

The Eclipse of Taiwan's Defense Industry and Growing Dependencies on the United States for Advanced Armaments: Implications for U.S.-Taiwan-Chinese Relations*

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Taiwan has long stressed the concept of self-sufficiency in arms production and procurement, and in this respect has made considerable progress in expanding military research and development (R&D) efforts and in building up a local defense industry. At the same time, as the demands of high-tech warfare have escalated, the gaps and deficiencies in the island's homegrown defense industry have also increased and become more conspicuous. Consequently, over the past decade Taiwan has increasingly

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*The analysis and arguments expressed in this paper are strictly the author's and should not be construed as representing those of the U.S. government or of any U.S. governmental organization, institution, or agency.

preferred foreign—particularly U.S.—weapons systems in order to meet the island's critical self-defense requirements. There are obvious risks to Taipei becoming too reliant on foreign arms suppliers, particularly in terms of guaranteeing security of supply (ironically, the very insecurities that drove Taiwan to enter into arms manufacturing in the first place). The island, however, appears to have few viable alternatives, particularly in the face of a manifest Chinese military threat.

At issue is whether Taiwan's increased dependencies on U.S. weapons systems might prompt Beijing to feel so threatened by apparently growing U.S.-Taiwanese military ties that China will be forced to react militarily. This article argues that the current U.S.-Taiwanese arms-transfer relationship is not strong enough to constitute a major challenge to Chinese interests and would not prompt such an extreme reaction. Taiwan's growing dependencies on U.S. weaponry does deal Taipei some interesting cards to play against Washington, however, in particular by strengthening military-political ties between the United States and Taiwan. At the same time, Taipei cannot count on a blank check from the United States in terms of arms sales, nor can the island's defense industry necessarily afford or absorb the weapons systems and military technologies Taipei craves.

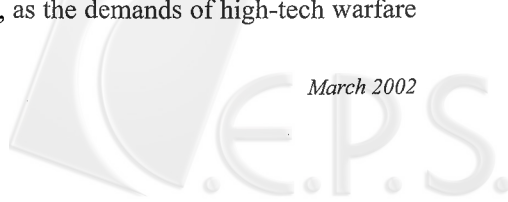
So long as Washington continues to exert reasonable self-restraint in arms and technology transfers to Taiwan, China will likely accept the status quo, despite public and vociferous protestations to the contrary.

KEYWORDS: cross-Strait relations; defense industry; arms transfers; arms production; U.S.-Taiwan-Chinese relations.

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Taiwan faces a dilemma common to many small states—that of defending its territory in a basically anarchic international security system with only limited economic and technological resources at its disposal. Most countries typically prefer a reliable source of armaments, and the most dependable source is generally a domestic one. In this respect, over the past thirty years, Taiwan has made considerable progress in expanding its military research and development (R&D) efforts and in building up a local defense industry, to the point where the island has achieved a remarkably high degree of self-sufficiency in arms procurement.

At the same time, most small countries have generally failed to attain an advanced level of independent military-technological innovation and development. In the case of Taiwan, as the demands of high-tech warfare

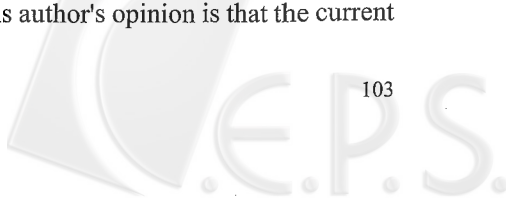


have escalated, the gaps and deficiencies in the island's homegrown defense industry have also increased and become more glaring. For most countries, the solution to this military-industrial dilemma has been to turn to the leading arms-producing states—such as the United States, France, or (during the Cold War) the Soviet Union—for military equipment and critical military technologies. While there is generally a price to be paid in the form of increased foreign dependencies and therefore increased exposure to outside economic and diplomatic pressures, there is often a benefit as well in the form of political-military linkages and even alliances with a great-power protector.

Unfortunately, Taiwan has had a much harder time accruing such benefits. Like most small states, the island has continued to seek foreign military equipment and technologies. From the perspective of the world's main arms-supplying countries, however, selling arms to Taipei carries the risk of angering one of the world's most rapidly-growing powers. For this reason, most potential arms suppliers have been wary of dealing with Taiwan.

This article addresses this peculiar Taiwanese quandary: while the island's defense industry faces many problems which have forced Taipei to look abroad for military support, there are at the same time many serious limitations with such a reliance on foreign military assistance that work to push Taiwan back to the impossible strategy of self-sufficiency. Drawing parallels to other "second-tier" arms producers, the first section discusses the impetus behind Taiwan's drive for self-sufficiency in arms procurement, while the second then documents the rise of the island's domestic arms industry. Section three addresses the enduring deficiencies impeding indigenous arms production that continue to exist despite efforts at reform. The fourth section discusses Taiwan's subsequent growing reliance on foreign—and particularly American—weaponry and highlights the limitation that this "look abroad" approach entails.

The last section is concerned with implications for U.S.-Taiwan-Chinese relations. One oft-heard concern is that Taiwan's increased dependencies on U.S. weapons systems might prompt Beijing to feel so threatened by apparently growing U.S.-Taiwanese military ties that China would be forced to react militarily. This author's opinion is that the current



U.S.-Taiwanese arms-transfer relationship is not strong enough to constitute a major challenge to Chinese interests and would not prompt such an extreme reaction. In particular, Taipei cannot count on the United States to provide whatever arms the island wishes to purchase, nor can Taiwan necessarily afford or absorb the weapons systems and military technologies Taipei craves—hence, constituting one of the continuing dilemmas the island continues to face in shaping a security strategy.

Taiwan's Defense Priorities and the Role of Indigenous Production

Taiwan's national defense priorities are, not surprisingly, oriented primarily toward deterring or guarding against an assault by mainland China, e.g., a naval blockade, an air/missile attack, and/or a limited or full-scale invasion. As a result, Taiwan has over the past decade given increased priority to expanding the size and capabilities of its air and naval forces. Of greatest import is to further the goals of long-range patrolling and screening and defensive operations, e.g., air interdiction, ground- and sea-based anti-air and antimissile defense, antisurface and antisubmarine (ASW) operations, and antilanding operations.¹

Taiwan has detailed a number of specific procurement goals for modernizing its armed forces. These include: (1) a centralized automated command, control, communications, and intelligence (C³I) structure for national air defense, integrating air-, sea-, and land-based early warning, surveillance, and reconnaissance; (2) across-the-board improvements in national air defense capabilities (e.g., fourth-generation combat fighters, beyond-visual-range air-to-air missiles, and advanced surface-to-air missiles—including theater missile defenses); (3) improved three-dimensional ASW capabilities, including maritime patrol aircraft and submarines; (4) next-generation sea- and shore-based antiship defenses; (5) improved tanks

¹1998 *National Defense Report: Republic of China* (Taipei: Ministry of National Defense, 1998), 45-47; David Shambaugh, "Taiwan's Security: Maintaining Deterrence Amid Political Accountability," *The China Quarterly*, no. 148 (December 1996): 1303-17.

and antitank weapons; and (6) advanced electronic and information warfare capabilities.² These goals that Taiwan has laid out for modernizing and enhancing the effectiveness of its armed forces are thus quite ambitious.

At the same time, Taiwan has long stressed the concept of autarky, or self-sufficiency, in arms production and procurement. As with other countries, security of supply has been the primary motive behind Taiwan's establishment of an indigenous arms-producing capability.³ Taipei's growing diplomatic isolation beginning in the early 1970s greatly compounded the island's (often well-founded) fears of being cut off from the island's principal overseas arms suppliers. Note, for example, that the United States not only derecognized Taipei in 1979, but in 1982 also signed a Joint Communiqué with China committing Washington to limit future arms sales to Taiwan.

