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## MILITARY PREPAREDNESS AND SECURITY NEEDS: PERCEPTIONS FROM THE REPUBLIC OF CHINA ON TAIWAN

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Wang Chi-wu

WHILE THE U.S. GOVERNMENT'S "Taiwan Relations Act" of 1979 clearly states that the security of Taiwan is a serious concern of the United States, diverse opinions have been expressed in both countries about the security risks Taiwan is exposed to following the disruption of diplomatic relations between the Republic of China (ROC) and the United States. A number of American observers, both in and out of government service, maintain that the termination of the 1954 Sino-American Mutual Defense Pact and the breakup of U.S.-ROC diplomatic relations not only had not damaged Taiwan's security position but rather had reduced Taiwan's security needs. Richard Holbrook, the Assistant Secretary of State for Far Eastern Affairs in the Carter administration, for example, contends that the Taiwan Strait is calmer now than at any point in the previous three decades, and that, in fact, Taiwan faces no threat of a military nature from Communist China.

The argument that Taiwan's security risks are diminishing is based on the following assumptions:

1. The Moscow-Beijing antagonism is likely to persist. With the Soviet Union deploying about 20-25% of its ground forces along the Sino-Soviet border, and concentrating up to one third of its naval forces in Pacific waters, Communist China would not dare to commit its forces against Taiwan, for that may tempt the Soviet Union to attack mainland China from the rear and would thus open up a dangerous two-front war.

2. Deng Xiaoping's political leadership in Beijing is likely to pre-

vail. Mainland China seems to be serious about its policy of the "Four Modernizations" and is therefore dependent upon the West, especially the United States, for the infusion of capital and technology, without which the "Four Modernizations" could not get off the ground. An attempt to invade Taiwan would provoke rather strong reactions in the United States, and the leadership in Beijing would not risk this American displeasure.

3. The only real reason for Mainland China to seek a military solution to the "Taiwan issue" would be if Taiwan should seek to use the so-called Soviet option, which would result in the encirclement of the Chinese mainland from both the land and the sea. However, since it is extremely unlikely that Taiwan would play the "Russia card," Communist China and Soviet Russia are not likely to face a confrontation over Taiwan. This point was laboriously made by Michael Armacost, then Deputy Assistant Secretary of Defense for Far Eastern and Pacific Affairs, during the Senate hearing on the Taiwan Relations Act in 1979.<sup>1</sup>

In the eyes of the people of the ROC who live in the shadow of an enemy fifty times the size of Taiwan in both land area and population, these points are superficial at best and are perhaps downright spurious arguments designed to mislead the American people. In the first place, the assumption of a stable political structure and a moderate policy in the People's Republic of China (PRC) is considered to be wishful thinking. No sooner had the "normalization of relations with Washington" been consummated than an acute political power struggle surfaced again in Beijing. It was not simply a bid for supremacy between Deng Xiaoping and Hua Guofeng. All major factions either have joined the fracas or are juggling for better positions. While details of the lining up of factions may have shifted from time to time, it seems clear that Deng Xiaoping, as the front runner in the race for supremacy, has been a target of all the underdogs in Beijing. The People's Liberation Army (PLA) faction under the titular leadership of the aging Marshall Ye Jianying, the "Petroleum Gang" consisting mostly of the followers of the centralist economic planner Li Xiannian, as well as the "Remnants of the Gang of Four" who had thrown in their lot with the political fortunes of Hua Guofeng, have from time to time formed a coalition to prevent Deng from getting into a position where he can call all the shots. Meanwhile, two of Deng's top lieutenants, Party Secretary Hu Yaobang and Premier Zhao Ziyang, have also been sending subtle signals that they might not be going with Deng all the way now that they have attained sufficient stature.

Everything considered, the political struggle in the PRC is still too fluid to be considered stable and durable. The best evidence of the po-

<sup>1</sup> See *Taiwan: Hearings before the Committee on Foreign Relations, United States Senate, 96th Congress, on S.245 February 3, 6, 7, 8, 21 and 22, 1979*, Washington: U.S. Government Printing Office #41-117 0, 1979, pp. 667-671.

litical unrest in Beijing is that the 12th Congress of the Chinese Communist Party (CCP), scheduled by Deng before the end of 1980 to ratify and magnify decisions adopted in the September 1980 Plenary Session of the People's Representatives Council, has been postponed time and again. Reports from Beijing currently speculate that the CCP Congress may finally be called in June or July 1981 if Deng agrees to water down his de-Maoification stance and compromise his pragmatic policies. This points up the fact that Deng, although now the topdog, is far from having consolidated his power base. Furthermore, it should be kept in mind that if Deng could achieve a firmer hold on power by yielding his philosophical purity, he is quite capable of doing so. One possible bargain that may be worked out in Beijing, although not in the immediate future, would be a move "to normalize" relations with the Soviet Union.

