of measures was introduced to improve maritime safety and security under the auspices of the International Maritime Organization (IMO). An early estimate of global costs to ship owners to meet the requirements of the ISPS Code was US$1.3 billion initially and then US$730 million pa.[41] Importantly, these costs, while large are less than the costs that would entail if an attack occurred, as outlined below.

Japan

On 17 January 1995, Kobe, Japan was hit by a severe earthquake. The Port of Kobe was one of the largest container ports in the world and it was severely damaged, with an assessment of direct damages thought to be more than US$11 billion, and its reconstruction thought to be higher than that figure.[42]

United States

During September-October 2002, a dispute between labour and management saw the shutdown of 29 ports on the US West Coast, impacting predominantly on US trade with Asia. These ports handle about US$300 billion in trade a year, including more than half of America's containerised imports and exports, as well as agricultural exports. Initial estimates were that losses would run at between US$1-2 billion per

day, while the Anderson Economic Group estimated the cost to the US economy of a four week stoppage would be US$4.669 billion, comprising $84 million in workers wages, $2.88 billion to industrial consumers, $48 million to maritime producers, $1.6 billion to exporters and $57.6 million to consumers for higher prices. As the stoppage ended after 12 days, this estimate was revised down to US$1.67 billion, comprising $36 million in workers wages, $925.7 million to industrial consumers, $20.6 million to maritime producers, $685.7 million to exporters and $6.2 million to consumers for higher prices.[43]

In October 2002, Booz Allen Hamilton war gamed a scenario based on a terrorist attack coming through a US port: over the course of three weeks, a radiological bomb was found in a container on a truck leaving the port of Los Angeles, terrorist suspects were detained at the Port of Savannah, another bomb was found in Minneapolis (having been shipped through Halifax), and a third bomb exploded in Chicago. As the war game progressed, two ports were closed for three days and then all US ports were closed for a further nine days. In the outcome of the game it was determined that it took approximately three months to clear the backlog of containers, and that the total loss to the US economy was US$58 billion, including spoilage, last sales/contracts and a manufacturing slowdown and/or halt in production.[44]

In 2005 the Congressional Budget Office modelled the impact on the US economy if there was a week long halt to all container traffic through the ports of Los Angeles and Long Beach. Estimated costs were between US$65 and US$150 million per day. They then modelled a three year shutdown of these ports; estimated costs were between US$125 to US$200 million per day, or US$45 billion to US$70 billion pa.[45]

While these examples relate to container ports, they are indicative of the flow-on effects on employment and consumers of delays in shipments of goods. Given the importance of energy to transportation, manufacturing and power generation, disruptions to energy supplies through damage to 'energy' ports and refineries would have an even greater impact.

If a port were damaged or destroyed, either through a natural disaster or an attack, its replacement cost would also be high. As an example, the cost of replacing a 16 hectare container port has been estimates at US$32 million, plus the costs of land acquisition and equipment.[46]

Yemen

The maritime terrorist attacks off Yemen in October 2000 and 2002, against the USS *Cole* and the MV *Limberg* respectively, had an economic impact on Yemen. There was a tripling of insurance premiums for vessels calling at Yemeni ports (some premiums were US$300,000 per vessel), while some lines cut their schedules to Yemen completely and others substituted other ports in the region. Within Yemen, it

is claimed over 3000 people lost their jobs in the ports and the Government was losing US$15 million a month due to decreased trade.[47]

Environmental Spills

Accidental or deliberate oil spills are a major concern for coastal states, which assume responsibility for cleaning up the spill and suffer the costs not only of the clean up, but also lost revenue if other activities on affected waters cannot take place, such as fishing and tourism. The best known recent example is the *Exxon Valdez.*

Exxon Valdez

On 24 March 1989, the *Exxon Valdez* struck a reef in Prince George Sound, Alaska and 11 million gallons of oil leaked into the water. Two months later, the resulting oil slick was 470 miles long. The initial clean up took 3 years and cost US$2.1 billion. Exxon agreed to pay the State of Alaska and the US Government US$900 million over 10 years and was fined US$250 million. In 1994, Exxon was fined US$5 billion in punitive damages, but this was overturned in 2001.[48]

After this accident, the US declared that only tankers with double hulls would be allowed to enter its ports, and increasingly in the world shipping fleet, single hull tankers have been phased out in favour of double hulled vessels.

Global Impacts

The case studies outlined above have been predominantly sectoral in nature, or have focused more broadly on terrorism and its impact on the US economy. There are relatively few macroeconomic studies that examine the impact of energy disruptions on selected economies. The three examples given below were developed by Australia for APEC, examining the impact to APEC member economies of disruptions to energy supplies from the Middle East in 2005 and 2020, and the impact of a five week closure of the Malacca Strait (prices are in 2002 dollars).[49]

Disruptions to Middle East Oil Production

If Middle East oil production was disrupted for three months, there would be obvious impacts on oil importing nations. A decline of 5 per cent of world output was simulated, similar to the 1979 energy crisis and Iran–Iraq War of 1980-88, leading to a decline in world oil output of 8 per cent – 266 million tonnes of oil equivalent (Mtoe) in 2005 and 385 Mtoe in 2020. The decline in crude oil supplies equated to a rise in oil prices of about 40 per cent, and other fuel prices also rise. As LNG prices are linked to oil prices, LNG prices for Japan, South Korea and Taiwan rose by 20 per cent in both 2005 and 2020.

APEC is a net oil importer and its gross national product contracted by 0.2 per cent (US$43 billion) in 2005 and 0.2 per cent (US$82 billion) in 2020. The 2005 contraction was the equivalent of the national economies of New Zealand, Peru or Vietnam; and for 2020 is equivalent to the current size of the economies of Malaysia, the Philippines or Singapore.

In reaction to the higher oil price, total energy consumption reduces by 7.3 per cent in 2005 and almost a tenth in 2020; APEC's demand for crude oil contracts 11 per cent in 2005, about 136 million tonnes (mt) and 12 per cent (211 mt) in 2020. APEC coal production increased by 17 Mtoe in 2005 and 23 Mtoe in 2020 to offset the decline in oil demand. APEC oil producers increase their production by over 10 per cent in both scenarios, equivalent to 138 million tonnes.

Disruptions to Middle East LNG Production

If Middle East LNG production was disrupted for six months, there would be minor impacts on LNG importing nations, as LNG can be easily sourced from within Asia. A decline of 10 per cent of global LNG production was modelled, which affected APEC at 6 per cent in 2005 and 7 per cent in 2020, equivalent to 15 Mtoe and 33 Mtoe respectively. Japan, South Korea and Taiwan rely on LNG imports for almost all their natural gas requirements, with all but Taiwan heavily reliant on Middle East imports (which is expected to become reliant later this decade). While China will increase its LNG imports, it is not clear supplies will come from the Middle East. For instance, in 2004, China and Australia signed a LNG supply contract for 3.5 million tonnes pa for 25 years at a priced of $25 billion; a further contract was signed in September 2007 for another 1 million tonnes pa for 20 years at a price of $45 billion.[50]

For LNG importing countries in APEC, an inability to obtain LNG leads to increased production costs and a contraction in economic activity. In Japan in 2005, output contracts by US$590 million and US4320 million in South Korea. In 2020 South Korea contracts by US$525 million. For LNG exporting countries in APEC, Indonesia, Malaysia and Australia benefit, with Indonesia benefiting the most as its LNG sector comprises a large share of its economy.

Five Week Closure of the Malacca Strait

The scenario modelled was of a five week closure of the Malacca Strait, equivalent to a halving of ship productivity and a 5 per cent annual decline.

For APEC as a whole, its exports contracted by 0.05 per cent and imports 0.07 per cent, at a cost of US$1.7 billion and US$2.8 billion respectively. This impact is lower than the estimates for a loss of energy production in the Middle East, due to the shorter timeframe for delays in delivery, higher transport costs for shipments that use the strait which can be offset by sourcing oil from other regions, and use of intra-region energy

shipments including coal and gas. There is marginally lower energy consumption in APEC of 0.01 per cent (0.45 Mtoe) in 2005 and 0.011 per cent (0.83 Mtoe) in 2020.

Calculating the Impact of Blockage in the Malacca Strait

In a separate Australian Government study that is not publicly available, a three month blockage of the Malacca Strait due to the collision and sinking of a VLCC and large container ship was modelled with China, Japan, Indonesia and South Korea affected markedly. The direct costs to the global community were calculated using the following methodology:

- fatalities and injuries of ships'
- loss of ships
- loss of cargo
- salvage of ships
- pollution clean up
- diversion of vessels to other shipping routes
- rise in fuel prices due to delivery delays to Asian oil refineries
- rise in sea freight rates due to additional sailing time and the rise in fuel prices.

In order to estimate costs using this methodology, some figures should be easily obtainable, with others would have to be extrapolated from relevant case studies. Insurance companies have calculated the 'value' of a human life as well as average compensation figures for injuries sustained in the maritime industry. The loss of ships is easily calculated based on the cost of new construction for the type of vessel destroyed. As an example, the cost of a VLCC in 2005 was US$120 million.[51] The value of the lost cargo would come from freight brokers or insurance companies. Salvage is estimated as up to 25 per cent of the value of the ship and its cargo. Pollution costs will include the cost of the clean up (noting that heavy fuel oil is five times more costly to clean up that crude oil) as well as any compensation claims. Critically, compensation paid will be less than what has been claimed and will be significantly less than the assessed damage. The diversion costs of vessels using other shipping routes will be based on additional sailing time of 2 to 5 days, and for the first two weeks of the closure costs would be high, and after two weeks shipping schedules would have been amended to manage rerouting options. Delivery delays to Asian oil refineries drive up prices, which would be partially offset by increases in intra-regional trade using smaller tankers, as well as a drawdown of stockpiles; it would take an estimated 8.5 days for re-routed tankers to reach Asian refineries. Freight rates will rise due to increases in sailing time

and fuel prices, also impacting on shipping capacity; rates are assumed to rise 100 per cent for the first two weeks and 70 per cent for the remaining 10 weeks.[52]

Conclusions

The Asian economies are heavily reliant on energy imports and their reliance will continue to grow over the next 20 years. Indeed, for APEC member economies, their forecast energy consumption to 2030 is 2.1 per cent pa, but their production will only grow at 1.5 per cent pa; requiring increased energy imports.[53] As energy demand grows, some energy exporting countries will become energy importing countries, placing further pressures on energy supplies. Notwithstanding the increasing use of pipelines, the majority of energy to Asia continues to be transported by sea.

Given global reliance on energy, and particularly Asia, the impact of any disruptions to this trade is generally stated to be catastrophic. However, it is difficult to obtain reliable data – either historical cases studies or credible scenarios – that provide adequate information on which policy makers can base decisions.

Where there is a problem with the production of oil or gas, the issues are: for how long are supplies cut, are countries able to source energy supplies from other countries, are they able to switch to other types of energy, and are they able to drawdown their own (or others') energy stockpiles? The policies of OPEC in the 1970s and 1980s to limit oil supplies to the West, leading to higher prices which caused inflation and recessions, led the West to diversify their supply among non-OPEC countries, as well as switching to natural gas where possible – and in some countries, to nuclear power. These are long-term solutions if production is cut for a considerable period. In the case of Australia and temporary disruptions to natural gas supplies, while hardship occurred, some supplies could be obtained from elsewhere within the country.

Where the problem is a blocked or closed strait leading to the need to divert shipping, the issue is for how long the diversions might take place. During short term diversions, countries should be able to use their stockholdings until the situation is resolved. When longer diversions occur, it becomes a matter of whether surplus shipping can be utilised to cover the increased demand for shipping due to longer voyages. Theoretically there is a surplus in shipping tonnage, but whether it is the right type of ship in the right place is another matter.

The importance of the oil and gas infrastructure is often overlooked. For offshore installations, they may require ongoing protection, as in Iraq. Shore-based infrastructure may also require protection, as in the case of Saudi Arabia. While analysts may think about the protection of shipping, and propose land-based pipelines as a solution to avoid threats, pipelines are more difficult to protect than shipping: the entire length of pipeline must be monitored or patrolled, whereas ships can be formed into convoys for protection by navies.

Ports remain vulnerable to damage from natural disasters and from attack. The ISPS Code regulates security requirements for ports (and international shipping), focusing on physical security. While the importance of container ports to economies has been modelled, there is no available modelling of the issues associated with an attack on 'energy' ports and refineries.

Cost estimates for the case studies and scenarios surveyed in this paper vary markedly, and generally reflect direct costs rather than full costs (ie where the impacts flow across a country's economy and onto its trading partners). It is therefore difficult to draw any firm conclusions as to the exact magnitude of the economic consequences of energy trade disruption on affected countries and the world. Recent experience is that any disruption to oil supplies generally leads to recession, and short term disruption to supplies or shipping diversion will have an economic impact; however the quantum will never really be known.

Notes

1 One 1975 estimate was that it had cost the world nearly US$8 billion in increased shipping costs. Robert Arndt, 'Suez: The Reopening', *Saudi Aramco World*, September/October 1975, Vol. 26, No. 5, available at: <www.saudiaramcoworld.com/issue/197505/suez-the.opening.htm>.

2 Sheldon Richman, 'Where Angels Fear to Tread: The United States and the Persian Gulf Conflict', *Policy Analysis*, No. 90, 9 September 1987, available at: <www.cato.org/pub_display.php?pub_id=956&full=1>. These oil shocks are thought to have contributed to economic recession, but some economists believe monetary policies were also a contributing factor. Marc Labonte, *The Effects of Oil Shocks on the Economy: A Review of the Empirical Evidence*, RL31608, Congressional Research Service, Washington, DC, 2004.

3 United Nations Conference on Trade and Development, *Trade and Development Report, 2007*, Geneva, 2007, pp. 1-2.

4 British Petroleum, *BP Statistical Review of World Energy June 2007*, London, pp. 11, 20.

5 In 2004, China and Australia signed a LNG supply contract for 3.5 million tonnes pa for 25 years at a priced of $25 billion; a further contract was signed in September 2007 for another 1 million tonnes pa for 20 years at a price of $45 billion. 'Chinese ties enter new era after $45bn gas deal', *The Australian*, 7 Sep 2007.

6 British Petroleum, *BP Statistical Review of World Energy June 2007*, p. 30.

7 Energy Information Administration, *International Energy Outlook 2007*, Washington, May 2007, p. 11.

8 EIA, *International Energy Outlook 2007*, p. 6.

9 EIA, *International Energy Outlook 2007*, pp. 29, 39. The natural gas forecast in 2030 is 163 trillion cubic feet (ie 163 x 10^{12}), which has been converted at the rate of 1 cubic foot = 0.028316846592 cubic metres.

10 Member economies are: Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, Papua New Guinea, Peru, the Philippines, New Zealand, Russia, Singapore, South Korea, Taiwan, Thailand, the United States, and Vietnam.

11 Asia Pacific Energy Research Centre, *A Quest for Energy Security in the 21st Century: Resources and Constraints*, Tokyo, 2007, pp. 3, 13.

12 EIA, *Energy Outlook 2007*, pp. 165, 171, 172, 177, 188.

13 Maritime Port Authority of Singapore, *Tanker Arrivals (>75GT) and Shipping Tonnage by Type*, available at: <www.mpa.gov.sg/infocentre/pdfs/tanker-vessel.pdf>.

14 M Stopford, *Maritime Economics* (2nd ed), Routledge, London, 1997, p. 226.

15 United Nations Conference on Trade and Development, *Review of Maritime Transport, 2006*, Geneva, 2006, p. 21.

16 United Nations Conference on Trade and Development, *Maritime Review of Trade 1997*, Geneva, 1997, p. 16; *Maritime Review of Trade 2001*, Geneva, 2001, pp. 18, 43; *Maritime Review of Trade 2006*, Geneva, 2006, pp. 21, 46.

17 An average ULCC is 350m long, has a beam of 60m and a draft of 22m. J Medalia, *Port and Maritime Security: Potential for terrorist Nuclear Attack Using Oil tankers*, RS21997, Congressional Research Service, Washington, DC, 2004, p. 2.

18 United Nations Conference on Trade and Development, *Review of Maritime Transport, 2006*, pp. 4, 8.

19 United Nations Conference on Trade and Development, *Maritime Review of Trade 1997*, Geneva, 1997, pp. 5, 11; *Maritime Review of Trade 2006*, Geneva, 2006, pp. 5, 8.

20 Paul W Parfomak, *Liquefied Natural Gas (LNG) Infrastructure Security: Issues for Congress*, RL32073, Congressional Research Service, Washington, DC, 2005, pp. 2, 4, 10-11.

21 Asia Pacific Energy Research Centre, *A Quest for Energy Security in the 21st Century: Resources and Constraints*, p. 22.

22 *The World Fleet of LNG Carriers* (as of July 11, 2007), available at: <www.coltoncompany.com/shipbldg/worldsbldg/gas/lngactivefleet.htm> and *The Orderbook of LNG Carriers* (as of 11 July 2007), available at: <www.coltoncompany.com/shipbldg/worldsbldg/gas/lngorderbook.htm>.

23 PW Parfomak and J Frittelli, *Maritime Security: Potential Terrorist Attacks and Protection Priorities*, RL33787, Congressional Research Service, Washington DC, 2007, p. 20.

24 Parfomak, *Liquefied Natural Gas (LNG) Infrastructure Security: Issues for Congress*, pp. 9-10.

25 *The World Fleet of Fully Refrigerated LPG Carriers Over 10,000 cu.m.* (as of 11 May 2007), available at: <www.coltoncompany.com/shipbldg/worldsbldg/gas/lpgactivefleet.htm> and *The Orderbook of Fully Refrigerated LPG Carriers Over 10,000 cu.m. (as of 11 May 2007)*, available at: <www.coltoncompany.com/shipbldg/worldsbldg/gas/lpgorderbook.htm>.

26 Andrew Forbes, 'Maritime Security Regulation', in Andrew Forbes and Michelle Lovi (eds) *Australian Maritime Issues 2006: SPC-A Annual*, Papers in Australian Maritime Affairs, No. 19, Sea Power Centre – Australia, Canberra, 2007, pp. 123-128.

27 P Lenain, M Bonturi and V Kloen, *The Economic Consequences of Terrorism*, Economics Department Working Paper, No. 334, Organisation for Economic Co-operation and Development, Paris, July 2002, p. 24.

28 Navy Newsstand, *Coalition Maritime Forces Revise Iraqi Oil Terminal Protection Procedures*, Story Number NNS040506-08, dated 6 May 2004, available at: <www.navy.mil/search/

display.asp?story_id=13177>; *Warning and Exclusion Zones at Khawr Al'Amaya Oil Terminal (KAAOT) and Al Basra Oil terminal (ABOT)*, US Maritime Liaison Office, Bahrain, 6 May 2004; John C Daly, 'The Threat to Iraqi Oil, *Terrorism Monitor*, Vol. 2, Issue 12, 17 June 2004; Royal Navy, *Combined Task Force 158*, available at: <www.royalnavy.mod.uk>.

29 Brian Cashell and Marc Labonte, *The Macroeconomic Effects of Hurricane Katrina*, RS22260, Congressional Research Service, Washington, DC, 2005, p. 4; Robert Bamberger and Lawrence Kumins, *Oil and Gas: Supply Issues After Katrina*, RS22232, Congressional Research Service, Washington, DC, 2005, pp. 1-2; *Katrina and Oil Prices*, Council on Foreign Relations, 7 September 2005, available at: <www.cfr.org/publication/8834/katrina_and_oil_prices.html>.

30 P Aitken, J Mitchell, M Northcott, M Peters, *Esso Gas Plant Explosion*, available at: <www.members.iinet.au/~jinsploj/pdf/longford.pdf>; Attorney-General's Department, *Longford Gas Plant accident and Victorian gas supply crisis*, Emergency Management Australia, Canberra; Maurice Blackburn Cashman, *Longford Gas Plant Class Action*, available at: <www.mauriceblackburncashman.com.au/areas/class_actions/longford_gas.asp>; ABC News, *Gas explosion victims win $1.4m payout*, 23 June 2003, available at: <www.bananasinpyjamas.com/news/stories/2003/06/23/886403.htm>.

31 Department of Industry, Tourism and Resources, *Task Force Report on the Rationing of Jet Fuel at Sydney Airport September-October 2003*, available at: <www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=49F59201-F839-29D2-845BA892F-74DCBFF>.

32 Michael Harrison, *Awaiting the Moomba backdraft*, available at: <www.lawyersweekly.com.au/articles/71/0C01CD71.asp>; Rod Meyer, 'Corporate fallout from gas explosion spreads, *The Age*, 7 January 2004; *Settlement of Moomba Insurance Claim*, Origin Energy Australia, 22 December 2005, available at: <www.originenergy.com.au/news/news_detail.php?pageid=82&newsid=635>.

33 During both World Wars, Germany attacked Allied shipping, targeting British imports of food and necessary war materiel in order to drive her out of the war. In World War I, Britain lost 7,759,090 gross tonnage of shipping and 14,593,987 gross tonnage (2919 merchant ships) in World War II. C Ernest Fayle, *Seaborne Trade Vol III, The Period of Unrestricted Submarine Warfare*, History of the Great War, Imperial War Museum, London, 1924, Table 1b, p. 467; Clay Blair *Hitler's U-Boat War Vol 1 - The Hunters: 1938-1942*, Random House, New York, 1996, Appendix 18, p. 771 and *Vol 2 - The Hunted: 1942-1945*, Random House, New York, 1998, Appendix 20, p. 820. In World War II, the United States (US) destroyed most of the Japanese merchant marine (8,433,389 gross tonnage) and thereby most of Japan's food and war materiel imports, crippling her ability to prosecute the war. Mark M Parillo, *The Japanese Merchant Marine in World War II*, Naval Institute Press, Annapolis, 1993, Table A-9, pp. 243-244.

34 Andrew Forbes, 'International Shipping: Trends and Vulnerabilities' *Maritime Studies*, September/October 2003, No. 132, p. 27.

35 Philippe Crist, *Security in Maritime Transport: Risk factors and Economic Impact*, Maritime Transport Committee, Organisation for Economic Co-operation and Development, Paris, July 2003.

36 MS Navias and ER Hooter, *Tanker Wars: the assault on merchant shipping during the Iran-Iraq conflict, 1980-1988*, Tauris Academic Studies, I. B. Tauris Publishers, London, 1996, pp. 1, 181, 183.

37 Piracy only occurs on the high seas, when any country might intervene, while sea robbery occurs in the waters of a coastal state and only that country is legally able to respond.

38 Hans Tino Hansen, 'Piracy off the Coast of Somalia and the Hijacking of Danica White', *Protocol*, June 2007, p. 3.

39 *Pirates free Danish ship*, 23 August 2007, available at: <www.news.com.au/story/0,23599,22292931-23109,00.html>.

40 Ken Blyth, *Petro Pirates: The Hijacking of the Petro Ranger*, Allen and Unwin, St Leonards, 2000, pp. xiv, xvi, 47, 54-55; Jonathan Howland, *Hazardous Seas: Maritime Sector Vulnerable to Devastating Terrorist Attacks*, JINSA Online, 1 April 2004, available at: <www.jinsa.org/articles/print.html/documentid/2426>; Charles Glass, 'The New Piracy', *London Review of Books*, 18 December 2003, available at: <www.lrb.co.uk/v25n24/print/glas01_.html>.

41 Crist, *Security in Maritime Transport: Risk factors and Economic Impact*, p. 39.

42 EQE International, *The January 17, 1995 Kobe Earthquake: An EQE Summary Report*, 1995, p. 61. available at: <www.absconsulting.com/resources/Catastrophe_Reports/Kobe,%20Japan%20EQ%201995.pdf>.

43 The White House, *President Takes Action to Protect America's Economy and Jobs*, 7 October 2002, available at: <www.whitehouse.gov/news/releases/2002/10/print/20021007-5.html>; Patrick Anderson, *Lost Earnings Due to the West Coast Port Shutdown - Preliminary Estimate*, working paper 2002-10, Anderson Economic Group, Lansing, 7 October 2002; Patrick Anderson and Ilhan Geckil, *Flash Estimate: Impact of West Coast Shutdown*, Anderson Economic Group, Lansing, 15 October 2002.

44 Mark Gerenscer, Jim Weinberg and Don Vincent, *Port Security War Game: Implications for US Supply Chains*, Booz Allen Hamilton, 2003, pp. 1, 3.

45 *The Economic Costs of Disruptions in Container Shipments*, Congressional Budget Office, 29 March 2006, pp. 2, 14, 19-20.

46 Crist, *Security in Maritime Transport: Risk factors and Economic Impact*, p. 19.

47 Crist, *Security in Maritime Transport: Risk factors and Economic Impact*, p. 18.

48 'The Exxon Valdez Oil Spill Disaster', *ExploreNorth*, available at: <www.explorenorth.com/library/weekly/aa032499.htm>.

49 Lindsay Hogan, Lindsay Fairhead, Andrew Gurney and Robert Pritchard, *Energy security in APEC: assessing the costs of energy supply disruptions and the impacts of alternative energy security strategies*, Australian Bureau of Agricultural and Resource Economics, Canberra, 2005, pp. 134-157.

50 'Chinese ties enter new ear after $45bn gas deal', *The Australian*, 7 Sep 2007.

51 United Nations Conference on Trade and Development, *Review of Maritime Transport, 2006*, p. 41.

52 In-Confidence advice from the Bureau of Transport and Regional Economics, Canberra, May 2007.

53 Hogan, Fairhead, Gurney and Pritchard, *Energy Security in APEC*, p. 11.

In Ports We Trust: The Economic Consequence of Attacks on Ports

Nazery Khalid

Distrust and caution are the parents of security.

Benjamin Franklin

Fort Port: Maritime Security Post-11 September 2001

Port authorities, terminal operators, security agencies and regulatory authorities have been abuzz – if not nearly obsessed – with the question of security since the fateful 11 September 2001 terrorist attacks on the United States. They have worked hard and have spent huge amount of resources to protect ports from a permutation of potential security threats and possible attacks. Despite this, several security analysts and even defence ministers have not stopped talking about the probability of the 'nautical version of 11 September 2001', so much so that there is almost an anxious sense of 'are ports next on the terrorists' list?' anticipation among those in the maritime sector.

Such punditry has not helped in allaying fears over port security. Goaded on by predictions of terrorist attacks on maritime interests, security/enforcement agencies and international bodies such as the International Maritime Organization have introduced a multitude of security measures to protect the maritime industry from potential security threats. Yet, one gets the feeling that the industry is still unsure that the security measures put in place are resilient, sustainable or even necessary in the first place to deter the attacks. The more pessimistic among them even feel that the implementation of some initiatives merely heightens the anxiety, as if waiting for attacks to occur on maritime assets and infrastructures.

Thanks to the armchair pundits, the maritime sector seems to have been led to believe that attacks on maritime infrastructure would be a matter of *when*, not *if*. Ports, especially, seem to be a favourite 'target' of the doomsayers. Despite the almost unblemished record of ports against terror attacks thus far, the prognosis of terrorists replicating on ports the kind of damage, havoc and fear caused by hijacked planes crashing into buildings has not relented. Predicting the worst and confronting the risk of security threats – real or imagined – on ports have become some sort of a growth industry.

Post-11 September 2001 has seen the introduction of a slew of security measures intended to protect lives and to fortify the security of ports, ships and seaborne cargo. Just when we thought that the maritime sector was already drowning in an alphabet's

soup of security initiatives – ISPS, CSI, C-TPAT, PSI, RMSI and many more – new measures are being introduced on grounds of further protecting the maritime supply chain from terrorist attacks.

Despite the intense focus on port security since 11 September 2001, port operators and users have not stopped debating if the measures in place are adequate or capable of thwarting terror attacks or preventing ports from being used as transit points to carry out such attacks. Just as intensely speculated is the potential repercussion that such attacks can inflict on ports, seaborne trade and the global economy.

To Serve and to be Protected: The Importance of Port Security

The task of projecting the potential economic implication of attacks on seaports must begin with developing an understanding of the role of ports and their crucial position in the maritime supply chain. To understand the intensity of speculation of possible attacks on ports – and, at times, the emotion involved in the discourse of port security – one has to appreciate the critical importance of ports as a pivotal component of global trade. Modern day ports have assumed the role of trade facilitators through which cargo of various types and of high value that make the world economy operate are loaded and unloaded. Hence, their protection is rightly a matter of international concern and tremendous strategic importance as the unimpeded flow of global trade and the growth of the world economy depend heavily on their smooth running.

Consider this: an estimated 95 per cent of global trade is carried by international shipping. Seaborne trade as measured by goods loaded reached a record high of 7.11 billion tons in 2005 and was expected to grow further in the coming years on the back of a positive outlook of the global economy.[1] Further underscoring the importance of shipping to global trade, the freight rates earned from the operation of merchant ships was estimated to contribute 5 per cent annually to total world trade. Globalisation, liberalisation of trade, opening up of markets, growing prosperity of economies around the world and the corresponding rise in consumer demand for manufactured goods and commodities will see global trade continue to grow in the foreseeable future. This will require the trade supply chain to run efficiently and smoothly to facilitate the delivery of goods in greater volume, to more people, at lower cost, to farther destinations and in shorter time.

Crucial to facilitating this daunting process are ports, an entity which has emerged as a critical cog in the long and complex network of the global supply chain. Ports are no longer isolated facilities where ships come and go: they have developed extensive connectivity with other transport modes and have become embedded into the inter-modal network that link producers and manufacturers with consumers. It is not an exaggeration to state that without ports, it would not be possible to carry out trade

efficiently at the extensive scale and in the enormous volume that we seem to take for granted today.

That fact established, it would not be too difficult to see what the fuss on port security is all about. Without efficient ports – where many activities take place and assets and cargo worth billions congregate – the smooth running of the supply chain would be disrupted and global trade would be adversely affected. A single security scare on one major port alone may cause inconvenience to its users and affect its smooth running due to traffic congestion along its entrance channel, delays in cargo processing and a disrupted shipping schedule. The prolonged closure of a single major port due to a terrorist attack can have severe repercussions on that port's operations and have widespread impact on the local, regional and even global economy. With ports being extensively connected with one another in a complex international hub-and-spoke system of seaports, delays at one port will trigger a domino effect in other connecting ports. One can imagine the potential implication of a coordinated series of simultaneous attacks at several hub ports that may cripple their operations – a scenario best not dismissed in these uncertain times despite its remote likelihood of occurrence. Put simply, if terrorists were aiming to wreak havoc and cost serious economic damage on a global scale, they could not pick a better target than ports.

Tense Present: Ports Under Threat

In the aftermath of the 11 September 2001, attacks and the subsequent raising of threat perceptions, maritime industry stakeholders have viewed security issues more seriously. Those mind-numbing attacks – stunning in their execution, destruction and impact – and the subsequent Madrid train bombing and London underground and bus attacks, have raised grave concerns of terrorist assaults being inflicted on other transport modes. Given maritime transport's importance as a global trade conduit, there is every reason for stakeholders in the sector to be fearful of the spectre of terrorist attacks on their interests.

That said, some of the doomsday projections of the kind of attacks that terrorists may inflict on maritime facilities, such as ports border on the hyperbolic. The projected scenario of hijacked chemical tankers or crude oil tankers being steered into ports as 'floating bombs' seems to be a favourite among headline-seeking security 'analysts' and 'experts'. Such dramatic forecasts have gripped the attention of port stakeholders and have been influential in shaping the perception of threat among security agencies leading to the introduction of various maritime security measures. However, there is a growing chorus of scepticism whether terrorists have the technical capability or operational *nous* to pull off such a feat, or if there could exist a unique set of circumstances – like on 11 September 2001 – to enable such a spectacular attack to occur.

However, given the non-conventional nature of terror attacks and the strategic importance of ports, any possibility of attacks on these essential facilities should not be ignored. After all, who could have foretold that commercial jetliners could be turned into lethal weapons and cause unspeakable carnage? If someone were to project before 11 September 2001 that *four* passenger airplanes could be hijacked and steered into high-profile buildings in a synchronised wave of attacks, would he have been deemed 'dramatic'?

Although it is a matter of debate whether ports present legitimate, high-value targets for terrorists, the occurrence of various scenarios at ports could adversely affect the smooth flow of seaborne trade and therefore global trade. The toppling of structures like super post-Panamax cranes due to sabotage could halt quay operations and cause berthing delays for ships and processing delays for cargo. The discovery of a shipment of weapons of mass destruction (WMD) materials such as uranium for the purpose of mounting terrorist attacks and even terrorist personnel inside container boxes can trigger the kind of panic and frantic response that can paralyse the global maritime supply chain.[2] A suicide attack on a chemical tanker or crude oil tanker at the entrance channel of a busy port could result in its closure and disrupt shipping traffic and cargo delivery.

All these could lead to bottlenecks forming along the maritime supply chain whose efficiency depends on the efficient running of its various sub-chains and components along it. A breakdown anywhere along the chain – as can arise from a single incident or a combination of several incidents – could disrupt the flow of the goods.

Chaining the Supply Chain?

On any given day, millions of containers transit the world's oceans and pass through its ports, carrying a stunning variety of high value cargo. Their movements are orchestrated with admirable efficiency, involving many players, processes, equipment, systems, vehicles and venues along the length and breadth of the global maritime supply chain. At the core of this long and complex network are ports; key facilities which act as critical nodes in the movement of much of the world's trade. At ports, large amounts of cargo are loaded and unloaded from many types of vessels to be delivered to markets and consumers across the world.

The strategic importance of maritime transport as the most popular and cost-efficient means of transporting the bulk of the world's trade has put the issue of port security in the international spotlight since 11 September 2001. It is therefore not surprising then that given the position, role and profile of ports in the supply chain, they are seen as reasonably attractive targets for terrorist attacks and to be used to facilitate the smuggling of men and materials to mount attacks elsewhere. The expanse of ports – accessible through land, air and water – and their integrated nature with other

transport modes make protecting them a daunting task. In addition, the multiplicity of activities at ports which involve so many personnel, vehicles and containers also pose a stiff challenge for security personnel to monitor.

Despite the flurry of security measures introduced since 11 September 2001, it would be nearly impossible to account for all of the world's containers – mobile or stationery, laden or empty – in the manner that commercial airline passengers can be monitored. Despite the existence of what could pass as a reasonably strict passenger screening process in the aviation sector on 11 September 2001, the tragic attacks still occurred. There is no guarantee that all the maritime security measures in place would be sufficient or resilient enough to deter attacks on maritime facilities like ports and assets such as international shipping.

