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Taiwan in the Cross-Strait Arms Dynamics: Past and Present

Shang-su **Wu***
Nanyang Technological University

Abstract

The military confrontation between Taiwan and China used to be a famous example of arms dynamics, but the context has gradually changed from the 2000s (Buzan and Herring, 1998: 80). This has occurred as Taipei's recently lukewarm responses to the increasingly serious challenges from the People's Liberation Army (PLA). According the recent military build-ups, Taiwan seems to shift to a denial-oriented strategy to counter China's achieving aerial and naval superiorities; nevertheless, this new approach to the cross-Strait arms dynamics may be eclipsed by a range of issues.

Keywords: *Taiwan, arms dynamics, People's Liberation Army*

JEL classification: *F51, F52, H56, N45*

1. The Past of the Cross-Strait Arms Dynamic

The arms dynamic across the Taiwan Strait is historically related to the Chinese Civil War between the Chinese Nationalist Party (commonly known as Kuomintang, KMT) and the Chinese Communist Party (CCP) after the Second World War. The regime of the KMT, the Republic of China (ROC), fled to Taiwan in 1949 after it lost control over almost all

of the territory of China to the CCP, whose newly-established regime, the People's Republic of China (PRC), claimed it would capture Taiwan in order to terminate the civil war. Thereafter, the ROC regime in Taiwan desperately armed itself for survival, with the additional goal of "retaking the mainland", whilst an important concern for the PRC's military build-ups was the invasion of Taiwan (Cole, 2006a: 15, 20). This situation meant that the ROC and the PRC regimes both came to fit the criteria of an arms dynamic: that both actors acquire armed forces and pursue their progress concerning each other at different levels (Buzan and Herring, 1998: 5). As a challenger in the cross-Strait arms dynamic, Beijing's efforts match with most Hammond's criteria for an arms race, corresponding military and diplomatic policies, political-military linkage, growth of defence expenditure at more than 8 per cent per annum in the last decade, focus on particular weapon systems, such as ballistic missiles, and the purpose of annexing Taiwan (Hammond, 1993: 31; TAO, 2011). Taiwan, in comparison, would have been more likely to maintain the status quo after substantially giving up its goal of "retaking the mainland" in the mid-1960s, with the result that its relatively moderate movements would have turned the cross-Strait dynamic into an arms competition (Cole, 2006a: 52; Buzan and Herring, 1998: 80).

The cross-Strait arms dynamic has been more than bilateral due to the involvement of several international powers. Firstly, both sides rely more or less on foreign arms suppliers for advanced weapon systems and relevant technologies. After the foundation of the PRC in 1949, the Soviet Union provided a wide range of sophisticated weapon systems, such as diesel-electric submarines (SSK), jet fighters and destroyers, until the split between them in the early 1960s (Cole, 2001: 162). In the subsequent two decades, its revolutionary diplomacy resulted China into a degree of international isolation. The Sino-US rapprochement of 1971 gradually helped China to gain access to weapon systems from the US and Western European countries, until the arms embargo on China following the Tiananmen massacre in 1989 (Archick, Grimmett and Kan, 2005: 1). Simultaneous to the Western embargo, the resumption of military ties with the Soviet Union, and then Russia, has maintained

China's access to foreign advanced arms to this day. As for Taipei, the US has been the only major continuous source of arms, in addition to limited procurements from France and other countries from the 1950s on (SIPRI; Kallgren, 1963: 36-38). Secondly, the US has directly intervened in the ROC-PRC arms dynamic by providing military presence, such as deploying aircraft battle groups during the missile crisis in 1996, diplomatic pressure, such as forcing Taiwan to abandon nuclear weapon projects, and other means (Roy, 2003: 143-144; Tucker, 2009: 96). In sum, the cross-Strait arms dynamic has been deeply shaped by the international powers. It is clear however that Beijing has a much larger capacity to decrease foreign influence than Taipei.

China has indeed far more advantages than Taiwan in the cross-Strait arms dynamic for several reasons. Firstly, its widely recognized international status and economic conditions endow Beijing with greater access to foreign arms suppliers, a fact which puts pressure on Taipei not to try to do the same, because of the latter's inadequate foreign policy as well as its inferior physical conditions. From 1949, both the ROC and the PRC regimes waged diplomatic war over who would be the exclusive representative of China, by competing to gain official recognitions from other countries as the only legitimate Chinese regime, and vying for the membership in major international organizations, particularly the United Nations. It is clear that the contest is asymmetrical in nature, as the majority of countries would naturally choose the PRC on the basis of its actual governance of China and other factors, such as its huge population. In this disadvantageous scenario, Chiang Kai-shek insisted on the orthodoxy of his ROC regime and kept struggling until his eventual loss of the UN membership in 1971 and the cessation of formal relationship with most countries in the world in the 1970s and 1980s (Tucker, 2009: 31, 35-36; Ravenal, 1971: 46). After that, Taipei was isolated on an international level, with arms deals all suffering from diplomatic and economic pressure from Beijing. What remains is the US government's Taiwan Relation Act (TRA), which leaves a relatively stable channel to arms, restricted however by Washington's near monopoly to control Taipei's military capability (AIT, 1979). As the main concern for the US is to stabilize the situation and

maintain the military balance in the Strait, Taiwan is confined to almost "non-offensive defence" and is unlikely to develop other strategies such as pre-emptive or punishment deterrence (SIPRI, 2013).