In the second place, everyone in Taiwan is highly conscious that no Chinese Communist leaders have ever renounced the need to eventually use force against Taiwan. On the other hand, the people in Taiwan are quite sensitive to President Carter's failure to use his political leverage to make Communist China move toward the renunciation of the use of force. In the past two and a half years, Deng and other Chinese Communist leaders have always claimed aloud that they would be patient and lenient with Taiwan, but, in the same breath, they would also warn Taiwan that their patience was not unlimited. At the same time, while promoting exchanges of mail, navigation, and commerce with Taiwan, Beijing never took the position that it wanted to negotiate with Taiwan as co-equals but always called for Taiwan "to come back to the fold." It is quite obvious that Beijing has been arduously manipulating its signals so that people in different parts of the world would read different meanings into those signals. For instance, the halt in the every-other-day shelling of Kingmen (Quemoy) since early 1979 has created the impression in the West that Beijing no longer contemplates military confrontation with Taiwan, yet the people on Taiwan believe the truce will be only brief and transient while Beijing determines if Taiwan can be "liberated" at lesser cost.

In the third place, it is believed in Taiwan that whether Beijing would use force against Taiwan is an issue to be resolved by internal political considerations in the PRC rather than by foreign policy considerations. A case in point was the 1979 border war between Communist China and Vietnam. Deng Xiaoping staged the invasion only a few weeks after his visit with President Carter in Washington, and there was no evidence that President Carter had acquiesced to, let alone approved, the proposition that Deng should "teach the Vietnamese a lesson." In retrospect, it seemed quite clear that the Vietnam border war of 1979 had set the stage for Deng's assumption of the chairmanship of the CCP Military Affairs Commission and the wholesale reshuffling of military area commandants in 1980. If in the future force should be

used against Taiwan, the decision would be dictated by domestic political considerations, and possibly a decision would be made in spite of foreign policy needs.

In Communist countries in general, and in Communist China in particular, power struggles at home would always take precedence over political implications abroad in decision-making. This is a point which often eludes the attention of the Western press. Under this hypothesis, Deng Xiaoping, or any other top leader in Beijing, would not hesitate to use force against Taiwan if it is judged to be advantageous to his power position at home; whether such a move would please or displease Washington is at best a factor of secondary importance. This is true as long as the U.S. does not consider military retaliation against Communist China an option. Thus the alleged dependence on the West for the "Four Modernizations" in terms of capital and technology is not considered by the ROC on Taiwan as a deterrent to Beijing's military adventurism. Early in 1981, when Beijing abrogated a series of contracts with Japan for the construction of major steel and petrochemical plants totaling over US\$2 billion, it became clear that the PRC had very limited capacity to absorb Western capital and technology. As a corollary, it is now extremely unsound to believe that Western capital and technology can be used effectively to constrain Communist Chinese political and military behavior.

Last but not least, it is believed in Taiwan that Beijing would to a large extent base any decision to use force against the ROC on military calculations. These will involve the following estimates on the part of Beijing:

(1) Can an invasion plan be staged successfully? If so, how long would it take?

(2) Will such a campaign trigger an American reaction to increase the supply of arms to Taiwan, thereby making for a long drawn-out war?

(3) If the campaign should last any substantial length of time, would it tempt the Russians to indulge in some land grabbing on the long Sino-Soviet border? How could Beijing cope with such Soviet pressure?

(4) Will a combination of the above factors trigger another round of power struggles at home? How can the challenge to Beijing's leadership at home be dealt with?

