

*Taiwan's Security Policy since the Cold War Era:
A Review of External Military Assistance
and the Development of Indigenous
Defence Industry*

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Throughout the Cold War era, the ROC's national security was threatened by the PRC's enmity. Even in the present day, the ROC's national security strategy focuses overwhelmingly on addressing military threats from the People's Liberation Army (PLA). Although the US has, over the years, granted hardware and software to Taiwan to strengthen its defence capabilities, Taiwan has remained far from independent in defence modernisation and national security. For Taiwan, a hard lesson learned from changes to US policy in Asia and other bilateral relations was that the US will only invest in countries that will bear fruit for it. Post-World War Two economic development in Taiwan has been closely linked to political attempts to develop a strong indigenous defence industry, with the aim of ensuring Taiwan would be able to avoid the potential risks associated with changes in US policy. The development of an indigenous defence industry thus became critical and would go on to gain prevailing support in domestic politics. Taiwan's development of an indigenous defence industry started with three public institutions/organisations and gradually networked more than 200 indigenous SMEs. Over the decades, the country has built a very useful and promising defence industrial chain, reflecting more generally the benefits of economic development for Taiwan.

I Introduction

Ever since the end of the Second World War, due to the continuing civil war between the Communist Party of China and the Nationalist Government, the fates of China (the People's Republic of China, the PRC) and Taiwan (Republic of China, the ROC) have been decided not by themselves but by the changing international environment; this was especially the case after the Nationalist Government was defeated in the civil war and consequently relocated to Taiwan in 1949. Defeat in the civil war posed a great threat to the survival of the ROC. Externally, the National government crumbled completely and lost control of the whole mainland to the communists. At this low point, the US government

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under President Truman decided not to resume support of the ROC's leadership, Chiang Kai-shek and his government, after the PRC was formally established. The reluctance of the US to support the Nationalists indicated a lack of faith in Chiang Kai-shek's leadership and his competence to rule the country. Importantly, Truman's administration decided to focus its Cold War efforts of containing communism on Europe rather than Nationalist China, and this policy would eventually result in the Chinese Communist victory in mainland China.¹ Without any external support, the sustainability of the ROC was at tremendous risk. Internally, the Nationalist Government was perceived by the people as being corrupt, ill-fated, inefficient, pathetic and incapable. In no way could the Nationalists gain immediate support from the people of what was fast becoming a panicked and disordered society.

At first, the chaotic government arrived in Taiwan in 1949 and the civil war continued. The ROC government did not have sufficient competence to govern, nor to defend itself; the leadership, governmental organisations and overall morale of the ROC were under threat. The political atmosphere was very uncertain and the government needed time to recover and reorganise after its comprehensive defeat. Under such circumstances, the ROC's fragile defence capabilities were not sufficient to keep the island free from communist military attack. After the Second World War, the ROC had been too exhausted to implement any new nation-building processes alone, let alone regenerate its security policy. It therefore needed external assistance from the US. Then, in June 1950, with the support of the Soviet Union and the PRC, North Korea invaded South Korea. The Korean War disintegrated into a war between the US-led alliance and the Communist Camp. As a result, the Cold War was ignited. The cause of the Korean War was seen by the United States government as a Communist expansion effort attempting to break through the defence line of East Asia and therefore as a threat to US strategic interests; as a result, the First Island Chain (Japan, the Ryukyus, Taiwan, the Philippines and Borneo) and the Second Island Chain (Japan, Guam, Indonesia and Australia) were created to contain communism², establishing what became known as the 'hub-and-spoke' security alliance system, linking bilateral and multilateral security arrangements in the Asia Pacific region. In doing so, the US tightened its military alliances with Japan, Taiwan, South Korea, the Philippines and others in the region. Based on the concept of island chain defence, Taiwan's strategic importance was substantially recognised and enhanced.

The aftermath of the Second World War showed that countries in the region were extremely unlikely to recover fully by themselves, as most of them had suffered or were suffering the setbacks of either civil wars or wars of independence. As a result of Cold War strategic thinking, the US incorporated these Asian allies into its wider strategic picture as a way of supporting its overall defence capabilities and strengthening the American sphere of interest. The US was, on the one hand, committed to protecting and ensuring the security of its allies in the region; on the other hand, it also sought to strengthen its global strategic position against communist expansionism. With these goals in mind, the US helped boost the defence capabilities of those allies to support the defence of the two Island Chains in the West Pacific. By doing so, the US has since then supplied a security umbrella to those regional allies, such as Japan, South Korea, Taiwan *et-al*.

This paper intends to examine the transformation of Taiwan's security policy under the support of the American security alliance system during the Cold War era. By examining

¹ Hamby, A. L., 'Harry S. Truman: Foreign Affairs', *UVA/ Miller Centre*, 2019, <https://millercenter.org/president/truman/foreign-affairs>.

² Yoshihara, T., 'China's Vision of its Seascape: The First Island Chain and Chinese Seapower', *Asian Politics & Policy*, 4:3 (2012), p. 297.

security policy, it will also focus on security partnerships between the US and Taiwan. Within such a US-led alliance, American security structures have shaped the fundamental structure of Taiwanese security and supported the emergence of an indigenous defence industry. Since the US has consistently assisted Taiwan in strengthening its defence capabilities in all areas, Taiwan's defence industry has been generated by American policy during and after the Cold War. This paper will therefore also argue that the development of an indigenous defence industry in Taiwan has been generated by national security concerns about the changing nature of relations between great powers.

II Civil War and the Revival of the ROC's National Security in Taiwan

After being defeated in the civil war in mainland China, the Nationalist Government was plunged into disorder and fled to Taiwan. At first, the government which re-established itself in Taiwan realised that, with little access to resources, it was highly vulnerable to military attack. It was therefore critical for the ROC to shift its political centre from Nanjing to Taipei, so as to transform the geopolitical foundation from mainland- to maritime-oriented thinking. Thereafter, the ROC's national security policy gradually shifted to the security context of the maritime domain. Although the government settled hastily in Taiwan, the first stage of the ROC's national strategy was overshadowed by military objectives: the early stages of national security policy development aimed to take advantage of Taiwan's remaining resources to prepare to fight another war. The core focus of national strategy at that time was to recover the mainland, ensure Taiwanese security and develop Taiwan. It was that the country prioritised its strategy.

The ROC Nationalist Government, when it first arrived in Taiwan, anticipated winning back the mainland within three to five years of fighting. It therefore did not have a long-term plan to settle in Taiwan, but instead anticipated launching a war back on the mainland. However, the ROC did not have clear support from the US, as the US government hesitated to grant support to the corrupt and incapable Nationalists. In 1949, the PRC was formally established as the communist regime on the mainland. Seen by the US as a new opportunity to be engaged with, the PRC's position was critical in Asia. To begin with, the US government waited, hoping to formally engage with the PRC, and anticipated abandoning the ROC in due course. Militarily, the ROC was weakened further after it was defeated in the civil war and did not have any external support. Diplomatically, as the PRC gradually gained ground, the ROC was quickly losing the support of the international community. Domestically, the chaotic society in Taiwan resulted from a hasty settlement from mainland China and did not have a clear vision for the future. During this critical period, however, the military forces of the ROC defeated the Chinese Communist Army in the Battle of Gunningtou, in October 1949, and the Battle of Dengbu Island, in November 1949. These victories, which successfully deterred the PLA's ambition to march through quickly to Taiwan, helped drive up confidence and moral in Taiwan. The ROC government decided to restructure its strategic deployment by withdrawing its military from Hainan and Chousang Islands.³ The Nationalists from this point forward would focus more on Taiwan's defence, making it much harder for PLA to invade.

