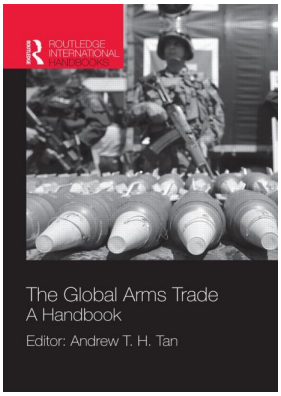

The Global Arms Trade
A handbook

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Arms modernization in Asia

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3 Arms modernization in Asia

An emerging complex arms race

Desmond Ball

'Asia is rushing to arm itself as never before' (Sikes 1990); 'Southeast Asian countries have recently gone on a military spending spree' (Clad and Marshall 1992); the People's Republic of China is also now engaged in an 'arms buying spree' (Tai Ming Cheung 1992); 'Asia's armories are bulging … conventional arms abound, and more are flooding in' (*Economist*, 20 February 1993, 19); and there is a 'new Asian arms race' underway which 'bodes ill for a region already racked by ancient animosities and border disputes' (Clad and Marshall 1992). These quotations from press reports in the early 1990s reflect the concerns that were widespread among strategic analysts at that time regarding the sustained build-up of modern conventional weapons systems in Asia, which had been underway since the mid-1980s. I argued then that it was misleading to characterize the robust weapons acquisition programmes as an 'arms race', but that they could be better explained in terms of defence modernization and the new requirements for defence self-reliance in the region (and especially the maritime dimension) (Ball 1993–94).

However, a decade and a half later, the question of whether the Asia-Pacific region is on the verge of an emerging arms race must be reconsidered. Regional defence budgets were hit by the Asian economic crisis in 1997–98, but they mostly rebounded fairly quickly, and a multitude of new weapons systems were soon ordered – dozens of new warships, submarines, hundreds of fighter aircraft and all sorts of infantry weapons. This was particularly the case in North-east Asia, where the growth in China's defence budget has been especially disturbing – it has increased by double digit figures nearly every year since 1988, meaning that it has increased eight-fold over the 20-year period (according to official budget figures). The US defence budget has also increased rapidly since 2002, with significant implications for the strategic balance and security in the Asia-Pacific region. This region is now also subject to the most active proliferation of weapons of mass destruction (WMD), as well as long-range delivery systems, in the world today. Estimates of WMD capabilities must now figure integrally with new conventional weapons capabilities in strategic calculations with respect to this region – and in any discussion of the question of a prospective arms race in the region.

This chapter has five principal parts. The first part discusses the 'arms race' argument of the early/mid-1990s and the conceptual meanings of the terms 'modernization' and 'arms race'. The second part describes the recent trends in regional defence expenditure and acquisitions. It briefly outlines the main new capabilities most commonly being acquired in the region, and shows the preponderance of North-east Asia in the regional military balance. Special attention is drawn to naval acquisitions and the issue of an 'emergent naval arms race' in the region. It also discusses a couple of particular developments, viz: unmanned aerial vehicles (UAVs) and information warfare (IW), the implications of which are relatively unexplored. The third part briefly describes the proliferation of nuclear weapons and associated delivery systems in this region. The fourth reviews Asia's place in the global arms trade and particularly its prominent position with respect to arms importation. Finally, the fifth part argues that untrammelled by any arms control arrangements, 'arms-racing' behaviour is likely to increase over the next one to two decades, with disturbing implications for regional stability.

The 'arms race' argument in the early/mid-1990s

The common characterization of the arms acquisition programmes in East Asia in the late 1980s/early 1990s as an 'arms race' was not based on any systematic analysis. Rather, it reflected astonishment at the rapid increase in Asian defence expenditure, anxiety about China's growing capabilities, and bewilderment about some of the major acquisitions in the region.

From the mid-1980s to the mid-1990s, defence expenditure in Asia increased at an unprecedented rate. Together with a decline in defence spending in the USA, Europe and the former Soviet Union in the late 1980s and early 1990s, this resulted in the Asian share of world military expenditure almost doubling in the decade from 1984 to 1994 – from 11% to 20% (see Table 3.1 – US ACDA 1995).

In the case of arms imports to the region, Asia's share of world expenditure on arms transfers more than doubled from the early 1980s to the early 1990s – from 15.5% in 1982 to 33.24% in 1993 (Anthony et al. 1992, 308; Anthony et al. 1994, 510; Gill 1994, 552).

Any arms race should have two principal features. First, it should involve a rapid rate of acquisitions, with the participants stretching their resources in order to ensure that they remain at the head of the race, or at least are not falling behind; and, with their capabilities increasing, in quantitative and/or qualitative terms. It is commonly presumed that the proportion of gross domestic product (GDP) being allocated to defence expenditure is a good indicator of national commitments to this effort, but this can be very misleading. It is quite possible, given high rates of economic growth, for the proportion of GDP spent on defence to decline while real defence spending and capabilities are being substantially increased.

In most countries in the Asia-Pacific region, the proportions of gross national product (GNP) committed to defence spending were much lower in the mid- and late 1990s than they had been in the early 1980s – typically 30% or 40% lower. China, where the proportion has remained fairly constant, was the only exception to this. However, most countries had much more capable forces in the 1990s than they had in the 1980s.

Second, there should be some reciprocal dynamics in which developments in the defensive and offensive capabilities of one adversary are matched by attempts to counter the advantages thought to be gained by another. Thus, the continued acquisition of new weapons capabilities becomes an interactive process in which the arms requirements of one party depend upon the known, assumed, or anticipated capabilities of the forces of the other party or parties.

However, there was little evidence of these action-reaction dynamics in the regional acquisition programmes of the 1980s and 1990s. Rather, those programmes could best be explained in terms of modernization, or the requirements for enhanced self-reliance in the context of a rapidly changing and increasingly uncertain regional security environment, with the extraordinary rates of economic growth across most of the region providing the largesse for the increasing defence budgets. For many countries, modernization involved the replacement of

Table 3.1 Asia's share of world defence expenditure, 1984 and 1994

	1984		*1994*	
	Defence expenditure US$b (constant 1994)	*% of world defence expenditure*	*Defence expenditure US$b (constant 1994)*	*% of world defence expenditure*
World	1,251.8		840.3	
South Asia	9.1	0.73	12.5	1.49
East Asia	120.9	9.66	144.8	17.23
Oceania	7.1	0.57	9.0	1.07
Asia	138.1	11.03	166.3	19.79

obsolescent equipment acquired in the 1960s and 1970s. This replacement process often involved substantial increases in qualitative capabilities, especially with respect to weapons, sensors and electronic warfare (EW) systems.

On the other hand, there were two important cautionary points expressed by those who denied the arms race thesis. The first was that many of the new weapons systems being acquired had an 'offensive' character (such as fighter/strike aircraft, modern surface combatants, submarines and long-range anti-ship missiles), which not only made them more likely to generate counter-acquisitions in the future, but which were also disturbing in terms of their implications for crisis stability (Ball 1993–94, 105).

Second, it was noted that the possibility of some regional arms race developing within the next decade or so remained a serious concern. Since the requirements for defence self-reliance cannot be defined without some consideration of the capabilities possessed by neighbours and potential adversaries further afield, there must come a point where further acquisitions begin to stimulate reciprocal or interactive dynamics. By 2010, most countries in the region will face the demands not only of continued force modernization but also of replacement of the weapons systems acquired in such large volumes in the late 1980s. Defence budgets and acquisition programmes may enter another cycle of substantial increase – but this time for a base of higher numbers and more sophisticated capabilities than obtained during the round of the late 1980s and early 1990s.

It is of course possible, region-wide, for modernization and arms racing processes to proceed simultaneously. In this situation, which by and large obtains in Asia today, the analytic task is to locate the presence of arms racing behaviour and to determine the extent to which force structures are being affected by arms race dynamics, i.e. the extent to which equipment is being procured beyond the requirements of modernization, maritime patrol and other identified national purposes, in order to match or counter the acquisitions of notional adversaries.