These military calculations point to the fact that time is of paramount importance. In other words, Beijing would start an invasion of Taiwan if it believed a blitzkrieg would be successful, but would hesitate if it felt that the invasion would result in a long drawn-out war. For a blitzkrieg-type of operation to be successful, superiority in both quantity and quality is required. For quantity, Communist China knows that Taiwan has already been stretched to the limit and can depend on internal resources to widen the gap to a sufficient differential. For superiority in quality, it has both to build its own capability and to weigh

carefully Taiwan's quality in personnel, equipment, logistics, field tactics, and strategy. American observers occasionally assert that Taiwan is obsessed with acquisition of sophisticated weapons. If Taiwan appears to be overly eager for high performance aircraft and high precision missiles, there is a good reason. Only through qualitative superiority in weapons and men can Taiwan gain time in the defense of the island, and if Taiwan can guarantee Communist China a long drawn-out war, there will be no war.

At the moment, when Soviet military strength is still increasing, a Communist Chinese invasion of Taiwan, though it cannot be ruled out, is not imminent. However, many strategists have forecast that the Soviet military build-up will level off, if not decline, after 1985. If this should come to pass, the war danger in the Taiwan Straits will tend to increase in the late 1980s and early 1990s. It is therefore reasonable to make scenario studies of Communist China's invasion plan against Taiwan targeted between 1985 and 1995, taking into consideration the economic and technological growth on both sides of the Taiwan Strait.

A basic assumption is that Communist China would not, short of a general war, use nuclear weapons against Taiwan. This assumption is based on the following simple analysis. First, the use of a single nuclear weapon tends to escalate a local or regional confrontation into a global war. After the death of Mao, the leaders in Beijing no longer perceive that they stand to gain in a global nuclear holocaust, at least not in the foreseeable future. Second, a nuclear attack would be so destructive that it might drastically reduce Taiwan's value as an economic prize. And third, a preemptive nuclear attack is not called for since Taiwan is not developing nuclear warheads and has no plan to do so. Naturally, Taiwan has made, and will continue to make, remarkable progress in the peaceful use of nuclear energy, and this capability can be converted to military purposes given a totally different political structure. However, Taiwan's peaceful intention in its nuclear power program is perhaps far more credible to Beijing than to Washington if one does not underestimate the efficiency of Communist China's intelligence network.

Under this assumption, only conventional, non-nuclear weapons will be contemplated in Communist China's invasion planning. A likely strategy would involve the following elements and phases:

- (1) A bid for control of the air space in the shortest period of time;
- (2) Neutralization of the ROC navy by a combination of aerial bombardment and submarine attacks;
- (3) Crippling Taiwan's industry, which is concentrated in a belt only 20-miles wide along Taiwan's west coast, by selective aerial bombardment. The objective is to do enough damage to demoralize the ROC armed forces. This phase may overlap with Phase (2) to some extent, depending on the number of available bombers and fighter-bombers;
- (4) Launching of a massive invasion against Taiwan following suc-

cessful amphibian operations against Kingmen (Quemoy) and Penghu (the Pescadores). All kinds of vessels and craft would be used, ranging from Yangtze River barges to motorized junks in large numbers. The staging of such a fleet along the many small ports on China's southeast coast would be vulnerable to ROC counter-attack so it would probably not begin unless Communist China had gained substantial control of the airspace over the Taiwan Straits in Phase (1); and

(5) Once established on Taiwan's beaches, the PLA would not hesitate to engage in "human-wave attacks," both to make up its deficiency in modern equipment and to terrorize the ROC population.

Obviously, the key to this campaign plan will be the fight to control the airspace over the Taiwan Straits. In 1958 and 1964, Communist China attempted to test the efficacy of the ROC air force and failed miserably. During the running battle in the air over the Straits and along China's southeast coast, the ROC air force achieved a kill-ratio of 14 to 1 in 1964, which stopped any further challenge by the Communist Chinese air force subsequently. At that time, F-100s and F-86s were the backbone of the ROC air force, while the Communists were using an assortment of MiG-17s and MiG-19s. In terms of aircraft performance, neither side could claim definitive superiority. But there were two decisive elements in favor of the ROC air force: better pilot training and stronger motivation, and availability of the heat-searching Sidewinder air-to-air missile, which the Communists did not develop until the mid-1970s.