Such restrictions and cancellations, in turn, prompted Taipei to place more stress on developing a "self-defense capability without relying on outside assistance," and, accordingly, to significantly expand its military-industrial complex.⁴ As Taiwan's 1993-94 defense white paper asserted, "Research and development of national defense technology has become an important matter in military buildup. It is particularly important for those nations that want to achieve an independent national defense policy."⁵

Taiwan, as in the case of other second-tier arms-producing states, has viewed domestic arms production as providing additional *economic* benefits as well. First, defense industrialization can function as an import-

²1998 *National Defense Report: Republic of China*, 55-72; Sung Wen, "Towards a Modernized National Defense," in *Quiet Revolutions on Taiwan, Republic of China*, ed. Jason C. Hu (Taipei: Kwang Hwa Publishing, 1994), 428-30; Barbara Opall-Rome, "Taiwan Trims Arms Buys; Seeks FMS Payment Relief," *Defense News*, November 30, 1998, 1, 36.

³Janne E. Nolan, *Military Industry in Taiwan and South Korea* (New York: St. Martin's Press, 1986), 47-62; A. James Gregor, Robert E. Harkavy, and Stephanie G. Neuman, "Taiwan: Dependent 'Self Reliance'," in *Arms Production in the Third World 1971-1985*, ed. Michael Brzoska and Thomas Ohlson (Oxford: Oxford University Press, 1987), 233-49; Dean Cheng and Michael W. Chinworth, "The Teeth of the Little Tigers: Offsets, Defense Production and Economic Development in South Korea and Taiwan," in *The Economics of Offsets: Defense Procurement and Countertrade*, ed. Stephen Martin (London: Harwood, 1996), 261.

⁴Sun, "Towards a Modernized National Defense," 428.

⁵1993-94 *National Defense Report: Republic of China* (Taipei: Ministry of National Defense, 1994), 149.

substitution strategy, and instead of sending capital (especially government monies) out of the country via arms imports, countries can use indigenous arms production to create jobs, ameliorate trade imbalances, and protect foreign currency reserves. Furthermore, by *exporting* arms, defense firms can constitute an important source of foreign currency earnings. Note that Brazil in particular pursued an aggressive export-led defense industrialization strategy, and by the late 1980s had emerged as the world's largest exporter of wheeled armored vehicles, as well as being a major supplier of lightweight trainer planes and multiple rocket launchers to a number of armed forces in Latin America, Africa, the Middle East, and even Western Europe.⁶ During the mid-1980s, Brazil was the sixth largest arms exporter in the world.⁷ The Swedish, Israeli, South African, and to a lesser extent Singaporean arms industries have also relied on overseas arms sales for a sizable portion of their revenues. In the cases of South Africa and Israel, moreover, the local defense industry has been among the largest exporters of manufactured goods overall.⁸ Although economic benefits have been largely secondary to the goal of safeguarding security of supply, Taiwan's defense firms have also sought, particularly over the past decade, to increase overseas sales as a means of expanding their revenue base.

Finally, one cannot discount the effects of nationalism, status, and prestige on defense industrialization.⁹ Possessing an independent defense industrial capability feeds directly into a country's concept of national power—not only by creating military power but also by demonstrating the country's industrial and technological prowess, and thereby confirming its status as an important power in the broadest sense. Note, moreover, that

⁶"Third World Arms Industries: Swords Not Ploughshares," *The Economist*, March 23, 1991.

⁷U.S. Congress, Office of Technology Assessment (OTA), *Global Arms Trade: Commerce in Advanced Military Technology and Weapons* (Washington, D.C.: Government Printing Office, 1991), 143.

⁸Ronnie Kasrils, "The Future of South Africa's Defense Industry: The Government's Perspective," in *South Africa's Defense and Security into the 21st Century*, ed. William Guttridge (Dartmouth: Dartmouth Press, 1996), 121; G.M. Steinberg, "Israel: High-Technology Roulette," in Brzoska and Ohlson, *Arms Production in the Third World*, 181-88.

⁹Michael J. Green, *Arming Japan: Defense Production, Alliance Politics, and the Postwar Search for Security* (New York: Columbia University Press, 1995), 11-13.



this "rich nation/strong army" complex is not confined to aspiring great powers—such technonationalism can be detected in the cases of several smaller second-tier arms-producers, such as Argentina, Brazil, Indonesia, Israel, and South Korea. Indonesia, for instance, established an aviation industry as an indicator of its intentions to become a modern industrialized nation and a power to be reckoned with in Southeast Asia. For its part, South Korea pursued an advanced arms-production capability not only for reasons of repelling an attack from North Korea but also to positioning itself to be a "full-fledged player upon the regional stage," particularly after reunification.¹⁰

Official statements have therefore stressed that Taiwan's priority is on indigenous production. In 1996, Taiwan's then-Defense Minister Chiang Chung-ling (蔣仲苓) asserted that self-sufficiency was still Taipei's "ultimate goal" in developing an indigenous arms industry, adding that Taiwan would never import weaponry that could be developed or manufactured domestically.¹¹ In 1999, President Lee Teng-hui (李登輝) asserted that "only by enhancing self-development capability can national security be ensured."¹² In 2000, moreover, the former head of Taiwan's leading defense R&D institute, Shen Fang-cheng (沈方秤), argued that "what mainland China really cares [about] is which new weapons and new defense technology [Taiwan] can develop."¹³

The Rise of Taiwan's Arms Industry

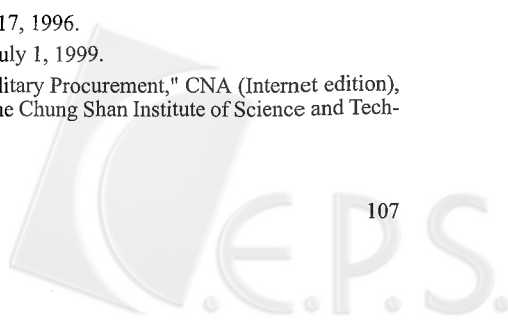
When countries—and especially second-tier arms producers—decide

¹⁰Kongdan Oh, "U.S.-Korea Aerospace Collaboration and the Korean Fighter Project," in *International Military Aerospace Collaboration: Case Studies in Domestic and Intergovernmental Politics*, ed. Pia Christina Wood and David S. Sorenson (Aldershot, England: Ashgate, 1999), 39.

¹¹Central News Agency (CNA) (Taipei), April 17, 1996.

¹²Agence France-Presse (AFP) (Hong Kong), July 1, 1999.

¹³"Former CSIST Chief Calls for Domestic Military Procurement," CNA (Internet edition), August 8, 2000. Note that CSIST stands for the Chung Shan Institute of Science and Technology (中山科學研究院 or 中科院).

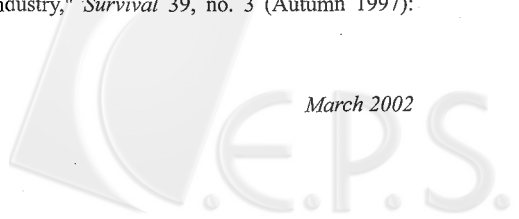


to enter into indigenous arms manufacturing, they have tended to follow roughly similar patterns of industrialization and production. This process usually entails a series of gradual and progressive steps leading to greater sophistication and self-sufficiency in the design, development, and manufacturing of weapons systems. As such, defense industrial development has often been described as following a "ladder of production," and while scholars may disagree as to how many steps there are in this process or the precise ordering of these stages of production, the idea that countries engage in an evolutionary and incremental mode of defense industrialization is broadly accepted.¹⁴

According to the ladder of production, indigenous arms production is a process of transitioning from extremely high to very low levels of foreign dependency for weapons and production technologies. Initial armaments production tends to rely heavily on imported technical assistance from countries possessing already well-advanced defense industries. Most second-tier arms-producing countries start out by assembling weapons systems from imported parts and components (i.e., knock-down kits). The next step usually consists of the licensed production of foreign weapons systems, with some (and, in many cases, eventually nearly all) of the actual manufacturing of components and subsystems performed indigenously.

