

## CAN CHINA CONQUER TAIWAN?

By Michael O'Hanlon\* (July 2000)

After a decade of intense focus on Iraq and North Korea, the U.S. defense planning community needs to devote more attention to possible war in the Taiwan Strait. The China-Taiwan relationship is structurally unstable, and potentially explosive. China (also known as the People's Republic of China, or PRC) insists that Taiwan is a part of its territory, whereas Taiwan refuses to be ruled by Beijing.

Although Taiwan's new president, Chen Shui-bian, has stated that he will avoid declaring independence from the PRC, his Democratic Progressive Party has long called for just such a declaration of independence. Chen himself is willing to forgo one only on the grounds that it is unnecessary, given that Taiwan is already sovereign in his eyes.<sup>1</sup>

Beijing has welcomed President Chen's restraint, and even offered to view the TAIWAN as an equal partner in negotiations rather than as a local, renegade government. But it has also issued a recent white paper threatening that it will not wait for reunification indefinitely, stated that Chen must publicly renounce his party's stand on independence and explicitly reaffirm the "one China" principle, and reminded the international community that it reserves the right to use force against Taiwan to "safeguard its own sovereignty and territorial integrity."<sup>2</sup> Chinese officials recognize that their military will not excel until their economy develops further—a conclusion that would seem to counsel strategic patience on Beijing's part.<sup>3</sup> They also understand, however, that Taiwan is improving its own armed forces, and note pro-independence trends among the Taiwanese population. For the Chinese, these latter concerns argue against patience.<sup>4</sup>

Any war between the two Chinas could easily involve the United States. Under the 1979 Taiwan Relations Act, official U.S. law stipulates that the United States would view any conflict over Taiwan with "grave concern."<sup>5</sup> The 1995-96 Taiwan Strait crisis showed that the United States does not take its interest in Taiwan's security lightly. A 1995 visit by Taiwanese President Lee Teng-hui to his American alma mater, Cornell University, provoked China to conduct military exercises and fire missiles near Taiwan, leading the United States to send an aircraft carrier through the strait that same December for the first time in seventeen years. In March 1996, the PRC launched more missiles near Taiwan; in response, the United States deployed two carriers in the vicinity as a show of strength.<sup>6</sup> Largely as a result of the 1995-96 crisis, much of the U.S. Congress has lost patience with the existing U.S. policy of strategic ambiguity—by which Washington suggests to both Taipei and Beijing that it might help Taiwan defend itself, but does not commit itself to doing so—preferring an unambiguous commitment to defend Taiwan instead.<sup>7</sup>

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War over Taiwan could take a number of forms. An attempted PRC invasion of the TAIWAN is the most dire possibility, and my primary focus in this article. Some Pentagon analysts believe China could prevail in such an attack. As a 1999 Department of Defense report puts it, a “campaign would likely succeed—barring third-party intervention.”<sup>8</sup>

China’s true views on the feasibility of the invasion option are unclear, but worrisome.<sup>9</sup> Notably, when threatening Taiwanese voters not to choose Chen just before their March 2000 presidential elections, Chinese Prime Minister Zhu Rongji suggested that China’s resolve would overcome whatever material shortcomings PRC armed forces might face. As he put it, “People making such calculations [that China could not take Taiwan] don’t know about Chinese history. The Chinese people are ready to shed blood and sacrifice their lives to defend the sovereignty and territorial integrity of the motherland.”<sup>10</sup> On the other side of the strait, many Taiwanese defense planners believe they could not hold off a Chinese assault indefinitely without U.S. help.<sup>11</sup>

My conclusions suggest strongly, however, that China could not take Taiwan, even if U.S. combat forces did not intervene in a conflict. Nor will China be able to invade Taiwan for at least a decade, if not much longer. As such, Washington need not abandon its policy of strategic ambiguity. China should be deterred from attempting an invasion by the military impracticalities of the scenario, regardless of U.S. policy.

Coercive uses of force are more likely—both because their costs to Beijing would be lower, and because their prospects of success would be greater. They include, most notably, a ballistic missile attack or a naval blockade.<sup>12</sup> In these scenarios, however, the United States would have time to make any necessary military response; Taiwan’s very survival would not be at immediate risk. Given the dangers of a policy of strategic clarity, which could embolden Taipei to move toward independence and produce a major crisis, strategic ambiguity therefore still makes sense.

As for sales of U.S. weaponry to Taiwan, they must balance military need with broader strategic impact. Antisubmarine warfare capabilities should be a top priority, as should assistance in hardening airfields, command centers, and related infrastructure. By contrast, missile defenses should be handled carefully. In particular, Aegis-class destroyers should not be sold to Taiwan at this time. There are less incendiary, more timely, and more economical ways to improve Taiwan’s missile defenses.

My article proceeds as follows. The next section reviews the fundamentals of amphibious assault. The following section analyzes the military feasibility of an attempted PRC invasion of Taiwan. The third section considers possible Chinese missile attacks and blockades against Taiwan. The fourth section examines trends in the military balance. The conclusion considers policy implications for Washington.

## **PRINCIPLES OF AMPHIBIOUS ASSAULT**

The history of amphibious assaults suggests three key elements—if not absolute prerequisites—to a successful invasion. First, an attacker should achieve air superiority. Second, the attacker should try to use maneuver, surprise, and strength to land troops in a place where they locally outnumber defenders in troops and firepower. Third, it should try to strengthen its initial

lodgment faster than the defender can bring additional troops and equipment to bear.<sup>13</sup> In successful amphibious assaults of World War II and the Korean War, the United States and allies typically possessed all three advantages [see Table 1].<sup>14</sup>

Attackers can succeed even if they lack some of these three ingredients to success. For example, the British did not have decisive air superiority when landing on East Falkland Island in 1982. In that conflict, the United Kingdom initially brought just a brigade ashore, later reinforcing it with additional amphibious as well as airborne units to make for a total of 9,000 troops against 14,000 Argentine defenders on the island. Britain achieved surprise, however, surreptitiously landing the invasion force in Falkland Sound on a dark night, and advancing beyond its initial lodgment without encountering opposition. (Argentina was weak in night vision technology, and failed to adequately patrol the island with infantry soldiers.) The superior competence of British troops also helped them prevail—as did the Falklands’ distance from mainland Argentina (about 400 miles), which limited Argentina’s ability to use its aircraft effectively.<sup>15</sup>

But if an attacker lacks any of the three key elements of a successful amphibious assault, any mistakes it makes can easily prove fatal to the invasion attempt. A good example is the Allied experience at Gallipoli, Turkey, in 1915. There, the two sides ultimately brought comparable numbers of troops to the battle. Despite their lack of numerical superiority (and, for that matter, air superiority), the Allies managed to find ways to get some forces ashore unopposed, and appear to have had a real chance to win. But the operation was conducted too gradually and tentatively; Turkey was able to recover from its various setbacks by bringing in reinforcements, laying mines, preparing defensive positions, and galvanizing troops’ morale.<sup>16</sup>

Consider also the 1944 U.S.-British landing at Anzio, Italy (south of Rome). The Allies had a substantial aircraft advantage in the theater, and also wielded considerable naval gun power in the vicinity. They pulled off a successful landing, managing to get forces ashore generally unopposed, but did not have the capacity for a rapid buildup. Germany responded quickly to the attack, bringing in enough units to quickly outnumber the Allies and pin them down. Germany also showed that even a badly outnumbered air force could make effective raids against ships and other critical assets. A long winter of German siege warfare against the Allied foothold ensued. The situation did not change appreciably until spring, when Allied reinforcements arrived in Italy en masse.<sup>17</sup>

In modern times, amphibious assault forces must worry about antiship and surface-to-air missiles, not just mines and guns. Amphibious assault against fixed defensive positions has if anything become harder—leading the U.S. Marine Corps now to place a premium on maneuver and speed rather than traditional frontal attack.<sup>18</sup>

As the analysis below demonstrates, for the present and at least a decade beyond, the three key elements to successful amphibious assault will almost surely remain out of China’s reach.

## **COULD CHINA INVADE TAIWAN?**

For China to seize Taiwan, it would probably have to begin by attacking key assets including airfields, command-and-control facilities, and ships using its missiles, aircraft, and special forces.

It would hope to do so with surprise, so that Taiwan could not first relocate its airplanes, get its ships under way, and begin general military mobilization while its command-and-control infrastructure was still intact. This tactic would constitute China's only hope of establishing air and sea dominance, which in turn would represent its only hope of rapidly deploying enough troops ashore on Taiwan to stand a chance in subsequent land battles.

After the surprise attack, China would then assemble and load up amphibious and airborne assets to cross the Taiwan Strait en masse. It would simultaneously swamp the strait with many other ships as a distraction to Taiwanese and U.S. reconnaissance assets, and as a magnet for Taiwanese antiship missiles that might otherwise be fired at valuable military vessels. China would hope to use control of the skies, together with mass confusion in Taiwan created by its preemptive strikes, to limit Taiwan's ability to move reinforcements to areas that PRC airborne and amphibious forces would then attack.

### Initial PRC Attacks with Missiles, Aircraft, and Special Forces

To carry out a successful surprise attack against key Taiwanese assets, China could not start loading and sailing most of its ships toward Taiwan until after the missile and air strikes began. In fact, the PRC would do extremely well simply to prepare its air and missile forces for the attack without having those preparations noticed by Taiwanese and U.S. intelligence.

Consider first China's large ballistic missile force. These missiles are numerous, perhaps now totaling 200 in southeastern China near Taiwan, with the PRC adding an estimated 50 missiles a year there, according to U.S. Pacific Comdr. Adm. Dennis Blair.<sup>19</sup> (China is also reportedly modernizing its air defenses in that vicinity and elsewhere, replacing SA-2 surface-to-air missile systems with the SA-10, also known as the S-300.<sup>20</sup>) China's ballistic missiles are inaccurate, however.<sup>21</sup> They might achieve an occasional hit on a runway, but the missiles' accuracy—typically no better than 300 meters—would be too poor to make that happen more than every tenth shot or so.<sup>22</sup> And runways can absorb a number of hits before being incapacitated; up to 100 properly distributed craters could be needed to shut down operations at a single runway.<sup>23</sup> China presently lacks advanced submunitions that could reduce the number of missiles required per base.<sup>24</sup> To shut down a runway even temporarily using conventional munitions, therefore, literally hundreds of ballistic missiles might be required—virtually the entire PRC inventory.

Chinese attack aircraft could probably do better. If China could get several hundred of its 800 to 1,000 attack aircraft through to runways, it could render some of them unusable at least temporarily, and perhaps destroy part of the Taiwanese combat air fleet on the ground as well.<sup>25</sup> But it is not clear that all or even most of China's attack planes would be available against airfields. Moving the bulk of them to bases near Taiwan could tip Taipei and Washington off about a pending military action, allowing Taiwanese air defenses to be alerted, mines to be laid, and reservists to be mobilized. Even if China could move most attack aircraft within combat range of Taiwan clandestinely, it might have to use substantial numbers against Taiwan's air defenses and command-and-control assets, as well as Taiwan's 37 surface combatants and 59 smaller coastal combatants that carry antiship missiles. China has a large number of submarines that it could try to use against these ships, but most are in poor condition, and surging them to sea could tip off Taiwanese authorities about a pending attack. Finally, China has never demonstrated the capacity to orchestrate more than a few hundred air sorties a day.<sup>26</sup>

Assume nonetheless for the sake of conservatism that China could use the majority of its entire attack plane inventory against Taiwan's air bases. Most PRC attack aircraft could carry only a few unguided bombs (China's cruise-missile and precision-strike capabilities are quite limited and rudimentary).<sup>27</sup> Making very favorable assumptions about the accuracy and effectiveness of the Chinese munitions, it is likely that at least three dozen planes would be needed to shut down a given runway—meaning that about fifty planes might have to be dedicated to each location (allowing for aircraft breakdowns, attrition, poor aiming, and other problems).<sup>28</sup>