Defence economic trends, 1996–2006

In 1996, the last full year before Asia was struck by the 1997–98 economic crisis, it accounted for 18.9% of world defence expenditure, with East Asia accounting for 15.8% (Sköns et al. 1999, 270). The high rate of growth in North-east Asia had levelled off in 1993–94 but was resumed in 1995–96, until hit by the regional economic crisis towards the end of 1997. The proportions of GNP being spent on defence in most countries in the region continued to decrease (DIO 1997, tables 24 and 25; DIO 1998, tables 24 and 26; DIO 1999, tables 24 and 26). In 1997 Asia's share of world spending decreased to 17.75% (Sköns et al. 1999, 270). In 1998, when most of the region was suffering economically, Asia's share of world arms transfers reached 41% (Asia-Pacific Economic Update, 2000, 89). It was 45.15% in 2002 (Hagelin et al. 2003, table 13B.1).

US defence expenditure increased dramatically in fiscal year 2002, following the terrorist attacks on the World Trade Center and the Pentagon in September 2001 and Operation Enduring Freedom in Afghanistan, and has been further bolstered by the war in Iraq since 2003. By 2003, when US defence spending increased by 14% over the previous year, and spending in Europe and the Middle East was increasing in real terms, Asia's share of world spending had fallen to 15.67%; it was 15.66% in 2006 (Stalenheim et al. 2007, 299).

Nearly all of the countries that were severely affected by the economic crisis had resumed increasing defence budgets by 2000 – Indonesia being the most important exception to this. In North-east Asia, the Republic of Korea (South Korea), which was hit the hardest by the crisis, increased its defence spending by 6.2% in the fiscal year 2000/01. South Korea's defence budget for fiscal year 2001/02 was a record US$12.72 billion. It included plans to spend $26.5 billion on new weapons systems over the next five years, including the acquisition of 40 new fighter aircraft, manned and unmanned reconnaissance aircraft, the SAM-X air defence

system, at least three and perhaps six KDX-III destroyers, and improved command and control systems (Lake 2001a). In 2007, to complete and expand these acquisitions, South Korea announced a defence plan for 2008–12 which included $61 billion for weapons systems. The defence budget in 2007 was 9.9% higher than the previous year, with military spending planned to increase from 2.7% of GDP to 3% over the next five years (*Asian Defence Journal*, September 2007, 55).

Conventional acquisition programmes

Throughout the region as a whole, there have been significant common themes apparent in the acquisition programmes since the late 1980s. Asia is, of course, an extremely diverse region, with extraordinary disparities in national economic resources and military capabilities, and significant differences in security concerns and threat perceptions – in light of which, the degree of consistency in the acquisition programmes is all the more remarkable. The principal common themes involve:

National command, control and communications systems

Since the end of the Cold War and the commitment by most countries in the region to policies of enhanced self-reliance, there have been substantial investments in national command, control and communications (C^3) systems – including the construction of modern HQs and command and control centres, and the procurement of all sorts of communications and data-relay systems. The events of 11 September and the 'war on terror' prompted moves to enhance both the physical and electronic security of key C^3 facilities.

National strategic and tactical technical intelligence systems

The policies of greater self-reliance, together with the continuing prevalence of conflicts and disputes (both inter-state and intra-state) throughout the region, the requirements for maritime surveillance in exclusive economic zones (EEZs), and the need to monitor the details of new weapons systems being acquired by neighbours and potential adversaries, have led to increased investments in technical intelligence collection systems, especially signals intelligence (SIGINT) capabilities. Budgets for new SIGINT systems and expanded collection operations typically doubled during the period from around 1985 to 1995 (Ball 1993). Many countries in the region now maintain ground stations for intercepting satellite communications (i.e. long-distance telephone calls, facsimile traffic, e-mails, computer-to-computer data exchanges, etc.), including the USA, Russia, China, Japan, Australia, Singapore and even Myanmar (Ball 1993, 102–6; Ball 1998, 107–10).

Some countries have also been acquiring extensive airborne SIGINT capabilities. These are very expensive to maintain, but they provide the only means for effective, continuous, real-time surveillance of the electromagnetic emissions across maritime approaches and around areas of interest further afield. Japan now has about 16 dedicated SIGINT collection aircraft, six EW training aircraft with some electronics intelligence (ELINT) capabilities, 13 E-2C Hawkeye and four E-767 airborne early warning and control (AEW&C) aircraft with substantial secondary ELINT capabilities (Ball and Graham 2000). The Chinese Air Force has more than 20 dedicated ELINT collection aircraft – several HD-5s, at least one EY-8, eight HD-6s and five Tu-154M aircraft. In addition, China has also an active ELINT satellite programme, which would be very useful in maritime contingencies (including in the Taiwan Strait) (Ball 2003).

In South-east Asia, Singapore acquired modest but sophisticated airborne SIGINT capabilities in the early 1990s. Two of the Air Force's C-130H Hercules aircraft have been

equipped with extensive suites of Israeli-supplied communications intelligence (COMINT), ELINT and EW systems for strategic, operational and tactical SIGINT missions (Ball 1995, 16–7; IISS 2001–02, 207). They have been reported undertaking collection in Australia; over the Andaman Sea and along the western coasts of Malaysia, Thailand and Myanmar, with stop-overs in Rangoon and Dhaka (Ball 1998, 235–7; Karniol 1997; Lintner 1997); and 'as far west as Pakistan' (Ricketts 2002). Singapore also has four Fokker F-50 Maritime Enforcer Mark-2 maritime patrol aircraft, which are equipped with similar Israeli SIGINT systems, and which operate around South-east Asian waters from the Andaman Sea to the South China Sea (Ball 1995, 16; Ricketts 2002).

In 1995–98, the Royal Australian Air Force acquired two EP-3C Orion aircraft which had been specially configured for SIGINT operations (La Franchi 2000; Barker 2000; McPhedran 2000), which were used extensively around Timor in 1999–2000, and which have more recently been used in the Persian Gulf in support of Operations Enduring Freedom and Iraqi Freedom. The RAAF reportedly also operates a SIGINT configured C-130H; the Australian Army has a King Air 200 fitted for ELINT operations; and the Navy has a Learjet specially equipped for ELINT and electronic warfare activities (Ricketts 2002).

Operations Enduring Freedom and Iraqi Freedom undoubtedly stimulated further regional interest in the acquisition of airborne collection systems. The intensity of intelligence collection flights in the region is increasing, but so too are the risks of neighbourly disputes about them (as occurred between Singapore and Australia because of RSAF technical intelligence collection activities in Australia in 1993–94), as well as more serious crises, such as the confrontation between the USA and China occasioned by China's shooting down of a US EP-3 SIGINT aircraft near Hainan Island on 1 April 2001 (Ball 2004).

Multi-role fighter aircraft, with maritime attack capabilities as well as air superiority capabilities (e.g. F-16s and F-18s)

During the decade from around 1987 to 1997, Asian countries procured about 3,000 new fighter and strike aircraft, and about an equal number of existing aircraft were upgraded with new mission avionics and armaments. By 2000 Asia accounted for about 60% of world holdings of combat aircraft. A somewhat smaller number of more advanced and more expensive fighter aircraft were procured during the decade from 1997 to 2007.

China has developed a new multi-role fighter aircraft called the Jian-10, which entered service in 2003. It is said to be 'superior to the Su-27 but inferior to the Su-30'; as many as 300 may be produced (Asian Defence Journal, January/February 2007, 38). In April 2002, South Korea announced that it had decided to buy 40 new Boeing F-15K (designated Slam Eagle) fighter jets, at a cost of $4 billion. Deliveries began in October 2005, with all 40 expected to have arrived by the end of 2008. Another 20 were ordered in January 2008, to be delivered from 2010 to 2012 (Fong 2007; Asian Defence Journal, January/February 2007, 40). In October 2007 South Korea also announced plans to purchase about 60 fifth-generation fighters (such as the F-22 Raptor and the F-35) from 2014 to 2019 (Asian Defence Journal, December 2007, 74). Japan has identified a requirement for a 'stealth' fighter, and has decided to develop a prototype for test flight by 2012, in addition to seeking procurement of F-22 Raptors from the USA (Asian Defence Journal, September 2007, 55). Taiwan decided in mid-2007 to buy 66 F-16C/D fighters from the USA, to complement the 146 F-16A/B versions that it acquired in 1996–99. A prototype upgraded version of Taiwan's Ching-Kuo Indigenous Defence Fighter (IDF-II) had its first test flight in early 2007.