If the battle were to be staged today, the result would be somewhat different. The ROC's F-5Es would be pitched against Communist China's F-7s (copies of the MiG-21s produced in mainland China's Shenyang Aircraft Factor and elsewhere). Both have supersonic capabilities in short bursts, with the F-7s having a slight edge in maximum speed but the F-5Es enjoying greater maneuverability. The Sidewinder-type of infrared guided air-to-air missiles, however, may no longer be a decisive factor. To say the least, the increased speed of the aircraft on both sides tends to restrict pilot reaction time to a few seconds and thus substantially reduce the efficacy of those weapons. The ROC air force still could depend on its superior pilot training and motivation, and its far stronger management system and maintenance network, but Communist China may rely on greater numbers of jet fighters if the Soviet threat can be discounted for the time being. The upshot is that, in all likelihood, the ROC air force still can maintain a relative advantage, but the control would not be as complete as it was in the 1960s and 1970s.

To project the situation into the late 1980s and early 1990s, further changes will occur. Communist China's F-8s will likely be in operation in considerable numbers. The F-8s, once jokingly referred to as the MiG-21½, are now known to be a delta-wing jet fighter of Communist China's own design. These fighters have now been manu-

factured and are under testing. Reputedly, they are not deployed because they suffer from stability and control problems.<sup>2</sup> It would be too risky to assume that such technical problems would not be resolved by Communist China's aircraft industry in five years' time. No one knows precisely the performance characteristics of the F-8s, but defense planners in Taiwan must assume that they are superior to the F-7s and therefore may outmatch the F-5Es. Furthermore, Communist China has already produced and deployed its A-5s (previously misidentified as F-9 Fantans by Western sources),<sup>3</sup> which are subsonic fighter-bombers designed for close ground support. The A-5s, being enlarged versions of the MiG-19, might be effective against the ROC's naval vessels and its defense installations on the offshore islands if Communist China could gain a substantial measure of airspace control. It is noteworthy that the A-5s have been developed and manufactured at the Nanchang Aircraft Factory, the aviation industry facility closest to the Taiwan Strait. Given the lack of integration in Communist China's defense industries, the selection of the manufacturing site might very well involve consideration of using the same facility for maintenance support near the projected theater of operation.

Under the scenario that control of the airspace is not likely to be achieved by either side in an absolute sense in the late 1980s and early 1990s, it becomes important to ROC defense planners that a capability be established in Taiwan to roll back enemy airbases if war should break out. The "rollback" strategy is conceived with a host of relevant factors in mind:

(1) To begin with, Taiwan's population centers and industrial zones, all crowded on its west coast, must be protected from enemy air raids because the ROC prefers not to fight a protracted war on land on the island bastion. Once the enemy air bases are rolled back, the enemy fighter-bombers will have to reduce their payloads, and the escorting jet interceptors will have range constraints which would curtail their operation time.

(2) The enemy aircraft from more distant bases will encounter serious problems in searching out the ROC's surface naval ships.

(3) The ROC's newly acquired early warning radar network could not be expected to function with optimum efficacy if the forward enemy bases are located less than 200 kilometers from Taiwan's shores. On the other hand, if the enemy air bases are rolled back, the enemy can hardly use port facilities on the coast of Fujian, southern Zhejiang, and northern Guangdong staging points for a massive invasion because those port facilities would lie within striking distance of the ROC air force.

(4) Within some 500 to 600 kilometers of Taiwan's west coast, the topography of southeast China is indeed very rugged. Presently, the

<sup>2</sup> See *Aviation Week and Space Technology*, June 9, 1980, p. 18.

<sup>3</sup> See *Aviation Week and Space Technology*, October 1, 1979, p. 20.



only viable air base facilities within this periphery are to be found near the coastal cities of Xiamen (Amoy) and Fuzhou. On the other hand, the ROC air force now uses a dozen or more air bases with stronger facilities and infrastructure investments on Taiwan. Once the air bases at Xiamen and Fuzhou are neutralized, the enemy is likely to roll back its centers of operation by 300 kilometers or more. In fact, modern air bases will be difficult to build within this 500-kilometer radius. The transportation network within this rugged hill area is both primitive and vulnerable. There is only a single railroad connecting Fujian and Jiangxi, and it is vulnerable because it goes through numerous tunnels and bridges. Similarly, the highway network is backward and vulnerable to ROC air attacks. Such topography tends to enhance the value of a "rollback." Once the air bases are removed from the coastal cities, they probably will be relocated either in Shantou in northern Guangdong or to the northwestern part of Zhejiang, or to the Jiangxi basin around the great lake Poyang. In any case, the added distance will help the ROC establish substantial control of the airspace.