Theoretically, the entire PRC air armada might thus incapacitate Taiwan's best dozen or so airfields. More likely, it might shut down operations at the three or four bases where Taiwan keeps its most advanced fighters. But Taiwan would immediately begin to repair its airfields. China could undertake subsequent attack sorties, but Taiwan's anti-aircraft artillery and SAMs would then be on a high state of vigilance. Because Chinese planes do not carry precision munitions as a rule, they would have to fly low; China could easily lose 10 percent of its planes on each subsequent sortie. Also, given their poor state of repair, and their lack of night-flying capabilities, it is implausible that most PLAAF (People's Liberation Army Air Force) and PLAN (People's Liberation Army Navy) aircraft could fly more than two sorties before darkness or maintenance requirements grounded them. PRC aircraft rarely fly more than one sortie every two to three days; their mission-capable rates are poor, and repairs are frequent as well as time-consuming.<sup>29</sup> Given that most PRC amphibious ships would need more than a day to reach Taiwan (most are not based near the strait in peacetime, and moving them there as well as loading them prior to an attack would alert Taiwan), Taiwan could use the night to repair many runways. PRC attacks on subsequent days would be much less effective.<sup>30</sup> They would become particularly ineffective if the weather turned cloudy, since Chinese pilots generally require visual identification of targets to attack them.<sup>31</sup>

China could try to directly attack Taiwanese aircraft, as well as early warning and command-and-control installations, on the ground. Taiwan does not do enough to protect such assets at present.<sup>32</sup> Carrying out such attacks is difficult, however, for aircraft lacking precision-guided bombs, for pilots receiving only limited training in low-altitude flight, and against air defenses like those Taiwan deploys at its airfields and other critical infrastructure. Even if China could destroy some planes on the ground, Taiwan already has hardened shelters for many of its fighters and should soon be able to provide 60 percent of them with protection against anything but laser-guided bombs.<sup>33</sup> The costs of doing so are not insignificant—perhaps \$4 million per plane—but are far less than the purchase costs of the aircraft themselves.<sup>34</sup>

The Desert Storm experience is instructive here as an analogy. Coalition aircraft averaged dozens of strike sorties daily against Iraqi airfields during the war's first week, yet did not stop the Iraqi air force from flying about forty sorties a day.<sup>35</sup> The attacks included British planes dropping advanced runway-penetrating weapons known as the JP-233, and doing so precisely and from low altitude. Yet Iraqi airplanes continued to fly. So would Taiwanese planes, despite China's best efforts to stop them.

There are caveats to these generally optimistic conclusions. Shelters will probably not be constructed for larger planes, such as airborne warning and control aircraft, given the difficulty of doing so. For the sake of conservative planning, it should probably be assumed that Taiwan would not have such aircraft available for combat, having lost them to preemptive PRC attacks.

In addition, China could use chemical weapons against Taiwanese airfields, drastically complicating air operations. The standard assumption is that operating in a chemical environment would reduce a military's flight operations in half, such that an air force that would otherwise fly two sorties per aircraft per day might manage only one if personnel needed to wear protective gear and frequently decontaminate equipment. China would need to weigh the potential benefits of attacking Taiwanese military infrastructure with chemical weapons against the risks that doing so would only steel Taipei's resolve and convince the United States to come to Taiwan's military aid regardless of which side was viewed by Washington as having provoked the conflict. In the end, however, it must be acknowledged that China's precise assessment of the pros and cons of such an attack cannot be predicted, and there is some chance it would use chemical weapons.<sup>36</sup> (It seems highly unlikely that China would use nuclear weapons against the island; it has stated that it would not do so, and the political repercussions would surely be enormous.<sup>37</sup>)

Even if runways were badly damaged and airfields were contaminated with chemical weapons, Taiwan would be able to keep aircraft in the air. It might use some highways for limited flight operations by fixed-wing aircraft, once it repaired runways sufficiently to move planes off airfields and onto secondary sites.<sup>38</sup> (Taiwan would also probably retain most of its 20 armed maritime helicopters.)

What about attacks by China's special forces against Taiwanese airfields and aircraft, which are less well-protected than they should be?<sup>39</sup> Clandestinely infiltrating enough personnel into Taiwan to launch attacks on airfields would be a challenge, though it is possible that China already has several thousand agents ashore in Taiwan.<sup>40</sup> Even if that is true, however, actually conducting the attacks would be far from trivial. For example, the United States and its allies lost fewer than 400 aircraft (fixed-wing planes and helicopters) this way in Vietnam—a conflict that lasted many years and involved tens of thousands of airplanes, many of which could not be placed in hardened facilities given their sheer numbers and locations. Chinese special forces might be able to avail themselves of improved equipment, such as long-range sniper rifles and precision mortar shells, not available in earlier conflicts. But most of the tactics of attacking aircraft and their fuel supplies and support facilities with special forces remain similar to what they were previously. Even in a worst case, Chinese special forces would be unlikely to destroy more than a couple dozen Taiwanese planes.<sup>41</sup>

All told, of Taiwan's 600 or so combat aircraft, at least half would likely survive even a well-coordinated, large-scale Chinese preemptive attack that caught them by surprise. Most of Taipei's airborne control aircraft might be lost, and remaining combat jets might be reduced to flying only a sortie a day, at least in the war's first day or two, given damage to runways and the possible use of chemical weapons by the PRC. But Taiwan's remaining capability would be quite substantial. The ability of Taiwan's ships and key command-and-control assets to survive a Chinese preemptive attack is more difficult to assess quantitatively, based on publicly available information. It is likely that the Taiwanese armed forces should make greater efforts to protect them, notably by hardening key fixed infrastructure. But China's limited capacity for large-scale precision strike casts doubt on its ability to conduct a successful surprise attack against these assets as well.

### A PRC Amphibious Assault

China would face several daunting constraints and challenges if it attempted to invade Taiwan by sea. Few PRC troops could deploy over water, given China's very limited amounts of military sealift. Its 70 or so amphibious ships could move no more than 10,000 to 15,000 troops with their equipment, including some 400 armored vehicles (airlift could move another 6,000 troops, or perhaps somewhat more counting helicopter transport).<sup>42</sup> These shortfalls would be magnified by China's other military weaknesses. Although Chinese military personnel are generally competent at basic infantry skills, the armed forces do not tend to attract China's best, nepotism is prevalent, party loyalty is of paramount importance, most soldiers are semiliterate peasants serving short tours of duty, and a strong professional noncommissioned officer corps is lacking. Combined-arms training, while somewhat enhanced of late for elite rapid reaction forces, is infrequent. To quote the Pentagon, "China probably has never conducted a large-scale amphibious exercise which has been fully coordinated with air support and airborne operations."<sup>43</sup>

Taiwan of course has weaknesses of its own, above and beyond those cited above. It fails to foster cooperation and joint training between the different arms of its military; it also has not integrated communications systems to make systematic use of early-warning data and other key information.<sup>44</sup> Among its other, generic military shortcomings, Taiwan continues to rely on conscription to fill out its force structure; thus, turnover in the ranks is high, and the quality of the force is limited.<sup>45</sup>

Most of Taiwan's weaknesses are not, however, as severe as China's. Moreover, the basic numbers work strongly in Taiwan's favor. It has a large military of 240,000 active-duty ground troops and 1.5 million more ground-force reservists. With a coastal perimeter of about 1,500 kilometers, it could deploy roughly 1,000 defenders per kilometer of coastline along all of its shores if it wished. So over any given stretch of 10 to 15 kilometers, a fully mobilized Taiwanese defense force could station as many troops as China could deploy there with all of its amphibious fleet. (An attacker would need to seize a shoreline of roughly that length, to create areas safe from enemy artillery.<sup>46</sup>)

The above presupposes no advance knowledge by Taiwan about where the PRC intended to come ashore. In reality, unless completely blinded and paralyzed by China's preemptive attacks—a most unlikely proposition—Taiwan would see where ships sailed and be able to react with at least some notice. (It is also likely that, if necessary, the United States would provide Taiwan with satellite or aircraft intelligence about the objective of China's attack, even if U.S. forces stayed out of combat operations.) Although the strait is typically only 100 miles wide, Taiwan itself is about 300 miles long, so ships traveling 20 knots would need more than half a day to sail its full length, and could not credibly threaten all parts of the island at once. In addition, amphibious assault troops cannot come ashore just anywhere. Only about 20 percent of the world's coastlines are suitable for amphibious assault; on Taiwan's shores, the percentage is even less, given the prevalence of mud flats on the west coast and cliffs on the east.

As a practical matter, then, Taiwan would not need to mobilize all of its reservists to achieve force parity in places most likely to suffer the initial PRC attack. If it could mobilize even 20 percent of its reservists in the twenty-four to forty-eight hours that China would require, at a bare minimum, to assemble and load its amphibious armada and then cross the strait, it could achieve force parity along key beachlines while maintaining thinner defenses elsewhere.<sup>47</sup> Taiwan also has two airborne brigades that it could use for rapid reaction to any point experiencing amphibious or paratroop attack (and is developing an airborne cavalry brigade

equipped with helicopters for that purpose as well).<sup>48</sup> So China would be unlikely to establish even a local, temporary advantage along the section of beach where it elected to try coming ashore—meaning it lacks the second element of most successful amphibious attacks shown in Table 1.

Nor could China subsequently build up its initial force as quickly as Taiwan could strengthen local defenses at the point of attack. In other words, China also lacks the third crucial element of most successful invasions identified above. Whatever happened during the first day of conflict, Taiwan could almost surely deploy large numbers of reinforcements by road on the first night of the war and thereafter. The Chinese air force has limited capacity for finding and attacking mobile ground targets, and limited capacity to operate at night, so it could not seriously slow such reinforcements.<sup>49</sup>

China's naval gunfire would not be particularly effective either. Its ship-based guns are relatively small and few. In previous experience using guns of comparable size and ordnance in the Korean War, for example, such weapons were generally mediocre at destroying land targets or impeding enemy reinforcements.<sup>50</sup> China also does not have nearly enough guns to cover a tactical battlefield of several miles on a dimension. Maintaining enough naval gunfire to make it difficult for defending troops to approach and enter a zone under attack might require 25 five-inch rounds per minute for every zone of 100 yards on a side, according to U.S. Navy estimates. Given that China's entire surface fleet has only about 100 guns, firing 25 to 30 rounds per minute, China could not maintain the requisite fire over more than a square mile of land.<sup>51</sup>

China's inability to stop Taiwanese road traffic would have dire consequences for the PRC. Countries on the tactical offensive on foreign soil often attain movement rates of twenty to thirty kilometers every twenty-four hours.<sup>52</sup> Faced with nothing more than Chinese aerial harassment, most of it only during daylight hours, Taiwan could certainly move reinforcements at least 50 kilometers per day. That would make more than 100,000 troops available within forty-eight hours on most parts of the island.<sup>53</sup>

Taiwan would not have this same buildup capacity everywhere. Near major military bases and cities, its capacities would tend to be greater, whereas in some rural areas they would be less. But that would not constitute a major vulnerability. For one thing, if China wished to attack a port and airfield (see below), it would need to do so near a city. In addition, even if China chose a spot for amphibious assault where Taiwan's initial reinforcement capacity was limited, Taiwan could bring overwhelming firepower to bear within a couple days, having used air-mobile and local forces in an initial defense.

If it somehow established an initial lodgment ashore, China could try to reinforce it using its small amphibious fleet. But it would probably need at least two days for each round trip of its ships, and even that schedule would be highly contingent on encountering good seas in the notoriously foul-weathered Taiwan Strait.<sup>54</sup> Moreover, returning ships would need to resupply troops already ashore, limiting their ability to deliver reinforcements. After forty-eight hours, therefore, Taiwan would likely have more than 100,000 troops facing the PRC's total of perhaps 20,000 at Beijing's chosen point of attack—and the situation would continue to deteriorate from there for China.