Taiwan has followed this path, having initiated a local arms manufacturing industry in the early 1970s by building a number of U.S. weapons under license, including the M-14 and M-16 rifles, various types of mortars, 125mm multiple rocket launchers, the AIM-9P4 Sidewinder air-to-air missile, and the PSMM-5 multimission patrol boat. Taiwan's aircraft industry was initiated by license-producing foreign (mostly U.S.) aircraft and aerospace systems, particularly the F-5E/F fighter; this program entailed

¹⁴Keith Krause, *Arms and the State: Patterns of Military Production and Trade* (Cambridge: Cambridge University Press, 1992), 171; Michael Brzoska and Thomas Ohlson, "Arms Production in the Third World: An Overview," in Brzoska and Ohlson, *Arms Production in the Third World*, 15-27; James Everett Katz, "Understanding Arms Production in Developing Countries," in *Arms Production in Developing Countries: An Analysis of Decision Making*, ed. James Everett Katz (Lexington, Mass.: Lexington Books, 1984), 8-9; Susan Willett, "East Asia's Changing Defense Industry," *Survival* 39, no. 3 (Autumn 1997): 116-18.



the progressive indigenous manufacturing of components and subsystems, along with final assembly of the aircraft. In the early years of Taiwanese arms production, Israel was also an important supplier of licenses and technology. Taiwan's first antiship cruise missile (ASCM), the Hsiung Feng I (Male Bee 雄蜂), was in fact a direct copy of the Israeli Gabriel ASCM, while Tel Aviv also licensed the production of its Dvora-class fast-attack missile boat to Taipei.¹⁵

Spurred by the threat of overseas arms cutoffs, however, Taiwan began in the late 1970s and early 1980s to design and develop its own weapons systems, including small arms, armored vehicles, artillery systems, and surface combatants. By the early 1990s, Taiwan had built up some of the most impressive defense industrial bases among the newly industrialized economies. Taiwan put particular effort into missiles and combat aircraft, and by the late 1990s was producing its own antiship, air-to-air, and surface-to-air missiles, along with a basic trainer plane, a trainer jet, and a supersonic fighter of indigenous design.¹⁶

Although Taiwan has a strong private-sector industrial base, the traditional locomotive of Taiwanese arms production has been the state-owned enterprises, and nearly all indigenous defense R&D and manufacturing is concentrated in a handful of such entities. Perhaps the most important of these is the Chung Shan Institute of Science and Technology (CSIST 中山科學研究院 or 中科院), located in Taoyuan County (桃園縣) and owned and operated by the Ministry of National Defense. Founded in 1969, CSIST at its peak in the early 1990s employed around 6,000 scientists and 8,500 technical personnel. CSIST has four main research divisions— aeronautics, missiles and rockets, electronics, and chemistry—responsible for the research, design, development, and manufacture of indigenous weapons systems.¹⁷

¹⁵Nolan, *Military Industry in Taiwan and South Korea*, 53-62.

¹⁶*Ibid.*, "Taiwan: The Military Weans Itself from Dependency on U.S.," *Far Eastern Economic Review*, May 8, 1986, 27; Hseuh R. Men, "Taiwan's Home-Grown Defense Industry," *Asian Defense Journal*, August 1995, 52; OTA, *Global Arms Trade*, 172-73.

¹⁷*The Chung Shan Institute of Science and Technology* (brochure published by the Taiwan

CSIST has primary responsibility for all indigenous missile development and production. One of the institute's first products was the Hsiung Feng antiship cruise missile program, initiated in the mid-1970s. The Hsiung Feng I (a license-produced copy of the Israeli Gabriel ASCM) has an estimated range of 30-40 kilometers and is deployed in a variety of modes (air-, sea-, and land-based). During the 1980s, CSIST began work on a wholly indigenous ASCM, designated the Hsiung Feng II. The Hsiung Feng II is powered by a turbojet engine for a longer range (up to 80 kilometers) and is outfitted with a dual (active radar and infrared) terminal seeker. Deployment of the Hsiung Feng II began in the early 1990s and, like its predecessor, is carried on ships, aircraft, or mobile land-based systems. A land-attack version of the Hsiung Feng II is also reportedly under development.¹⁸

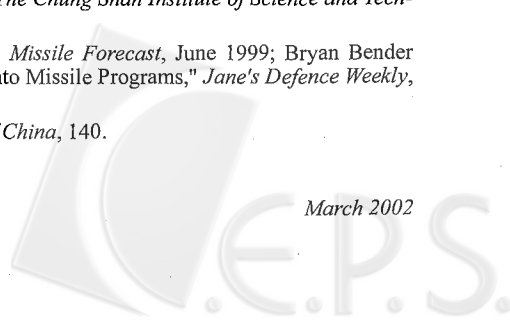
CSIST has also developed two surface-to-air missile systems, the Tien Kung I (Sky Bow 天弓) and the Tien Kung II. The Tien Kung I, first deployed in the mid-1990s, is a medium-range SAM. The Tien Kung II is a system with a longer range (approximately 100 kilometers), reportedly similar in performance to the first-generation U.S. Patriot air-defense missile; the Tien Kung II is currently in the process of start-up production and deployment.¹⁹

Finally, CSIST has developed two indigenous air-to-air missiles (AAMs), the short-range Tien Chien I (Sky Sword 天劍)—similar to the U.S. AIM-9 AAM—and the medium-range, active-radar-guided Tien Chien II, akin to the U.S. AMRAAM missile. The Tien Chien I is currently operational, while the Tien Chien II entered production in the late 1990s. Variants of these missile systems include a surface-to-air version of the Tien Chien I and an antiradiation version of the Tien Chien II, to attack

Ministry of National Defense, June 1992); *The Chung Shan Institute of Science and Technology* (CD-ROM, 1999).

¹⁸Forecast International, "Hsiung Feng I/II," *Missile Forecast*, June 1999; Bryan Bender and Robert Karniol, "Taiwan Puts \$600m into Missile Programs," *Jane's Defence Weekly*, March 10, 1999.

¹⁹1998 *National Defense Report: Republic of China*, 140.



ground-based air-defense radars.²⁰

In recent years, there have been a number of reports that Taiwan is developing a ramjet-powered, supersonic ASCM—the Hsiung Feng III. This missile, which could soon enter production, could additionally serve as the basic airframe for a land-attack cruise missile.²¹ Ramjet technology is also reportedly being tested for a ballistic missile defense system (sometimes referred to as the Tien Kung III SAM), as well as for a longer-range version of the Tien Chien II AAM.²² Other indigenous missile systems include the Ching Feng (Green Bee 青蜂) short-range surface-to-surface missile (which was never put into service) and the Kun Wu (昆吾) antitank missile.

CSIST's Electronics Institute is Taiwan's leading domestic producer of defense electronics, including C³I systems, radars, fire control systems, missile guidance systems, electro-optical equipment, and electronic warfare systems, while the institute's chemistry division is responsible for developing propellants, warheads, and explosives. CSIST is also involved in R&D on advanced materials, including composites and superalloys.²³

Until recently a division of CSIST, the Aerospace Industrial Development Corporation (AIDC 漢翔航空工業股份有限公司) is the crown jewel in Taiwan's arms industry and the center for military aircraft manufacturing. AIDC, a state-owned company founded in 1969 and based in Taichung (台中), employs approximately 4,500 workers and is organized into six units, including an aeronautical research laboratory, an aeronautical systems development division, and three factories for producing aircraft, aero engines, and avionics. Over the past thirty years, AIDC has produced several types of aircraft for the Taiwan armed forces, including the PL-1B

²⁰Brain Hsu, "Report Says Military Developing New Missile," *Taipei Times*, September 8, 2000, 3; Robert Karniol, "Taipei Develops Anti-Radiation Missile for Ching-kuo IDF," *Jane's Defence Weekly*, September 13, 2000.