The US at this time was also evaluating the strategic importance of Taiwan to the region. According to US Cold War strategic thinking, it was necessary for the US to help defend

³ Ministry of National Defense, ROC, *1992 National Defense Report ROC*, (Ministry of National Defense, ROC, 1992).

Taiwan in order to secure sea lanes of communication near Taiwan. The US Joint Chiefs of Staff indicated as much to the personal Chief of Staff to President Roosevelt, William D. Leahy, in a 1948 report entitled 'The Importance of Formosa':

Studying various plans for Allied entry into the strategic triangle, the Joint Chiefs and their subordinate advisory committees concluded that Formosa constituted the most important single objective in the target area. The island possessed so many obvious advantages and was located in such a strategically important position that most planners in Washington believed the Allies would have to seize it no matter what other operations they conducted in the western Pacific. Until they seized Formosa, the Allies would be unable to establish and secure an over water supply route to China.⁴

Although the thorough assessment of the Asian situation reflected American strategic interests, the focus on Taiwan was not taken into policy consideration by the Truman administration until the Korean War. Nevertheless, it was this same strategic thinking that supported Taiwan at its most vulnerable moment. From a strategic perspective, in light of the risk of communist aggression, the US could not afford to lose Taiwan to the opposing side. Taiwan's pivotal strategic position has been recognised since the end of the Korean War.

III The Aftermath of the Korean War and Crises in the Taiwan Strait

In 1950, the outbreak of the Korean War initiated significant changes to Asian security structures. Because communist expansionism posed an immediate threat to regional stability, the United Nations Security Council quickly passed Resolution 83, which called for military assistance for South Korea. The US led UN troops to engage in war with North Korea. The US tried to revive the economic and military capabilities of war-torn Japan and the ROC in order to meet the industrial demands of the war. According to US geostrategic assessments, strengthening Taiwan's strategic position was in accordance with US national interests. The US developed the island chain strategy, which was part of the wider containment policy against communism, the so called 'Truman Doctrine', to include Taiwan. From a geopolitical perspective, Taiwan's geographic location is critical to the success of containment policy. The Korean War, therefore, was critical to the ROC's national security, as it not only redefined the strategic importance of the ROC in the geopolitical context of the Asia Pacific region, but also changed the American strategic perspective in the region vis-à-vis the ROC. The US resumed military support of the ROC, accelerated the negotiation of the Sino-American Mutual Defence Treaty and signed the treaty in 1954. As a result, the ROC was formally brought into the American alliance system. As well as successfully stopping the PRC's attempt to invade Taiwan immediately after it was established in 1949, therefore, the Korean War also helped prevent deterioration of the ROC's international status. These positive outcomes were only partially marred by US decision-makers' questionable articulation of this policy as 'neutralising' Taiwan,

⁴ Robert Ross Smith, *Command Decision: Luzon Versus Formosa*, (Washington D.C.: Center of Military History, United States Army, 1990), p. 463; 'Memorandum by the Executive Secretary of the National Security Council (Souers) to the National Security Council, 'Importance of Formosa', NSC-37 g (2)', *Office of Historian, US Department of State, Washington*, 30 December 1949, <https://history.state.gov/historicaldocuments/frus1949v07p2/d387>. Section g(2).

thereby undermining its legal status.⁵

When the PRC was established in 1949, a number of countries in the world severed diplomatic relations with the ROC in order to establish them with the PRC instead. The ROC's diplomatic outreach began a decline that has continued to the present day: as of 2018, only seventeen countries officially recognise the ROC. Nevertheless, subsequent US aid helped renew Taiwan's hopes of re-establishment and fend off complete collapse after defeat in the civil war. There are two significant strategic reasons why the US continues to support the ROC. First, Taiwan is located at the geographic centre of the first island chain against communism in East Asia. Second, revival of the ROC symbolizes US serious commitment to the region and its allies.

After the Korean War ended in 1953, the PRC quickly regenerated its political momentum to shift away from the Korea Peninsular to begin its military campaign for unification in the Taiwan Strait. In August 1958, China launched a new war, shelling Kinmen Island for 44 days consecutively. It was regarded as the second Taiwan Strait Crisis. The shelling continued periodically from August 1958 to December 1979. As the war threatened the ROC's national security, the government hastily decided to push for military reform. The ROC's first military reform was launched during these crises, mainly as a means of restructuring troop organisations regrouping from mainland China.

Since the ROC's relocation to Taiwan, therefore, its policy has been deeply influenced by US Asian policy in general and its bilateral hostile relation with China in particular. When geopolitics shifted, the relations among the US, the Soviet Union and China were also transformed. The changes have deeply influenced US policy toward China and thus Taiwan's national security.

IV Stages of Taiwan's Defence and Military Reform

Throughout the last few decades, the ROC was very much under the shadow of the security threat posed by the PRC. Because the PRC regards Taiwan as a renegade province of China, changes in the level of hostility in the cross-strait relationship do not fundamentally alter Beijing's determination to unify the nation. The pace of US-ROC (Taiwan) relations has fully depended on the development of US-PRC relations. When China directly entered into the Korean War fighting against US-led alliance forces, the US was left without much choice other than to boost Taiwan's defence capabilities as part of its global anti-communist campaign. Through the Sino-American Mutual Defence Treaty signed in 1954, Taiwan was able to press ahead on its long path of military modernisation, helped by the wide variety of its cooperative arrangements.⁶ The US has since then supplied advanced weapons systems to help upgrade Taiwan's military hardware and strengthen its military capabilities. In addition, the US also provided considerable support with military software, such as the institutionalisation of joint training and exercises. Over the years, US-Taiwan defence relations became the only official channel existing to help facilitate and internationalise Taiwan's defence networks; diplomatic isolation has taken toll on Taiwan's political and defence relations with other nations.

Together with the mutual defence treaty, the US Military Assistance Advisory Group in Taipei was established to help Taiwan proceed with defence reform and to assure the

⁵ Lin, C., 'The Legacy of the Korean War: Impact on U.S.-Taiwan Relations', *Journal of Northeast Asian Studies*, 11:4 (Winter 1992), pp. 42-43.

⁶ Huang, A. C., 'The United States and Taiwan's Defense Transformation', *Brookings Op-Ed*, 16 February 2010, <https://www.brookings.edu/opinions/the-united-states-and-taiwans-defense-transformation/>.

security and continuity of the ROC government in Taiwan. More importantly, in terms of defence networks, the mechanisms built between the US and Taiwan enabled them to engage in a comprehensive network of military alliance systems, allowing Taiwan to form links with other regional partners.