Australia has embarked on the process to replace its F-111 strike aircraft and its F/A-18A Hornet fighters in the 2010s. In 2007 the government decided to purchase 24 F/A-18F Super Hornets, at a cost of $5.6 billion; already on Boeing's production line in St Louis, they are to be delivered from early 2010 to late 2011. The Super Hornets are intended to prevent the

emergence of any 'air combat capability gap' following the retirement of the F-111s in 2010 and the introduction of the new J-35 Joint Strike Fighter (JSF) later in the decade. Australia plans to acquire 'up to 100' JSFs by 2020, with the first scheduled to enter service in 2013. There is also considerable interest in Australia in the acquisition of a number (perhaps 10–12) of F-22 Raptor 'stealth' fighters.

In 2007 India signed an agreement with Russia for 40 Su-30MKI multi-role fighters, in addition to 140 ordered in 2000. India has also reportedly reached agreement with Russia for the provision of some 126 fifth-generation fighters, to begin entering service between 2012 and 2015 (*Asian Defence Journal*, December 2007, 62).

In September 2005 Singapore decided to procure the F-15SG, a variant of the F-15E, as its next-generation fighter, with the intention of initially acquiring 20–24 new fighters to replace its highly-upgraded A-4s, but the final total requirement may be for as many as 80 (Fong 2007). Malaysia ordered 18 Su-30MKM multi-role fighters in May 2003; the first two were delivered in May 2007 and the rest by the end of 2008. The Royal Malaysian Air Force has expressed a desire to procure a number of 'fifth generation fighters like the … Super Hornets' in 2010–15 (*Asian Defence Journal*, June 2007, 10). Myanmar has acquired 10 MiG-29 fighters from Russia (Lintner 2001). In August 2003 Indonesia took delivery of two Su-27 Flanker fighter-bombers and two Su-30 fighter aircraft from Russia (Tjahjadi 2003). It planned to have a squadron of 10 Sukhoi fighters operational by 2009.

A significant feature of the current fighter programmes is the acquisition of new air-to-air missiles, such as the US AIM-20 Advanced Medium Range Air-to-Air Missile (AMRAAM), which has a range of more than 40 km and uses active radar guidance for interception. Australia, South Korea, Taiwan and Japan have already taken delivery of AMRAAMs; missiles reportedly purchased by Thailand and Singapore 'are held in the US on 48-hour call'; and the USA is considering supplying them to Malaysia, Indonesia and the Philippines (Kerr 2002).

Unmanned aerial vehicles (UAVs)

Throughout Asia there have been substantial investments in the acquisition of unmanned aerial vehicles (UAVs) for surveillance, targeting and fire support, especially since around 2001. It is the main sort of defence equipment needed for the 'war on terror'. The regional interest was palpably quickened by the capabilities demonstrated in the UAV operations in Operation Enduring Freedom in Afghanistan in 2001–02.

In North-east Asia, China is the only country with an extensive operational UAV capability, including ELINT and EW systems. The Chinese Air Force's primary long-range UAV is the WZ (Wu Zhen, or unmanned reconnaissance)-5, better known as the Chang Hong-1, based on US reconnaissance drones shot down over China in the 1960s. Production began in the late 1970s and some were used in the Sino-Viet Nam border conflict in 1979. The latest version of the Chang Hong is a prospective ELINT platform (Fisher 2001, 7–8). In addition, according to a report by the US Department of Defense, 'China already has a number of short-range and longer-range UAVs in its inventory for reconnaissance, surveillance, and electronic warfare roles', and has 'several developmental UAV programs underway related to reconnaissance, surveillance, communications, and EW' (US Department of Defense 2002, 18).

South Korea has recently deployed several indigenously-designed Night Intruder 300 UAVs, which have a range of up to 120 km from their ground station using a line-of-sight data link and 200 km using a relay system. South Korea also plans to acquire four Global Hawk high-altitude UAVs for broad-area surveillance purposes by 2012 (*Asian Defence Journal*, October 2007, 53).

Australia plans to acquire six Global Hawk UAVs, at a cost of $200m. A Global Hawk UAV flew to Australia from California in April 2001, the first non-stop flight across the Pacific Ocean by an autonomous aircraft, and was tested in several roles over the next month (Nelson

2001). Australia is also acquiring about 16 tactical UAVs for focal-area surveillance (Bostock 2001). In August–September 2003, four Project Nervana UAVs were deployed to the Solomon Islands as part of Operation Anode, and were used to provide real-time video imagery for the Regional Assistance Mission (RAMSI) (Liebelt and Burton 2003; Air Force News, 11 September 2003, 6). Boeing ScanEagle UAVs were used by the Australian Army in southern Iraq in 2006–07 (*Asian Defence Journal*, January/February 2007, 44).

Singapore is the only country in the region that had hitherto invested in a substantial UAV capability. The Singapore Air Force currently has a Squadron with several Blue Horizon 'stealth' or 'penetrator' UAVs, with an endurance of more than 16 hours, 40 Searcher Mark-2 and 24 Chukar 111 UAVs (IISS 2007, 371). Singapore Technologies has also been working on the development of larger UAVs, such as the Firefly, which could carry a warhead rather than sensor payload (Eshel and Kemp 1998).

Thailand has a single Searcher UAV. In the early 2000s it was mainly used for surveillance flights along the northern Thailand-Myanmar border in support of counter-narcotics operations. In March 2001 the Thai Army released images, taken by the Searcher, of opium crops and methamphetamine laboratories in Myanmar. Thailand has also produced a small indigenously-designed UAV for reconnaissance purposes, 10 of which were delivered to the Royal Thai Army in 2007. These are to be mainly used for monitoring violent activities in the south (*Asian Defence Journal*, September 2007, 53).

In 2001 the Philippines acquired two Blue Horizon UAVs from Singapore for use against Abu Sayyaf and other Muslim rebel groups. The Philippines Army has also developed its own unmanned surveillance aircraft to support its counter-terrorist programme, including especially locating Abu Sayyaf units (*Straits Times*, 31 January 2002). The Malaysian Ministry of Defence has begun flight testing a locally-produced Eagle UAV system, complete with a ground control station and a remote receiving station, and with a 60 kg payload capacity for carrying various sensors or EW equipment (*Jane's Defence Weekly*, 24 April 2002, 13).

Maritime surveillance aircraft (e.g. P-3 Orions)

About 120 new maritime reconnaissance aircraft were acquired by East Asian countries during the 1990s, and a similar number is likely to have been acquired during the 2000s. In February 2008 the USA agreed to sell Taiwan 12 P-3C Orion long-range maritime patrol aircraft (LRMPA), at a cost of $1.9 billion for the aircraft and $272m. for missiles. The P-3Cs are able to carry eight AGM-86 Harpoon anti-ship missiles (with a range of 120 nm or 225 km) as well as surface search radar, SIGINT/ELINT/EW equipment, and anti-submarine warfare (ASW) systems.

Anti-ship missiles (e.g. Harpoon and Exocet)

Since the mid- to late 1980s, East Asian defence forces have acquired more than 3,000 modern anti-ship missiles, such as Harpoons and Exocets. More than 2,000 are deployed aboard surface combatants and more than 1,000 are for use by maritime strike aircraft. These numbers could well double through the coming decade as a consequence of the acquisition of new submarines, surface combatants and maritime strike aircraft (including maritime reconnaissance aircraft with anti-ship missile capabilities).

