

In Defense of Singapore

by Felix K. Chang

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Between the two world wars, the United Kingdom placed Singapore at the center of its East Asian defense plans. Collectively known as the “Singapore Strategy,” these plans reaffirmed Singapore’s strategic location. Britain’s Royal Navy believed that from Singapore it could not only safeguard Britain’s Pacific interests, but also defend the sea passageways to British territories in Australia, New Zealand, and the Indian subcontinent.¹

When Singapore gained full independence in 1959, the island appeared too small and devoid of natural resources to craft a credible military defense without its British garrison or even to survive as a sovereign state. Indeed, security was among the many factors that led Singapore and its then prime minister, Lee Kuan Yew, to seek a merger with Malaysia in the early 1960s. However, Lee’s advocacy of a multiracial meritocracy for the newly merged country eventually led to Singapore’s ouster from the Malaysian federation in August 1965.²

In the years since, Singapore has been forced to fend for itself. It has concentrated on acquiring the weapons and operational talents necessary to protect the island from near the shoreline and, more recently, to engage foes further beyond its borders. In doing so, Singapore has produced a military

¹ Christopher Michael Bell, *The Royal Navy, Seapower and Strategy Between the Wars* (Stanford: Stanford University Press, 2000), pp. 59–98, 184–85; Ian Hamill, *The Strategic Illusion: The Singapore Strategy and the Defence of Australia and New Zealand, 1919–1942* (Singapore: Singapore University Press, 1981), p. 310.

² Sumit Ganguly, “Ethnic Policies and Political Quiescence in Malaysia and Singapore,” in Michael E. Brown and Sumit Ganguly, eds., *Government Policies and Ethnic Relations in Asia and the Pacific* (Cambridge, Mass.: MIT Press, 1997), p. 250; Kin Wah Chin, *The Defence of Malaysia and Singapore: The Transformation of a Security System, 1957–1971* (Cambridge: Cambridge University Press, 1983), pp. 29–86.

sufficient to not only deter potential adversaries, but also defend itself and its interests in the region.

Ambitious Neighbors

Since independence, Singapore's defense needs have been influenced by the pressure of ambitious and antagonistic neighbors, principally Indonesia and Malaysia. Indonesia has long endeavored to become Southeast Asia's political heavyweight. In the early 1960s, under President Sukarno, Indonesia sought recognition as a revolutionary leader in the developing world. During that period of *Demokrasi Terpimpin* ("Guided Democracy"), Sukarno proclaimed a policy of "Confrontation," which entailed a low-level military challenge to the Malaysian states on Borneo. Witnessing this gave Singapore a keen appreciation of the need to maintain a strong defense.³

However, Sukarno's revolutionary policies caused significant economic adversity in Indonesia and led his successor, Suharto, to pursue a more pragmatic approach in its foreign relations. While adhering to the principle of non-alignment, Suharto's New Order government concentrated on economic development and channeled many of its foreign policy goals through the Association of South-East Asian Nations (ASEAN).⁴

As Indonesia's economy improved in the mid-1980s, Jakarta once again sought a leadership role. For instance, it played a leading part in developing the Asia-Pacific Economic Co-operation (APEC) forum.⁵ At the same time, Indonesia's military sought to strengthen its capabilities in an ostensible response to the reduced American presence in the region and China's and India's military buildups. Indonesian defense spending doubled from 2.5 percent of government expenditure in the 1985–89 five-year development plan to 5 percent in the five-year development plan for 1990–94. In late 1992, Indonesia procured the bulk of the former East German navy.

However, the 1997–98 Asian financial crisis, the East Timor imbroglio in 1999, and subsequent internal upheavals stalled Indonesia's military expansion. Jakarta was forced to focus on its domestic affairs and institute a ten-year moratorium on the purchase of major new weapons systems. Its military readiness suffered. According to former defense minister Juwono Sudarsono, in early 2001 the majority of the Indonesian navy's warships were below acceptable levels of serviceability. One year later, the Indonesian navy dropped its plans to acquire several helicopters and, instead, chose to replace the engines in its Frosh-class LSTs. Despite an attempt by President

³Lucian W. Pye, *Asian Power and Politics* (Cambridge, Mass.: Harvard University Press, 1985), pp. 248–49.

⁴R.E. Elson, *Suharto: A Political Biography* (Cambridge, UK: Cambridge University Press, 2001), pp. 180–82.

⁵*Country Profile: Indonesia, 2001* (London: Economist Intelligence Unit [EIU], 2001), p. 12.

Abdurrahman Wahid to improve the navy's condition, expectations for an increase in naval and marine personnel were unmet. The administration of the next president, Megawati Sukarnoputri, called for no manpower growth at all in its defense white paper.⁶

Malaysia has also attempted to be a significant actor in Southeast Asia and beyond. Kuala Lumpur has long taken an independent approach in its foreign relations. During the Vietnam War, Malaysia's leaders were "critical of American involvement in South Vietnam, the most inclined to think well of Hanoi's leaders, and the most anxious for peace and tranquility throughout the region."⁷ Disillusioned when Vietnam invaded Cambodia in December 1978, Kuala Lumpur has since generally pursued its international aims under the auspices of ASEAN.