Under the framework of the Mutual Defence Treaty signed in 1954, the US and ROC military-to-military relationship was built on a solid foundation. Although it lasted until the US–China normalisation in 1979, the bilateral military-to-military relationship has been further deepened in the years thereafter. In other words, the role played by the US in the modernisation of Taiwan’s defence network is undeniable. The formal alliance between the US and the ROC persisted until the US began to favour the PRC to balance the influence of Soviet Union. The transformation of defence strategy in Taiwan has also been impacted by significant geopolitical changes, especially among the great world powers.

V Impacts of US-China Normalisation on Taiwan’s Security Policy

During the Cold War era, Soviet expansionism gained the upper hand in many parts of the world, thereby challenging American dominance. When serious disagreement about communist doctrine emerged between China and the Soviet Union in the 1960s, American strategic calculations took into consideration two key factors: firstly, if China would align with the US, it would shift global power structures in favour of the US against the Soviets, and secondly, alliance with China would grant the US access to tremendous market potential in China.⁷ China’s increasing influence in the international community was considered useful as a means of filling the gaps in containment policy against international communism. As US President Richard Nixon sought for a diplomatic breakthrough with China, his administration orchestrated a blunt but secret rapprochement process leading to successful US-China normalisation. In the strategic shift to alignment with China, the US naturally gained a strategic advantage vis-à-vis the Soviets.

Just as the US triggered the process of strategic change, US-China rapprochement changed the course of traditional hostile China policies, resulting in a redistribution of strategic configurations in Asia. When the US made a new move to shift its strategic alignment with PRC, its traditional policies with regard to the PRC were likewise reviewed. Relevant US policies in Asia, and especially policies pertaining to the ROC and the PRC, were greatly affected. As a result of the change in US policy, the ROC’s representation in the United Nations was first challenged and then lost, with the PRC gaining their seat in 1971. Once the US could confirm normalisation with the PRC, the communist security threat against the ROC was intentionally played down by the US. Defence cooperation between the US and Taiwan stagnated and the progress of Taiwan’s defence modernisation also slowed down. By the 1970s, China had started to cultivate sufficient ground in the international community to welcome President Jimmy Carter onto the scene. The Carter Administration anticipated potentially high political dividends for pushing normalisation with China in the complicated contexts of domestic and external politics. If China aligned with the US, the effects would include a weakening of the communist camp, redirecting China’s course of development toward international cooperation rather than confrontation.

The result for the ROC government was declining faith in the strength of US support, as US policy shifted more obviously in favour of China. Taiwan, in turn, became more

⁷ Goh, E., *Constructing the US Rapprochement with China, 1961–1974: From ‘Red Menace’ to ‘Tacit Ally’* (Cambridge University Press, 2005), pp. 10-12.

pragmatic in its policy toward China and attempted to establish greater independence from US military assistance.⁸ One unsuccessful example of an attempt by Taipei to be independent in its development of defence capabilities was a nuclear weapons program, which was forced to end by the US government in 1987.⁹ The ROC's policy makers reflected strategic apprehension and sound political will to pursue strategic independence. The ROC was diplomatically isolated by the PRC for a long time and was left without many reliable suppliers in the international community. Political difficulties also seriously hampered its efforts to conduct defence modernisation.

Political obstacles in international politics continue to limit Taiwan's hope for overall defence modernisation. Restricted international arms markets present another difficulty to be overcome if Taiwan is to advance its defence modernisation and military technologies. In such a political difficult context, development of an indigenous defence industry would seem to be the only possible solution. As President Tsai Ing-wen stated, on the occasion of launching construction of a facility to build Taiwan's first indigenous submarines, '[b]uilding submarines at home is the only way out'.¹⁰

VI Emergence of an Indigenous Defence Industry in Taiwan

During the 1950s and 1960s, the ROC's national security was seriously threatened, as the ROC and the PRC engaged in a heated diplomatic struggle for the right to represent 'China' in the United Nations and related international organisations, and the military threat of the PRC to the ROC increased dramatically. Under such a serious threat, improvement of national defence capabilities became the top priority for Taipei. In order to bolster the defence industry and prevent overdependence on external military assistance, the then Minister of Defence, Chiang Ching-Kuo, ordered the establishment in 1965 of the National Chung-Shan Institute of Science and Technology (NCSIST)¹¹, pioneering the initial stages of arms and military technologies production. Although industrial development begun in Taiwan only in the 1960s, the political will of the leadership in this area was strong and clear. Approved by the then President, Chiang Kai-Shek, the NCSIST was formally established in 1969. Before the NCSIST was established, the ROC had a poorly organised national defence industrial program. The NCSIST has led a systematic development of defence capabilities build-up with research and development and manufacturing.

At this historical juncture, there were two main factors driving the establishment of self-defence development in Taiwan. The first was the sea change in US Asian policy during the Nixon era with the establishment of the 'Nixon Doctrine' in 1969. Nixon stated that 'the United States would assist in the defence and development of allies and friends', but would

⁸ Lee, B., *The Security Implications of the New Taiwan* (International Institute for Strategic Studies Adelphi Paper 331, 1999), pp. 20-21.

⁹ For the detailed reason why Taiwan was forced to called off the entire nuclear weapons program, please refer to the publication below. David Albright, and Andrea Stricker, *Taiwan's Former Nuclear Weapons Program: Nuclear Weapons On-Demand* (Institute for Science and International Security Press, 2018). http://isis-online.org/uploads/isis-reports/documents/TaiwansFormerNuclearWeaponsProgram_POD_color_withCover.pdf

¹⁰ 'Taiwan Begins Work on 1st Indigenous Submarine Facility', *Kyodo News*, 9 May 2019, <https://english.kyodonews.net/news/2019/05/b86865a4528c-taiwan-begins-work-on-1st-indigenous-submarine-facility.html>.

¹¹ When it was established in 1969, CSIST was part of Armament's Bureau of the Ministry of National Defense conducting in the development, manufacturing and sale of various weapons systems and dual use technologies. In 2014, the CSIST was transformed into an administrative corporation supervised by the Ministry of National Defense and the name was formally changed to the National Chung-Shan Institute of Science and Technology (NCSIST).

not 'undertake all the defence of the free nations of the world'.¹² This doctrine meant that each allied nation was in charge of its own security in general, but the United States would act as a nuclear umbrella when requested. The Doctrine argued for the pursuit of peace through partnership with American allies. As such, the US would directly reduce military aid to its allies and shift to boosting the development of their indigenous defence industries instead. According to President Nixon's report to Congress in 1973, the US defined three types of foreign assistance: security assistance, humanitarian assistance and economic aid. He asserted, furthermore, that '[s]ecurity assistance (including military aid and economic assistance) is vital to help friendly countries develop the capability to defend themselves'.¹³ The report alerted Taiwan's security decision-makers at the time to place more emphasis on efforts to develop the indigenous defence industry than on seeking US military assistance.

