FORCE MODERNIZATION: Vietnam

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During the period 2012–16, Vietnam was the tenth-largest importer of arms globally.[1] This is an impressive figure given that Vietnam ranked thirty-seventh in the world in terms of its gross domestic product (GDP) in purchasing power parity terms[2] and forty-eighth in the world in nominal terms.[3] This chapter discusses why Vietnam made such large arms purchases, what specific weapon systems and platforms it acquired and for what purpose.

States procure arms for a variety of reasons: to defend themselves from perceived threats, to develop capabilities to suit specific needs, to acquire modern military technology, to gain prestige and to modernize their existing weapons and platforms.[4] Force modernization (or defence modernization) may be conceptualized as two distinct yet interrelated processes. The first consists of reconditioning and upgrading existing stocks of weapons and platforms with new technology. The second process involves the acquisition of more modern sets of platforms and weapon systems to meet new roles and missions.

This chapter focuses on force modernization in Vietnam from the mid-1990s to the present and is divided into seven parts. Part 1 provides a brief historical overview of the Vietnam People's Army until the early 1990s when the conflict in Cambodia ended. Part 2 discusses naval modernization as a response to new security challenges in the South China Sea in the post–Cambodian conflict period. Parts 3 and 4 examine the modernization of the air defence air force and land force, respectively. Part 5 focuses on Vietnam's development of a national defence industry to support force modernization. Part 6 presents an overview of Vietnam's defence budget. Part 7 evaluates Vietnam's force modernization programme.

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Part 1: Historical Overview

The Vietnam People's Army (VPA) was founded on 22 December 1944 as a small guerrilla force. Within ten years it had grown into a regular army of 80,000 grouped into seven infantry divisions equipped with heavy artillery and 320,000 grouped into independent regiments and battalions at the regional and local level, largely armed by China.[5] These combined forces defeated the French in the First Indochina War, 1946–54.

After partition in mid-1954, the VPA was reorganized along conventional lines for the defence of North Vietnam. During this period, and especially during the Vietnam War (1965–75), the VPA expanded to include air, air-defence and coastal naval forces. During this period the Soviet Union overtook China as Vietnam's main provider of "big ticket" weapons and platforms. During the 1970s, the VPA was organized into multi-division corps units equipped with battle tanks and long-range artillery. This force spearheaded a major offensive in 1975 that led to the collapse of the Republic of Vietnam (South Vietnam) and the formal reunification of the country as the Socialist Republic of Vietnam.

In late 1978, the VPA invaded Cambodia in response to increased cross-border attacks by the Khmer Rouge. In early 1979, China, an ally of the Khmer Rouge, responded by launching a punitive attack on northern Vietnam. For the next decade, a quarter of a million VPA forces remained in defensive positions along the northern frontier to repel a second Chinese attack, while VPA forces in Cambodia conducted a protracted counter-insurgency campaign. The VPA expanded in numbers to 1.26 million to become the fifth-largest army in the world at that time after the Soviet Union, China, the United States and India.[6]

In 1987, Vietnam's leaders assessed that their counter-insurgency efforts in Cambodia had made sufficient progress that they could accelerate the withdrawal of military forces and commence a major demobilization of their large standing army. In September 1989, Vietnam withdrew all formed military units from Cambodia. Between mid-1987 and late 1990, 600,000 troops, or nearly half of the standing army, was demobilized.[7]

Vietnam's withdrawal from Cambodia set the stage for a comprehensive political settlement of the Cambodian conflict in October 1991 and the normalization of Vietnam's relations with China the following month. These two events led to an unprecedented period of peace. Vietnam, however, now faced new security challenges that necessitated the modernization of the VPA to carry out new roles and missions. There were two main drivers behind this process: changes in the international legal regime and the emergence of maritime disputes between Vietnam and an assertive China.

In July 1994, Vietnam ratified the United Nations Convention on the Law of the Sea (UNCLOS). UNCLOS came into force in November of that year. Under the Law of the Sea, Vietnam, as a coastal state, was entitled to a twelve nautical mile territorial sea and a two hundred nautical mile exclusive economic zone (EEZ) drawn from its coastline. In order to exercise sovereignty over its territorial sea and sovereign jurisdiction over the resources in its EEZ, Vietnam had to develop the requisite capabilities not only to monitor this large maritime area but also to enforce its sovereignty against unauthorized intrusions.

In 1992, China's National People's Congress passed a Law on Territorial Sea and Contiguous Zone that laid claim to sovereignty over the Paracel and Spratly islands. This brought China into conflict with Vietnam, which also claimed sovereignty over the two archipelagos.[8] In 1994 and 1996, Vietnam and China became embroiled in a series of maritime confrontations when the Crestone Energy Corporation, a U.S. company, began exploring for oil under a contract awarded by China in the Vanguard Bank claimed by Vietnam.