Under its long-serving prime minister, Mahathir Mohammed, however, Kuala Lumpur has frequently taken outspoken stands on a broad range of international issues. Mahathir's government has ignored criticism of its records on democracy, human rights, and press freedom and generally dismisses international trade and environmental efforts as barriers being used by the developed countries to thwart the growth of newly industrializing countries."⁸ Buoyed by its economic advances in the late 1980s and early 1990s, Malaysia embarked on a fifteen-year defense modernization plan to transform its internally oriented military into one equipped and trained for external operations.

But like Jakarta, Kuala Lumpur was pressured to temporarily rein in its defense spending in the wake of the Asian financial crisis. Some projects, like the production of 27 Meko A 100-class offshore patrol vessels, were extended a number of years; only high-priority acquisitions have proceeded. In June 2002, the Malaysian navy signed contracts worth \$1 billion for a refurbished Agosta-class submarine, intended for crew training, and two new-construction Scorpene-class submarines from a French-led consortium. Meanwhile, the army ordered a new type of infantry fighting vehicle from Turkey.⁹

Neighborly Disputes

Indonesia. Singapore's relationship with Indonesia has been rocky. After the "Confrontation" in the 1960s, Singapore sought to improve relations with Suharto and Indonesia's government. Singaporean companies were encouraged to invest in Indonesia, and the two countries agreed to jointly develop the Riau Islands, a collection of Indonesian islands south of Singapore. However, after Suharto's resignation, Singapore found its ties to the former

⁶ Paul Dibb and Peter Prince, "Indonesia's Grim Outlook," *Orbis*, Fall 2001, pp. 621–36.

⁷ Pye, *Asian Power and Politics*, p. 248.

⁸ *Country Profile: Malaysia, 2001* (London: EIU, 2001), pp. 11–12.

⁹ S. Jayasankaran, "Wanna Buy a Sub?" *Far Eastern Economic Review*, Aug. 15, 2002.

president a hindrance to the development of good relations with his successors, even as the Singaporean military maintained its working ties with its Indonesian counterpart. Given Jakarta's fluid political situation, Singapore began to develop direct ties with individual Indonesian provinces. In January 2001, Foreign Trade Minister George Yeo visited the Riau Islands to explore new commercial opportunities.

Nevertheless, Indonesia's relations with Singapore were once again tense in the first months of 2002, when Singaporean officials openly criticized Indonesia for failing to take stronger measures to locate and arrest suspected terrorists. Moreover, Indonesia's domestic politics have grown even more fractious in the face of international pressure to curb the country's militants. This pressure from abroad creates the potential for Indonesian religious nationalism to find expression in low-level aggression against neighboring countries similar to that of the 1960s.

Malaysia. Singapore's relationship with Malaysia is both contentious and vital. Unfortunately, a number of Singapore's problems also involve its northern neighbor. For most of the 1990s, the two countries were at loggerheads over a variety of issues, ranging from immigration control to airspace rights and water supply.

The immigration control issue first arose in 1989, when Singapore notified Kuala Lumpur that it wished to move the customs and immigration facilities at the Malaysian-owned Tanjong Pagar railway station in central Singapore to the Woodlands, near Malaysia's border. Malaysia signed an agreement on this, but the document was never approved by Mahathir's cabinet or ratified by the Malaysian parliament. Mahathir declared the agreement void in July 1998. The Singaporean government responded that nothing in the agreement required approval or ratification and that it would proceed with its plan to establish the new immigration checkpoint near the border. Mahathir replied, "We do not have a big army to attack anyone. We have tried to be good neighbors. But don't take us for granted!"¹⁰

Two months later, Kuala Lumpur shut its airspace to Singaporean air force planes, which often flew over Malaysia's territory, without prior consultation. Malaysia also notified Singapore that its navy would need clearance before its ships could enter Malaysian waters to conduct search and rescue operations. Though these actions had minimal impact on the island's military readiness, they did reveal how rapidly relations between the two countries could deteriorate.

But by far the most important issue for Singapore was the security of its water supply from Malaysia. With one of its two water supply agreements with Kuala Lumpur slated to expire in 2011, Singapore understandably wanted to settle the terms of a renewed agreement. The two most difficult issues revolved around the price structure for the water and the ratio of

¹⁰ *Country Report: Singapore, 3rd quarter 1998* (London: EIU, 1998), p. 9.

treated to untreated water. During the negotiations, Mahathir addressed several thousand of his supporters in Johor Bahru, the Malaysian city closest to Singapore. His speech animated the crowd, who, referring to the water pipeline to Singapore, chanted “Cut! Cut! Cut!” The event caused a stir in Singapore, and the local *Straits Times* admonished the Malaysian prime minister not to underestimate Singapore, saying “We will shed blood to defend our country’s honour.”¹¹

A framework agreement was hammered out in September 2001, after Singapore agreed to make some major concessions. Among the agreed terms were a higher price for the water Malaysia supplies to Singapore, a compromise location for immigration control, and Malaysian permission for Singapore’s air force to resume its use of the airspace over Johore. The agreement also stipulated that a new bridge and tunnel would be built between Johore and Singapore around 2007 and that once completed, the existing causeway linking the two countries would be destroyed. Aware of Malaysia’s fractious politics, Lee Kuan Yew, the leader of Singapore’s negotiating team, agreed to the concessions because he “did not want to deal with a government not led by the UMNO.” The negotiations were brought to a close.¹²