The second factor driving the establishment of self-defence development was the complicated nature of arms procurement in the context of US-China relations, due to the increasing diplomatic difficulty Taiwan encountered since early the 1970s, when the ROC left the UN in 1971. In particular, since President Nixon sought for diplomatic normalisation with the PRC, Taiwan's arms procurement from the US has become ever more challenging. Since 1979, when the US broke off its formal diplomatic relationship with the ROC, the issue of US arms sales to Taiwan has continued to be a critical political issue between the US and China. As China grows more powerful and influential, challenging the dominance of the US in the last two decades, US arms sales to Taiwan have become not only a political but also a strategic issue vis-à-vis China. This has in turn increased the unpredictability of Taiwan's national defence build-up and has complicated strategic planning.

Over the years, Taiwan has developed a very strong private-sector industrial base, particularly in commercial manufacturing. Regarding domestic production of defence equipment, organisations are directly overseen by the Ministries of National Defence and Economic Affairs. The defence industry depends on government funding and policy demands they follow the government's guidelines for developing and conducting defence trade. The ROC's development of its defence industry is concentrated in three organisations: the NCSIST, the Combined Service Forces of the Ministry of National Defence (CSF) and the state-run Aerospace Industrial Development Corporation (AIDC). In addition, academic institutions and public enterprises, most notably the China Shipbuilding Corporation, all play a significant role in the production of defence equipment.

Taiwan has adopted an industrial development process for building defence industries that is quite similar to those adopted in developing countries. In general, the pattern of industrial development in many developing countries follows four incremental steps:¹⁴

- (a) Initial importation of arms from foreign suppliers;
- (b) Gradual creation of maintenance and overhaul capabilities and related facilities, including the manufacture of spare parts, made possible by the provision of equipment, data, training and supervision from foreign sources;
- (c) Eventual assembly and production of major weapons under license, to include

¹² 'Report by President Nixon to the Congress: US Foreign Policy for the 1970s: A New Strategy for Peace', *Office of Historian, US Department of State, Washington*, 18 February 1970, <https://history.state.gov/historicaldocuments/frus1969-76v01/d60>.

¹³ Industrial College of the Armed Forces, *National Security Seminar: Background Readings*, (Industrial College of the Armed Forces, 1973), p. 95.

¹⁴ Nolan, J. E., *Military Industry in Taiwan and South Korea*, (Palgrave Macmillan, 1986), p. 45.

varying levels of technical participation by the host country;

(d) Indigenous design, development and production of systems.

Study of the histories of several established organisations reveals that the development of defence industries in Taiwan follows these steps exactly. The fact that in 1960s, national economic development was also catching up in terms of technology made the production of advanced military equipment possible later. During the 1960s and 1970s, although the ROC went through the painful experience of diplomatic setbacks and military threat from the PRC, its economy made a surprising recovery. The Ministry of National Defence (MND) made it very clear that the defence industry was closely interrelated with the technological level of national industry. In order to raise the standard of domestic industrial technology, thereby leading to a self-reliant defence industrial system, the MND has long been 'making good use of the national defence industrial development fund for assisting those public and private enterprises to cultivate qualified technical personnel and purchase facilities; bringing in more advanced science and technology; and developing more sophisticated production, so as to meet the demands of national defence and to strike the roots of defence industry into civilian society'.¹⁵ Therefore, during that time, together with the National Science Council, the Ministry of Education and the Ministry of Economic Affairs, the MND established new mechanisms to strengthen cooperation between academic and industrial sectors, and issued the 'Defence Science and Technology Development Plan'. More importantly, based on national transformation of economic development, the MND then made efforts to guide public and private enterprises, including small- and medium-sized enterprises (SMNs), to enhance their capabilities for weaponry and armament production. It was the beginning of civil-military cooperation for the development of the indigenous defence industry.

For decades, Taiwan has learned the hard way to develop its indigenous defence industry under politically difficult circumstances in the international community. With foreign assistance it has successfully managed to develop its own fighter aircraft, missile systems, surface ships, radars, rocket artillery, armoured vehicles and assault rifles. Now, it has even expanded to the development of indigenous submarines. Taiwan has developed an advanced economy with the capability to manufacture cutting-edge information technology. In 2018, Taiwan's indigenous defence industry grossed over \$2.3 billion US dollars in revenue, amounting to about 23 percent of its annual defence budget.¹⁶ Although the revenue was mainly shared among three major government-affiliated organisations/companies – the National Chung-Shan Institute of Science and Technology, the Aerospace Industrial Development Corporation and the China Shipbuilding Corporation – SMEs are well connected to these major players and are able to both profit and contribute.

The Leading Role of the National Chung-Shan Institute of Science and Technology (NCSIST)

In light of the international political downturn, the government in Taipei quickly moved to establish an indigenous defence industry. All political setbacks have facilitated Taipei's determination to push the progress of building an indigenous defence industry. The emergence of the NCSIST reflected the strategic vision of the ROC's decision-makers during that time. The NCSIST's early work included various missile and radar systems, as

¹⁵ Ministry of National Defense, ROC.

¹⁶ An, D., Schrader, M., and Collins-Chase, N., 'Taiwan's Indigenous Defense Industry: Centralized Control of Abundant Suppliers', *Global Taiwan Institute*, May 2018, <http://globaltaiwan.org/wp-content/uploads/2018/05/GTI-TW-Indig-Defense-Occasional-Report-May-2018-final.pdf>.

well as systems integration for ROC military aircraft and ships. The NCSIST was also, and remains, active in military construction. After the United States shifted diplomatic recognition from the ROC to the PRC, the NCSIST became even more important as Taiwanese authorities felt they could no longer view the United States as a reliable and exclusive defence partner and supporter. Establishing the ability to design and manufacture weapons systems became even more significant to the ROC authorities. To this day, the NCSIST continues to lead the development of indigenous defence industry in Taiwan.

The Hsiung-Feng (HF) anti-ship missile, inspired by the Gabriel missile (Israel), is an emblematic product of the NCSIST. In late 1960s, the PRC not only bought anti-ship missiles from the Soviet Union, but also began its own anti-ship missile development project. In order to fight against the PRC, the NCSIST began the HF program in the 1970s, but development did not progress smoothly during the early stages. It was not until 1983 that the first generation of HF missiles were successfully developed and deployed in the warships of the ROC navy. The HF program is still progressing and developing the next generation of anti-ship missiles with increased speed and operational range.

The NCSIST started the Tien-Kung (TK) anti-tactical ballistic missile system in the late 1970s based on its previous experience with propulsion systems from pioneer projects. In 1984, the first model of the TK missile, propelled by a solid rocket engine, was successfully developed. A compatible phased-array radar system was designed at the same time for better guidance and control. The TK series is still the main air defence missile deployed in Taiwan to date.

The NCSIST developed several famous global weapons systems for the self-defence of the ROC from 1969 to the 1980s; however, the government of the ROC has not been satisfied to rest on its laurels. The two missiles systems have been continually modified and upgraded with the latest technologies, while another project for developing an indigenous defence fighter aircraft was initiated in the early 1980s. This project was dominated by the government-funded Aerospace Industrial Development Corporation (AIDC) and the NCSIST and included the development of the four necessary components of a fighter aircraft: the airframe, propulsion system, avionics system and weapons system. In 1989, the first Taiwanese-developed indigenous defence fighter aircraft made its first successful flight test. Later, this fighter was named AIDC F-CK-1 Ching-Kuo to memorialize the former president of Taiwan, Chiang Ching-Kuo. During the 1990s, more than 130 of these fighters were manufactured and most of them are still in service today. The weapons system employed on AIDC F-CK-1 Ching-Kuo is the Tien-Chien (TC) air-to-air missile, which was developed at the same time as the AIDC F-CK-1 Ching-Kuo. These short-range infrared-guided missiles provide all-aspect engagement capabilities and vigorously strengthen the air defence of the island.