²¹Brian Hsu, "New Anti-Ship Missile Expected to Enter Production," *Taipei Times*, September 12, 2000, 3.

²²Forecast International, "Sky Sword I/II," *Missile Forecast*, December 1998.

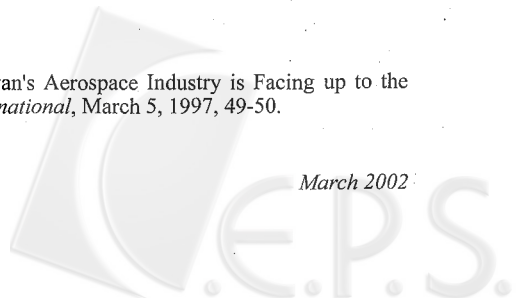
²³*The Chung Shan Institute of Science and Technology* (CD-ROM, 1999); Men, "Taiwan's Home-Grown Defense Industry," 52; *The Chung Shan Institute of Science and Technology* (brochure published by the Taiwan Ministry of National Defense, June 1992).

prop trainer, the UH-1H utility helicopter, and the F-5E/F fighter jet. Taiwan, in fact, was the second-largest producer (after the United States) of F-5 combat aircraft, manufacturing over three hundred units in the 1970s and 1980s.²⁴ AIDC also license-produced the TFE-731 turbofan engine, which powered the F-5.

As early as the late 1970s, AIDC began transitioning to the indigenous design, development, and manufacture of combat aircraft. During the 1980s, AIDC successfully developed and produced the TCH-1 basic trainer and the AT-3 advanced trainer/light attack jet, building a total of 116 of these aircraft (52 TCH-1s and 64 AT-3s) for the Taiwan Air Force (TAF). The centerpiece of recent AIDC production has been the Ching-kuo (經國號) Indigenous Defensive Fighter (IDF). The IDF is a light, all-weather air-defense fighter, with a secondary ground attack/maritime interdiction capability, and this aircraft was intended to replace F-5 and F-104 fighters in the TAF. The IDF possesses many characteristics of a modern fighter aircraft. The fighter is outfitted with a multimode pulse-doppler radar, featuring both air- and sea-search modes and a look-down/shoot-down capability, while the cockpit includes several multifunction displays and a head-up display. The IDF can fire both infrared and radar-guided AAMs (the Tien Chien I and Tien Chien II), along with the Hsiung Feng ASCM. The first prototype flew in May 1989, and the aircraft entered series production in 1994. A total of 130 IDFs were built for the TAF between 1994 and 2000.

The state-owned China Shipbuilding Corporation (CSBC 中國造船公司) is Taiwan's main naval shipbuilding facility. CSBC is located in Kaohsiung (高雄), at the south end of the island, and has a workforce of approximately 5,200. Although primarily a commercial shipyard, CSBC has built a number of surface combatants, beginning in the 1970s with the construction of fifty Dvora-class small fast-attack craft for the Taiwan Navy. In 1993, China Shipbuilding launched the first of eight Cheng-

²⁴Brent Hannon, "Changing the Guard: Taiwan's Aerospace Industry is Facing up to the Realities of New Privatization," *Flight International*, March 5, 1997, 49-50.



kung-class (成功級) guided missile frigates, based on the U.S. Perry-class frigate and equipped with the Hsiung Feng ASCM, surface-to-air missiles, and antisubmarine helicopters. CSBC recently completed construction of twelve 500-ton missile patrol boats.²⁵

The Ministry of National Defense's Combined Service Forces (CSF) Directorate (聯勤總部) is responsible for producing equipment for the ground forces. CFS produced Taiwan's "Brave Tiger" (猛虎) main battle tank, and is currently building the CM-31 armored personnel carrier. Other locally produced ground equipment includes the RT-2000 multiple rocket launcher, the XT86A1 towed howitzer, night-vision equipment, and a variety of small arms and munitions.²⁶

The government-run Industrial Technology Research Institute (ITRI 工業技術研究院) technically is not a defense R&D establishment, yet the institute's activities have directly benefited Taiwan's defense industry. ITRI was created in the early 1970s to conduct applied research in industrial technology, to facilitate foreign technology transfer, and to stimulate the development of advanced manufacturing technologies by local industries. ITRI has played an important role in the development of high-technology industries that, in turn, have fed into Taiwan's defense industrial base. ITRI, for example, has helped train more than ten thousand engineers, a talent pool which was instrumental in the growth of Taiwan's microelectronics, computer, and machine tool sectors; more recently, the institute played a key role in the creation of a Taiwanese fiber-optics manufacturing consortium. The institute's electronics division helped establish Taiwan's microwave industry, which aided the development and production of indigenous radar, communications systems, and missile seekers for military purposes. ITRI's material research laboratories developed high-

²⁵George O'Young, "China Shipbuilding Facing Difficult Times," *Taiwan News*, September 18, 2000, 16; "Taiwan Launches Patrol Ship," *Jane's Defence Weekly*, September 2, 1998; "Taiwan Plans to Build New Patrol Boats," *Lianhe bao* (United Daily News) (Taipei), September 6, 1998, 4 (translated and reprinted in Foreign Broadcast Information Service—*FBIS-CHI*, September 13, 1998).

²⁶1998 *National Defense Report: Republic of China*, 142-44; OTA, *Global Arms Trade*, 172-73.

performance specialty castings for combat aircraft, missiles, and armored vehicles. The institute also operates a Center for Aviation and Space Technology to promote Taiwanese participation in international aerospace joint ventures and to support research in such areas as avionics, small turbojet engines, quality assurance, and systems integration.²⁷

Taiwan's private sector is involved in arms manufacturing mainly at the subcontractor level, providing parts and components for state-owned platform integrators. As with ITRI, however, Taiwan's growing commercial high-technology sector, particularly in the area of electronics and information technologies, has indirectly benefited the defense industry.²⁸ In addition, a private Taiwanese company is collaborating with CSIST to build an indigenous unmanned aerial vehicle (UAV).²⁹

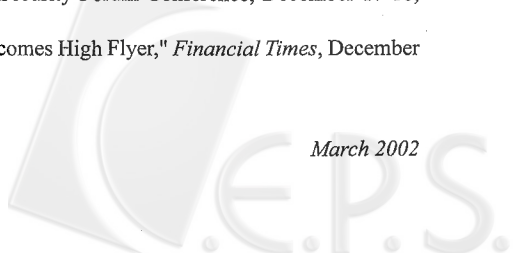
The Defense Industry's Enduring Deficiencies

Taiwan—for a small, newly industrialized economy (NIE)—has made considerable progress in building an indigenous defense industry. The island has scored particular success in building up an aerospace industry, especially in the areas of combat aircraft and tactical missile systems. Taiwan, for example, is one of but a handful of countries—and certainly one of the few developing countries—to produce its own supersonic fighter jet, antiship cruise missile, or radar-guided air-to-air missile. Compared to a fellow NIE like South Korea, which has also tried to establish a home-grown arms industry, Taiwan has made much more progress in developing

²⁷Walter Arnold, "Science and Technology Development in Taiwan and South Korea," *Asian Survey* 28, no. 4 (April 1988): 446-47; *The Aviation Industry in Taiwan, ROC* (Taipei: Office of the Committee for Aviation and Space Industry Development, 1999); John Pomfret, "Taiwan's Bright Idea on Fiber Optics," *Washington Post*, June 16, 2000, E1, E4.

²⁸Holmes Liao, "From Earthquake to Taiwan's National Security: A Technology Perspective" (Paper delivered at the 1999 Asia-Pacific Security Forum Conference, December 17-18, 1999, Taipei, Taiwan).

²⁹Laura Tyson, "Model Taiwan Company Becomes High Flyer," *Financial Times*, December 18, 1997.