In addition to the question posed on the efficacy of the security measures, there is growing discontent among port users who complain of the slowing down of the maritime supply chain as a result of the extra checks on ships and cargo imposed by those measures. They have also made their feelings known strongly about the extra charges imposed on them by port operators on the grounds of providing 'extra security' to their users.[3] Shippers feel that the provision of security at ports should be a given, instead of being treated as an extra service that users should pay for.

Some years have passed since the introduction of these maritime security measures affecting ports, yet tension is growing between port operators and port users arising from more strict cargo inspection regimes. The most recent strain was caused by the announcement of a plan calling for a 100 per cent scanning of containers at ports outside the US destined for the US. The risk-based initiative, known as the Secure Freight Initiative (SFI), was introduced by US Customs and Border Protection (US CBP). Under the SFI, targeted for full implementation within five years, the US CBP plans to use x-ray based equipment and detectors to generate a data feed of cargo for review by its officers prior to the cargo being loaded onto US-bound vessels. All containers exported to the United States via the port will be scanned and the information gathered from the scanning fed to US CBP to assess security risks.

Predictably, the proposal, like many others before it, has received stiff resistance from shippers who are worried that more stringent scrutiny of containers will add further to their costs and delay the shipment of their cargo. They fear that more of such measures will further inconvenience them, like other port users who are already reeling from the inconveniences caused by more strict inspection of containers.[4] Shippers contended that post-11 September 2001 security measures are already causing delays to container shipments and their clearance at ports, and contributing to congestion at various ports. With global maritime trade set to grow further, one can only imagine the kind of bottlenecks that will form along the maritime supply chain if every single US-bound container is subjected to detailed inspection. The introduction of the SFI program, according to some critics, reeks of smug unilateralism on the part

of the United States, which did not consult the many parties that will be affected by the measure and did not take into account the potential disruption that it could cause to the smooth flow of seaborne trade.

Storming the Port: Possible Attack Scenarios

To assess the consequence of attacks on ports, it is useful to list the possible types of attacks that can be mounted against them. Although there are all sorts of possibilities, the resources available to counter the threats arising from the scenarios are limited. It is therefore essential that the responses put in place to confront security threats faced by ports should be narrowed down to threats which are most *possible* instead of just *probable*. This will ensure that valuable resources are allocated to fund appropriate measures and used optimally to neutralise real threats instead of being wasted on questionable initiatives to counter questionable threats conjured up in the fertile minds of security 'experts'.

Some of the imagined scenarios may seem at the outset like plots from a Tom Clancy novel or a *Die Hard* movie, but the terrorist threat has proven to be asymmetrical; highly unpredictable in its form, function and timing; transnational in nature and one that can easily morph from one mode of attack and one type of perpetrator to another. As such, the task of outlining the possible attacks on ports should be based on a mixture of solid information gathering and analysis; sharing of information and data that can be useful in interpreting the security risks and threats faced by ports; a grasp of the roles and operational dynamics of ports in facilitating seaborne trade; and even an understanding of the motives of terrorists and the resources available at their disposal. It is beyond the scope of this paper to dwell into the detail of each element, but the following scenarios are deemed to be among the most plausible types of attacks that can be waged on ports:

- Outright attacks on vessels anchored at ports or near their waters. This presents a more viable option for terrorists than the much touted 'floating bomb' projection of tankers being steered into port installations. The suicide attacks on the USS *Cole* (near Aden Port, Yemen in 2000) and the French supertanker MV *Limburg* (off Yemen in 2002), and the bombing of the *Superferry14* (off Manila in 2004) demonstrate the vulnerability of vessels, whether at anchor or at sail, to direct assault by terrorists. Attacks on ships in port waters can result in the closure of port channels due to the danger posed by burning vessels and the spillage of hazardous cargo such as chemicals or crude oil. The closure of a busy port such as Singapore where an average of 15 vessels call every hour could cause serious congestion as shipping is delayed at the port's entrance channel.[5] The ensuing disruption to shipping schedules, delays in cargo delivery and a host of other problems may cause a chain reaction of congestion and delayed shipment at connected ports, and

bottlenecks forming along the maritime supply chain. The threat of attacks on vessels in ports is not confined to cargo carriers alone – an attack on a packed cruise ship berthing at a passenger terminal can also cause huge property damage and heavy loss of lives, not to mention the ensuing economic impact on the cruise industry and its ancillary activities.

- The detonation of a 'dirty bomb' hidden in a container or smuggled into the port. The ensuing radiological plume may result in fatalities, closure of port operations due to the contamination, high costs to clean up the mess and indirect economic impacts to the local economy. More catastrophically, a nuclear attack on ports located in densely populated areas such as the Port of New York/New Jersey and Hong Kong Port could cause horrendous loss of lives and economic chaos to the locality, host country, surrounding region and even the rest of the world.

- The smuggling of weapons to mount attacks, materials like uranium that can be used to make WMD, or terrorist personnel inside container boxes. The threat of such an incident, even a hoax 'warning' of one, could trigger a frantic, search of ships across the world's oceans, of containers at yards at ports and inland, and even of trucks and trailers should boxes carrying such contents make it past port gates. The measurers involved in such an operation can be costly and the economic impact arising from the ensuing chaos it creates along the supply chain can be telling.

- Direct assault on port personnel and acts of sabotage on port facilities. Such an incident occurred at Ashdod Port in Israel in 2004 which was blamed on 'terrorists', and attacks by 'insurgents and militias' happen frequently in Iraqi ports such as Basra, Khor Al-Zubayr and Umm Qasr. Terminologies aside, such attacks threaten lives, expensive equipment such as cranes and sensitive facilities such as oil installations. The entire maritime supply chain can be disrupted if port operations are halted or entire ports are shut down in the aftermath of such attacks.

- Cyber attack on ports' information and communication technology (ICT) systems. Modern day ports are increasingly equipped with sophisticated equipment and systems to facilitate the handling of even larger vessels, growing shipping traffic and rising cargo throughput, and to coordinate the operations and many activities at their premise. ICT also figures prominently in port operators' quest to reduce the time involved in berthing of ships and cargo processing to reduce supply chain costs and to keep its flow smooth. Given ports' increasing dependence on ICT to ensure their operational efficiency, a cyber attack mounted by even a single hacker may severely disrupt their IT-dependent operations. A series of attacks on various systems of a port may cause serious enough repercussions to paralyse its entire operation

for a prolonged period. One can imagine the impact of a simultaneous wave of cyber attacks launched by several hackers on the ICT systems of several mega-hub ports.

The Devil to Pay: Assessing the Economic Consequence of Attacks on Ports

It is difficult to contextualise the economic consequence of attacks on ports in terms of dollar value alone, as the impact of such attacks will be widespread. An attack on a port will not only affect the port in question but will cause economic losses to its terminal operators, shipping lines, shippers, consumers, operators of other transport modes, freight forwarders, businesses, and even consumers and entire economies.

A simple calculation involving the key statistics of a single port gives a broad indication of the economic cost of an attack on the port. Let us, for the sake of illustration, take the example of PSA International, Singapore's state-owned port operator, which operates and manages Singapore Port, the world's busiest container port, and 14 other ports worldwide. Ports under the PSA International stable handled a total of 51.3 million TEU containers in 2006, generating total revenue of US$2.4 billion.[6] Of these figures, Singapore Port contributed 24 million TEU and 57 per cent of the revenue or US$1.37 billion.[7] Should the port be closed for a day due to the discovery of weapons or a terrorist in a container box or due to a direct assault resulting in its shutdown, the daily loss of revenue to PSA International would amount to US$3.75 million. That is only the loss suffered by the port in a single day – not an insubstantial amount given ever-rising port operational costs. For a city-state like Singapore whose economic prosperity – nay, *survival* – depends heavily on its port, the closure of its port as a result of an attack even for a short duration would deliver a severe blow to its port-dependent economy and a potentially traumatic shock to the national psyche.

The closure of Singapore Port will also affect neighbouring countries, whose ports act as 'spokes' to Singapore's 'hub', and the city-state's trading partners will be affected. The economic impact resulting from disrupted shipping services and cargo movement in and out of the world's busiest container port would reverberate far and wide.

It is likely that in reaction to such an attack, security agencies will tighten security procedures in and around ports and along the supply chain. This will result in port authorities and terminal operators having to incur greater costs to put in place more personnel, equipment and systems to boost security and conduct more checks on ships, crew members and cargo. This will prolong the time taken to clear ships, crew members and cargo at ports. Terminal operators will inevitably pass down the extra costs to their users such as shippers and shipping lines, who in turn will shift the costs down to consumers.

The ensuing delay in processing ships and cargo as a result of more stringent checks at ports is anathema to the essence of speed and efficiency as expounded by modern supply chain management and production concepts such as just-in-time and zero-inventory and focus on door-to-door transport as expounded by the concept of multimodal transport.[8] A sluggish supply chain flow, as a result of delays at ports, is not conducive to facilitating the carriage of huge amount of goods across the global market at the lowest cost and shortest time possible.

A likely repercussion of attacks on ports would be an increase in marine insurance on ships and cargo heading towards ports which have been subjected to attacks. This will increase the operating costs of shippers and carriers, and the cost will eventually be felt by consumers. The increase in insurance premium charged on ships traversing the Malacca Strait, one of the world's busiest and most strategic sea lanes, after it was categorised as a 'war risk zone' by Lloyd's Market Association in 2005 could provide an idea of the impact on insurance on ships and cargo heading towards a port reeling from an attack.[9]

Several studies have provided estimates of the economic consequence of attacks on ports. Among them:

- A 'dirty bomb' attack[10] on the Ports of Los Angeles and Long Beach – which together make up the largest port complex in the United States – could incur a loss of US$300 million for a 15-day shutdown, US$63 billion for 120 days and US$252 billion for a one year closure of the port.[11] Another estimate by University of Southern California and Texas Southern University puts the potential loss to the US economy as a result of a single 'dirty bomb' attack at the Ports of Los Angeles and Long Beach at US$34 billion.[12]

- According to a study by the Public Policy Institute of California, an attack resulting in the shutting down of the Ports of Los Angeles and Long Beach could cost an estimated US$45 billion.[13] It predicted that an attack on a smaller port such as the Ports of Oakland and Richmond could also create devastating effect to the local and national economy.

- A 2003 study by ABT Associates Inc. estimated that a single nuclear terrorist attack on a major US seaport could cause disruption to US trade worth US$100-200 billion and property damage between US$50-500 billion.[14] It projected that the global and long-term impacts, including the economic impact on the national and international response to such an attack would be 'substantially greater'. The study also forecast that the cost involved in securing a single major port from nuclear terrorist attack would be US$100 million. More sobering than the economic consequence of such an attack is the projection of lives lost on a nuclear attack in Manhattan which could

claim 1 million lives and inflict a loss of US$3 trillion to the US economy or 30 per cent of its GDP.

- A 2002 estimate put the economic cost to Asian countries arising from a month-long disruption at US West Coast ports to be 0.4 per cent of their nominal GDP.[15] It was estimated that the negative impact in major trading nations such as Malaysia and Singapore could well run into as high as 1.1 per cent of their nominal GDP.

Large as these projected numbers are, the economic loss of attacks on ports would be even higher if extrapolated on a wider scale. Whole economies would suffer in the wake of attacks on ports as their operations are suspended, shipping schedules are interrupted, cargo processing is delayed and the flow of trade is impeded. The prolonged closure of ports could result in price rises of commodities and goods, affecting consumers and households. The adverse effects on port and trade-related business activities could lead to businesses closures and unemployment. Indeed, the potential total economic loss resulting from a major terrorist attack on a single port could even make the hundreds of billions of dollars of losses projected by some of the studies mentioned look like very conservative estimates.

Securing the Perimeters: Protecting Ports from Threats

The 11 September 2001 terrorist attacks demonstrated that nothing can stop determined terrorists from carrying out their deeds. Despite the phalanx of security measures subsequently introduced in the maritime sector, there is no guarantee that ports are immune to or can withstand attacks. As the adage goes, build a bigger mousetrap and a bigger mouse will come along.

What then can be done to secure ports from the kind of attacks that can cripple their operations? More realistically, what further measures can be taken to lower the risk of ports from being subjected to the various threats they face in these uncertain times?

To answer the question, it is essential that port operators and players along the maritime supply chain rally behind the set of protective measures already in place. Notwithstanding the complaints against the inconvenience caused by tighter security measures and more stringent inspections on ships, crew and cargo, it would be counterproductive to give in to the odd opposition against these initiatives. Talk of dismantling programs such as the ISPS Code and the Container Security Initiative (CSI) at this point in time on grounds of the diminishing terrorism threat should not be allowed to gain currency, as this would be counterproductive to securing ports from the various threats that terrorists are capable of.

The maritime industry has accepted that it is a changed world – arguably for the worse – and the current security matrix requires a more stiff approach towards assessing,

anticipating and countering the potential security threats. Port stakeholders have little choice but to live with the security measures in place, despite their criticism against the effect of more strict inspection on ships and cargo on the smooth running of the supply chain. It is a sad fact that when it comes to strategic facilities like ports, even a single major attack would be one attack too many. With ports, the economic price to be paid as a result of lackadaisical attitude toward security could be high and even potentially catastrophic.

As unpopular as some of the post- 11 September 2001 measures are – including the new SFI proposal to inspect all US-bound containers at the ports of origin – industry players have little choice but to support these efforts to inspect, monitor or even detect suspect containers and vessels. The concepts of 'better be safe than sorry' and 'prevention is better than cure' should not be seen as mere clichés and must be adapted as an organisational culture in the maritime industry.

Core to the protection of ports and their personnel and assets against threats is intelligence – solid, reliable intelligence that can be useful in assessing security risk and putting in place appropriate measures to counter the 'threat'. There must be full cooperation amongst the parties involved – from intelligence agencies to port operators, from security enforcement bodies to port users. 'Smart intelligence' must be collected, analysed, interpreted, recorded, shared, used and acted upon effectively among maritime security stakeholders. A common, interoperable framework must be put in place to enable the many players involved in port security to cooperate on collecting, analysing, sharing and disseminating material data and information on which security response can be made. Port operators and other players in the supply chain must be convinced that it is in their collective interest to work together within a mutually acceptable organisational framework that can facilitate the sharing and rapid exchange of data and intelligence.

Adequate resources must also be readied to enable them to procure the necessary equipment and systems and also to provide, put in place, and train personnel to secure ports. Help in the form of government grants like that provided by the US Government via the Department of Homeland Security to boost security at US ports, is essential to help assuage the burden of providing extra security on the shoulders of port operators and owners. Assistance in cash and in kind should also be extended to ports in developing countries that do not have access to the kind of resources available to ports in developed nations in order to boost their security. Such help would relieve port operators of the need to impose security surcharges on their users and would help facilitate the smooth flow of global trade.

The key to setting up such a framework for cooperation, and to undertake the challenging task of monitoring ships, cargo, vehicles and personnel going in and out of ports is the use of technology. Cost-effective and proven technologies already effectively used in activities such as notification of arrival of ships, pre-clearance of cargo before arriving at

ports, inspection of cargo, submission and verification of manifest and documentation, and checking of personnel going in and out of ports must be optimally utilised and enhanced to secure ports from the manifold threats they face. Technologies such as gamma ray, biometrics, global positioning system (GPS), radio frequency identification (RFID) and long-range identification and tracking (LRIT) systems must be continuously harnessed to develop effective security response based on risk assessment as used in measures such as the CSI. This stands a better chance to work effectively and to gain acceptance by port users as opposed to a 'needle in the haystack search' approach to be deployed in a measure such as the SFI container inspection program.

Business Unusual: Balancing Security and Supply Chain Imperatives

Although steps have been taken to secure ports from the multiplicity of threats they face, there is a notable apprehension on the efficacy of security measures put in place since 11 September 2001 to protect these critical facilities. Despite the best of intentions and the meticulous approach by security agencies to improve security at ports from direct attacks and from being used as conduits for terror attacks, there is no guarantee that determined terrorists would not be able to evade these measures. Even with the forward deployment of security officials at ports of embarkation, increasing multilateral efforts to secure seaborne trade, the use of state-of-the-art technology, the increase in the number of port security personnel and many other efforts to boost port security, there is just no telling when, where and how terrorists can strike.

As the span of seaborne trade and the maritime supply chain, where ports provide a central focus where ships and cargo converge, extends to a global scale, the efforts to secure ports from potential attacks should be on a multilateral basis. While efforts put in place thus far are admirable, the current piecemeal approach to securing ports and the maritime supply chain lacks cohesion and even the consensual support of all parties. Only when measures introduced can garner the support of those affected, can they be built and maintained on a strong basis, and thus stand a good chance of being implemented efficiently and in a sustainable manner. Emphasis must also be given to rally those along the supply chain to shore up security on their end of the chain and to assist those who lack the resources to do so.

Every single party along the length and breadth of the maritime supply chain must accept that the security of their component in the chain assists the security of all along it. A 'door-to-door' approach to security is essential in ensuring that ports and other components along the supply chain are secured from terrorist threats and from being used to facilitate terrorist attacks. From the point of origin of cargo to its final destination, the focus on security – on the cargo itself and on the processes, procedures, documentation, equipment, vehicles and personnel involved – must be relentlessly pursued. A single gap could allow an attack, resulting in chaos and carnage – not only

in economic terms but in the cost of human lives and the traumatic impact of terror attacks – to a world already driven to paranoia by the looming threat of terror.

That said, port stakeholders must find a balance between meeting the need for ports to serve the supply chain and to protect these critical trade facilities from security threats. Port operators must remember the role of ports as an enabler of global trade and a key player in ensuring the smooth running of the supply chain. At the same time, they need to be buttressed from attacks that can obstruct their operations and hinder the flow of global trade. Finding equilibrium between the two imperatives – and worrying about the economic consequence of attacks on ports – will set to shape the landscape of maritime security and supply chain management in the years to come.

Notes

1 United Nations Conference on Trade and Development, *Review of Maritime Transport 2006*. Geneva, 2006, p. 4.

2 In 2001, security personnel in Italy found a suspect they believed to be aligned with Al Qaeda hiding in a shipping container equipped with a bed and makeshift bathroom. The Egyptian-born Canadian man was reported to have with him a passport, a laptop computer, cell phones, airport maps and security passes for airports in three countries. The container originated from Egypt and was headed for Toronto.

3 For example, shippers in Hong Kong Port were critical of plans by terminal operators to impose a security levy on each import and export box. They argued that it was unfair for ports to pass the security costs to them as they already had to bear the brunt of such measures through inconveniences such as cargo delays. Australian shippers have also cried foul over the lack of transparency in Australian container terminals' imposition of security fees and ocean carriers' ISPS ship fees. The shippers have accused ports and shipping lines of using the charges as a component of their revenue-enhancement strategy and as a smokescreen to cover the ports' and carriers' own security costs.

4 Among the most vocal opposition of the proposal has come from the powerful Global Shippers Forum – which carries an estimated 90 per cent of the world's trade – the Asia Shippers' Council, Japan Shippers Council and the European Shippers Council. This is not surprising as shippers stand to be the hardest hit by this initiative as they will likely have to bear the increased costs imposed by shipping lines as a result of the more stringent inspection of cargo at ports. No less than the US National Industrial Transportation League cautioned that the use and reliance on scanning ocean containers will create a false sense of security, contradict with the goals and objectives of the 9/11 Commission and create disastrous consequences for trade between the United States and its major trading partners.

5 Based on 130,000 ship calls at the port in 2005. Retrieved on 20 September 2007, available at: <http://www.sedb.com/edb/sg/en_uk/index/why_singapore/singapore_facts__.html>.

6 Port of Singapore Annual Report 2006, retrieved on 19 September 2007, available at: <www.internationalpsa.com>.

7 'Singapore firm PSA says 2006 profit up 14 pct'. Reuters Online. 5 March 2007, retrieved on 24 September 2007, available at: <http://uk.reuters.com/article/oilRpt/idUKSIN19705020070305>.

8 Multimodal transport involves the movement of goods from the producer to the consumer by a single entity, using at least two different modes of transport on a single transport document.

9 Lloyd's Market Association, is an insurance trade association based in London acting for its members in the Lloyd's underwriting market. Lloyd's is the world's leading insurance market providing specialist insurance services. It listed the Malacca Strait as a 'war risk zone' following recommendations by a private defense consultant, Aegis Defence Services, which carried out risk assessments on the area and suggested that it was a potential site for a terrorist attack. The list was revoked in after strong protestations from the governments of the littoral states, shippers and the shipping industry.

10 Such bomb carrying radiological dispersal device is cited as among one of the serious threats that can be posed by terrorists. See B Blair, 'What if terrorists go nuclear?', available at: <www.cdi.org/terrorism/nuclear-pr.cfm>.

11 H Rosoff, and D von Winterfeldt, 'A risk and economic analysis of dirty bomb attacks on the Ports of Los Angeles and Long Beach', *Risk Analysis*, 27(3), 2007, p. 543.

12 'Terrorist attack on LA-area ports could cost economy $34 billion', *Associated Press*, 22 August 2007, retrieved 20 September 2007, available at: <www.nctimes.com/articles/2004/08/22/news/state/8_11_158_22_04.txt>.

13 'Plan for aftermath of attacks, ports told', *Oakland Tribune*, 28 June 2006.

14 ABT Associates Inc, 'Executive summary', *The economic impact on nuclear terrorist attacks on freight transport systems in an age of seaport vulnerability*, Contract #DTRS57-03-P-80130, 2003, retrieved on 15 September 2007, available at: <www.abtassociates.com/reports/es-economic_impact_of_nuclear_terrorist_attacks.pdf>.

15 T Saywell, 'Shipping news', *Far Eastern Economic Review*, 17 October 2002.

Abu Sayyaf and its Capability to Threaten Energy Sea Lanes

Eduardo Ma R Santos

Sea lines of communication connect the countries of the world. During peace, these ocean routes serve as commercial trade routes; in time of war, they become strategic lines of communication. The world's seven major sea lines: the North Atlantic, the South Atlantic, the North American-South American, the Eurasian, the North Pacific, the South Pacific, and the Cape of Good Hope are all relevant to the Asia-Pacific region. In terms of ship movements, the seas in the Asia-Pacific region are among the busiest in the world. The Asia-Pacific region has two significant sea lines of communication, one passing through the China Sea to the Indian Ocean and the Middle East, the other passing through the East China Sea and the Sea of Japan to the Pacific Ocean and the Pacific Coast of the United States and Canada.

International sea lanes through Southeast Asia are equally important to the economic and political well-being of billions of people throughout the world. In Southeast Asia, the first sea lane is the Malacca Strait, which is the main passage between the Indian Ocean and the South China Sea. The Malacca Strait and the Strait of Singapore are considered to be the busiest waterways in the world. The second sea lane is the wider and deeper Lombok Strait, which is less congested than the Malacca Strait and quite often is used as an alternative passage for the largest tankers transiting between the Persian Gulf and Japan, and is considered the safest route. The third sea lane is the 50-mile long Sunda Strait, which is another alternative route to the Malacca Strait, but due to its strong currents and shallow waters, it is not used by deep draft ships. The largest regional sea lane is the South China Sea, stretching 1800 nautical miles from Sumatra to Taiwan, including the sea lanes connecting Northeast Asia, Southeast Asia and the Middle East.

More than half of the world's international shipping fleet tonnage passes through the Malacca, Sunda and Lombok straits, with the majority continuing onto the South China Sea. Tanker traffic through the Malacca Strait leading into the South China Sea is more than three times greater than traffic through the Suez Canal, and well over five times more than that using the Panama Canal.

The large volume of shipping in the South China Sea/Malacca Strait littoral has created opportunities for attacks on merchant shipping. In 1995, almost half of the world's reported cases of piracy occurred in this area. In recent years, incidents of piracy have reduced significantly; however, Indonesian waters and the Malacca Strait still recorded the most number of cases.

In the aftermath of the 11 September 2001 terrorist attacks on the US, there were growing concerns that the global energy traffic, particularly in the Middle East, could become the focus of terrorist attacks: it was discovered that Osama Bin Laden identified energy facilities as targets in his war against the West.[1] The arrest in November 2002 of Abd Al-Rahim Al-Nashiri, identified as Al Qaeda's operational commander in the Arabian Gulf region and an alleged specialist in maritime operations, pointed to plans to attack shipping targets.[2]

This paper will examine the capability of the Philippines-based Abu Sayyaf Group (ASG) to threaten the vital energy sea lanes, the lifeline of global economic development and stability.

Evaluating Abu Sayyaf Group Capabilities

Brief History

The Abu Sayyaf Group (ASG), meaning 'Bearer of Sword' or also known as Al-Harakatul Al-islamiyah, traces its beginnings to the 1980s with the revival of Islamic fundamentalism in Mindanao. It was spearheaded by the 'Jamia-Atul Al Islamic Tabligh', an association for the propagation of Islam.[3]

In 1989, a small group broke away from the Tabligh and formed the 'Mujahideen Commando Freedom Fighters', now known as the ASG. The eight Tabligh members were led by Ustadz Abdurajak Abubakar Janjalani, who became the ASG's founding leader. Its core members consist of Filipino Muslim volunteers who joined the international Islamic brigade that fought in the Afghan resistance.

The ASG objective is to establish an Islamic state in southern Mindanao. Although the ASG's public aspirations may be limited to the Muslim areas of the southern Philippines, some believe its real desire is of a much grander magnitude; they have ambitions for establishing a Pan-Islamic State extending to all of Muslim Southeast Asia, including neighbouring Malaysia and Indonesia.

The ASG gained prominence in 1991 when it bombed the foreign missionary ship, MV *Doulos* in Zamboanga City. Since then, the ASG has perpetrated a series of high-impact terrorist activities, notably bombings in southern Mindanao and in Metro Manila. However, it is in its conduct of kidnap-for-ransom activities that the group gained international notoriety. Kidnapping, aside from extortion/piracy, has become a profitable undertaking for the group to sustain its operations.

The series of terrorist attacks prompted the Philippines Government to launch an all-out offensive against the group, leading to the capture of its main stronghold - the Camp Al Madina complex in Isabela, Basilan on 11 May 1993; causing the ASG to conduct a recruitment drive to rebuild its forces.[4]

However, after the death of its founder and spiritual leader in an encounter with government troops in October 1998 in Lamitan, Basilan, the ASG suffered a leadership vacuum and members became disgruntled. Janjalani's younger brother Khadaffy Janjalani took over as leader in 1999, and this saw the ASG's transformation from a rebel group with political and religious aspirations to a purely terrorist organisation.

In its early years, the ASG directed its terrorist activities against Christian missionaries and civilians, aside from government troops, in line with its religious aspirations. However, the last few years saw it metamorphose into a ruthless and merciless criminal group that not only killed Christians but also Muslims as well, including the decapitation or mutilation of their bodies. This kind of attack bespeaks of the group's barbarity, and demonstrates they mean business.[5]

The ASG's preoccupation with kidnap-for-ransom, however, has alienated it from Al Qaeda and Jemaah Islamiyah because such activity is contrary to the ASG's beginnings as an Islamic fundamentalist group that advocated Jihad in pursuit of religious ends. To regain the support of Al Qaeda and other like-minded foreign groups, the ASG returned to its Islamic roots. Since 2003, it has sustained its posturing as an Islamic group along the model of Jemaah Islamiyah by focusing on bombings and other armed activities in Mindanao and Metro Manila. However, it has not completely abandoned its trademark kidnap-for-ransom operations, which it continues to pursue along with other criminal activities to generate money and resources.

The kidnapping of civilians from tourist resorts prompted an intensified effort by the government to neutralise the group. In continuous military operations against the ASG in Mindanao, government troops were able to neutralise several key leaders, including former ASG spokesman Aldam Tilao (also known as Abu Sabaya).[6] Under the auspices of the Republic of the Philippines (RP)-US visiting forces agreement (VFA), US troops supported Filipino soldiers in the counter-terrorism campaign through provision of technical support and equipment as well as technical advice in the conduct of anti-terror operations.

In August 2006, the military launched an operation called OPLAN ULTIMATUM, to hunt down ASG leader Khadaffy Janjalani and two foreign militants/jihadists: Dulmatin and Omar Patek, who sought refuge in the country and were both wanted for the 2002 Bali bombing. The operation resulted in the deaths of 31 ASG members including Khadaffy Janjalani and Jainal Antel Sali (also known as Abu Solaiman) and the capture of six camps in Indanan, Parang and Patikul, Sulu. Khadaffy Janjalani was reported killed on 4 September 2006, with his body exhumed on 27 December 2006, and his death confirmed on 20 January 2007 after DNA testing by the US Federal Bureau of Investigation. The Armed Forces of the Philippines (AFP) also launched OPLAN ULTIMATUM II, as the second phase of its war against the ASG, involving a humanitarian mission aimed at rehabilitating the war-ravaged areas.[7]

Following the death of Khadaffy Janjalani, a straw vote was reportedly taken sometime in May or June 2007 to select the new ASG leader: Yasser Igasan, a Syrian-trained Islamic scholar, widely believed to have close associations with foreign jihadists (he was chosen because of his religious background).[8]

A History of Seaborne Activities

The ASG has a history of seaborne activities that demonstrate its reputation as a ruthless terrorist and criminal group. The significant seaborne activities of the ASG over the past few years include:

- A seaborne raid on the Sipadan Beach resort in Sempurnah, Sabah, Malaysia on 23 April 2000 where 21 foreigners were abducted. The 11 masked men were onboard a Jungkong boat powered by 2200hp engines, and equipped with rocket propelled grenades, M16 rifles and AK-47 rifles; they took the victims to Sulu. The distance between Sipadan and Sulu is approximately 200 miles which reflects the group's ability for long distance operations. This was followed by the abduction of resort workers and, later, several journalists and mediators. The kidnappers also issued political demands including a separate Muslim State and an inquiry into alleged human rights abuses in Sabah and the restoration of fishing rights. After receiving ransom payments estimated at US$6 million, most of the hostages were released.[9]
- In another raid at the Pasir Dive resort in Pandami Island, Sabah, Malaysia on 10 September 2000, three Malaysians were kidnapped and taken to Sulu.[10]
- Twenty four ASG members aboard a large 'kupit-type' watercraft abducted 20 people including three Americans and three personnel from Dos Palmas Beach resort in Honda Bay, Puerto Princesa City, Palawan on 21 May 2001. They demanded a ransom for the release of the hostages, and beheaded one of the American captives and held the other two Americans hostage in Basilan.[11] Significantly, the distance between Dos Palmas Beach and Basilan is 300 miles.
- Ten ASG members on board two motor-bancas raided the luxurious Barcelo Pearl Farm and Beach resort in Samal Island, Devao Del Sur on 22 May 2001, murdering two resort workers and wounding three others.[12]
- The Singaporean tugboat *SM88*, while towing the barge *Taboroy*, was hijacked in the waters between Capual Island and Bitinan Islands, Sulu on 17 June 2002 by eight men onboard three watercraft, taking the hostages to Jolo, Sulu.[13]
- About eight to ten armed men onboard a twin-engine speedboat kidnapped one Indonesian and two Malaysian crew members of the tugboat *East Ocean-2* in the vicinity of Linkian Island, Sabah, Malaysia on 11 April 2004. They left

seven other crewmembers unharmed but took the hostages in the direction of Baguan Island, Turtle Island group, Tawi-Tawi.[14]

- The ASG claimed responsibility for the bombing of the local ferry vessel MV *Superferry 14* in the waters of Manila Bay on 27 February 2004, where some 116 people died in the Philippines' worst terrorist attack and the world's deadliest terrorist attack at sea. The bomb was 4kg of TNT stacked in a television and placed on board the vessel. Ninety minutes out of port, the bomb exploded killing 63 people instantly with 53 others missing and presumed dead. The ASG demanded protection money from the vessels' owners before the incident.[15]
- Another highjack involving 10 ASG members onboard a speedboat victimising two Malaysian tugboats in the vicinity of Mataling, Sempornah, Sabah, Malaysia on 20 March 2005 where six crewmen were taken hostage. Three of the abducted crew managed to escape, while the three remaining crewmembers were taken to Sipangkot Island, Sitangkai, Tawi-Tawi.[16]
- The MV *Doña Ramona* was bombed while docked at the port of Lamitan, Basilan on 28 August 2005; the bombing was caused by an improvised explosive device, a trademark operation of the ASG.[17]
- In 2004, a report was monitored on a plan to kidnap foreigners and officials from an oil rig located at Linkian Beach, Sabah, Malaysia. Eighty ASG members armed with 0.50 calibre machine guns, recoilless rifles, and other high-powered firearms planned to launch the attack using four speedboats.

Current Strength and Capabilities

The ASG is one of the smallest but strongest of the Islamic separatist groups in Mindanao. Some ASG members have allegedly studied or worked in Saudi Arabia and developed ties with the mujahideen while fighting and training in the war against the Soviet invasion of Afghanistan.

The group was originally not thought to receive funding from any other group. However, the Philippine Government considers the ASG to be allied with Jemaah Islamiyah and notes that initial funding came from Al Qaeda through the brother-in-law of Osama Bin Laden, Mohammed Jamal Khalifa, laundered through regional Islamic charities. Continuing ties to Islamist groups in the Middle East indicate that Al Qaeda may be continuing its support.[18]

The ASG obtains most of its financing through ransom and extortion. One report estimated its revenues from ransom alone in 2000 to be between US$10-25 million. The US State Department also opines that the ASG may also receive funding from radical Islamic benefactors in the Middle East and South Asia.[19]

Following the Sipadan hostage crisis in 2000, the ASG received a large ransom in exchange for the release of its foreign hostages. They used part of the money to recruit additional members. They were also able to purchase additional weapons such as rocket propelled grenades, assault rifles, and equipment including satellite phones, handheld radios, sports-type motorcycles and high-speed watercraft.

Philippine military officials believe the ASG has been weakened due to OPLAN ULTIMATUM, with their strength decimated and their plans disrupted. However, the ASG has been devising new strategies to maintain their posture and meet the AFP challenge against them. They continue to maintain an evasive stance by seeking refuge in areas where they can easily establish contact with local residents and demand support from them. They also splintered into small groups to make their escape from the military easier and blend in with local inhabitants. Some ASG elements were thought to have sought refuge in other areas in Mindanao where they concentrated on recruitment, training and building up of their forces while continuing to plan a series of attacks in the region.

To ease the military operations against their comrades in Sulu, the ASG continued to plan terrorist activities, including bombings and assassinations in other parts of the country. They also continued to connive with foreign militant jihadists to conduct high-impact operations to show that they were still a force to be reckoned with: they continue to recruit, to replace their decimated strength.