In addition to missile systems, fighter aircraft and radar, the NCSIST is also involved in the development of simulators, digital warriors for cyber space, satellite communication devices, specific materials and other items and continues to introduce the latest military technologies into existing products. Although the progress of self-defence capability development in Taiwan has slowed since 2000, president Tsai, who won the election in 2016, has encouraged the further development of self-defence, and her government has invested considerable funds and effort into next generation weapon systems.

The NCSIST jointly conducts independent research and development of weapon systems with the Aero Industry Development Centre, which is now under NCSIST supervision; some manufacturing units of the Combined Services Force; academic institutions; and

public and civilian industries. To date, a significant number of weapons systems and credible technologies have been domestically designed, tested and produced on a mass scale by the NCSIST.¹⁷

The Combined Service Forces (CSF), Ministry of National Defence

The Combined Service Forces (CSF) serves as the logistical command responsible for the production of ordinance, military maps and communications equipment for Taiwan's armed forces. The CSF also provides support and services commonly utilized by all armed forces services, such as finance, surveying, engineering, rear echelon administration and armament appraisal and testing. As part of the defence industry developed within the defence establishment, the CSF's main responsibility has been to produce weapons and equipment for troops. By manufacturing weapon systems, the CSF takes on the responsibility of maintaining high capability rates for weapons at all times and enhancing combat capability.

Over the years, the CSF and the NCSIST have jointly developed the following weapons:¹⁸

1. Tanks and Armoured Vehicles: The CM family of armoured personnel carriers has been developed and will continue to be mass-produced. Research and development of communication command vehicles, artillery observation vehicles and ambulances are on in progress.
2. Artillery: XT86A1 howitzers, RT-2000 MLRS (multiple launch rocket system), M32K1 tank guns and 20mm T82F cannons have been developed and test-fired. Some of them are in the process of production.
3. Small Arms: 66mm T-85 launchers and 40mm T-85 howitzer launchers have been developed and test-fired. They are scheduled to be produced.
4. Other Weapons: TC-85 20mm high-explosive ammunition, XTS-85 reflective sights, night vision monitoring systems and soft bullet-proof vests have been developed and are in the process of production.

Since its establishment in 1946 in Nanjing, China, the CSF's organisation went through several restructuring processes. After the Nationalist Government came to Taiwan and ordered it to be restored in 1950, it then became responsible for the production of military arms and equipment and provided joint back-up and general support for military services. It has constantly enhanced its production skills and quality and improved military arms. In joint logistics back-up, it has closely coordinated effective supply, repair and maintenance and. In March 2002, the CSF was officially renamed as the 'Combined Logistics Command of the Ministry of National Defence' (CLC). In December 2012, under a new wave of defence organisation reform during President Ma Ying-jeou's era, the CLC was dismissed again and merged into the Taiwanese Army Logistics Command. Although the CSF is legally no longer existent, its function of arms and equipment production remains intact in the new organization.

Catching up with Military Technology: The Aerospace Industrial Development Corporation (AIDC)

The Aerospace Industrial Development Corporation, previously known as the Aero Industry Development Centre, was founded in 1969 under the authority of the Republic of China Air Force and was later transferred to the Chung-Shan Institute of Science and Technology

¹⁷ Ibid.

¹⁸ Yen, P., 'Taiwan: Diversification and Defense Trade Opps', *U.S. & Foreign Commercial Service and US Department of State*, 1999, <https://fas.org/irp/world/taiwan/isar0020.htm>.

under the management of the Ministry of National Defence in 1983.¹⁹ Since its establishment, the main task of the AIDC has been the research and development of aerospace military technologies. Thus, in cooperation with international defence producers (e.g. Northrop and Lockheed), early production efforts included all kinds of military aircraft: UH-1H helicopters, F5E/5F, T53, trainers and so on. After the United States severed diplomatic relations with the ROC in 1979, the future supply of military equipment for Taiwan's defence was questionable and uncertain. Political barriers would wreck all chances of military procurement for the next generation of advanced fighters, which Taiwan's security is highly dependent on. Through the enactment of the Taiwan Relations Act, the US was obliged to sell arms and military equipment to strengthen Taiwan's defence capabilities; however, this support gradually waned:

Taiwan built nearly 300 Northrop F-5s under license from 1974 to 1986. From the early 1980's, Taiwan expressed an interest in purchasing US fighter aircraft to replace its obsolescent Northrop F-5 and Lockheed F-104 fighters. The United States, which was interested in improving relations with China, denied Taiwan's request to purchase the more capable F-16, and blocked a subsequently proposed \$1 billion sale of 100 F-20 Tigersharks in July 1982. The 1982 decision by the Reagan administration to bar export of new fighters to Taiwan left technical assistance unrestricted. Taiwan decided to go it alone to build the Indigenous Defence Fighter (IDF).²⁰

In 1981, the ROC government ordered the AIDC to develop new fighters for upgrading national defence. The project led to the successful development of the IDF (Indigenous Defensive Fighter or F-CK-1) squadrons. The first squadron joined the ROC Air Force in December 1994.²¹

In 1996, in support of national aerospace development, the AIDC was reformed from a military establishment into a government-owned company under the authority of the Ministry of Economic Affairs. As a market-oriented and successful commercial entity, the AIDC worked towards commercialisation, privatisation and globalisation. According to the new company objectives, 'AIDC's business strategy turned from products and services which were previously solely for military applications into a well-balanced diversified mix of both military and commercial of products and services'.²²

Given the highly competitive and technologically demanding nature of the aerospace industry, the AIDC developed and proposed its privatisation plan to the government in early 2013, and it was approved later the same year. The AIDC successfully consummated its privatisation objectives through a public stock offering and was officially listed on the Taiwan Stock Exchange on August 25th, 2014. In facing up to extreme competition in the global market, the AIDC established an industrial alliance of joint effort with domestic materials suppliers, equipment providers, manufacturers, logistic services and the banking industry, as well as with academia integrating from upstream to downstream resources. The objective of the alliance aims at establishing itself as a global Tier 1 supplier by uplifting group competitiveness and integrating related industries.²³ With the establishment of the

¹⁹ *Aerospace Industrial Development Corporation*, 2019, <https://www.aidc.com.tw/en/>.

²⁰ 'Ching-kuo Indigenous Defense Fighter', *Military Analysis Network*, 4 April 2000, <https://fas.org/man/dod-101/sys/ac/row/idf.htm>.

²¹ *Ibid.*

²² *Aerospace Industrial Development Corporation*.