In sum, changes in the international legal regime and contingencies in the South China Sea were the main drivers behind Vietnam's initial efforts at force modernization. The following sections explore force modernization for each branch of the Vietnam People's Army and national defence industry during two phases: the initial phase from the mid-1990s to 2005 and a second phase from 2006 to 2015, when priority was given to the modernization of the Navy (*Quân chủng Hải quân*), Air Defence Air Force (*Phòng không Không quân*), technical surveillance (*Trinh sát kỹ thuật*), electronic warfare (*Tác chiến điện tử*), and information systems (*Thông tin liên lạc*).[9] In 2015, Vietnam's leaders concluded that sufficient progress had been made to shift priority to the modernization of the army. These developments are discussed in turn below.

Part 2: Naval Modernization

Vietnam began the first phase of force modernization during the mid to late 1990s when it began upgrading its legacy naval and air fleets and procuring naval and air platforms and weapon systems.[10]

During the first phase of force modernization, Vietnam signed a series of agreements on arms sales and servicing with the Russian Federation. Russia soon became Vietnam's major source of "big ticket" military weapons and equipment. In 1994, a memorandum of understanding on arms sales was signed. Between 1996 and 1999, Vietnam took delivery of four modified *Tarantul* guided missile fast patrol craft from Russia.[11] These ships were armed with twin launchers for

anti-ship missiles, manually operated surface-to-air missiles (SAMs), and close-in weapon systems (CIWS). In 1998, Vietnam and Russia signed a framework agreement for continuing arms sales and support.

Vietnam also turned to the Ukraine, Belarus, India and other countries for assistance in modernizing its navy. For example, in 1997 Vietnam acquired two *Yugo*-class midget submarines from North Korea that it subsequently refitted. This acquisition represented the first step in implementing Vietnam's long-standing interest in developing an undersea-warfare capability.[12]

A major turning point in defence cooperation between Vietnam and Russia took place in February–March 2001, when the two countries agreed to raise bilateral relations to a strategic partnership during the visit by President Vladimir Putin. This was Vietnam's first such agreement. Under its terms, Hanoi and Moscow agreed to "strengthen their co-operation in military supplies to meet Vietnam's security demands".[13] Later the following year, Vietnam procured two *Svetlyak*-class coastal patrol boats armed with CIWS.

Under the terms of a Defence Cooperation Agreement (DCA) signed in March 2000, India agreed to assist Vietnam by repairing and upgrading its existing stock of Soviet-era *Osa*-II fast attack missile craft and *Petya*-class anti-submarine corvettes. In June 2005, the Indian Navy donated 150 tons of spares to Vietnam for these frigates and fast attack craft. Three years later, the Indian Navy donated five thousand essential spares to Vietnam to keep its *Petya* frigates operational. In 2015, India offered Vietnam a $300 million line of credit to purchase warships built in Indian dockyards. A year later, Vietnam's Border Guard and India's Larson & Toubro Ltd. signed a contract for the construction and delivery of four ocean patrol vessels under a $100 million line of credit offered in 2014. Subsequently, India offered to sell heavyweight torpedoes to Vietnam.

In 2006, Vietnam commenced a ten-year naval modernization programme by signing memoranda of understanding (MOU) and defence cooperation agreements (DCA) with a variety of foreign states. Vietnam sought assistance, services and equipment acquisitions in six major areas: the storage, maintenance and upgrading of existing military equipment; modernization of platforms and equipment for the army, navy and air force; modernization of Vietnam's national defence industry; maritime logistics capacity in the South China Sea; mitigating the effects of natural disasters, notably flooding and storm damage, and search and rescue at sea; and, finally, training for future involvement in UN-endorsed peacekeeping operations.

The second phase of defence modernization was signalled in 2006[14] when Vietnam placed an order with Russia for the construction of two *Gepard*-class

frigates, Vietnam's first modern surface combatants. During the following decade Vietnam also acquired modern coastal defence systems, restructured its domestic shipbuilding industry and upgraded its technology, and created two new branches — a naval aviation unit and a submarine brigade.

The Vietnamese navy has responsibility for coastal defence. In the 1980s it took delivery of the 4K44 Redut (SS-N3 Shaddock) and 4K51 Rubezh (SS-N-2 STYK) coastal anti-ship missile systems. During the second phase of naval modernization, Vietnam acquired two K-300P (Bastion) coastal defence systems equipped with the *Yakhont* (SS-N-26 Strobile) anti-ship cruise missile between 2009 and 2011. This system is now operating in tandem with the Cold War–era legacy coastal defence systems. Between 2014 and 2016, Vietnam also took delivery of one hundred AccuLAR guided rockets and one hundred EXTRA guided rockets from Israel for coastal defence.