But the salubrious effects of the agreement were short-lived. A month later, Mahathir hinted that Malaysia might end rail service at Johore Bahru in order to cut costs and develop Malaysian-owned land in Singapore. Although those ideas were quickly abandoned because they would jeopardize Kuala Lumpur’s hopes for a Singapore-China railway, they marked the beginning of a new round of conflicts. In January 2002, Mahathir claimed that there had been no agreement on the planned bridge and that Malaysia could probably build the \$520-million structure faster itself. Sharp rhetorical exchanges occurred throughout the year. With talks about to resume in September 2002, Kuala Lumpur sought to renegotiate several issues separately, despite the framework agreement signed a year earlier. Singaporean Prime Minister Goh Chok Tong reluctantly assented to revisit some issues, but contended that they—particularly the price of water—should be discussed within the framework’s larger context.¹³

While some attribute this latest bout of friction to Mahathir’s immediate desire to shore up his domestic standing, it is but part of recurring tensions arising around long-term issues. Malaysia has always aspired to challenge Singapore’s domination as the major cargo hub in the Malacca Strait. To that end, Kuala Lumpur built up the Tanjung Pelepas Port in

¹¹ “Ruffled Feathers in Singapore,” *Economist*, Sept. 26, 1998; “Malaysia-Singapore Relations Worsen,” *Associated Press*, Aug. 13, 1998.

¹² *Country Report: Singapore, October 2001* (London: EIU, 2001), pp. 13–14; S. Jayasankaran, “Moving On,” *Far Eastern Economic Review*, Sept. 20, 2001, p. 29; “S’pore-KL pact’s success hinges on details,” *Jane’s Defence Weekly*, Sept. 15, 2001.

¹³ Reme Ahmad, “PM emphasises need for basis for water price,” *Straits Times*, Oct. 9, 2002; Tan Tam How, “KL-S’pore talks: Back to square one?” *Straits Times*, Sept. 5, 2002.

southern Johore during the 1990s. In January 2002, Denmark's Maersk Sealand shipping line, one of the Port of Singapore's largest customers, and Taiwan's Evergreen line moved their Southeast Asian transit centers to Tanjung Pelepas Port. Weeks later, Malaysia alleged that Singapore's land reclamation project on Pulau Tekong was narrowing the waterway to its new seaport. Soon thereafter, Kuala Lumpur claimed that Singaporeans operating a lighthouse on a Malaysian island were violating proper immigration controls and that Singaporean authorities were blocking its fishermen from Pedra Branca—an island disputed between the two countries and whose fate was referred to the International Court of Justice in 2001. Though some on both banks of the Johore Strait hinted at an open conflict, most, including Singapore's second defense minister, Teo Chee Hean, urged restraint in dealing with bilateral issues.¹⁴

ASEAN. Meanwhile, as Southeast Asian countries have wrestled with their respective economic, ethnic, and religious problems over the last decade, ASEAN has proven to be a disappointment. Unable to stem the region's currency devaluations or revive its economic growth, the organization's now-evident limitations and slow pace of administrative and financial reform have troubled some of its member countries, including Singapore. While still working through ASEAN to achieve freer regional trade, and stronger East Asian ties, as evinced in Prime Minister Goh's October 2002 five-point plan for the organization, Singapore has shown renewed enthusiasm for bilateral trade negotiations with other countries, including Australia, Mexico, and the United States. It achieved quick success with countries whose agricultural and textile sectors were heavily protected, because it has no such industries of its own. It has signed free-trade deals with Japan and New Zealand, and was close to one with the United States in late 2002. It has been reproached for doing so by Malaysia, which has argued that all ASEAN members should conduct their trade negotiations through that organization.¹⁵

Another regional issue that has become more prominent not only for Singapore, but also for the rest of East Asia, has been the dramatic increase in piracy. While far from unfamiliar to Southeast Asia, piracy was generally thought to have been contained by the 1990s. Only seven incidents were reported in the Malacca Strait in 1997 and 1998. But in 1999 there were 37 pirate incidents, and in 2000 there were 75 pirate attacks in the Malacca Strait, 119 more in Indonesian waters, 21 along Malaysia's coast, and five in the immediate Singapore area. The security of the Malacca Strait, navigated by more than 200 ships daily and 800 oil tankers each year, is vital to Singapore's transshipment business. Though Singapore has increased its coastal patrols, policing the area

¹⁴“Ex-minister urges govt to take over lighthouse,” *Straits Times*, Apr. 30, 2002; S. Jayasankaran, “A Great Divide,” *Far Eastern Economic Review*, Feb. 21, 2002, p. 18.

¹⁵Ignatius Low, “PM Goh's 5-point plan for Asean,” *Straits Times*, Oct. 10, 2002; Wayne Arnold, “Expanded Trade Powers for Bush May Help Singapore,” *New York Times*, Aug. 3, 2002; Keith B. Richburg, “Regional Crises Leave ASEAN in Disarray,” *Washington Post*, Dec. 17, 1998.

has remained a challenge. Pirates frequently shift across provincial and national boundaries, complicating the coordination and response of police.¹⁶

Strategy of Deterrence

Given the sometimes belligerent tone of its neighbors, with whom it has ongoing disputes, Singapore has always been mindful of its precarious situation in Southeast Asia. The island's strategic vulnerability has never diminished. Surrounded by far more populous Indonesia and Malaysia, Singapore is the smallest of all Asian countries and encompasses no appreciable natural resources. Logically then, Singapore's principal conventional military concerns have revolved around the possibility of either a blockade or a direct assault on the island.