²³ *Ibid.*

NCSIST and the AIDC, the related aerospace industry supply chain was built and continues to grow annually. The potential of the aerospace industry cannot be neglected over the coming decades. Each year since 2016, more than US \$1.5 billion in funds from the Taiwanese government has been invested into domestic industries. Alongside strong government funding, Taiwan's international partners include Boeing, General Electric, Pratt and Whitney, Airbus, Bombardier and so on. The number of international cooperative projects continues to grow. The strengths of Taiwan's aerospace industry supply chain include design and production, systems integration, aircraft assembly and aviation technological maintenance.

An important part of the AIDC's success is its ability to match the right strategy to optimal human resources. Constant support from the government over the past decades has enabled the AIDC to acquire and maintain a talented human resource base dedicated to the aviation industry, and this has equipped the AIDC with expertise and capabilities in aircraft systems integration, aircraft development, parts manufacturing, aircraft assembly, testing and verification. As a result, the AIDC continues its excellent record of achievement and has outperformed its competitors in the Asia-Pacific region. In doing so it has earned itself well deserved recognition and acceptance from the global aerospace community as a valuable supplier.

To ensure the AIDC's technological advance and to satisfy Taiwan's self-reliant defence needs, the AIDC is actively pursuing development and expansion of local industry capability and capacity. In compliance with the government's policy of 'domestic production of jet trainers', the NCSIST signed a commission agreement with the AIDC on April 25, 2017, for the production of 66 advanced jet trainers, with which a domestic outsourcing and industry assistance program was launched. Taiwan's first prototype of an indigenous advanced jet trainer made its public debut on September 23, 2019, following the current President Tsai Ing-wen's 'design and build at home' policy for military equipment.²⁴ The development of the AIDC, therefore, provides a clear snapshot of Taiwan's efforts to drive the indigenous defence industry from low technological equipment to high technological weapons systems.

Toward a Leading Technology Provider: China (Taiwan) Shipbuilding Corporation

Taiwanese shipbuilding began in 1937 during the Japanese colonial period, when the Mitsubishi Heavy Industries Corporation founded the Taiwan Dockyard Corporation. After World War II, the ROC authorities established the Taiwan Machinery and Shipbuilding Company by merging the existing Taiwan Dockyard Corporation with Taiwan Steel Works and the Toko Kogyo Corporation. In 1948, the company split into two state-owned companies, called the Taiwan Machinery Corporation and the Taiwan Shipbuilding Corporation (TSBC). In the government's 'Ten Major Construction Projects' announcement delivered by Premier Chiang Ching-Kuo in November 1973, the China Shipbuilding Corporation (CSBC) was listed as one of the national projects.²⁵ It was then founded in 1973 and reverted to being a government-owned corporation in 1977. The CSBC and the TSBC merged in 1978 and became known as the China Shipbuilding Corporation until 2007. The CSBC was renamed by President Chen Shui-Bian as the Taiwan Shipbuilding Corporation in Chinese, but the English name remains unchanged.

²⁴ 'Taiwan Unveils Prototype of Indigenous Advanced Jet Trainer', *Focus Taiwan*, 24 September, 2019, <http://focustaiwan.tw/news/aipl/201909240008.aspx>.

²⁵ 'Ten Major Construction Projects', *National Archives Administration*, 2012, https://atc.archives.gov.tw/csbc/en_boatsd1.aspx.

The CSBC has built container ships, one-of-a-kind commercial ships and semi-submersible heavy-lift transport ships. Furthermore, it has built ships, submarines and advanced naval weapons for the ROC Navy, patrol vessels for the ROC Coast Guard Administration and research vessels for the Taiwan Ocean Research Institute. Most recently, the CSBC is participating in the development of the first domestic Taiwanese Autonomous Underwater Vehicle (AUV).

In 2018, the CSBC entered into an alliance with the Yang Ming Marine Transport Corporation, Taiwan Navigation Co Ltd and the Taiwan International Ports Corporation, to provide marine services to Taiwan's burgeoning offshore wind power sector. The CSBC has a joint venture with DEME Wind Engineering to offer wind-farm construction in East Asia. In 2019, they were hired by Copenhagen Infrastructure Partners to transport and install wind turbines at two new wind farms off the Taiwanese coast. In July 2019, the CSBC launched the CSBC No. 15, a barge designed to support the CSBC's offshore wind-power business. The barge has a loading capacity of 23,000 metric tons and a loading deck bearing strength of 20 metric tons per square meter. Since 2016, the CSBC has been contracted to build eight conventional attack submarines for the ROC Navy. The initial project contract is for US \$3.3 billion with projected procurement costs of US \$15.9 billion estimated for a fleet of eight submarines.²⁶

After all updated developments, the CSBC has expanded its business beyond simple construction of ships into related service sectors to provide strong support for the development of commercial vessel construction and repair capabilities, special vessel and military vessel construction and repair capabilities, offshore industry, and land-based machinery. The CSBC can now offer varieties of products and services, 'such as the constructions of merchant ships, naval vessels, official ships, and commercial services, large steel structures, machinery manufacturing, offshore engineering manufacturing, assembly, transportation, hoisting, commercial, and other core business projects'.²⁷ Its operating status today focuses on three main categories: the technology of merchant shipbuilding and maintenance, the manufacturing and maintenance of naval and official ships and the offshore wind power business. It is itself a successful example of an indigenous defence industry.

VII Taiwan's Successful Economic Development for Indigenous Defence Industry

Through the development of three major indigenous defence institutions/companies established by the government, Taiwan has gradually built a thriving indigenous defence industry based on its successful economic strategies over the last seven decades. Only if economic development was successful could technological development be advanced. The economic process is therefore what the indigenous defence industry relied upon. After relocating to Taiwan, the ROC government gradually managed to stabilise the domestic political and social situation. It was all the more important for the government to adopt an outward-looking development strategy, which encouraged fledgling domestic industries to connect with the dynamism of international markets. Over the last seven decades, the successful experience of economic development in Taiwan can be categorised into six

²⁶ 'Taiwan begins work on 1st indigenous submarine facility'.

²⁷ 'About CSBC', *Taiwan Shipbuilding Corporation*, 2016, <http://www.csbcnet.com.tw/English/About/About/About.htm>.

stages: 1950s – import substitution, 1960s – export-orientation, 1970s – export expansion, 1980s – technology-intensive economy, 1990s – high technology, 2000s – knowledge-based economy.

During the 1950s, the ROC's main economic policy was to pursue stability and self-sufficiency. Top priority was then given to economic stabilisation and sufficient food production: '[t]he major tasks were to effectively utilise US economic aid for development, and to make use of tariffs and import controls in fostering the development of domestic industry'.²⁸ The government focused on the development of labour-intensive imports, substituting industries in order to ease dependence on imports and the demand for foreign exchange. Accompanied by an import substitution policy, a land reform program was introduced to promote social stability and shift the focus of large landowners to developing private sector agricultural products.

In the 1960s, when Taiwan had managed to gradually accumulate a certain level of industrial base, the government began to encourage light industries to expand their export scale beyond Taiwan. The government's economic strategy emphasised encouraging labour-intensive and export-oriented industries to target potential international markets. To take greater advantage of global economic development and opportunities, the government then introduced reforms in foreign exchange and taxation, increasing incentives for investors. At the same time, Taiwan's first export processing zone was established in Kaohsiung. Such policy flexibility made it into the international markets well. It resulted in the rapid increase in Taiwan's exports and the subsequent successful record of strong economic growth.