In their current war with the AFP, the ASG renewed its ties with former allies, including radical elements of the Moro National Liberation Front (MNLF) and the Moro Islamic Liberation Front (MILF), seeking sanctuary in their respective strongholds. These groups have also developed a modus vivendi, using each other's strength in case of military operations against individual groups. To further sustain their operations, the ASG sought ties with some political warlords, to provide them with arms and other logistical support.[20]

Probable Threats to Energy Sea Lanes

The ASG has time and again shown its resiliency in spite of the hardships it has encountered, and in spite of pressures mounted by Philippine authorities to destroy it. For the moment, it is reeling from continuing government counter-operations. However, to offset its losses, it has intensified its collusion and tactical alliances with varied allied groups to include rogue MNLF and MILF elements, kidnap-for-ransom groups, foreign militant jihadists, lost command groups and even political warlords to support its survival and activities. Through these alliances, it is now trying to regroup and regain strength.[21]

Given its ability to survive and sustain its cooperation with the other groups, the ASG can still pose a formidable challenge against Philippine internal security and could extend its reach outside Philippine territorial jurisdiction.

Given its drive to show its Islamic posturing and regain prestige before its international benefactors, the ASG might be able to conduct high-impact operations against international shipping. Given its history of attacking foreign vessels for piracy or ransom, the ASG can still duplicate these feats by attacking more vulnerable targets such as oil tankers or liquefied natural gas (LNG) carriers.

When they regain their strength, their most probable course of action could be any of the following.

Hijacking. The ASG has the capacity to hijack foreign-owned vessels: there have been three instances of sea-jacking in the waters of Mataking, Sempornah and Linkian, both in Sabah, Malaysia and in the waters between Capul Island and Bitinan Islan, Sulu, where they hijacked four tugboats (three Malaysian and one Singaporean) and held hostage eight crewmembers for ransom. Tankers could be vulnerable to these operations as they are not armed.

Harassment. The ASG could block the passage of tanker traffic especially in their areas of operation, notably in the Sulu-Celebes Sea, as well as in the South China Sea where they are expanding their operations.

Attack. The ASG could duplicate the *Superferry 14* bombing by attacking other maritime targets such as supertankers. This could be done by using infiltrators to plant explosive materials, as was done in the *Superferry 14* incident. They could also fire upon passing carriers as they are also known to possess sophisticated weapons, such as rocket propelled grenades. Of late, they have acquired a sophisticated arsenal, by purchasing additional weapons to sustain their fight against government forces.

Attack Port Facilities. The MV *Andrea* incident demonstrated their ability to bomb targets while in port. They could duplicate this on moored vessels loaded with oil or LNG, which would give them an even higher international reputation.

Attack on Chokepoints. They could block chokepoints to pinpoint targets of opportunity, including tankers or LNG carriers.

Sabotage Operations. In the past, some ASG elements undertook scuba diving and underwater demolition training, for planned seaborne attacks both inside and outside the country. It is still possible the ASG could attack seaborne targets.[22]

For the moment, none of these scenarios are in the agenda of ASG current objectives. Nonetheless, knowing its ability to get out from crises situations, the ASG has the potential to threaten energy flows along vital sea lanes.

Assessment of Strength and Capabilities

The ASG falls under the category of an ethno-nationalist terrorist group. Originating from a small breakaway group of the MNLF, the ASG members endeavoured to project themselves as freedom fighters contending to carve an independent Islamic state in the southern Philippines, conducting atrocities garbed in wrongfully convoluted interpretation of the Islam religion. In view of its incessant terroristic attacks and even acts of barbarism, the group was labelled as a foreign terrorist organisation by the US Government in October 1997.[23]

The ASG has suffered formidable defeats with over a hundred members, key supporters and leaders either killed or captured. Nonetheless, the robust Islamist milieu shrouded by socio-economic crisis, in which the ASG operates, has enabled the group to replenish both its human losses, and its equipment and weapons.

To counter and evade the growing threat to it from the AFP, the ASG has transformed itself structurally, strategically and geographically. The ASG is regional in reach, from Mindanao to Metro Manila; multi-ethnic in composition, from Tausugs and Yakans in Mindanao to Tagalogs and Pangasinense Balik-Islams in Luzon; and enjoys diverse capabilities, access to resources, and multiple modus operandi.

The ASG preoccupation for the moment is its survival. To counter the intensive AFP operations against it, different tactics have been adopted to regain its strength and recoup its losses. Its present strength for now is ably provided by its intensive collusion with allies and other like-minded groups. Given the chance to recoup its losses and regain strength, the ASG remains a formidable challenge to world peace and the internal stability of the Philippines.

Notes

1 Gal Luft, and Anna Korin, 'Terrorism Goes to Sea', *Foreign Affairs*, November/December 2004.

2 'Tanker Terror: Gulf's Oil Routes Under Threat', *Jihad Watch*, 22 April 2004.

3 Larry Niksche, *Abu Sayyaf: Target of Philippine-US Anti-Terrorism Cooperation*, RL31265, Congressional Research Service, Washington, 25 January 2002.

4 Fe B Zamora, 'Al Harakatul Al Islamiya: The Beginnings of Abu Sayyaf', INQ7.net, 25 June 2001.

5 Al Jacinto, 'RP's Legacy of Terror - Special Report', *The Sunday Times*, 9 September 2007.

6 Kate McGeown, 'Is this the end for Abu Sayyaf?', BBC News/Asia-Pacific, 23 January 2007.

7 Jade Verde, 'Abu Sayyaf's Khadaffy Janjalani', *American Chronicle*, 13 June 2007. Embassy of the United States in Manila, 'Janjalani designated for leadership position in the ASG', From the Office of Public Affairs, 17 December 2004.

8 PIA Daily News Reader, Philippine Information Agency, September 2007.

9 Thomas Fuller, '20 kidnapped from Malaysian Resort Island', *International Herald Tribune*, 25 April 2000.

10 Rommel Banlaoi, 'Maritime Terrorism is Southeast Asia: The Abu Sayyaf Threat', *Naval War College Review*, Autumn 2005.

11 Alex Spillius, 'Americans among 20 hostages in resort raid', *The Telegraph*, available at: <www.telegraph.co.uk>, 5 June 2001. 'Filipino rebel group claim kidnappings', BBC News, 28 May 2001.

12 Jeffrey M Bale, *The Abu Sayyaf Group in its Philippine and International Contexts: A Profile and WMD Threat Assessment*, Monterey Institute of International Studies, Monterey Terrorism Research and Education Program (MONTREP), December 2003.

13 'Four abducted from tug in Philippines' *World Maritime News*, Marelink.com, 20 June 2002.

14 Haler Glang, 'Link seen in Borneo, Tawi-Tawi idnaps', *Manila Standard Today*, 25 April 2004.

15 Countryman and McDaniel, 'The Air and Ocean Logistics-Custom Brother Attorneys, On the Scene in the Philippines', *The Cargo Letter*, March 2004; 'Superferry 14 fire was Sabotage', Safety at Sea International, November 2004; Aaron Favila, 'The Return of Abu Sayyaf', *Time*, 23 August 2004.

16 'Foreign gunmen kidnap three from Malaysian tugboat', Daily Collection of Maritime Press Clippings 2005-082, 31 March 2005, p. 4.

17 Al Jacinto, 'Suspect in Sipadan Kidnapping Arrested in Basilan', *The Daily Terrorist Round-Up*, Free Republic, September 2, 2005; Shipping News: Passenger Ship, Cruise News and Shipping Reports from Around the World, *Maritime Matters*, August 2005.

18 'The Perpetrators Lives Destroyed: Attacks on Civilians in the Philippines', *Human Rights Watch*, July 2007.

19 'Terrorism Update: The Philippines and Terrorism', *Anti-Defamation League*, April 2004.

20 Culled from reports of the Armed Forces of the Philippines.

21 International Crisis Group, *Philippines Terrorism: The Role of Militant Islamic Converts*, Asia Report No. 110, Jakarta/Brussels, 19 December 2005.

22 Rollie Lal, Brian A Jackson, Peter Chalk, Farhara Ali, and William Rosennau, *The MIPT Terrorism Annual 2006*, National Memorial Institute for the Prevention of Terrorism.

23 Office of the Spokesman, 'State Department Identifies 28 Foreign Terrorist Groups', US Department of State, Washington, 5 October 2001, available at: <usinfo.state.gov/is/Archive_Index/State_Department_Identifies_28_Foreign_Terrorist_Groups.html>.

The Impact of a Bio-terrorist Attack on Shipping and Potential Remedial Measures

Lewis R Brown

Biological warfare is the premeditated use of one or more biological agents in warfare, while bio-terrorism is the use of one or more biological agents in terrorist activities. Biological warfare is a state-supported activity, that is, the perpetrator is a country, whereas bio-terrorism is not and it can be the action of an organisation, such as Al Qaida, a cult, or simply an individual. Furthermore, biological warfare can be used against humans, livestock, or plant crops while bio-terrorism is almost exclusively employed against humans. Disease is a large killer of humans, but the difference between biological warfare or bio-terrorism and naturally occurring disease is premeditation.

Natural Disasters

Historically, the most devastating disease events in human history have been naturally occurring.

- The Black Death (*Yersinia pestis*) in the 1340s is thought to have been bubonic plague spread by fleas and rats, originating in Central Asia and spread via trade routes into Europe and the rest of the world. The disease devastated the larger cities of Europe, as their unsanitary conditions enabled quick transmission of the disease. It is estimated that 20 million people died in Europe and 75 million worldwide.
- Smallpox (*Variola*) devastated the cultures of Mexico in the 1500s. When Cortez went into Mexico in 1517, one of his soldiers had the disease. This led to the infection of the Aztecs and killed half of the population (3,500,000 individuals); leading to the demise of the Aztec Nation.
- The cholera (*Vibrio cholerae*) outbreak that began in 1816 was a pandemic (a worldwide epidemic) that started in India and spread over decades via sea and land trade routes through Russia, on to Western Europe and then North America.
- The measles (*Rubeola*) outbreak in 1875 was smaller and occurred when the son of the king of the Fiji Islands contracted the disease in Australia. On his return home, a quarter of the population of the Fiji Islands became infected and died because they were relatively isolated and, as a consequence, had never been exposed to measles and thus had no immunity to it.

- The most devastating pandemic of all was the Spanish Flu pandemic in 1918-19, which was first found in the United States and then quickly spread around the world. Over a third of the world's population had the flu and it killed millions of people; in India alone, they lost 20 million people.

Premeditated Use of Disease

Biological warfare is not a new innovation and has been used periodically for thousands of years. For example, during the 11th century Crusades, bodies of people who had died (not killed in battle) were catapulted into walled cities on the theory that the 'evil spirits' that caused the death would leave the dead body and enter the bodies of the inhabitants of the city. Obviously, it was not 'evil spirits' that killed the individuals but rather disease-producing micro-organisms. Nevertheless, the result was the same.

When Jeffery Amherst came to America in 1763, the British were having difficulties with the native Indians, so he gave the Indians blankets and towels deliberately laced with smallpox and over two million Indians died. This was particularly effective against the Indians since they had never been exposed to smallpox and consequently there was no resistance to it in the population.

Bio-terrorism

Bio-terrorism, on the other hand, is a modern use of disease microbes to either retaliate for a perceived wrong, to create havoc in a population, or help achieve a particular goal. The latter was the first case of a bio-terrorist attack in the United States where the Rajneeshee cult attempted to spread *Samonella typhimurium* in restaurant salad bars to sicken the local residents of the area so they would not be able to vote in local elections, and thus the cult could elect their own people to office. This occurred in The Dalles, Oregon in 1984, and although 750 people were affected, no one died and the effort failed. Interestingly enough, it was over 12 months later before it was realised that this was actually a bio-terrorist attack.

You may remember the more recent Sarin attack in a Japanese subway by the Aum Shinrik Jo cult. While this was a chemical attack, the same cult attempted to disseminate botulinum toxin in downtown Tokyo and anthrax (*Bacillus anthracis*) spores at the Imperial Palace. They also staged unsuccessful attacks on the American naval bases at Yokohama and Yokosuka.

In both warfare and terrorist attacks there is an option of whether to use a nuclear device, a chemical agent, or a biological agent. Each has its advantages and disadvantages as shown in Table 1.

Characteristics	Nuclear	Chemical	Biological
Area affected	75-100 sq miles	100 sq miles	34,000 sq miles
Lethality	98 per cent	30 per cent	varies
Residual effect	6 months	3-36 hours	varies
Time for effect	seconds	seconds-minutes	hours to days
Property damage	all in 36 sq miles	none	none
Variation	little	wide	wide
Covert application	little	some	great
Detection	simple	effective and rapid	difficult and slow
Medical countermeasures	little	good if quick	some
Trigger retaliation	yes	yes	doubtful if covert
Capital costs	very expensive	somewhat expensive	inexpensive

Table 1: A comparison of nuclear, chemical and biological weapons

Another important factor when considering the threat of bio-terrorism is what it costs to produce the 'weapon'. If you are going to use chemical weapons to take care of a square kilometre area, it would cost you 600 times as much as it does if you use biological agents. If you are going to use nuclear weapons it's going to cost you 800 times as much as biological weapons or if you are going to use conventional weapons, such as guns and explosives, it will cost you 2000 times as much. As someone has so aptly stated - a biological weapon is a poor man's nuclear bomb. This is evident when examining the weapon to cost ratio in Table 2.

Weapon	Cost (US$)
Biological	1
Chemical	600
Nuclear Weapons	800
Conventional Warfare	2000

Table 2: Cost ratio of biological, chemical, nuclear and conventional warfare to effect one square kilometre area

Biological agents have the greatest value for covert application, and it may take considerable time to determine that an attack has actually occurred. This was the case with the Legionnaires' disease (*Legionella*) outbreak after an American Legion convention in July 1976. It actually took months to identify the cause of the disease and determine that it was not a bio-terrorist attack.

Responding to an Attack

There have been a number of simulated attacks carried out in the United States to assess how well we are equipped to handle a terrorist attack. For example, a simulated biological attack in Denver in 2000 resulted in an out-of-control epidemic of pneumonic plague (*Yersinia pestis*). As a result of the test it was found that there were problems in diagnosing the mysterious disease and delivery of medication to treat the illness, in addition to other key problems such as quarantining certain areas, restricting access to that area and, obtaining food supplies. In a simulated chemical-weapons attack using mustard gas in Portsmouth, New Hampshire, in 2000, it took an exceedingly long time for the 170 'victims' to receive treatment.

In an actual case in New York in 1999, a neurological illness was misdiagnosed as St Louis encephalitis instead of West Nile virus and a total of 62 individuals were infected and seven of those died. In spite of the misdiagnosis, elaborate steps were taken to eliminate the carrier of the disease, mosquitoes, in New York City. Nevertheless, the first epidemic of the West Nile virus in animals in the Western Hemisphere began.

Infection Rates

The question arises as to which organism would be the best for a specific terrorist mission. Table 3 lists several of the more common disease-producing organisms that are potential bio-terrorist options. As noted, there is a considerable difference in the number of organisms required to infect a person and the number depends, not only on the virulence of the microbe, but also the immune system of the individual.

Disease	Number to infect
Anthrax	20,000
Plague	3000
Brucellosis	1300
Cholera	100
Tularemia	25
Q Fever	1
Ebola	a few
Smallpox	a few
Yellow Fever	1 to 2
Botulinum Toxin	< 11μg

Table 3: Number of micro-organisms required to infect humans for some potential bio-terrorist agents

The number of organisms required to infect an individual obviously vary with the agent involved. The Ebola virus only requires a few organisms to infect an individual; cholera only takes 100 organisms, the plague 3000 organisms and anthrax 20,000 organisms. The botulinum toxin requires less than 11ug.

Considering their use as a weapon, as little as one millilitre (20 drops) of cholera cells could infect 10 million people, with one drop able to kill 500,000 people; while one gram of botulinum toxin could kill eight million people. Botulinum toxin in solid form would kill the following numbers: 1 gram (8,000,000 people), 0.01 gram (80,000 people), and 0.001 gram (8000 people).

Another very important characteristic of the infectious agent is whether or not it is contagious. In some bio-terrorist activities a highly contagious agent would be desirable while in other cases, it may not be such a desirable characteristic. For example, if the biological agent is to be employed on the front lines in a war, a contagious agent would not be the organism of choice since ones own troops could be infected.

Incubation Periods

Still another important characteristic of the infectious agent is the length of the incubation period, that is, the length of time from infection until symptoms appear. Table 4 shows that there is a difference in the incubation period for different pathogens and in each case the length of the incubation period depends upon the virulence of the specific strain of the pathogen as well as the immunity of the individual.

Disease	Causative Agent	Incubation Period
Anthrax	Bacteria	5-14 days
Brucellosis	Bacteria	1-3 weeks
Cholera	Bacteria	1-5 days
Plague	Bacteria	1-4 days
Tularemia	Bacteria	2-4 days
Q Fever	Rickettsia	10-28 days
Rocky Mountain Spotted Fever	Rickettsia	2-14 days
Typhus	Rickettsia	5-23 days
Dengue Fever	Virus	3-6 days
Flu	Virus	7-10 days
Smallpox	Virus	1-12 days
Yellow Fever	Virus	1-6 days

Table 4: Incubation period for some potential bio-terrorist agents

The length of the incubation period is of special importance for it means that a suicidal terrorist could infect themselves and then infect thousands of people in airports, sporting events, or anywhere large crowds are present before ever showing any sign of a disease. Furthermore, the terrorist could travel to numerous cities before the symptoms appeared, thus, one individual could spread the disease to many different people in widely scattered places and escape before symptoms began to appear in the victims.

Potential Bio-terrorism Agents

Now let's look at some of the diseases that are potential bio-terrorism agents. One of the most familiar agents is anthrax. It is not considered a contagious disease, that is, one that spreads from person to person, but it does affect people and there are basically three kinds of infections, depending upon where it gets into the body. One place is the skin, which is the most common, but this infection has a very low mortality. If you ingest the organism, there is about 25 per cent mortality, while if you inhale it into the lungs, the mortality rate is almost 100 per cent. Importantly, there is a five-day incubation period, which means that when you get the anthrax organism, it is going to take five days until the symptoms appear and then death usually follows because the symptoms are caused by the toxin that is produced, not by the organism itself. But there is now an antitoxin that will neutralise the toxin and if the antitoxin is given soon enough, the disease is no longer fatal. Therefore, if the antitoxin is available quick enough we can prevent the disease in most of the people. Antibiotics can then be administered to kill the organism and prevent more toxins being produced.

Plague is a highly contagious disease with an incubation period of 1-4 days. It can be spread through inhalation, but once again, if we respond quickly enough by getting an antibiotic to the exposed individuals prior to the development of symptoms, we can prevent the disease.

Another potential bio-terrorism agent is cholera. It is highly contagious and has an incubation period of 1-5 days. The portal of entry into the body is through the mouth but, once again, if we get antibiotics to the individual that has been exposed quickly, we can prevent the individual from getting the disease.

There are a lot of food-borne diseases, such as *Salmonella*, *Shigella*, *Vibrio* and *Campyloacter* that can be employed as bio-terrorism agents. These are very common diseases that cause about 325,000 hospitalisation a year, 76 million illnesses a year, with incubation periods that range from hours to days.

Botulism is a disease caused by the ingestion of the botulinum toxin, and it is the most toxic substance known to man. After ingestion, the symptoms begin to appear in 6-36 hours. A dose the size of one hundredth of an aspirin tablet could kill 50,000 people. The toxin is stable in uncooked food but is destroyed by heat (80°C for 10

minutes). There is an antitoxin available and if given early enough, the disease can be prevented.

Potential Impact on the Shipping Industry

The length of the incubation period has special significance to the shipping industry since there is no way at the present time to identify an infected crewmember. There is, however, a bright side to the fact that there is an incubation period, since many diseases can be prevented or at least minimised if treatment is started before the infection takes hold. Logically, the bio-terrorist should be the first one to show symptoms of the disease and if treatment were available, the remainder of the crew might be prevented from developing the disease. If the terrorist had been immunised against the disease, he or she would not contract the disease and another member of the crew would be the first to show symptoms. Normally, the first person to show symptoms would be someone with a compromised immune system, such as someone with AIDS or a transplant victim who is taking immunity-suppressing drugs.

It would be unrealistic to have treatments for all potential diseases available on every ship, but with the proper communication system, the necessary treatment materials could be made available very quickly, provided, of course, that the specific disease were known. Therefore, it would seem a logical solution to establish centres at strategic places around the world to which ships could communicate in the event of a suspected bio-terrorist attack. More specifically, it would be desirable to have both audio and visible communication capabilities. These centres would house an expert in diseases who could help diagnose the disease in question and immediately send the recommended treatment materials to the ship and arrange for support personnel to help secure the ship. After the ship is secured, plans for decontaminating the ship must be formulated and put into action. There have been a number of episodes where passenger ships have had large numbers of passengers experiencing food poisoning and apparently the ships have been satisfactorily decontaminated. However, in the case of some diseases, special measures must be employed. For example, the recent anthrax attack in the United States required a much more rigorous decontamination procedure in the office buildings involved. Even more difficult was the effort required to remediate Gruinard Island situated off the coast of Scotland, when in 1941, the British exploded a bomb containing anthrax spores in the air over this tiny island. Within days all 60 sheep placed on the island for the test were dead. Thirty years later tests showed that anthrax spores were still alive in the soil and it was not until 1986 that the island was decontaminated using a powerful brushwood killer; the brush was burned, and the soil was treated with formalin in seawater. Finally in 1987, sheep were able to live on the island without contracting anthrax.

Another possible bio-terrorist attack on shipping could be launched by subjecting the crew to an infected terrorist in bars and other places frequented by seafarers.

The terrorist would be infected but not showing any signs of the disease (during the incubation period) and there would be virtually no way to determine that the terrorist was spreading the disease. Under these circumstances the terrorist could then go and receive treatment and possibly not suffer any deleterious effects.

Using Bio-terrorism Agents

Unlike terrorism using chemical, explosive, or nuclear agents that can be found by screening, it is impossible to screen for biological agents if the terrorists have infected themselves and are in the incubation period where the symptoms of the disease have not yet appeared. The question arises as to where the terrorist can obtain the biological agent. If the terrorist chose to obtain a disease from a sick individual in the hospital or steal it from a laboratory, the exact nature of the disease would not be known to the terrorist and could well be of limited value in disrupting shipping. Therefore, in order to be effective in creating a problem to shipping, the terrorist must have a connection to a group, such as Al Qaida, to obtain the most appropriate agent for the anticipated job. Furthermore, the intent of the attack would dictate what particular agent would be the most appropriate. If the desired result is only to create havoc or panic in a given population, many options are available. However, if the intent of the terrorist were to infect themselves and not show symptoms before disembarking, the result would be open to speculation since the incubation period would vary depending upon the virulence of the organism and the resistance of the host. On the other hand, if the intent were to kill the crew, another agent, such as botulinum toxin would be more appropriate. In this case the problem would be to get the agent on board but this would not be an especially difficult task at the present time since only minute quantities of the agent are required.

Currently four of the most likely biological agents to be employed in bio-terrorist activities are anthrax, plague, food poisoning and, botulinum toxin.

- By far the most publicised biological agent is anthrax, primarily because of its use in the United States in 2001. The organism causing anthrax is genetically stable, forms spores, and therefore can be stored for long periods of time. Although treatment is ineffective once the symptoms appear, the fact that it is not contagious and has a rather long incubation period, eliminates it as a desirable agent for use on ships.
- Plague, on the other hand, is a highly contagious disease, has a short incubation period, can be spread by inhalation, but can be effectively treated if treatment is given within the first 24 hours.
- One of the most attractive bio-terrorist agents is food poisoning that can be caused by a number of different organisms, can be totally incapacitating,

and can have an incubation period as short as a few hours. Lethality varies with the organism.

- Botulinum toxin is another agent that could be employed in shipping, can be essentially one hundred percent fatal, can manifest itself within hours, and is stable in uncooked food. The minute amount of this toxin necessary to kill an individual means that the amount necessary to kill an entire crew could be easily smuggled onboard a ship, since one gram is the amount of sweetener contained in an individual package of Equal, Splenda®, or Sweet'N Low. While botulinum toxin is technically a chemical, it is produced by a bacterium and therefore, is sometimes classified as a biological agent. Unlike most biological agents, botulinum toxin can be stored for a long time without deteriorating if it is encapsulated.

One of the questions facing potential bio-terrorist is how to disseminate the biological agent other than by infecting oneself. For warfare purposes, inhalation would be the method of choice and could be accomplished in a number of ways. Explosive bomblets or spray tanks would be possibilities, but since the biological agent must remain viable, the bomblets must not generate much heat since many micro-organisms are easily killed by heat. Spraying is an extremely effective means of disseminating biological agents as exemplified by the spraying of fluorescent particles from a ship 9.9 miles offshore as shown in Table 5.

Category	Amount
Weight	440 pounds
Particle Size	2 microns
Trip Length	150 mile boat trip
Distance from Shore	9.9 miles
Area Covered	34,749 square miles
Particles Inhaled	15-1500 particles per minute

Table 5: Aerosol dispersion of fluorescent particles

On the other hand, for covert operations, distributing the biological agent through the air conditioning system could be employed if inhalation is the chosen method of dissemination. If the intent of the terrorist were simply to disrupt shipping it would also be quite easy to place the biological agent in the air conditioning system in bars frequented by seafarers. In this instance the purpose would not be to target a specific ship but rather create havoc in the shipping activities in a specific area of the world.

Another aspect of the problem of biological warfare or bio-terrorism is the potential to produce new germs. Through the use of genetic engineering and other scientific

techniques, new microbes with new characteristics can be made. To do this trained specialists are required and, unfortunately, many individual scientists are potentially available from Russia and Iraq, which are two countries known to have worked on developing new agents in the past. This creates an extremely difficult situation to overcome because a new microbe can be produced in one-tenth the time it takes to develop a preventative or treatment for the ailment the new germ can cause.

Mitigation

Considering how a bio-terrorist attack could take place against shipping, a highly virulent food-borne disease could be employed to incapacitate the crew of a ship quickly. Notwithstanding the type of disease, an individual could be infected when they board a ship but not show any of the symptoms of the disease at the time.

Let me emphasise that it is impossible to prevent a bio-terrorist attack on ships, but there are ways in which we can mitigate the damages of such an attack and prevent a catastrophe.

First, we need to have effective communication, not only between ships and ports, but also have available trained medical personnel who can evaluate symptomatology of seafarers on ships and give advice as to what to do until help arrives. They can also call for the immediate dispatch of testing equipment, antitoxins, antibiotics, etc.

Second, we need to have available at key location(s) in the area such things as testing devices to identify specific disease organisms and have available for immediate delivery necessary antitoxins, antibiotics, or other medical treatments. Many diseases can be prevented if antitoxins or antibiotics are administered in time. Some diseases can be treated within 24 hours and the Center for Disease Control and Prevention can ship antitoxin anywhere in the world.

The third requirement to prevent a disaster is to have personnel available so that they can be transported rapidly to a ship should the entire crew be affected by a disease. Consideration also must be given to the safety of this replacement crew.

Finally, plans should be in place to decontaminate stricken ships. Not only would it be worthwhile to have certain decontamination capabilities aboard ships but also more elaborate capabilities on shore ready for deployment.

The question arises as to how to prevent biological warfare and bio-terrorism. Numerous attempts have been made to resolve the issue diplomatically but none of the efforts have been successful. As early as 1925 the *Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare* evolved into a 'no first-use' treaty. The *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction 1972* also attempted to ban germ weapons, but many countries ignored

the treaty even though they were signatory to it. The use of germ weapons in warfare requires the ability to produce rather large quantities of the agent in question. In order to produce the quantities of the micro-organisms needed for this type of endeavour requires specialised facilities whereas only miniscule amounts of a given agent may be needed for bio-terrorist activities.

Unfortunately, it is evident that acts of bio-terrorism cannot be prevented so the question arises as to what countermeasures can be implemented to minimise the consequences of the attack. In general, there are basically three areas that need to be addressed. They are: a need to develop a rapid worldwide reporting system, a need to develop a rapid identification system for pathogens, and a need to develop new treatments for old and new diseases.

Specifically, the rapid reporting system would alert others to unusual diseases or to an unusual number of individuals with the same disease in a given area. Particular attention should be paid to people that are particularly vulnerable to contracting a disease, such as individuals with a compromised immune system. In the shipping industry it would be advisable to establish centres at strategic locations where the ship's captain could report any suspicious sickness aboard the ship and receive advice and council and, if deemed advisable, supplied with the necessary treatment materials and any other help needed.

The second major need is to develop rapid and accurate means of identifying the specific pathogen involved. Speed is absolutely essential in order to prescribe and treat the victims before symptoms are evident. Much progress has been made in developing techniques and instruments to identify micro-organisms. It is now possible to identify many micro-organisms in a matter of hours instead of days and advances are still being made to reduce the time required even further. It must be remembered however, that new germs can be created through the use of genetic engineering and this may require developing new methods to insure proper identification. Work is also in progress to develop methods to identify the origin of biological agents used by a bio-terrorist in order to help find those responsible for a given attack. For example, if the biological agent is to be disseminated by inhalation, the cells need to be treated to insure that they do not agglomerate since the particle size must be small enough to be breathed deeply into the lungs. Therefore, this and other treatments that the agent has undergone in either production or treatment might help identify the provider of the agent to the bio-terrorist.

Research in the third area of need, developing new treatments for disease, is ongoing but has intensified because of the threat of bio-terrorist activities. There is a constant challenge to develop and/or improve vaccines for even some of the older diseases as well as to develop newer and better treatments for both old and newly emerging diseases. A new micro-organism can be created in one-tenth the time it takes to develop a treatment. Nevertheless, considerable progress is being made in all areas of medicine,

especially in treating diseases. For example, an antitoxin is nearing development that will neutralise anthrax toxin, thus making it possible to treat people for anthrax even after the symptoms appear. Another exciting advance in disease treatment and prevention is the research currently being conducted on gene vaccines. These gene vaccines are chemical, not biological, thereby eliminating many of the objections to conventional biological vaccines. If these gene vaccines live up to expectations, it could revolutionise disease prevention and treatment. Also being investigated is the development of an aerosol-based vaccine that could be inhaled and could potentially safeguard people from a broad range of pathogens. This would enable a cloud of vaccine, sprayed over a large area, to protect people and animals from an epidemic. There is also a new detergent under development that could dissolve anthrax spores, thus making cleanup of contaminated areas much simpler.

In conclusion, it is evident that bio-terrorism is a threat that cannot be prevented, and unfortunately shipping is an easy target. We do, however, have the capability to minimise the consequences. There is further reason to be optimistic because all of the effort being devoted to minimising the potential effects of bio-terrorism will also produce many advances in identifying and treating diseases in the normal course of human events.

The Sea Lane and Energy Security
Lifeline between the Persian Gulf and Asia

Michael Richardson

This paper focuses on two potential oil supply chokepoints: the Strait of Hormuz in the Middle East and the Malacca and Singapore straits in Southeast Asia, and the implications for energy security and geopolitics of disruptions to traffic transiting these straits.

Strait of Hormuz

The Strait of Hormuz is a vital node in world energy trade and is the only way by sea into and out of the Persian Gulf. Of all the oil exported from the Gulf, over 90 per cent goes via the strait. The Gulf region, both onshore and offshore, produces close to 30 per cent of the world's oil and a rapidly increasing proportion of its natural gas. At a time of growing concern about future energy supplies, the Persian Gulf has 57 per cent of all proven oil reserves and 45 per cent of natural gas reserves.

The Persian Gulf region is also one of the most politically volatile areas of the world. The interests of many major outside powers, including the United States, Europe, Russia, China, India and Japan, are deeply engaged in the area - and are often at variance. For America, the rise of Iran and the spread of terrorism and terrorist-related smuggling are big problems in the Gulf region as US forces in Iraq fight Al Qaeda and struggle to contain growing political factionalism, as well as sectarian violence among and between majority Shiites and minority Sunnis. The US Navy aircraft carriers and associated warships currently deployed in or close to the Persian Gulf are seen as a warning to Iran not to underestimate America's power and resolve despite its troubles in Iraq.

The Malacca Strait and the Strait of Singapore run between Indonesia on one side, and Malaysia and Singapore on the other. Although located thousands of kilometres from the Persian Gulf, the Southeast Asian straits are closely connected by maritime trade to the Strait of Hormuz. These straits are integral parts of the same vast conveyor belt of seaborne commerce that runs between the Indian and Pacific oceans, carrying huge quantities of oil and other cargo.

The Malacca and Singapore straits provide the shortest sea passage for ships travelling between South and East Asia. They are part of a lifeline for the export-oriented but oil-short economies of East Asia, among them China, Japan and South Korea. India, too, with its rapidly growing economy and rising demand for imported oil and gas, is locked into this maritime highway. More than half of India's trade goes through the Malacca and Singapore straits that link the Indian and Pacific oceans via the Andaman

and South China seas. Already, the waterway carries about 30 per cent of global trade, a substantial part of the world's energy shipments and at least 75 per cent of the oil imported by Northeast Asia's industrial giants – Japan, China and South Korea – and this traffic is growing. This is increasing the strategic significance of Southeast Asia's main maritime chokepoint. China, for example, fears that its vital energy imports could be blocked here by the United States and its allies in a crisis over Taiwan.

US Interests

The United States has important military and alliance interests in the Malacca and Singapore straits. Relatively little of US oil imports come through the waterway. But the overwhelming proportion of oil reaching its Northeast Asian allies, Japan and South Korea, is carried by tankers that traverse the Southeast Asian straits.

The US Navy also sends warships, including aircraft carriers, from its Pacific Fleet through the Malacca and Singapore straits to reinforce its military presence in the Arabian Sea and Persian Gulf. This naval 'surge' capacity through the straits is especially important to the US at times of crisis in the Gulf or Indian Ocean region. The US Navy's 5th Fleet is based at Bahrain in the Gulf, operating under the US Central Command. Drawing ships as needed from the Pacific and Atlantic fleets to augment its force, the 5th Fleet's mission includes keeping the Persian Gulf and Strait of Hormuz open to international shipping.

Iran

Both the Strait of Hormuz and the Malacca and Singapore straits are vital nodes in maritime trade between the Middle East and Asia. The Southeast Asian straits have been the focus of some piracy, or more accurately, maritime criminal activity in recent years. But the coastal States that flank the straits are committed to keeping them open to international shipping.