Between 2008 and 2016, Vietnam acquired eight *Tarantul*-5 (*Molniya*-class) guided missile fast attack craft armed with more advanced anti-ship missiles, manually operated surface to air missiles and CIWS. Two were purchased from Russia and six were assembled in Vietnam. Between 2011 and 2012, Vietnam took delivery of six more *Svetlayk*-class coastal patrol boats and commissioned into service two *Gepard*-class guided missile frigates armed with Kh-35E anti-ship missiles. In 2016–17, Vietnam added four more *Gepards* to its surface fleet, two outfitted for anti-submarine warfare.

In 2013, Vietnam placed an order for two SIGMA-9814 frigates from Damen in the Netherlands and acquired missiles for these ships from France, including forty MICA beyond-visual-range air-to-air missiles, twenty-five MM-40-3 Exocet anti-ship missiles and two VL-MICA-M surface-to-air missiles. Three years later it was reported that Vietnam opted to purchase the newer and larger SIGMA-10514.

In 2013, Vietnam stood up its first naval aviation branch by transferring Kamov Ka-27/28 helicopters from the Air Force's 954th Brigade. These helicopters were then sent to the Ukraine for upgrading. Vietnam also acquired three Canadian DHC-6-400 Twin Otter transport aircraft between 2012 and 2013 and three DHC-6-400 Guardian maritime patrol aircraft in 2014.

No development was more significant than Vietnam's acquisition of six *Varshavanyka* or enhanced *Kilo*-class conventional submarines in the period 2013–17. Crews for these submarines received training in Russia and India. The submarines are armed with heavy torpedoes and anti-ship and land-attack cruise missiles.[15]

By 2016, Vietnam's navy had been transformed from an inland and coastal brown-water fleet to a green-water one capable of operating in the South China

Sea. Vietnam's navy developed the capability to not only monitor its EEZ and protect key offshore oil and gas platforms but also to project power into the South China Sea to defend occupied features. Vietnam's navy also developed a modest deterrent to China's People's Liberation Army Navy.

Part 3: Air Defence Air Force Modernization

Vietnam modernized its air defence air force in parallel with naval modernization by upgrading existing inventories and procuring modern multi-role jet aircraft, armed with advanced missiles, capable of missions over the South China Sea.[16]

Air Force

In the first phase of modernization Vietnam cast its net wide for suppliers. Between 1996 and 1998, Russia upgraded thirty-two single-seat *Sukhoi* Su-22M4 and two twin-seat Su-22UM3 ground-attack aircraft. Under the 2000 DCA between India and Vietnam, India overhauled Vietnam's war-legacy fleet of MiG-21 combat aircraft and provided training assistance for Vietnam's technicians and pilots. Later, in October 2006, India supplied Vietnam with spare parts for its MiG-21s.

Between 1996 and 2006, Ukraine sold Vietnam ten L-39 trainers, six MiG-21 UMs, and eight Su-22s.[17] Later, Ukraine was contracted to upgrade these aircraft so they could mount anti-ship missiles. In 2004, Vietnam acquired five SU-22 UM3 aircraft from the Czech Republic, including spare parts and ammunition. Two years later, Vietnam purchased forty second-hand Su-22M4 fighter-bombers from Poland.[18] In 2015, Vietnam retired its fleet of MiG-21s. Russia has offered to sell its MiG-35 as a replacement.

Vietnam's air force entered a new phase of modernization when it procured seven Su-27SK (Flanker B) single-seat air superiority fighters, three Su-27UBK (Flanker C) two-seat trainers, and two additional Su-30Ks between 1995 and 1998. The Su-27s were later upgraded so they could operate the Kh-31 (AS-17) anti-ship missile and the *Vympel* Kh-29 (AS-14) and Kh-59M (AS-18) air-to-surface missiles.

After having gained experience with the Su-27, Vietnam next acquired thirty-six Su-30MK multi-role all-weather jet fighters. The first four were delivered in 2004, twenty Su-30s were acquired between 2010 and 2012, and the final batch of twelve was received in 2014–16. Vietnam upgraded its Su-30s so they could operate the Kh-29, Kh-31 and Kh-59MK air-to-surface missiles.

Air Defence

At the same time as Vietnam was acquiring a new generation of fighter aircraft, it also modernized its air defence and surveillance systems.

In May 2002, Vietnam and Ukraine signed a three-year agreement on military technical cooperation, including the development of naval test facilities and arms co-production. Under the terms of this agreement, Ukraine upgraded Vietnam's radar and communications systems as well as surface-to-air missiles. In 2005, Russia delivered to Vietnam two batteries of the highly advanced S-300PMU1 air defence system comprising twelve launchers and sixty-two missiles in total. The S-300 is regarded as one of the world's most effective all-altitude regional air defence systems. It has been recently reported that Russia is offering Vietnam the newer P-400 air defense system.

Intelligence, Surveillance and Reconnaissance (ISR)[19]

In 2012–13, Vietnam procured four Ukranian *Kolchuga* passive early warning radar systems capable of identifying and tracking land, sea and air threats. In 2013–16, Vietnam purchased five air search radar systems: two from Israel (EL/M-2288 AD STAR), two from the Ukraine (ST-68 *Tin Shield*), and one French Coast Watcher 100 air and surface radar system. In 2016, Vietnam took delivery of one Israeli SPYDER MR short and medium range air defence system; four additional systems are on order.