Western observers are sometimes puzzled about Taiwan's obsession with the acquisition of high-performance jet interceptors. In fact, without a generation of fighters that have heavier payloads and stronger staying power, the ROC air force cannot be expected to destroy the enemy's advance air bases and to force the enemy to roll back some 300 kilometers or more. This is all the more important because Taiwan is such a small island where the ROC air force has nowhere to roll back to. Enemy space, therefore, must be used to provide time for Taiwan's defense.

Under this type of strategic planning, the ROC's desire to obtain F-16 fighters becomes understandable. The F-16 has far greater range and payload than the F-5E and may be able to roll back the enemy with dispatch. What should be emphasized here is that the rollback strategy is conceived strictly as a defensive strategy even though it calls for deployment of aircraft which are sometimes classified as having "offensive capabilities." In this day and age, it is perhaps foolish to try to differentiate "defensive weapons" from "offensive weapons." What Taiwan must have are weapons adequate for its defense. Everyone in the Republic of China perceives the intention of the Taiwan Relations Act in this way. Unfortunately, there still seem to be arguments in the American press that only "defensive weapons" can be sold to Taiwan. If the "defensive weapons" theory were carried to its logical extreme the U.S. could not even sell Taiwan "Saturday night specials."

As far as Taiwan's defense planners are concerned, the debate on the performance specifications of the proposed F-X should also be focused on the F-X's capability to start an enemy rollback. From very incomplete information, the F-16-79 (proposed by General Dynamics) would use the GE J-79 power plant, with a reduction of perhaps more than a third of its propulsion thrust but without comparable reduction

in weight. On the other hand, the Northrop F-5G, yet to be designed, is reported to use a most advanced turbojet power plant, but the very light F-5 airframe probably will be retained. As a result, both are not entirely satisfactory. At this point, when specifications of the two versions of the F-X are not announced, no real trade-off study is possible. Naturally, much of the ROC's strategic planning will depend on technological and industrial developments on both sides of the Taiwan Straits.

A great deal has happened in the Republic of China on Taiwan. Immediately following President Carter's announcement of the derecognition of the ROC on December 15, 1978, a massive movement to raise funds to boost the national defense industry was started spontaneously in every city in Taiwan. Within six months, this movement netted more than NT\$4 billion (US\$100 million) from millions of small contributors. The significance is in the sum total of contributors who represent a national consensus that self-reliance in defense technology must be regarded as a top priority item in the nation's programs. In 1981, when Taiwan is facing the spectre of both a deficit in its international trade and a deficit in its international payments, the newly elected National Legislature worked hard to curtail government spending. However, no voice has been raised to cut defense spending or the budget for defense-related research and development activities.

A tremendous, and largely successful, change has been made in the relationship between the defense industry and the civilian industry in Taiwan. Interactions between these two had been minimal prior to 1979 when numerous measures were taken to contract out to the civilian industry components with military applications. Because of the ROC armed forces' restricted budget, many manufacturers are known to take defense contracts at drastically reduced profits.

A conscientious effort has also been made in Taiwan to differentiate defense technology from defense industry. The decision to make or buy is always a difficult one for the ROC defense authorities. To make defense hardware in Taiwan is often hampered by the limited demand. On the other hand, to buy such an item from abroad would often involve political complications. The resultant policy is therefore to develop at home the requisite technology to the hilt, in the hope that this may give Taiwan broader options on procurement abroad.

In high technology weaponry, Taiwan in the past three years has made impressive progress. On National Day (October 10) in 1979, the government paraded the newly commissioned Hsiungfeng (Hornet) missiles on Taipei's streets. These are surface-to-surface missiles, using a target acquisition system by radar locking and a wave-top trajectory which helps to evade enemy radar detection. Both the ROC navy and its forces for coastal defense are now using the Hsiungfeng missiles, which are considered to be superior, at least for the time being, to Communist China's Styx-type missiles in accuracy and in radar-evading capability. It is no secret that air-to-air missiles and ground-to-air mis-

siles are under development in Taiwan to improve its air defense network. These activities, however, should fall into the category of technological development rather than industrial development. The goal seems to broaden Taiwan's procurement opportunities because it would be very hard to produce such weapons in small quantities.