The above analysis has ignored attrition to PRC forces as they approach land and come ashore. In reality, such losses would be enormous. Mounting an amphibious assault against



prepared defenses is extremely difficult and bloody. For example, during the D-Day assault of 1944, the United States lost roughly 10 percent of its forces as they tried to reach land. Comparable loss rates characterized other invasions, such as the 1943 assault on Betio Island in the Battle of Tarawa, in which attackers had to directly overrun prepared defenses to get ashore, just as China would have to do here.<sup>55</sup> The PRC, not enjoying the air dominance or battleship firepower that U.S. forces possessed in World War II, would surely lose an even higher proportion of its assaulting forces in this way.<sup>56</sup>

China would also have to deal with precision-guided munitions fired from shore batteries, airplanes, and any surviving Taiwanese ships. As one way of getting a very rough bound on the problem, consider that the British lost 5 ships to missiles and aircraft and had another 12 damaged, out of a 100-ship task force, in the Falklands War—and that they did not generally have to approach any closer than 400 miles from the Argentine mainland during the war. That amounts to an effective attrition rate of 5 to 15 percent—against an outclassed Argentine military that only owned about 250 aircraft, and that was not capable of conducting effective low-altitude bombing runs (among other problems, many of its bombs were not fused to detonate quickly, meaning that many hit and passed through British ships before they could explode).<sup>57</sup> PRC losses would surely be greater against a foe whose airfields it would have to approach directly, whose air forces would likely retain at least 300 planes even after a highly effective Chinese preemptive attack (see above), and whose antiship missile capabilities substantially exceed Argentina's in 1982. Taiwan possesses significant numbers of antiship missiles such as Harpoon and its own Hsiung Feng.<sup>58</sup> Nor would China's underdeveloped ship defenses save the day.<sup>59</sup>

In conducting such operations, Taiwan would lose airplanes to Chinese fighters, but only gradually, given the poor quality of those PRC aircraft and their command-and-control support.<sup>60</sup> Because Taiwan's attack aircraft could fly low and concentrate their efforts near Taiwan's coasts, China's ground radars and control centers would contribute little to the battle. Thus many Taiwanese aircraft would sneak through PRC fighter cover and carry out attacks, using antiship missiles or even dumb bombs against the poorly defended Chinese ships. They could similarly use air-to-air missiles against transport aircraft.<sup>61</sup> They would probably suffer no more than 5 percent attrition per sortie, meaning that a given plane could fly many missions before being shot down.<sup>62</sup>

China could face other problems too. Taiwan reportedly does not have a large number of shallow-water mines, but even a mediocre mine capability could be effective; in 1991, Iraq damaged two U.S. ships and frustrated Pentagon aspirations to mount an amphibious assault with just 1,300 sea mines. Sweeping against mines in shallow waters is very difficult. In fact, given the lack of good technology, the U.S. armed forces continue to depend on divers and dolphins in such waters.<sup>63</sup>

Adding these loss rates together suggests that the PRC would likely lose at least 20 percent of its forces just in approaching Taiwan's coasts and fighting its way onto land.<sup>64</sup> It would continue to suffer high attrition rates during subsequent efforts to reinforce troops already ashore. On average, China could not hope to add more than about 5,000 troops per day to its initial beachhead—assuming that the beachhead could be established in the first place (see Table 2 for estimates of reinforcement rates, which are further discussed below). [insert table] More likely, given expected attrition, the PRC would do well to deploy 3,000 to 4,000 amphibious troops daily after its initial assault.

What if the PRC used chemical weapons in this part of its attack? If it could fire chemical munitions from its ship-based guns, it might be able to deliver enough ordnance to cover a battlefield several kilometers on a dimension within several minutes. China would presumably want to use nonpersistent agent, like sarin, so that its troops could occupy the area within a short time without having to wear protective gear. The effects of the weapons on Taiwan's defenders would depend heavily on whether they had gas masks handy, the accuracy of Chinese naval gunfire, weather conditions, and the speed with which Taiwan could threaten the PRC ships doing the damage.<sup>65</sup> Historical experiences with chemical weapons suggest, however, that China should not expect these weapons to radically change the course of battle. Even in World War I, when protective gear was rudimentary, chemical weapons caused less than 10 percent of all deaths; in the Iran-Iraq War, the figure was probably less than 5 percent.<sup>66</sup> China would need to worry that, if its timing and delivery were not good, its own exposed troops could suffer larger numbers of casualties than the dug-in defenders, either from its own chemical weapons or from Taiwan's.<sup>67</sup> All told, this approach would slightly improve China's odds of getting an initial foothold on Taiwan, but it would not change the fact that Taiwan could build up reinforcements far faster than the PRC.

Could the PRC use its fishing fleet to put tens if not hundreds of thousands of troops quickly ashore on Taiwan? That is extremely unlikely. First, the ships could not carry heavy equipment. Second, shore-based coastal defense guns and artillery, as well as Taiwanese aircraft, small coastal patrol craft, and mines, would be highly lethal against the unarmored ships as they approached shore.<sup>68</sup> Third, the fishing ships could not carry landing craft, leaving soldiers completely defenseless after they disembarked from the ships and trudged through mudflats or swam in the face of Taiwanese fire.<sup>69</sup>

In summary, China would probably not be able to get enough troops ashore to establish even the rudiments of an initial beachhead. Even if it somehow could, Taiwan could send forces to the chosen point of attack more than five times faster than China could, assuring that PRC forces would be promptly overrun.

#### A PRC Airborne Assault to Seize a Port and an Airfield

Could China seize a port, airfield, or both through an airborne operation? If successful, it would then be able to use commercial airlift and/or sealift to bring in reinforcements as quickly as they could be loaded up, sent across the strait, and unloaded. Reportedly, Taiwan's army has not provided enough protection for ports and airfields, perhaps offering Beijing a glimmer of hope that it could pull off this type of operation.<sup>70</sup>

China has the capacity to airlift about two brigades' worth of paratroopers in a sortie of its entire military airlift fleet. That is possibly enough to establish at least temporary control of both a port and airfield—but just barely. When seizing such facilities, it is generally considered necessary to control the surrounding area for several miles in each direction to prevent enemy direct-fire weapons from shooting at ships, planes, runways, and piers. Doing so typically requires at least a brigade of troops per facility, according to U.S. military doctrine.<sup>71</sup>

However, PRC paratroopers (or troop-carrying helicopters) over Taiwan would be at great risk from Taiwanese fighters, surface-to-air missiles, and anti-aircraft artillery.<sup>72</sup> To mitigate these dangers, China would need to attempt an airborne landing at nearly the same time it was

launching initial attacks against Taiwan's airfields and other key infrastructure—further complicating an already very complex opening operation.

The United States has made good use of air drops, even as recently as the 1989 invasion of Panama. But it has done so by exploiting air dominance, night-combat capabilities, heavy air-to-ground fire support, and a careful choice of circumstances. For example, in the invasion of Panama, the United States was taking on a foe that lacked modern surface-to-air missiles and had a total active-duty military of less than 5,000 troops.<sup>73</sup> China would not have such luxuries in an attack on Taiwan.

Even if China somehow managed tactical surprise with its first sortie of airlift, thus keeping initial losses to a minimum—a highly dubious proposition—it would have only about 6,000 to 8,000 soldiers on the ground as a result. Efforts to reinforce and resupply them would have to cope with alerted Taiwanese air defenses. The drop positions of subsequent paratroopers would be predictable, as would the ingress and egress corridors of aircraft actually trying to use a seized runway. Taiwan has more than 100 surface-to-air missile batteries with ranges of tens of kilometers—more than enough to have some coverage near all of its twenty to thirty large airfields and five major ports. It also has 400 anti-aircraft guns and many smaller surface-to-air missile batteries that use high-quality modified Sidewinder and Sparrow missiles.<sup>74</sup>

Unless Taiwanese SAM batteries and anti-aircraft artillery sites were suppressed by Chinese attack aircraft, Taiwan would be able to detect and fire at most airplanes delivering reinforcing troops. And it is doubtful that China could suppress Taiwanese air defenses. The PLAAF has mediocre electronic warfare and precision-strike capabilities. It might be able to find large runways and drop unguided bombs on them; it would not be likely to find and jam or destroy smaller, more easily camouflaged anti-air weapons.<sup>75</sup>

Finally, as estimated before, Taiwan would retain a substantial fraction of its air force as well—perhaps 50 percent—even after a very successful Chinese preemptive strike against air bases.<sup>76</sup> These Taiwanese planes would be hard for PRC fighters to fend off, and many would get into position to fire at PRC troop transports.

As the Afghan war, Arab-Israeli wars, and Persian Gulf War all showed, modern anti-air and surface-to-air missiles are typically extremely effective against aircraft that are unable to outmaneuver them or deploy effective decoys. For example, coalition kill probabilities were generally in the range of 25 to 35 percent per air-to-air shot against Iraqi fighter aircraft in Operation Desert Storm.<sup>77</sup> Some missiles could easily have 50 percent kill probabilities against larger aircraft, even if those aircraft used simple countermeasures.<sup>78</sup> Because they would be easy to detect, low-flying, and hard to maneuver, Chinese transport aircraft would be very vulnerable. Attrition rates of the planes could be astronomically high—perhaps even 50 percent per sortie, at least after the first sortie. Even though Taiwan does not have a properly integrated air defense,<sup>79</sup> and even though most of its airborne control aircraft might be lost to a preemptive PRC attack, such capabilities would be less than essential in this scenario, once China had revealed the geographic target of its attack.

Even if China managed to drop enough troops to establish temporary control of an airfield and partially secure the approaches to it, it could not reinforce very fast. It would be hard-pressed to fly in tonnage more quickly than the United States could manage under secure airfield conditions at the peak of its Desert Storm buildup operation—a daily rate that averaged

about 600 tons per airfield. That translates into equipment and initial supplies for fewer than 1,000 lightly armed troops.<sup>80</sup> Even if China could double or triple that rate, it would still be only a very modest reinforcement capacity.

China would probably not do much better in trying to seize a port with airborne forces and subsequently reinforcing its beachhead with shipping. First, reinforcements would probably not begin to arrive for twenty-four to forty-eight hours, since ships would need to be loaded and sailed across the strait. Second, ships are hard to load and unload quickly even in harbors not under attack. Over the Operation Desert Shield/Storm experience, the United States delivered about 8,000 tons of equipment per day to each of the two major Saudi ports it used.<sup>81</sup> Even under good conditions at the ports, backlogs developed as a result of shortages of cranes, elevator loaders, trucks, and the like.<sup>82</sup> China would do well to deliver 5,000 tons of equipment and initial supplies with port facilities under attack—enough for perhaps 2,000 to 3,000 troops a day (assuming that some would be heavy forces, which the PRC would want to fend off the inevitable counterattack by Taiwanese ground forces).<sup>83</sup> Third, the entire operation could be virtually halted by the destruction of major cranes and ship berths by Taiwanese air attack, or by the sinking of a couple ships near piers.

China might be able to increase the rate of troop deployment severalfold if it were willing to forgo heavy equipment, simply sailing in fishing vessels (which could be less vulnerable in this scenario than in an amphibious assault) and other troop transports and turning loose large numbers of rifle-wielding infantrymen. But these troops would come under severe artillery fire immediately, and would have little in the way of defensive cover or equipment.

In short, whether they tried to seize a port or an airfield or both, China's armed forces could not build up their strength very fast. The arithmetic is similar to that for the case of an attempted amphibious assault discussed above. Even two to three days after an airborne assault began, China would probably have no more than 20,000 troops ashore, granting them the highly generous assumption that they could establish a foothold in the first place. Within that same time frame, Taiwan could concentrate more than 100,000 troops at the same site or sites, and proceed to overrun China's forces. The PRC would have been able to seize an area of only a few kilometers' diameter with such small, rather light, tactically rather immobile forces, and set up a hasty defense. Historically, attackers with the types of force advantages that Taiwan would be able to generate can advance several kilometers per day against such weak defenses, and often ten kilometers per day. At that rate, the PRC forces would be defeated within just a few days of the beginning of the conflict, even if they managed to establish initial lodgments.<sup>84</sup>

### A Combined Airborne/Amphibious Assault

If China could concentrate amphibious and airborne forces in one place, establishing a beachhead as well as seizing a port and an airfield, it could theoretically deploy up to 40,000 troops in one area within forty-eight to seventy-two hours. It might add nearly 10,000 more troops a day thereafter (see Table 2). If that were possible, it would clearly improve overall force ratios for China, relative to the separate amphibious and airborne operations considered above.

But China would face two main problems in carrying out such an attack. First, such a combined airborne and amphibious assault would severely test its limited capacity for coordinating large-scale military operations. Chances are that it would fail badly in the attempt. Second, any location suitable for this type of combined PRC assault would have to be near a

Taiwanese city. As a result, large numbers of Taiwanese active-duty troops and reservists would be nearby, meaning that Taiwan could surely marshal a local defense of considerably more than 100,000 troops within two days of the start of the war. (In addition, with its own forces approaching from several sides, China would be hard pressed to use chemical weapons against Taiwanese defenders at its chosen battlefield.)