Modern surface combatants – destroyers, frigates, ocean patrol vessels

More than 200 new major surface combatants were acquired in East Asia through the 1990s, ranging in size and capability from the 13,000-ton light aircraft carrier acquired by Thailand and the four 7,200-ton DDG-173 Kongo (US Arleigh Burke)-class Aegis destroyers acquired

by Japan, through about 100 new frigates, to more than 100 corvettes and ocean patrol vessels in the 1,000–1,500-ton range.

Since 2000, similar numbers have been acquired or ordered. China has acquired four Sovremenny-class destroyers and several variants of its Luhai/Luzhou destroyers. It has also begun deployment of its Type 054A or Jiangkai-II frigate; some 28–32 are expected to be produced to replace obsolescent Jiankai-1 vessels (Jacobs 2007). In 2000 Japan decided to build two 7,700-ton DDG-177 Atago-class destroyers, larger and more capable than the Kongo-class; they were commissioned in March 2007 and March 2008. It is likely that a further two will be ordered in the next few years. South Korea decided in 2002 to build three KDX-III (King Sejong the Great) Aegis-equipped destroyers, with a full-load displacement of 10,290 tonnes. The first of these (DDH-991) entered service in December 2008, with the second expected in 2010 and the third in 2012. The ROK Navy hopes to procure another three.

Singapore has acquired six Formidable-class frigates (3,200 tonnes), the last of which was launched in May 2006 and which will all be in service by 2009. They are nominally replacements for the six Sea Wolf missile gunboats which entered service in 1972, but carry Harpoon missiles and a helicopter, as well as modern sensors and electronic countermeasures (ECM) systems, providing a small-scale illustration of the qualitative advances incorporated in replacement processes (*Asian Defence Journal*, May 2007, 12).

Several countries in the region have acquired or are in the process of acquiring Standard SM-2 (Block IVA) and even SM-3 capabilities. With a range of 400 km, the Aegis/SM-2 (Block IVA) system provides air defence and limited ballistic missile defence over areas of fleet operations, amphibious landings, ports and support facilities, etc. Japan's four Kongo-class and two Atago-class destroyers are equipped with a mixture of SM-2s and SM-3s. In December 2007 an SM-3 (Block 1A) launched from the Kongo (DDG-173) successfully intercepted a ballistic missile in a test exercise in the mid-Pacific. South Korea's new KDX-III destroyers, the first of which entered service in December 2008, are also being equipped with SM-2s. In June 2007 Australia announced its decision to acquire 'at least three' Hobart-class anti-air warfare destroyers from Spain's Navantia, at a cost of $6.7 billion, with the first to be delivered by late 2014 and the third by mid-2017; they are to be equipped initially with SM-2 missiles.

Submarines

East Asian navies currently possess more than 100 submarines and, although many of the Romeo-class boats possessed by China and the Democratic People's Republic of Korea (North Korea) are no longer operational, more than 36 new boats were acquired during the 1990s. Most of these were in North-east Asia, where Japan acquired seven Harushio-class boats and began the eight-boat Oyashio project, South Korea acquired eight Chang Bogro (Type 209) boats, and China acquired four Song-class (Type 039) and four Russian Kilo-class submarines. Australia produced six Collins-class boats, the last of which was commissioned in March 2003, which are among the most capable conventional submarines in the world.

Since 2000, Asian countries have acquired or signed contracts for the delivery of about 30 new submarines, with orders for a further 20 expected in the next several years. China purchased eight more Project 636 Kilo-class submarines in 2002. South Korea has three 1,800-tonne Type 214 Sohn Won Il-class submarines which should be ready to enter service in 2010, and has announced plans to procure six more between 2012 and 2020. Taiwan is seeking to acquire eight new boats. In early 2008 India ordered six Scorpene submarines from France, the first of which is to be delivered in 2012 and the rest over the next five years (Asian Defence Journal, March 2008, 47). India is building two prototype nuclear submarines, the first of which is expected to be commissioned in 2011–12 (*Asian Defence Journal*, May 2007, 52). Several more are likely to be procured in South-east Asia.

The role of submarines is being revolutionized. In Australia's case, for example, the Collins-class submarines will operate very differently from submarines in the past. Their primary roles are no longer anti-submarine warfare (ASW), convoying, or supporting battle groups in large-scale open ocean engagements. Rather, they will operate primarily in joint or combined operations in littoral regions, and in the new theatre of IW or Network-enabled Warfare. The submarines will remain an indispensable element of the RAN's fleet operations, but the chains of command, the range of information being distributed to the submarines, the recipients of information disseminated from the submarines, and hence the contribution of the submarines to Australian Defence Force (ADF) operations more generally, will be very different (Ball 2001, 7–10).

Electronic warfare capabilities

Most countries in East Asia are rapidly developing their electronic warfare capabilities, including their maritime EW capabilities. This reflects the widespread efforts in the region to achieve national self-reliance, the general recognition of the value of EW as a 'force multiplier', the defence modernization programmes (which necessarily include significant electronic components), and the ability of many countries in the region to produce advanced electronic systems for the desire to promote the development of indigenous electronic sectors through local design and production).

EW operations require full and real-time intelligence concerning the adversary's electronic order of battle (EOB) – that is, catalogues of the plethora of communications systems, radars and other electro-magnetic emitters which might be expected in area of operations. Electronic support measures (ESM) systems, including electronic counter-measures (ECM) and electronic counter-counter-measures (ECCM) systems, have to be carefully tailored to an adversary's EW systems and techniques. It is a highly interactive process which presumes identification of particular possible adversaries. In North-east Asia, there is evident action-reaction with respect to naval EW capabilities (Ball 2004, 76–7).

Rapid deployment forces, special forces, amphibious landing capabilities

Many countries in the region have either recently established or are in the process of developing some form of rapid deployment force, typically of brigade or light divisional size, designed to be deployed to possible areas of operation (AOs) at short notice and to fight as more or less self-contained units. Some of these forces are specially equipped and trained for amphibious assault operations.

Several countries are acquiring large amphibious landing ships (around 20,000 tons and heavier), described in one report as 'the real Asian arms race' (Stratfor 2007). These ships are able to carry 15–24 helicopters, a handful of transport hovercraft, heavy battle tanks, hundreds of troops, dozens of vehicles and tons of supplies for a variety of expeditionary missions. South Korea is producing four Dokdo-class LPX (Landing Platform Experimental), the first of which was commissioned in July 2007 and named after the Dokdo islets in the Sea of Japan, which South Korea contests with Japan. Its logo is inscribed with the words (in English): 'Project Power'. In November 2007 during a joint South Korean-US amphibious landing exercise, the Dokdo served as the exercise's command vessel with the landing force operation centre (LFOC) on board (Mingi Hyun 2007). Japan is building two Hyuga-class 16DDH helicopter-carrying destroyers, the first of which was laid down in May 2006 and is scheduled for commissioning in 2009. In June 2007 Australia decided to buy two 27,000-ton Spanish Navantia-designed LHDs, also called 'strategic projection ships', at a cost of $2.6 billion.

Information warfare capabilities

Although the investments have been too small to figure in defence budgets, and are generally covert anyway, many countries in the region have been acquiring IW capabilities – from internet monitoring and manipulation to strategic deception, to capabilities for destroying or incapacitating the critical information infrastructure of notional adversaries (including their defence C^3I systems).

China began to implement an IW plan in 1995, and since 1997 has conducted several exercises in which computer viruses have been used to interrupt military communications and public broadcasting systems. In April 1997 a 100-member élite corps was set up by the Central Military Commission to devise 'ways of planting disabling computer viruses into American and other Western command and control defence systems' (Dawnay 1997). In 2000 China established a strategic IW unit (which US observers have called 'Net Force') designed to 'wage combat through computer networks to manipulate enemy information systems spanning spare parts deliveries to fire control and guidance systems' (Sherman 2000). In August 1999, following a spate of cross-Straits attacks against computer networks and official websites in Taiwan, the Minister for National Defence in Taipei announced that the Ministry had established a Military Information Warfare Strategy Policy Committee and noted that 'we are able to defend ourselves in an information war' (ADJ News Roundup, August 1999, 14). In December 2000, this committee was expanded and converted into a battalion-sized centre under the direct command of the General Staff HQ, with responsibilities for network surveillance, defence and countermeasures (Minnick 2000; Lake 2001b). In May 2000 Japan announced plans to establish a research institute and an operational unit for fighting cyber-terrorism.