Taiwan's aviation industry is facing formidable odds because it is almost impossible for it to penetrate civilian markets. So far Taiwan has been able to produce excellent jet trainers, which in an emergency can also be used as aircraft for close ground support, and is about to unveil a medium sized turboprop transport to replace its aging fleet of C-119s. These activities, however, are a far cry from the design, testing, and fabrication of high-performance jet fighters. For years Taiwan has had a co-production contract with Northrop on the F-5Es. Since the co-production does not include the power plant, it is not much more than a co-assembly scheme. If the F-Xs are to be co-produced in Taiwan, the ROC certainly will request a higher level of technical cooperation.

Training and maintenance capabilities for advanced weapons, especially jet fighter-bombers, in Taiwan are excellent. It is a known fact that during the Vietnam War many of the U.S. Phantom (F-4) jets were repaired and overhauled in Taiwan, much as the Saber (F-86) jets were serviced in Japan during the Korean War. Because of the rapid development in jet fighters, airborne armaments, and military electronics, however, the ROC armed forces may not sustain its state-of-art level in training and maintenance unless training opportunities in the U.S. are open to ROC officers and military technicians.

The developmental potential for defense in Communist China is quite different. After a massive infusion of Soviet technology in the 1950s, mainland China lived in self-imposed isolation for almost twenty years. Self-reliance on defense technology and production was transformed from a slogan to a habit. However, the isolation was at times more apparent than real. Communist China, while refusing to have normal interactions with the international community of science and technology, has always maintained an information network for the collection, analysis, and dissemination of scientific and technological information. This network has also been augmented by espionage activities. Moreover, a number of top-notch Chinese in science and technology had returned to mainland China from the West, bringing with them knowledge, ideas, and experience without which Communist China could not have made breakthroughs in nuclear weaponry and ballistic missiles. And last but not least, Hong Kong had been used as a convenient back door through which clandestine exchanges of people and goods could be arranged.

There are, naturally, many weaknesses in Communist China's technological establishment:

(1) Even though Communist China professes to practice centralized planning, the planners have no experience in the coordination and

management of modern engineering projects. The result is that productivity is extremely low, quality assurance is weak, and cost-effectiveness is very poor.

(2) While defense-related activities, especially in the high technology areas, were largely immune to the social and political upheavals of the 1960s and 1970s, technocrats were never given much voice in basic decision-making. At the same time, the breakdown of the education system during the "Cultural Revolution" made the recruitment of technical manpower a difficult and hazardous undertaking. The effect will be long lasting.

(3) In the Soviet fashion, Communist China has built up a technological community that emphasizes compartmentalization and discourages horizontal communication. For example, Jiaotong University and Fudan University are two institutions in Shanghai designated to develop electronics. People at one university often must try to learn what the other is doing from foreign visitors. Under these conditions, cross-fertilization of ideas is very difficult.

(4) Lack of computer facilities and qualified computer personnel would often delay engineering projects. Even though defense-related projects normally would receive top priority in computer facilities and computer time, the management system is still very poor and could not optimize utilization of existing facilities.<sup>4</sup>

On the other hand, defense-related research, development, and engineering activities in Communist China have their unique strengths. First, motivation has been strong in a society where individual incentive has been looked upon with contempt. Even under Deng's pragmatic policy, individual incentive is merely recognized as a necessary evil. People would compete for jobs in defense-related high technology fields in order to be exempt from traumatic political upheavals. This type of negative incentive is rather peculiar to a totalitarian society. A surgeon from Beijing once explained why the medical profession enjoyed high prestige in mainland China: "The pay is only slightly higher, but medical doctors alone can authorize sick leaves. During the Cultural Revolution, even a fervent Red Guard would want a few days off on sick leave."

Second, project managers could normally disregard safety and environmental factors. More often than not, they could even assume an attitude of "cost be damned." These characteristics of the management system are largely responsible for the fact that breakthroughs can be achieved in defense-related technologies in a society where general standards of industry are very poor.

Third, emphasis on self-sufficiency in each installation, while uneconomical, tends to assure the survival of each facility in times of

<sup>4</sup> See Leo A. Orleans, ed., *Science in Contemporary China*, Stanford: Stanford University Press, 1980, pp. 385-399.

emergency. Most of Communist China's aircraft factories, for example, are assigned to make a single or a few products. They seldom contract out the fabrication of sub-systems or components. Some are known to make their own machine tools. Of course, whether such versatility should be regarded as an asset or a liability is debatable even from the military viewpoint. Under this system, for example, interchangeability of parts in military hardware is almost beyond hope.