That scenario, of course, has happened before. In February 1942, Japan's 25th Army descended upon Singapore. While British infantry generally contained the Japanese assault across the causeway from Malaya, a two-division amphibious landing on Singapore's northwest coast broke through the hastily prepared Indian and Australian beach defenses on Singapore's northwest coast and seized the city's main water reservoirs. Although British troops still outnumbered those of the Japanese, their efforts to retake the reservoirs were unsupported and ultimately unsuccessful. Without water, British forces fought on for two more days, but finally surrendered as the city fell into disorder.¹⁷

Understandably, the Singaporean military has been conditioned to prevent a repetition of those events. From its inception, it has sought to develop a conventional deterrent that would dissuade any adversary from mounting a direct attack, regardless of his ability to prevail. The island emphasized its ability to rapidly mobilize its regular forces and keep its reserve forces at a good state of readiness. Reservists are expected to train for at least 40 days each year and come to full combat capability within hours.

In February 2000, Singapore's Ministry of Defense released a policy paper entitled "Defending Singapore in the 21st Century," reaffirming its "total defense" concept first introduced in 1984. As Minister of Defense Tony Tan outlined, "total defense" requires every element of Singaporean society to "play its part." The concept encompasses not only military defense, but also civil, economic, psychological, and social defense. They are manifested

¹⁶Richard Scott, "Singapore seeks help to counter piracy," *Jane's Defence Weekly*, May 16, 2001; "Dangerous waters," *Economist*, July 19, 2001; "Indonesia: Naval commander replaced after recent piracy outbreak," *Jakarta Media Indonesia*, Mar. 29, 2001; Nayan Chanda, "Foot in the water," *Far Eastern Economic Review*, Mar. 9, 2000, pp. 28–29; "Yo, ho, ho and a bottle of rice wine," *Economist*, Jan. 30, 1999.

¹⁷Williamson Murray and Allan R. Millet, *A War to Be Won* (Cambridge, Mass.: Harvard University Press, 2000), pp. 179–81; Masanobu Tsuji, *Singapore: The Japanese Version* (London: Constable, 1982), pp. 49–95.

in Singapore's rationing exercises, crisis shelters, and public education encouraging national unity.¹⁸

Nevertheless, the island's lack of depth to meet an attack has continued to weigh on its military leaders. Thus, they have attempted to enlarge the island's defensive depth by expanding the operational reach of their combat elements, which could strike at assembling or approaching foes and secure important points close to the island. Singapore has made a considerable effort to increase the flexibility and power projection capabilities of its military, such as the formation of the army's amphibious brigade and the acquisition of the air force's F-16C/D multirole fighters. It has also strengthened its navy to exert greater sea control in the island's nearby waterways and, in doing so, prevent effective interdiction of its sea lanes of communications, on which the island is dependent for most of its food, fuel, and commerce.

Navy

In the mid-1990s Singapore operated a small navy capable of a variety of local sea denial missions. But about that time, the Singaporean navy began to introduce new capabilities to its fleet. In September 1995, the navy acquired its first diesel submarine from Sweden. By July 1997, it had purchased four additional former Swedish submarines. Finally, in March 2000, Singapore ordered six French-designed frigates. Once completed, they will be among the largest and most capable surface ships in the region.¹⁹

The first of the frigates, which are being built to a modified Lafayette class design, will be constructed in France and is expected to be delivered in 2005. The remaining ships will be assembled in Singapore. Since the weapon systems aboard the frigates can be configured in a number of ways, it is still uncertain how the ships will eventually be fitted. But however they are fitted, these ships, with a range of 11,200 km at 15 knots, will greatly extend the operational radius of the Singaporean navy.²⁰

The diesel submarines Singapore acquired were laid down in Stockholm Yard between 1965 and 1967 and originally named the Sjöormen class. Decommissioned by the Swedish navy in the late 1980s, they were rechristened the Challenger class by the Singaporean navy. The *Challenger* was put back into service in September 1997 and was followed by the *Centurion*

¹⁸ Tony Tan, address, SAFTI Military Institute, Singapore, Feb. 15, 2000; Ministry of Defense, *Defending Singapore in the 21st Century* (Singapore: Ministry of Defense, 2000), p. 12; Tan Tai Yong, "Singapore: Civil-Military Fusion," in *Coercion and Governance: The Declining Political Role of the Military in Asia*, ed. Muthiah Alagappa (Stanford: Stanford University Press, 2000), pp. 285–89.

¹⁹ Mazumdar Mrityunjoy, "Naval shipbuilding programmes Asia and the Middle East," *Naval Forces*, vol. 21, no. 1, 2000, pp. 42–52.

²⁰ Antony Preston, "Singapore set to order new frigates from France," *Sea Power*, May 2000, pp. 27–28.

and *Conqueror* in May 1999. While the *Challenger* and *Centurion* will remain in Sweden to train submarine crews until 2003, the *Conqueror* sailed to Singapore aboard a transport ship in March 2000. The *Chieftain* was similarly transported in late 2001. The four submarines will operate from Singapore's Changi naval base and will eventually achieve full operational capability as 171 Squadron in 2004.