Secondly, China has a much better industrial base from which to facilitate the arms dynamic, compare to Taiwan. The Chinese modern defence industries were started with massive Soviet technological aid, from the training of professional personnel to providing blue prints and assembly lines in the 1950s and early 1960s, and several advanced weapon systems, such as the P-15 anti-ship cruise missile (ASCM), which could be produced domestically (FAS, 1999; Bussert and Elleman, 2011: 2, 4; Shen, 2012: 257-258). This foundation provided Beijing with considerable capability to clone other weapon systems without authorization and to develop their own new designs. The Chinese defence industry then benefited from technological assistance from Western European countries and the US in the 1970s and 1980s. Later, due to the economic difficulties after the Cold War, the ex-Soviet defence industry and associate expertise contributed to the Chinese defence industry. In addition, Chinese industrial spies provided advanced defence technology through illegal approaches (Archick, Grimmett and Kan, 2005: 4, 13-14). The domestic arms supply in China has gradually developed to provide comprehensive supplies, whereas foreign products are purchased for reverse engineering or in areas where capabilities are lacking, such as turbine engines (Hsu, 2013). Taiwan's defence industry was established in the late 1960s for the Nixon Doctrine and was dramatically expanded in the period of international isolation in the 1970s (Nolan, 1986: 19, 28, 35). In its heyday in the late 1980s, Taiwan domestically produced several major weapon systems such as jet fighters, but still depended highly on American assistance and authorization (Tucker, 2009: 150-152). Hence, the defence industry would not have been a sound alternative for Taipei to maintain the arms dynamic.

Despite the difficulties in the cross-Strait arms dynamic, strategic conditions compensate Taiwan's inferiority. Firstly, the Taiwan Strait, with a width of more than 100 kilometres forms a significant barrier for an invader. A number of technical limitations on crossing the Strait

somehow neutralize China's overall superiority in the cross-Strait arms dynamic. The geographic environment would make China's huge group troops generally irrelevant to the dynamic, because China has to achieve sea and air control in order to project its army to Taiwan. Furthermore, the PLA Navy (PLAN) also faces different natural challenges: due to climatic factors at play in the region, the sea surrounding Taiwan is often choppy with large waves and seasonal winds in winter and typhoons in summer (Shambaugh, 1996: 1317; Clough, 1978: 113-114). Secondly, the wide and complex strategic surroundings, including a number of territorial disputes such as the ones in the South China Sea, may prevent Beijing from concentrating its military superiority against Taipei. Thirdly, as far as its defensive position is concerned, Taiwan benefited from low logistic and quantitative requirements. Since the defenders would not be in a position to project their forces too far, supply is relatively easy. Additionally, historic attack and defence principles would indicate that the ratio of attack to defence would be at least 3 to 1 (Mearsheimer, 1983: 181). Thus, the pressure of quantitative inferiority on Taipei would be less serious. Finally, possible US intervention would reverse the arms dynamics in a specific theatre. Washington could intervene through arms sales and military presence to adjust the arms dynamic.

Based on several considerations, the different administrations in Taipei were keen to manage their arms dynamic in an action-reaction model in order to survive, rather than merely relying on the advantages mentioned above. Firstly, history has demonstrated that various invaders were able to overcome the Strait and conquer Formosa. In the 17th Century, the Koxinga and the Ch'ing (Qing) Empire successfully defeated the original regimes in Taiwan and established general control over the island (Lin, 2005: 11-12, 18-19). Since even pre-modern armed forces were able to achieve invasion across the Strait, Taipei needs to be concerned about Beijing's capability. Secondly, the US may not prove to continue to be reliable. In addition to the case of South Vietnam, the ROC regime was abandoned by the US during the end of the civil war in 1949, and severed formal diplomatic relations at a short notice in 1979 (Wang, 1990: 2; Ho, 1990: 30). With the increasing involvement into the

globalization and the uncertainty of the US intervention, a blitzkrieg is likely to be the ideal goal of China's military action against Taiwan. Based on its strategic conditions, Taipei has to maintain certain capabilities and capacities to counter any aerial or maritime challenge from Beijing, and it needs to do this in a way which is more qualitative than quantitative, in order to prevent a short, sharp and decisive victory by the latter. Prolonged warfare would lead to more uncertain strategic outcomes, which would be more difficult for Beijing's gambit, and may accumulate pressure on Washington to intervene, due to the disturbance of the global economy and the sea lines of communication (SLOCs).