In 2016, Vietnam took a major step forward in ordering or acquiring four distinct ISR systems.

The first system was the VNREDSat satellite from France's Airbus Group. Also in 2016, the Indian Space Research Organisation agreed to finance a satellite tracking and imaging centre in Ho Chi Minh City and Japan's NEC and Mitsubishi Electric Corporations agreed to develop an ASNARO-2 high resolution Earth observation satellite to Vietnam's specifications.[20]

India's satellite tracking centre will be capable of accessing real time imagery from India's earth observation satellites that cover China and the South China Sea. Although India's satellites are primarily aimed at gathering scientific, environmental and agricultural information, analysts say the enhanced imaging technology can be used for military purposes.[21]

Second, Vietnam also began to acquire unmanned aerial vehicles (UAVs) through overseas procurements and domestic production. For example, in 2009–11, Vietnam placed an order for the Israeli Obiter-2 and Obiter-3 UAVs to assist in

targeting for its Israeli coastal defence systems. In 2014–15, Vietnam took delivery of several Grif-K tactical drones from Belarus.

In May 2013, Vietnam flight-tested six indigenously built drones. But it was only in late 2015, with design assistance from Belarus, that Vietnam was able to successfully produce its first high-altitude long-endurance UAV, the HS-6L, with a range of four thousand kilometres and endurance of up to thirty-five hours.

Third, in May 2016, Vietnam placed an order for two Airbus DS C-295 airborne early warning and control (AEW&C) aircraft.

Fourth, in January 2017, Vietnam took delivery of one Pluto Plus unmanned underwater vehicle (UUV) from Italy's Gaymarine Electronics. This UUV will be used in tandem with its *Sonya*- and *Yurka*-class minesweepers.

Coastguard

In 2008, Vietnam elevated the status of its maritime police (now renamed in English as the Vietnam Coast Guard, or VCG) to an armed service under the joint command of the Ministry of National Defence and Vietnam People's Army Navy. The VCG was given responsibility for law enforcement, search and rescue and sovereignty protection over the territorial sea and EEZ off Vietnam's extended coastline.

In order to execute these roles the VCG moved to upgrade its maritime surveillance capabilities, which, at that time, comprised two Polskie Zaklady Lotnicze (PZL) M28 *Skytruck* short take-off and landing aircraft and four PZL *Swidnik* W-3RM *Anakonda* maritime search and rescue helicopters equipped with Wescam forward-looking infrared turrets. In 2008, Vietnam signed a contract with the Swedish Space Corporation for the purchase of three Spanish-manufactured EADS-CASA C212 Series 400 maritime patrol aircraft equipped with MSS 6000 side-looking radar.[22] In 2014–15, Vietnam took delivery of three twin-turboprop EADS CASA C-295. The C-295 is a tactical military transport aircraft manufactured in Spain by Airbus Defence and Space.

Between 2010 and 2016 the number of ships in the VCG over five hundred tons grew from thirty-nine to fifty-five, of which five were over a thousand tons. A major driver of the VCG's expansion was the mid-2014 crisis when China parked the *Haiyang Shiyou* 981 mega-oil drilling platform in Vietnam's EEZ.[23] China's actions precipitated a six-week maritime confrontation between the VCG and the Vietnam Fishery Surveillance Force and China's mixed armada of naval ships, coastguard vessels, tugboats, and fishing craft.

As a result of this crisis, in June 2014, Vietnam's National Assembly approved $756 million in funding for the construction of seven vessels: two 2,400-ton

Damen DN 2000–class patrol vessels, one 2,900-ton multipurpose logistics and transport ship; and four TT-400 patrol boats. In 2017, Vietnam took delivery of the 3,250-ton former United States Coast Guard *Morgenthau*, a Hamilton-class cutter. Vietnam is expected to place an order for at least one more ship of this class. In summary, the VCG is acquiring heavier ships for extended patrols in the South China Sea.

Part 4: Ground Force Modernization

In the initial phase of defence modernization, the main focus on the army was on refurbishing and upgrading its artillery, infantry fighting vehicles (IFV) and main battle tanks (MBT). In April 2001, for example, military factory Z-751 in Ho Chi Minh City undertook a modest overhaul of about fifty former U.S. M113 armoured personnel carriers (APC) by utilizing spare parts obtained through commercial sources and weapons stocks captured at the conclusion of the Vietnam War. Negotiations to purchase T-80 tanks from Russia fell through for lack of funding.

In May 2002, Vietnam and the Ukraine reached a three-year agreement on military-technical cooperation under which the Ukraine upgraded Vietnam's armour and artillery forces and armaments production. In 2005, Vietnam investigated the possibility of acquiring up to seventy Soviet-era T-54 and T-55 MBTs from Finland or 150 second-hand T-72 MBTs from Poland, but no sales eventuated. In 2006, Vietnam purchased two light armoured vehicles from Israel.