However, Iranian officials have warned a number of times that if the United Nations Security Council applies the kind of tough financial and trade sanctions being sought by the United States to punish Teheran for refusing to halt uranium enrichment and other sensitive nuclear activities, the stability of the Middle East would be affected. Teheran has warned that any attack on Iran would endanger the region's oil supplies. The Iranian military have held naval manoeuvres and fired torpedoes and missiles near the Strait of Hormuz, evidently to show how easily it could be blocked.

Iranian forces are the strongest local fighting units in the Persian Gulf. Using the country's oil wealth, they have been reequipped, modernised and reorganised since their nadir at the end of the eight-year war with Iraq in 1988. They could, at least temporarily, halt commercial shipping traffic through the Strait of Hormuz. Iran has missiles that could strike ships within a minute or two of being launched. They could

be fired from the mainland or offshore islands in or close to the strait. Iran also has more than 5000 anti-ship mines that it could lay in the strait or its approaches.

Gulf Oil Hub

In 2006, the Persian Gulf states (Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia and the UAE) produced about 28 per cent of the world's oil. They exported 18.2 million barrels per day, including about 17 million barrels per day through the Strait of Hormuz; this was about 20 per cent of the world's oil supply. The group exported the remaining 1.2 million barrels of oil per day from the Gulf via pipelines through Turkey to the Mediterranean and through Saudi Arabia to the Red Sea. This means that about 93 per cent of all the oil exported from the Persian Gulf was carried in tankers passing through the Strait of Hormuz. These vessels carry approximately 40 per cent of all global crude oil and petroleum products traded by sea. Besides oil, an increasing amount of gas from the Gulf is being exported in liquefied form in tankers through the Strait of Hormuz, mainly to Asia.

The Gulf is a huge source of energy for the world and one that is predicted to become even more important in future. While some of these oil exports could be diverted into overland export pipelines, any interruption to the supply from the Persian Gulf by sea would panic markets, making prices soar. It would jolt the world economy which struggled for much of 2006 and 2007 to absorb the impact of oil costing over $US60 a barrel.

Oil Stockpiles

Member states of the International Energy Agency (IEA), that are net oil importers are supposed to hold emergency reserves equivalent to at least 90 days of their oil imports of the previous year, even though it is expensive to do so. The reserves are designed for use in an oil supply disruption, to cushion the economic impact of any crisis. The United States, European nations and Japan all maintain large physical stockpiles of crude oil or crude oil and refined products, in line with IEA recommendations. It is also significant that Asia's two big emerging oil consumers, China and India, both of them large net oil importers, have taken advice from the IEA on setting up strategic oil stocks, although the consumption cover they provide is well below 90 days and likely to remain so for some years.

The IEA says that the biggest oil shock since the 1973 Arab oil embargo occurred in 1978-79 during the Iranian revolution. This resulted in a supply shortfall in the global market of approximately 5.6 million barrels per day for a period of six months. This was close to 10 per cent of world oil output in 1979. The shortfall doubled oil prices, plunging the global economy over the next three years into its longest and deepest recession since World War II.

The IEA says that the other three largest oil supply disruptions since 1973 were also related to the Gulf and Middle East. The 1990-91 Gulf crisis following Iraq's invasion of Kuwait, the start of the Iraq-Iran war in 1980-81, and Arab-Israeli war in 1973-74 each resulted in a supply shortfall of over 4 million barrels of oil per day that lasted for more than four months on world markets. In fact, the last four global recessions are all linked to oil supply restrictions in the periods 1973-74, 1979-81, 1990-91 and 2000-01.

Asia's Gulf Oil Dependence

While the global economy could be hit hard by another major disruption in the flow of oil from the Gulf, the repercussions would be most severe in Asia where emergency oil reserves in many countries are far below levels recommended by the IEA.

About 16 per cent of Gulf oil exports are shipped to Europe and only 11 per cent to the United States, by far the largest oil consumer in the world. By contrast, about two thirds of Gulf oil exports go to Asia. Japan, for example, imports all its oil and 89 per cent comes from the Middle East, defined as the Gulf oil exporters plus Oman and Yemen. Asia's two emerging economic giants, China and India, are also heavily reliant on the Middle East for their oil, India for about 70 per cent of its imports and China for around 50 per cent. South Korea, Singapore, Taiwan, Thailand and the Philippines each depend on the Gulf for over 70 per cent of their oil imports. Overall, the Middle East supplies nearly 75 per cent of Asia's import needs, making the region by far the most important customer. This relationship is expected to strengthen even further as Asian oil production plateaus and demand rises.

Partly as a result of this dependence, China and many Asian countries are wary of offending Iran and siding openly with the United States and Europe in the dispute over Teheran's nuclear program. Iran has also been diversifying its foreign trading partners to reduce reliance on the West. Asia's share of Iran's trade has increased to nearly match Europe's 40 per cent share. Teheran sees trade diversification away from the West to Asia as a buffer against efforts to isolate it.

What about the costs for Iran? If Iran were to try to close the Strait of Hormuz with its mines, missiles, submarines, small attack craft and larger naval vessels, coastal artillery and aircraft, it could expect widespread international condemnation and possibly retaliatory strikes by the United States and some of its allies, if the blockade was not ended promptly. US warships routinely work in patrol and protection coalitions with other navies from the Gulf region and much further away, including Pakistan, Singapore, Japan, Australia, New Zealand and European nations. In a crisis that threatened shipping in the Strait of Hormuz, coalition warships would guard convoys and try to protect tankers and other commercial vessels, as happened during the 1980-88 Iraq-Iran War.

Iran's economy would also be hurt by any prolonged closure of the strait. The Iranian people are clamouring for higher living standards. The Iranian Government has been heavily subsidising domestic oil prices and in June 2007 had to introduce fuel rationing. Iran is short of refining capacity and must import around 40 per cent of its petrol. The government relies heavily on oil export revenues. They provide at least 80 per cent of export earnings and fund half the budget. Moreover, Iran relies on the Strait of Hormuz to export nearly 2.5 million barrels of oil per day, making it the second largest producer in OPEC, after Saudi Arabia. While Iran has huge reserves of oil and gas, it needs foreign investment, technology and markets to develop them to their full potential and boost overseas sales.

Conclusion

To improve prospects for energy security in East Asia, countries in the region need to be more active in helping to defuse tension between Iran and the United States, and in contributing naval ships to patrol waters in and around the Gulf to protect international shipping and the tanker trade. They also need to diversify their sources of oil and gas imports to reduce reliance on the Gulf. They need to develop alternatives to fossil fuel energy and build emergency oil stockpiles as a cushion against supply disruption. And they need to improve their energy efficiency and conservation. All these things are easy to say. But doing them requires political will and substantial resources. And even with this commitment, some of the objectives will take many years to achieve.

Meanwhile, India and the United States should continue to build their naval partnership to protect freedom of international navigation along the key middle section of the oil supply lifeline linking the Persian Gulf and East Asia. This should be at a pace that India finds politically acceptable. The military-to-military relationship will be further strengthened if India decides to buy more of its future air and naval equipment from the United States. Common platforms, sensors and weapons systems facilitate interoperability.

In September 2007, the United States and India expanded their long-running Malabar bilateral naval exercises for the first time to include Japan, Australia and Singapore. Over two dozen ships, including three aircraft carriers, took part. The operational zone for the training off India's east coast stretched from the mainland to India's Andaman and Nicobar Islands guarding the western approaches to the Malacca Strait. The participating navies practiced maritime interdiction, taking control of suspect vessels at sea, and air combat exercises as well as surface and anti-submarine warfare.

In the background to this sea lane security activity by five of the navies with interests in protecting the oil supply artery from the Persian Gulf is some initial discussion about the formation of a 'quadrilateral dialogue' between the United States, Japan, Australia and India. This has been pushed by Japan and the United States on the basis that the four

share common values of freedom and democracy, and should cooperate in the region to advance other shared interests. Australia and Japan are allies of the United States. In March 2007 Australia and Japan signed a Joint Declaration on Security Cooperation, and their foreign ministers hold a regular trilateral strategic dialogue with the United States to coordinate approaches to regional security and stability.

When the United States and Japanese foreign and defence ministers met in Washington in early May 2007, they made a direct reference for the first time to the importance of engaging India. The statement said it was their 'common strategic objective' to build cooperation with New Delhi, 'recognizing that India's continued growth is inextricably tied to the prosperity, freedom, and security of the region.' For Japan, India is a key part of the 'Arc of Prosperity and Freedom' that the government of former Prime Minister Shinzo Abe was trying to build around the outer rim of the Eurasian continent skirting the borders of China and Russia. The 'Arc' partnership appeared to exclude Beijing and Moscow.

When senior officials of the United States, Japan, India and Australia arranged inaugural talks on the sidelines of a meeting in Manila in late May of the ASEAN Regional Forum on security to discuss how to take the four power relationship forward, China pointedly sent diplomatic notes to each of them requesting an explanation. Since then, Beijing has indicated that if the quadrilateral is formed, it will be divisive, destabilising and risk plunging Asia into another Cold War. Partly for this reason, Australia and India are wary of giving the group a strategic shape. China may hope that elections and political change in quadrilateral countries over the next few years will bring different parties to the fore that will veto or downgrade moves to form the four-nation association. This may already have happened in Japan with the selection of Yasuo Fukuda as the successor to Mr Abe as prime minister. Mr Fukuda appears to be more wary of challenging China than Mr Abe and his some of his ministers.

Yet the quadrilateral countries should not be deterred by Beijing's bluster from continuing to keep in touch and preparing to develop their own hedge or counter-balancing mechanism in any Asian power play. After all, China and Russia, along with four Central Asian states, started post-Cold War bloc politics in Asia when they formed the Shanghai Cooperation Organisation (SCO) in 2001, long before Japan mooted its Arc of Prosperity and Freedom or the quadrilateral concept first emerged. Beijing and Moscow say that the SCO is not aimed at third countries or groups but is intended to maintain security and stability in the region while building cooperation among its members. Indeed, they point out that ASEAN has observer status at the SCO.

If the quadrilateral is formed, it could be called the New Delhi Cooperation Organisation, mimicking the phraseology of the SCO while acknowledging India's pivotal role and its position as a leading member of the Non-Aligned Movement. The aims of the NDCO would be similar to those of the SCO. It would build economic and other forms of cooperation among its members and deal with transnational security threats. Only these

threats would not be primarily onshore, as in the case of the SCO, but offshore, around the eastern and southern maritime periphery of mainland Asia. They would include maritime-related terrorism, piracy, smuggling and sea lane protection in general.

When placed in juxtaposition to the SCO, the quadrilateral (even in the guise of the NDCO) might look suspiciously like an Asian version of NATO confronting a Warsaw Pact-style bloc in the region, with non-members coming under pressure to take sides. Or would it?

It is too early to tell. The economic rise of China and India is stimulating a huge surge of trade and investment in Asia and the Pacific. Regional countries, including those of the SCO and the putative NDCO, are being drawn together as never before by economic interdependence. The hope must be that as these bonds continue to tighten, the costs of breaking or even risking them in any military conflict become so heavy that war is ruled out. Political linkages among Asian and Pacific states are also likely to increase. China and Russia may want to draw India into the SCO as a full member. It is already an observer. The other four participants - the United States, Japan, Australia and Singapore - in the naval exercises in the Bay of Bengal earlier in October 2007 all have strong economic and other ties to China and do not want to disrupt them.

In the longer term, if the quadrilateral, or whatever it might be called, takes shape the trick may be for it and the SCO to act transparently, while developing mutual connections and confidence, so that cooperative security replaces competitive security in peacetime Asia. This could help to usher in a new era of global maritime partnership along the lines of the '1000-ship Navy' concept, first advocated in 2005 by the then US Chief of Naval Operations Admiral Michael Mullen, now the Chairman of the Joint Chiefs of Staff.

Navigational Security in the East China and Yellow Seas

Choon Kun Lee

The 21st century is considered to be the 'age of globalisation', with the economic interaction of countries its most important aspect. Trade is a major component of this economic activity, and is mostly done by sea. The countries located in the Yellow Sea/East China Sea area – Japan, South Korea, China and Taiwan – have experienced unparalleled economic growth in the past 50 years, all attributable to international trade. Thus, sea lane and navigation security are crucial factors for their continued trade and economic development.

As a result of the rapid growth in international trade, the Yellow and East China seas have become the busiest waterways in the world, containing eight out of the world's twenty largest ports, measured by cargo tonnage,[1] with the sea lanes acting as 'life lines' to all Northeast Asian countries.

There are many variables to consider when examining sea lane and navigation security, natural as well as artificial causes: such as piracy, disputes amongst countries, and rivalry among naval forces. This paper analyses Yellow and East China seas security from an international relations perspective. Sea lane and navigation security in these seas has become more volatile: North and South Korea's naval forces have exchanged live fire near the Northern Limit Line on two occasions in the past seven years, China and Korea have territorial and fishery disputes, Japan and China have territorial and natural resources disputes, there are tensions in the Taiwan Strait between China and Taiwan, and there is rapid growth of naval capabilities among all Northeast Asian countries.

Physical and Political Conditions

All the seas in the world, from the coast line out, are important, as disruptions to shipping may occur anywhere on the oceans. Thus, it is difficult to determine whether the oil route from the Middle East to Northeast Asia or the trade route from Asia to the Americas across the Pacific is more important.

However, we are able to determine which seas are more dangerous to navigation. As a part of the western Pacific Ocean, the East China Sea is shaped like a lake, surrounded by China, the Korean Peninsula, Japan, and Taiwan, while the Yellow Sea is like a big bay, with China, North Korea and South Korea as its gulf states; both seas are considered to be 'closed seas' under international law. These two seas have seen a high frequency of political conflict because of their geographical location, and are considered crucial

sea lanes to the Northeast Asian countries. Moreover the recent discovery of valuable sea-bed resources has increased the possibility of conflict between these countries.

The Yellow Sea

The Yellow Sea ('Huang Hai') is the northern part of the East China Sea, which is a marginal sea of the Pacific Ocean, and is located between mainland China and the Korean Peninsula. The name Yellow Sea comes from the actual yellowish colour of the sea; in times of flooding, a great deal of yellow mud water flows into the sea. Koreans call it the 'West Sea' as it is located on the west of the Korean peninsula, and the sea appears to be a turbid greenish colour from Korea. The sea is shallow with its deepest point being 152m, and an average depth of 44m. The north of the line that connects the mouth of Yangtz River to Cheju Island is called the Yellow Sea, and the south, the East China Sea. The Yellow Sea measures about 1000km from north to south, and 700km from east to west. The narrowness of this sea means the exclusive economic zones (EEZ) of both Korea and China overlap, and this has not yet been delineated.

The Yellow Sea has been a traditional maritime battle site from the 6th century: the Tang-Koguryo wars in the 7th century, the Sino-Japanese wars of the 16th and late 19th century, the Russo-Japanese War (1904-05), the Korean War (1950-53) and very recently naval battles between South and North Korea (1999, 2002). In October 1994, a US Navy fleet (including an aircraft carrier) exercised in the northern part of the Yellow Sea, to which the People's Liberation Army Navy (PLAN) reacted.[2] Confrontation between and among Northeast Asian navies occurs frequently and both the United States and China regard the Yellow Sea as strategically important.

The East China Sea

The East China Sea stretches from the south of the Yellow Sea to Taiwan – north to south – and from the east coast of China to Japan's Kyushu and Ryukyu Islands – east to west; its area approximately 1,249,000km^2. While China calls it the 'East China Sea', Korea calls it the 'South Sea' (Nam Hae) for its southern location of the Korean Peninsula. The East China Sea is connected to the South China Sea through the Taiwan Strait. It covers about 752,000km^2 and is bounded by the islands of Cheju (north), Kyushu (northeast), and Ryukyu. The average depth of the East China Sea is 366m and its deepest point is 4572m. The East China Sea is also a small body of water, so the EEZs of Japan, China, Korea, and Taiwan overlap. The discovery of natural gas and oil means there is a high probability of conflict over these resources.

There has also been considerable warfare in the East China Sea. After the Opium War (1839-42), the British and French fleets sailed across the East China Sea, threatened Tianjin and Beijing, and turned China into a semi colonial state in 1860. In 1996, China carried out a military drill in the Taiwan Strait, leading the United States to deploy two aircraft carriers to protect Taiwan from the threat. This tension led to commercial

vessels and aircraft deliberately bypassing the area. China has made it clear that it will use military force to stop Taiwan from declaring independence; obviously its naval force are the best military option, which will seriously affect sea lane security.

Military Expenditure

After the Cold War, the prevalent strategic analysis claimed the world was entering an era of peace, but that peace has not come to the countries surrounding the Yellow and East China seas. Stankiewicz claimed that during the Cold War, these seas were under the constant threat of the Soviet Navy, with the biggest threat being a possible conflict between the Soviet Navy and the US Pacific Fleet, and he further stated that 'With the end of the Cold War, concepts of maritime security have fundamentally changed from military threat to non-military threat.'[3]

So, if Northeast Asian sea lane security is not a military issue, we need not worry much about the navigational security of these seas, as even serious economic competition between countries is incomparable to a military conflict. However, from a Northeast Asian perspective on the post-Cold War era, sea lane security remains a serious concern, and thus these countries are more insecure after, rather than during the Cold War. The military expenditure of the Northeast Asian countries post-Cold War demonstrates their insecurity, as the global decrease in military expenditure is not evident in their expenditure. During the 1990s, when global military expenditure decreased as a whole by about 35 per cent, Northeast Asia rapidly increased its military expenditure by 36 per cent.

Country	1985	1999	2000	% Change 1985-2000
China	29414	39889	41167	39.9
Japan	31847	40383	44417	39.5
North Korea	6158	2100	2049	-66.7
South Korea	9323	12088	12496	34.0
Taiwan	9541	14964	17248	80.8
Subtotal	**86283**	**109424**	**117377**	**36.0**
United States	382548	283096	294695	-23.0
NATO Europe	226397	174375	162053	-28.4
Soviet/Russia	364715	56800	58810	-83.9
Subtotal	**973660**	**514271**	**515558**	**-47.0**
World	**1,253,517**	**812,043**	**811,452**	**-35.3**

Table 1: Military expenditure of East Asian countries, US$ million, constant 1999 dollars[4]

The terrorist attacks on the United Sates on 11 September 2001 saw a refocusing of the United States and its allies on counter-terrorism, and counterinsurgency warfare in Iraq and Afghanistan, and East Asian military expenditure also increased after 2000. The United States increased its military expenditure by 50 per cent, while global military expenditure increased by 22.5 per cent.

Country	2000	2001	2002	2003	2004	2005	% Change 2000-05
China	49.15	49.55	57.30	61.27	66.67	82.54	67.9
Japan	53.03	46.08	43.91	46.91	48.11	46.12	-13.1
North Korea	2.46	5.12	5.60	6.02	5.87	6.19	151.6
South Korea	14.92	13.56	14.83	16.01	17.39	21.36	43.2
Taiwan	20.59	9.35	8.86	7.26	8.01	8.58	-58.3
Subtotal	**140.15**	**123.66**	**130.50**	**137.47**	**146.05**	**164.81**	**17.6**
United States	355.8	347.6	390.5	443.1	497.1	534.6	50.3
NATO Europe	202.4	192.6	221.1	242.1	250.7	207.9	2.7
Soviet/Russia	60.9	52.5	56.9	71.4	66.0	67.1	10.2
Subtotal	**619.1**	**592.7**	**668.5**	**756.6**	**813.8**	**809.6**	**30.8**
World	**966.2**	**908.7**	**986.3**	**1092.0**	**1167.8**	**1183.6**	**22.5**

Table 2: Military expenditure of East Asian countries 2000-06, US$ billion, constant 2006 dollars[5]

Over the period 2000-05, the Northeast Asian countries as a bloc increased their military expenditure by around 17.6 per cent, with China increasing its expenditure nearly 70 per cent, North Korea over 150 per cent (from a low baseline), and South Korea by 43 per cent. These increases were offset by Japan and Taiwan decreasing their military expenditure 13 and 58 per cent respectively.

Do these figures demonstrate the increased probability of military conflict between the Northeast Asian countries? Moreover, do they 'prove' that the Northeast Asian countries consider sea security to be their most important planning consideration, given the increase in their naval capabilities? Why are the East Asian countries increasing their military expenditure, especially naval-related expenditure, more rapidly than the rest of the world?

The fact that the nations are increasing their military expenditure means they feel insecure. Northeast Asia's strategic landscape was relatively simple during the Cold War; in the tension between the United States and the Soviet Union, the East Asian countries clearly knew their allies and enemies, and the issues that caused disputes,

but also recognised that regional stability was maintained. Post-Cold War, Japan and South Korea began to have doubts as to whether the United States would continue to support them, as had occurred previously.

China was also insecure after the Cold War, as there was the possibility that the United States would disengage from the western Pacific. From China's perspective, if the United States were to withdraw, then Japan's naval power would become a clear threat to it.

Post-Cold War, other factors such as economic and energy security concerns encouraged Northeast Asian insecurity, as these countries were experiencing rapid economic development that was heavily dependant on imported energy. Korea and Japan import 100 per cent and 99 per cent of oil respectively, from foreign countries, while China, which became an oil-importing country in 1993, imported 48 per cent of its oil in 2005. Securing petroleum resources is only possible through safe sea lanes.

During the Cold War, the US Navy was the stabiliser and/or the guarantor of sea lane security for the Northeast Asian countries. Post-Cold War, these countries did not know whether the United States would continue this role, and decided that increasing their own military capabilities would be the best security option.

The insecurity that these countries are feeling is 'structural', thus not easily solvable. As Henry Kissinger had argued, 'wars between Asian countries are not likely, but neither are they excluded.'[6] Professor Kent Calder clearly points out the vicious cycle of Asian countries' insecurity leading to increased military expenditure leading to further insecurity.[7]

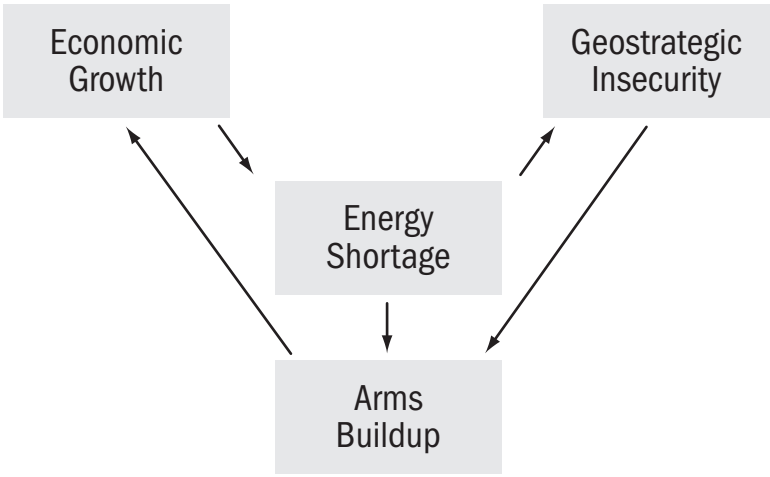

Figure 1: The deadly triangle of Asia

Territorial Disputes

A coastal state's EEZ can be considered just as important as its land territory, and comprises waters out 200nm from the coastline, but in Northeast Asia, not only the EEZ but also continental shelf claims overlap. This has led to serious and ongoing territorial disputes, particularly over specific islands that could be used to delineate these claims, as shown in the following examples.

The Senkau (Diaoyudai) Islands: China-Taiwan-Japan

The Senkaku (Diaoyudai) Islands are a group of five uninhibited islands currently controlled by Japan, but also claimed by China and Taiwan as their territory. Even though the total area of the islands is only 7km^2, these islands are important to all claimants due to their strategic location. Japan argues that these islands are part of the Ryukyu Islands, while China argues they sit on the edge of its continental shelf and are separated from the Ryukyu Islands by a sea trench.

China claims the islands have been its territory since the Ming Dynasty in the 15th century. The islands were then under the rule of the Dutch during the Qing dynasty, 1624-62, until China regained them by defeating the Dutch. In 1894, after the first Sino-Japanese War, Japan seized the islands under the newly created and unequal Shimonoseki Treaty of 17 April 1895; where Japan also seized Taiwan. China claims that the Shimonoseki Treaty is invalid, and that the islands are still part of Taiwan, which it regards as a province of China

Meanwhile, after the Meiji restoration in 1885, Japan investigated the status of the islands and claimed that there was no basis to China's claim. Japan erected a marker on the islands to formally incorporate them as its territory, three months prior to the end of the Sino-Japanese War. In 1978, the Japan Youth Association built a lighthouse on Senkaku's largest island and a 5m lighthouse on another island on 14 July 1996. On 14 September 1996, the US State Department spokesman indicated its neutral position on the Senkaku (Diaoyudai) islands' dispute; confirmed again on 24 March 2004. China, Japan, and Taiwan still claim the islands to be their own: by planting flags on the islands, occupying the islands for a few days at a time, harassing other countries' fishing vessels, sending warships into the disputed waters, and conducting military exercises in the area.

As the Senkaku (Diaoyudai) islands contain a large quantity of oil and gas, the issue is not simply a dispute over the possession of an uninhabited island; rather there is a high probability that a military confrontation will occur over access to energy resources.

Leodo Island: South Korea-China

Although not as well recognised as the China-Japan territorial dispute, Korea and China also have a dispute over what South Korea calls Ieodo Island, and China calls Suyen Chao. This 'island' is actually a rock around 149km away from South Korea's southern Cheju Island, located in the East China Sea and submerged 4.6m under the sea. It is also called the Socotra Rock, when it was 'discovered' by the English merchant ship *Socotra*, which hit it in 1900.

Over the period 1995-2003, South Korea built a maritime science laboratory on Ieodo Island, opposed by both China and Taiwan. *Asia Week* reported on 26 November 2006, that China established a non-governmental organisation to acquire Ieodo Island: China plans to erect a copper stone with the letter 'Territory of China' engraved in it, while the 'Suyen Chao Preservation Society' is asking for the evacuation of the laboratory. Although no full-scale dispute has begun, the non-governmental organisations of both China and South Korea are appealing to the patriotic emotions of their countrymen over the issue.

Northern Limit Line: North Korea-South Korea

During the Korean War, the United Nations had naval supremacy in Korean waters, and took possession of all islands on North Korea's coast. On 27 July 1953, the armistice treaty ending the Korean War established a clear 'land' boundary dividing the north and the south, but not a sea boundary, due to North Korea's aggressive opposition to its delineation. The Northern Limit Line was established in order to prevent any accidental military confrontation, in other words, to smoothly carry out the armistice agreement, with North Korea accepting it as a realistic line for more than 20 years. However, since the mid 1970s, North Korea has denounced it and violated its provisions; in 1999 and 2002, the South and North Korean navies exchanged live fire leading to more than 100 deaths.

North Korea continues to ignore the Northern Limit Line, and South Korea considers conceding the issue to North Korea as a threat to Seoul's defence. Thus it appears impossible for the two countries to negotiate a solution to the Northern Limit Line, and the probability of continued military hostility over it remains high.

Naval Arms Race in Northeast Asia

The naval build-up in the Yellow and East China seas may impact upon sea lane and navigation security. During the 1990s, many scholars warned that 'if a war breaks out in Asia, the first sound of the gun will be heard at the sea.'

China's Naval Build-up

China has shown the most rapid economic development for the past 30 years, and has become a military power through high expenditure on military expansion and modernisation. As part of this transformation, China has decreased the size of its military force by 2 million people, while constantly increasing its military expenditure; this means it is becoming leaner but meaner. This has been done by reducing Army personnel numbers and expanding the size and capabilities of the PLAN. The size of the Chinese military dropped from 2,840,000 in 1997 to 2,255,000 in 2006; while PLAN personnel numbers only dropped from 280,000 to 255,000 over the same period.

Today, China possesses Northeast Asia's most powerful submarine force (58 boats), and the number of surface ships is increasing very rapidly: there were 18 destroyers in 1997, 20 in 1999, 21 in 2000, and 27 in 2006, while the corresponding frigate numbers were 36 in 1997, 40 in 1999, 41 in 2000, and 44 in 2006.

Japanese Sea Power

Japan is an economic giant, and is fully capable of becoming a military giant as well. Japan is a natural 'sea power', and the most important component of the Japan Self-Defense Force is the Japan Maritime Self-Defense Force (JMSDF). The JMSDF can be rated as the world's second most powerful navy, and is currently equipped with 18 submarines and 54 surface combatants (45 destroyers and 9 frigates). Japan also has 31 minesweepers for its mine countermeasures force and was the 2nd in the world to acquire an AEGIS-equipped cruiser after the United States.

Japan's Fleet has a range of 5000 nautical miles, was dispatched to the Arabia Gulf during the 2003 Iraqi War, and participated in Exercise MALABAR in September 2007 in the Bay of Bengal. In the future, Japan may choose to develop a balanced blue water navy, equipped with aircraft carriers, to project power.

Korea and Taiwan's Naval Build-up

Although considerably smaller than the naval forces of Japan and China, both South Korea and Taiwan began modernising and increasing their naval forces during the 1990s. South Korea, especially has been working on a structural reform of its naval forces under the motto 'Building an Ocean Going Navy'. During the Cold War, the Republic of Korea Navy was a small coastal force, but after 2000, it began construction of new vessels and in 2006 had nine submarines, six destroyers and nine frigates. Taiwan's navy has four submarines, nine destroyers, and 22 frigates, and is a bigger and stronger navy than Sotuh Korea's.

Conclusion

The Yellow Sea and East China Sea are the busiest seas in the world. This is due to the rapid and successful industrialisation of South Korea and China over the past 40 years, with economies highly reliant on international trade. Thus, safe navigation in these seas is extremely important for their ongoing economic growth.

However, the Yellow Sea and East China Sea are not safe. First, the seas are very small and neighbouring countries' interests collide: the exclusive economic zones of China, Japan, and South Korea overlap, resulting in ongoing sea boundary and territorial disputes. As natural gas and oil are located near the disputed islands it makes it more difficult to solve these conflicts.

Thus, Kent Calder's analysis on the existence of the structural problems on the East Asian Seas is valid and useful. The Asian countries have been competing to secure seabed energy resources, and have been rapidly building up their military capabilities – especially naval power. However, the expansion of military forces does not guarantee international peace and security, rather, it could result in a vicious cycle of an armament race.

There has been a repositioning of elements of the US Fleet in Asia. During the Cold War, the United States stationed forces in Europe/Atlantic Ocean and the Pacific Ocean in a ratio of 6:4; post-Cold War, the ratio is now 4:6. The fact that more US naval forces are repositioning to the Asia-Pacific region indicates that the region is becoming politically unstable. There are apprehensions of a hegemonic conflict between the United States and China in the future. However, it is also true that the basing of the US Navy in the region has made many Northeast Asian countries feel safer, because they believe that the continuing and increasing American presence will guarantee the sea lane and navigation security of Northeast Asia.

The coastal countries bordering the Yellow Sea and East China Sea want safe navigation in peaceful seas. However, the current strategic situation promotes insecurity, and with no security framework in place to handle these issues, growing military power may lead to strategic miscalculation. While it is not the perfect solution, the continued US naval presence in the region, acting as a stabilising force is the best practical means for the navigation security of the these seas.

Notes

1 They are Shanghai (1st), Ningbo (4th), Tiamjin (5th), Busan (8th), Qingdao (12th), Kwang Yang (13th), Dalian (14th) and Kaoshing (20th).

2 Matsui Shigeru, *Atlas of Conflicts in the World*, Shinchosha, Tokyo, 1995, p. 52.

3 Machael Stankiewicz, 'Inroduction' in Kent Calder and Fereidun Fesharaki, *Maritime Shipping in Northeast Asia: Law Of The Seas, Sea Lanes, and Security*, Institute on Global Conflict and Cooperation, IGCC Policy Papers, Paper No. 33, February 1998, pp. 1-3.

4 International Institute for Strategic Studies, *The Military Balance*, London, various editions.

5 Anthony Cordesman and Marin Kleiber, *The Asian Conventional Military Balance 2006: Overview of Major Powers*, Center for Strategic and International Studies, Washington, 2006, <www.csis.org/media/csis/pubs/060626_asia_balance_powers.pdf>, accessed 26 May 2008.

6 Henry A Kissinger, *Does America Need a Foreign Policy? Toward a Diplomacy for the 21st Century*, Simon and Schuster, New York, 2001, p. 110.

7 Kent Calder, *Pacific Defense: Arms Energy and America's Future in Asia*, Morrow, New York, 1996, p. 5.

Securing Asian Sea Lanes

Thomas B Fargo

I would guess one of the advantages I have after almost six years in command within the Pacific is a little bit of context. I have seen the effort to take on these maritime security challenges in our new and globalised world gather considerable steam. It was especially rewarding today to both hear and read about the extensive initiatives that have taken place in and around the Malacca Strait. So, real progress has been made in the region although there is clearly much additional work to be done. Regional partners recognise the tremendous importance of secure sea lanes for a wide range of transnational purposes and I believe they also understand clearly that no nation has the ability to accomplish these tasks alone. I am sure you have heard the United States (US) Chief of Naval Operations, Admiral Mike Mullen (actually as of today our Chairman of the Joint Chiefs of Staff) speak extensively about a '1000-ship Navy', embracing the navies of the world as a coordinated entity to enhance our security. There are a lot of reasons this is a great vision, but one is sheer pragmatism. The navies of the world are getting smaller every day. The US Navy – at 278 ships – is 40 per cent of its size 20 years ago. And I recently saw an article that said the Royal Navy is headed for additional cuts that could lead to about 50 ships including the Royal Fleet Auxiliary. Hopefully that won't come to pass, but you can see clearly that we aren't going to solve this problem the old fashion way – with the overwhelming presence of a great sea power. It will require a great deal of collaboration and an equal dose of existing and new technology.

I would peg the real start of serious regional discussions on maritime strategy and sea lane security to the Shangri-La Dialogue in Singapore a little over four years ago. It coincided with the presentation of the Regional Maritime Security Initiative (RMSI). The RMSI as you know had a rocky start because of an unfortunate and inaccurate AFP news story. But, the good news is that almost all of what RMSI proposed has outlived the acronym, and it was the impetus of much of the progress we have seen to date. Although the focus at that time was not on energy security per se, the prescription is the same.

As with most important issues and certainly any with high content of political and diplomatic interest, the road will be a little bumpy but I am really encouraged by the discussions that are ongoing and look forward to your solutions and action. And this is a group, right in this room that really understands the problem and can make a contribution to new directions in maritime and Asian energy security.