Whilst the KMT was the ruling party until 2000, the challenge to maintain the arms dynamic centred on the access to arms. Taipei took several alternative approaches to supplement normal arms deals, such as indigenous development in the domestic defence industry, purchasing civilian versions of military aircraft, special trade arrangements and foreign technological assistance (Cole, 2006b: 128, 131). During the minority government of the Democracy Progress Party (DPP) between 2000 and 2008, domestic political struggle along with an insufficient budget situation became Taiwan's main obstruction to the arms dynamic. In 2000, the Bush administration made the unprecedented move of adding items to the arms sales list such as submarines and other major weapon systems, which Taiwan had required for decades. However, the special budget for such items had been refused, due to political concerns, in the congress as it was dominated by the opposite parties, mainly the KMT (AIT, 2009; Chase, 2008: 703-704, 710-721). Secondly, compared to the previous administrations, the minority government of the DPP did not invest adequately in national defence. Partially due to the obstruction in the congress, the overall defence budget was generally reduced down to a relatively small share of the gross domestic product (GDP) between 2000 and 2008 (Chen, 2006: 68; DGB, 2011). Thus, not only the submarines but also other defence projects had to be postponed. In 2007 and 2008, Taiwan's arms import dropped to the lowest points since 1951 (SIPRI, 2013).

2. The Present Arms Dynamics in the New KMT Administration

Currently, with the KMT being a majority in congress, the new administration has the potential to revive Taiwan's arms dynamic but has not fully done so. Military investment on a limited scale after 2008 is reflected in two areas. Firstly, although President Ma Ying-jeou pledged three percentage of GDP for the defence budget, this goal has never been attained, with the portion of GDP remaining similar to that of the previous DPP administration (Murray, 2013: 2). With rising human costs in adapting full-voluntary troops for service, the low budget investment becomes even more inadequate. Although Beijing seems to allocate a smaller portion of GDP (2 per cent) to defence to Taipei, China's unclear budget and substantial growth would give it in financial superiority over Taiwan in the cross-Strait arms dynamic. In China's published defence budget, several areas, such as the procurement of foreign equipment and systems, are omitted and the actual expenditure would in fact be higher (OSD, 2013: 45-46). Moreover, China's rapid economic growth provides a far larger budget than Taiwan's. Thus, the gap between Beijing and Taipei in defence expenditure has increasingly expanded, and the latter seems not to respond effectively.

Taipei's falling investment in defence might be interpreted as the result of the domestic political struggle during the DPP administration, but it could not apply to the inaugurate KMT administration with its majority of seats in congress. Although loosing of cross-Strait relations might be considered as an explanation, it fails down in the light of the PLA's expansion of its offensive capabilities and the official Chinese intention to use force. Social and economic concerns, such as the global financial crisis since 2008, might be able to explain the relatively low expenditure on defence. However, the previous KMT administrations insisted a high priority of national defence in economic crises. For instance, during the first oil crisis between 1973 and 1974, Taiwan's economy was significantly affected, but defence expenditure was not (IISS, 1973: 50; 1974: 53; 1975: 53; Minns, 2006: 193-194). Regionally, Taiwan's percentage of GDP spent on defence since the end of the Cold War has been surpassed by several regional countries, including South Korea, Singapore and Vietnam (SIPRI, 2013).

Table 1 China's Expansion of Maritime and Aerial Capability since 2008

Type	Number	Note
Liaoning Class aircraft carrier	1	Carrying 18-24 J-15 fighters and 17 helicopters
Type 039A/B SSK (Yuan Class)	6/2	
Type 052C Destroyer	2	
Type 054/054A Frigate	2/15	
Type 056 Frigate	(6)	Launched and undergoing sea trials, but not yet in service
Landing Ship Mechanism (LSM)	12	
Type 071 Landing Platform Dock (LPD)	3	
JH-7/7A Fighter Bomber	152	
J-10/10A/10S Fighter	202+	
J-11/11B/Su-27SK/UBK Fighter	212	
J-15A/S Fighter	N/A	For aircraft carrier

Sources: IISS (2014, 2013 and 2008).

Secondly, with a limited budget, the extent of military modernization in Taiwan is more restricted than that of its Chinese counterpart, with an expanding maritime and aerial capability that can be used against Taiwan. The PLAN is acquiring a range of new major weapon systems and platforms with a purpose of strengthening its sea denial operations and also establishing a certain sea control capacity which is crucial for projecting forces to Taiwan. The PLAN Air Force (PLANAF) and the PLA Air Force (PLAAF) continue to introduce a

variety of advanced combat aircraft and the Chinese aero industry has even produced stereotypes of stealth fighters (OSD, 2013: 8). In contrast to Beijing's proactive attitude, Taipei's responses are relatively limited. Several projects that have been postponed for years, such as the P-3C Orion maritime patrol aircraft and the AH-64D Apache attack helicopters, were revived in 2008 and passed by congress. Those projects were reflected in the recovery of Taiwan's arms import amount (SIPRI, 2013). Since then however, very few new projects have been launched. All that has been undertaken is the purchase of UH-60 utility helicopters, the upgrade of F-16A/B, F-CK-1 fighters and the E-2K air warning and command system (AWACS). Furthermore, several current projects such as UH-60 have been delayed as a result of the financial issues (IISS, 2011: 205). The majority of current projects are in fact those remaining from the previous administration, with the Ma administration in power since 2008 adding very few projects. The small number of projects could also be a result of restrictions by Washington; however, with limited budget, Taipei seems to be unlikely to use the domestic defence industry to provide a sound alternative which occurred during the 1970s and 1980s (IISS, 2010: 390).