In December 2015, Lieutenant General Vo Van Tuan, Deputy Chief of the General Staff, stated that Vietnam's army had officially commenced a ten-year modernization programme. In early 2015, for example, Vietnam acquired the KZKT-7428 heavy tank transporter for the T-90 MBT. India was contracted to upgrade the thermal sights and fire control systems of Vietnam's stocks of Soviet-era armoured vehicles and T-54 and T-55 tanks. Vietnam was also reported to be in the market for eighteen CAESAR 155 mm self-propelled howitzers.

In 2016, in the first "big ticket" arms purchases for the ground force, Vietnam took delivery of the first batch of ten Guardian APCs manufactured in the United Arab Republic by the International Armored Group and, more significantly, announced the purchase of sixty-four modern T-90S/SK MBTs from Russia.[24]

Part 5: National Defence Industry

In January 2011, the Political Report to the Eleventh National Congress of the Communist Party of Vietnam identified modernization of the armed forces and the national defence industry as one of five key national objectives for the period

2011–16. The goals of defence modernization were "to further push the development of defense and security technology industry … to strengthen scientific research in military and security capable of defeating hi-tech wars from enemy forces …[and ensuring] that the armed forces incrementally have access to modern equipment with priority being given to the navy, air force, security, intelligence, and mobile police forces".

In his address to the eleventh congress, Lt. Gen. Ngo Xuan Lich, head of the Vietnam People's Army's General Political Department, identified "armaments, ammunition and technical means" as key priorities. Speaking on the sidelines of the congress, General Phung Quang Thanh, Minister of National Defense, included electronic and technical reconnaissance among the priorities for defence intelligence. Later in 2011 the Politburo adopted a resolution on "Building and Developing Defence Industry to 2020 and Beyond".[25]

According to Vietnam's 2014 Defence White Paper, priorities for the defence industry included the maintenance, manufacture, improvement and upgrading of weapons and equipment.

As noted above, Vietnam signed a number of MOUs and DCAs with its strategic partners and other states. These agreements usually contained clauses on bilateral national defence industry cooperation in five priority areas: promotion of defence research and technology transfer; co-production of weapons; maintenance, upgrading and repair; technical support; and personnel training.

Vietnam also has promoted national defence industry cooperation with its Southeast Asian neighbours. For example, Vietnam supported a Malaysian proposal to promote defence industry cooperation among members of the Association of Southeast Asian Nations (ASEAN). Vietnam and Indonesia have discussed co-producing fixed-wing transports, maritime surveillance aircraft and multi-role helicopters. Vietnam has approached Singapore for assistance in the safe storage of ordnance and munitions. Vietnam and the Philippines have discussed cooperation in the manufacture of various types of unspecified military equipment.

With respect to the modernization of Vietnam's national defence industry, two developments are noteworthy: the expansion and upgrading of Vietnam's shipbuilding industry and the co-production of missile systems.

Domestic Shipbuilding

In early 2008, Vietnam and Russia signed a contract for the delivery of several naval and coastguard ship-building kits and related weapon systems. These kits were assembled in Vietnam at the Hong Ha shipyard in Hai Phong and Ba Son shipyard in Ho Chi Minh City. The Hong Ha shipyard successfully produced

Vietnam's first 400-ton TT-400TP-class gunboat, which was commissioned in 2012; three other gunboats of the same class were commissioned between 2012 and 2014.[26]

In October 2011, President Truong Tan Sang made a state visit to India and requested Indian assistance to modernize the port facilities at Nha Trang.[27]

In 2013–14, under the terms of a co-production agreement, Vietnam and Russia assembled one KBO 2000/BPS 500 missile patrol boat at the Ba Son shipyard. This vessel failed to meet the technical requirements of Vietnam's navy and the project was terminated. However, by the end of 2016, Vietnam successfully assembled six *Tarantul*-5 (*Molniya*-class) guided missile fast attack craft at the Ba Son shipyard.

In 2015, the original Ba Son shipyard was sold off and redeveloped as a housing area. A new Ba Son shipyard is presently being constructed in Ba Ria-Vung Tau. It is expected to have the capacity to build ships displacing 500 to 2,000 tons and repair naval ships displacing up to 5,000 tons. There are reports that Vietnam will attempt to build two *Gepard*-class frigates when Ba Son becomes fully operational in 2018.

As noted above, the HD 981 crisis in 2014 was a major driver to expand the capabilities of the Vietnam Coast Guard through domestic production. In October 2016, the National Assembly approved a long-term VCG modernization programme that included the domestic construction of eight 1,500-ton TT-1500 offshore patrol vessels, four 2,200-ton DN 2000–class cutters and four 4,300-ton Damen DN 4000–class multi-role patrol vessels. These ships will be built at the Song Thu Shipyard in Da Nang with support from the Damen Group of the Netherlands.