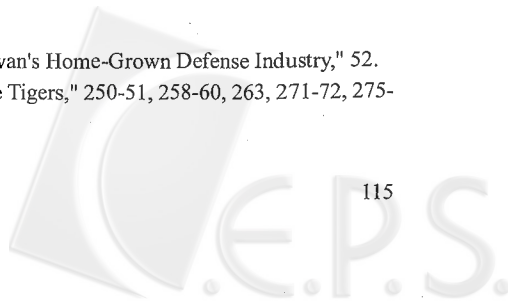
and manufacturing indigenous armaments. Taiwan's domestically produced IDF and Hsiung Feng ASCM stand in sharp contrast to Korea's licensed production of such foreign weapons systems as F-16 fighters, Type-209 submarines, and UH-60 helicopters.³⁰

Nevertheless, even after thirty years of significant public and private investments in infrastructure and technology, Taiwan still possesses only limited capacities for autarkic arms production. The island's defense technology base remains underdeveloped, as insufficient funding, limited expertise, and the lack of qualified personnel have constrained indigenous military R&D as well as the industries ability to absorb and exploit imported technology. Taiwan is particularly deficient in the areas of armaments-related design, advanced subsystems and component technologies (such as propulsion, guidance systems, sensors, and composite materials), and process technologies (i.e., advanced manufacturing techniques). Moreover, a particular paucity of systems integration skills means that local designers and engineers often have difficulty amalgamating the disparate technologies that comprise most advanced weapons systems.³¹

Excess production capacity and the lack of economies of scale due to small or shortened production runs have particularly eroded cost-effective arms production and constituted a serious drain on indigenous arms development and procurement. Beginning in the early 1980s, Taiwan greatly expanded its arms-manufacturing capacities in response to existing or projected needs, only to become saddled with too many workers and underutilized, high-overhead facilities. Taipei had at one time planned on acquiring two hundred and fifty IDFs, and as a result AIDC built a modern production facility large enough to turn out four aircraft a month. When IDF procurement was subsequently cut by nearly half, however, output was reduced to only two per month. With the delivery of the last IDF in early 2000, sales have fallen by 60 percent, and AIDC factories have been left with a "skilled but underemployed workforce," "idle assembly lines,"

³⁰OTA, *Global Arms Trade*, 222-25; Men, "Taiwan's Home-Grown Defense Industry," 52.

³¹Cheng and Chinworth, "The Teeth of the Little Tigers," 250-51, 258-60, 263, 271-72, 275-76.



and "large rooms filled with little-used machines."³² Bloated workforces and thin order books similarly plague the country's missile and shipbuilding sectors.

Structural weaknesses in the local arms industry have also undermined the development of Taiwan's defense industrial bases. Defense production is concentrated in monopolistic, state-owned enterprises; this has had the effect of eliminating most market forces—such as competition, marketplace awareness, profitability, and cost-containment—from local arms manufacturing. In addition, like most publicly owned enterprises, these defense firms traditionally suffer from bloated staffs, low productivity, and red ink. AIDC, for example, is losing around US\$60 million to US\$85 million a year, while China Shipbuilding lost over US\$170 million in 2000 and has run up debts of almost US\$225 million.³³

As in other developing countries, technology overreach has been the undoing of Taiwan's arms industries. Early successes with local arms production only bred greater ambitions, which in turn spurred the island to pursue programs that increasingly taxed indigenous technological capabilities to fulfill. While Taiwan has proven to be very capable at licensed manufacturing and at the indigenous production of relatively low-tech items such as small arms and ordnance, the island continues to lack the technology and industrial capacities for many types of advanced arms production. Consequently, the island's defense industry has experienced much less success in developing and designing major weapons systems. Most of Taiwan's missile systems, while quite advanced for a developing country, are nevertheless at least a generation or two behind systems produced in the United States or Western Europe. A major drawback to the IDF has been the limitations of its engine, due mainly to problems with the domestically developed afterburner, which has left the fighter under-

³²See note 24 above; Brent Hannon, "AIDC Faces Turbulence," *Taipei Times* (Internet version), August 15, 2001; Chris Pocock, "Taiwan Government Uncertain on Plans for Top Aerospace Firm," *Aviation International News* (Singapore), February 22, 2000, 34.

³³Hannon, "AIDC Faces Turbulence"; "China Shipbuilding to Lay Off 2,500 Employees," CNA (Internet edition), November 16, 2001; "State-Run Enterprises Planning Workforce Reduction," CNA (Internet edition), May 1, 2001.

powered in certain situations.³⁴

While continuing to support the concept of a strong domestic defense industry, Taipei has shown signs in recent years of retreating from earlier, ambitious plans for indigenous arms production. In particular, Taiwan is all but out of the business of indigenous aircraft production. The last IDF fighter was delivered to the TAF in January 2000. Moreover, plans to develop an improved variant of the IDF, featuring a more powerful engine, an increased use of composites, and perhaps even the incorporation of stealth technologies, have been put on indefinite hold.³⁵

Given declining prospects for future large defense projects, Taiwan is increasingly attempting to rationalize and diversify its arms industry. In the mid-1990s, for example, CSIST announced plans to cut its workforce and greatly curtail its range of R&D activities; AIDC also pledged similar staff reductions.³⁶ In addition, the government is intent on privatizing and commercializing its state-owned aerospace and shipbuilding industries. At one time, the government had planned on denationalizing AIDC by the end of the 1990s and selling all or part of the company to private investors. The company also envisioned selling a sizable portion of its shares to a "foreign strategic investor."³⁷ In 1996, as a first step toward this goal, the government transferred control of AIDC from the Ministry of National Defense over to the Ministry of Economic Affairs, and AIDC was subsequently restructured as a state-owned enterprise.³⁸ Taipei also intended to privatize the China Shipbuilding Corporation by late 1997.

Taipei has in particular targeted civilian aerospace as a key business

³⁴Julian Baum, "Winged: Locally Made Jet Fighter Fails to Convince Critics," *Far Eastern Economic Review*, January 12, 1995, 21.

³⁵Carol Reed, "Taiwan Proposes Design for Ching-kuo Trainer," *Jane's Defence Weekly*, July 2, 1997, 14.

³⁶Hannon, "Changing the Guard," 49; "Taiwan Institute Cutting Back Sharply Due to Foreign Supply," *The Estimate*, June 10, 1994, 4.

³⁷Andrzej Jeziorski, "AIDC Still Aims for Privatization," *Flight International*, August 25, 1999, 23.

³⁸"Taiwan: Industry Plays Vital Part in Modernization," *Jane's Defence Weekly*, July 8, 1998; Kelly Her, "Military Producer of IDFs Changing into Private Firm," *Free China Journal*, October 20, 1995, 3.



sector marked for growth and development. AIDC, for example, estimates that if it remains a mainly military-oriented aerospace company, the corporation will be forced to lay off up to 75 percent of its workforce. Consequently, since the early 1990s Taipei has encouraged Taiwan's aerospace industry to expand into commercial aviation manufacturing. As part of this strategy, in 1991 the central government founded the Taiwan Aerospace Corporation (TAC 台翔航太工業股份有限公司), a joint public-private venture with the central government holding 35 percent of the company's shares. TAC was supposed to become the center for Taiwan's commercial aerospace business and to make Taiwan a major Asian aerospace manufacturing center by 2000.³⁹ In addition, the government plans to establish a special aerospace industrial park (similar to the island's Hsinchu 新竹-based microelectronics science and technology incubator) in Taichung, home already to AIDC and several other aircraft companies.⁴⁰

Particular emphasis is placed on Taiwanese companies entering into strategic alliances, joint ventures, and subcontracting agreements with foreign aerospace firms. AIDC, for example, is partnering with the Czech firm Aero Vodochody to jointly develop and produce the AE-270 small business plane. In addition, the company is collaborating with Sikorsky Aircraft to coproduce the S-92 commercial helicopter, and with Allied Signal on jet engines.⁴¹ AIDC and other Taiwanese aerospace companies are supplying Western aircraft manufacturers with parts and components for commercial aircraft. AIDC, for example, is building empennages (tail sections) for the Boeing B-717 regional jet, rudders for the Dassault Falcon-900 business jet, and tail parts for the Alenia C-27 transport aircraft.⁴² AIDC is also expanding engine component production, particularly

³⁹TAC/Taiwan Aerospace Corporation (undated brochure); "Taiwan Aerospace May Lease," *Asian Wall Street Journal*, May 15, 1996.