With the limited resources and the strengthening opponent, applying asymmetrical perceptions could be a solution for Taiwan to preserve its gradually inferior status in the cross-Strait dynamic.

3. Asymmetrical Operations

According to official publications, asymmetrical operations have been highlighted by the Ministry of National Defense (MND) in Taipei, due to the altered strategic environment (MND, 2013: 22). Derived from sea power theories, the concepts of denial and control are able to explain Taiwan's new countermeasures against Chinese military threats. Denial denotes the military capabilities to exclude an adversary's control over a specific space, whether sea, air or land, mainly through offensive tactics. Control is one step further on from denial, in which an enemy's control has been eliminated and the invading state takes over the control of a certain space in a specific time. For instance, submarines can deny an

Table 2 Taiwan's Military Build-ups after 2008

Name	Number	Launched Time	Note
AH-64D Apache attack helicopters	30	2008	Delayed due to budget war in the congress
P-3CUP ASW aircraft	12	2008	Delayed due to budget war in the congress
Patriot Advanced Capability (PAC)-3 missile defence missiles	330	2008	Delayed due to budget war in the congress
UGM-84 sub-launched Harpoon ASCM	32	2008	
F-CK-1 fighter upgrade	127	2009	
F-16 Upgrade	145	2010	
E-2K AWACS upgrade	6	2009	
UH-60M utility helicopter	60	2011	Not fully funded
CM-32 Armoured Personnel Carrier (Indigenous)	650	2010	Developed in 2007
HF-IIE ASCM (Indigenous)	245	2005	Under production
HF-III supersonic ASCM (Indigenous)	N/A	Earlier than 2004	Under production
RT-2000 Multi-Launch Rocket System (Indigenous)	57	1999	Under production
TK- III SAM	N/A	N/A	Under production

Sources: Waldron (2013); SIPRI (2013); IISS (2014, 2013); Kan (2013); DSCA (2013); Chang (2012).

adversary's sea control by sinking its major surface vessels, thus neutralizing the defender's fleet, and leaving a vacuum for the invader's surface vessels to build control (Grove, 1990: 12).

Before the PLA acquired its formidable denial capability, Taipei had focused on struggling for a control-oriented strategy, based around political and military concerns related to its military structure. Firstly, although launching offensive moves toward China became impossible in the mid-1960s, the ROC regime still held on to its political ideal to "retake the mainland", a political posture supported by maintaining some control capability plus offensive units, such as marine divisions (Cole, 2006a: 26). Secondly, as Taipei controls several islands near China's coastal lines, such as Matsu and Quemoy, and islands in the South China Sea, such as Itu Aba (Taiping) Island, control of the SLOCs is crucial to these islands. In order for the ROC regime to build its control capabilities, the ROCAF aimed to secure air superiority through its fighters, and the ROCN focused on sea control using its major surface vessels. However, in the last two decades both Taiwan's fighters and warships have become relatively vulnerable to the PLA's denial tactics, and face qualitative and quantitative challenges from their Chinese counterparts.

After several decades of development, the PLA now has considerable capability in two dimensions: denial and control. Although the potential confidence building measure across the Strait may provide some slight relief on the strategic pressure on Taiwan, the MND still has to cope on a structural level with the military challenges from China. China's denial capabilities are to block Taiwan's access to external support, including that of the US, and to sweep the air and maritime defences of Taiwan in order to achieve its air and sea control. The sphere of denial would be wider than that of control, because control requires extra efforts of defence and utilization rather than mere strikes. So far, Beijing's sphere of denial, based on the ranges of its various missiles, aircraft and submarines, is able to cover Taiwan and even further. China's sphere of control may cover Taiwan now or sometime in the near future (OSD, 2013: 32-33).

Table 3 China's Air Denial Capacity

Type	Number	Range (km)	Note
Short Range Ballistic Missile (DF-11, DF-15)	1100+	300-600	
CJ-10 Land Attack Cruise Missile (LACM)	54	1500-2500	Subsonic
Kh-59 ASM	150	115	Equipped with Su-30MKK
Kh-31P Anti-Radar Missile (ARM)	760	110	Supersonic. Suppress air defence.
YJ-63 Air-Launched Cruise Missile (ALCM)	N/A	200-500	Subsonic, equipped with H-6 bombers
YJ-100 ALCM	N/A	1500-2000	Subsonic
YJ-91 ARM	N/A	120	Supersonic
KD-88 ARM	N/A	180-200	Subsonic

Sources: IISS (2014); Erickson and Yuan (2011); OSD (2013); Rosoboron Export (2005); SIPRI (2013).