Co-production of Missiles

Vietnam has sought offset agreements involving technology transfers in several of its arms procurement contracts.[28] In February 2002, the Russian defence enterprise LOMO announced that it reached a contract with Vietnam to assist in the transfer of technology so Vietnam could produce the Igla (SA-18 Grouse) low-altitude surface-to-air missile. Four years later, during the second phase of defence modernization, Russia and Vietnam reached agreement on technical assistance in the production of *Yakhont* (SS-N-26 Strobile) ship-to-ship missiles. In February 2012, it was announced that Russia and Vietnam would co-produce three versions of the Kh-35 Ural-E (SS-N-25 Switchblade) anti-ship missile to be deployed on aircraft, helicopters, ships and fired from coastal batteries.[29] Vietnam also has sought a licence to produce the Russia–India manufactured BrahMos anti-ship cruise missile.[30]

Currently, Vietnam is capable of maintaining and repairing existing stocks of naval and air weapons and platforms, depot-level reverse engineering of aircraft spares, assembling patrol boats from kits, building light aircraft,[31] constructing patrol boats and larger ships, co-producing a variety of missiles through technology transfer, and, most recently, manufacturing indigenous UAVs.

Part 6: Defence Budget

Vietnam's defence budget is closely tied to economic growth.[32] Since 1990, Vietnam has been one of the fastest growing economies in the world, averaging 6.4 per cent in the 2000s.[33] Its GDP in constant U.S. dollars rose from $99 billion in 2008, to $116 billion in 2010 to $193 in 2015. Defence spending averaged 2.89 per cent of GDP between 2006 and 2015, ranging from a high of 5.2 per cent in 2006 to a low of 2.0 per cent in 2011. In the five-year period ending in 2015, defence spending averaged 2.2 per cent of GDP.

Vietnam's defence budget as a percentage of nominal government spending averaged 9.89 between 2006 and 2015, with a high of 19.9 per cent in 2006 and a low of 6.9 per cent in 2010, reflecting the impact of the global economic crisis. Vietnam's defence budget as a percentage of nominal government spending averaged 7.76 for the five-year period ending 2015.

Vietnam's official defence budget, calculated in U.S. dollars (constant and exchange rate 2015), averaged $4.28 billion over the period 2006–15 and averaged $3.94 billion over the five-year period ending in 2015. It is estimated that Vietnam's defence budget will reach $5 billion in 2017 and rise to $6.2 billion by 2020.[34]

Part 7: Conclusion

Changes in the international legal regime and Chinese assertiveness in the South China Sea in the 1990s motivated Vietnam to embark on the modernization of its naval and air defence air force to develop capabilities to respond to likely contingencies in the maritime domain. This chapter traced two phases of force modernization, the first from the mid-1990s to the end of 2005 and the second from 2006 to the present. During the second phase, Vietnam moved from refurbishing and upgrading existing stocks to acquiring "big ticket" platforms such as missile attack craft, frigates, enhanced Kilo-class submarines, multi-role jet fighters, advanced radars, modern air defence and ISR systems, coastal defence missiles and new armoured fighting vehicles and main battle tanks. At the same time, Vietnam modernized its national defence industry to maintain and repair these

new weapons and platforms, co-produce a variety of missiles and build larger and more capable warships.

Despite these impressive efforts to modernize its armed forces, Vietnam will face at least eight major interrelated challenges to create an effective modern joint fighting force.

First, Vietnam needs to maintain high economic growth in order to meet current operating costs, maintain expensive platforms such as the Kilo submarines, and to procure new platforms and weapons. Vietnam has set the target of 7 per cent growth of GDP per annum.

Second, Vietnam must overcome what Derek Grossman has called the legacy of army parochialism that has cast a shadow over the emergence of the navy as a separate co-equal service.[35]

Third, Vietnam must promote the effective integration of technology and systems acquired from diverse sources, such as radar and missiles.

Fourth, Vietnam needs to further develop the interoperability of its army, navy and air defence air force into an effective joint force by conducting innovative exercises.

Fifth, Vietnam must gain experience in conducting military operations in the maritime domain, including improving its capabilities in amphibious operations, mine sweeping, anti-submarine warfare, and acquiring acoustic signatures for its Kilo submarines.[36]

Sixth, Vietnam needs to gain experience in high-tech warfare by developing its newly acquired ISR assets for battlefield awareness and targeting, particularly for the land attack cruise missiles purchased for its Kilo submarines.