⁴⁰"Taichung to Become Aerospace Industrial Area," CNA (Internet edition), November 6, 1999.

⁴¹AIDC website (www.aidc.com.tw); "AIDC, Sikorsky to Coproduce S-92 Choppers," CNA (Internet edition), February 6, 1998; "Taiwan, Czech Republic Form Plane-Making Venture," Reuters, March 15, 1997.

⁴²"Taiwanese Firms Poise to Make Push into Offset Component Manufacturing," *Asian Avia-*

castings.⁴³ By becoming a "reliable" second-tier supplier to Western aerospace firms, AIDC hopes to expand its commercial business to at least 50 percent of total corporate income by 2010 (compared to 20 percent in 2000) and treble company revenues to US\$1 billion. The government has also pursued similar plans to revitalize the shipbuilding industry through new commercial projects.⁴⁴

Taiwan, like other countries, is interested in leveraging dual-use commercial technologies for military uses, and the military has at the very least a declaratory policy of increasing the use the civilian resources to further the national defense industry. This includes promoting greater cooperation between military R&D organizations (such as CSIST and AIDC) and local commercial research institutions and industry, and exploiting dual-use technologies for military as well as civilian purposes.⁴⁵

Finally, Taiwan has tried to expand its arms exports during the 1990s. In this regard, AIDC, in cooperation with Allied Signal, is supplying Aero Vodochody with F124-100 turbofan engines (a derivative of the IDF's TFE-1042 engine) for the Czech Republic's L-159 light combat aircraft program.⁴⁶ In addition, AIDC wants to develop and market internationally a two-seater trainer version of the IDF, as well as upgrade and resell up to 140 used F-5 fighters currently being removed from the TAF.⁴⁷

In reality, however, not much has actually happened to reform and revitalize Taiwan's defense industry. Taiwan has so far done little to enact

tion, July 1992, 11-12; "AIDC Stepping Up Production of Boeing Parts," *China News*, August 2, 1999; AIDC website (www.aidc.com.tw).

⁴³Robert Karniol, "Taiwan Postpones Aerospace Privatization," *Jane's Defence Weekly*, October 4, 2000.

⁴⁴"Government Enterprises Facing Pressure to Liberalize," CNA (Internet edition), in English, May 14, 1999.

⁴⁵*1998 National Defense Report: Republic of China*, 113, 139; Wu Nan-shan, "President Lee Stresses Building Independent Defense Industry as Established Policy, and Calls for Developing Defense Industry by Utilizing Civilian Resources," *Zhongguo shibao* (China Times) (Taipei), November 28, 1992, 6 (translated and reported in *FBIS-CHI-92-235*, December 7, 1992, 57).

⁴⁶See note 42 above; Andrzej Jeziorski, "Aero Vodochody Flies Initial Combat Version of L-159," *Flight International*, August 26, 1999, 16.

⁴⁷"AIDC Begins Design of IDF Trainer," *Flight International*, November 24, 1999, 28.

a long-term strategy for defense industry readjustment or to achieve any large measure of success in recent reform efforts. First of all, the government has ultimately been unwilling or unable to privatize its money-losing, defense-oriented state-owned enterprises. Deadlines to privatize AIDC—first by the end of 1998 and then by the end of 1999—have come and gone. In late 2000, AIDC announced that it would privatize by the end of 2001—even then, the government would retain up to 49 percent of the company, but this goal, too, was missed.⁴⁸ In addition, AIDC has particularly resisted efforts to break up the company into several profit-and-loss centers. Consequently, the company has found difficulty in attracting foreign (and particularly U.S.) investors.⁴⁹ At China Shipbuilding, labor opposition and concerns for the company's long-term economic viability have pushed back plans to sell off the shipyard by several years. There are *no* plans at the moment to privatize or commercialize CSIST, which remains directly owned and operated by the Ministry of National Defense.

In addition, Taiwan's state-owned defense enterprises have so far resisted significant workforce reductions. CSIST reportedly cut around two thousand jobs beginning in the mid-1990s, but reliable statistics are not publicly available.⁵⁰ Other redundancies announced by CSIST turned out to be artificial, attributable mainly to the transfer of ownership of AIDC from CSIST to the Ministry of Economic Affairs.⁵¹ AIDC, for its part, has downsized only around 10 percent, mainly through attrition and early retirement. China Shipbuilding, as one bright spot, appears to have finally reached agreement with its unions to lay off around half of its workforce and to implement pay cuts of 35 percent.⁵²

Efforts to increase Taiwanese arms exports have also been largely un-

⁴⁸See notes 36 and 42 above; "AIDC Seeks Strategic Investors for Privatization," CNA (Internet edition), August 4, 1998.

⁴⁹See note 36 above; Pocock, "Taiwan Government Uncertain on Plans"; Andrzej Jeziorski, "Weathering the Storm," *Flight International*, August 11, 1999.

⁵⁰"Taiwan: Industry Plays Vital Part in Modernization."

⁵¹*Ibid.*; see also note 24 above.

⁵²O'Young, "China Shipbuilding Facing Difficult Times," 16; "China Shipbuilding to Lay off 2,500 Workers."



successful, and over the past decade the island's overseas arms sales have amounted to less than US\$15 million annually (mainly small arms and ammunition).⁵³ Taiwan faces stiff competition in the global arms market. Sweden, for example, is offering its two-seater Gripen as an advanced trainer aircraft, in direct competition with the proposed IDF-based trainer. In addition, the United States, Belgium, and the Netherlands are all trying to sell used F-16s, while several nations are offering services and packages to upgrade older fighters. Finally, Taiwanese weapons come with considerable political baggage, and few countries want to risk angering China by buying arms from Taipei.⁵⁴

Finally, Taiwan has made little significant headway in terms of dual-use development and spin-on or defense diversification. Despite CSIST's declared dual-use cooperation and adaptation strategy, a successful commercial-to-military spin-on effort has not materialized. Although possessing considerable capabilities in design and construction, CSBC struggled in a global commercial shipbuilding sector characterized by low demand and excess capability. In addition, most of Taiwan's commercial aircraft work remains relatively minor. Despite the initial high expectations, the Taiwan Aerospace Corporation never really took off; consequently, TAC is only a minor player in local aviation manufacturing. Furthermore, Taiwan's efforts in the 1990s to buy its way into foreign commercial aircraft programs mostly ended in failure and disappointment, such as the stillborn McDonnell Douglas MD-12 super-jumbo jet, a joint venture with British Aerospace to build regional jets, and, most recently, the plans to coproduce a seventy-seat regional jet with a European consortium.⁵⁵ For its part, the AIDC/Aero Vodochody AE-270 business plane program is heavily delayed and has not yet garnered a single sale.⁵⁶ In fact, with the conclusion of IDF

⁵³Department of State, Bureau of Verification and Compliance, *World Military Expenditures and Arms Transfers 1998* (Washington, D.C.: Government Printing Office, 2000), 129.

⁵⁴Philip Finnegan, "Taiwan in Lonely Quest for Foreign Sales, Investors," *Defense News*, April 3, 2000.

⁵⁵"AIDC, AIR Development of 70-Seat Aircraft Viewed," CNA (Internet edition), November 10, 1996.

⁵⁶Jeziorski, "Weathering the Storm."

production in early 2000, AIDC is without a major aircraft-manufacturing program.