The Chinese denial capability consists mainly of various anti-ground and anti-ship missiles, along with other means, such as submarines, with the aim of neutralizing the two strategic pylons of Taiwan's defence: fighters and major surface ships. The ROC Air Force (ROCAF) fighters, the backbone of Taiwan's defence, would be able to constrain the operations of their PRC counterpart, or even defeat them and obtain air superiority as they did in the 1950s (Clough, 1978: 108; Zhang, 2003: 281). However, these fighter fleets have become vulnerable in the face of China's aerial denial capability against the

airbases in Taiwan. Possibly inspired by the Iraqi tactic of using Scud missiles during the first Gulf War in 1991, China began to deploy short-range ballistic missiles in the areas adjacent to Taiwan from the early 1990s, reaching a total number in 2013 of at least 1100 (Kagan, 2007: 126; OSD, 2013: 38). In addition, an increasing number of Chinese cruise missiles went into service from 2010, as well as air-to-surface missiles (ASM) carried by bombers and fighters, thus providing up-to-date means for strikes on the air bases and air defence facilities in Taiwan (OSD, 2008: 2). Taiwan's limited number of air bases would mostly be paralysed, or at least significantly incapacitated by the missile attacks (Murray, 2008: 22; Hagen, 2010: 2-3). With the short strategic depth and response time for missiles crossing the Strait, the ROCAF may not be able to evacuate its fighters in time (Pollack, 2006: 66-67). Moreover, the fighters and bombers of the PLAAF and the PLANAF could launch air raids right after the first missile salvos, with the result that any delay in the ROCAF's interception operation caused by previous missile attacks would make China's raids more destructive. Unless replaced by vertical-taking-off-and-landing aircraft (VTOL), short-taking-off-and-landing aircraft (STOL) or by building more air fields, this vulnerability would prevail and be further exacerbated.

The expansive sea denial capability of the PLAN and other services also thwart Taipei's naval strategy. The ROC Navy (ROCN) with about 26 principle surface combatants would be an important factor to counter the threats from the PLAN through a decisive battle or a fleet-in-being strategy (IISS, 2014: 281). Taiwan's fleet-in-being strategy would be to deploy these ships of a safe distance away from China's strikes, and then threaten or return to intercept an all-out amphibious invasion by China (Corbett 2004, 167). Considering the rising number of Chinese long-range anti-ship missiles equipped on submarines, surface vessels and aircraft, combined with assistance from their ocean surveillance satellites, electronic intelligence aircraft and other means of detection, the ROCN's fleets would be located easily and may suffer serious damages. Chinese sea denial capability, the core of the anti-access and area denial strategy, is also aimed at a potential US intervention and blockade of the SLOCs to Taiwan (OSD, 2013: 32).

Table 4 China's Sea Denial Capacity

Type	Number	Note
Type 091 nuclear attack submarines (SSN)	3	
Type 093 SSN	2	
Kilo (2 Project 877, 2 Project 636, 8 Project 636N) Class SSK	12	Equipped with 3M-54 anti-ship cruise missile (ASCM)
Type 035 SSK	20	Only equipped with torpedos
Type 039/039G SSK	16	Equipped with YJ-82 ASCM
Type 039A SSK	4	Equipped with YJ-82 ASCM
Type 039B SSK	8	Equipped with YJ-82 ASCM
JH-7/JH-7A Fighter bomber	120	Equipped with YJ-8 ASCMs
SU-30MK2 Fighter bomber	24	
H-6G Bomber (Tu-16)	30	
Y-8 Electronic Intelligence Aircraft	7	Collecting intelligence, maybe locating targets
Y-8 AWACS	10	Collecting intelligence, maybe locating targets
YJ-8 ASCM	N/A	Equipped with JH-7, range: 42km
YJ-82/YJ-83 ASCM	N/A	Equipped with JH-7, range: 180km
YJ-62	N/A	Equipped with H-6, range: 250km
3M-54 ASCM	150	Equipped with Kilo Class SSKs, range: 300km
Potential support from the PLAAF		
JH-7	120	
H-6A/H/K/M	90	
Su-30MKK	73	
Y-8 Electronic Warfare aircraft	13	
KJ-2000 AWACS	8	

Sources: IISS (2014); SIPRI (2014); Erickson and Yuan (2011).

Table 5 China's Air Control Capacity (PLAAF and PLANAF)

Type	Number
J-10A/S Fighter	268+
J-11/Su-27 Fighter	328+
Su-30MKK/MK2	97
J-8 E/F/H Fighter	168
AWACS (Y-8 & KJ-200)	14+
JH-7	240
B-6	112
H-6 Tanker Refuel Aircraft	13

Source: IISS (2014, 2013).