Seventh, Vietnam must articulate a national defence strategy, maritime strategy and military doctrine to guide the development of an effective and modern joint force.[37]

Eighth, Vietnam must continually revamp its system of professional military education and training to keep up with changes in technology and the creation of a joint force.[38]

Notes

1. A. Fleurant, P.D. Wezeman, S.T. Wezeman, and N. Tian, *Trends in International Arms Transfers, 2016*, SIPRI Fact Sheet, February 2017 <https://www.sipri.org/sites/default/files/Trends-in-international-arms-transfers-2016.pdf>. Vietnam's main sources were Russia (88 per cent), Belarus (3.5 per cent) and the Ukraine (2.8 per cent).
2. United States Central Intelligence Agency, "Vietnam", *World Fact Book*, 3 January 2018 <https://www.cia.gov/library/publications/the-world-factbook/geos/vm.html>.

3. International Monetary Fund, *World Economic Outlook*, October 2006 <http://statisticstimes.com/economy/projected-world-gdp-ranking.php>.
4. C.A. Thayer, *Trends in Force Modernization in Southeast Asia*, Working Paper no. 91 (Canberra: Peace Research Centre, Research School of Pacific Studies, The Australian National University, September 1990).
5. B.B. Fall, *The Viet Minh Regime: Government and Administration in the Democratic Republic of Viet Nam* (New York: Institute of Public Relations, 1956), p. 81.
6. "East Asia and Australasia – Vietnam", International Institute for Strategic Studies, *The Military Balance 1987–88*, pp. 14, 33, 145 and 175–76.
7. C.A. Thayer, *The Vietnam People's Army under Doi Moi*, Pacific Strategic Papers (Singapore: Institute of Southeast Asian Studies, 1994), p. 23.
8. In January 1974, China seized control of features in the Paracels occupied by the Army of the Republic of Vietnam (ARVN). The following year, VPA Special Forces similarly evicted ARVN forces from features in the Spratlys prior to the fall of Saigon. In March 1988, Chinese naval forces seized Fiery Cross and South Johnson reefs from Vietnam.
9. Bạch Dương, "Được ưu tiên hiện đại hóa, Lục quân VN sắp thay đổi lớn về chất" [Priority to modernisation: The army is about to change dramatically], Soha.vn, 22 December 2015 <http://soha.vn/quan-su/duoc-uu-tien-hien-dai-hoa-luc-quan-vn-sap-thay-doi-lon-ve-chat-20151222003129668.htm>.
10. C.A. Thayer, "Force Modernization: The Case of the Vietnam People's Army", *Contemporary Southeast Asia* 19, no. 1 (1997): 1–28; N.H. Son, "Vietnam: A Case Study in Naval Modernization", in *Naval Modernisation in South-East Asia: Nature, Causes and Consequences,* edited by G. Till and J. Chan, pp. 127–30 (New York: Routledge, 2014); Z. Abuza and N.N. Anh, "Vietnam's Military Modernization", *The Diplomat*, 28 October 2016 <https://thediplomat.com/2016/10/vietnams-military-modernization/>; and Alex Vuving, "Tracking Vietnam's Force Build-Up in the South China Sea", Asia Maritime Transparency Initiative, Center for Strategic and International Studies, 3 November 2017 <https://amti.csis.org/tracking-vietnams-force-build-south-china-sea/>.
11. Unless otherwise noted, data on Vietnam's arms acquisitions have been taken from the Stockholm International Peace Research Institute's Arms Transfer Database for the period 1990–2016 <http://armstrade.sipri.org/armstrade/page/trade_register.php>.
12. In the late 1980s, Vietnam expressed an interest in obtaining two or three Kilo-class submarines from the Soviet Union. Reportedly, a crew was in training when the Soviet Union collapsed and the programme was terminated.
13. Quoted in C.A. Thayer, *Vietnam People's Army: Development and Modernization*, Armed Forces Lecture Paper Series Paper no. 4 (Bandar Seri Begawan: Sultan Haji Hassanal Bolkiah Institute of Defence and Strategic Studies, 2009), p. 11.
14. T.M. Vu and N.T. Phuong, "Naval Development in Vietnam", in *Naval Modernisation in Southeast Asia*, edited by G. Till and A.S. Ristian, pp. 93–94 (London: Palgrave Macmillan, 2017).