Finally, Communist China has a demonstrable ability in reverse engineering. The Soviet Turmanskyy R-9 turbojet engines, which power the MiG-19 fighters, were duplicated in the Shengyang Aircraft Factory to power the F-6s. Likewise, the Turmanskyy R-11 engines were duplicated at the Xi'an Aircraft Factory to power the F-7s. It is noteworthy that after Egypt broke with the Soviet Union after the 1973 Middle East war, efforts were made to adapt a Rolls-Royce engine to power the leftover MiG-21s. The project failed because of vibration problems. Simultaneously, the duplication of MiG-21s in Communist China fared far better. In the duplication of the Turmanskyy R-9, it was reported that the designation was changed to WP-6 when, after a while, the Chinese Communists modified the engine design by putting in air-cooled turbine blades of their own design and thereby doubled the engine's overhaul lifetime.<sup>5</sup> If military-related technology is to be sold to Communist China by the United States, the factor of reverse engineering must be weighed carefully by Taiwan's defense planners.

Because of a host of uncertainties in Communist China, any forecast of its technological development, even in the short term, will be speculative. As far as planning for an invasion of Taiwan is concerned, however, it seems that Communist China intends to depend on development at home and political maneuvering abroad to block Taiwan's procurement efforts in the effort to catch up with the ROC lead in military quality. A primary concern on the part of Beijing may be a shortage of foreign exchange reserves. On the other hand, the ROC defense planners would prefer to buy from abroad rather than to make every item at home, especially high technology weaponry. The reason again can be traced to ROC's foreign exchange holdings and its limited scale of economy for non-export industries. If the ROC armed forces should stand still, its edge in quality over the PLA can be eroded in five to ten years' time. Both sides are therefore engaged in a race against time. As far as the ROC armed forces are concerned, new equipment, especially high-performance jet aircraft, high-precision homing missiles, and military grade electronics, must be ordered now. It would usually take three to five years, for example, to deliver a jet fighter, and there may be further delays before its actual deployment. This perhaps explains why, even when the Taiwan Straits appear to be calm and tranquil, Beijing would go all out to frustrate the ROC effort to ob-

<sup>5</sup> See *Aviation Week and Space Technology*, June 9, 1980, p. 19.

tain a new generation of better jet fighters now. At the same time, it is quite understandable why Taiwan is eager to upgrade its air force and naval equipment, for the quality gap is Taiwan's best insurance for peace.

Obviously, the ROC defense planners prefer to stop an enemy invasion force in the air and at sea. However, the contingency of waging battle on Taiwan's beaches, city streets, and hills is not lost. Across-the-board military preparedness is not much talked about at the present time but is effectively practiced. The first task is to minimize the enemy's numerical superiority. A thorough system of universal military training was launched a quarter of a century ago and is vigorously maintained. The ROC army, for example, commands an immediately mobilizable reserve force of over two million men. Strict annual refresher training programs are an important feature to ensure the efficacy of the army reserve. Government officials of the vice-minister rank, for example, are not excused from calls to refresher training if they are young enough (under 50) to be in the army reserve. Communist China of course has a far larger reserve force in its militia. However, since the downfall of the Gang of Four, the loyalty of the Communist militia has been in doubt. Consequently, the militia receive very little refresher training. Chen Yun, a maverick leader and sometime supporter of Deng Xiaoping, once remarked that the net effect of the militia was that it required half of the PLA to act as their watchdogs so that they did not get into mischief.

After the expiration of the one-year moratorium on arms sales to the ROC imposed by President Carter at the time of his "normalization" with Beijing, arms sales resumed in 1980. Carter's offers included TOW missiles and M-48 tanks with gasoline engines, which seemed to imply that, as far as he was concerned, the defense of Taiwan began with Taiwan's beaches. Public opinion in Taiwan was outraged. However, the ROC government accepted the items offered. The TOW missile was, after all, the best anti-tank missile, provided users enjoy sufficient air cover, and the M-48 tanks could be replaced with diesel power plants manufactured by Taiwan's industry. Nevertheless, the important point of this decision was to deliver a message to the people that they must fight a last ditch battle if needed. The determination of the ROC people to defend their chosen way of life, in the final analysis, is a very effective deterrent to any invasion attempt.

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