In fact, I am reminded of Winston Churchill's famous quote that the three most difficult things to do in life are: climb a wall leaning toward you, kiss a woman leaning away from you, or talk to a group that knows more than you do about a subject.

Let me spend a few minutes this evening providing an overarching framework for maritime security. You have made many of these points earlier in the day. My task will be to knit them together and then I will be happy to take your questions.

Security Backdrop

Maritime history has been dominated by efforts to master the seas for three key reasons: to defend against invasion, to project power and influence, and to secure resources and trade to fuel our economies. It is this latter objective that we will focus on intently over these two days.

Certainly, maritime security in the 21st century must provide for these traditional needs of the past. Land and resource disputes still require resolution – many were highlighted by you today, and they in fact are the genesis for much of these discussions. Countries of the Asia-Pacific region are maritime nations by their nature and secure sea lines of communication will assume even greater importance. You all know the numbers – as recited in some form this morning – oil currently accounts for half of Asia's energy consumption. Japan imports 98 per cent of its oil, and by 2020, China's oil consumption alone will nearly double. We are headed toward a point where China's consumption will equal the entire Saudi Arabian output. As we know well, much of that oil will transit through the narrow straits of Southeast Asia. This oil, like the straits, must be protected.

But the contextual change lies in the degree to which we can maintain control of the infrastructure of globalisation – the tools we use to advance trade, travel, and intellectual exchange – while denying access to those who would abuse it. We must facilitate and even enhance information sharing among nations while defending against cyber-attack or exploitation.

Very specifically, we need exquisite knowledge of traffic on the seas, and agreement on methods for regulating that traffic. We will also need maritime forces with sufficient capability to provide mobile havens from which we can defend friends and allies, disrupt aberrant behaviour, and protect our commerce against conventional or unconventional attack from any dimension. Finally, we must strengthen those nations left behind in the globalisation age; otherwise they may unwillingly serve as portals through which the community of nations can be threatened.

So let me briefly cover our primary maritime security concerns and then provide a vision for a maritime and therefore sea lane security framework in the 21st century.

Maritime Security Concerns

The primary threat to maritime security in the Asia-Pacific region is inadequate Maritime Domain Awareness. This in turn allows a host of both dangerous and illicit transnational activities to use our sea lanes and to undermine our security.

At the top of this list, I worry about transnational threats like terrorism and proliferation, both of which have advanced on the dark side of globalisation. Our main terrorist concerns include Al Qaeda and of course in Southeast Asia, Jemaah Islamiyah. In addition, organisations like the Abu Sayyaf Group in the Philippines are problematic from a couple of standpoints. While not projecting regional capabilities, they can facilitate the training and movement of groups like Jemaah Islamiyah throughout the archipelagic region. Progress has been made here also. Acts of terror can and do occur on the high seas, but it is the maritime movement of terrorists, and their use of vessels as weapons or weapons couriers, that provide a significant challenge.

With respect to proliferation, it is the transit of weapons of mass destruction and their delivery systems that pose the greatest concern. North Korea's nuclear material was the most serious concern during my tenure in Pacific Command. Recent progress in the Six Party Talks with respect to North Korea's nuclear program is encouraging because the stakes are very high. The threat of trafficking nuclear weapons or fissile material on our Asian sea lanes would also undermine international treaties and norms against proliferation.

But what keeps us awake at night is the possible nexus between terrorists and weapons of mass destruction. I enjoyed the debate today on which large commercial vessels can or can not be used as a weapon. Armed with these weapons, undeterrable, unaccountable enemies could inflict enormous damage without warning. And if pirates or sea robbers can board a ship, as we have seen, what is achievable by a trained terrorist willing to give up his life?

As an aside, the sea lanes are also used today with some impunity to move drugs, and to facilitate the trafficking in humans.

I thought our speakers today did a superb job of articulating energy demand, the overriding importance of protecting our shipping and the range of potential threats to their safety. I would only add that in addition to the graphs we saw today, the best way to gain a clear picture of how all this ties to Asian energy security is to spend a few hours at the Port of Fujairah adjacent to the Strait of Hormuz and count the ships at anchor awaiting passage to the Gulf. Or pick out a strategic location near the Man of War Anchorage at Singapore and gauge the traffic through the Malacca and Singapore straits. A tanker sunk at any of these strategic chokepoints would put our collective economic prosperity on its heels.

Hence our future maritime security depends on a more proactive, a more multilateral, and frankly, a more courageous approach.

Imperatives for Maritime Security

This security context challenges Asia-Pacific nations to cooperate in unprecedented ways. A collaborative effort is needed to coordinate maritime security in the Pacific and ultimately worldwide. So let me talk to what I believe are five imperatives for maritime security in the 21st century.

1. Advanced Situational Awareness

At the top of my list is the urgent need to obtain a clear and accurate operational picture of traffic on the seas in support of maritime security. Maritime Domain Awareness is a general concept that supports this imperative and underpins maritime security. Technology can provide this picture – just as it does in great measure today in the air. But the key is a coalition of nations maintaining a strong unified front. Today we know essentially where commercial aircraft are, whom and what are onboard and its status in flight. Tomorrow we need an equally clear and accurate picture of our sea space and it must be shared.

There are necessary steps to better awareness of our maritime environment: first, we need sensors on, above and adjacent to our sea lanes to gather timely information. There is some coverage today, and we have heard what is being accomplished in the Malacca Straits Security Initiative, but it is still spotty at best. Second, we need mandated satellite transponders on every ship outside territorial seas. We have current mandates for ships over 300 tons, but that is not to the extent required. Next, we require processes, protocols and standards with which to fuse that information with intelligence from other sources in order to ascertain 'intent'. In this area our progress has been minimal. And finally, fused information and intelligence must be exchanged between like-minded governments. This is key – as discussed the problem is simply too large without shared information and solid bi-lateral intelligence sharing. And obviously we need the communications structure in place to support all of the above.

Advanced sensors ashore, at sea, and certainly in both the air and space, are central to this effort. An accurate picture of seaborne traffic will facilitate border security and contribute to counter-terror, counter-narcotic, and counter-piracy efforts and ensure those that potentially threaten the movement of commerce can be readily identified. I would point out that we have solved a similar problem albeit on a somewhat smaller scale once before in the counter-narcotic effort in the Caribbean.

We are also challenged to increase our awareness of people and goods moving to our ports and across our borders without erecting barriers to progress. We recognise clearly that 90 per cent of the world's freight moves by sea. The US Customs Service's

Container Security Initiative, which a multitude of Asian nations have joined, is an effort to ensure safe movement of that freight. Private industry has developed associated efforts like the Secure Trade Lanes Initiative to improve safety of shipping containers through portal screening and end-to-end real time electronic monitoring. Strict portal monitoring to enforce common standards is an essential defensive element of modern maritime security. Figuring out which of these initiatives provides real value should be a near term action.

So, success is described as adequate awareness throughout the continuum, from port through territorial seas to international waters. I should allow that nobody believes this is easy – especially container security – but it is essential.

So what is the product of all this situational awareness? Perhaps the most important dividend of true situational awareness is cueing – knowing who or what to go after. The vast expanses of ocean and complex networks of coastal waterways will defeat perfect knowledge of enemy intent. Cueing is thus required to direct our attention to the most pressing threats. Anyone who has spent time sorting contacts in the South China Sea understands this well.

2. Responsive Decision Making Architecture

Cueing is only a first step. Timely responses require agile and rapid information sharing to support combined or national decision making processes. In the new threat context, it is all about speed of command.

Efficient command response is facilitated by three factors: first, national policies that permit cooperative engagement of threats must be established and exercised. Criminals thrive on gaps in governance or poorly coordinated seams in jurisdiction. The sparsely populated archipelagoes of our region pose obvious challenges. But there are also seams at the transition from territorial to international waters, in the straits accessed by ships of many flags, and in consensus gaps both within and between governments. Our policies must transcend these seams. Second, we need strengthened legal frameworks within which to execute the will of the international community. For example, the grey area between drugs and terrorism and proliferation is very real and perhaps necessary, but certainly self-imposed. Maritime forces need the authority necessary to responsibly turn that ambiguity into a liability for the threat rather than permit it to be a barrier to our security. Third, and once again, our speed of command must operate inside the decision timeline of those who would threaten us. For example, how do we handle hot pursuit to territorial seas? This remains an emotional, but relevant issue. We must streamline national and coalition command and control processes. I can see a point in time where multiple regional maritime coordination centres will be built and linked and facilitate all of which we have just discussed.

3. Expeditionary Military Capabilities

Another imperative is the special relevance of expeditionary military capabilities. Naval, marine, and coast guard forces are inherently expeditionary, but they, too, can be enhanced for a variety of scenarios. In the maritime security context, regional force requirements include tactical intelligence assets, and robust maritime interdiction forces.

Long-dwell intelligence assets are essential elements of our vision for the future. Maritime patrol aircraft – such as in the 'eyes-in-the-sky' initiative in the Malacca Strait with Malaysia, Indonesia and Singapore – contribute in this manner, and unmanned aerial vehicles launched from sea or shore have demonstrated great utility for the future.

Expeditionary forces proved their value in the tsunami relief effort. Maritime platforms matched with helicopter lift and amphibious craft have great utility. Singapore's landing ships provide exactly the required capability. Appropriate high-speed lift and interdiction assets ensure we can respond with regionally tailored power on short notice. High speed lift like the twin hull catamarans built in Australia will be a part of the solution.

Tailored air packages, based and launched from capable maritime platforms, can satisfy a variety of missions ranging from disaster relief to maritime interdiction to sea control.

4. Provide Security in Contested Littoral Regions

The most challenging sea lanes to protect may be those close to land. Our ability to operate in what I call 'the contested littoral regions', poses perhaps our greatest maritime challenge and is the fourth aspect of our framework. Land and resources are contested, jurisdictions overlap, and the environment never cooperates. The most significant threats to our sea lanes are posed by mines, missiles, and submarines in these areas. We tend to ignore this in favour of low end issues. But we have to gain and retain the ability to deal with this combination of high and low end capability.

Although global issues affect the security of every nation, the ability to secure borders and territorial seas is a fundamental responsibility. The reality, then, is that most nations need a coastguard before they need a 'blue water' navy. Once established, integration of coastguard operations with naval forces is essential to eliminating seams at sea. This fact is the basis for the US Coast Guard's 'Integrated Deep Water System' initiative, which improves their ability to sense and share information with forces at sea and with homeland security elements ashore.

Mine countermeasure forces are in short supply and unfortunately anti-submarine warfare capabilities have atrophied. No single technology has proven absolutely

effective against these weapon systems and of course they can wreak havoc on our sea lanes. We will continue to rely on coalition contributions of air and surface forces, as well as uninhabited undersea vehicles, to neutralise these threats. The US Navy's Pacific Fleet is leading an effort to revitalise this essential capability.

The US is developing a littoral combat ship, designed from the keel up to defeat anti-access and asymmetric threats. Agile, stealthy, and modular, this flexible littoral warship will contribute to coalition efforts before the end of the decade. It is especially important that we build ships that can operate in shallow water and deploy off-board systems.

Lastly, the Pacific Theatre and the Persian Gulf are home to some of the world's most acute missile concerns. Growth of existing missile forces, coupled with continuing proliferation threats, demands development of multi-dimensional defences to seamlessly engage a missile in any stage of flight. That missile threat could be as rudimentary as those carried on small vehicles positioned along the shoreline adjacent to a sea lane. Seaborne and airborne cruise and ballistic missile defences, deployable on short notice to the region of immediate need, are a high priority. Recent events have only magnified this requirement.

5. Apply all Elements of Multinational Power

Maintaining maritime security in the 21st century is much more than the application of military capability or the capability of a single nation. Transnational threats demand multilateral solutions, and interagency cooperation plays a key role in applying all elements of national and multinational power. The reason is clear. Pick any country and you will find that homeland security is the province of multiple agencies.

During my last address to this group some 18 months ago, I talked to the lessons of the tsunami relief effort in 2005. Much of what was learned from the multilateral operations – during that operation – apply directly to the military, political and diplomatic aspects of maritime security. Ultimately as with every important security issue in Asia and the Pacific, a multinational solution will be the appropriate approach.

As a reminder, when you look back on the tsunami relief operation, a number of points were germane then and will apply equally as we fashion an architecture to protect our trade. A set of guiding principles will be required at the outset. Speed and tempo will be essential. We will have to remember each nation is proud and sovereign. They have to remain in charge of the effort within their country and territorial seas. This will have to be a unified effort, and inclusive and we must encourage participation by organisations not comfortable with a rigid command structure. Coordinate vice compel or command will be the thrust of the arrangement. It was possible because of a set of habitual relationships – really habits of cooperation that had been established over

many years. Exercises, exchanges, combined training, and well developed relationships are essential.

Conclusion

Let me conclude by thanking all of you here tonight. It is in sessions like this that we will open our eyes to difficult issues and forge new ideas for our future security architecture. Clearly, the light you shed on our Asian energy future and the practical solutions you fashion to improve our security posture will be helpful indeed.

Once again, nobody said it was easy or inexpensive to secure our sea lanes, but clearly it is important and I think we all believe within our reach.

And while no nation can unilaterally control all the variables involved in any transnational threat – every nation can contribute – and every nation has a unique capacity and responsibility to help.

THE ROLES OF NAVIES AND COASTGUARDS

Building a Maritime Coalition for Comprehensive Security in the Asia-Pacific Region

Stanley Byron Weeks

Maritime coalitions in the Asia-Pacific region have much potential to help safeguard the sea lanes which are vital to energy security in and beyond the region. This paper will first consider traditional and new types of coalitions for ensuring maritime security, then address the current US Navy initiative for the '1000-ship Navy' concept. Highlighting the global importance of the broader Asia-Pacific region, the potential for maritime coalitions will be assessed in the four distinct sub-regional contexts of Northeast Asia, Southeast Asia, the Indian Ocean, and the South Pacific. Conclusions then focus, from a US perspective, on how to best leverage existing and potential international maritime partnerships to help ensure maritime security throughout the Asia-Pacific region.

Maritime Coalitions

As we consider the potential for maritime coalitions to help safeguard the vital Asia-Pacific sea lanes, it is important to recognise the evolving nature of such maritime coalitions. In a recent presentation, the British naval analyst Geoffrey Till distinguished between two basic types of maritime coalitions and naval roles.[1] In his typology, 'national navies', in their traditional maritime roles of sea control and power projection in crisis and conflict, deal mostly with other state actors. This has been the traditional focus of formal Alliance relationships such as NATO in Europe and the US bilateral alliances with Japan, Australia, and others in the Asia-Pacific region.

In addition to these traditional maritime roles of navies, new coalitions are possible to respond to today's non-traditional maritime threats, often involving non-state actors. This involves what Till termed 'collective navies' in coalitions to counter the maritime threats of piracy/sea robbery, trafficking (of guns, people, and drugs), terrorism, humanitarian assistance/disaster relief, and marine environmental protection.

Both types of maritime coalitions can help safeguard the sea lanes, shape regional security, and deter threats. Further discussion below will show how both types of maritime coalitions can help ensure Asia-Pacific maritime and energy security, properly tailored for the four sub-regions, each with their own distinct coalition types/prospects. Before considering the Asia-Pacific sub-regions, however, it is necessary to consider the current global US Navy '1000-ship Navy' initiative, as a prime example of new ideas for coalitions for countering today's non-traditional maritime threats.

The '1000-ship Navy' Concept

The development of the US Navy's 1000-ship Navy initiative (also called the Global Maritime Partnership) began with the approval by the US President in September 2005 of *The National Strategy for Maritime Security*, an unclassified document intended to serve as a vision of a coordinated government-wide effort to safeguard US global maritime interests. This top-level strategy guidance emphasised the need for international maritime security cooperation: 'Security of the maritime domain is a global issue. The United States cannot safeguard the maritime domain on its own. We must forge cooperative partnerships and alliances with other nations and with private stakeholders around the world.'[2]

Later in September 2005, the new Chief of Naval Operations, Admiral Mike Mullen (who had extensive experience of, and commitment to, international maritime cooperation from his previous position as the US and NATO commander in the Mediterranean) spoke to the dozens of heads of international navies meeting at the biennial International Seapower Symposium at the Naval War College. The theme for his speech was 'Establishing a Global Network of Maritime Nations for a free and secure maritime domain'.[3] A key point was that this 'new vision must include increased interoperability and close maritime cooperation between the navies and coast guards of the world'. Echoing the new US *The National Strategy for Maritime Security*, Admiral Mullen noted how 'our level of cooperation and coordination must intensify', and that 'no nation today can go it alone, especially in the maritime domain'.

The next step in the evolution of the '1000-ship Navy' concept was the article in the November 2005 edition of the journal *Proceedings* authored by the two top strategy Admirals on Admiral Mullen's staff, Vice Admiral Morgan and Rear Admiral Martoglio.[4] This article identified in more detail the rationale and imperatives for global maritime security cooperation, and the requirements for building this global maritime network.

The rationale states that the emerging security environment of increased globalisation and interdependence makes 'policing and protecting the maritime commons' a high priority for all nations, part of a broader trend of more 'international cooperation on economic and security issues'. Most nations were seen as challenged by 'multi-faceted transnational threats' including maritime piracy, organised crime, smuggling, drug trafficking, illegal immigration, proliferation of weapons (including WMD), and terrorism. There is thus a need to harness 'the powers of the international community's maritime organizations to confront these multi-national transnational threats', particularly since 'no single nation has sovereignty, capacity, and control'. Such cooperation was also seen as paying dividends in other circumstances, such as the international maritime humanitarian relief for the December 2005 Indian Ocean tsunami. Every nation was seen as capable of contributing in some way to security in the maritime domain. Navies were seen as 'the first and predominant contributors' through

their continuing role in 'enabling the peace', but coast guards and the international shipping industry also would contribute.

The overall goal of the Global Maritime Network is to increase security of the maritime domain for the safe use of the maritime commons *by all nations* (emphasis added). This is to be achieved through an increase in maritime domain awareness and by posturing assets to respond rapidly to crises/emergencies. Nations with more capable maritime forces can export maritime security through traditional international maritime cooperation and through security assistance. But the influence of allies, peers and neighbouring nations was also important, as it was recognised that the US Navy did not have the capability or desire to solely assist, and it was also recognised that 'overcoming resistance based on sovereignty concerns is often a delicate issue'.

In a December 2005 speech in London, Admiral Mullen elaborated 'Ten Principles of the Global Maritime Network'.[5] One of these principles further emphasised the earlier *Proceedings* article in its stress on the importance and model role of regional (and sub-regional) maritime security networks, since there is no 'one size fits all' template for international maritime cooperation. After briefly considering the overarching global importance of the broader Asia-Pacific region, the remainder of the discussion below will thus focus on the specifics of the maritime challenges and prospects for maritime coalitions in each of the four major sub-regions of the broader Asia-Pacific region.

The Importance of the Asia-Pacific Region

Others at this workshop have articulated in clear terms the importance of the Asia-Pacific region from global security and energy security perspectives. The vital importance of the sea lanes through the Indian Ocean and critical straits to East Asia in carrying global trade and, especially, energy flows clearly merits our focus on their maritime security. To place this in further perspective, by 2020 it is estimated that Asia will hold 56 per cent of the world's population, (by contrast, the Middle East will hold only four per cent), six of the ten largest militaries, three of the four largest economies, and six of the ten largest energy consumers.

The Four Sub-Regions of the Asia-Pacific Region

Despite the common nature of most non-traditional maritime threats, globally and region wide across the broader Asia-Pacific region, there are four clearly identifiable sub-regions in the Asia-Pacific where these threats vary in extent and where the potential for maritime coalitions also varies. In the remainder of the discussion below current and potential maritime coalitions will be assessed for each of these four sub-regions. For each sub-region, its particular strategic context, maritime challenges, and maritime coalition status and prospects (from a US perspective) will be considered.

Northeast Asia

Strategic Context

The Northeast Asia strategic context reflects the prime geographic intersection of major powers relations in the Pacific. The United States is still the predominant global, Asia-Pacific regional, and Northeast Asia sub-regional power. But it is stretched thin globally, and for the past six years has been distracted by the Global War on Terror, Afghanistan, and Iraq. Despite these distractions, U S policy has responded to the rising importance of the Asia-Pacific region by shifting US naval and air force postures to and within the Western Pacific area.

China is a classic rising power, in and beyond the Pacific. Its complex relationship with the United States - close economic ties, political rivalry, and military wariness on both sides - combined with the unresolved Taiwan issue provides a constant background potential for a major power conflict with the US. China also wields great influence on the Korean peninsula, is growing in influence in Southeast Asia, has political and military ties with a resurgent, more belligerent Russia, and maintains historical animosities and maritime territorial disputes with Japan.

Taiwan remains a potential flashpoint for US-China conflict. Despite increased offers of US arms and some military contacts with Taiwan since 2001, the United States has increasingly come to distrust the populist independence moves of President Chen and his party - given their potential to drag the it into any cross-straits conflict with mainland China.

After a decade in eclipse as a power factor in the Northeast Asia strategic context, the recent economic and diplomatic resurgence of Russia in the Putin era is now notable even in the Russian Far East. Worsening global relations with the United States contrast with closer Russian ties with China and North Korea. Militarily, Russia remains a major nuclear power and its conventional maritime power in the Pacific is gradually recovering.

Japan remains the closest US ally in Northeast Asia and is still the world's second largest economy. Japan is slowly moving toward 'normal power' status with corresponding diplomatic and military influence. But regional historical animosities persist with China and both Koreas, and Japan has maritime territorial disputes with all its neighbouring countries. There is a gradual extension of reach and influence of Japanese military (particularly maritime) forces, and the strong alliance with the United States is being revitalised and reshaped.

The complexities of the Northeast Asia strategic context are illustrated by the situation on the Korean peninsula. North Korea remains the Cold War's residual black hole in Asia, now radiating not just its characteristic militaristic belligerence, but also new

threats of nuclear and missile capabilities and proliferation potential - as well as criminal state sponsoring of counterfeiting and drug trafficking. US and regional and global diplomatic efforts to restrain it (particularly its nuclear development, through the Six Party negotiations) continue, as any regime change by military means is seen by all parties as too unpredictable and potentially dangerous in its consequences. The traditional US ally, South Korea has, in recent years, had an increasingly difficult relationship with the United States, as nationalist sentiment has risen, and also rekindled the maritime territorial dispute (Tok Do) with Japan.

Nature of Maritime Challenges

Given the sub-region's unique conjunction of major economic/military powers and history, Northeast Asia is affected more by traditional big power maritime rivalries and disputes. From a US perspective this maritime sub-region is characterised by formal bilateral Alliances with Japan and South Korea, limited contacts (but a defence commitment) with Taiwan, and wary maritime confidence-building measures with China and Russia. However, new non-traditional threats also exist in this sub-region. The threat of proliferation of Weapons of Mass Destruction and missile delivery systems from North Korea is a major concern and a spur to training for maritime interdiction under the global Proliferation Security Initiative (PSI). The PSI is supported by the United States, Japan, and Russia in this sub-region, while China and South Korea remain aloof from its activities.

Terrorism is also a concern in Northeast Asia, though less for the usual Islamic extremism than from past North Korean history of state terrorism, as well as some domestic terrorism history in Japan and China. Piracy and sea robbery have been minimal in Northeast Asian waters, but all the countries of the sub-region are concerned about the security of their vital shipping lanes (for energy and trade) passing through the Malacca Strait area of higher piracy/sea robbery threat. Finally, as regards trafficking, drugs from North Korea, and small arms from China and Russia have been a concern.

Maritime Coalition Status/Prospects

The US Navy has its own forward-deployed carrier and amphibious groups in Japan, as well as traditional formal maritime alliance cooperation with Japan and South Korea. For the foreseeable future, the US maritime alliance with Japan is likely to continue to deepen, with cooperation in sea-based missile defence, and with the Japanese maritime forces increasing their reach under somewhat less restrictions. There is also a potential for enhanced US blue water naval cooperation with the Republic of Korea Navy, as it transitions from a strictly peninsula defence role to a greater blue water focus, with capable new ships (including AEGIS-equipped destroyers) and destroyers.

Apart from traditional US maritime defence cooperation with long time Northeast Asian allies, there is considerable potential for broader cooperation in the sub-region under the 1000-ship Navy concept to deal with common non-traditional maritime threats. In this regard, the United States should strive for greater Chinese maritime cooperation through the recent process of building closer navy-to-navy and coast guard agencies ties.

Southeast Asia

Strategic Context

A decade after the economic crisis in 1997, ASEAN has renewed economic, and (to a lesser extent) political, dynamism. The ASEAN-initiated ASEAN Regional Forum (ARF) is the only region wide Asia-Pacific multilateral security dialogue forum. ASEAN has also developed as the centrepiece of broader external political dialogues such as ASEAN Plus 3, and ASEAN-Europe. The sub-regional ASEAN nations also play a strong role in the region wide Asia Pacific Economic Cooperation (APEC) forum.

Within the sub-region, a number of traditional and non-traditional security problems exist. These have been problems of Islamic terrorism in Indonesia, the Philippines, Singapore, Malaysia and southern Thailand. Maritime territorial disputes persist, especially in the South China Sea (Spratly Islands, Paracel Islands). And, despite recent improvements, piracy and sea robbery remain major concerns in Indonesia, the Malacca and Singapore straits, and the Philippines.

The Southeast Asia sub-region is also characterised by residual Alliance relationships of the United States with the Philippines and Thailand, close US-Singapore security cooperation, and the Five Power Defence Arrangement (FPDA) of the United Kingdom, Australia, and New Zealand with Malaysia and Singapore.

Nature of Maritime Challenges

The Southeast Asia sub-region features traditional interstate maritime territorial disputes, notably in the South China Sea. But the most notable feature of the sub-region's maritime challenges is the extent of serious non-traditional threats. Piracy and sea robbery remain a major concern, especially in the vital Malacca and Singapore straits area. Terrorism ashore raises concern over the threats of maritime terrorism in ports and at sea, as well as the use of the sea lanes by terrorists. Trafficking (of guns, people, and drugs) through these vast and often minimally patrolled sea lanes is also a real concern. Finally, the sub-region is subject to many natural disasters - earthquakes and tsunamis, as well as typhoons - where the need and role of maritime forces in humanitarian assistance/disaster relief is great, as demonstrated by the maritime-led multinational response to the 2005 tsunami.

Maritime Coalition Status/Prospects

From a US perspective, enhanced maritime cooperation in the Southeast Asia sub-region can build on residual traditional maritime alliance ties (of both US bilateral alliances and the FPDA), as well as recent bilateral and multilateral maritime exercises (such as the US annual Cooperative Afloat Readiness and Training (CARAT) exercise series, counter-terrorist exercises, etc.), and growing sub-regional maritime cooperation (such as the Malaysia-Singapore-Indonesia patrols in the Malacca and Singapore straits area.)

The US 1000-ship Navy initiative is particularly relevant for this sub-region, and might best focus on enhanced information-sharing and assistance in maritime capacity-building. But the United States will need to have great sensitivity to sovereignty concerns, which are particularly keen in this (post-colonial) sub-region.

Indian Ocean

Strategic Context

In the Indian Ocean area, the current strategic context features the rise of India as a major economic, political, and military (especially maritime) power. A troubling backdrop in this area remains the history of India-Pakistan conflict (especially over the unresolved Kashmir issue), and the more recent acquisition of nuclear weapons by both nations. Also of concern (particularly to India) are China's maritime ties and potential port access in Burma and Pakistan. In both Pakistan and Bangladesh, the threats of Islamic terrorism and arms trafficking are serious concerns. Violent insurgencies have only recently ended in Nepal, and are intensifying again in Sri Lanka. South Africa is now incorporating new modern maritime forces. The US military (especially naval) presence at the Indian Ocean base in Diego Garcia is of renewed importance given continuing operations in Afghanistan.

Nature of Maritime Challenges

The lengthy sea lanes from the Strait of Hormuz to the Malacca Strait are vital to global trade and especially to Asian energy security. Threats of piracy and sea robbery, not to mention maritime terrorism, raise concerns for the security of these sea lanes across the Indian Ocean. There is a need to counter trafficking at sea, particularly in small arms. As India and Pakistan modernise their navies, the potential maritime consequences of a conflict between these two nations worsen. Perhaps most consequential in the longer term is the potential maritime competition between India and China in (and beyond) the Indian Ocean.

Maritime Coalition Status/Prospects

Much has changed in recent years regarding the status and prospects for maritime coalitions in the Indian Ocean area. There has been a dramatic increase in Indian Navy (and Indian Coast Guard) exercises with the United States and with other major power and regional maritime forces. In 2002, the Indian Navy coordinated with the US Navy the escorts of vital shipping in the Malacca Strait. The recent trend is toward increased operational cooperation of US and Indian Navy forces. The Pakistan Navy has also become a significant partner in actual multinational naval coalition operations in the Arabian Sea, even twice assuming command of that coalition naval Task Force.

From the US perspective, to further the 1000-ship Navy in the Indian Ocean area, we should build on the growing US Navy operational relations with India (and also, in the Arabian Sea area, with Pakistan), with a focus on the security of shipping across the Indian Ocean sea lanes. Additional useful approaches would be to leverage the periodic presence of naval forces from Europe for operations in the Indian Ocean, as well as reaching out to deepen relationships with the new South African naval forces in the Western Indian Ocean area.

South Pacific

Strategic Context

The strategic context in the South Pacific sub-region has been changing in recent years. From the United States perspective, its territories of Guam and the Commonwealth of the Northern Marianas Islands have received renewed attention as secure American territories for basing of military forces for power projection into East Asia and beyond. The US has commitments to defend not only these and other US territories in the South Pacific, but also has defence commitments to numerous other former trust territory island states in the Central and South Pacific which are now formally independent. Australia, a long time formal ally of the United States under the ANZUS Treaty, wields increasing influence as a major global and regional ally, and US defence relations with New Zealand have improved. In recent years internal weaknesses (economy, corruption, ethnic conflict) have troubled many other South Pacific island nations such as Papua New Guinea, Fiji, East Timor, and the Solomon Islands. Australia and New Zealand (and France) have key security and support roles in these and other South Pacific island nations.

Nature of Maritime Challenges

The nature of the maritime challenges varies throughout the South Pacific sub-region. For Guam and other US territories, the challenges are primarily in homeland defence. For the recently troubled South Pacific island nations, their internal weaknesses

complicate their defence of their vast maritime exclusive economic zones against illegal fishing, smuggling, and crime. In some cases, these weaknesses are so pronounced that these island nations are almost failed states, with dangerous illegal trafficking of guns, people and drugs and violent ethnic conflict. Overall, the South Pacific island nations need to enhance their maritime capacity to patrol and defend their own waters and maritime resources. From a broader alliance perspective, the United States needs to continue to tighten US-Australia alliance cooperation, particularly in the maritime domain, as well as restoring closer naval ties to New Zealand.

Maritime Coalition Status/Prospects

In the South Pacific, the United States can further tighten its regional and global maritime coalition with Australia by leveraging cooperation with new Australian diesel submarines and future AEGIS-equipped destroyers and large amphibious ships, as well as exercising whenever possible with the new Royal New Zealand Navy ships. The United States should encourage a lead role for Australia, New Zealand, and France (in their respective island areas of influence) to help these island nations build their maritime capacity. (Australia's longstanding Pacific Patrol Boat program is an excellent model for such capacity building.[6]) Finally, the United States should continue to increase coast guard and navy cooperation with the Pacific island states, possibly by basing a dedicated 'Global Fleet Station' ship in Guam to conduct rotational deployments throughout these islands for exercises, maritime capacity-building, and information sharing support.

Conclusions

There is no 'one size fits all' coalition model for the Asia-Pacific region. Vast distances and marked differences in the strategic contexts and maritime challenges in four distinct sub-regions mean that the United States must help craft many varied 'maritime coalitions'.

The first priority for the United States should be to maintain and enhance critical traditional Alliance-type maritime ties - especially with Japan, Australia, South Korea, the Philippines, and Thailand, as well as less formal partners Singapore and New Zealand. The United States can also encourage these nations to join the 1000-ship Navy initiative to deal with common non-traditional maritime threats.

The second priority should focus US maritime forces on the two rising Asian major powers, China and India. The United States should seek to develop a real US-China maritime operational relationship, focused initially on search and rescue and humanitarian assistance/disaster relief, then broadening to include operational cooperation in interdicting the common non-traditional threats to order at sea (WMD proliferation, terrorism, trafficking, piracy/sea robbery) that are the focus of the 1000-

ship Navy initiative. Recent US-India maritime operational cooperation should be further developed, focusing on coordination of sea lane security for energy and trade shipping flows across the Indian Ocean (also with maritime forces of Australia and perhaps South Africa). The United States should also encourage India to contribute to coalition maritime counter-terrorism operations, as Pakistan has done.

There are numerous other areas of importance for building maritime coalitions in the Asia-Pacific region. The United States must work to implement the 1000-ship Navy initiative cooperation against non-traditional maritime threats with other non-Allied key ASEAN maritime states, particularly Indonesia, Malaysia, and Vietnam.

In the South Pacific sub-region, the United States must focus on maritime capacity building for the island nations and coordination with lead sub-regional nations Australia, New Zealand, and France, perhaps through the Pacific Islands Forum. Overall, the 1000-ship Navy initiative can help spur maritime cooperation and capabilities for coalition operations in all four sub-regions. But the United States will have to be very sensitive to concerns of sovereignty (and 'face') in all its dealing with Allies, major powers and smaller post-colonial states. In this regard, it would be of value for the United States whenever possible to leverage and enhance existing multilateral regional maritime forums – such as the Western Pacific Naval Symposium (WPNS), the Asian Regional Forum (ARF) maritime meetings, the Council for Security Cooperation in the Asia Pacific (CSCAP) Maritime Working Group, and the North Pacific Coast Guard Forum.

Notes

1 Professor Till's presentation was made at the September 2006 International Maritime Symposium at the Applied physics Laboratory of Johns Hopkins University in Laurel, Maryland.

2 The White House, *The National Strategy for Maritime Security*, September 2005.

3 'CNO Calls for More International Naval Cooperation', *Navy Newsstand*, 21 September 2005.

4 Vice Admiral Morgan and Rear Admiral Martoglio, 'The 1000-Ship Navy: Global Maritime Network', US Naval Institute *Proceedings*, November 2005, pp. 14-17.

5 US Navy Office of Information, 'Edited Remarks by Admiral Mike Mullen', RUSI Future Maritime Warfare Conference, London, England, 13 December 2005.