In terms of control, the PLAN and the PLAAF may have both sea and air superiority thus achieving a definite capability of projecting their forces to Taiwan. The PLAN originally achieved quantitative superiority in surface vessels, but those ships were vulnerable to ASCMs and air strikes due to their poor air defence capability and other obsolete designs. In the last two decades, China's expanding fleets of new major surface vessels, including an aircraft carrier, with improved air defence capability, may be able to escort its growing amphibious fleet if it were intercepted by the ROCN, in a case where the latter were able to survive China's massive missile attacks (Bussert, 2011: 22, 47). Regarding air power, the increasing number of advanced fighters, backed up by their AWACS aircraft and refuel-tankers, have rapidly replaced the obsolete fighters and would provide a direct challenge to their ROCAF counterpart, with quantitative and perhaps qualitative superiority of fighters (Ulman, 2011: 45-47). Furthermore, the PLAAF and the PLANAF have also strengthened their ground-attack capability with

Table 6 China's Sea Control Capacity

Type	Number	Note
Liaoning Class aircraft carrier	1	Carrying 18-24 J-15 fighters and 17 helicopters
Hangzhou (*Sovremenny*) Class Destroyer	4	
Type 051B Destroyer	1	
Type 051C Destroyer	2	
Type 051 DT/G Destroyer	4	Modernized Type 051 destroyers
Type 051 Destroyer	6	Lack of SAM, and ASCM counter capability
Type 052 Destroyer	2	
Type 052B Destroyer	2	
Type 052C Destroyer	4	
Type 054 Frigate	2	
Type 054A Frigate	15	
Type 056 Frigate	6	Launched, not delivered yet
Type 053H2G/H3 Frigate	14	
Type 053 H/H1/H1G/H2 Frigate	18	Lack of SAM, and ASCM counter capability

Source: IISS (2014).

ASMs, guided bombs and other munitions to suppress air defence forces and sweep out other defence in order to launch airborne or amphibious invasions (Shlapak, 2012: 201). Although China may not be able to concentrate all of its forces against Taiwan due to its wide and complicated strategic surrounding, with the PLA's increasingly quantitative and qualitative superiority over its counterpart, it would be likely for the former to gradually gather partial forces in order to use force against the latter.

As Beijing has achieved or will shortly achieve conventional military superiority over Taipei, asymmetrical operations are a feasible solution for the latter, given its limited investment in defence. As Taiwan's defence is mainly about protecting the democratic regime, its sovereignty, people and other traditional objects of national defence through its conventionally organized armed forces, most conditions of asymmetrical warfare do not apply in Taiwan's case (Snow, 2008: 296-299). Taipei's military build-up since 2008 could be interpreted as a shift on an operational level, from control to denial for its strategic reasons. Among various operational options, Beijing's strategic goal is clear: capture the island and annex it as territory. Accordingly, Taiwan's strategic goal should be to make China's air and sea control either unlikely or extremely costly. This goal could be served by using Taiwan's geographic environment to deny Chinese aerial and maritime platforms.

Aerial denial and sea denial are composed respectively of surface-to-air missiles (SAM) plus other air defence means, and ASCMs, sea mines and torpedoes on various platforms. These are relatively cheap and more likely to survive the first missile salvoes from the PLA. Furthermore, less offensive SAMs and ASCMs are more likely to be supplied by the US than other weapon systems. Taiwan's defence industry also has certain capability and experience to produce such missiles. Finally, Taiwan can extend denial targets to China's adjacent airfields and ports in order to create larger strategic effects with its cruise missiles (Hsu, 2007; IISS, 2011: 333; Chang, 2012). When both sides lose certain numbers of their transport facilities, the invader would suffer more than the defender, as it would be less likely to attain its goal of

conquering the other. In order to avoid Taipei's denial capability, Beijing could adopt a distant sea blockade tactic to force Taipei to surrender due lack of food, fuel or material. However, if Taiwan prepares well, a siege would need considerable time to be effective, and have a major impact on China's economy during the wartime period. As China's overseas trade is highly dependent on sea transport, its sea blockade against Taiwan would impede its own export and import ability. Thus, in terms of using force, Beijing does not have much room to evade Taipei's denial capability.