15. C.A. Thayer, "Submarine Acquisition in Vietnam", in *Naval Modernization in Southeast Asia*, Part Two, *Submarine Issues for Small and Medium Navies*, edited by G. Till and C.S.L. Koh, pp. 109–118 (London: Palgrave Macmillan, 2018).
16. Abuza and Anh, "Vietnam's Military Modernization"; and Vuving, "Tracking Vietnam's Force Build-Up".
17. In 1980, Vietnam acquired the first of twenty-four Aero Vodochody L-39C jet trainers from Czechoslovakia. In mid-2008, Vietnam acquired four second-hand L-39s from the Czech Republic and ten new Yak-52 basic trainers from Rumania to replace the aging inventory in its air training division.
18. According to Government of Australia, Department of Defence, Defence Intelligence Organisation, *Defence Economic Trends in the Asia-Pacific 2007*, p. 22 <http://www.defence.gov.au/dio/documents/DET_07.pdf>.
19. Abuza and Anh, "Vietnam's Military Modernization".
20. "Japan to Export Earth Observation Satellite to Vietnam", Vietnam News Agency, 20 September 2016 <http://english.vov.vn/economy/japan-to-export-earth-observation-satellite-to-vietnam-331560.vov>.
21. S. Miglani and G. Torode, "India to Build Satellite Tracking Station in Vietnam That Offers Eye on China", Reuters, 25 January 2016 <https://www.reuters.com/article/us-india-vietnam-satellite/india-to-build-satellite-tracking-station-in-vietnam-that-offers-eye-on-china-idUSKCN0V30B3>.
22. "CASA C212-400 para la Guardia Costera Vietnamita", *Zona Militar*, 5 June 2008 <https://zona-militar.com/foros/threads/casa-c212-400-para-la-guardia-costera-vietnamita.12149/>.
23. Vuving, "Tracking Vietnam's Force Build-Up".
24. N.T. Phuong, "What Will New Russian Tanks Mean for Vietnam's Military?" *The Diplomat*, 27 July 2017 <https://thediplomat.com/2017/07/what-will-new-russian-tanks-mean-for-vietnams-military/>.
25. P. Nguyen, "Vietnam's Rising Geopolitical Profile is Driving a Military Sea Change", *Nikkei Asian Review*, 17 November 2016 <https://asia.nikkei.com/magazine/20161117-INCOMING/Viewpoints/Phuong-Nguyen-Vietnam-s-rising-geopolitical-profile-is-driving-a-military-sea-change>.
26. TT-400TP. TT is a Vietnamese abbreviation of *Tuần Tra*, or patrol, and TP is an abbreviation for *Tàu Pháo*, or gunboat.
27. S. Dikshit, "Vietnam's Plea Puts South Block in a Predicament", *The Hindu*, 9 November 2011.
28. These missiles were produced by the Soviet Union in the 1950s.
29. The Vietnamese name for this missile is KCT-15; Douglas Barrie and Tom Waldwyn, "Vietnam Paddles its Own *Kayak*", International Institute for Strategic Studies, *Shangri-La Voices*, 5 June 2016 <http://www.iiss.org/en/shangri-la%20voices/blogsections/2016-588c/vietnam-paddles-its-own-kayak-46c1>.
30. R. Johnson, "India is Preparing to Sell BrahMos Supersonic Cruise Missiles to Vietnam", *Business Insider*, 20 September 2011.

31. Between June 2003 and September 2005, Vietnam manufactured three A-41 (VNS-11) three-seat amphibious aircraft for use in search and rescue and forestry patrols.
32. The discussion in part 6 is based on Government of Australia, Department of Defence, Defence Intelligence Organisation, *Defence Economic Trends in the Asia-Pacific 2016* <http://www.defence.gov.au/dio/documents/DET_16.pdf>; see also Abuza and Anh, "Vietnam's Military Modernization".
33. "Vietnam GDP", *Trading Economics* <https://tradingeconomics.com/vietnam/gdp>.
34. IHS Jane's, "Defense Budget Overview", *Jane's Sentinel Security Assessment: Southeast Asia*, 25 July 2016, p. 1.
35. D. Grossman, "Can Vietnam's Military Stand up to China in the South China Sea?" *Asia Policy* (National Bureau of Asian Research) 13, no. 1 (2018): 123–24.
36. C. Koh, "Vietnam's Quest for a Greenwater Navy", *The Diplomat*, 18 March 2016 <https://thediplomat.com/2016/03/vietnams-quest-for-a-greenwater-navy/>; C.A. Thayer, "Vietnam: Evaluating its Fleet of Six Kilo-class Submarines", *Thayer Consultancy Background Brief*, 25 February 2017 <http://www.viet-studies.net/kinhte/Thayer_VN_subs.pdf>, and C.A. Thayer, "Vietnam: Acoustic Signatures and Kilo Submarines", *Thayer Consultancy Background Brief*, 8 May 2017 <https://www.scribd.com/document/348493131/Thayer-Vietnam-Acoustic-Signatures-and-Kilo-Submarines>.
37. Vu and Phuong, "Naval Development in Vietnam", p. 104; Abuza and Anh, "Vietnam's Military Modernization"; S.S. Wu, "The Development of Vietnam's Sea-Denial Strategy", *Naval War College Review* 70, no. 1 (2017): 143–61; and A.D. Ton, "Vietnam's Maritime Security Challenges and Regional Defence and Security Cooperation", *Soundings* (Sea Power Centre, Royal Australian Navy), forthcoming 2018.
38. P. Nguyen, "High Ambitions, Tall Orders for Vietnam's Military", *Nikkei Asian Review*, 2 November 2016 <https://asia.nikkei.com/Viewpoints/Phuong-Nguyen/Phuong-Nguyen-High-ambitions-tall-orders-for-Vietnam-s-military>.