6 Midshipman Steve Bell, 'The Pacific Patrol Boat Project', in Gregory Gilbert and Robert Davit (eds), *Australian Maritime Issues 2005: SPC-A Annual*, Papers in Australian Maritime Affairs, No. 16, Sea Power Centre – Australia, February 2005.

Naval Control of Shipping

Andrew Brown

> *I consider the protection of trade the essential service that can be performed.*
>
> Lord Horatio Nelson

Naval Control of Shipping (NCS) is probably one of the most misunderstood and most confusingly used expressions in any navy. In the Royal Australian Navy (RAN) the term 'NCS' could, depending on its context, mean a Branch of the Officer Corps, the RAN's organisation charged with maritime trade protection or a body of doctrine with attendant procedures for the protection of maritime trade. When I was a Sub-Lieutenant, I was a NCS Officer who was part of NCS and I was involved in NCS operations! There were times when even I was confused as to which NCS everyone was talking about: it soon became apparent that those talking were sometimes just as confused. Within NATO alone the term 'NCS' has at least four possible meanings and, so as to avoid any such confusion, in this paper the term 'NCS' is a broad reference to the doctrine(s) and procedures that exist for the protection of maritime trade.

Brief Historical Overview

The concept of a nation protecting its maritime trade has been around for, quite literally, thousands of years. For as long as nations have traded by sea there has been a need, one way or another, to protect their trade from the navies of rival nations, from what were known as privateers or from pirates.[1] Over the centuries, nations, especially the United Kingdom (which once was completely and largely still is dependent on its maritime trade for its survival) developed mandatory procedures and what would today be termed NCS doctrine to protect its trade principally by the use of the convoy system. By the 16th century naval powers such as the British and the Spanish regulated ships so as to require them to form convoys.[2] By the time of World War I the concept of maritime trade protection had reached a state that would come to be known as NCS and the convoy system was well known (even if not as well understood as should have been the case). All modern history students have at least a passing acquaintance with the Battle of the Atlantic of World War II and the struggle of the Allied convoys against German submarines. Convoys were, and still can be today, a very successful form of protection and traditional NCS (in the strictest use of the term) doctrine is largely about convoys, so today when one hears the term 'NCS' one still thinks almost exclusively of convoys.[3]

NCS, however, did not just happen to work. It was made possible by the fact that cargoes for the most part were carried in ships owned, operated by and manned by citizens of the major maritime nations which developed, over time, an acceptable and practical legal structure that required their shipowners to comply with naval sailing directions. This is because the 'control' function was then (as it is now) tied to a merchant ship's nationality and this was a determining factor. For example, a ship flying the British Red Ensign would be owned by British interests and be crewed by a British crew: a direction to such a ship from its Government would be obeyed (usually without question) not only for legal reasons but also because for trading nations such as Great Britain, maritime trade was closely linked with the nation's prosperity as much in the public's mind as in the Government's. This close alignment of legal and commercial interests enabled NCS to work. Certainly there were those who disobeyed naval orders (even at the height of the Battle of the Atlantic there were 'rompers' and 'stragglers', ships that went ahead of the convoy or lagged behind even though they invariably paid a heavy price for doing so) and the organisation necessary to successfully integrate convoys of ships into ports with limited facilities (wharfage, cranes, warehousing and road and rail infrastructures) was enormously complex and was not always efficient. These structural and logistical difficulties were, however, largely confined to (usually well enough defended) ports and anchorages. The underlying basis for the NCS system at sea was commercially sound, legally reinforced and was at least proven to work against a professional and determined enemy far better than independent sailing.[4]

The Modern Day Lack of 'Control'

These two prerequisites – a legal framework tied to a ship's nationality – for a working NCS system existed up until the mid 1960s. However, by the late 1960s whilst the legal framework remained the ships, to coin a phrase, had sailed: 'flagging out' had begun slowly at first but had then gathered pace. By the 1970s most maritime nations were waking up to the fact that fewer and fewer merchant ships engaged in their international trade were flying their nation's flag.[5]

Some nations have experienced social and political reluctance in accepting this fact. For example, in Australia overseas foreign-flagged vessels are required to obtain a permit to carry domestic cargo around the Australian coast but such permits are routinely granted as there are no other options available. Even though the exception has become the rule the law remains in force and, as it is quite easy for foreign vessels to obtain the required permit, there is little practical imperative or political will for that law to be repealed.[6] The Jones Act of the United States is another example of a law that simply no longer achieves what its architects envisaged.[7]

As a consequence, NCS (in its traditional sense) is rarely found nowadays. The world has moved on from the concept of world wars (perhaps these will return, but hopefully not) and from the concept that any one nation can 'control', both legally and practically,

any significant number of merchant ships as the 'control' function is tied to a merchant ship's nationality. This reliance on a merchant ship's nationality (commonly referred to as its 'flag') as the foundation for the NCS system – once its greatest strength – now provides its greatest difficulty. As with the world generally the world of commercial shipping has also moved on with the control systems that navies have traditionally applied to merchant ships becoming progressively more difficult to implement, and therefore more irrelevant for all practical purposes, for the past 30 years. Merchant ships now change registries, and thereby their nationality, with great ease and few of the world's major trading nations still maintain significant trading fleets compared to the number of ships calling at their ports: most ships fly 'flags of convenience'.[8]

Further, it has now become rare for the crew of a merchant ship to all have the same nationality let alone all be of the same nationality as the ship's flag. Rather, it is common for the ship's owners to be of one (or more) nationality, the charterers to be of another, the crew to be of a variety of nationalities (although every non-Australian merchant ship I visit seems to have a Cadet from Ghana on board!) as are the cargo interests and so the list goes on. It is quite common for the nationality of the ship's flag not to match the nationality of any of those interests and, as a practical consequence, the 'control' that once could be traditionally exercised over such ships by the navies of the major trading nations has largely disappeared.[9]

This issue of lack of real control over merchant shipping was known about and discussed during the latter years of the Cold War, but largely ignored. The former Soviet Union (with the Warsaw Pact), the People's Republic of China and the United States (with NATO and other allies, such as Australia) were ranged against each other. Possible battle lines were very clearly drawn and every so often border incidents and 'hot wars' of various sizes would erupt around the globe. The potential for another world war was very real and, so far as maritime trade protection was concerned, legal niceties about real ownership and crew nationality were dealt with as necessary or, more often, just conveniently overlooked by all parties. For example, during what has become known as The Tanker War (1980-88) between Iran and Iraq, crude oil tankers voluntarily submitted to foreign warship protection in the Persian Gulf or reflagged (in the case of some Kuwaiti tankers) to the United States in order to obtain formal protection from the US Navy.[10]

Core Difficulties in Current Day Trade Protection

With the end of the Cold War faded the possibility of world war and for many the concept of trade protection became an anachronism. The questions most often (and not unreasonably) asked were 'Protect against whom?' and 'Protect against what?' The last ten years have shown, unfortunately, the answers to those questions. State-sponsored terrorism, once properly feared as a potential major source of disruption to maritime trade (and it still exists, of course), has been replaced by non-state terrorists operating

for a variety of motives within a variety of structures and seeking to achieve a variety of ends. Piracy is still very active in many parts of the world – currently the seas off Somalia feature almost daily in piracy reports – and the potential overlap between terrorism and piracy is a live issue.

Although this appears to be a significant change in fact, from both the practical and legal point of view, little has changed. Outside of their respective territorial seas, navies can control (that is, give orders that will be obeyed) very little maritime trade. Certainly, they can control the vessels that fly the same flag as they do, or fly the flag of nations that have appropriate bilateral or multilateral arrangements with their own nation, but even then they can do so only if the appropriate legal framework has been put in place and is applicable or is activated to meet the specific situation. Indeed, absent reasons justifiable under international law even within a nation's territorial sea rights of innocent passage cannot be infringed. The position becomes even more difficult in a nation's Exclusive Economic Zone and, of course, on the high seas navies must be very cautious indeed.

For navies generally this is far more than just a legal or operational problem: it represents a very real cultural problem as well. Navies are, by definition, inexorably connected to the nations whose flag they fly and naval officers, as a group, can find it very difficult to understand why merchant ships to do not view nationality the same way a warship does.[11] The concept of a 'multinational merchant ship' is quite alien to a warship, yet if maritime trade is to be properly protected it must not only be understood but it must be embraced as navies may not be able to formally control much shipping, but there is no doubt in the minds of their respective governments that they are responsible for enforcing, one way or another, government policy at sea and for protecting trade.

There is yet another layer of complexity to this problem and it is found in the now well-established concept of the global nature of manufacturing, sales and distribution. This transformation (generally referred to as globalisation) has impacted on maritime trade protection. Most countries were always reliant upon seasonal imports of, for example, grain or oil in order to survive and large stockpiles of grain or raw materials such as iron ore will still be found in many places. But as large as those stockpiles are they require constant replenishment and in today's trading world stockpiles are the exception rather than the rule. Most commodities, such as crude oil, refined petroleum products, motor vehicle spare parts, telecommunications and computer equipment (to name just a few) are not stockpiled in any meaningful way or at all but rather supplies are wholly dependent on continuous deliveries arriving by sea.[12] The supply chain no longer stretches, for example, in the case of crude oil from the oil well to the refined product consumer with large staging posts in almost an uninterrupted line. Many countries, Australia included, have comparatively small stocks of crude oil or refined

product on hand and few countries can afford the luxury of holding large quantities of crude oil in reserves.[13]

Coupled with this is the relative inflexibility of many merchant ships, which these days are often built not only to carry specific cargoes and to a design suitable for specific ports but are often equipped with engines best designed for the bunkers available on certain routes. By their very nature oil and gas tankers are very specialised as are the loading and discharge facilities found in the ports that are serviced by them.

Defence of Trade – Within or Without Strategic Alliances?

Into these complexities of modern maritime trade can now be added the fact that a nation's principal trading partners need no longer be those with whom it has either traditional or treaty based strategic or defence alliances. Australia is a case in point. Australia's major strategic partner is the United States and the well-known ANZUS Treaty underpins that alliance. However, consider Australia's major export trading partners for the year 2005-06 for goods and services in order of precedence: Japan (A$35.6 billion), China (A$23.7 billion), the United States (A$15.6 billion), the Republic of Korea (A$13.9 billion) and New Zealand (A$12.7 billion).[14] If the value of goods alone is listed, the United States' placing drops considerably. With respect to imports into Australia, China ranks second only to the United States. Within only a matter of years it is expected that Australia's most important trading partner will be China.

From Australia's experience this is somewhat of a novelty. Australia's trade relationships have, to date, always paralleled its defence alliances. Australia was formed by the federation of six former British colonies and, not surprisingly, its trade links formed part of the British Empire in its early (and the Empire's dying) days. It looked to the United Kingdom for strategic support and as its protector until the Fall of Singapore in World War II. After that it looked (and still does look) to the United States for strategic support but although its major trading markets changed from the United Kingdom to North East Asia those new markets operated under the same or similar strategic defensive arrangements as applied to Australia.[15] Accordingly, Australia's arrangements for the defence of its maritime trade dovetailed neatly into its broader defence and strategic alliances.[16]

However, the growth of China into a world power and possibly into the next, or one of the next, superpowers has resulted in its burgeoning requirements for natural gas, coal and iron ore (to name just three examples) and Australia has moved to supply much of what China requires. In doing so Australia has fostered and, it hopes, secured a major long term trading relationship with a nation that falls well outside its current strategic alliances. That relationship is extremely valuable to Australia and, one hopes (from the Australian perspective!), equally valuable to China. As such that trade must be protected from external interference as much as possible and this must occur within

the context of Australia's current strategic defence alliances and obligations. Such are the changes that have occurred in the world over the past decade there is simply no reason why this should not be possible. Indeed, from Australia's point of view alone (and doubtless also from China's) it must occur.

Protection of Trade – A Way Ahead

The key, it is suggested, to somehow reconciling what may appear to be two quite divergent interests – that of strategic alliances which include trade protection with protection of trade outside of those alliances – is to accept the proposition that by taking steps to protect bilateral or multinational trade in a given region, nations are accepting that international maritime trade is important to the nations involved, that such steps can legitimately be taken outside of existing formal defence alliances, and that procedures must be established within each concerned nation to monitor the maritime trade which is vital to its interests and to protect that trade when and where necessary.

Two issues fall out of the adoption of such a proposition. The first is that, although the steps that might be first taken to give effect to it are purely procedural or administrative, it is an active (as opposed to a passive) step nonetheless. It is a step that proclaims to the international community that a nation openly admits that maritime trade is vital to its national well-being and those who contemplate interfering with it will be discovered and, by implication, do so at their peril. The second is that even for a nation with the military and industrial capacity of the United States it soon becomes apparent that no one nation has the capacity to monitor and protect all of its maritime trade all of the time. Every trading nation must rely on its trading partners for assistance.

In naval operations this is somewhat unusual for a number of reasons. In most cases naval operations involve the prosecution of a target in an area of operations. If the target is destroyed or leaves the area of operations then, broadly speaking, the prosecution is considered successful. However, when defending maritime trade this is no longer adequate. So far as maritime trade is concerned these days, the area of operations is the world itself. Defending merchant ships in a territorial sea or in an adjacent area of operations is not sufficient. Unless the merchant ship being protected departs on time, safely travels its route and arrives at its intended destination in a timely fashion then 'the enemy' (whoever or whatever that may be) has scored a victory. To do this effectively at any operational level a nation must know what ships to protect, where those ships are, their destination and which nation or assets are best suited to assist or protect them in any given circumstance.

In this environment, and for the underlying reasons detailed earlier in this paper, common NCS doctrine has now evolved from 'naval control of shipping' through a number of intermediate post-Cold War stages into 'naval cooperation and guidance

for shipping' (NCAGS). Agreed procedures based on that doctrine can be established in any region to keep track of strategic or 'vital' cargoes (such as oil supplies) and to actively protect them (although usually advice or guidance is all that is required) if necessary. Experience has shown that in order to achieve what can be a very cost effective form of NCS every concerned nation needs to become part of an appropriate group of nations and accept that each participating nation in that group will be responsible for the protection of all maritime trade that passes through a specified area. Implicit in this is that the nations concerned are prepared to accept that other nations will look after their assigned areas, and that responsibility for these areas is not tied in any way to territorial claims but rather to an acceptance of the reality that these days trade protection is every nation's business.

One may ask whether what is proposed is realistic or, at best, over-simplistic. Is it possible to implement such a system at all let alone have one that works on a daily basis? The short answer is that it is possible and there are well-established and well-trialled examples of just such relationships in the Asian region. Since the 1950s the Radford-Collins Agreement has *inter alia* provided for just such a system. The very early versions of this Agreement have recently been declassified and it shows the establishment of a system that is very much orientated towards traditional NCS procedures.[17] Although that is not a particularly useful example in today's geopolitical environment it does illustrate the point of taking responsibility for trade protection for the common good.

Pacific Indian Ocean Shipping Working Group

A far more useful, but much less well-known, example is the Pacific Indian Ocean Shipping Working Group (PACIOSWG).[18] The PACIOSWG was established to advance NCAGS doctrinal and procedural issues in the Pacific and Indian Oceans and to apply and exercise those agreed doctrine(s) and procedures. Combined exercises regularly take the form of the BELL BUOY exercise series and NCAGS activities are incorporated into other exercises and training events. The current members of the PACIOSWG are Australia (which also guards on New Zealand's behalf for any issues of mutual interest – Australia conducts separate NCAGS exercises with New Zealand), the United States (which also guards for Japan), Canada, Chile, the Republic of Korea, the United Kingdom – which is also a member of the NATO Shipping Working Group (NATOSWG), and is the link between these two Groups and most recently South Africa. Singapore is often an observer at BELL BUOY exercises. France (which has, of course, substantial interests in both the Pacific and to a lesser extent Indian Oceans) was a member of a predecessor to the PACIOSWG some years ago but, regrettably, did not believe continued membership of the Group was essential.

There are several points to be made about the PACIOSWG not only as to what it is but equally as important as to what it is not. Firstly, although it shares a very similar name

to its NATO counterpart, unlike the NATOSWG (which was a child of the Cold War, so to speak) the PACIOSWG was established as the Cold War wound down in response to the realisation that although the possibility of a world war had receded there was a need to ensure that the communications links, exercise programs and expertise in trade protection that had been developed during that time between trading nations were not lost.[19]

Second any nation in the Pacific and Indian Ocean regions is free to apply to join the PACIOSWG. No one nation controls the PACIOSWG, although the web site is hosted in Australia, and all decisions on matters such as membership are by unanimous vote.

Third (and this is made easier by the fact that it is common to most NCS systems worldwide) most NCAGS doctrine and procedures are unclassified, enabling them to be easily transferred to or taught in new member countries. This should not come as a surprise: for many years most of the doctrine and procedures for trade protection were either unclassified or were classified at a very low level as most of them (in truth) are based on efficiency, common sense and a working knowledge of the industry that they are designed to protect. Of course, once data on cargo and shipping movements is added in, operational security becomes a live issue but for most exercises real world shipping movements are used and, as these are not confidential, so security of data is not important.

Fourth, and this is often not appreciated, this is an international maritime trade protection Group that operates outside traditional strategic and defence alliances and has done so for years. From Australia's point of view, its membership of the Group is not inconsistent with its separate strategic arrangements with, for example, the United States although both countries are members.

Some Lessons Learned

Australia's experience in maritime trade protection in two World Wars and the Cold War coupled, much more recently, with its membership of the PACIOSWG has enabled the RAN to learn and to have reinforced a number of valuable lessons in maritime trade protection.

First, dedicated maritime trade organisations need to be established within navies that understand not only how merchant shipping and the maritime industry works from a commercial point of view but the susceptibilities of the nation's economy to specific trade disruption, such as vital or strategic shipments, regional disruption, specialist shipping, choke points, port redundancy, specialist cargoes, rear area infrastructure sensitivities and redundancy and the like.

Second, that maritime trade organisations must be integrated into the naval/joint/combined operations staff so that senior commanders always take maritime trade issues

into account when formulating a course of action, and that it regularly exercises with its opposite numbers in other navies.[20] This will inevitably result in maritime trade organisations being required to be well trained and adequately manned but this can be done for the most part by Reservists on a part time basis (in most navies a cheaper option than permanent staff) and most of the exercises required can be 'command post exercises' focusing on common signals and administrative procedures (once again, an inexpensive option).

Third, a great deal of effort must be put into monitoring the progress of merchant ships and the issue of 'purity of the plot' must be understood and addressed. Experience has shown that this latter point can become a difficult issue to both conceptualise and to overcome. The general operations plot in an operations room displays known information in a historical format: that is to say every icon that appears on the plot represents a ship's or aircraft's reported position as at a set date and time. There are several reasons why this occurs, but foremost it is because contacts are reported with a position as at a set date and time and warships usually positively report their position and intended movements at a prearranged date and time or in certain prearranged circumstances. On the other hand, a merchant shipping plot is a prognostic plot: it reports as fact what the signals traffic has indicated will occur at some time in the future unless another signal has subsequently been received that cancels any predicted movements. In other words, merchant ships (according to merchant shipping plots) sail when they are meant to sail along the projected route and arrive on schedule unless somebody says something to the contrary. This difference between the manner in which the two plots are maintained must be appreciated or else the overall surveillance picture will be compromised and confusion (possibly with tragic consequences) can be the result. There is no doubt that the historical plot is the more accurate but the sheer number of merchant shipping movements and the lack of appropriate communications equipment on merchant ships means that a prognostic plot is the only practical solution for merchant shipping: and, in fairness, it works very well most of the time.[21]

Fourth, the commercial sensitivities of the shipping information received must be understood and respected. A maritime trade organisation will rapidly lose the respect of the maritime industry it is designed to protect if it does not behave in a professional fashion and nowhere is that more important than in respecting the commercial confidentiality of information passed on for protection purposes only. Once respect is lost, it can take years for it to be rebuilt.

Fifth, a wide variety of procedures must be developed the object of which is to ensure that maritime trade is affected as little as possible by threats or contingencies. These must provide for a series of measures scaled to the nature of the threat to merchant shipping in any particular area, whether that be a traditional military threat or otherwise. These measures can range from the provision of briefing, debriefing and routing information to the establishment of shipping control points, communication

reporting gates, movement control and, only in the event of extreme threats, lead throughs, escorting or convoying.[22]

Applicability to Security of Asian Energy Supplies

From the point of view of security to Asian energy supplies, what will all this achieve? Actually, it could achieve a great deal and for comparatively little cost.

First, it will show that in an uncertain world full of non-state aligned terrorists who have demonstrated an intention and capacity to attack merchant shipping that trade protection alliances can operate independently of traditional strategic and defence alliances and, additionally, nations will be proactive in securing their own and their trading partners' energy supplies.[23]

Second, properly conducted this will lead to the development of respect between participants and, whilst not weakening or altering existing alliances, will leave open channels of communication on a matter of common interest: the protection of trade. History teaches that if nations can talk on matters of common interest they will usually be prepared to discuss more controversial matters in order to defuse them.[24]

Third, as is commonly taught in defence force staff colleges, most wars are caused, one way or another, by trade related issues. In matters such as the future development of potential superpowers and, indeed, the future of the world generally the path ahead of all of us is unclear. If nations in the Asian region are prepared, at least in the area of maritime trade protection or possibly even more restrictively in the area of the security of maritime shipments of oil and gas, to agree that certain merchant shipping needs to be monitored and, if necessary and to the best of their ability, protected then a potential area of international dispute will not exist.

These are not such philosophical statements as may first appear. On the contrary, the time to establish procedures to safeguard trade in general and shipments of oil and gas to and through Asia is fast running out. There is a growing body of evidence that the world will soon reach, if in fact it has not already reached, what is known as 'peak oil' and 'peak gas'.[25] Whether in fact either of those two points has been reached is largely irrelevant from the point of view of trade protection: however, it becomes very relevant indeed when nations generally form the view that point has been reached. By that time it will have become apparent that, unlike today where oil and gas prices fluctuate but purchasers will always be able to buy what they need providing they can pay the market price, some purchasers will not be able to purchase what they need irrespective of what they are prepared to pay. It will be vital, when that time comes, to safeguard all seaborne oil and gas shipments and it will be too late to establish the organisation, doctrine, agreed procedures and trained personnel in order to take on this task. These things take time to establish, appropriate personnel must be recruited, trained, retained (always an underestimated factor) and regularly exercised both

on a national and on an international basis for any NCS procedures at any level of operations to be effective.

Conclusion

The development and maintenance of NCS doctrine and procedures could never be considered one of the more glamorous or action-packed jobs in any navy, but it is undoubtedly one of the, if not the, most essential. NCS provides the framework within which all trade protection operations are conducted – and it takes time to professionally develop and maintain that framework. The time to start developing NCS generally in the Asian region to safeguard future energy supplies will not be some time in the near future, nor even today. The time to start attending to these matters was yesterday.

Notes

1 For example, during the Peloponnesian War from c. 430BCE both Sparta and Athens conducted a *guerre de course* and implemented blockades. British merchant shipping suffered greatly at the hands of American privateers during the American War of 1812.

2 See J Winton, *Convoy: The Defence of Sea Trade 1890-1990*, Michael Joseph, London, 1983, pp. 12-16. It is worth noting that although equipment has changed the basic need for and the fundamental doctrine behind the successful defence of merchant shipping by the use of NCS procedures remains basically unchanged.

3 See generally Winton, *Convoy*, chapter 20 for an excellent analysis on the devastating effect on the Japanese economy in World War II consequent upon the US Navy's submarine *guerre de course*, made largely successful by the Imperial Japanese Navy being disinterested in appropriate NCS measures. It should be noted that modern NCS doctrine does contemplate some protective measures aside from convoys.

4 A useful analysis of how the British Government has, over the centuries, relied upon naval protection of its maritime trade and the price it has paid when it has failed to do so can be found in DW Waters, 'The Science of Admiralty', *The Naval Review* Vol. LI, No. 4 and Vol. LII, No. 1 to No. 4, 1963-64.

5 The Australian Shipping Register is mostly comprised of yachts, fishing vessels, tourist and pleasure craft. Only 40 vessels on the register are merchant ships, with only 20 regularly engaged in overseas trade.

6 Australia's Coastal Trade Licence and Permit System (as this form of cabotage is known in that country) is authorised by Part VI *Navigation Act 1912*.

7 Formally the *Merchant Marine Act 1920*. A form of cabotage designed *inter alia* to protect American shipyards and encourage the growth of the US Merchant Marine, its practical result is that whilst internal maritime trade is carried by US flagged vessels, 97 per cent of international trade is carried in foreign flagged vessels, overall US flagged shipping is older than the world average, the US builds only 1 per cent of the world's merchant fleets and is effectively priced out of world ship building markets. See US Department of Commerce:

National Security Assessment of the U.S. Shipbuilding and Repair Industry (003-009-00719-4), May 2001.

8 A term traditionally used to describe merchant ships registered in any number of small nations whose owners are not nationals of those countries. It is still a useful enough but still slightly derogative term. The utility of the term will probably decline unless there is a reversal of current registration trends.

9 G Till, 'A Changing Focus for the Protection of Shipping', in Andrew Forbes (ed), *The Strategic Importance of Seaborne Trade and Shipping*, Papers in Australian Maritime Affairs No. 10, Sea Power Centre – Australia, Canberra, 2003.

10 Lloyd's of London estimated that nearly 550 vessels had been damaged and hundreds of merchant seamen killed as a result of attacks principally, but by no means solely, by Iran against Kuwaiti flagged tankers.

11 Part of the function of the RAN's Maritime Trade Organisation is to act as a 'consultant' for other parts of the Australian Defence Force on matters affecting merchant shipping and maritime trade, explaining what certain terms mean in the maritime industry and that industry's commercial expectations and limitations in any giver situation.

12 Broadly speaking, the concept is known as 'just in time ordering', the object of which is to abolish stockpiles on land altogether: the cargo of goods on the ship heading your way becomes the stockpile.

13 See Department of Prime Minister and Cabinet, *Securing Australia's Energy Future*, Canberra, 2004, chapter 7. On average, Australia holds only 50 days' worth of unrefined crude oil and 18 days' worth of refined product at its oil refineries and terminals.

14 Australian Department of Foreign Affairs and Trade, available at: <www.dfat.gov.au/aib/trade_investment.html>, accessed on 12 September 2007

15 It is worth remembering that one hundred years ago the British Empire considered the United States to be its most likely threat. This view was shared within the US Navy at the time.

16 See 'Radford-Collins Agreement – 1959' and 'Radford-Collins Agreement – 1967' in Andrew Forbes and Michelle Lovi (eds), *Australian Maritime Issues 2006: SPC-A Annual*, Papers in Australian Maritime Affairs, No. 19, Sea Power Centre – Australia, Canberra, 2007, pp. 47-67.

17 Radford-Collins Agreement in Forbes & Lovi, *Australian Maritime Issues 2006: SPC-A Annual*.

18 See <www.pacioswg.org>.

19 The NATOSWG was established as part of the overall NATO requirement to resupply and reinforce Europe by sea should the Warsaw Pact Forces move into Western Europe. Many procedures developed by the NATOSWG have been adopted by the PACIOSWG.

20 This integration of Reserve specialist trade protection personnel into an operations room or 'battlewatch' (to use an American term) can take many years and can be best summed up by one RANR officer who, in his first year, was greeted with 'Who are you?', in his second year with 'What are you doing here?' followed by in subsequent years by 'Where have you been?' meaning that in his first year no one knew what he did, in his second year they knew but could not understand why he was on watch and in the third year wanted to know why he wasn't part of the permanent watchbill. The RAN MTO now maintains a permanent presence in Australia's Headquarters Joint Operations Command to avoid just these questions and all that they imply.

21 A related issue is that of 'track discrimination'. Care must be taken to ensure that only one contact for any one ship is maintained on each of the plots (a technical issue outside the scope of this paper).

22 Well developed and frequently exercised NCAGS procedures can be found in the NATO publication ATP-2(b) Vol. II, *Naval Co-operation and Guidance for Shipping Manual*, December 2006 available at <http://www.nato.int/docu/stanag/atp-2b-v2/atp-02%28B%29v02.pdf>. Although outside the scope of this paper, it should be noted that the best procedures for the protection of trade against extreme threats will be useless unless warships are both available and capable of carrying out escort duties (especially with respect to range and sustained speeds of not less than 30 knots). Of course procedures for the defence of ports, harbours and anchorages must also be developed and exercised.

23 The ease with which the French supertanker MV *Limburg* was attacked off the coast of Yemen in 2002 demonstrates that a well organised, well financed and highly motivated terrorist organisation can and will attack merchant shipping if it suits its aims to do so.

24 Or as the late British Prime Minister Sir Winston Churchill accurately but rather inelegantly stated: "Better jaw-jaw than war-war!" (Remarks at a White House luncheon on 26 June 1954 as reported by the *The New York Times,* 27 June 1954).

25 See generally the web site of the Association for the Study of Peak Oil and Gas, available at: <www.peakoil.net>.

Maritime Coalitions to Protect Vital Sea Lines of Communication

Hideaki Kaneda

Maritime security is a significant factor in maintaining regional stability in the highly dynamic and rapidly changing Asia-Pacific region. Increasing interdependence through globalisation has made it crucial to ensure the security of the sea lines of communication (SLOC) and ports for international shipping and trade, as they are vulnerable to a range of traditional and non-traditional threats.

Regional nations have sought to improve maritime security through cooperative efforts, ranging from joint maritime patrols under many bilateral and multilateral arrangements to the Proliferation Security Initiative (PSI). These efforts impact on the development of international maritime law, regional cooperation, and overall development and stability, and require continued discussion and coordination to ensure they are effective.

In this paper I assess, from a Japanese viewpoint, the challenges and solutions for regional cooperation to protect SLOC.

Security Situation in the Asia-Pacific Region

This overview of the security situation in the Asia-Pacific region outlines regional risks that might materialise as 'threats'. At the beginning of the 21st century, there are seven major threats to stability in the Asia-Pacific region, and these can be conceptually divided between traditional and non-traditional threats, all of which impact, to varying degrees, on SLOC security.

The first traditional threats are the remnants of the Cold War era in the form of confrontation on the Korean Peninsula and across the Taiwan Strait. As the Taiwan Strait is a major international strait for East Asia, any conflict would have an impact on SLOC security. The second threat is the rapid build-up of Chinese military power mostly in its naval and air forces, which may disrupt the military balance of the region; the fear is that these forces might be used to interdict merchant shipping transiting regional SLOC. The third threat involves territorial, religious and ethnic disputes that have a long history, especially territorial issues over remote islands that are likely to obstruct SLOC security, and cause general instability in the region. The fourth threat is confrontation over maritime interests which overlay the previously mentioned island territorial disputes; there have been numerous cases of naval confrontation over ocean activities over the past few years.

The non-traditional threats emerged at the end of the Cold War. The fifth threat is the proliferation of weapons of mass destruction and ballistic missiles. However, since their movement will likely be along SLOC, the measures introduced under the PSI in September 2003 and the 2005 Protocols to the *Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation 1988* (SUA Convention) have strengthened the inspection regime for suspicious activity at sea. The sixth threat is international terrorism, where international shipping may be attacked, or where these groups often move people between countries by sea. The seventh threat is the reorganisation of crime groups taking advantage of globalisation to be truly transnational in nature, with an increasingly maritime focus: piracy, and trafficking of people, drugs and weapons.

Significance of SLOCs Today

The end of the Cold War enabled conditions leading to greater economic cooperation, increased interdependence and a more globalised economy. The key to this integration has been seaborne trade. Maritime transportation has become critical to globalisation, and as a consequence, SLOC security is of much greater significance in a globalised economy.

Thus any direct or indirect threat to SLOC security may not only seriously impact on the global economy, but also the surrounding region and coastal nations, as was demonstrated in the 1990-91 Gulf War, the Taiwan Strait crisis in 1996 when China launched ballistic missiles against Taiwan, the war in Afghanistan to control and contain terrorist groups prompted by the 11 September 2001 terrorist attacks on he United States, and the 2003 Iraqi War. Because of these events, coastal states along many SLOC have needed to cooperate and coordinate their activities to ensure SLOC security.

In the Malacca and Singapore straits for example, the efforts of the littoral states involve coordination between them and with states that use the strait, in order to prevent terrorist attacks and piracy. In the northwest Indian Ocean, activities under the auspices of Operation ENDURING FREEDOM aim to contain maritime terrorism, and are conducted by multinational naval forces including the JMSDF.

In terms of maritime use, the *United Nations Convention on the Law of the Sea 1982* allows coastal states to have sovereign right over their internal waters, territorial seas and contiguous zones, and grants jurisdiction over the exclusive economic zone (EEZ) as well as the use of maritime resources and the protection of environment. As the coastal states have established their EEZs, almost half of the world's seas are now under some form of limited jurisdiction by individual states.

Conflicts over maritime interests and historical territorial disputes hinder reaching agreement on maritime borders between many neighbouring coastal states. With the

looming depletion of terrestrial resources, there is a move towards the oceans to make greater use of fisheries and to begin accessing seabed resources.

As the Asia-Pacific economies, including Japan, are highly dependent on the ocean, they place a higher strategic value on it. This reliance on the ocean stems from the need for protein via fisheries, and seaborne trade. The Japanese economy is totally dependent on maritime transportation using secure SLOC, not only for the import of raw materials, but also for the export of manufactured goods. The oil imports that drive the Japanese economy come predominantly from the Middle East and are shipped to Japan along SLOC through the Indian Ocean, the Malacca and Singapore straits, the South China Sea and the East China Sea. These SLOC are not only Japan's lifeline, but are also increasingly critical to the other East Asian states: China, South Korea and Taiwan. About 90,000 ships a year, more than a quarter of world's maritime cargo shipments and about one half of the entire trade volumes of Japan, China and South Korea, navigate through the Malacca Strait. About 50 per cent of world's oil tankers and about 85 per cent of the tankers navigating from the Middle East to East Asia go through these straits.

Since the late 1960 Japan, as the major user of the straits, has assisted the three littoral states (Singapore, Indonesia and Malaysia) by funding many projects related to the safety of navigation in the straits. But nowadays, Japan is no longer the major 'player' in strait security, as China, South Korea and Taiwan now import considerable amounts of oil from the Middle East, while the littoral states are also importing more oil to feed their new coastal refineries located along the strait.