The 'war on terror' has added further impetus to these IW developments. In addition to forming IW units for conducting defence operations, there has been more intrusive monitoring of domestic electronic communications and transactions in many countries.

IW and related cyber-warfare or Network-centric warfare (NCW) activities are intrinsically target-specific. They require detailed knowledge of the telecommunications architectures of selected prospective targets, as well as the pro formas they use for computer-to-computer data exchanges, and identification of the 'back door' access points for insertion of viruses and 'Trojan horses'. These activities also involve action-reaction phenomena, as an intruded party takes measures to address its vulnerabilities and the intruder responds with new viruses and insertion techniques (Ball 2008, 138–42).

The predominance of North-east Asia and the rise of China

Northeast Asia accounts for the great bulk of the total defence expenditure and acquisitions in the region, including most of the more disturbing new capabilities. Japan, China, Taiwan, and North and South Korea account for more than 80% of East Asian and Australasian defence expenditure ($108.7 billion, or 83% in 2001; and $196.83 billion or 83% in 2006), and about three-quarters of total Asian defence expenditure (i.e. including South Asia) – 73% in 2001 and 74% in 2006. According to International Institute for Strategic Studies (IISS) estimates, China accounted for about 46% of total Asian expenditure in 2006 (see Table 3.2). An overview of defence capabilities in North-east Asia (in 2001 and 2006) is given in Table 3.3.

There is enormous uncertainty about Chinese defence expenditure. The official budget was $17 billion in 2001 and $35.3 billion in 2006, but this includes only a part of the funds spent on defence. Outside estimates vary widely, with some as high as $140 billion as far back as 1999 (Shaoguang Wang 1999). The IISS has long produced estimates of Chinese defence expenditure which include estimates of the extra-budgetary military expenditure. In 2001, for example, it estimated that actual expenditure was $47 billion and in 2003, when the official budget was $22.3 billion, it estimated that actual expenditure was $55.9 billion. Since 2004

Table 3.2 East Asia, South Asia and Australasia: defence budgets 1998, 2001 and 2006 (US$)

	1998	*2001*	*2006*
North-east Asia			
China, People's Republic	37.5 bn	47.0 bn	122.0 bn
Japan	37.66 bn	40.4 bn	41.1 bn
South Korea	9.9 bn	11.8 bn	23.7 bn
North Korea	1.3 bn	1.3 bn	2.3 bn
Mongolia	24 m.	30.2 m.	17 m.
Taiwan	8.3 bn	8.2 bn	7.73 bn
	94.62 bn	*108.73 bn*	*196.83 bn*
South-east Asia			
Brunei	357 m.	348 m.	343 m.
Cambodia	75 m.	128 m.	123 m.
Indonesia	939 m.	1.27 bn	2.59 bn
Laos	33 m.	15.8 m.	13.4 m.
Malaysia	1.2 bn	1.9 bn	3.08 bn
Myanmar	1.7 bn	1.7 bn	6.23 bn
Philippines	1 bn	1.1 bn	909 m.
Singapore	4.4 bn	4.3 bn	6.4 bn
Thailand	2 bn	1.7 bn	2.13 bn
Viet Nam	924 m.	1.8 bn	3.43 bn
	12.63 bn	*14.26 bn*	*25.24 bn*
Australasia			
Australia	7 bn	6.6 bn	15.1 bn
New Zealand	860 m.	678 m.	1.31 bn
	7.86 bn	*7.278 bn*	*16.41 bn*
South Asia			
Bangladesh	612 m.	692 m.	843 m.
India	10 bn	15.6 bn	22.3 bn
Pakistan	3.2 bn	2.6 bn	4.14 bn
Sri Lanka	733 m.	700 m.	686 m.
	14.55 bn	*19.59 bn*	*27.97 bn*
	129.71 bn	***149.86 bn***	***266.45 bn***

Source: IISS 2000–01; IISS 2001–02; IISS 2007

Note: Official budget figures, except for China (IISS estimates)

the IISS has adopted a 'purchasing power parity' (PPP) approach to estimating Chinese spending, which has produced figures more than three times as high as the official budget. In 2004, when the official budget was $25 billion, the IISS estimate jumped to $84.3 billion. In 2006 the IISS estimate was $122 billion (see Table 3.4). The Stockholm International Peace Research Institute (SIPRI), on the other hand, estimated that actual expenditure was $49.5 billion in 2006 (Stalenheim et al. 2007, 289), while the US Defense Intelligence Agency (DIA) estimated it to be $80 billion–$115 billion (Maples 2007).

China has now clearly overtaken Japan (which spent $41.1 billion in 2006, essentially stagnant since 2001) with respect to defence expenditure, making it the largest defence spender in Asia. According to IISS figures, this happened in around 2001, while SIPRI reckons it occurred in 2006 (Stalenheim et al. 2007, 289). According to the IISS figures, China is now the second-largest defence spender in the world (after the USA), while Japan ranks fifth (after the United Kingdom and France). Both China and Japan are now well ahead of Germany and Russia, the sixth- and seventh-largest spenders in the world. South Korea ranks eleventh in the world (see Table 3.5).

Table 3.3 The military balance, North-east Asia, 2001 and 2006

	Japan		*China, People's Repub.*		*Taiwan*		*North Korea*		*South Korea*		*USA*	
	2001	*2006*	*2001*	*2006*	*2001*	*2006*	*2001*	*2006*	*2001*	*2006*	*2001*	*2006*
Defence Budget (US$ billion)	40.4	41.1	47	122	10.9	7.73	2.1	2.3	12.8	23.7	310.5	559
Total Armed Forces (Active)	239,800	240,000	2,310,000	2,255,000	370,000	290,000	1,082,000	1,106,000	683,000	687,000	1,367,700	1,506,757
Army (Active duty)	148,700	148,300	1,600,000	1,600,000	240,000	200,000	950,000	950,000	560,000	420,000	477,800	488,944
Navy												
Aircraft carriers	–	–	–	–	–	–	–	–	–	–	12 (6)	12 (6)
Submarine	16	16	69	58	4	4	26	22	19	20	55 (30)	58 (27)
Destroyers	42	44	21	28	11	11	–	–	6	6	71 (38)	72 (37)
Frigates	12	9	41	48	21	22	3	3	9	9	35 (18)	31 (15)
LRMPA	90	80	4	7	–	–	–	–	8	8	260 (73)	174
Combat Aircraft	297	280	2,900	2,643	482	479	621	590	555	518	3,939 (657) (CINCPAC)	4,199

Source: IISS 2001–02; IISS 2007

Table 3.4 Estimates of the People's Republic of China's defence expenditure, 1991–2007 (US$ bn)

	Official	*IISS*
1991	6.1	18.8
1992	6.8	24.3
1993	7.3	27.4
1994	6.7	28.5
1995	7.5	33.0
1996	8.4	35.4
1997	9.7	36.6
1998	11.0	37.5
1999	12.6	39.5
2000	14.5	42.0
2001	17.0	47.0
2002	20.0	55.3
2003	22.3	55.9
2004	25.0	84.3
2005	29.5	103.0
2006	35.3	122.0
2007	46.7	

Source: IISS

Table 3.5 World's top 12 defence spenders, 2006

	Country	*Defence expenditure (US$ bn)*
1	USA	535.0
2	China, People's Republic	122.0
3	United Kingdom	55.1
4	France	45.3
5	Japan	41.1
6	Germany	35.7
7	Russia	24.9
8	Saudi Arabia	25.4
9	India	22.3
10	South Korea	23.7
11	Italy	15.5
12	Australia	15.1

Source: IISS 2007

The emerging naval arms race

The naval acquisitions have become especially disturbing, with undeniable signs of action-reaction dynamics. East Asia is now embroiled in a serious maritime strategic competition. Highly capable 'blue-water' navies are being developed, with modern surface combatants (destroyers and frigates), aircraft carriers (euphemistically called 'air defence ships' or 'sea control ships'), and new submarines, as well as land-based aircraft for both maritime surveillance and strike. Maritime surveillance and ELINT collection operations are being conducted with increasing intensity and intrusiveness. Hundreds of long-range anti-ship missiles (e.g. Harpoons and Exocets), which require over-the-horizon targeting capabilities, are being acquired. The proliferation of submarine- and ship-based land-attack cruise missiles is also underway.