Although old, the submarines are relatively capable for Southeast Asia. With a crew of 23 officers and men, the Challenger class is armed with four 533 mm and two 400 mm torpedo tubes, which can launch naval mines as well as surface and sub-surface wire-guided torpedoes. All the submarines will be refitted with air conditioning and battery-cooling equipment—thereby avoiding the problems that plagued Indian and Chinese Kilo-class submarines after their purchase from Russia. Nonetheless, the Challenger class has been reported to be an interim class, which the navy will use to build its expertise before it orders a new submarine class later in this decade.

At the same time, Singapore has sought to upgrade its amphibious lift capability. The navy recently retired its last two LST 511-1152-class vessels and consigned them to reserve status at Tuas naval base, along with a third already there. These vessels last saw service as part of a UN force deployed to East Timor. They have been replaced by four domestically built Endurance-class amphibious ships, which not only require fewer personnel to operate, but also are far better equipped for amphibious operations with accommodation for two Super Puma helicopters and several landing craft. Each ship can also provide fire support with a 76 mm gun and low-altitude air defense with two twin Simbad launchers. The only other amphibious ship in the Singaporean navy is the *Perseverance*, a former British vessel that was recommissioned in May 1994.²¹

To better accommodate its new ships, the navy expanded its existing port facilities at Sembawang and Tuas and also completed a new base at Changi. The Changi naval base possesses one of the few piers in the Pacific that is large enough to berth an aircraft carrier. Good pier facilities are particularly important for loading and provisioning large vessels, such as aircraft carriers and amphibious vessels. The American carrier *Kitty Hawk* moored there for the first time in March 2001. In October 2001, Singapore offered the use of its naval facilities to Japan, whose ships sailed to the Indian Ocean in support of American operations there.²²

Despite its improvement efforts, the navy does have some shortcomings. The diverse origins of its ships and equipment will pose a challenge for the Naval Logistics and Training Commands in maintaining the fleet's

²¹ "Singapore launches new amphibious transport," *Jane's Defence Weekly*, Mar. 20, 1998.

²² David Lague, "New Rules of Defence," *Far Eastern Economic Review*, Nov. 1, 2001, pp. 20–21; Bruce Gilley, "The Region Takes Sides," *Far Eastern Economic Review*, Sept. 27, 2001, pp. 24–25; U.S. Department of Defense, "First U.S. Carrier to Moor Pierside in Singapore," press release No. 118-01, Mar. 20, 2001.

operational readiness. Moreover, the fleet remains relatively vulnerable to air attack from standoff weapons. Its most capable air defense system is currently the Barak surface-to-air missile, which has an effective range of 10 km, on its six Victory-class corvettes of 188 Squadron. Unless the new Lafayette-class frigates are outfitted with a better air defense system, such as the RIM-66B or RIM-66C, this condition will likely persist.

Air Force

Singapore's air force has also significantly improved its capabilities over the last fifteen years, forming new F-16 fighter squadrons to augment its core squadrons of T/A-4SU attack aircraft at Tengah air base and F-5S/T fighter and reconnaissance aircraft at Paya Lebar air base. Delivery on Singapore's initial order of F-16A/B fighters began in 1988. By 1994, the air force had placed a second order for thirty F-16C/Ds. Another 12 F-16C/Ds have been leased from the United States. A third order for twenty more F-16C/Ds was placed in 2001 and is expected to be delivered in late 2003. Equally important, the air force's armament inventory was improved to include AIM-7P and AIM-9N/P air-to-air missiles as well as AGM-45, AGM-65B/G, and AGM-84 air-to-surface missiles.

To extend the range of its aircraft, the Singaporean air force acquired its first aerial refueling tankers, four KC-130Bs and one KC-130H, in 1990 and four former American KC-135R aerial refueling tankers in 1997. The first KC-135R was delivered in 2000. While the air force awaits the delivery of its remaining tankers, it has begun to train its aircrews at McConnell Air Force Base in Kansas.²³

Further expanding its capabilities, the air force operates four E-2C airborne early warning aircraft, delivered in 1987 and assigned to 111 Squadron. With their APS-138 air search radar, the E-2Cs can track targets out to a range of 480 km, making them useful in both air interception and strike coordination. In 1994 Singapore acquired five Fokker 50 Mk 2 reconnaissance planes specifically equipped for a maritime role.²⁴

All four of Singapore's main air base are well within artillery range of peninsular Malaysia. As a result, the island has made a significant effort to harden its bases with aircraft shelters and underground parking aprons. To further defend the Tengah and Paya Lebar bases, where many of its combat aircraft are housed, Singapore has based many of its MIM-23 and Rapier surface-to-air missile batteries close by. Meanwhile, at least three nearby highways can be quickly converted into runways should the need arise.

²³ "Singapore receives US Stratotanker," *Jane's Defence Weekly*, Sept. 16, 1999; Boeing Corporation, "Boeing Delivers First KC-135R to Singapore Air Force," press release, Sept. 10, 1999.

²⁴ "RSAF Enforce With Fokker," *Jane's Defence Weekly*, Sept. 30, 1995, p. 16.