The era of rapid export expansion stimulated stronger domestic demands for machinery, equipment and intermediate materials. Taiwan's economic development and advancing technology facilitated the economy to a higher level of basic and heavy industry development, which in turn became the focus of economic strategy. It was around the 1960s to 1970s, when the economy began taking-off, that the NCSIST, the AIDC and the CSBC were established to combat the bleak international environment and national security challenges for the ROC. As a response to the changing international economic environment, the government decided to carry out the 'Ten Major Development Projects' to augment railway, airport, port, electricity and other basic infrastructure, and vigorously promoted the development of the petrochemical, steel and other capital-intensive import-substitution intermediate industries. The main rationale was that the Major Development Projects 'enabled Taiwan to effectively reduce its reliance on the foreign supply of intermediate products and to speedily upgrade its industrial structure'.²⁹

In the 1980s, Taiwan's economy entered into the stage of economic liberalisation and technology-intensive development. In spite of diplomatic difficulty in the international community, Taiwan's economy accumulated sufficient benefits in trade-promotion policies and an increasing surplus in foreign trade. To cope with growing imbalances in the economy, the government introduced two guiding principles for further economic development: economic liberalisation and internationalisation. Trying to utilise ample capital resources, the government decided on the blunt approach of leaping to the development of capital- and technology-intensive industries, such as electronics,

²⁸ 'Economic Development ROC (Taiwan)', *Council for Economic Planned and Development, Executive Yuan, ROC*, 2012, <https://ws.ndc.gov.tw/Download.ashx?u=LzAwMS9hZG1pbmlzdHJhdG9yLzEwL3JlbGZpbGUvNTYwNy83MzIvMDAxNzUwOV8xLnBkZg%3D%3D&n=MjAxMl%2FntpPlu7rnnINf6le654Gj55m85bGV6Iux5paH55Wr5YaKX%2BeAj%2BimvS5wZGY%3D&icon=.pdf>.

²⁹ *Ibid.*

information and machinery, as part of the economic strategy of the 1980s. It has been proven that this successful strategy has brought about not just economic achievement and wealth, but also advanced technology.

With the successful development of capital- and technology-intensive industries in the 1980s, Taiwan was ready to move on to the next stage of high technology. As the economy developed, rising wages forced labour-intensive industries to move out of Taiwan, relocating to mainland China and elsewhere. Boosted by high-quality human resources and comprehensive industrial clusters, the structure of the economy underwent a new wave of readjustment focusing on the information technology industry. In 1993, it became the world's top producer of many IT products, supplying more than half of the global market for monitors, motherboards and image scanners. In 1995, Taiwan's IT industry became the world's third-biggest producer of IT hardware and played an indispensable role in the global high-tech industry division of labour.

From 2000 onwards, Taiwan has made industrial remodeling and global linkage top priorities in its economic strategy. The government unveiled 'a new vision for pursuing knowledge-based, sustainable and just economic development, involving all-out investment in human resources, R&D innovation, logistics channels and the living environment, and a focus on developing the semiconductor, image display, biotechnology and digital content industries, with a view to raising the innovative capabilities of domestic industry and enhancing the people's quality of life'.³⁰ To overcome the impacts of the 2008 global financial crisis, Taiwan's economic strategy focused on infrastructure building, industrial remodeling, inward investment and global linkage.

Taiwan's experience of economic development over the last seven decades went from strengthening primary industry in agricultural sectors, labour-intensive industries and export-oriented industries, to capital-intensive industries and technology-intensive industries. Since 2000, it has taken the lead in the high technology sector. The entire historical context of Taiwan's economic development clearly indicates that the political and economic background supported the emergence of an indigenous defence industry. Taiwan's economic development and indigenous defence industry indicate three important trends. Firstly, only strong economic development can economically and technologically buttress the defence industry at home. Taiwan's advantageous economic development provided sufficient resources to develop an indigenous defence industry.

Secondly, through the process of developing the indigenous defence industry, the government has developed a very complicated civil-military industrial network at home and abroad. Due to diplomatic difficulties in the international community, it has been much harder for Taiwan to procure any advanced weapons and conduct any transfer of high technology. Likewise, Taiwan's emerging indigenous defence industry will not be able to enter into the global arms market. As the scale of defence production is limited to the home market, defence production is relatively costly. Investment in the defence industry would generate new jobs and stimulate economic growth. Because the ROC now faces a comprehensive security threat from China, the aging population, stagnant wages and 'brain drain', pushing for development of a highly capable indigenous defence industry is regarded overall as a good way of mitigating these challenges.³¹

Thirdly, it is always critical that high technology and industrial capacity developed by an indigenous defence industry or transferred from international partners be shared with

³⁰ Ibid.

³¹ Ferry, T., 'Growing Pains in Taiwan's Defense Sector', *Taiwan Business Topics*, 14 September 2019, <https://topics.amcham.com.tw/2019/11/taiwan-defense-sector/>.

civilian sectors. Indigenous military programs do not only help transfer critical state-of-the-art technology to civilian uses, but also stimulate the emergence of new industries and new applications, including applications in aerospace, electronics, information technology and even artificial intelligence.

VIII Concluding Remarks

The ROC has experienced significant social and political challenges. Despite this, it continues to grow and transform regardless of the serious security threat from the PRC. Its security policy has always focused on the threat from the Chinese communist regime. It went from a 'recover the mainland' strategy in the 1950s, to an 'offensive and defensive' strategy in the 1960s, a 'defensive defence' strategy in the 1970s and finally to an 'effective deterrence, resolute defence' strategy in 1980s and after. To survive defeat and disorder, the ROC government managed to link itself closely to the US. When the US national interest was favourable to Taiwan, US-Taiwan defence cooperation moved forward together. At other times, the US would shift to a different focus according to its national interest and decline to help defend Taiwan. After World War II, the development of the ROC was closely aligned to the US national interest. Taiwan's policy options limited were mostly in accordance with US national interest, especially when it came to mainland China policy; the US manages from behind the scenes and tries to make sure Taipei would not unilaterally change the status quo in the Taiwan Strait in accordance with US interests. At the same time, it remained unclear and uncertain what would happen if a conflict of national interest with the US arose.

Throughout the Cold War era, the ROC's national security was completely overshadowed by the enmity of the PRC. Even today, the ROC's national security strategy overwhelmingly addresses military threats from the People's Liberation Army. Although the US had over the years granted hardware and software to Taiwan to strengthen its defence capabilities, Taiwan remained far from independent in defence modernisation and national security. For Taiwan, a hard lesson learned from the changes in US policy in Asia and other bilateral relations was that the US will only invest in countries it deems strategically useful. As always, to receive military assistance from the US is to learn that military assistance comes with a political reckoning. The US uses the promise of military assistance to leverage strategic development of allied countries.