China could try to block the Chongshan north-south superhighway in Taiwan with airborne forces, slowing Taiwanese reinforcements and buying itself time to conduct an amphibious assault nearby. China would need to overfly a good deal of enemy territory to reach the highway, however—increasing its planes' vulnerability to fire by surface-to-air missiles and anti-aircraft artillery. Other smaller roads would remain available for Taiwan's reinforcements in any case.

Overall, a Chinese invasion attempt would actually do well to play out like a larger-scale version of the 1961 Bay of Pigs invasion by Cuban exiles trained and supported by the United States. In that conflict, about 1,500 infiltrators were met by local militia resistance, which was then reinforced by many of Castro's 12,000 main troops over the ensuing hours. The rebels could not defend or expand their initial lodgment, which extended some twenty miles inland and forty miles along the coast at its maximum. Castro used his extremely modest air force—with reportedly only six serviceable jets surviving a preemptive air attack—to good effect, sinking landing craft and incapacitating a resupply ship and harassing invading troops. Within less than three days, the entire operation was over, with about 100 of the infiltrators dead and almost all the rest captured. The operation was admittedly bungled. But it is doubtful that China would avoid similar mistakes in any comparable effort—in fact, it would probably not be able to establish even a temporary beachhead on Taiwan.<sup>85</sup>

### Quemoy and Matsu

A somewhat less reassuring implication of these quantitative assessments is that China might be capable of seizing Quemoy or Matsu, the small islands near the PRC coast that were the object of Chinese artillery attacks in the 1950s. Taiwan stations about 40,000 troops on Quemoy and 10,000 on Matsu. The latter number in particular is comparable to what China might be able to put ashore on such an island within hours. Moreover, Taiwan would have to traverse a greater distance to reinforce its garrisons on these islands than China would have to cover in building up any beachhead. Given geography, Taiwan might even lose the advantage in the air to China in such a scenario.

If China managed to take one of these islands against the local Taiwanese defenders, what should Washington and Taipei do? Trying to seize the islands back seems imprudent. Even though the United States and Taiwan together wield much more military capability than the PRC, they would face disadvantageous geographic conditions for an attempted amphibious assault. Should China seize one of these islands, a wiser response could include expanding U.S. arms sales to Taipei, formalizing and clarifying Washington's defense commitments to Taiwan, perhaps basing some U.S. combat aircraft directly on Taiwan, and imposing severe economic sanctions against China.<sup>86</sup>

## COULD CHINA COERCE TAIWAN'S CAPITULATION?

Even if China could not seize Taiwan, could it use military force in a more limited and coercive manner—perhaps in an attempt to pressure Taipei into accepting some form of confederation? Two scenarios are of particular interest: a missile attack, and a blockade.

Consider first a possible missile attack. As noted, the PRC has about 200 ballistic missiles deployed near Taiwan today, and may double or even triple this package within five years. From their current positions, the M-9 and M-11 missiles can reach Taiwan. But neither possesses sufficient accuracy to strike ports, airfields, or ships to great effect using conventional explosives. Indeed, as noted above, they would generally miss their targets by several football fields and almost always by the length of at least a single field. If Beijing unleashed a salvo of hundreds of missiles, it might indeed register a few hits or near hits against lucrative targets. Commercial sea traffic might diminish drastically for a spell. But if China exhausted the bulk of its missile inventory to sink a grand total of two or three cargo vessels, would that really be such an intimidating use of force?

Used against civilian populations, each missile might kill anywhere from zero to a dozen or more citizens, judging by the experiences of Operation Desert Storm and the Iran-Iraq “war of the cities.”<sup>87</sup> Such terror tactics would be tragic for the well-being of the Taiwanese—but limited in overall magnitude, at least by the standards of war, and more likely to embitter and harden the Taiwanese than coerce their capitulation, if past experience is any guide. In the end, using missile attacks in this way would say more about Chinese weakness than anything else—just as limited air and cruise missile attacks by the United States in recent years have often shown irresoluteness rather than strength or staying power, and achieved correspondingly poor results.<sup>88</sup>

The more troubling coercive scenario is a blockade. Rather than relying on sheer terror and intimidation, China would take aim at Taiwan’s economy, and try to drag it down substantially for an indefinite period. It is doubtful that China could truly cut Taiwan off from the outside world with such a blockade. If willing to risk losses, however, China could certainly exact attrition from commercial vessels trading with Taiwan as well as Taiwanese military forces trying to break the blockade. Even with an imperfect, “leaky blockade,” China could sink enough commercial ships to scare others off, and possibly do so for weeks if not months. Should it convince most commercial shippers not to risk trips to Taiwan, it could effectively begin to strangle the island.<sup>89</sup>

A Chinese blockade could take a number of forms. But for the PRC, the least risky approach would simply attempt to introduce a significant risk factor into all maritime voyages in and out of Taiwan by occasionally sinking a cargo ship with submarines or with mines laid in Taiwan’s harbors. China might couple such a blockade with a preemptive air and special forces attack—but perhaps just a limited one focused on Taiwanese submarine-hunting ships and airplanes. (Using airplanes and surface ships in the blockade would put more of China’s own forces at risk, especially because it could not realistically hope to eliminate all of Taiwan’s air force with a preemptive attack, as argued above. A PRC blockade using planes and surface ships would also be straightforward for the United States to quickly defeat, should it later intervene.)

In conducting a blockade of Taiwan, China would be taking advantage of three main facts. First, Taiwan has only a small coastline—forcing ship traffic to take predictable routes into ports. Second, Taiwan is more vulnerable to blockade than China because it has fewer natural

resources, a smaller economy on the whole, and no other way to import or export than via sea or air. Taiwan's foreign trade accounts for two-thirds of its gross domestic product; for China, by contrast, the figure is only about 10 percent (though the roles of foreign trade and capital are admittedly quite important).<sup>90</sup> Finally, Taiwan has few submarines or long-range attack aircraft to conduct a countervailing blockade of its own.

Taiwan could take a number of steps to break a Chinese blockade and to mitigate any effects it might have. Ships could come and go from Taiwan's eastern shores, avoiding the Indonesian Straits and South China Sea and forcing the PRC to attempt attacks in the open oceans far from Chinese territory. This approach would add a few thousand miles and modest cost to the merchant ships' journey, but such costs are not particularly onerous in modern ocean shipping. This type of approach would permit any of Taiwan's surviving antisubmarine surface ships to operate either within cover of land-based Taiwanese air power, or out of range of most PRC combat planes.<sup>91</sup> Similarly, Taiwanese air power would be well positioned to defend ships to the east of the island from any PRC aircraft that might pursue them.<sup>92</sup>

Nonetheless, Taiwan would remain vulnerable. If it tried to route ships only to ports on its east coast, it would give up use of its Kaohsiung Harbor, which is the third largest port in the world and accounts for more than half of all of Taiwan's trade, as well as Taichung, which accounts for another quarter of Taiwan's total trade. Other ports could probably handle more traffic than they do today, but Taiwan's harbors are already busy, and could not sustain anything close to current levels of trade without Kaohsiung and Taichung. Taiwan could mitigate the economic effects of its reduced trade by rationing use of fuel and certain foods, and giving preferential treatment for shipping to its highest-revenue exports and most crucial imports. It could also load and off-load some ships anchored near shore using small barges, easing the constraint posed by the limited harbor capacity on its eastern shore.<sup>93</sup> But as with Britain in World War II, Taiwan's ability to endure a long blockade would not be given.<sup>94</sup>

Most of China's submarines do not have antiship cruise missiles or great underwater endurance at present,<sup>95</sup> and their capacity to conduct a coordinated blockade operation in conjunction with surface and aerial assets is limited.<sup>96</sup> These shortcomings may not be particularly onerous, however, when the submarines' targets are commercial ships approaching Taiwan. The submarines have adequate ranges on a single tank of fuel—typically almost 10,000 miles—to stay deployed east of Taiwan for substantial periods.<sup>97</sup> If China had declared a free-fire zone and warned other countries not to enter it, it might be willing to give its submarines free rein to shoot at whatever surface traffic they could detect. Carrying torpedoes with ranges of ten kilometers or more, and being able to pick up commercial ships by sonar or by sight, such submarines could maintain patrols over a large fraction of the sea approaches to Taiwan.<sup>98</sup> It could take Taiwan weeks to find the PRC's modern submarines (of which it has nine today), particularly if China used them in hit-and-run modes. Modern attack submarines are able to detect ships at considerable distance, and are fast when submerged (unlike the case, say, in World War II)—giving them a chance to escape surface ships without running vulnerably on the surface.<sup>99</sup>

Taiwan could use whatever part of its surface fleet had survived Chinese preemptive attacks to accompany convoys of merchant ships. It would be harder to do this for ships approaching Taiwan than for those leaving, however. Those that approach come from many different places. If they assembled east of Taiwan to wait for escorts, they would be vulnerable at that point. Moreover, Chinese submarines lucky enough to be lying quietly in wait in the right

places would tend to hear approaching convoys before they were themselves detected, making it likely that they could often get off the first shot—if not the first couple—before being put at risk themselves. The overall outcome of this struggle is very hard to predict, given the rough parity in numbers between Chinese submarines and Taiwanese escorts, and uncertainties over how many escort ships Taiwan would have lost in a preemptive Chinese attack.

Chinese mines could pose a problem too. China's submarines usually each carry two to three dozen mines, so half of its entire submarine fleet would carry about 1,000. If half the fleet was able to place mines near Taiwan without being sunk, China would be able to deploy nearly as many mines as Iraq did—with considerable effect—against the U.S.-led coalition in 1990-91. Moreover, Taiwan's minesweeping ships are limited in number and mediocre in quality and condition. China might cause attrition rates of a couple percent each time ships tried to enter or leave Taiwan's ports.<sup>100</sup>

Taiwan might not be able to endure and finally break such a blockade by itself. U.S. forces might therefore be important. Carrier battle groups, additional surface combatants, submarines, land-based P-3 aircraft, and any underwater SOSUS arrays the United States has in the area could work with Taiwan, not only to escort shipping convoys but to set up a continuous patrol capability.<sup>101</sup> For example, they might set up a corridor, several hundred miles wide and about 1,000 miles long, for the approach to the island. Several dozen U.S. and Taiwanese ships or aircraft, possibly aided by information from fixed SOSUS arrays, could patrol the perimeters of such an area fairly thoroughly against PRC attack submarines.<sup>102</sup> They could be aided by American imaging and listening satellites looking for submarines when they surfaced; at present, China has little if any antisatellite capability.<sup>103</sup> U.S. aircraft carriers, perhaps aided by land-based fighters on Okinawa or Luzon, if Tokyo and Manila assented, could create an air umbrella and make it even more impractical for China to use its air force as well.

In general, the United States and Taiwan could suffer losses, as could ships they were protecting. In an extreme case, a U.S. ship or two could even be sunk. But the tide of battle would be strongly against the PRC. Taiwan and the United States would also retain the option of directly attacking the Chinese mainland and PRC military bases—whether through air, cruise-missile, and torpedo strikes, mining of harbors, a counterblockade run by the U.S. Navy, or other means. They could also offensively pursue Chinese submarines, perhaps as they approached and left port in the Taiwan Strait.<sup>104</sup>

## **TRENDS AND PROGNOSTICATIONS**

Given China's widely recognized status as one of the world's most rapidly rising powers, could the regional military balance change to Taiwan's detriment and China's advantage over time? The Pentagon's latest report on the China-Taiwan military balance suggests that the answer is yes. Although it casts some doubt on China's immediate capacity for establishing air superiority against Taiwan, and for successfully undertaking an invasion of the island, it projects that China is likely to make substantial progress by 2005 or shortly thereafter, giving it the capabilities that it may presently lack.<sup>105</sup>

That does not appear likely. Taiwan's defensibility against invasion may actually improve with time. It possesses a more advanced economy, and greater access to foreign arms, than does China.<sup>106</sup> In addition, trends in technology and associated tactics and doctrine—



described by some as a pending revolution in military affairs—will probably increase the vulnerability of large, slow-moving military objects, such as ships, helicopters, and transport aircraft. That is bad news for a country trying to develop an amphibious assault capability against a vigilant foe defending only a small coastline.<sup>107</sup> Perhaps because it is aware of these facts, China does not appear to have any intention of substantially augmenting its airborne and amphibious capabilities in the years ahead.<sup>108</sup>

China faces other challenges. Its indigenous defense industry is of mediocre caliber. Much of its defense budget must be devoted to paying, training, and equipping its large numbers of troops.<sup>109</sup> Its aspirations to conduct “local wars under high-technology conditions” remain aspirations, and its capabilities for taking advantage of the so-called revolution in military affairs, while much ballyhooed, are limited.<sup>110</sup>

Given the modest size of China’s defense resources—especially when measured against such a large military—the Defense Intelligence Agency estimates that only 10 percent of China’s armed forces will have “late-Cold War” equivalent hardware even by 2010.<sup>111</sup> For example, the People’s Liberation Army Air Force (PLAAF) is likely to add only 20 to 25 top-notch fighter aircraft to its forces annually in the years ahead. It is having trouble completing the development of its indigenous F-10 fighter program and may not be able to produce such aircraft until after 2010, if the program succeeds at all. China has limited ability to maintain and effectively operate even the modest number of advanced Su-27 fighter jets it has been able to acquire so far.<sup>112</sup> These facts cast doubt on China’s ability to establish air superiority in a hypothetical war against Taiwan even in five or ten years, or to compete favorably with Taiwanese ground forces should China somehow ever manage to establish a toehold on a Taiwanese coast.