Lastly, Singapore has completed work on its first underground ammunition storage facility, located in a rock cavern at Mandai.²⁵

Because of its limited airspace, the air force has been forced to seek training facilities around the world. Near home, the Singaporean air force uses air and ground ranges on Sumatra. Meanwhile, Singapore's 126 and 130 Squadrons operate from Oakley and Pearce Air Bases in Australia, where the air force maintains its basic flying school as well as six AS-532 helicopters and twenty-seven S-211 jet trainers. About eighteen T/A-4SU attack aircraft and 200 personnel have also been assigned to Cazaux Air Base in southwestern France, which offers bombing ranges and airspace over the Atlantic to practice combat.²⁶

Singapore maintains a strong training relationship with the United States. Singaporean pilots routinely train at two air bases in New Mexico and Arizona that host the island's F-16C/D fighters. The pilots participate in Red Flag war games in Nevada alongside their American, British, and French counterparts. Singaporean personnel also train at an Army National Guard base in Texas to learn to operate and maintain CH-47D helicopters. Singapore acquired six of these aircraft from the United States in 2000 to improve its airlift capacity. The air force also ordered twenty American AH-64D attack helicopters; the first were delivered in May 2002.²⁷

Army

At the time of its separation from Malaysia, Singapore fielded an army of only two infantry battalions. By the late 1980s, the Singaporean army had grown to three 18,000-man divisions and their associated support elements. The 3rd Division was an active formation, while the 6th and 9th Divisions were comprised of reservists. There were also two armored brigades, one active and one reserve, as well as two reserve light infantry formations of second-line troops, called the People's Defense Force, which were oriented toward coastal defense and protection of key facilities.

In the early 1990s, the army undertook a comprehensive reorganization, which recognized not only the force-multiplier benefits of combined arms units, but also a decline in the number of available conscripts due to Singapore's older demography. The three standing divisions were converted into 14,000-man combined arms divisions—each with one mechanized and two infantry brigades. In addition, two operational reserve divisions, the 21st and 25th, were created in 1991.²⁸

²⁵ Bruce Gilley, "The Region Takes Sides," *Far Eastern Economic Review*, Sept. 27, 2001, pp. 24–25.

²⁶ "Singapore to send pilots to France for training," *Agence France Presse*, Jan. 22, 1998.

²⁷ "S'pore receives first of 20 'tank-busters'," *Pioneer*, July 2002.

²⁸ Charles Haeyman, ed., *Jane's World Armies*, Oct. 2001, no. 9, pp. 687–93.

The army has also made notable acquisitions over the last decade. It is in the process of accepting some five hundred IFV-25 and IFV-40 armored personnel carriers. The first one hundred of these indigenously built vehicles were delivered in 2001. Singaporean firms also produced a new 155 mm towed artillery piece in the 1990s. The FH2000 gun improved upon an earlier Singaporean design, the FH88, with a higher caliber and greater durability in jungle conditions. Finally, Singapore's Ministry of Defense announced in January 1998 a plan to develop a new light tank to replace the army's aging AMX-13 SM1; its production is expected after the IFV-25 and IFV-40/50 orders are finished.²⁹

Like the air force, the army has been forced to find overseas training sites for its troops. Beijing offered Singapore military training facilities on Hainan Island in late 2000, an overture apparently designed to weaken Singapore's long-standing ties to Taiwan, where Singapore maintains three training camps under a program called Operation Hsing Kuang. These camps were vital to Singapore after its ouster from the Malay Federation, when few countries were willing to provide it with the space to train or exercise. Singapore also has training relationships with Australia, Brunei, France, South Africa, Thailand, and the United States.³⁰

Defense Procurement

Many countries have tried to develop or sustain domestic defense industries to ensure the provisioning of their militaries and, in doing so, preserve their political autonomy. However, as the expense and complexity of weapon systems have climbed, most governments have elected to either buy existing weapon systems or cooperate with their allies in developing and procuring new systems to reduce costs and share talents.

It is noteworthy that Singapore has decided to design and build much of its new artillery and armored equipment alone. Though these projects are well within the island's technical expertise, they remain a significant enterprise, demanding an investment that is exceptional for a country of Singapore's size. In 1972, Singapore established the Defense Science Organization to undertake defense-related research and development. Transformed into a nonprofit entity in 1997, the renamed DSO National Laboratories has continued its work on technologies involved in guided systems, weapon system upgrades, and electronic and chemical warfare. In June 2001, Singapore took delivery of three M-109 chassis as test units for

²⁹ Christopher F. Foss, *Jane's Armour and Artillery, 2001–2002* (Coulsdon: Jane's Information Group, 2001), pp. 168–69, 725–27.

³⁰ "Singapore Set To Move Training Facilities From Taiwan To China," Hong Kong *AFP*, Sept. 22, 2002; Robert Sae-Liu, "China offers training facility," *Jane's Defence Weekly*, Jan. 10, 2001; Ayu Sulaiman and Jacky Lim, "Bruneian, Singapore navies to begin joint exercise 27 Apr to enhance ties," Bandar Seri Begawan *Borneo Bulletin*, Apr. 25, 2001.

another fifty-one on order. In addition, the government continues to fund many research projects at Singapore's largest universities.³¹

Yet when very large integrated systems are required, Singapore has turned to other countries—the United States for aircraft, France for frigates, Germany for light naval vessels, and Sweden for submarines and minesweepers. While the island's diversified sourcing strategy may be cost effective, some degree of interoperability has probably been sacrificed. Undoubtedly, spare part inventory management as well as hardware and software integration will be important to maintaining the operational readiness of Singapore's armed forces.