The denial aspect was included in Taiwan's military capability during the Cold War, with the portion of denial having been expanded since 2008. For aerial denial, since 1958 when the first SAM was introduced, Taipei has established a network of several types of SAMs with high density (IISS, 2013: 336; Clough, 1978: 104). The American PAC-3 and the indigenous Tien Kung III SAMs are being added into the original SAM network to deny China's control over the air space around Taiwan, and somehow neutralize ballistic and cruise missiles attacks (IISS, 2013: 351; Chang, 2012). In terms of sea denial, Taipei first obtained SSKs, ASCM and missile boats in the 1970s. Submarines should be a major means of sea denial but Taiwan maintains a small flotilla of four diesel-electric submarines, which two Guppy II class were launched during the World War II and the rest Dutch Zwaardvis class are the mainstay, only equipped with torpedoes rather than sub-launched anti-ship missile (Tucker, 2009: 78; Freeman, 1997: 86). In 2008, the sub-launched UGM-84 significantly strengthened the strike radius of the submarines. Additionally, the continuous production of indigenous HF-2ER, HF-3 ASCMs and the KH-6 stealth missile boats is aimed at bettering the ROCN's sea denial capability. With an extended range of 600-800km, HF-2ER missiles can strike not only vessels but also targets on-shore. HF-3 supersonic ASCM, equipped on KH-6 missile boats and other platforms, would issue more serious threats to the PLAN with a shorter response time (IISS 2013, 275). Regarding aerial platforms, the introduction of airborne AGM-84 Harpoon missiles enhanced the ROCAF's sea denial function (Kan, 2013: 57).

For Taiwan, the final resort of denial is an anti-landing operation, which would be conducted mainly by the ROC Army (ROCA). The Army has catered for this strategic mission in its structure for decades. The new projects include the RT-2000 multi-launch rocket system (MLRS), and AH-64E Low Bow Apache attack helicopters with AGM-114 Hellfire anti-armour missiles and Javelin anti-armour missiles, which are useful for attacking approaching landing craft and invading troops (Hsu, 2001; Kan, 2013: 57; Nelms, 2013). Finally, some additional investments, including long-range early warning radar, the upgraded AWACS aircraft, and the modernized C4ISR system (command, control, communication, computer, intelligence, surveillance and reconnaissance), would comprehensively improve the effects of denial operations (IISS, 2013: 273).

Despite a range of projects for denial operations, it is uncertain as to whether this strategy would work for several reasons: economic vulnerability and the drawbacks of the military and civil sectors. In economic affairs, China has considerable means of leverages over Taiwan. Based on matters such as the common language, similar cultural background, China's lower labour costs and investment-friendly policies, Taiwan's investment in China has continue to grow since the 1990s, with a concomitant increase in the cross-strait trade. In short, Taiwan's economy is overly dependent on China. Theoretically, economic interdependence might promote peace by creating mutual interests, meaning that the use the economic leverages might create mutual economic losses. In fact, as many countries also invested in China to dilute Taiwan's portion of the investment there, the bilateral economic interdependence gradually evolved into a situation where Taiwan become unilaterally dependent on China. Since 2008, more than 40 per cent of Taiwan's export is towards China, including Hong Kong. (Bureau of Trade, 2014). Furthermore, Beijing has demonstrated its willingness to use trade as a political tool during disputes with Japan and the Philippines, and its authoritarian regime was successfully able to absorb the side effects (Raine and Le Miere, 2013: 73). Thus, China would have great potential to exert strong pressure via economic means on Taiwan. Since most economic levers are non-violent, it would be

difficult for any third party to intervene. In that case, denial strategy would be useless.

Militarily, the ROC armed forces have several challenges in pursuing a denial strategy. Even when direct military competition is avoided, a successful denial strategy still depends on sufficient budgetary allocation to match both quantitative and qualitative requirements. Quantitatively, the denial strategy relies on surviving capabilities, which are based on surplus numbers of units, command chains and surveillance facilities available to effectively carry out the strategy. In addition, adequate training and exercises would be critical to make the strategy credible. Thus, the MND should be in a position to afford enough munitions, facilities and other items for training and redundancy. Qualitatively, as countermeasures against SAMs and ASCMs are available, a workable strategy could be developed using technological upgrades and research on other means of denial. Without sound investment in technology, the denial strategy would not however be sustainable as China could develop a variety of measures to neutralize Taiwan's denial capabilities. Apart from the capabilities of the denial strategy, other auxiliary units in Taiwan would be unable to cooperate as their tight budgets have made existing some equipment obsolete. In the ROC armed forces, a number of World War II era weapon systems such as howitzers and landing ships are still in service (IISS, 2013: 336). The safety and reliability of these antique arms would be problematic, not to mention their performance and integration with other newer systems. When proper investment and management are lacking, a snowball-like effect occurs as, the oldest equipment remains in service, whilst other mid-life-span equipment is also aging, resulting into a continuous increase in the amount of outdated arms. This not only reduces defence capability but increases modernization costs. Although some funds will be saved by postponing Taipei's move to all-voluntary soldiers from 2013, the continuously decreasing portion of the defence budget allocated to training and investment indicates that the remaining budget could be still insufficient, and thus impede the denial strategy (Murray, 2013: 3; IISS, 2013: 273).