There are certainly important areas in which China could drastically improve its capabilities for attacking Taiwanese forces and infrastructure. For example, by improving the accuracy of missiles with global positioning system (GPS) guidance, and developing submunitions that could be dispersed by cruise or ballistic missile, China could acquire the capacity to destroy exposed aircraft on most of Taiwan’s airfields with as few as about 100 cruise missiles or 10 ballistic missiles. It could target ports and other key military and commercial infrastructure as well, trying to strangle Taiwan’s economy.

However, Taiwan would have responses to any such steps, many of them straightforward and relatively inexpensive. Building more hardened shelters for aircraft could deprive China of an area-effect attack capability against exposed fighters. Deploying jammers and missile defenses around airfields could degrade the accuracy of incoming missiles and reduce the number getting through. Taiwan could also consider operating more aircraft off highways and otherwise dispersing them, albeit at some cost in the efficiency of aircraft operations and maintenance.<sup>113</sup>

Taiwan also needs to consider the possibility that China would use weapons of mass destruction against it. Taiwan’s armed forces need to continually improve their protective and decontaminating gear against chemical weapons. In addition, key military infrastructure and equipment should be hardened against electromagnetic radiation. For example, if detonated to the east of Taiwan, a high-altitude nuclear burst might severely damage unprotected electronics on the island while causing minimal direct harm to Taiwanese citizens—or the PRC’s own electronic systems. The required level of further radiation hardening is probably in the hundreds of millions of dollars a year.<sup>114</sup>

China is likely to keep increasing its missile forces, but to what end is not clear. Its hope seems to be that more missiles will translate in a general sense into more Taiwanese fear, and hence more coercive capability. It is not obvious, however, that this will be the case. China can already strike Taiwan with hundreds of missiles, even if some might be intercepted by the relatively primitive Patriot missile defense systems that Taiwan now owns. China will retain this ability in the future, even if any future buildup in missiles is countered by Taiwanese acquisition of better missile defenses. For example, even the four Aegis-class destroyers that Taiwan asked to buy from the United States in 2000 would not plausibly be able to counter more than 100 to 200 incoming missiles—and China may have 600 within half a decade (before the destroyers could even be built and equipped with advanced missile defense capabilities).

Beijing might do better in the naval sphere. China is improving its People's Liberation Army Navy (PLAN) with the recent acquisition of its first Sovremennyi-class destroyer from Russia. Another is expected to follow, as are other modern surface combatants, many featuring improved antiship missiles including supersonic varieties. China could also improve its submarine fleet, adding more advanced vessels as well as acquiring antiship missiles that may someday be able to benefit from satellite guidance as they home on enemy ships.<sup>115</sup>

In summary, for those scenarios where China is most challenged today—notably, a possible invasion of Taiwan, but also scenarios in which it seeks to carry out decisive missile strikes—future trends are unlikely to help it greatly. For a possible naval blockade, already its best hope, its prospects for gaining strength are somewhat better.

## **CONCLUSIONS AND IMPLICATIONS**

China cannot invade Taiwan, even under very favorable assumptions about how a conflict would unfold. Nor will it be able to do so for well over a decade, if not much longer. Its best hope of pulling off a successful invasion would be to first mount a large-scale surprise attack with missiles, air power, and special forces. The PRC would follow up as quickly as possible with an airborne and amphibious assault. Even assuming a rather successful Chinese preemptive attack, however, Taiwan would be able to continue significant flight operations. Taiwan would also retain very effective anti-aircraft artillery, surface-to-air missiles, coastal defense guns, coastal patrol craft, and antiship missiles—not to mention a mobilized and large ground army. Taiwanese armed forces would be able to reinforce defenses in sectors that were under intense PRC attack much faster than China could reinforce any initial positions it managed to establish on Taiwan. China is probably a factor of five to ten short of the material requirements for establishing and reinforcing a defensible beachhead on Taiwan—and lacking in the necessary technology and military competence to boot.<sup>116</sup> Even if it used chemical weapons in the attack, it would not have a credible chance of victory.

In broader political terms, attacking Taiwan would be extraordinarily risky for the ruling regime in Beijing. It would likely lose much of its elite military personnel, and a large fraction of its strategic transport capabilities, combat aircraft, and navy, in any such attack. A PRC government that attempted such an invasion could fall in its aftermath.

The message of this analysis should be reassuring, and stabilizing. Beijing should recognize that it cannot seize Taiwan, and be dissuaded from any disastrous attempt to try. The

situation would be even more stable if the Pentagon would stop issuing poorly argued reports that could mislead Chinese leaders into thinking they have an invasion capability that they clearly do not.

Taipei should hardly be cavalier about moving toward a declaration of independence, however. Even if its military could hold off a full-bore Chinese assault, it would suffer substantial damage in the process. Blockade and missile-strike scenarios could also cause it great harm. In fact, even a limited blockade effort conducted by China's modest modern submarine force could stand a reasonable chance of dragging down Taiwan's economy—and keeping it down for a prolonged period. U.S. military intervention might be needed to break the blockade quickly.

What are the policy implications of this assessment for Washington? The first is that there is no need to commit to Taiwan's defense in advance. For an invasion scenario—the only one in which China could physically seize Taiwan and present the world community a fait accompli—the United States would not need to participate militarily. For other scenarios, its help might be required, but it would be less urgent. The United States would have time to react—or to pressure the parties to a diplomatic solution—before feeling the need to intervene militarily itself. In short, the United States should maintain its policy of strategic ambiguity. That desirable policy has helped restrain hard-liners on both sides of the strait historically, and continues to do so today without putting Taiwan at mortal peril.<sup>117</sup>

As for arms sales policy, the question is more complex, and the grounds for rethinking current U.S. policy more compelling. In early 2000, the Clinton administration announced a decision to sell Taiwan several types of precision-guided air-to-air and air-to-ground missiles, and to provide a land-based radar for warning of any missile attacks by the PRC as well. These ideas make sense, as do further efforts to help Taiwan harden its airfields, fuel and ammunition storage facilities, and command-and-control infrastructure.<sup>118</sup> The Clinton administration chose, however, not to sell Taiwan large naval weaponry including P-3 surveillance aircraft, attack submarines, and Aegis-class destroyer ships. Instead, the administration decided to allow time for further study of Taiwan's needs in these areas. Presumably it also wanted to keep leverage over Taiwan's President Chen to show restraint vis-à-vis Beijing during his first months in office—and to test Beijing's willingness to pursue a more conciliatory policy as well.<sup>119</sup>

That cautious approach to arms sales makes sense as a matter of principle. The military benefit of possible arms sales to Taiwan must always be evaluated against the likely political fallout, including the chance that should Taipei ever feel either invulnerable or automatically assured of U.S. military aid in a crisis, it might be more inclined to act provocatively.<sup>120</sup> Congressional Republicans tended to ignore this concern in crafting their Taiwan Security Enhancement Act, approved by the House in February of 2000.<sup>121</sup> It would formalize links between U.S. and Taiwanese militaries, state a U.S. predisposition to sell Taiwan any arms Taipei requested, and otherwise change the tone of American involvement in the Taiwan Strait problem. The proposal met with a negative reaction from the commander of U.S. forces in the Pacific, Adm. Dennis Blair. It also worried Chen Shui-bian, who in April asked the Senate to postpone consideration of the bill at least until he was inaugurated and had a chance to set up his cabinet.<sup>122</sup>

Nonetheless, Congressional Republicans are correct to critique the Clinton administration's new arms sales package for Taiwan. Their argument is strongest not for the four

Aegis destroyers Taipei has requested for missile defense, which have taken on a greater symbolic significance than their military capabilities warrant, but for dedicated antisubmarine warfare capabilities.<sup>123</sup>

Given China's missile firings near Taiwan in 1995 and 1996, as well as its buildup of short-range missiles along its coast near Taiwan, Taipei's request for the Aegis vessels seems understandable. But Chinese ballistic missiles armed with conventional warheads are far too inaccurate to threaten Taiwan's military bases seriously. In addition, the Aegis technology is immature—the U.S. military will not have advanced Aegis-based defenses against ballistic missiles until at least 2007 (a short-range defense may be available by 2003, but the broader coverage that would be needed to defend Taiwan will not).

Even if Taiwan had these ships and the antimissile systems worked perfectly, China has so many missiles it could always overwhelm them with a large attack. An Aegis-class destroyer carries about 100 missiles of all kinds.<sup>124</sup> If every launch tube were devoted to missile interceptors, a single ship could plausibly intercept no more than a few dozen missiles in a best case (as a practical matter, two or even three interceptors would be fired at each incoming missile). Even if two ships were in position to defend a given region of Taiwan, China could saturate their defenses with less than 100 missiles, guaranteeing that subsequent missiles would not be intercepted.<sup>125</sup> A sale of more advanced Patriot missile defense batteries to Taiwan is warranted, in light of China's major ballistic missile buildup. But Taiwan has better ways to spend its defense resources than to buy four Aegis-class destroyers, which could be vulnerable to preemption and possess only limited antisubmarine warfare capabilities.<sup>126</sup>

Instead, the United States should grant Taiwan its request for the P-3 Orion aircraft, which can drop buoys with sonar devices and fire torpedoes at any submarines the buoys detect. They possess ultra-low-frequency sonar capable of detecting Kilo-class submarines that Taiwan cannot now easily find.<sup>127</sup> Taiwan might replace its 31 S-2 aircraft with a comparable number of the more advanced, faster, and longer-range P-3's.<sup>128</sup> A P-3 fleet of that size would give Taiwan the capability to maintain about 10 to 12 planes in the sky continuously—translating into 5 to 6 along a northern perimeter and another 5 to 6 along a southern perimeter of a protected shipping corridor beginning at Taiwan and extending some 1,000 miles to its east. Given the speed of the aircraft, that would allow each spot along the perimeter to be monitored every thirty minutes or so, making it tough for Chinese submarines to penetrate the barrier without being detected.<sup>129</sup>

The United States—or better yet a country that makes diesel-electric submarines—could also help Taiwan upgrade its decaying submarine fleet. Doing so would be more provocative to China, however, so this measure could be held in reserve for now. If China accelerates the modernization of its submarine fleet and other blockade-related assets, submarines could be sold to Taiwan in the future.

The Taiwan Strait problem merits a great deal of careful political-military attention from U.S. policymakers. And they need to base future policy on a sound understanding of the nature of the cross-strait military balance—or more accurately, the various China-Taiwan military balances. It would be a major mistake for U.S. policymakers to keep emboldening China by telling its leaders that they can seize Taiwan. But it would also be a major mistake not to worry about other, less foreboding but nonetheless much more militarily promising, options that leaders in Beijing might consider.

**Table 1. Ingredients in Successful Amphibious Assaults**

<u>Case/Attacker</u>	<u>Air Superiority</u>	<u>Initial Superiority in Troops/Firepower at Point of Attack</u>	<u>Reinforcement/ Buildup Advantage at Point of Attack</u>
<u>Historical Successes</u>			
Okinawa, 1944/US	yes	yes	yes
Normandy, 1944/US, Allies	yes	yes	yes
Inchon, Korea 1950/US	yes	yes	yes
Falklands, 1982/UK	no	yes	yes*
<u>Addendum: Failed Attempts</u>			
Anzio, 1943/US and UK*	yes	yes	no
Gallipoli, 1915/UK, allies	no	yes	no
Bay of Pigs, 1961/Cubans	no	marginal	no
<u>Possible Chinese Attack on Taiwan</u>			
Taiwan Strait, 2000/PRC	doubtful	no	no
Taiwan Strait, 2010/PRC	doubtful	no	no

\*Although British forces were outnumbered on East Falkland Island, they did manage to build up their lodgment successfully and move out from it without opposition, satisfying the requirement listed here. At Anzio, although the forces there ultimately contributed to Allied victory in Italy in the spring of 1944, their initial objective of making a quick and decisive difference in the war during the winter was clearly not met; thus the operation is classified here as a failure.