The three littoral states reinforced naval patrols in the straits on a bilateral basis in their own territorial waters in the 1990s as a reaction to an increasing level of armed robbery at sea; however, as Indonesia and Malaysia are quite sensitive over issues relating to any perceived infringement of their national sovereignty, these patrols achieved little, as there was no right of 'hot pursuit' into each other's waters. In July 2004, as a response to the heightened demand of the international community for greater safety and security in the straits, they initiated the trilateral coordinated patrol, called 'MALSINDO', in which the navy of each state would patrol its own territorial waters while communicating with each other in order to guard against marine terrorism and piracy. In September 2005, based on the proposal of Malaysian Defence Minister Najib, the littoral states agreed upon the 'eyes-in-the-sky' program for aerial patrols over the straits with responsive officers from each country joining each other on patrol aircraft. These attempts would likely allow them to avoid the sensitive issue of sovereignty, while ensuring their effectiveness.

At the same time, steady economic development based on growing seaborne trade has led to increased shipping traffic through the straits. The role of the littoral states is also changing from 'host state' to 'user state' because of their development of hub ports and industrial development along the coast.

Increasing importance of Indian Ocean SLOCs

Traditionally, states in Asia have focused on the Malacca Strait as a strategic SLOC, but there is increasing recognition that the entire supply chain must be 'protected'. Thus, Japan's strategic interests spread beyond its neighbouring waters, through the Malacca Strait and into the Indian Ocean. In particular, the northern part of the Indian Ocean is now acknowledged as being an important SLOC, not only to states in that region, but also for continued economic growth and development in the Asia-Pacific region.

As the land routes connecting countries bordering the northern Indian Ocean region with the Asia-Pacific region are not fully developed, it is inevitable that there is a greater dependence on SLOC for the movement of goods. Additionally, Indian Ocean states are also making greater use of ocean and seabed resources, such as fisheries, oil and natural gas to enhance their economic development and growth. But this increased reliance on the oceans also makes them susceptible to any disturbance or disruption to SLOC, with a consequential impact on their economies and their security.

The security situation in the Indian Ocean region is complex. There are a range of factors that may cause instability, such as the tense relationship between India and Pakistan, both regional terrorism and particular states acting as havens for international terrorism, the absence of US military bases that can provide a forward presence and a measure of security in the region, and India's anxiety over China's economic growth and increasing international presence. In the Middle East, there is the unresolved Israel-Palestine issue, the continuing war in Iraq, Iran's nuclear ambitions and alleged sponsorship of international terrorism, and no apparent solution to the fighting in Afghanistan.

The northern Indian Ocean region is critically important geo-politically and strategically as it is the trade corridor connecting the Asia-Pacific region with the Middle East and Europe. But it forms what the United States has called the 'arc of instability', as there is inter- as well as intra-state conflict, as well as being the home base of international terrorism.

Given the importance of the SLOC connecting the Indian Ocean with the Pacific Ocean, perhaps this region should instead be called the 'arc of inseparability', rather than the 'arc of instability'. The security of these SLOC symbolise the connection and inseparable integration of the global economy, requiring a level of coordination and cooperation between the Asia-Pacific region and northern Indian Ocean region.

The importance of securing these SLOC will increase over time, due to both security requirements of individual states and increasing trade volume. But given the importance of the security of these SLOC to states outside the Indian Ocean region, combined with the complexity of security issues within the region, greater cooperation between a much larger group of states is required to actually ensure SLOC security.

Thus there is an urgent need to develop consensus among the states that benefit from these SLOC to create a cooperative system to ensure their security.

The Importance of Maritime Coalitions

The Japan-United States alliance is fundamentally a maritime alliance; and the United States maintains similar alliances in the Asia-Pacific region. With the United States at the centre of this web of alliances, in essence a 'global maritime coalition'; individual states should accept responsibility proportionate to their national power and national interests. In particular, Japan should take on a greater role and the Japan-United States alliance should form the basis for a western Pacific maritime coalition.

At the end of World War II, the United States assumed a major security role for the Western alliance culminating in the demise of the Soviet Union at the end of the Cold War. But after the events of 11 September 2001, it could be argued that the United States has over-extended itself in the global war on terror, by fighting in Iraq and Afghanistan, dealing with North Korea and Iran over nuclear issues and their support of terrorism, and an emerging change in the balance of power with the slow rise of both India and China.

It is suggested that in order for the United States to best manage these issues, it can no longer rely on the prestige of being the sole remaining superpower, and needs to begin building multinational coalitions. The United States has occasionally used the auspices of the United Nations, and involved other states in the Six Party Talks over North Korea, for a mixture of both military and non-military responses to global issues; this should continue. As an example of mutually reinforcing responses to the proliferation of weapons of mass destruction and ballistic missiles, amendments were agreed to existing international conventions, while coalitions were developed to respond under that legislation. The United States is also transforming its military forces to handle any peer competitor while managing a number of other tasks. Creating coalitions of willing partners can improve regional and global security as more forces become available to react to situations, through greater interoperability, and exercises and training.

The United States is also changing the posture of its forces based in Japan. Historically, these Japanese bases have been the core of US forward basing in East Asia, but with a growing recognition that Japan should play a larger role not only its own defence, but also in the region, the United States is realigning its forces. Importantly however, Japan has never been a satellite of the United States, and as a sovereign nation, it should decide on the positioning of US bases and military forces within its territory and whether such actions are in its national interest. But Japanese decision making is bound by the framework of the Japan-United States alliance and will likely face deadlock if it tries to address this issue within the conventional concept of the alliance. So, Japan needs to deepen and expand its relationship with the United States, in order to meet

the requirements of the emerging security environment, and will have to assume greater responsibility for its own and regional security.

A model for how the current Japan-United States alliance might evolve is the current United States-United Kingdom alliance, where both states are partners rather than one being in a subservient role. This would also be beneficial if the proposed maritime coalition were to extend from the Pacific Ocean to the Atlantic Ocean with the United States in the centre. The first steps should be to improve the existing Status of Forces Agreement between Japan and the United States, increase the strategic readiness of US forces in the region, and for Japan to exercise its right of self-defence, rather than rely on the protective umbrella of US military forces.

Over the mid to long-term, it will be necessary to strengthen regional and global cooperation between Japan and the United States. Japan has slowly begun to cooperate with other states in the region and further a-field, after the passing of appropriate legislation, such as with the United States, through the *Law Concerning Measures to Ensure Peace and Security of Japan in Situations in Areas Surrounding Japan*; and international cooperation under the *Anti-Terrorism Special Measures Law* and the *Specials Measures Law for Humanitarian and Reconstruction Assistance in Iraq*.

Such activities will likely have greater importance in the future. For example, the Japan Self-Defense Force (JSDF) participates in the US-led PSI exercises and has only recently transitioned from sending observers to an active participant role. Similarly, the Japan Coast Guard has been involved in a range of regional and international activities, but the emerging security environment may require greater capabilities than it possesses, leading to an increased role for the JSDF.

The fight against international terrorism requires more comprehensive measures over an extremely longer period of time. As these groups will likely develop more complex and advanced tactics, greater coordination and cooperation by the international community will be necessary to prevent terrorist attacks. Analysis of recent terrorist activity indicates greater cooperation and coordination between international and regional terrorist organisations, particularly in Southeast Asia. Thus there may be increased opportunities for the JSDF to participate in coalition operations, either bilaterally, multilaterally, or under the auspices of the United Nations.

Within the context of SLOC security, such activities could occur under regional arrangements such as the *Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia* (ReCAAP) to mange issues in the Malacca and Singapore straits, and if the situation called for it, under Operation ENDURING FREEDOM in the northwest Indian Ocean. It is likely that the US Navy and the Japan Maritime Self-Defense Force (JMSDF) could be central in such cooperative activity and consequently, SLOC defence will increase in importance in the Japan-United States alliance.

Building a Maritime Coalition

Japan, in cooperation with the United States, should take the initiative in building a regional and global maritime coalition, while also assuming a greater regional role for itself. This global maritime coalition would focus on a nation-to-nation coalition aiming to maintain and secure the safe and free use of the oceans. Importantly, such a coalition does not require an international agreement or convention, rather it is a multilateral network based on mutual trust. Therefore any state could enter the coalition as long as they shared the same common objectives. Of course, any state's involvement in the coalition would be based on its assessment of its national interests, albeit any involvement should be proportionate to its military capabilities. Thus levels of involvement by states would vary considerably.

Japan has a strategic interest in the security of SLOC extending south of the Suez Canal (or east of the Cape of God Hope) to East Asia. Considering domestic politics, the Japanese Constitution, and the capabilities of the JMSDF, Japan could take an active role in the area from East Asia to the Malacca and Singapore straits. In the Indian Ocean, Japan would prefer that India lead the coalition responsible for SLOC protection in those waters.

The only precondition for membership of the maritime coalition will be whether a state shares three basic maritime interests: to cooperate in maintaining the security of the region in peace time as well as in emergency or crisis (co-existence); economic cooperation in commerce, trade, and marine resource development (prosperity); and a commitment to maintaining and developing the benefits of the oceans (value).

As there are broad alliances in the Asia-Pacific based around the United States, the simplest way to create the maritime coalition would be to use the framework of states allied to the United States, and then progressively add friendly maritime nations that meet the three pre-conditions. In the western Pacific, the core grouping would be Japan and the United States, with regional states either joining or operating on a bilateral basis with the United States. Taiwan is a case in point, where it should be involved in the maritime coalition but such decisions would affect its relationship with China, and China's relationships with Japan and the United States.

Linking with Other Regional Maritime Coalitions

Moving beyond the western Pacific sector of the proposed maritime coalition, it is clear it needs to expand to create a truly global maritime coalition. Thus Canada from the eastern Pacific could be asked to join, Australia in the southern Pacific, the United Kingdom in the northwest Atlantic, Brazil in the south Atlantic and India in the Indian Ocean. For Japan, this concept of the global maritime coalition coincides with the 'Arc of Freedom and Prosperity' proposed by former Minister of Foreign Affaires Aso and the 'coalition of nations based on common values' by former Prime Minister Abe.

One important consideration as to how the global coalition might secure SLOC is where various SLOC converge near a country's coastline. Unresolved maritime boundaries and historical enmity amongst some coastal states might make it difficult to create a cooperative security system. For example, Russia unilaterally declared its interests in the Arctic Ocean by placing its flag on the seabed under the North Pole in anticipation of year round navigation through the North West Passage, which if it becomes possible due to retreating ice, will open a new international strait which will shorten trade routes considerably. China has also asserted 'its' claims in the East China and South China seas resulting in naval confrontation over disputed maritime border claims and access to ocean resources.

Both East Asian and Southeast Asian states have unresolved maritime boundaries that could lead to confrontation, which might then impact on SLOC security. The situation in the Middle East is more complex where the coastal states of the Arabian Peninsula, east Africa, and the eastern Mediterranean suffer from religious confrontation, frictions over oil interests and exploitation, and international terrorism. What kind of coalition is possible among the states in these areas? How do we link the coalition of 'ocean' states with the coalition of 'coast' states? Is it possible to actually form a truly global maritime coalition? These basic questions remain but we need to resolve these issues, in order to establish a maritime coalition among relevant 'coast' states. In this sense, it is essential to realise and form a maritime coalition with the 'ocean' states first.

Conclusion

So Japan, with the United States, should take the initiative in developing a cooperative maritime coalition, to secure global SLOC. Japan and the United States need to strengthen ties with, India, Australia, Canada and other states that also have an interest in SLOC security.

To achieve this first step quickly, the simplest option is to use an existing naval cooperation agreement, adapted to the requirements at hand. One option is to use the Western Pacific Naval Symposium, a grouping of navies in the Pacific that focuses on improving naval mastery, through regular meetings, harmonisation of procedures, and exercises.

Singapore Deputy Prime Minister Tony Tan said in his opening keynote speech at a maritime conference in Singapore in 2004, 'The region could not just wish the problem away or wait until an attack occurred before acting. If an accident happens, or should I say when it happens, everyone will wake up and scramble for a solution. But it will be too late. The time to act is now!'

Cooperation to Safeguard Shipping through the Malacca Strait

Rosihan Arsyad

The importance of the ocean for humankind has been described by Alfred Mahan in a simple but very accurate observation: 'The first and most obvious light in which the sea presents itself from the political and social point of view is that of a great highway; or better, perhaps, of a wide common, over which men may pass in all directions.' It is now widely recognised that the ocean 'is the common heritage of mankind' and has provided much of the inspiration for the *United Nations Convention on the Law of the Sea 1982* (LOSC).

While the ocean has over the years retained its primacy as a transport medium, there are now greater expectations of the immense resources that can be obtained from its confines. Growing interest in oceanic resources is a natural tendency as we realise that resources on land will not be sufficient to satisfy overwhelming demands worldwide. With its potential abundance of wealth and energy, the ocean has also come to be viewed as the 'last frontier' for the exploration and development of resources for the ever-growing needs of mankind. But over the years, excessive exploitation of sea-based natural resources and the transport of commodities, especially oil and other dangerous substances, have damaged the oceans through pollution and destruction of marine ecosystems and the ecological balance. A new spectrum of maritime competition that seems to be emerging in the post-Cold War era, makes maintenance of good order at sea more complicated.

The growing importance of the sea for transportation, sea-based resource extraction, and the vulnerability of domestic societies to the threats posed by drugs, arms smugglers and illegal immigration also suggest that the task of conducting good order at sea is becoming more complex. Marine resources are steadily becoming economically more important, but our concern is mainly focused on the safety and security of sea lanes, drugs and arms smugglers, boat people, pollution control, resource supervision, illegal fishing and other low-level security threats. While this concern may encourage international cooperation, it may also be a source of creeping maritime jurisdiction and competition.

Uni-polarity, one way or another, has also created or at least stimulated the rise of terrorism and terrorists. Sea mines can be used by terrorists to disrupt freedom of navigation through sea lines of communications. All these threats will understandably make the task of maintaining safety and security of the sea and the protection of marine resources a demanding and immense one.

The Strategic Importance of the Malacca Strait

With its importance as the world's highway and growing interests in oceanic resources, the sea presents itself to a wide variety of challenges. Sea lane security against piracy and armed robbery is a very high concern. Piracy, for example, seems to be a continuous threat in the Southeast Asian region, namely in the East and South China seas, and armed robbery is occurring regularly in the Malacca Strait and the Strait of Singapore, earning a bad reputation as the 'black area'. Since 2002, the International Maritime Bureau (IMB) has recorded 258 pirate attacks in the Malacca Strait and surrounding waters, including more than 200 sailors held hostage and eight killed.[1]

Southeast Asia is recognised as a 'gateway' to Asia since it contains most of the shipping routes to China, Japan, and Korea from the Middle East, Africa and Latin America. There are a number of strategic straits and waters in the region including the Sunda Strait, Gaspar Strait, Lombok Strait, Makassar Strait, Maluku Strait and the South China Sea. The most important strait, however, is the Malacca Strait, because it is the shortest route to East Asia from the Middle East, Europe and Africa. The Malacca Strait shortens a voyage by at least 2000km compared to the next fastest route, the Sunda Strait.[2]

China, Japan and Korea depend on the Malacca Strait for approximately 80 per cent, 90 per cent and 100 per cent respectively of their oil imports. Estimates predict that East Asian oil imports will grow exponentially; meaning China and the rest of East Asia will only increase their reliance on this sea lane.

As a strait used for international navigation, the Malacca Strait is the busiest in the world. Over half of all vessels passing through it head for East Asia, mostly to China, Japan and Korea, including to the United States military bases in Guam, Japan and South Korea. Some 60 per cent of China's foreign trade passes through it to various destinations in the Middle East, Africa and Europe. Today, one-third of the world's trade and half of the world's oil supply are carried through it by some 90,000 vessels which use it each year.[3]

Keeping this waterway safe, secure and clean is made more difficult by the fact that the littoral states (Indonesia, Malaysia and Singapore) have to rely mostly on their own limited resources with only some help for capacity-building from user states.

The Malacca Strait: A New Hot Spot?

The high global dependence on the Malacca Strait leaves it vulnerable not only to threats of piracy and perhaps terrorism, but in the future it could become a hot spot due to competition between the United States, China, Japan and India, seeking to control this sea lane. In 2001, the United States introduced the Cargo Security Initiative (CSI), followed by the Proliferation Security Initiative (PSI) in 2003, both involving the Malacca Strait and Indian Ocean in guarding against transportation of weapons of

mass destruction and serving to secure international waters. In 2004 the United States proposed a Regional Maritime Security Initiative (RMSI) calling for the littoral states to allow US naval forces to conduct anti-piracy and terrorism patrols. However, the RMSI – the one most directly relevant to the narrow shipping lanes – has never been presented as a mechanism open to Chinese or Japanese participation, and therefore it could be regarded by other user states as challenging.[4] Nor do the littoral states favour these initiatives for fear that this will only complicate the situation around those vital sea lanes as it will invite further competition.

Japan and India have also taken similar actions to increase their involvement in managing the Malacca Strait.[5] In 2005, Japan put forward a security mechanism to promote anti-piracy and anti-maritime armed robbery in Asia in the form of the *Regional Cooperation Agreement on Combating Piracy and Armed Robbery Against Ships in Asia* (ReCAAP) by 'unofficially' requesting littoral countries to allow the presence of the Japan Self-Defense Force in the strait.[6] This proposal was not welcomed by Southeast Asian countries, mainly because it would be a case of Japanese power projection capability beyond defence of its homeland,[7] and of its increasing reach into the western Pacific with its naval power would be viewed with suspicion.[8] Under ReCAAP, an Information Sharing Office was established in Singapore, and Indonesia and Malaysia have indicated their preparedness to cooperate with it, but they have not ratified the agreement.[9] But at the implementation level, ReCAAP is still a big question mark. Among other reasons, Indonesia, being co-responsible for security of navigation in the Malacca and Singapore straits and three other important archipelagic sea lane passages, feels that it should be regarded more properly and given a leading role, and hence questions the decision to put the centre in Singapore rather than in Batam, Indonesia. Not being very successful with that initiative, Japan is trying to increase its presence in the region through its coast guard and is intensifying its engagement through dialogue and seminars on sea safety and security.

The Indian Navy is also showing its growing desire to be involved in safeguarding the Malacca Strait. Their establishment of military bases in the Andaman and Nicobar Islands at the west end of the channel – beginning in the 1990s – and growing blue water patrolling capability from the Indian Ocean to the South China Sea demonstrates the Indian Navy's capability.[10] The United States and Japan in early May 2007 made a direct reference for the first time to the importance of engaging India.[11] For Japan, India is a key part of the 'Arc of Prosperity and Freedom' that the Abe Government is trying to build around the outer rim of the Eurasian continent skirting the borders of China and India.[12] MALABAR 07, a long-running bilateral naval exercise between the US and India, has been extended as a joint naval exercise to also include Australia, Japan, and Singapore. Conducted in September 2007 covering the vast area from the Indian mainland to the Andaman and Nicobar Islands and practicing nothing less than maritime interdiction, inspection of suspect ships at sea, air combat exercises as well

as surface and anti-submarine warfare will surely be seen as threatening by China.[13] And this will be considered by China as an attempt to contain it.

In recent years, China has also taken important steps to address the inherent risks facing shipping in the Malacca Strait. To begin with, China has actively developed closer cooperative relationships with Singapore, Malaysia and Indonesia to secure its interests in the strait and to alleviate the growing rivalries among the world's major powers. China has also expressed its willingness to take an active part in relevant cooperation for maintaining and enhancing sea lane security and prevention of oil leaks in the strait. It is quite obvious that, while China is willing to cooperate in international activities to improve effective measures to enhance Malacca Strait security, it is also willing to go all-out to play a major role and is likely to use its military in the act of self defence.

One very important aspect to consider when discussing the Malacca Strait is to assess the maritime interests of its littoral states. The safety and security of sea lanes and the protection of marine resources and the environment are of paramount interest to the littoral states. Most of the traffic through the strait will make a stop over in the port of Singapore for logistics and trans-shipment. The Malaysian port of Tanjung Pelepas is becoming a major hub-port to link Asia with Europe, the Middle East and Africa. These trading relationships show how much the Singaporean and Malaysian economies depend on the strait. For Singapore, the Malacca and Singapore straits are its only veins. Most of Indonesia's import and export are also through this strait, including its oil imports. Indonesia and Malaysia are also dependent quite heavily on the strait for their fishing industry. Indonesia and coastal states are faced with an increasing intensity and severity of major oil spills from foreign tankers in the strait as well as the possibility of catastrophic accidents involving carriers of ultra-hazardous cargoes including plutonium which may pass through it. Therefore, it is obvious the littoral states place a very high priority on the safety, security and marine environment protection of the strait, and therefore are very willing to cooperate with user states to safeguard the Malacca Strait, in a way that ensures cooperation, not competition.

Possible Cooperation

The end of the Cold War may have defused tensions resulting from the ideological rivalry, but has led to new problems and complexities. An adjustment of policies and postures to cope with the realities of a uni-polar world ensued, and this is continuing against a backdrop of an international situation characterised by not only competition but also cooperation, change and uncertainty. Unfortunately, we have not succeeded in laying the foundation of a framework that will ensure a more stable order in the future. Not much comfort can be drawn from the fact that there are areas in Asia where tensions not only persist but have, in fact, intensified. There is the possibility of an arms race among major powers in the region that could escalate out of control,

requiring an urgent need for transparency in military spending and military discussions between the two countries.

Nevertheless, there are very important international compulsions demanding our attention and indeed involvement in economic, political and technological opportunities. The most important is that the increasing globalisation of trade, finance, and communications that make use of sea transportation will continue to increase as the world economy becomes more integrated. Therefore, it is of paramount interest to address safety and security of the Malacca Strait in a stronger and more comprehensive cooperative effort.

The solution to safety and security of sea transportation in Southeast Asia must be addressed on the basis of a balance-of-interest principle. Any solution in which interest imbalances exist is inherently unstable and lacks the resilience to absorb the stresses and strains of an evolving crisis. Huge differences in the size and maritime capability of states in the region seriously complicate the task of establishing cooperation among the littoral and user states navies to safeguard shipping in the Southeast Asian region, especially in the Malacca Strait. There is no easy solution, but given the geopolitical situation in the region and as safety, security and protection of marine resources and environment protection remain the prime concern of littoral and user states, there must be a comprehensive framework for cooperation.

Discussion about cooperation among littoral state and user state navies and coast guards must start with cooperation among littoral states. Safety, security and the maritime environment of the Malacca Strait have been and will always be considered vital by them. In 1971, the governments of Indonesia, Malaysia, and Singapore made a joint statement concerning the Malacca Strait. They agreed that the safety of navigation in the Malacca and Singapore straits was the responsibility of the coastal states concerned and realised the need for tripartite cooperation on the safety of navigation in the straits. The three governments also agreed that a body for cooperation to coordinate efforts for the safety of navigation in the straits needed to be established as soon as possible and that such body should be composed of only the three coastal states concerned. The joint Statement of 16 November 1971 has been followed by several others, namely that of 19 February 1975, 24 February 1977, the Joint Batam Statement in 2005, the Jakarta Statement in 2005, the Kuala Lumpur Statement in 2006 and Singapore Statement on 6 September 2007. The essence of these statements is that, while the three littoral states take full responsibility and put on their best efforts to safeguard the safety, security and marine environment in the Malacca Strait, they always welcome the participation of user states.

As a result of these joint statements, the three littoral states established routine coordinated patrols and established a mechanism for such cooperation. The littoral states have also equipped, improved and maintained better navigation aids and established a traffic scheme to allow for a safer navigation especially for very large crude carriers

and other large vessels. Under the recent Malacca Strait Security Initiative (MSSI), they have intensified their cooperation and conducted daily Malaysia-Indonesia-Singapore (MALSINDO) coordinated patrols, and bilateral Malaysia-Indonesia (Malindo/Malindo Optima) and Indonesian-Singapore (Indosin) coordinated patrols. They also actively support other MSSI projects, such as the Malacca Strait identification system, eyes-in-the-sky, integrated maritime surveillance system, intelligence and information exchange, public information campaign and margin of allowable hot pursuit. But this concept is not easy to be implemented. For one thing, the littoral states often lack sufficient resources, especially Indonesia, which must also maintain safety, security and marine resource and environment protection and other threats, including maintaining its national integrity as a high priority.[14] There are other constrains as well. Coordinated patrols become entangled with the complexities of maritime jurisdiction, especially if talking about warships and navies. A major function of navies is to assert sovereignty in national waters. For this reason, there is no right of 'hot pursuit' into neighbouring territorial waters, and so far, the three littoral states have not been able to establish even a margin of allowable hot pursuit.

Even though the spirit of cooperation does exist among the littoral states, there is no mechanism for security cooperation. While Indonesia would like to see a more comprehensive examination of the threat perception in the Malacca Strait, Singapore and Malaysia perhaps do not see smuggling of commodities, transportation of illegal logging and illegal fishing as a high priority in their maritime security agendas.[15]

Fortunately, the littoral states subscribe to the notion of freedom of navigation and the ability of merchantmen to go about their normal business without let or hindrance. On this basic issue, there is no fundamental difference of opinion and this can be used to provide the foundation of a common approach to the question of cooperation regarding safety, security and marine environment protection in the Malacca Strait.

Since cooperation is the key to safeguarding the Malacca Strait, it must take into account the balance of interests among littoral states and user states and among those states themselves. There are basic principles that must be observed in forging cooperation, such as territorial integrity and political independence, as well as the betterment of their people.

The question remains, what is the best way to improve cooperation in the Malacca Strait? As it lies at the crossroad of two oceans and two continents, the strait is highly accessed by world shipping; and littoral and user states' maritime interests converge in the one area. Coupled with the tendency of major powers to practice unilateralism and intervene in many parts of the world, sovereignty becomes a practical concern. Therefore, cooperation in safeguarding shipping through the Malacca Strait can only be successful if it is of a step-by-step approach, starting with confidence building measures to avoid competition that could escalate out of control. These measures should aim at increasing transparency among states by sharing information including their security

policies and plans, and maintaining good and reliable communication among states. Another important aspect of these measures is to ensure that constraint measures are followed; meaning states must regulate their various military activities and limit their manoeuvres so as as not be viewed as threatening or interfere with another's sovereignty. Confidence building measures are of particular importance because they could help remove inter-state suspicion and promote and develop a sense of security community.

Security cooperation does not necessarily mean that there has to be a permanent presence of user states security forces in the Malacca Strait, as that might be perceived as conflicting with a littoral states' sovereignty. The littoral states, especially Indonesia, would not welcome user states deploying their naval forces in any part of its waters or escorting their vessels with coast guard or naval forces when navigating Indonesian waters.[16] Indonesia also would not welcome commercial cargo vessels or tankers with armed guards navigating Indonesia waters.[17] It must be realised that the presence of foreign naval forces or commercial vessels with armed guards could only create more problems rather than provide solutions, as it will trigger more competition rather than cooperation among user states. But as the security burden must be shared, positive support is welcome and must cater for the whole range of security measures, and will best be achieved if directed at littoral state capacity building.

One good example of good cooperation is that between the United States and Indonesia. As the need to suppress armed sea robbery and its possible link with terrorism at sea increased, in 2005 the United States gave assistance to Indonesia to establish an Integrated Maritime Surveillance System for the Indonesian Navy in the Malacca and Singapore straits.[18] The program was multi-phased, beginning with basic maritime domain awareness, a common operational picture and blue force tracking. In the first two phases (2005-06), two coastal surveillance stations were built along the Malacca Strait equipped with radar, automatic identification system (AIS), long range cameras, a computer system, and high frequency radio and very small aperture terminal communications.

Also as part of this phase, Western Fleet ships began to be equipped with a blue force tracking system and Trident monitoring system with each ship equipped with cameras and digital data recording equipment, AIS and voice and data communications. This system will be integrated to provide a command centre display, a classified reporting system, as well as basic data communications and data management exchange facilities. When this program completes in 2008, there will be 12 stations built along the Malacca Strait, considered sufficient to cover the Malacca and Singapore straits, enhancing the Indonesian capability to maintain security and safety of navigation in these waters.

Cooperation in social and economic aspects through navy to navy or coast guard to coast guard must be considered especially in the field that could enhance capacity building. Indonesia, Malaysia and Singapore do not have the resources or the expertise

to explore their undersea wealth or their means to preserve the marine environment. Therefore, education, research and development in marine science is a good way to start, because clearly activities related to this field can and should provide the basis for broad-based regional security cooperation in Asia-Pacific region. Maritime surveillance and exchange of intelligence is an important field in which user states can cooperate. In addition, cooperation can be further cemented through intensive training and regular exercises between naval security forces, first bilaterally and then expanded multilaterally.

Cooperation among littoral states and user states coast guards is perhaps less delicate, and should be made a main pillar for further cooperation. But while Singapore and Malaysia have integrated their maritime security forces into one coast guard agency, Indonesia has yet to improve its maritime security arrangements. But, realising that it needs to change, Indonesia has started to work on the establishment of an Indonesian Sea and Coast Guard. The objective is to make efforts in safeguarding safety, security and environment protection in its waters more efficient and to establish proper representation for cooperation among littoral and user states coast guards. Indonesia for so long has denied its responsibility to establish a capable national sea and coast guard organisation to conduct all necessary efforts for the safety and security of navigation in Indonesian waters. But now, the process to create a single agency responsible for those big tasks has already started, and user states support can help to expedite this process.[19]

With regard to the Malacca and Singapore straits, for the last twenty years, the three littoral states have been cooperating to promote the safety of navigation with support from Japan. This cooperation has resulted in improved navigational aids and hydrographic charts as well as other measures. Yet, obviously, more needs to be done to promote safety of navigation in the area, including the prevention of armed sea robbery and protection of the marine environment in those waters.

Article 43 of the LOSC encourages cooperation between user states and states bordering a strait (a) in the establishment and maintenance of necessary navigational and safety aids or other improvement in aid of international navigation, and (b) for the prevention, reduction and control of pollution from ships. So far, only Japan has cooperated with the three coastal states with regard to installing navigational aids, hydrographic surveys and other means to promote safety of navigation in the Malacca and Singapore straits.[20] Obviously, cooperation with or assistance from other user states to prevent, reduce, and control pollution from ships, or to help coastal states to combat sea armed robbery in the area are not sufficient as needs to safeguard the strait keep rising due to many factors, including the continuous increase of traffic that continually demands increase of efforts by littoral states. In the Singapore Statement of 16 September 2007, littoral states invited user states to support six projects, including the removal of wrecks in the traffic separation scheme; cooperation and capacity building on hazardous and noxious

substances; setting up a tide, current and wind measurement system; installation of automatic identification system transponders on small ships and replacement and maintenance of aids to navigation in the Malacca and Singapore straits. China has confirmed that it will take care of the replacement of navigation aids damaged by the December 2004 tsunami, and the United States agreed to carry out a needs assessment to serve as the basis for the establishment of a hazardous and noxious substances preparedness and response capability and capacity in the littoral states.[21] But other projects have not been able to secure any commitment from user states.

The littoral states also welcome and invite initiatives from user states as well as other stake holders to assist law enforcement and security efforts at sea by maintaining and strengthening their capabilities at an operational level through intelligence sharing, pollution control, and capacity building in term of support of equipments and training. But after all, we also must consider the prosperity approach to handle this problem. Regional development will help address issues on economic marginality and help reduce poverty, and hopefully can stop or at least slow down sea robber recruitment as it provides alternatives to earn a living. User states and shipping companies threatened by armed sea robbery might become sources of funding for coastal development initiatives in armed sea robbery prone areas if such efforts could be seen to make an impact on reducing the prevalence of armed sea robbery.

Conclusion

Considering the importance of the Malacca Strait for stability, security, as well as its economic importance for the region and the world, there must be a common perception on threats related to the safety and security of this important sea lane. It is also necessary for littoral states and the international community to contribute to the safeguarding of security in the Malacca Strait against armed sea robbery, pollution, drugs, arms and commodity smuggling, maritime terrorism, transport of illegal logging and safety of navigation of the strait. International contribution will serve best if it is not in the form of power presence in the Malacca Strait, but through capacity building, exchange of information, support for improvement of navigational aids, hydrographic survey, mapping and the removal of wrecks, support for Malacca Strait identification system, integrated maritime surveillance system facility, and last but not least, coastal area community and economy development.

But most important, joint efforts of the three littoral states, namely Indonesia, Malaysia and Singapore, must be made as the key factor, and other measure must be evolved around the littoral states and ASEAN initiatives.[22] With MSSI and littoral states and ASEAN initiatives as a starting point for cooperation, and as trust and confidence between and among littoral and user states build up, safety, security and marine environment protection of the Malacca Strait will be highly improved.

Notes

1 Peter Gwin, 'The Strait of Malacca Dark Passage', *National Geographic*, October 2007, pp. 133-134.

2 Zhang Xuegang, 'South Asia and Energy, Gateway to Stability', *China Security*, Vol. 3 No 2, p. 19.

3 Singapore Meeting on the Straits of Malacca and Singapore, Enhancing Safety, Security and Environment Protection, Agenda item 3, 4-6 September 2007, Annex, p. 1.

4 Xuegang, 'South Asia and Energy, Gateway to Stability', p. 20.

5 Xuegang, 'South Asia and Energy, Gateway to Stability', p. 20.

6 Xuegang, 'South Asia and Energy, Gateway to Stability', p. 20.

7 Dewi Fortuna Anwar, 'Abe a 'fool' nukes not an option', *Jakarta Post*, 14 September 2007, p. 12.

8 Xuegang, 'South Asia and Energy, Gateway to Stability', p. 21.

9 Singapore Statement on 'Enhancement of Safety, Security and Environmental Protection in the Straits of Malacca and Singapore', 4-6 September 2007, Agenda item 4, p. 4.

10 Xuegang, 'South Asia and Energy, Gateway to Stability', p. 21.

11 Michael Richardson, 'Asia Security Needs Cooperation not Competition', *Jakarta Post*, 14 September 2007, p. 7.

12 Richardson, 'Asia Security Needs Cooperation not Competition', p. 7.

13 Richardson, 'Asia Security Needs Cooperation not Competition', p. 7.

14 Indonesia would need more than 300 ocean going patrol vessel to protect its maritime interest including maintaining safety and security of navigation and protection of marine environment and resources. But it has only less than 50 per cent of that requirement, consists of old and small vessel, so only about 2 dozen vessels that are operating at sea at any given time.

15 Personal observation, based on the author's experience during his serving time as Commander, Sea Security Command, Western Fleet, Indonesian Navy.

16 Hasjim Djalal, 'Combating Piracy: Cooperation Needs, Efforts, and Challenges', in Derek Johnson and Mark Valencia (eds), *Piracy in South Asia, Status, Issues and Responses*, Institute of Southeast Asian Studies, Singapore, 2005, p. 147.