According to an analysis by Sam Bateman, the current naval acquisition programmes have overtones of arms racing, which were not present in the acquisitions prior to the economic downturn in 1997–98. As he has wrote in 2001:

> The 'first round' of naval expansion was argued away on the basis that it was part of an understandable non-threatening process of modernization. This does not appear to be the case with this 'second round' of naval expansion which appears to be much more clearly posited on assessments of threats posed by other regional countries.
>
> (Bateman 2001, 85)

The expansion of naval forces has been particularly rapid, and the evidence of reciprocal dynamics most apparent, in North-east Asia. As Bateman concluded in 2001 with respect to this sub-region:

> Unfortunately [there is now] an element of acquiring new capabilities competitively to keep up with other navies. Certainly a strong element of technical modernization is present but there is also a large element of competitiveness.
>
> (Bateman 2001, 90)

The Japanese Maritime Self-Defence Force is the most powerful Navy in the Asia-Pacific after the US Navy. Its recent acquisitions include four Kongo-class and two Atago-class Aegis destroyers, the three Osumi amphibious assault ships commissioned between 1998 and 2003, with at least two new Hyuga-class 16DDHs planned, and 10 Oyashio-class submarines. The acquisitions of the Aegis-equipped destroyers have been determined in large part by Chinese and North Korean ballistic missile developments, while other elements are indubitably intended to offset China's growing maritime capabilities.

The Chinese Navy has more than 75 major surface combatants (destroyers and frigates), 62 submarines (including one Xia-class SSBN and six Han-class/Type 091 and Shang-class/Type 093 SSNs), and aspirations to acquire an aircraft carrier capability. Its recent acquisitions include two 8,000-ton Sovremenny-class destroyers purchased from Russia in 2000, with another two ordered in January 2002. Two more 6,000-ton Luhai-class DDGs, as well as two Type 051C Luzhou-class destroyers, were built in the early 2000s. Numerous Type 054A or Jiangkai-II frigates are under construction.

There has been speculation about China's interest in the acquisition of an aircraft carrier since at least the 1980s, usually misinformed and invariably premature, but some such capability now seems fairly close. In 1998 China purchased the former Varyag, a Soviet Kuznetsov-class multi-role carrier (with a displacement of about 33,000 tons) that was only 70% complete when the Soviet Union collapsed. It was delivered in 2002 to the Dalian Shipyard in northern China, where refurbishment of the deck was completed in late 2006, and where it was renamed the Shi Lang (after the mainland Chinese general who conquered Taiwan in 1681). However, whether this will become an operational aircraft carrier or serve as a training and transition platform for an indigenous design yet to be constructed remains unknown (Goodman 2008). In late 2008 Chinese government spokesmen suggested that China would soon proceed with construction of its 'first aircraft carrier'. Defence Ministry officials said that carriers were 'a reflection of a nation's comprehensive power', that China would use any such carrier to 'safeguard its shores and defend sovereignty over coastal areas and territorial seas', that 'the navy of any great power … has the dream to have one or more aircraft carriers', and that 'the question is not whether you have an aircraft carrier, but what you do with your aircraft carrier' (*Straits Times*, 18 November 2008; Wong 2008). In October 2006 China reportedly signed a deal with Russia for the supply of up to 48 Sukhoi Su-33 Flanker-D carrier-capable fighter aircraft. In September 2008 the PLA Daily announced that the first batch of 50 pilot cadets

had been inducted at the Dalian Naval Academy to undergo training on 'ship-borne aircraft flight', while other training has reportedly recently also been conducted in the Ukraine.

Taiwan has recently acquired eight Cheng Kung (US Perry)-class frigates (the eighth entered service in 2004), six Kang Ding (French La Fayette)-class frigates, and four refurbished Kidd-class guided missile destroyers. US President George W. Bush announced in April 2001 that the USA would sell Taiwan 'up to eight' conventional submarines; the project made no progress for several years, but in December 2007 Taiwan's legislature approved funding to begin the design process, with at least one US submarine builder eager for the construction contract (Hamilton 2007). Taiwan's acquisitions are avowedly intended to offset China's growing capabilities.

In March 2001, South Korea's President Kim Dae-jung said that 'our navy will have a "strategic task force" for protecting the national interests and international peace [on a] blue water scale' (cited in Bateman 2001, 86). South Korea has constructed the first of at least three KDX-111 Aegis-equipped destroyers; its ninth Chang Bogo submarine was delivered in 2001; it has announced that it will build nine advanced German-designed submarines by 2020; and it is acquiring four Dokdo-class LPX amphibious transport ships. While North Korean capabilities obviously figure centrally in South Korea's force development, it is also clear that there is an element of competitiveness with Japan with respect to its major naval systems.

The situation is rather different in South-east Asia, where the maritime capabilities have been improving significantly both quantitatively and qualitatively, but from a much lower base. South-east Asian countries are acquiring new maritime surveillance and maritime strike capabilities, modern surface combatants (frigates and ocean patrol vessels) and, perhaps most disturbing and reaction-provoking, submarines. Singapore has procured four Challenger-class (refurbished Swedish Sjoormen-class) submarines, the first of which was delivered in 2000 and the fourth (RSS Chieftain) in mid-2001 (Kockums 2001). In late 2000 Malaysia received two submarines from the Netherlands for 'training purposes'. It reportedly now plans to purchase four submarines (*Financial Times*, 27 August 2000; *Straits Times*, 22 April 2001). In 2002 it ordered two French/Spanish Scorpene boats, which were launched in 2007 and 2008 and were to enter service in 2009 (*Asian Defence Journal*, July/August 2007, 23). Some Asian diplomats have characterized Malaysia's move as a response to Singapore's Challenger programme (*Financial Times*, 27 August 2000). The Royal Thai Navy has also proposed the lease of one or two second-hand submarines from Germany 'to keep up with the underwater ambitions of neighbours Malaysia and Singapore' (*The Times of India*, 10 January 2001), but these plans have not been accepted by the government (Wassana 2001). These naval developments in South-east Asia are not significant enough to affect the balance of power in East Asia, but they could easily prove to be destabilizing within the sub-region itself.

Furthermore, there is a real risk of the maritime strategic competition in East Asia 'spilling over into the Indian Ocean' (Bateman 2001, 139).

The proliferation of nuclear weapons and long-range delivery systems

The proliferation of WMD and long-range missile systems is now proceeding much more rapidly and extensively in Asia than in any other part of the world. It is both a much more complicated and a potentially more volatile process than the bipolar superpower strategic nuclear arms race of the Cold War. The proliferation process that is developing in Asia involves multidimensional dynamics. There are several bilateral competitors, some of which are engaged in multiple pairings. The most obvious direct nuclear competition is between India and Pakistan. A nuclear arms race between India and China, which is a real possibility, would be especially disturbing. The expansion of China's nuclear arsenal could also cause other countries in North-east Asia to exercise their own nuclear options. Moreover, the dynamics now involve not only comparative nuclear capabilities, but interactive connections between nuclear postures and developments in other WMD areas (i.e. chemical and biological

weapons), and between WMD and conventional capabilities. The situation is further complicated by the possibilities for access to WMD by non-state actors, such as terrorist organizations.