**Table 2. Estimated Daily Troop Reinforcement Rates  
(for days 3-10 after “D-Day,” at a specific site on Taiwan)\***

<u>Means of Transport</u>	<u>China</u>	<u>Taiwan</u>
Amphibious Lift	4,000	0
Other Sealift	3,000	0
Airlift	1,000	0
Internal Land Lines/Roads	0	50,000
DAILY TOTAL	8,000	50,000

\*These estimates probably overstate Chinese capabilities and understate those of Taiwan.

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<sup>1</sup> Chas. W. Freeman, Jr., "Preventing War in the Taiwan Strait: Restraining Taiwan—and Beijing," *Foreign Affairs*, Vol. 77, No. 4 (July/August 1998), pp. 7-9; and John Pomfret, "Taiwan Takes Goodwill Steps toward China," *Washington Post*, March 22, 2000, p. 22.

<sup>2</sup> Information Office of the State Council of the People's Republic of China, "The One-China Principle and the Taiwan Issue," Beijing, March 2000, <http://chinadaily.com.cn.net/highlights/taiwan/whitepaper.html>; Information Office of the State Council of the People's Republic of China, "China's National Defense," Beijing, July 1998; and John Pomfret, "Beijing Stresses 'One China' to Taiwan," *Washington Post*, April 28, 2000, p. 24.

<sup>3</sup> See for example, Major General Yang Chengyu, "Logistics Support for Regional Warfare," in Michael Pillsbury, ed., *Chinese Views of Future Warfare* (Washington, D.C.: National Defense University, 1997), p. 184.

<sup>4</sup> Willy Wo-Lap Lam, "Act Soon If Force Is Needed, Says Jiang," *South China Morning Post*, March 28, 2000.

<sup>5</sup> Harry Harding, *A Fragile Relationship: The United States and China since 1972* (Washington, D.C.: Brookings Institution, 1992), pp. 13-16, 82-87.

<sup>6</sup> See William J. Perry, "Dealing with a Rising China," in Ashton B. Carter and Perry, *Preventive Defense: A New Security Strategy for America* (Washington, D.C.: Brookings, 1999), pp. 92-99; and Richard D. Fisher, Jr., "China's Missiles over the Taiwan Strait: A Political and Military Assessment," in James R. Lilley and Chuck Downs, eds., *Crisis in the Taiwan Strait* (Washington, D.C.: National Defense University, 1997), pp. 167-175.

<sup>7</sup> Owen Harries, "A Year of Debating China," *National Interest*, Winter 1999/2000, pp. 145-147; Jonathan S. Landay, "How Far Would U.S. Go to Protect Taiwan?" *Christian Science Monitor*, September 3, 1999, p. 3; Freeman, "Preventing War in the Taiwan Strait," pp. 7-9; and Robert S. Ross, "Beijing as a Conservative Power," *Foreign Affairs*, Vol. 76, No. 2 (March/April 1997), p. 39.

<sup>8</sup> William S. Cohen, "The Security Situation in the Taiwan Strait," report to Congress pursuant to the FY99 Appropriations Bill, Department of Defense, Washington, D.C., 1999, p. 22. This is one of two detailed analyses of PRC military capabilities produced by Pentagon intelligence in the late 1990s at the direction of Congress. Not all Pentagon observers agree; see Richard Lardner, "DoD Intelligence Chief Downplays China's Threats against Taiwan, U.S.," *Inside the Pentagon*, March 2, 2000, p. 2.

<sup>9</sup> David Shambaugh, "China's Military Views the World," *International Security*, Vol. 24, No. 3 (Winter 1999/2000), pp. 64-65.

<sup>10</sup> Clay Chandler, "China Threatens Voters in Taiwan," *Washington Post*, March 16, 2000, p. A1.

<sup>11</sup> Michael D. Swaine, *Taiwan's National Security, Defense Policy, and Weapons Procurement Processes* (Santa Monica, Calif.: RAND, 1999), pp. 55, 58; and Alexander Chieh-cheng Huang, "Taiwan's View of Military Balance and the Challenge It Presents," in Lilley and Downs, *Crisis in the Taiwan Strait*, p. 285.

<sup>12</sup> Some may also hope that Japan would hold the United States back. Tokyo hedges more than the United States in its Taiwan policies, as reflected in the debate there over whether to include Taiwan within the formal purview of the 1997 Defense Cooperation Guidelines between Japan and the United States. But the United States would probably not need to conduct combat missions from bases in Japan in any war against China (though it might choose to if allowed). Mike M. Mochizuki, "American and Japanese Strategic Debates: The Need for a New Synthesis," in Mochizuki, ed., *Toward a True Alliance* (Washington, D.C.: Brookings, 1997), pp. 60-61, 74-77; and Thomas J. Christensen, "China, the U.S.-Japan Alliance, and the Security Dilemma in East Asia," *International Security*, Vol. 23, No. 4 (Spring 1999), pp. 62-63.

<sup>13</sup> United States Marine Corps, *Concepts and Issues 99: Winning in the 21<sup>st</sup> Century* (Washington, D.C.: U.S. Marine Corps, 1998), pp. 21-33; and Michael Berger, *Moving the Marine Corps by Sea in the 1990s* (Washington, D.C.: Congressional Budget Office, 1989), pp. 3-11.

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<sup>14</sup> Patrick L. McKiernan, "The Tide That Failed," *Proceedings*, February 1962, reprinted in Lt. Col. Merrill L. Bartlett, *Assault from the Sea: Essays on the History of Amphibious Warfare* (Annapolis, Md.: Naval Institute Press, 1983), pp. 210-218; John Keegan, *The Second World War* (New York: Penguin Books, 1989), pp. 301-303, 561-573; Louis Morton, "The Marianas, 1944," in Bartlett, ed., *Assault from the Sea*, pp. 219-227; Hanson W. Baldwin, "Amphibious Aspects of the Normandy Invasion," *Marine Corps Gazette*, December 1944, reprinted in Bartlett, *Assault from the Sea*, pp. 320-325; James L. Stokesbury, *A Short History of the Korean War* (New York: Quill, 1988), pp. 65-72; and Robert D. Heinl, "The Nucleus for Victory at High Tide," *Marine Corps Gazette*, September 1967, reprinted in Bartlett, *Assault from the Sea*, pp. 337-353.

<sup>15</sup> Edgar O'Balance, "The San Carlos Landing," *Marine Corps Gazette*, October 1982, reprinted under the title of "The Falklands, 1982," in Bartlett, *Assault from the Sea*, pp. 429-436; and Anthony H. Cordesman and Abraham R. Wagner, *The Lessons of Modern War, Volume 3: The Afghan and Falklands Conflicts* (Boulder, Colo.: Westview, 1990), pp. 350-353.

<sup>16</sup> Eliot A. Cohen and John Gooch, *Military Misfortunes: The Anatomy of Failure in War* (New York: Free Press, 1990), pp. 133-163; John Keegan, *The First World War* (New York: Alfred A. Knopf, 1999), pp. 234-249; and J.F.C. Fuller, *A Military History of the Western World, Volume 3: From the American Civil War to the End of World War II* (New York: Da Capo, based on original 1956 copyright), pp. 233-264.

<sup>17</sup> Samuel Eliot Morison, *History of United States Naval Operations in World War II, Volume 9: Sicily-Salerno-Anzio* (Boston: Little, Brown and Company, 1954), pp. 326, 331, 336, 343-346, 356, 360-384; and Martin Blumenson, *Anzio: The Gamble That Failed* (Philadelphia: J.B. Lippincott, 1963), pp. 26-30, 197-206.

<sup>18</sup> See U.S. Marine Corps, "Operational Maneuver from the Sea," *Marine Corps Gazette*, June 1996.

<sup>19</sup> Bill Gertz, "Admiral Says Taiwan Invasion Would Fail," *Washington Times*, March 8, 2000; and Steven Mufson and Thomas E. Ricks, "Pentagon to Seek Delay on Ship Sale to Taiwan," *Washington Post*, April 17, 2000, p. 1.

<sup>20</sup> In addition to simply being more effective, SA-10 systems also have long ranges, making it possible for China to fire at aircraft near the unofficial line of demarcation running down the middle of the Taiwan Strait. Bill Gertz, "Chinese Bases Near Taiwan Sport Defense Missiles," *Washington Times*, March 28, 2000, p. 1; and Bill Gertz, "Chinese Missiles Could Hit U.S. Forces," *Washington Times*, March 29, 2000, p. 1.

<sup>21</sup> Bruce Dorminey, "Chinese Missiles Basic to New Strategy," *Aviation Week and Space Technology*, March 8, 1999, p. 59.

<sup>22</sup> International Institute for Strategic Studies, *The Military Balance 1999/2000* (Oxford: Oxford University Press, 1999), p. 310; and Robert G. Nagler, *Ballistic Missile Proliferation: An Emerging Threat* (Arlington, Va.: System Planning Corporation, 1992), p. 15.

<sup>23</sup> See the U.S. Marine Corps estimates cited in Joshua M. Epstein, *Measuring Military Power: The Soviet Air Threat to Europe* (Princeton, N.J.: Princeton University Press, 1984), pp. 198-201.

<sup>24</sup> *Ibid.*, p. 201; John Stillion and David T. Orletsky, *Airbase Vulnerability to Conventional Cruise-Missile and Ballistic-Missile Attacks* (Santa Monica, Calif.: RAND, 1999), pp. 9-15; and Mark A. Stokes, *China's Strategic Modernization: Implications for the United States* (Carlisle, Pa.: Strategic Studies Institute, Army War College, 1999), pp. 79-93.

<sup>25</sup> There are now roughly thirteen Chinese airports within 450 kilometers of Taiwan. See Sean Boyne, "Taiwan's Troubles," *Jane's Intelligence Review*, September 1998, p. 27; and Richard A. Bitzinger and Bates Gill, *Gearing Up for High-Tech Warfare?: Chinese and Taiwanese Defense Modernization and Implications for Military Confrontation across the Taiwan Strait, 1995-2005* (Washington, D.C.: Center for Strategic and Budgetary Assessments, 1996), p. 45. On the size of China's attack aircraft fleets, see Cohen, "Security Situation in the Taiwan Strait," p. 6; and IISS, *The Military Balance 1999/2000*, pp. 186-188.

<sup>26</sup> Kenneth W. Allen, "PLAAF Modernization: An Assessment," in Lilley and Downs, *Crisis in the Taiwan Strait*, pp. 224-232.