In light of these failures, Taiwan's arms industry appears to have few alternatives but to beg for further government support. The central government, for example, is planning to establish a US\$625 million fund to help AIDC invest in foreign aerospace projects.⁵⁷ More important, Taipei is increasing defense spending and indigenous arms development as a means of boosting defense industry employment. The Taiwanese Navy recently agreed to acquire an eighth Perry-class frigate, along with thirty new "stealthy" patrol boats, to be built by CSBC.⁵⁸ AIDC still regards military work as critical to preserving its core engineering and systems integration capabilities, and in mid-2000 the government initiated a seven-year program to develop a strike aircraft based on the IDF; this project could be worth as much as US\$226 million to AIDC.⁵⁹ CSIST has particularly applied pressured on Taipei to underwrite several new domestic missile and other military programs, mainly as a means of preserving jobs. In this regard, CSIST is reportedly transferring some missile component production to AIDC, in an effort to increase work at the latter's underutilized aviation facilities.⁶⁰

These actions, however, are only a short-term solution to the challenges facing Taiwan's defense industry. Eventually, both the government and industry must deal with the myriad problems of overcapacity, inefficient production, and declining demand that afflict local arms manufacturing.

⁵⁷"In Brief," *AA2000 Today*, February 24, 2000, 15.

⁵⁸Wendell Minnick, "Taiwan Finalizes Design for Fast Attack Craft," *Jane's Defence Weekly*, April 12, 2000.

⁵⁹Wendell Minnick, "Taiwan's Strike Aircraft Plan," *Jane's Defence Weekly*, August 9, 2000.

⁶⁰Wendell Minnick, "Taiwan to Produce 100 Thunder 2000s," *Jane's Defence Weekly*, August 9, 2000; "Cross-Strait Sea Supremacy Forces Compared," *Jianduan keji* (Cutting-Edge Technology) (Taipei), January 1, 1999 (translated and reprinted in *FBIS-CHI*, February 15, 1999); "How Can We Counter the 'Hsiung Feng 2'?" *Jianchuan zhishi* (Ship Knowledge) (Beijing), September 4, 1999 (translated and reprinted in *FBIS-CHI*, October 15, 1999); Bender and Karniol, "Taiwan Puts \$600m into Missile Programs."

Taiwan's Foreign Weaponry Alternative: Trends and Shortcomings

Given the local arms industry's deficiencies and limitations, unsurprising therefore is that over the past decade the Taiwan armed forces have appeared to increasingly prefer foreign weapons systems. The fact that the Taiwan military buys more and more from overseas, even when a domestic option is available—i.e., the Harpoon ASCM, as opposed to the Hsiung Feng, or the AMRAAM instead of the Tien Chien II—is an indicator of the higher relative value military brass place on foreign weapons systems over locally sourced products. From 1992 to 1999, Taiwan bought over US\$20 billion worth of arms, including one hundred and fifty F-16 fighters, sixty Mirage-2000 fighters, nine hundred AIM-9M/S and four hundred Magic short-range AAMs, six hundred AIM-7 and nine hundred and sixty MICA medium-range AAMs, six Lafayette-class frigates, nine Knox-class frigates (along with Harpoon antiship cruise missiles), three hundred M-60A3TTS tanks, one thousand and three hundred Stinger missiles, eighty-one AH-1W attack helicopters, and six E-2T airborne early warning aircraft.⁶¹ Taiwan has also acquired the Patriot Improved PAC-II PLUS system to provide long-range air defense, as well as limited protection against theater ballistic missiles. The United States has also agreed to permit the export of diesel submarines, AMRAAM air-to-air missiles, Javelin antitank missiles, and P-3C maritime patrol aircraft to Taiwan. Washington is also considering the possible sale of Arleigh Burke-class destroyers, equipped with the Aegis naval air-defense system (which has a potential theater missile defense [TMD] capability). Finally, Taipei has expressed interest in acquiring AV-8B Harrier jump jets, AH-64 attack helicopters, LAV armored vehicles, and M-1A2 main battle tanks.⁶²

In addition, many of Taiwan's so-called indigenous weapons systems

⁶¹Jason Sherman, "U.S. Maintains Caution in Taiwan Arms Sales," *Defense News*, October 16, 2000, 3, 27.

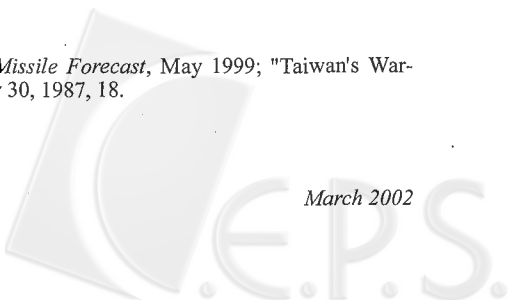
⁶²Michael Sirak and Wendell Minnick, "Taiwan Seeks AV-8B Harrier," *Jane's Defence Weekly*, November 28, 2001.

continue to rely heavily on foreign designs and/or use large amounts of foreign technologies, components, and even systems integration skills. The Tien Kung I SAM, for example, reportedly utilizes the Patriot missile's launcher-container and various electronic systems derived from the U.S. Hawk SAM; moreover, the missile's phased array radar was developed by Lockheed Martin and license-produced in Taiwan.⁶³ The Chengkung-class frigate is not only based on the U.S. Perry-class design, but nearly all of its critical subsystems—particularly the ship's radar, sonar, weapons control systems, and electronic countermeasures—were bought off-the-shelf from the United States. Even the IDF is heavily dependent on U.S. technology inputs—particularly subsystems, design and systems integration inputs, test equipment, and even production tooling. The General Dynamics Corporation (later Lockheed Martin), for example, provided considerable assistance on airframe design and development, and Allied Signal worked closely with AIDC to develop the IDF's engine (based on its TFE-731 turbofan). In addition, the aircraft's radar is derived from the General Electric Company's APG-67 radar system (originally developed for the F-20 fighter jet), while Lear Astronics, Allied Signal, and Honeywell all contributed to developing the IDF's avionics, cockpit instrumentation, and fly-by-wire flight control system.⁶⁴

At the same time, there are obvious risks to Taiwan becoming too reliant on foreign arms suppliers. Because of the island's growing dependency on arms imports, Taiwan's long-term military capabilities will increasingly hinge on the island's ability to preserve and expand its connections to foreign suppliers. For one thing, Taiwan must be able to maintain access to spare parts, maintenance, and training for its current and forthcoming crops of foreign weaponry. More important, Taipei must also convince foreign suppliers to sell the island new systems to meet evolving military requirements—particularly ballistic missile defense. Since neither

⁶³Forecast International, "Tien Kung I/II," *Missile Forecast*, May 1999; "Taiwan's Warheads," *Far Eastern Economic Review*, July 30, 1987, 18.

⁶⁴OTA, *Global Arms Trade*, 172.



of these relationships can be unreservedly guaranteed, Taiwan could be exposing itself to dangerous vulnerabilities.

First of all, arms sales to Taiwan will always be subject to suspension or limitation—particularly depending on China's ability to influence or pressure suppliers. Most European arms producers, including France, Germany, and the United Kingdom, have in general refused to sell arms to Taiwan, out of respect for—or fear of—China. Beijing, for example, retaliated against France's sale of jet fighters and frigates in the early 1990s by interrupting trade and diplomatic relations with Paris until France agreed not to sell further armaments to Taiwan; in 1996, this agreement resulted in France's canceling the sale of Mistral surface-to-air missiles to Taiwan. Pressure from Beijing also eventually forced the Netherlands to cancel the sale of four diesel submarines to the Taiwan Navy in the 1980s.⁶⁵

Second, while the United States has generally been willing to sell almost any type of advanced military systems to Taiwan (for example, F-16 fighters, AMRAAM missiles, P-3C patrol aircraft, and even submarines), Washington has not given Taipei *carte blanche* regarding purchases of U.S. arms. This reluctance is due both to concerns over Beijing's likely reactions (witness, for example, China's angry response when the United States sold the F-16 to Taiwan in the early 1990s, which Beijing argued violated the 1982 Joint Communiqué) and to American interests in not exacerbating cross-Strait tensions by selling Taiwan potentially destabilizing weapons systems. The United States will probably continue to reserve judgment on the sale of many types of armaments (e.g., Aegis-type destroyers) to Taiwan until Washington determines the wider impact of such exports.