Five of the world's nine nuclear countries (see Table 3.6) are in Asia, including Russia, which still maintains hundreds of nuclear weapons in the Far East, China, India, Pakistan and North Korea (designated by President Bush as a member of 'the axis of evil'). The USA also maintains hundreds of nuclear weapons in the Pacific, as well as hundreds of others based in the USA itself but targeted on China, North Korea and the Russian Far East.

China is the largest nuclear power in Asia, with a stockpile of about 400 nuclear weapons and an active development programme. Official US estimates credit China with only about 150 weapons, but this comprises only deployed 'strategic' missile- and bomber-delivered weapons, with no allowance for tactical weapons (including short-range missiles such as the DF-18) or non-deployed weapons held in reserve. It is likely that China has now overtaken the UK and perhaps even France to become the world's fourth- or even third-largest nuclear power.

Nuclear proliferation has become overt in South Asia since the flurry of Indian and Pakistani tests in May 1998. India might now possess some 120–125 plutonium-based weapons, although some estimates are as low as 50–75. Its current production capability is 6–10 bombs per year. The USA-India agreement on civil nuclear co-operation, approved by the US Congress in October 2008, would allow diversion of India's uranium to reactor fuel and allow production of several dozen weapons a year. Pakistan has produced a substantial stockpile of highly-enriched uranium (HEU)-based weapons; estimates range from about 30 to 60 weapons (Kile et al. 2007, 543).

North Korea conducted its first nuclear test on 9 October 2006 and may have a stockpile of more than 10 weapons, although some estimates credited it with as many as 20 by the end of 2005 (Pike 2005). It is likely that it produced sufficient plutonium for two weapons in the early 1990s, before acceding to the agreed framework in 1994, although some estimates range up to five to six weapons. Another four to six could have been produced with plutonium obtained with the removal of fuel rods from the 5 Mw reactor at Yongbyon from 1994 to 2005, and

Table 3.6 Nuclear weapons inventories, 2007

	Country	*Number of weapons*	*Comments*
1	USA	5,045	First detonation in 1945. US stockpile peaked at 32,500 in 1967.
2	Russia	5,614	First detonation in 1949. Stockpile reached 45,000 in 1986.
3	China, People's Republic	490	First detonation in 1964. Inventory includes about 160 IRBM and ICBM warheads, some 50 short-range ballistic missile warheads, 12 SLBM warheads, 150 air-deliverable warheads and some 120 tactical weapons.
4	France	470	Inventory includes 384 SLBM warheads and some 80 air-deliverable weapons.
5	Israel	200	Production began in 1968. More than 25 bombs in September 1973 (Yom Kippur War).
6	United Kingdom	185	160 SLBM warheads (and approx. 25 spares). Had 350 warheads in 1975–81.
7	India	125	First detonation in May 1974. More than 24 weapons in 1990. Five detonations in May 1998.
8	Pakistan	60	Produced first bomb in 1984. Had about eight (unassembled) weapons in 1990. First tests in May 1998.
9	North Korea	10	First detonation 9 October 2006. One to five weapons produced in 1993–94; five to six in 2004–05; and two to three in 2005–06.

Table 3.7 Ballistic missile proliferation in Asia

Country/system	*Type*	*Maximum range (km)*	*Status*
China, People's Republic			
CSS-2 (DF-3/3A)	IRBM	2,800	In service
CSS-3 (DF-4)	IRBM		In service
CSS-4 (DF-5/5A)	ICBM		In service
CSS-5 (DF-21)	MRBM		In service
CSS-8 (M-7)	SRBM	160	In service
CSS-N-3 (JL-1)	SLBM		In service
DF-11 (CSS-7/M-11)	SRBM	300	In service
DF-15 (CSS-6/M-9)	SRBM	600	In service
DF-25	MRBM	1,700	Development
DF-31	ICBM	8,000	Tested
JL-2	SLBM	8,000	Development
India			
Prithvi 1 (SS-150)	SRBM	150	In service
Prithvi 2 (SS-250)	SRBM	250	In service
Prithvi 3 (SS-350)	SRBM	350	Development
Sagrika	SLBM	300	Development
Agni 1	MRBM	1,500	Tested
Agni 2	IRBM	2,500	Production
Agni 3	IRBM	3–5,500	Development
Surya	IRBM	5,500	Development
ASLV	SLV	4,500	In service
GSLV	SLV	14,000	Development
PSLV	SLV	8,000	Development
Japan			
M-3	SLV	4,000	Capability
H-1	SLV	12,000	Capability
H-2	SLV	15,000	Capability
North Korea			
Scud Mod B	SRBM	320	In service
Scud C	SRBM	550	In service
Nodong 1	MRBM	1,000	In service
Nodong 2	MRBM	1,500	Development
Taepodong 1	MRBM	2,000	Tested
Taepodong 2	IRBM	4–6,000	Development
South Korea			
NHK-1	SRBM	250	In service
KSR-1	SRBM	150	Development
NHK-A (Hyon Mu)	SRBM	180	Development
Pakistan			
Hatf 1	BSRBM	100	In service
Hatf 2	SRBM	300	In service
Hatf 3	SRBM	600	Development
M-11 (CSS-7)	SRBM	300	In service
Shaheen 1	MRBM	750	Development
Ghauri (Hatf 5)	MRBM	1,000+	Tested
Taiwan			
Green Bee (Ching Feng)	BSRBM	130	In service
Sky Horse (Tien Ma)	MRBM	950	Development
Viet Nam			
SS-1 Scud B (R-17)	SRBM	300	In service

Source: ACA 2002

Notes: BSRBM is Battlefield Short-Range Ballistic Missile; SLV is space launch vehicle; SRBM is Short-Range Ballistic Missile; MRBM is Medium-Range Ballistic Missile; IRBM is Intermediate-Range Ballistic Missile; SLBM is Submarine-Launched Ballistic Missile; ICBM is Intercontinental-Range Ballistic Missile

another two or three after the April 2005 shut-down of the reactor (Niksch 2006). North Korea may also have produced a few uranium-based weapons.

There is also considerable proliferation of ballistic missile technology in the region, or at least in the North-east and South Asia sub-regions (see Table 3.7). China has produced a full suite of intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), intermediate-range ballistic missiles (IRBMs), medium-range ballistic missiles (MRBMs), and short-range, tactical ballistic missiles. Two new road-mobile ICBMs are being developed – the Dong Feng-31 (DF-31), which is likely to have now entered service and which 'will be targeted primarily against Russia and Asia'; and a longer-range solid-propellant ICBM, which will primarily be targeted against the USA (and which replaces the aborted DF-41 programme). China has also exported some short-range ballistic missiles elsewhere in the region (e.g. M-11 missiles, with a range of some 300 km), to Pakistan. China now has some 1,320 ballistic missiles facing Taiwan (Reuters, 1 January 2008), a rapid increase from around 800 in 2006. They comprise DF-11, DF-15 and DF-15A medium-range missiles, with conventional warheads and are based mainly in Fujian Province. North Korea has some 30 Scud B/C and perhaps 15 Nodong missiles. South Korea has some 12 NHK (250 km) ballistic missiles. Taiwan is developing the 950 km range Tien Ma ballistic missile. India has a comprehensive development programme which includes the short-range (150–250 km) Prithvi, the Agni IRBM, and several possible ICBM launchers. Pakistan has flight-tested the short-range Shaheen I and the medium-range Ghauri (1,300 km) ballistic missiles. The dual-capability of many of these missiles would greatly complicate any notional arms control processes.

The relationship between these nuclear weapons and ballistic missile programmes on the one hand and the conventional weapons acquisition programmes on the other hand is difficult to ascertain. At a minimum, they compete for budgetary resources, requiring some trade-offs. None of the Asian nuclear countries have clearly articulated policies for the employment of their nuclear weapons, at least not publicly available, which might illuminate the point in their strategic policies where reliance on conventional weaponry would give way to employment of their nuclear forces.

China, India and Pakistan have each effectively declared their adoption of nuclear 'no first-use' policies, suggesting a requirement for robust conventional capabilities able to balance those of notional adversaries in order to forestall pressures to 'go nuclear' in plausible contingencies.