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- <sup>27</sup> Stokes, *China's Strategic Modernization*, pp. 79-86; William S. Cohen, "Future Military Capabilities and Strategy of the People's Republic of China," report to Congress pursuant to the FY98 National Defense Authorization Act (Washington, D.C.: Department of Defense, 1998), p. 10; Stillion and Orletsky, *Airbase Vulnerability*, pp. 9-15; and Stokes, *China's Strategic Modernization*, pp. 79-93.
- <sup>28</sup> Epstein, *Measuring Military Power*, pp. 208-209, 223.
- <sup>29</sup> Allen, "PLAAF Modernization," pp. 224-232.
- <sup>30</sup> China probably keeps only 20 to 40 percent of its amphibious forces within close range of Taiwan under normal circumstances; see IISS, *The Military Balance 1999/2000*, p. 188; Epstein, *Measuring Military Power*, pp. 225-261; and L. Nordeen, Jr., *Air Warfare in the Missile Age* (Washington, D.C.: Smithsonian Institution, 1985), pp. 201-203.
- <sup>31</sup> Allen, "PLAAF Modernization," p. 232.
- <sup>32</sup> Thomas E. Ricks, "Taiwan Seen as Vulnerable to Attack," *Washington Post*, March 31, 2000, p. 1.
- <sup>33</sup> Personal communication from Shuhfan Ding, Institute of International Relations, National Chengchi University, Taipei, April 14, 2000. I have been unable to determine the exact schedule of this hardening initiative, or the percentage of planes currently protected, perhaps because Taiwan does not wish to publicize such information. See also Shambaugh, "China's Military Views the World," p. 61.
- <sup>34</sup> Stillion and Orletsky, *Airbase Vulnerability*, pp. 30-32.
- <sup>35</sup> Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington, D.C.: U.S. GPO, 1993), pp. 56-65; General Accounting Office, *Operation Desert Storm: Evaluation of the Air Campaign* GAO/NSIAD-97-134, June 1997, pp. 209-212; and Christopher S. Parker, "New Weapons for Old Problems," *International Security*, Vol. 23, No. 4 (Spring 1999), p. 147.
- <sup>36</sup> Victor A. Utgoff, *The Challenge of Chemical Weapons: An American Perspective* (New York: St. Martin's, 1991), pp. 172-181.
- <sup>37</sup> "China Says It Will Not Use Nuclear Weapons Against Taiwan," *New York Times*, September 3, 1999, p. 3.
- <sup>38</sup> IISS, *The Military Balance 1999/2000*, pp. 205-206.
- <sup>39</sup> Swaine, *Taiwan's National Security*, p. 57.
- <sup>40</sup> Denny Roy, "Tensions in the Taiwan Strait," *Survival*, Vol. 42, No. 1 (Spring 2000), p. 85.
- <sup>41</sup> David A. Shlapak and Alan Vick, "*Check Six Begins on the Ground:*" *Responding to the Evolving Ground Threat to U.S. Air Force Bases* (Santa Monica, Calif.: RAND, 1995), pp. 30-37, 48-54, 64-74.
- <sup>42</sup> IISS, *The Military Balance 1999/2000*, pp. 187-188; Cohen, "Security Situation in the Taiwan Strait," p. 9; Cohen, "Future Military Capabilities and Strategy of the People's Republic of China," pp. 15-16; and Edward B. Atkeson, "The People's Republic of China in Transition: An Assessment of the People's Liberation Army," Land Warfare Paper No. 29, Institute of Land Warfare, Association of the U.S. Army, Alexandria, Va., 1998, p. 11.
- <sup>43</sup> Cohen, "Future Military Capabilities and Strategy of the People's Republic of China," p. 15.
- <sup>44</sup> See Swaine, *Taiwan's National Security*, pp. 51-61; Stokes, *China's Strategic Modernization*, pp. 79-108; Ricks, "Taiwan Seen As Vulnerable to Attack," p. 1; and Elizabeth Becker, "Problems Seen in Taiwan's Defenses," *New York Times*, April 1, 2000.
- <sup>45</sup> Huang, "Taiwan's View of Military Balance," p. 291.
- <sup>46</sup> See Dunnigan, *How to Make War*, pp. 284-292.

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<sup>47</sup> Dunnigan, *How to Make War*, pp. 290-291; Swaine, *Taiwan's National Security*, p. 52; and McVadon, "PRC Exercises, Doctrine and Tactics toward Taiwan," p. 253.

<sup>48</sup> Swaine, *Taiwan's National Security*, p. 60; and IISS, *The Military Balance 1999/2000*, p. 205.

<sup>49</sup> Dennis J. Blasko, Philip T. Klapakis, and John F. Corbett, Jr., "Training Tomorrow's PLA: A Mixed Bag of Tricks," in David Shambaugh and Richard H. Yang, eds., *China's Military in Transition* (Oxford: Clarendon Press, 1997), p. 255.

<sup>50</sup> Office of the Chief of Naval Operations, "Characteristics of Naval Gunfire Support in Korea," OEG Study 506 (Washington, D.C.: U.S. Navy, 1953), pp. 17-18.

<sup>51</sup> Capt. Richard Sharpe, ed., *Jane's Fighting Ships, 1995-96*, 98<sup>th</sup> ed. (Alexandria, Va.: Jane's Information Group, 1995), pp. 119-126; and Commander in Chief, U.S. Pacific Fleet, "Korean War U.S. Pacific Fleet Operations," Interim Evaluation Report No. 1 (Washington, D.C.: U.S. Navy, 1953), Appendix 5, pp. 3-8.

<sup>52</sup> Joshua M. Epstein, *Strategy and Force Planning: The Case of the Persian Gulf* (Washington, D.C.: Brookings, 1987), p. 52.

<sup>53</sup> Even in the highly implausible case that they could move no faster than German troops in France in 1944 after D-Day, when Allied aircraft totally ruled the skies, Taiwan's forces would still move fifteen kilometers a day—bringing at least 25,000 troops to the battle every twenty-four hours. See Keegan, *The Second World War*, p. 389.

<sup>54</sup> McVadon, "PRC Exercises, Doctrine and Tactics toward Taiwan," p. 251.

<sup>55</sup> McKiernan, "Tarawa: The Tide that Failed," in Bartlett, *Assault from the Sea*, pp. 210-218; and Keegan, *The Second World War*, p. 387.

<sup>56</sup> McVadon, "PRC Exercises, Doctrine, and Tactics toward Taiwan," in Lilley and Downs, eds., *Crisis in the Taiwan Strait*, p. 253.

<sup>57</sup> IISS, *The Military Balance 1981/1982* (London: International Institute for Strategic Studies, 1992), pp. 92-93.

<sup>58</sup> Ronald Montaperto, "China," in Patrick Clawson, ed., *1997 Strategic Assessment* (Washington, D.C.: National Defense University, 1997), p. 52; Yu Kien-hong, "Taking Taiwan," p. 31; Swaine, *Taiwan's National Security*, p. 57.

<sup>59</sup> McVadon, "PRC Exercises, Doctrine, and Tactics toward Taiwan," in Lilley and Downs, eds., *Crisis in the Taiwan Strait*, pp. 259-260.

<sup>60</sup> Kenneth W. Allen, Glenn Krumel, and Jonathan D. Pollack, *China's Air Force Enters the 21<sup>st</sup> Century* (Santa Monica, Calif.: RAND, 1995), pp. xiii-xxi; Cohen, "Security Situation in the Taiwan Strait," p. 6; Allen, "PLAAF Modernization," pp. 224-233; and Peter Yu Kien-hong, "Taking Taiwan," *Jane's Intelligence Review*, September 1998, pp. 31-32.

<sup>61</sup> Rear Adm. Eric A. McVadon, "PRC Exercises, Doctrine and Tactics toward Taiwan: The Naval Dimension," in Lilley and Downs, *Crisis in the Taiwan Strait*, pp. 262-265.

<sup>62</sup> Most likely, aircraft attrition rates per sortie would be no more than 5 percent, actually high by historical standards. Higher rates are possible; for example, Argentina may have suffered attrition rates per sortie as high as 20 to 30 percent in the 1982 Falklands War. But the only aircraft likely to do this poorly in a China-Taiwan confrontation would be China's older planes, particularly if flying low-altitude missions near or over Taiwan (where the latter's air defenses would be most effective). See Nordeen, *Air Warfare in the Missile Age*, pp. 201-203; O'Balance, "The Falklands, 1982," pp. 435-436; Epstein, *Measuring Military Power*, pp. 151-152; and Barry R. Posen, "Measuring the European Conventional Balance: Coping with Complexity in Threat Assessment," in Steven E. Miller, ed., *Conventional Forces and American Defense Policy* (Princeton, N.J.: Princeton University Press, 1986), p. 104.

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- <sup>63</sup> U.S. Navy, *Mine Warfare Plan*, 2<sup>nd</sup> ed. (Washington, D.C.: U.S. Navy, 1994), pp. 1-3, 43-47; and U.S. Marine Corps, *Concepts and Issues 99*, p. 56.
- <sup>64</sup> Nordeen, *Air Warfare in the Missile Age*, pp. 201-203.
- <sup>65</sup> Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction* (Washington, D.C.: Office of Technology Assessment, 1993), pp. 45-67.
- <sup>66</sup> Trevor N. Dupuy, *Attrition: Forecasting Battle Casualties and Equipment Losses in Modern War* (Fairfax, Va.: HERO Books, 1990), p. 58; and Anthony H. Cordesman and Abraham R. Wagner, *Lessons of Modern War, Volume 2: The Iran-Iraq War* (Boulder, Colo.: Westview Press, 1990), p. 518.
- <sup>67</sup> See Utgoff, *The Challenge of Chemical Weapons*, pp. 148-188; and Dupuy, *Attrition*, p. 58; and Nagler, *Ballistic Missile Proliferation*, p. 10.
- <sup>68</sup> See Dunnigan, *How to Make War*, pp. 284-292. The typical lateral inaccuracy of gunfire or artillery fire is proportional to the distance over which the round must travel, meaning that a shot to 500 meters would be expected to have one-tenth the miss distance of a shot to 5 kilometers.
- <sup>69</sup> For a concurring view, see McVadon, "PRC Exercises, Doctrine, and Tactics toward Taiwan," pp. 254-255.
- <sup>70</sup> Swaine, *Taiwan's National Security*, pp. 57-60.
- <sup>71</sup> See Headquarters, Department of the Army, *Field Manual 100-5: Operations* (Washington, D.C.: U.S. Army, 1993), pp. 3-3 through 3-10; and Commandant, U.S. Army Infantry School, "The Application of Peace Enforcement Operations at Brigade and Battalion," Fort Benning, Georgia, August, 1994, p. 9.
- <sup>72</sup> For historical perspective, see James A. Huston, "The Air Invasion of Holland," *Military Review*, September 1952, pp. 13-27; and Gerard M. Devlin, *Paratrooper!: The Saga of U.S. Army and Marine Parachute and Glider Combat Troops during World War II* (New York: St. Martin's Press, 1979).
- <sup>73</sup> Susan L. Marquis, *Unconventional Warfare: Rebuilding U.S. Special Operations Forces* (Washington, D.C.: Brookings, 1997), pp. 196-198; and IISS, *The Military Balance 1989-1990* (Oxford: Brassey's, 1989), pp. 198-199.
- <sup>74</sup> Cohen, "Security Situation in the Taiwan Strait," p. 8.
- <sup>75</sup> See, for example, Bernard Blake, ed., *Jane's Weapon Systems* (Alexandria, Va.: Jane's Information Group, 1988), pp. 187-190; and Duncan Lennox, ed., *Jane's Air-Launched Weapons* (Alexandria, Va.: Jane's Information Group, 1999).
- <sup>76</sup> Taiwan has twenty runways with length of at least 8,000 feet and a total of thirty with lengths of at least 3,000 feet; see Central Intelligence Agency, *The World Factbook 1999* (1999), [www.odci.gov/cia/publications/factbook](http://www.odci.gov/cia/publications/factbook).
- <sup>77</sup> Timothy M. Laur and Steven L. Llanso, *Encyclopedia of Modern U.S. Military Weapons* (New York: Berkley Books, 1995), pp. 237-256; and Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress* (Washington, D.C.: Department of Defense, April 1992), pp. T-187 through T-191.
- <sup>78</sup> Jerome Bracken, ed., *Worldwide Barrier Air Defense of the Sea Lines of Communication*, IDA Report R-241 (Alexandria, Va.: Institute for Defense Analyses, 1978), pp. S-1 through S-30.
- <sup>79</sup> Swaine, *Taiwan's National Security*, p. 57.
- <sup>80</sup> Rachel Schmidt, *Moving U.S. Forces: Options for Strategic Mobility* (Washington, D.C.: Congressional Budget Office, 1997), pp. 48, 54, 80-81.
- <sup>81</sup> Department of Defense, *Conduct of the Persian Gulf War*, p. F-26.

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<sup>82</sup> Schmidt, *Moving U.S. Forces*, pp. 30, 50, 54.

<sup>83</sup> This tonnage would correspond to the equipment and supplies for only about 1,000 heavy U.S. Army soldiers (or 4,000 light soldiers); see Schmidt, *Moving U.S. Forces*, pp. 79-80.

<sup>84</sup> Trevor N. Dupuy, *Numbers, Predictions, and War*, rev. ed. (Fairfax, Va.: HERO Books, 1985), p. 213.

<sup>85</sup> Karl E. Meyer and Tad Szulc, *The Cuban Invasion: The Chronicle of a Disaster* (New York: Praeger, 1962), pp. 116-146; and Trumbull Higgins, *The Perfect Failure: Kennedy, Eisenhower, and the CIA at the Bay of Pigs* (New York: W.W. Norton, 1987), pp. 138-153.