Third, there is no certainty that the United States can guarantee delivery of certain weapons systems. This has certainly been the case with diesel-electric submarines, which Washington recently agreed to sell to Taiwan, either off-the-shelf or via license-production. Since the United States no longer builds diesel submarines, Washington has approached for-

⁶⁵"Taiwan: The Military Weans Itself from Dependency on U.S.," 27.

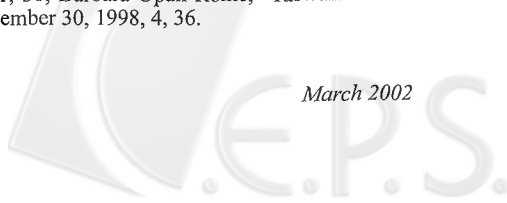
foreign producers of submarines (particularly Germany and the Netherlands) for design and production assistance. So far, however, no foreign company has been willing to incur Beijing's wrath and supply the necessary blueprints and technologies to Washington.⁶⁶

Fourth, funding shortfalls and the high costs of state-of-the-art weapons systems will most likely limit arms imports. Taiwan's defense budget has been largely static for the past several years (meanwhile, Chinese military expenditures during the 1996-2001 timeframe increased by more than 50 percent in real terms). In addition, the 1997-98 Asian financial crisis resulted in a 25 percent devaluation of the Taiwanese dollar, forcing Taipei to defer or reduce several planned arms purchases, including utility helicopters and additional Stinger missiles. Meanwhile, support for theater missile defense has been tempered somewhat by its multi-billion dollar price tag; "sticker shock" may as well inhibit purchases of submarines or Aegis-class destroyers.⁶⁷

Finally, the acquisition of foreign military technologies is no guarantee that Taiwan will successfully absorb and exploit such know-how. As already noted, Taiwan's defense industry suffers from a number of structural impediments, including a limited R&D base, weak systems integration/engineering capabilities, overcapacity, and small production runs, all of which pose enormous obstacles to advancing up the learning curve. Consequently, the industry has long experienced delays and setbacks with integrating advanced foreign technologies into domestic production and extracting maximum effectiveness—witness, for example, Taiwan's teething problems with the IDF. Therefore, even should the United States transfer design and manufacturing technologies, Taiwan could still face considerable hurdles to producing such highly complex weapons systems as diesel-electric submarines.

⁶⁶"Seven Shipbuilders Express Interest in Constructing Subs," *Taipei Times* (Internet version), November 19, 2001; Andrew Koch and Wendell Minnick, "USA Seeks Help to Deliver Taiwan Sub Promise," *Jane's Defence Weekly*, November 21, 2001; "Pentagon: Planned Submarine Sale to Taiwan May Collapse," *Voice of America*, November 28, 2001.

⁶⁷Opall-Rome, "Taiwan Trims Arms Buys," 1, 36; Barbara Opall-Rome, "Taiwan Resists Call to Embrace TMD," *Defense News*, November 30, 1998, 4, 36.



Conclusions

As the demands for high-tech warfare have grown, Taiwan has discovered that the pursuit of autarky in arms production and procurement is not only increasingly difficult but also even militarily undesirable. On the other hand, expanding arms imports—both of finished weapons systems and of defense technologies—offers no better solution. In the end, Taipei is faced with a Hobson's choice: either procure armaments domestically and risk fielding less-than-optimal military systems in the face of a manifest Chinese military threat, or else increase the island's dependencies on foreign weaponry, with all the insecurities of supply and political vulnerabilities that attend.

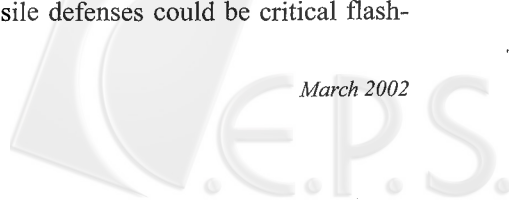
Taiwan's weakening indigenous arms industry and subsequently increasing dependencies on foreign (i.e., U.S.) arms suppliers have many complications for the Taipei-Beijing-Washington triangle. Obviously, the more Taiwan must rely on the United States to provide the equipment the island needs to adequately defend itself, the more potential leverage Washington has over Taipei's international behavior. Conceivable, for example, is that the United States might link some arms sales to assurances that Taiwan will better "behave," such as stop agitating for entry into the United Nations. In this regard, Taiwan would be confronted by the very concerns that the Taipei leadership had hoped to avoid by pursuing self-sufficiency in armaments: a loss of independence in international affairs. In addition, a growing U.S. influence over Taiwan, via arms sales, might actually help defuse regional tensions by demonstrating to Beijing that Washington will use this authority to check any destabilizing unilateral challenges by Taipei.

At the same time, Taiwan's growing dependencies on U.S. weaponry do provide Taipei with some interesting cards to play against Washington. The armaments being supplied by the United States are quickly becoming Taiwan's front line of defense, and with no possibility of being replaced by any other foreign supplier, Washington is increasingly becoming, *de facto*, the ultimate guarantor of Taiwan independence—*perhaps even more so than is Taiwan's own military*. This places the United States in the uncomfortable position of being required to fully commit to protecting Taiwan—

no half-measures would be effective. Under such a circumstance, Taipei actually gains some leverage over Washington, thus encouraging the island to be more assertive and more risk-prone in its relations with Beijing. The flip side, of course, is that the increased likelihood of U.S. defense of Taiwan—as evidenced by the U.S. aircraft carriers sent to the Taiwan Strait area during the missile crises of 1995-96—would tend to discourage Beijing from any all-out conflict with the island.

In addition, Taiwan could still use its remaining strengths in domestic arms manufacturing as a bargaining chip against Washington. Taipei can, for example, use the "threat" of indigenous arms production in order to extract arms exports or other technical-industrial concessions, such as technology transfers or production offsets. More important, however, Taiwan may choose to specialize in certain areas of armaments production that, in turn, could pose considerable challenges for the United States. Certainly, recent reports that Taiwan is reinigorating ballistic missile R&D are very troubling and may give Taipei additional leverage over Washington; Taiwan could, for example, trade off its missile program in exchange for currently embargoed U.S. weapons (such as the Aegis) or for a stronger and more explicit security guarantee.

This does not necessarily mean that the sale of U.S. arms to Taiwan in and of itself constitutes a crisis issue for China—especially one that could compel Beijing to use military force against Taiwan. So long as Washington continues to exert reasonable self-restraint in what the United States will and will not transfer to Taiwan, and so long as structural impediments in the island's defense industry continue to restrain indigenous development and production, China will likely accept the status quo, despite Beijing's many public protestations to the contrary. Beijing will continue to oppose categorically all arms sales to Taiwan, but mainly as a way to pressure the United States to exercise prudence in transferring arms and technology—and to drastically curtail any such efforts by other nations. Consequently, so long as China perceives the cross-Strait military balance—at least in terms of hardware—as not tilting too far in Taiwan's favor, Beijing will likely not act preemptively; in this regard, Taiwan's acquisition of ballistic missiles and ballistic missile defenses could be critical flash-



points in any such decision-making.

Overall, therefore, Taiwan's arms modernization Catch-22—no guarantee of security of supply of foreign weapons, but at the same time an inability to ensure that self-sufficiency will be both practical and militarily effective—constitutes its own form of restraint. Even with a sympathetic Republican administration in Washington, Taiwan is unlikely to receive a blank check on future arms sales. Taipei is, moreover, unlikely to abandon its (however imperfect) dreams of autarky in favor of dependency. Hence, there will probably always be important impediments to U.S. sales of arms to Taiwan, and given the current environment, arms transfers alone are unlikely to cause Taiwan to develop close ties with a third country—read, the United States—such that China may feel forced to react militarily.