The PLA's irregular tactics, such as espionage and sabotage, pose serious threats to Taiwan's denial strategy. In recent years, several cases of Chinese espionage have been discovered in the ROC armed forces, one even involving a general who was in charge of the C4ISR project (Callick, 2011). Furthermore, a number of retired high-ranking officers of the ROC regime visited China and publicly demonstrated a shift in their loyalty to the PRC regime (Mo and Su, 2011). Both these sensitive intelligence matters are likely to decrease the survivability of the denial forces of Taiwan in the first waves of attacks. The penetration of the Chinese agents and soldiers for sabotage purposes pose another serious threat to Taiwan's denial strategy. The Ma administration has formulated a variety of policies allowing an increasing number of Chinese to visit Taiwan for tourism, academic study, employment, business, kinship and other purposes (MAC, 2013). In other words, the PLA could project thousands of unarmed soldiers into Taiwan, where they could avail themselves of weapons and other equipment through smuggling or other channels. Although Taipei examines the background of Chinese visitors, Beijing is able to provide complete cover documents with its authority. A large enough number of PLA troops, even without heavy arms, would be capable of successfully sabotaging both the infrastructure and key units of the ROC armed forces, such as the chain of command.

Even if Taiwan were not to suffer seriously from leaked defence information and the mainstay of its forces survived, its denial capability, such as its submarines, would be insufficient. The great denial capability of submarines has been proved in both World Wars by the German and American navies. Considering Taiwan's strategic environment, submarines would be crucial in deterring and repelling invasion. Furthermore, China's economy, especially energy and national income through export, relies considerably on sea transportation and would thus be vulnerable, allowing Taiwan to exert additional leverage. However, as Taipei lost the opportunity of procuring submarines in the 2000s, its poor flotilla is unlikely to be improved in the near future.

Taiwan's specific geographic conditions mean that the preparation of civil sectors is crucial to its denial strategy, mainly civil defence and development of wartime economic strategies. With its small territory

lacking in strategic depth and with a high population density, an armed conflict or war would leave the whole island as a warzone. Thus, the civil sectors would be a key factor in determining whether the denial strategy works. Under denial operations, it is unlikely that the ROC armed forces would maintain international trade during wartime, meaning that sufficient strategic materials such as fuels should be stored in advance. The strategic reservation of fuels and natural gas in Taiwan could last 60 and 25 days respectively (Bureau of Energy, 2008: 25-26). However, in reality, this could be reduced into a much shorter duration, as large and obvious oil tanks and other storage facilities are easy targets for Chinese missiles and sabotage. Even if they survived, island-wide distribution during wartime would present another challenge, due to wartime disruption to traffic in an already rugged terrain. As the denial strategy might see a passive response to the invader's aggression, with the intention of prolonging warfare to counter the invader's blitzkrieg, the endurance capability of the population matters. This depends on both the government and the people.

Measures taken by government in preparation for wartime scenarios, such as plans for the provision of food, medicine, shelter and other basic needs, could counter public panic and maintain morale during wartime. Furthermore, the introduction of several more extreme methods such as censorship and suppression, where required might prevent rumours spreading and riots occurring. However, considering the poor performance of the government's administrative capabilities during several natural disasters in recent years, such as Typhoon Morakot in 2009, its ability to deal with a wartime emergency may be severely lacking (Branigan, 2009). Although historic cases such as those of Britain, Japan and Vietnam demonstrated the strong resilience of population during bombardment, people in Taiwan may not respond in the same way due to a lack of national identity. On matters of both the government and popular support, the resolve of political leaders in Taipei is even more decisive. Unlike disasters and other events in peacetime, pressure from coercive diplomacy before war breaks out, combined with damages and casualties during wartime provide the ultimate test of the leaders on the both sides, particularly of weaker ones

(van Creveld, 2008: 93-94). In the history of the ROC, there have been several occasions of leaders fleeing during wartime (Barnouin and Yu, 2006: 118). The resilience of elected leaders thus provides the final determinant in the denial strategy.

4. Conclusion

The denial strategy may provide Taiwan with a niche in the cross-Strait arms dynamic, but its strategic effects would be uncertain. Since the denial-oriented strategy is to curb China's strategic goal of capturing Taiwan through an asymmetrical means, it would provide Taiwan with certain deterrence against the PLA. However, without proper funding and support from non-military sectors, Taiwan's denial strategy leaves a number of weaknesses for China to exploit. Furthermore, the economic and other forms of leverages acquired by Beijing as a result of Taipei's open policies would provide alternative options to the use of force. Whether using force or not, Taiwan would face further restriction on its freedom of decision making in negotiations with China due to its declining gambit of resisting the latter's economic and military measures.

Note

* Dr Shang-su Wu 吳尚書 is Research Fellow at the S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore. He completed both undergraduate and M.A. programme at the Department of Political Science, National Taiwan University. He obtained his Ph.D. degree at the University of New South Wales. Dr Wu's research interests are Sino-Taiwan relations, defence policies of Taiwan, the Philippines, Singapore and other Southeast Asian countries. <*Email: issswu@ntu. edu.sg*>

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