17 Djalal, 'Combating Piracy: Cooperation Needs, Efforts, and Challenges', p. 147.

18 The IMSS Program started in 2005 when Indonesia built two stations, followed by ten stations built with support from the US, expected to be completed in 2008. Hopefully the program could be expanded to include the Indonesian Archipelagic Sea Lanes Passages.

19 There has been a continuous effort to solve this problem by establishing the BAKORKAMLA (Coordinating Body for Sea Security), but this agency does not put all agencies under one coordinated command control and does not have a comprehensive strategy in maritime security arrangement. Each member only puts a small portion of a mere one to two ships of its fleet to be placed temporarily under ad hoc command of the Sea Security Command of the Naval Area Fleet Commander. The bigger part of the remaining fleet under each agency will still be wasted, trying to enforce its responsibility with out coordination with other agencies; most of the times, they operate in the same area at the same time while other Indonesia waters are left with no one patrolling them. It is hoped that the 'new' BAKORKAMLA that has been created by Presidential Regulation Number 81 in 2005 will be able to forge an integrated

security arrangement. But, again, it has no direct logistics support and operational capability and perhaps is best to remain in the policy-making level to synergise maritime security strategy with other strategic national interests. The latest idea is to establish Indonesian Sea and Coast Guard as a main maritime agency, together with the Indonesian Navy responsible for maintaining safety and security of navigation and marine resources and environment protection and other low level threat. Indonesia needs support to establish such Agency.

20 Presently, Japan through the Malacca Straits Council has been the most active in cooperating with the littoral States, in particular for the provision and maintenance of aids to navigation. Since 1969, Japan has contributed more than US$130 million in this respect. Such arrangements have seen a significant impact in reducing the number of shipping incidents in the Malacca and Singapore straits. However, with remarkable changes in the economic landscape, in particular the emergence of other major economies in the region and their use of the straits, it is timely to widen and enhance the existing partnership of cooperation in the Straits (Singapore Meeting on the Straits of Malacca and Singapore: 'Enhancing Safety, Security and Environment Protection', 4-6 September 2007, Agenda item 3, Annex, the Updated Project Proposals, General Introduction, p. 2).

21 Singapore Meeting on the Straits of Malacca and Singapore: 'Enhancing Safety, Security and Environment Protection', 4-6 September 2007, Agenda item 3, Identification and Prioritisation of Needs for Projects on Safety of Navigation and Environmental Protection, p. 3.

22 ASEAN itself has many initiatives attempting to combat piracy and armed robbery in ASEAN seas. The ASEAN work program to implement the ASEAN Plan of Action to Combat Transnational Crimes adopted in Kuala Lumpur on 17 May 2002, includes an agreement to work together on sea piracy regarding information exchange, legal matters, law enforcement, training, institutional and capacity building, and extra-regional cooperation. See Djalal, 'Combating Piracy: Cooperation Needs, Efforts, and Challenges', p. 150.

Indian Ocean Shipping: Roles of the Indian Navy and Coast Guard

PK Ghosh

> *…while to other countries Indian Ocean is only one of the important oceanic areas, to India it is a vital sea. Her lifelines are concentrated in that area, her freedom is dependent on the freedom of those waters.*[1]
>
> KM Pannikar

The evolving world order has heralded a paradigm shift in thought process that is increasingly accentuated by economic globalisation. A contributor to this shift is the fragile inter-dependent economic relationships between sovereign states, which have been partially caused by the vulnerability of maritime trade and the rising demand for energy. The dramatic rise of seaborne trade has brought about additional maritime security concerns in the form of asymmetric challenges, ranging from piracy and maritime-oriented terrorism, to a host of other concerns that directly or indirectly have a bearing on seaborne trade. Apart from trade, whose disruption may cause considerable economic concerns, energy flows and the security of their supply chain dynamics have been a matter of prime interest to the littoral states of the Indian Ocean region as a majority of their energy lifelines are sea based.

The Indian Ocean region is home to nearly half of world's shipping, and most of the energy resources (mainly in the form of oil and natural gas) emerging from the Persian Gulf, use the seas for transportation. Thus 'energy dependent' littoral states, including India, have an interest in ensuring that these sea-based lifelines remain free 'highways', since any disruption or threatened disruption to them, will have a significant effect on the economies of the states concerned.

The main objective of this paper is to highlight some of the pertinent facts of commercial shipping in the Indian Ocean region and energy flows with respect to India. The paper will explore the role of Indian maritime forces in the region with a focus on enhancing the level of security confidence for commercial shipping.

The Diversity Factor

Despite a common oceanic thread binding the Indian Ocean littoral states - cooperation on maritime issues has not received the primacy it deserves. There is a debate on what constitutes the Indian Ocean rim, with different definitions having group membership that ranges from 29 to 35 member states.[2] Apart from this basic conceptual disagreement on 'group membership', wide dissimilarities between these members exist, ranging from geography to economic and military capabilities. For example,

India has 'blue water' maritime assets and aspirations as a global power, while smaller nations may have limited or no maritime forces.[3] However, security interests have a common base and a convergence of interests that should be mutually beneficial to all regional states. Unfortunately this has not occurred, as demonstrated by the formation of the multilateral Indian Ocean Rim Association for Regional Cooperation (IOR-ARC), in late March 1997 in Mauritius. The IOR-ARC's charter is based on a mandate to enhance economic cooperation amongst member states, [4] does not even mention maritime cooperation (albeit as a project in its works program concerning the development, upgrading and management of ports). Consequently, maritime issues have also been largely ignored by the Indian Ocean Rim Business Forum (IORBF) and to a limited extent by the Indian Ocean Rim Academic Group (IORAG).

Another important regional initiative is the BIMST-EC comprising Bangladesh, India, Myanmar, Sri Lanka and Thailand, which was launched in June 1997 but again its main focus has been economic cooperation. With this grouping accounting for less than 3 per cent of global trade it has been overshadowed by efforts to revitalise the other regional grouping, the South Asian Association for Regional Cooperation (SAARC). Unfortunately none of these forums are able to respond to the emerging asymmetric threats or maritime challenges and thus to the maritime security demands in the Indian Ocean region; it is only through such cooperation that the challenges to the existing maritime order can be overcome.

The Importance of Indian Ocean Shipping Lanes

The major focus of most nations is on their economic development and most of the trade in the Indian Ocean is seaborne. These trade routes form the lifelines for the littoral states where the land transport infrastructure is not highly developed.

The Indian Ocean plays host to some of the most important sea lines of communication (SLOC), where its maritime chokepoints and international shipping lanes carrying nearly half of world trade by volume and 65 per cent of energy flows. A fundamental factor contributing to Asia's recent economic dynamism has been the free passage of commercial shipping along the Indian Ocean sea lanes. A dramatic expansion in the volume of commerce flowing into and out of the region has sharply enhanced the security value of these shipping lanes.

In 2006, the world merchant fleet expanded by 7.2 per cent to reach 960 million deadweight tons (DWT). Linked with economic performance (which had seen a slow down for developed countries to 2.7 per cent for 2005 and a moderate upswing for developing countries to 6.2 per cent for the same period), seaborne trade increased in 2005 reaching 7.11 billion tons in loaded goods, with Asia leading the way at 38.8 per cent.[5]

The rise in seaborne trade and maritime commercial traffic has often been closely linked to the associated rise in the variety and intensity of asymmetric threats that challenge this domain, including piracy, maritime terrorism, smuggling, pollution, accidents and inter-state conflicts.

Imperatives of Cargo and Energy Flows

Most of the maritime cargo emerging from the Persian Gulf or East Africa, and those from Europe to South and Southeast Asia transit the Indian Ocean. The generic pattern of shipping consists of large volumes of low-value resources shipped east through SLOCs to industrial economies (predominantly Japan) in the north, which manufacture finished or semi finished products. These 'value-added' goods are then shipped west via the SLOCs in relatively smaller tonnages. However crude oil is the biggest single cargo in terms of volume through these SLOCs, while finished consumer goods dominate in terms of value.

The Indian Ocean forms the main transportation route for oil and liquefied natural gas from West Asia and parts of Africa, to India, China and Japan. These energy importing states view the SLOCs as their lifelines. At current consumption levels, the oil import dependence for India is expected to become 82.2 per cent by 2010 and rising to 91.6 per cent by 2020, and for rest of South Asia is expected to be 95.1 per cent and 96.1 per cent respectively. Notwithstanding China's attempts at diversifying its energy supplies, its oil import dependence is estimated to become 61 per cent in 2010 and 76.9 per cent in 2020.[6]

Country	1997	2010	2020
North America	44.6	52.4	58
China	22.3	61	76.9
India	57.4	85.2	91.6
Rest of South Asia	87.2	95.1	96.1

Table 1: Oil import dependency of selected countries (%)[7]

Critically, political instability in the Persian Gulf region has a flow-on impact on their energy exports, and there have been at least seven disruptions to their oil production and supply. Any disruption to energy imports will prove disastrous for oil dependent economies. Hence SLOC security is not only critical but absolutely vital for the energy sustenance of these states. The majority of energy imports from the Persian Gulf to Asia, transit the Strait of Hormuz, which is regarded as the most important global choke point through which about 17 million barrels of oil per day move.[8] Hence the

closing down of the Strait of Hormuz would practically cut off all energy supplies to Asia, and would also impact on the United States and Europe.

Similarly, any disruption to the 11.7 million barrels of oil per day, and/or the 63636 ships that transit Asia's key chokepoint - the Malacca Strait - will create serious turbulence in the economies of Southeast Asian countries and the energy dependent economies of China and Japan.[9] In the case of China 'It is no exaggeration to say that whoever controls the Strait of Malacca will also have a stranglehold on the energy route of China.'[10] Thus any disruption could easily lead to the rerouting of merchant shipping through the Sunda and the Lombok/Makassar straits, which are part of the Indonesia archipelago. While these straits are superior to the Malacca Strait in terms of depth and width, they are more distant and possess inferior navigational aids. When combined with political instability in Indonesia, or occasional Indonesian action to temporarily close these straits, the Malacca Strait remains the preferred route for international shipping.[11] Importantly, any disruption to shipping traffic in the Malacca Strait, whether it be due to armed robbery at sea/piracy or an environmental spill, will have a major impact on the countries of Southeast Asia, and will flow-on to the global economy. Thus the Malacca Strait has enormous security implications for all the maritime states that use its waters.

India's Energy Requirements: The Maritime Scenario

With nearly 95 per cent of India's oil imports coming via the sea, it is inevitable that its security considerations are based on ensuring continued access to these resources.[12] This security angle is further complicated as most of the oil originates from West Asia and the energy traffic passes near Pakistan - often considered an adversary of India. To add to this concern, most of the tankers carrying petroleum products discharge at Vadinar and Mumbai, which are situated on the west coast of India, and are in relative proximity to Pakistan.

	2001-02	2002-03	2005-06	2011-12	2024-25
Production	32.03	33.05	33.98	33.47	61.4
Demand	99.7	114.3	140.0	199.6	376.5
Deficit	67.67	81.25	106.02	166.13	315.1

Table 2: India's Growing Gap between Crude Oil Production and Consumption (million metric tons)[13]

The sharp rise in consumption and demand of petroleum products is likely to cause a substantial rise in tanker traffic. At the present rate of oil consumption of nearly 120 million metric tons annually, India requires at least two very large crude carriers (VLCC) every day to meet the national demand (in addition to the oil being supplied by

pipelines from offshore installations). Forecasts for 2020 suggest that the requirement will grow to 3-4 VLCCs daily. This will require an enhanced capacity to discharge the oil at selected ports, since most of the imported crude from West Asia is handled on the western sea board at the offshore Buoy Terminal of the Gulf of Kutch. By 2010 this port will be handling over 7000 ships of all types with about 15-20 VLCCs transiting the Persian Gulf and the narrow deep water channels of the Gulf of Kutch at any given time. Such a high volume of traffic will require a state of the art vessel traffic management system to ensure ship safety and security, while mitigating the risks of an environmental spill.

Centres of Gravity and the Indian Role in the Region

India is in a geographically advantageous position, as it juts into the Indian Ocean astride a point that overlooks most of the transiting international shipping routes in the Indian Ocean. The Indian Ocean has two distinct centres of gravity of international shipping, located around the strategic chokepoints of the Strait of Hormuz in the north-west and the Malacca Strait in the north-east.

India sits astride the middle of these centres of gravity with an overview of, and responsibility for, both. Consequently, India aims to cultivate broad economic and military relations with friendly states in both these areas, especially those adjacent to the chokepoints and has undertaken diplomatic and strategic initiatives to strengthen such ties.

Given its 'blue water navy', a capable Coast Guard and vast maritime assets, India is well suited to play the role of a stabilising power in the Indian Ocean, by providing a positive influence in the region and ensuring the safety of commercial shipping in both the centres of gravity as well as the southern reaches of the Indian Ocean. This would be done multilaterally, by encouraging collaboration between the maritime agencies of capable littoral states to undertake patrols of vital SLOCs.

While regional initiatives will be discussed later, it should be noted that coordinated efforts like the MALSINDO patrols in the Malacca Strait chokepoint have had mixed results and probably need to be reinvigorated. Thus there is a need for high level political direction that can be translated into workable propositions at the operating level, such as the formation of interlinked joint maritime centres at important chokepoints for rapid responses to crises, such as smuggling, piracy, search and rescue, and environmental spills.[14] The staffing of such centres by a multilateral maritime force of experts will not be an easy task since a high level of expertise is required, which might not be readily available from resource constrained maritime forces of the littoral states, in which case, more capable states such as India, Australia, and Singapore might shoulder additional responsibility. However the contentious issue of hot pursuit into territorial waters remains a concern due to territorial sovereignty sensitivities. It is important

that the ASEAN Regional Forum (ARF) be involved along with countries like India with their larger maritime capacity. This would not only lower the vulnerability threshold of the SLOCs and chokepoints but also ensure that they remain secure and free from threats of any kind.

Responsibilities of the Indian Navy and the Indian Coast Guard

As one of the largest and most capable maritime forces in the Indian Ocean, the Indian Navy has emerged as one of the primary factors in not only India's maritime security considerations but that of the region. Endowed with considerable strategic reach, the force of 139 ships and submarines has slowly evolved into a near 'blue water force'. The Indian Navy also has substantial aviation capabilities that provide it with the ability to carry out patrol and surveillance operations in the farthest reaches of the Indian Ocean region.

The Indian Navy has repeatedly demonstrated its operational prowess, flexibility, and sustainability in both peacetime operations as well as near conflict situations. While the highly successful Operation CACTUS involving the capture of Tamil mercenaries attempting to flee after an abortive coup in Maldives is an example of the latter,[15] the peacetime operation involving humanitarian assistance to various Asian countries in the immediate aftermath of the 2004 tsunami are an example of the former. The Indian Navy has demonstrated its reach and sustainability by providing surveillance assistance and coastal security during the African Union Summit held in Maputo, Mozambique in July 2003 at the invitation of the host state.

The Indian Navy published *Maritime Doctrine of India* in 2004. Like most experienced and developed navies, the Indian Navy seeks to fulfil the standard roles associated with maritime forces, including warfighting, constabulary operations and the entire gamut of peacetime roles (including diplomatic). However some of the functions coming under the overall charter of constabulary functions within the coastal areas, such as environmental resource management and protection, zone protection, interdiction of smuggling, drugs, illegal migration and other functions originally under the naval role have been assigned to the Indian Coast Guard whose duties and responsibilities also include shipping safety. The Indian Navy continues to hone its professional and warfighting skills through a continuous process of training while enlarging on its peacetime operations. SLOC security, search and rescue, assistance to friendly nations, emergency evacuation of nationals overseas has gained primacy. The ability to provide humanitarian assistance quickly after natural disasters is an indicator of the maritime force's ability to be flexible, while at the same time demonstrating their ability to cooperate with other maritime forces.

The Indian Navy acquitted itself well in the aftermath of the 2004 Indian Ocean tsunami that spread havoc in many littoral states: it deployed 19 ships, 4 aircraft and 14 helicopters to the affected areas within hours. Within a short period of time, 5 simultaneous operations were underway, involving a total of 38 ships, 21 helicopters, 8 aircraft and 5500 personnel, operating as far apart as Indonesia, Sri Lanka, the Maldives, and the Andaman and Nicobar Islands. The operations were conducted in two phases: first providing search and rescue to marooned victims, and then supplying basic necessities, as well as medical aid.

However one of the primary peacetime roles of the Indian Navy has been to protect commercial shipping and associated SLOCs. The Indian Navy has played a proactive role in reacting to piracy and maritime terrorism; probably the best example of this was the capture of pirates onboard the *Alondra Rainbow* in 1999; an event that displayed remarkable intra- and inter-governmental cooperation at all levels.

The Indian Coast Guard

While some countries might consider the Indian Coast Guard to be more benign than the Indian Navy, both agencies are used extensively for maritime security and shipping safety. Their involvement is dependent on the geographical proximity of the incident to land, the necessary expertise and relevant capabilities.

The India Coast Guard was created in 1977 as an Armed Force of the Union of India, under the *Maritime Zones of India Act 1976*. An interim Coast Guard Organisation came into being on 1 February 1977, while a more formal organisation - more in tune with its current organisational format - was inaugurated on 18 August 1978 with the enactment of the *Coast Guard Act 1978*.

Importantly, the Indian Coast Guard is not a guardian on duty on the maritime coast, rather its main objective is to prevent a threat from either reaching or leaving the national coast with its area of operation extending up to 200nm from the shore line.

The Indian Coast Guard was created to enforce maritime law and to assist in the policing of coastal areas. However over the course of time, it has been involved in a wide variety of missions, ranging from policing maritime crime to control/management of environmental disasters. Its main functions, in order of precedence, are: maritime zone security, maritime safety, and maritime environmental security.[16]

The primary and most basic mission of the Indian Coast Guard is maritime zone security which includes two distinct elements: to deter an untoward incident from happening, and to respond quickly in case of any crisis. This task includes:

- protection of artificial islands, off shore terminals
- halting illegal activities and enforcing maritime law. These illegal activities could range from preventing crimes at sea (maritime fraud, cargo theft, charter

fraud, barratry, container fraud etc), and also piracy, hijacking, poaching and narcotics/arms smuggling. Bunkering at sea is also an economic crime that needs to be prevented. All these aspects are directly or in directly involved with shipping at sea especially since an enhancement of any of the above can have a direct affect on the shipping traffic and on insurance premium rates the unwarranted rise of which can have serious consequences on the shipping flows and on trade as a whole

- protection/assistance to Indian fishermen and maritime assets like shipping
- prevention/control of marine pollution which has direct/indirect influence on sea commerce.

The marine safety role overlaps with zone security, and to prevent any duplication of effort, marine safety focuses on protection/assistance to Indian fishermen/maritime assets, and safety to life and property at sea (search and rescue).

Marine environmental security involves the preservation and protection of marine resources from environmental disasters such as oil spills, garbage disposal, release of bilge oil etc. Environmental disasters not only effect the environment as commonly understood but their location and intensity can easily hamper the free flow of shipping traffic.

India recently extended its Exclusive Economic Zone (EEZ) by nearly 60 per cent (an additional 1.2 million km^2), and this will place a considerable burden on the 60 ships and 40 aircraft of the Indian Coast Guard. There are a number of proposals to enhance and modernise the Indian Coast Guard, which will make it one of the most capable coast guards in the Indian Ocean region, better equipped to undertake its mission and roles in a much larger area of operation.

Marine Police Wing

The Marine Police is a new enforcement agency at the state level created when the Federal Government set up a Group of Ministers Committee to explore the management of India's continental and maritime borders. The committee recommended the creation of the Tri-Services Command at Port Blair on the Andaman and Nicobar Islands, and the creation of the Marine Police in coastal states to enhance the security along the Indian coastline.

Until recently, none of India's coastal states, except the Andaman and Nicobar Island territories, possessed a similar agency with such duties. Even the distant island territories like Lakshadweep and Minicoy Islands on the south western seaboard did not possess such a policing organisation.[17] However the proposal to setup this agency

under their respective State Governments is a welcome step in enhancing coastline security and effective maritime border management in India.

The jurisdiction of this fledging agency is unlikely to be much more than five nautical miles from shore and thus will have no direct effect on the commercial shipping routes and trade flows in the Indian Ocean.[18] But since many maritime threats originate on land and move seaward from the coast, most of the incidents of piracy occur well within the planned jurisdiction of the Marine Police. Hence policing in critical areas on the coast will indirectly have an effect on seaborne traffic.

In addition, the Marine Police will also provide waterfront security to meet the provisions of the *International Ship and Port Facility Security* (ISPS) *Code*, and will be expected to assist the Indian Coast Guard in enforcing marine pollution control measures in and around the coastline. Issues like pollution control in harbours due to ballast water discharge, bilge pumping etc, close to the harbours can be controlled with the help of the Marine Police.

The Marine Police are expected to exercise jurisdiction up to five nautical miles from the coast, the Indian Coast Guard till the EEZ boundary and the Indian Navy on the high seas beyond the EEZ. While it is easy to draw these lines on the map and demarcate the responsibilities on paper, the coordination and handing-over procedures will require dedicated skills and professionalism of all the agencies involved.

Indian Initiatives

The maritime arc extending from the Persian Gulf through the Malacca Strait to the Sea of Japan is the 'new Silk route', with a total trade of nearly US$1.8 trillion.[19] Endowed with one of the largest and most capable maritime forces, and coupled with its aspirations to play an important balancing role in the region, India has taken a number of initiatives to ensure better maintenance of order at sea in general and the safety of ships in particular. These efforts can be classified under two groupings: bilateral efforts/agreements with a number of littoral states and other maritime nations, and multilateral efforts with many likeminded nations at an operational level.

Bilateral Efforts

Bilateralism was the core of India's maritime cooperative effort, but there is growing recognition that multilateral activities better meet the emerging maritime security environment.

The United States maintains one of the largest military forces in the region and the importance of developing Indo-US efforts in the direction of a bilateral maritime framework was amply clear from President Bush's statement:

> The United States has undertaken a transformation in its relationship with India. We are the two largest democracies…we have a common interest in the free flow of commerce, including through the vital sea lanes of Indian Ocean. Finally we share an interest in fighting terrorism and in creating a strategically stable Asia. [20]

These efforts were institutionalised in the bilateral framework between India and the United States for maritime security cooperation, first announced by President Bush during his visit to New Delhi in March 2006. The two countries agreed to cooperate in the prevention of transnational crime such as: piracy, armed robbery at sea, arms and drug trafficking etc. A core team comprising representatives from the Indian Navy, Indian Coast Guard, Ministries of Defence and External Affairs was formed to develop appropriate mechanisms, with the Indian Navy taking the lead role.[21] Methodologies for exchanging information on search and rescue and environmental pollution between appropriate maritime agencies have been developed. The Indian armed forces have conducted nearly 40 exercises with their United States counterparts to enhance 'interoperability', with some of these exercises being focused on shipping safety. In 2002, the Indian Navy assisted the US Navy by initially escorting US convoys through the Malacca Strait, but these were abandoned due to Malaysian and Indonesian concerns.

India and Indonesia signed a *Bilateral Agreement on Cooperative Activities in the Field of Defence* in January 2001, focusing on combating maritime terrorism and piracy in and around the Malacca Strait.[22] The key components of this agreement have been visits of Indian Navy warships to Indonesian ports and vice-versa, conducting joint naval exercises, and escorts of Indonesian ships in the Andaman Sea. India has conducted bilateral search and rescue operations with Indonesia under Indopura SAREX. Since 1997, the bilateral SAREX has been converted into a multilateral maritime operation involving India, Indonesia, Malaysia and Singapore.[23] From September 2002, these navies have conducted a cooperative exercise called 'IndIndonCorpat' (Indo-Indonesia Coordinated Patrol) involving safety of shipping at sea and patrolling the Malacca Strait's western approaches, but they are now held infrequently.

Similarly, India has also been engaged in maritime cooperation with Singapore that includes joint naval exercises, submarine training and bilateral exchanges aimed at the safety of shipping in the Malacca Strait. India is also keen to participate in the larger the Malacca Strait Security Initiative (MSSI). Apart from coordinated patrols in the western entrances of the Malacca Strait and the eye-in-the-sky patrol initiative, India continues to take a keen interest in the Malacca Strait since 40 per cent of its trade passes through the area. This interest is reinforced as the Andaman and Nicobar Islands are contiguous to the Malacca Strait, thus making India an 'extended littoral' state.

India's maritime relations with Sri Lanka are dynamic and hinge on effective cooperation. Despite two maritime agreements signed in 1974 and 1976, there are

irritants between the two states - the main one being the status of Katchchativu, a small barren island in the Palk Bay area. But this has not prevented the two navies from coordinating their activities, sharing and coordinating patrols against the sea-based activities of the Liberation Tigers of Tamil Elam. These efforts have resulted in capture of arms being transferred by sea and acted as restraining factor for the activities of the Tamil Sea Tigers.

India's bilateral relations with the island nations of the Indian Ocean especially the Maldives have also been close. Indian Defence Minster Pranab Mukherjee visited the Maldives on 15-16 April 2006, handing over to their National Security Service a fast patrol boat (INS *Tillanchang*), and INS *Darshak* (to conduct hydrology studies). This led to the Indian Ministry of Defence stating 'India and Maldives have decided to develop 'a privileged partnership' between the two countries'.[24]

Apart from the Indian Navy activities fostering cooperation with the littoral states, the Indian Coast Guard has also conducted bilateral visits and search and rescue exercises with the Japan Coast Guard and more recently with the Philippines Coast Guard.[25]

Multilateral Efforts

Having learnt from previous experience, India is keen to involve as many littoral states as possible in any effort to reduce the growing asymmetric challenges to maritime security in the Indian Ocean region. It is expanding its participation in all multilateral security initiatives as well as deepening its bilateral cooperation with all key regional actors. As part of this effort, the External Affairs Minister Mr Pranab Mukherjee at the 14th Annual ASEAN Regional Forum meeting in Manila, offered a training module to all member states on maritime security issues, including anti piracy, anti smuggling, search and rescue, narcotics control etc.[26] The basis for the offer was to encourage capacity building to meet the emerging challenge of terrorism.

Exercise MILAN is conducted with Southeast Asian navies (and Australia) every alternate year, with an increasing number of participants. The last exercise was held in 2006, and had serials aiming to ensure peace and stability in the region. The recently conducted Exercise MALABAR had an extensive 'marine interdiction' serial involving visit, board, search and seizure, as well as normal 'combat' serials.[27] These exercises enhance cooperation with the key maritime nations operating in the region and have been described by the Minister of State for Defence Pallam Raju as 'this [exercise] is simply directed at ensuring security of the sea lanes of communication'.[28]

India abides by global initiatives like the Container Security Initiative (CSI), and the Jawaharlal Nehru Port Trust, which handles nearly 58 per cent of container traffic to and from the country, is CSI-compliant. All major ports and some minor ports implemented the ISPS Code well before the 1 July 2004 deadline.[29]

Another regional effort, the *Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia* (ReCAAP) is a multilateral initiative that brings together sixteen countries on a common platform to share information in coping with piracy in the region (mainly the Malacca Strait).[30] An Information Sharing Centre has been set up in Singapore that will collate, analyse, disseminate related information and even alerts in the event of advance information of threat related activities. India is an active member of ReCAAP, with the Indian Coast Guard being the designated agency.

Conclusion

The growing maritime security challenges have a direct influence on the security and economic considerations of most littoral states, as their trade and energy lifelines are sea based. However extensive maritime cooperation may assist in negating these security threats. Despite their maritime dependence, most of these states however, have not cooperated in the past due to diverse capabilities and interests, an aspect that requires rectification. Given the capabilities of Indian maritime forces it is obvious that they can play a stabilising role in the entire Indian Ocean region, thereby ensuring maintenance of maritime order. Additionally there exists a strong Indian desire to cooperate with all littoral states to enable them to enhance their maritime capacities for creating a mutually beneficial, safer maritime environment for passage of trade and commerce.

While most debates have exclusively focused on the Indian role in the middle and north east reaches of the Indian Ocean, few have contemplated a role in the north west and the western reaches of Indian Ocean. Given their capabilities Indian maritime forces are quite capable of playing an active and a more acceptable role in the distant edges of the Indian Ocean. Thus Indian maritime agencies are keen to be involved in multilateral activities ensuring shipping safety at chokepoints, especially at the western entrances of the Malacca Strait and beyond, through coordinated patrols; it is thought the Strait of Hormuz can best be monitored with Indian help by a SLOC patrol extending from the Gulf of Oman to the eight/nine degree channel. Such a patrol would obviously include the participation of maritime agencies from the Gulf States. Thus Exercise VARUNA 07, scheduled to be held off the Gulf of Aden and culminate in a joint patrol off the Somali coast, is probably a small move in the right direction.[31]

Notes

1 K.M. Pannnikar, *India and the Indian Ocean*, Allen and Unwin, London, 1945, p. 84.

2 Rahul Roy Chowdhury, *India's Maritime Security*, Knowledge World, New Delhi, 2000, p. 30.

3 India is the second fastest growing major economy in the world, with a gross domestic product (GDP) growth rate of 9.4 per cent for the fiscal year 2006-07. Goldman Sachs has predicted that India will become the 3rd largest economy of the world by 2035 based on a predicted growth rate of 5.3-6.1 per cent. The Indian economy is the 3rd largest in the world as measured by purchasing power parity (PPP). When measured in USD exchange-rate terms, it is the 12th largest in the world, with a GDP of US$1 trillion in 2007. India's foreign currency reserves stood at US$141 billion in 2005-06 and currently stand at US$200 billion.

4 The members of the IOR-ARC are: Australia, Bangladesh, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Oman, Singapore, South Africa, Sri Lanka, Tanzania, Thailand, United Arab Emirates, Yemen. The dialogue members are China, Egypt, France, Japan, and the United Kingdom.

5 United Nations Conference on Trade and Development, *Review of Maritime Transport 2006*, Geneva, 2007, pp. 1-3.

6 P.K. Ghosh, 'The Maritime Dimension', in Jasjit Singh (ed), *Oil and Gas in India's Security*, Knowledge World, New Delhi, 2001.

7 The Energy and Resources Institute.

8 Energy Information Administration, *World Oil Transit Chokepoints - Hormuz*, www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/Hormuz.html

9 The number of ships passing through the Malacca Strait for the years 2000-04, as recorded by the Mandatory Ship Reporting System (Klang VTS) are 2000 (55,935), 2001 (59,314), 2002 (62,393) 2003 (62,334), and 2004 (63,636) www.marine.gov.my/service/kp_straitrep.html; Energy Information Administration, World Oil Transit Chokepoints - Malacca, www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/Malacca.html.

10 China Youth Daily, 15 June 2004, cited in Ian Storey, China's 'Malacca Dilemma', China Brief, Vol. 6, Issue 8 , Jamestown Foundation, 12 April 2006.

11 The Sunda and Lombok straits have witnessed stoppage of international shipping traffic four times in recent history - the most recent one being in 1988 when Indonesia stopped traffic for 48 hours.

12 Rahul Roy Choudhury, 'Energy Security Policy for India: The Case of Oil and Natural Gas', Strategic Analysis, February 1998, p. 1677.

13 Directorate General Hydrocarbons, Presentation by AS Popli, 'Orientation on India Oil and Gas Industry'.

14 See PK Ghosh, 'Let Indian Ocean Unite the Rim', *The Financial Express*, 12 December 2000.

15 In November 1988, the People's Liberation Front of Tamil Elam (PLOTE) comprising about 200 Tamil secessionists invaded Maldives. At the request of the President of Maldives, Maumoon Abdul Gayoom, Indian Armed Forces launched a military campaign to fight the mercenaries out of Maldives

16 Prabhakaran Palleri, *Role of Coast Guard in Maritime Security of India*, Knowledge World, New Delhi, 2004, pp. 122-127.

17 Commodore RS Vasan IN (Rtd), 'Creation of Marine Police Wings in the Maritime States of India' SAAG Paper 1405 dated 6 June 2006, www.saag.org/%5Cpapers15%5Cpaper1405.html.

18 Vasan states that the Indian Marine Police's jurisdictional boundary is up to 30nm and the Indian Navy's jurisdiction beyond - this is debatable and the limits may not be correct. Hence the correct boundaries have been mentioned in this paper.

19 Donald L Berlin, 'India in the Indian Ocean', *Naval War College Review*, Spring 2006, p. 65.

20 President Bush's address to West Point Military Academy, 1 June 2002, cited by K Subramanyam in *Times of India*, 7 October 2002.

21 Rajat Pandit, 'India US mull joint Maritime Patrol', *Times of India*, 6 August 2007.

22 The Memorandum of Understanding was signed in 1995 however it is yet to be ratified by the Indonesian Parliament.

23 V Shekar, 'India Indonesia Relations: An Overview', IPCS Special Report No 38, March 2007.

24 Vivek Raghuvanshi, 'India and Maldives move towards a Privileged Partnership', 24 April 2006, www.defensenews.com/story.php?F=1717348&C=asiapac

25 The India Coast Guard and the Philippines Coast Guard recently had an exercise on 12 June 2007, prior to theta exercise, the Indian Coast Guard exercised with the Japan Coast Guard. See 'Philippine Coast Guard and Indian Coast Guard Joint Passing Exercise' at www.coastguard.gov.ph/content/?p=55

26 P.S. Suryanarayana, 'India's Offer on Maritime Security', *The Hindu*, 3 August 2007.

27 The 13th Exercise MALABAR was conducted in the Bay of Bengal from 4-9 September 2007. The United States participated with 13 warships including the aircraft carrier USS *Nimitz*, India with 7 including aircraft carrier INS *Viraat*, 2 destroyers from Japan, a frigate from Singapore and 2 warships from Australia.

28 'Major naval drill kicks off in Indian Ocean' AFP, 4 September 2007.

29 The other state to implement the code prior to the deadline was Singapore.

30 The Asian countries that are party to the ReCAAP are Bangladesh, Brunei , Cambodia, PRC, India Indonesia Japan, ROK, Laos, Malaysia, Myanmar, Philippines Singapore, Sri Lanka Thailand and Vietnam; although Indonesia and Malaysia have not yet ratified the agreement.

31 A nine day strategic exercise involving the Indian and French navies commenced on 18 September 2007 off the Gulf of Aden. For details see, 'Indo French naval exercise starts in Gulf of Aden', *Express News Service*, New Delhi, 18 September 2007.