Cruise missile proliferation

There is a serious danger of cruise missile proliferation in this region. Cruise missiles are technically easier to produce and cheaper to acquire than ballistic missiles. Enabling technologies such as anti-ship cruise missiles (e.g. Exocets and Harpoons), UAVs, GPS satellite navigation systems and small turbojet engines are now widely available. However, the development and deployment of cruise missiles are also more difficult to monitor.

Several countries in East Asia have either begun to indigenously design and develop long-range, land-attack cruise missiles (e.g. China), or to seriously consider the acquisition of such missiles (e.g. Australia). China's Hong Niao family of cruise missiles is armed with both nuclear and conventional warheads, with ranges up to 1,500 km–2,000 km (in the case of the HN-2, which entered service in 1996) and 4,000 km (in the case of the HN-2000, a supersonic version which is currently in development) (Lennox 2000a; Lennox 2000b). Taiwan tested a Hsiungfeng 2E cruise missile in 2007; it may have a range of about 1,000 km, enabling it to reach Shanghai (*Asian Defence Journal*, October 2007, 53).

The US Navy, of course, maintains about 4,000 Tomahawk land-attack cruise missiles, which it has used against six countries since 1991. In August 2000 the US Air Force confirmed that it had moved 'an unspecified number' of conventional air-launched cruise missiles to Guam, which USAF officials said 'will allow the USA to respond more quickly to crises, particularly in the Asia-Pacific region' (*Jane's Defence Weekly*, 6 September 2000, 22).

In South Asia, India is in the process of developing and producing a variety of cruise missiles, with co-operation from Russian defence industries. These include the Kh-35 Uran anti-ship cruise missile, the 3M-54E Klub anti-ship missile, and the PJ-10 supersonic medium-range cruise missile (which was first successfully tested in June 2001). Both the Klub and the PJ-10 could be redesigned to serve as long-range (3,000 km) land-attack cruise missiles, and can potentially carry nuclear as well as conventional warheads (Raghuvanshi 2001; Jasinski 2002).

Asia and the global arms trade

Since the Asian defence build-up began in the mid-1980s, Asian countries have accounted for a higher proportion of global arms purchases than their share of global expenditure – 20% of transfers compared to 11% of expenditure in 1984, about 33% of purchases compared to 20% of world expenditure in 1994, 41% of transfers compared to 17.75% in 1998, and 45.15% of purchases compared to 18.7% of expenditure in 2002. Many countries in Asia have substantial indigenous defence industries, but they are still much more dependent on foreign purchases than the world's other major defence spenders. Within Asia there are, of course, significant sub-regional differences, particularly with respect to the arms exports side of the ledger. South Asia does not figure among the world's suppliers of defence hardware, and neither does Japan. On the other hand, there are voracious importers in each sub-region.

Asian countries, with the exception of China, are not major arms exporters. China is the only Asian country in the world's top 10 exporters. There are only six Asian countries in the world's top 40. A ranking by SIPRI of arms exporters in the five-year period 2002–06 placed China eighth, with exports amounting to $2.134 billion (in constant 1990 terms) over that period; this is about 6.6% of the US figure, and less than half the UK figure. South Korea is the second highest Asian arms exporter, but ranks only 19th in the world, with sales of $262m. over the five-year period. Australia is ranked 27th, with exports amounting to only $126m. Indonesia ranks 32nd, Singapore 36th and North Korea 37th, but their exports each amounted to less than $100m. over that same five-year period (Wezeman et al. 2007, 422–3).

On the other hand, Asian countries dominate the lists of the world's major arms importers. China and India are the world's first and second arms importers by a large margin. Over the five-year period 2002–06, China's imports amounted to $14.6 billion and India's were $10.15 billion (in constant 1990 dollar terms). Together, they accounted for nearly a quarter of the world total (23.24%). In addition to China and India, six other Asian countries are in the world's top 20 importers: South Korea ($3.884 billion) ranked fifth in 2002–06 and Australia ($3.461 billion) came sixth, with Taiwan ($2.17 billion), Pakistan ($2.038), Japan ($2 billion) and Singapore ($1.295 billion) ranking between 12th and 20th. Together, the eight countries accounted for nearly half (46.6%) of the world total (Wezeman et al. 2007, 418).

In North-east Asia, Japan and South Korea get most of their imports from the USA. Given their strong ship-building sectors, the major imports are aircraft and missile systems. Japan, for example, acquired its F-16 and F-15 fighters from the USA. South Korea's nine Chang Bogo (Type 209) have been built and its nine Type 214 submarines are being built in South Korea under licence to a German company.

Taiwan gets virtually all of its major capital equipment from the USA (including its F-16 fighters, its six E-2C Hawkeye AEW aircraft, 12 P-3C Orions, eight Cheng Kung or US Perry-class frigates, and its six Patriot PAC-3 air/missile defence batteries), although it has indigenously produced several significant weapons systems, including the Indigenous Defence Fighter (IDF) and various missile systems. There have been no major non-US foreign sales to Taiwan since France supplied six La Fayette-class frigates and 60 Mirage 2000–5 fighters in the early 1990s.

China's principal supplier of weapons systems continues to be Russia, which has supplied Su-27SK fighters, Su-30MKK fighters, Sovremenny-class destroyers, and Project 636 Kilo-class submarines. In the decade from 1991 to 2001, more than 90% of China's imports were

from Russia, but in more recent years China has also acquired important weapons systems from Ukraine (especially missile-related systems), Israel, France, Italy, Germany and the UK.

Asian countries figure even more prominently in lists of arms transfers to 'developing countries', where the relative economic burden is greatest, and where there are human security concerns as well as arms race issues. The US Congressional Research Service regularly produces reports on arms transfers to 'developing nations', which in Asia means every country except for Japan, Australia and New Zealand. Six Asian countries were in the top 10 'developing country arms importers' in 2002–05: China, Taiwan, India, South Korea, Malaysia and Pakistan (Grimmett 2006, 67). Four Asian countries were in the top 10 in 2004–07: India, Pakistan, China and South Korea; the other six were all in the Middle East, which in recent years has outpaced Asia in terms of arms imports. In 2007 India, Pakistan, South Korea, China and Taiwan were in the top 10 (Grimmett 2008, 54–5).

The prospects

Asia has now been involved in a sustained build-up of defence capabilities for two decades, hardly affected by economic tribulations. However, the character of the acquisition dynamics began to change around the end of the 1990s. Whereas the acquisitions in the first decade could be explained by and large in terms of modernization, they have in some places in the past decade involved substantial competitive elements. This combination of increasing capabilities and action-reaction is the essence of arms-racing. It may still not be the dominant driver of the acquisitions throughout the region, but it is playing an increasingly significant role in some sub-regions, most especially with respect to naval acquisitions in North-east Asia. Even in South-east Asia, arms-racing behaviour has been manifest in a couple of areas (fighter aircraft and submarines) in Singaporean and Malaysian acquisitions (Tan 2004, 4 and 28).

It is likely that over the next one to two decades, the role of arms-racing will continue to increase. Action-reaction generates its own momentum. Further, there are no arms control regimes whatsoever in Asia that might constrain or constrict acquisitions. Moreover, prospective regional security dynamics, including prospective arms racing, will be much more complex than those which obtained in the old bipolar Cold War situation. There are none of the distinctive categories, milestones and firebreaks which were carefully constructed during the Cold War to constrain escalatory processes and promote crisis stability. Now, there are also interactions between conventional weapons acquisition programmes on the one hand and developments with WMD and long-range delivery systems on the other hand. South Korea and Japan have responded to the development of ballistic missiles by China and North Korea by greatly enhancing their airborne intelligence collection and early warning capabilities and their land- and sea-based theatre missile defence (TMD) capabilities. US nuclear strategy is moving to permit virtually commutual employment of nuclear forces, precision conventional capabilities and information operations (IO), and to permit the use of nuclear weapons in otherwise non-nuclear situations. In this environment, with many parties and many levels and directions of interactions, the possibilities for calamity are high.

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