Multilateral Defense Relations

In effect since November 1971, the Five Power Defense Arrangement (FPDA) maintains military training and assistance links among Singapore, Malaysia, Australia, New Zealand, and the United Kingdom. After a lengthy period of neglect, the grouping was given new life in the 1990s when Singapore and Malaysia became concerned over Chinese activities in the South China Sea and the departure of American forces from the Philippines in late 1992. Singapore is committed to the arrangement. In October 2001, the island country hosted Exercise Stardex, a joint maritime and air defense exercise, under the FPDA's auspices. During spring 2002, Singapore again participate in the FPDA's annual exercise, which included naval, air, and land-based air defense forces.³²

Certainly, Singapore sees utility in multilateral ties and has sought cooperation with other countries. The Singaporean navy took the lead in August 2000 when it organized a submarine rescue exercise that involved Japan, South Korea, and the United States. The navy followed that event with another exercise in June 2001, which focused on mine countermeasures and drew the participation of 1,500 personnel and fifteen ships from sixteen countries. The following May, Singapore took part in its second Cobra Gold exercise with Thailand and the United States, and it planned to expand its role in that annual event to include air and naval assets in 2003.³³

³¹ "Singapore buys M109 SPH chassis," *Jane's Defence Weekly*, June 13, 2001; DSO Laboratories, "DSO World-Class R&D Helps Singapore National Security and Economic Development," press release, Oct. 1, 1998.

³² Chan Kairen, "FPDA nations hold joint naval, air exercise", *Pioneer*, June 2, 2002, p. 15; Phillip McKinnon, "New Zealand Skyhawks deploy for the last time," *Jane's Defence Weekly*, Oct. 31, 2001, p. 30.

³³ Robert Karniol, "Singapore seeks to join in 'Cobra Gold'," *Jane's Defence Weekly*, June 19, 2002, p. 35; Elizabeth Wu, "SAF in three-nation exercise in Thailand," *Pioneer*, June 2, 2002, p. 14; Robert Karniol, "Singapore hosts a 16-nation exercise," *Jane's Defence Weekly*, June 27, 2001, p. 13.

Water

The importance of water to Singaporean security cannot be overestimated. While the island consumed roughly 1.2 million cubic meters of water each day in 2001, Singapore's own reservoirs provided only half that amount. The other half was piped from Johore. Periodic Malaysian threats to sever the island's water supply have only heightened Singapore's chronic sense of vulnerability. Amid the latest round of threats in April 2002, Prime Minister Goh urged greater self-reliance in Singapore's water supply and suggested a series of measures that ranged from water conservation to diversified sourcing. The water supply from Johore is so important to Singapore that an island official once expressed a willingness to go to war against Malaysia if it was ever cut. Moreover, many accept that if war did occur, Singapore's first military objective would be to secure Johore's water resources.³⁴

Desalination has been one direct method for Singapore to reduce its reliance on Malaysian water. However, desalination plants are expensive to build and operate. In May 1998, the Singaporean government announced plans to construct three large desalination plants at a cost of about \$570 million each. Progress has been slow. It was not until March 1999 that the government called for a prequalification tender from private contractors for the first plant, at Tuas. Desalination plants also consume a large amount of energy. Since Singapore has no energy resources of its own, it must import them to provide power for the plants. These would be, of course, subject to international political and economic influences as well as possible interdiction in wartime. Thus, desalination alone will not end Singapore's vulnerability but may instead transfer it from one resource to another.³⁵

Recently, Newater, treated and purified sewage water, has been offered as a less-expensive alternative to desalination. A small Newater plant was built in Bedok in 2000. Apparently sufficiently clean, all seven of Singapore's water fabrication plants have agreed to accept Newater. However, Newater production remains low, and according to Minister Yeo will supply only one-quarter of the island's current consumption by 2010.

The government has also tried to improve Singapore's ability to capture rainwater. It has laid plans to build eight new rainwater ponds at a cost of nearly \$100 million. The ponds, which will collect run-off water from heavy rains and recycle it into the domestic water supply, are expected to double the capacity of the island's existing ponds. Meanwhile, Singapore has expanded its water storage facilities. Five large water tanks were erected near Upper Pierce Reservoir. Altogether, the tanks can hold about 318,000 cubic meters of water.

³⁴ Cho Yan Fatt, "Work towards being self-reliant in water," *Straits Times*, Apr. 12, 2002; "Ex-mentri besar recalls 'war threat'," *Straits Times*, Apr. 9, 2002.

³⁵ Ben Dolven and Murray Hiebert, "Ties that bind," *Far Eastern Economic Review*, Sept. 24, 1998. pp. 13–14.