<sup>86</sup> IISS, *The Military Balance 1999/2000*, p. 205. For a view similar to my own, see Swaine, *Taiwan's National Security*, p. 56.

<sup>87</sup> Cordesman and Wagner, *The Lessons of Modern War, Volume II: The Iran-Iraq War*, pp. 205-206; and Michael O'Hanlon, "Star Wars Strikes Back," *Foreign Affairs*, Vol. 78, No. 6 (November/December 1999), p. 69.

<sup>88</sup> Ivo H. Daalder and Michael E. O'Hanlon, *Winning Ugly: NATO's War to Save Kosovo* (Washington, D.C.: Brookings, 2000); Daniel L. Byman and Matthew C. Waxman, "Kosovo and the Great Air Power Debate," *International Security*, Vol. 24, No. 4 (Spring 2000), pp. 37-38; and Richard N. Haass, "The Squandered Presidency: Demanding More from the Commander-in-Chief," *Foreign Affairs*, Vol. 79, No. 3 (May/June 2000), p. 138.

<sup>89</sup> For a somewhat similar assessment, see Bitzinger and Gill, *Gearing Up for High-Tech Warfare?*, pp. 44-45.

<sup>90</sup> Central Intelligence Agency, *World Factbook 1999*.

<sup>91</sup> Paul H.B. Godwin, "The Use of Military Force against Taiwan: Potential PRC Scenarios," in Parris H. Chang and Martin L. Lasater, eds., *China Crosses the Taiwan Strait: The International Response* (Lanham, Md.: University Press of America, 1993), pp. 22-25.

<sup>92</sup> John Caldwell, *China's Conventional Military Capabilities, 1994-2004: An Assessment* (Washington, D.C.: Center for Strategic and International Studies, 1994), p. 20. China has roughly 100 H-6/B-6 aircraft, 50 Su-27, and about 1,000 planes of J-7/J-8/Q-5 vintage. See IISS, *Military Balance 1997/98* (Oxford: Oxford University Press, 1997), p. 178; and Paul Jackson, ed., *Jane's All the World's Aircraft* (Surrey, United Kingdom: Jane's Information Group, 1995), pp. 48-62.

<sup>93</sup> Godwin, "The Use of Military Force Against Taiwan," pp. 21-22.

<sup>94</sup> Republic of China, *Republic of China Yearbook 1999*, [www.gio.gov.tw/info/yb97/html/content.htm](http://www.gio.gov.tw/info/yb97/html/content.htm).

<sup>95</sup> See E.R. Hooton, ed., *Jane's Naval Weapon Systems*, issue 30 (August 1999).

<sup>96</sup> Ronald Montaperto, "China," in Patrick Clawson, *1997 Strategic Assessment* (Washington, D.C.: National Defense University, 1996), p. 52; and Cohen, "Security Situation in the Taiwan Strait," pp. 9, 16-17.

<sup>97</sup> Sharpe, ed., *Jane's Fighting Ships 1995-96*, pp. 117-118.

<sup>98</sup> Anthony J. Watts, *Jane's Underwater Warfare Systems, 1998-99*, 10<sup>th</sup> ed. (Alexandria, Va.: Jane's Information Group, 1998), pp. 215-216.

<sup>99</sup> Karl Lautenschlager, "The Submarine in Naval Warfare, 1901-2001," *International Security*, Vol. 11, No. 3 (Winter 1986-87), reprinted in Steven E. Miller and Stephen Van Evera, eds., *Naval Strategy and National Security* (Princeton, N.J.: Princeton University Press, 1988), pp. 258-268.

<sup>100</sup> Yu Kien-hong, "Taking Taiwan," pp. 31-32; and Sharpe, ed., *Jane's Fighting Ships 1995-96*, pp. 116-118, 700-701.

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<sup>101</sup> The extent to which U.S. SOSUS arrays are found in waters near Taiwan is unclear from the open literature, but the United States does have considerable SOSUS capabilities in the Western Pacific; see Tom Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy* (Lexington, Mass.: Lexington Books, 1987), p. 39.

<sup>102</sup> As points of reference, U.S. Cold War capabilities were thought capable of setting up barriers that might each cause 5 to 15 percent attrition to passing Soviet submarines. Submarines and surface combatants were thought to be relatively equally likely of destroying one another, meaning that on average roughly one submarine would be lost for each escort sunk. See Congressional Budget Office, *U.S. Naval Forces: The Sea Control Mission* (Washington, D.C.: U.S. Congress, 1978).

<sup>103</sup> Cohen, "Security Situation in the Taiwan Strait," p. 13.

<sup>104</sup> Tom Stefanick estimated that 40 U.S. attack submarines might have been able to search the Sea of Okhotsk for Soviet missile submarines in fourteen hours, under ideal sonar conditions. Assuming worse conditions, with sonar detection ranges of only 3 kilometers, but a smaller area of water to patrol, search times could be comparable for this scenario. See Stefanick, *Strategic Antisubmarine Warfare*, pp. 35-37, 49.

<sup>105</sup> Department of Defense, "Annual Report on the Military Power of the People's Republic of China," pursuant to the FY2000 national defense authorization act, June 2000.

<sup>106</sup> On the deep-rooted problems in the PRC economy, see Nicholas R. Lardy, *China's Unfinished Economic Revolution* (Washington, D.C.: Brookings, 1998).

<sup>107</sup> National Defense Panel, *Transforming Defense: National Security in the 21<sup>st</sup> Century* (National Defense Panel, Arlington, Va., 1997), pp. 33-36; and Paul Dibb, "The Revolution in Military Affairs and Asian Security," *Survival*, Vol. 39, No. 4 (Winter 1997-98), pp. 106-112.

<sup>108</sup> Michael D. Swaine and Ashley J. Tellis, *Interpreting China's Grand Strategy: Past, Present, and Future* (Santa Monica, Calif.: RAND, 2000), pp. 121-133; and Cohen, "Future Military Capabilities and Strategy of the People's Republic of China," pp. 15-16.

<sup>109</sup> See Tim Huxley and Susan Willett, *Arming East Asia*, Adelphi Paper 329 (Oxford: Oxford University Press, 1999), pp. 75-77.

<sup>110</sup> Gao Heng, "Future Military Trends," in Pillsbury, ed., *Chinese Views of Future Warfare*, pp. 85-94; Blasko, Klapakis, and Corbett, "Training Tomorrow's PLA," pp. 225-260; Cohen, "Security Situation in the Taiwan Strait," pp. 6, 11, 13; Cohen, "Future Military Capabilities and Strategy of the People's Republic of China," p. 8; and Andrew N.D. Yang and Col. Milton Wen-Chung Liao, "PLA Rapid Reaction Forces: Concept, Training, and Preliminary Assessment," in James C. Mulvenon and Richard H. Yang, *The People's Liberation Army in the Information Age* (Santa Monica, Calif.: RAND Corporation, 1999), pp. 56-57.

<sup>111</sup> Lt. Gen. Patrick M. Hughes, "Global Threats and Challenges: The Decades Ahead," statement for the Congressional Record, Defense Intelligence Agency, Washington, D.C., February 1999, p. 10; Avery Goldstein, "Great Expectations: Interpreting China's Arrival," *International Security*, Vol. 22, No. 3 (Winter 1997/98), p. 46; and John Wilson Lewis and Xue Litai, "China's Search for a Modern Air Force," *International Security*, Vol. 24, No. 1 (Summer 1999), p. 87.

<sup>112</sup> Allen, "PLAAF Modernization," pp. 232-240; Jonathan Brodie, "China Moves to Buy More Russian Aircraft, Warships, and Submarines," p. 15; and Office of Naval Intelligence, *Worldwide Challenges to Naval Strike Warfare* (Washington, D.C.: U.S. Navy, 1996), p. 29.

<sup>113</sup> Stillion and Orletsky, *Airbase Vulnerability*, pp. 8-45; and Stokes, *China's Strategic Modernization*, pp. 83-92.

<sup>114</sup> See Michael O'Hanlon, *Technological Change and the Future of Warfare* (Washington, D.C.: Brookings, 2000), pp. 176-181; Bruce G. Blair, *Strategic Command and Control: Redefining the Nuclear Threat* (Washington, D.C.: Brookings, 1985), pp. 90-92, 132-137; and Roy, "Tensions in the Taiwan Strait," p. 85.

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<sup>115</sup> If China had 10 submarines, each with a 20 percent chance of detecting an enemy ship before being detected itself (and the others of too poor quality to have a good chance of sinking American ships, at least in blue waters), 2 of them might get off the first shot at a U.S. ship (before being themselves detected and fired upon). If each had a 50 percent chance of sinking the U.S. ship on the first shot, one American ship might be sunk. Of the 9 other subs, most would be destroyed by U.S. ships, but perhaps 2 might survive the initial shots (assuming a 75 percent kill probability per U.S. torpedo) and have a chance to fire back. Of the 2, one might hit a U.S. vessel, making for a total of 2 American ships sunk. This somewhat oversimplified image of submarine/antisubmarine warfare nevertheless captures many of the core elements of undersea warfare. By contrast, if China had 20 submarines, each with a 33 percent chance of getting off the first shot, it might sink 6 or 7 U.S. ships. For background, see Mark Sakitt, *Submarine Warfare in the Arctic: Option or Illusion?* (Stanford, Calif.: Center for International Security and Arms Control, Stanford University, 1988), pp. 16, 40-44; and Stefanick, *Strategic Antisubmarine Warfare*, p. 62.

<sup>116</sup> For a concurring view, see McVadon, "PRC Exercises, Doctrine, and Tactics toward Taiwan," p. 252.

<sup>117</sup> On the policy of strategic ambiguity, see Harries, "Year of Debating China," pp. 141-147.

<sup>118</sup> See, for example, the comments of James Mulvenon, quoted in Steven Mufson, "Warship Sale Could Fuel China Tensions," *Washington Post*, April 14, 2000, p. 1.

<sup>119</sup> Thomas E. Ricks and Steven Mufson, "Taiwan Arms Deal Excludes Warships," *Washington Post*, April 18, 2000, p. 1.

<sup>120</sup> For a similar view, see Thomas J. Christensen, "Correspondence: Spirals, Security, and Stability in East Asia," *International Security*, Vol. 24, No. 4 (Spring 2000), p. 196.

<sup>121</sup> Christopher Marquis, "GOP Criticizes White House on Taiwan Aid Plan," *New York Times*, April 19, 2000.

<sup>122</sup> Thomas E. Ricks, "Admiral Takes Stand against Pro-Taiwan Legislation," *Washington Post*, March 8, 2000, p. A32; and Steven Mufson and Helen Dewar, "Taiwan Bill Tabled As Island's Leaders Urge Delay," *Washington Post*, April 27, 2000, p. 24.

<sup>123</sup> Steven Mufson, "Warship Sale Could Fuel China Tensions," *Washington Post*, April 14, 2000, p. 1.

<sup>124</sup> Sharpe, *Jane's Fighting Ships 1995-96*, p. 815.

<sup>125</sup> David Mosher, "The Grand Plans," *IEEE Spectrum*, September 1997, pp. 34-35; and Statement of Lt. Gen. Lester L. Lyles before the U.S. Senate, Committee on Armed Services, Subcommittee on Strategic Forces, 106 Cong., 1 sess., March 24, 1999.

<sup>126</sup> Erik Eckholm with Steven Lee Myers, "Taiwan Asks U.S. to Let It Obtain Top-Flight Arms," *New York Times*, March 1, 2000.

<sup>127</sup> June Teufel Dreyer, "Taiwan's Military: A View from Afar," in Larry M. Wortzel, ed., *The Chinese Armed Forces in the 21<sup>st</sup> Century* (Carlisle, Pa.: Strategic Studies Institute, Army War College, 1999), p. 307.

<sup>128</sup> IISS, *The Military Balance 1999/2000*, p. 206.

<sup>129</sup> If the submarines moved quickly, at 20 to 25 knots, they would be at their noisiest, and a plane would probably be within 5 miles of them at some point—generally within detection range for both passive and active sonar against most submarines in most water conditions. By contrast, if the submarines moved more slowly, they would produce a smaller acoustic signature. But there is a greater chance that an antisubmarine warfare airplane would be within a couple miles of them at some point—probably within detection range even against a nearly stationary submarine. See Stefanick, *Strategic Antisubmarine Warfare*, p. 36.