The post-World War II economic development in Taiwan closely aligns with the political attempt to develop a strong indigenous defence industry, so that Taiwan might avoid potential risk from changes in US policy. The challenging path Taiwan has followed in developing its indigenous defence industry demonstrates that there are three different ways the US has administered military assistance to Taiwan. Firstly, the US offered military assistance and arms sales to Taiwan. Secondly, the US was reluctant to sell advanced weapons, but would help transfer critical technology and build advanced weapons in Taiwan. Thirdly and finally, the US denied arms sales to Taiwan on political grounds. Extreme uncertainty about national security has always been a big challenge for Taiwan. The development of an indigenous defence industry has become critical and has gained prevailing support in domestic politics. Taiwan's development of the indigenous defence industry began with three public institutions/organisations and has gradually connected more than 200 SMEs at home. Over the past few decades, it has been built into a very useful and promising defence industrial chain, which generally reflects what Taiwan's

economic development offers.

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Appendix

Table 1. NCSIST Development of Weapons Systems³²

Name of the systems	Development date	Notes of development
Aircraft		
AIDC F-CK Indigenous Defence Fighter	Introduction in January 1994 Production 1990–2000 (A/B models)	Under the practice of US technology transfer and assistance to Taiwan’s defense industry
AIDC AT-3 Tz-chiang Advanced Trainer	Produced 1984-1989	A total of 62 aircraft were manufactured by the AIDC in collaboration with American aircraft manufacturer Northrop
AIDC T-5 Brave Eagle	The project was announced to begin in 2017. The development and production is to be undertaken by a partnership of AIDC and the NCSIST with delivery scheduled to begin in 2026.	Jet trainer/lead-in trainer developed in partnership with AIDC and the ROC Air Force. Based on the F-CK-1 B/D.
NCSIST Albatross Tactical Unmanned Aircraft System		The Albatross Tactical UAS were designed in composite material structures and modular system.
CSIST Chung Shyang II Unmanned Aircraft System		
NCSIST Tengyun (Teng Yun or Cloud Rider) Unmanned Aircraft System	Unveiled in 2015	
Cardinal Mini Unmanned Aircraft System		
NCSIST Chien Hsiang	2019-2024	In 2019, the Taiwan Air Force’s Air Defense and Missile Command announced a five year, NT\$80b (US\$2.54b) project to build up a full force of anti-radiation UAVs

³² The main development of indigenous defence industry can be quoted on historical development of the NCSIST. From low level of technological weapons to advanced weapons, the table reflects the progress of the ROC independent defence industry. “Defence system,” http://www.ncsist.org.tw/eng/csistdup/products/catelogs_Middle.aspx?catelog_Id=8; “Aviation systems,” http://www.ncsist.org.tw/eng/csistdup/products/products.aspx?catelog_Id=9; “electronic systems,” http://www.ncsist.org.tw/eng/csistdup/products/catelogs_Middle.aspx?catelog_Id=10

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Missile Systems		
Hsiung Feng I (HF-1)		Surface-launched subsonic anti-ship missile
Hsiung Feng II (HF-2) ³³	Started the development in 1983 and deployed to R.O.C NAVY in 1990. In 2007 the improved version of HF II BLOCK II deployed to Kwang Hua 6 FAC (Fast Attack Craft).	Surface-launched subsonic anti-ship missile with limited air-to-ground missile capabilities
Hsiung Feng IIE (HF-2E)		Surface-launched long-range cruise missile system.
Hsiung Feng III (HF-3) ³⁴	Started the critical technology research in 1994 and proceeded the first flight test in 1997. In 2004, NCSIST finished the development test and evaluation of HF III missile and then the R.O.C Navy finished the initial operational test and evaluation in 2005.	Surface-launched supersonic anti-ship missile.
Sky Bow (TK)		Air defence weapon system, consisting of TK-1, TK-2 and TK-3 systems
Sky Sword I (TC-1)		Radar-guided medium-range air-to-air missile
Road mobile SHORAD system		Radar-guided medium-range air-to-air missile.
Sea Oryx: Sea-based point defence system		Sea-based point defence system built around the TC-1.
Sky Sword II (TC-2)		Radar-guided medium-range air-to-air missile.
Sky Horse	developed in the 1970's	Short-range ballistic missile system
Sky Spear		Short-range ballistic missile system derived from the TK-2.
Yun Feng		supersonic surface-to-surface cruise missile.

³³ "Hsiung Feng II," http://www.ncsist.org.tw/eng/csistdup/products/product.aspx?product_Id=238&catalog=30

³⁴ "Hsiung Feng III," http://www.ncsist.org.tw/eng/csistdup/products/product.aspx?product_Id=10&catalog=30

FU-KUO LIU

Wan Chien		Air-ground cruise missile
Other Weapons Systems		
Coastal Defence Rocket Launcher.		
Thunderbolt-2000 (LT-2000)		Locally-developed MLRS
Kung Feng 6 (KF 6)		Locally-developed MLRS.
Kestrel (Rocket Launcher)	Development began in 2008. The Kestrel entered service with the ROCMC in 2015.	Disposable rocket launcher firing HEAT and HESH projectiles. Development began in 2008. The Kestrel entered service with the ROCMC in 2015. The Kestrel platform is being used as a starting point for the development of an anti-tank guided missile system.
XTR-101/102	Exhibited for the first time in 2015.	Automatic close-defence with 20mm weapon mounts. Prototypes were demonstrated in September 2013.
CS/MPQ-90 Bee Eye		Short- to medium-range multifunction AESA radar to support SHORAD batteries. Intended to have a naval role as well.
Bistatic Radar System	Two systems entered service in 2018 with mass production to begin in 2020.	Bistatic radar system. Two systems entered service in 2018 with mass production to begin in 2020 if they behave favourably in the field.
AV2 Long-Range Chaff Rocket		Long-Range Chaff Rocket: Chaff (countermeasure) rocket for ship self-defence.
CS/MPQ-90 Bee Eye		Short- to medium-range multifunction AESA radar to support SHORAD batteries. Intended to have a naval role as well.

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2.75in Rocket		2.75 inch aerial rocket for use aboard AH-64, OH-58D, F-5E/F, F-16, P-3 Orion and so on. There are two variants currently available: Mk4 and Mk66.
CAPTOR Mine		Designated No. 1 Wan Xiang CAPTOR Mine. CAPTOR mines contain a torpedo and a targeting system.
Bottom Mine		Designated No. 2 Wan Xiang Bottom Mine. A remote-controlled or passive mine designed to sit on the bottom of the sea.
Moored Mine		A remote or automatic mine designed to be moored to the bottom of the sea and float in the current.
Civilian Systems		
Sensor System for the Resource Prospector Lunar Rover Mission.		
SG100 Cloud Computer for the International Space Station	It was launched to the space station in 2017.	Designed and manufactured in collaboration with Academia Sinica and National Central University under contract for NASA.
High Speed Rail Simulator		Developed with Taiwan High Speed Rail. Based on aircraft simulator technology, the system can simulate natural disasters such as typhoons and earthquakes.
Civilian Air Traffic Control Radar		NCSIST has partnered with the British firm Easat Radar Systems to pursue dual use projects using NCSIST's proprietary radar technology.