Finally, Singapore has attempted to diversify the source of its water imports. In 1991, it signed an agreement to obtain water from Bintan in Indonesia's Riau Islands, but little progress was made. Ten years later, on a visit to the islands, Minister Yeo reaffirmed Singapore's continued interest in Riau's water resources. Singapore also expressed a desire for water supplies from Sungai Kampar in Sumatra. However, importing Indonesian water could be as vexing as relying on Malaysian water alone, given the volatility in Indonesia's relations with Singapore. In November 2000, after a report surfaced that Lee Kuan Yew allegedly implied that Abdurrahman Wahid, then Indonesia's president, might have to resign, Wahid encouraged Indonesia and Malaysia to cut off freshwater supplies to Singapore.³⁶

Conclusions

Whatever the intentions of its neighbors, Singapore has materially improved its security situation in recent years. It has generally kept pace with the doctrinal and technological changes in military affairs and thus has created not only a stronger conventional deterrent, but also a more capable defense through its power projection capabilities. The successful implementation of Singapore's modernization can be largely attributed to the constancy in its military policies and firmly in-control government of the island itself. Despite some groups' disaffection, the stability of the prevailing Singaporean polity is unlikely to change, especially in light of the elections held in November 2001. But in its quest for more capable defense, the island has drawn the notice of its neighbors, who have questioned its need for aerial refueling tankers and submarines. Indeed, Malaysia's and Thailand's interest in acquiring their own submarines has been linked, in part, to Singapore's submarine procurement in the 1990s.³⁷

But the most serious challenge to Singapore's modernization plans has been a weak economy. Certainly, economic difficulties have derailed the best-laid plans of many other countries. During the 1997–98 Asian financial crisis, Indonesia, Malaysia, and Thailand saw their defense budgets precipitously fall and their military readiness suffer accordingly. Fortunately for Singapore, the Monetary Authority of Singapore handled that crisis well and blunted its worst effects. But in 2001, the island slipped into its worst recession in four decades as its economy contracted at least two percent.³⁸

Since the nineteenth century, Singapore has been thoroughly engaged in international trade. It needs little reminder that its welfare

³⁶ *Country Report: Singapore, January 2001* (London: EIU, 2001), p. 8.

³⁷ Wassana Nanuam, "Thai Navy Plans To Charter Two Submarines From Germany," *Bangkok Post*, Jan. 9, 2001.

³⁸ "Thai Navy Chief Reveals Lack of Cash Hindering Arms Maintenance, Sub Deal," *Bangkok Post*, May 13, 2001; David Saw, "Funding Crisis Threatens To Submerge Navy," *Defense Daily International*, Sept. 15, 2000.

depends on its position as a major commercial center in Southeast Asia, on continued Western and Japanese investment in the island, and on the health and openness of OECD markets. Thus, its interests are often aligned with those of developed countries, like the United States. Prime Minister Goh intimated as much in December 2001, when he explained, “The outlook for the next year depends on developments outside Singapore, especially the U.S. economy . . . and the war against terrorism.”³⁹ American companies represent the island’s largest foreign employers and fixed-asset investors. The United States is also Singapore’s largest export market and second largest trade partner.

Moreover, the American and Singaporean governments have generally agreed on a variety of security issues, including terrorism, currently. The presence of Islamic militants in Singapore—thirteen of whom were arrested in December 2001 and twenty-one more in September 2002—is antithetical to the island’s authorities, who believe domestic unity to be a cornerstone of national security.

These coincident interests have fostered mutually beneficial ties between Singapore and Washington. In April 2000, the two governments signed an Acquisition and Cross-Servicing Agreement to facilitate logistic support between their armed forces. One month later, Singapore participated in the annual Cobra Gold exercise for the first time. This relationship was deepened after the September 11, 2001, terrorist attacks against the United States. During that same month, the U.S. Department of Defense bestowed the title “friendly foreign country” on the island, giving it access to restricted defense technologies and eligibility to conduct research and production with American companies. Meanwhile, American forces were permitted to use Paya Lebar air base and Changi naval base to support their operations in Afghanistan. As Lee Kuan Yew, who visited President George W. Bush in May 2002, noted in his memoirs, the United States remains “the most benign of the great powers” and the one that all non-communist East Asian countries prefer to be the strongest power in the region.⁴⁰

Yet even with a superpower ally, Singapore must contend with its enduring vulnerabilities, including its reliance on imported food and energy supplies. In 2000, the island imported a net 35 million tons of oil, almost all of it from the Middle East. Those oil imports represented about 96 percent of the island’s energy resources. While Singapore recently increased its use of natural gas, it too must be imported. In January 2001, Singapore’s SembCorp signed a long-term natural gas supply contract with Indonesia’s Pertamina to acquire natural gas from the West Natuna fields through a newly built 656 km

³⁹ “Singapore: Recession Deepens,” *New York Times*, Jan. 1, 2002.

⁴⁰ Chua Lee Hoong, “Time for a refresher course on Singapore foreign policy,” *Straits Times*, Jan. 23, 2002; Seth Mydans, “Suspects in Singapore Are Linked to Al Qaeda and Plans for Anti-U.S. Attacks,” *New York Times*, Jan. 12, 2002; Michael Leifer, *Singapore’s Foreign Policy: Coping with Vulnerability* (New York: Routledge, 2000), p. 177.

pipeline to the island country. The following month, Singapore inked a second contract with Indonesia that would supply it with natural gas from the Asmera fields in southern Sumatra.

Still, Singapore has achieved a remarkable level of security, given the country's small size and the turbulent history of Southeast Asia. The island's continued investment in its deterrent strategy has produced a military that is increasingly able to defend itself from external threats and influence its environment. Singapore, in fact, might no longer be seen as merely a strategic location or commercial hub, but rather also a stabilizing regional power. That would be a noteworthy accomplishment, especially since only a few decades earlier Singapore's survival had been in doubt.

