

**SUN TZU**  
**STRATEGIC PARALYSIS**  
**and SMALL NATIONS**



The 1991 Gulf War appeared to mark a significant turning point for modern warfare. For the first time, precision attacks could be conducted successfully against virtually any strategic or tactical targets. Waging total war seemed no longer necessary because the enemy could be quickly paralyzed and forced to make concessions by a strategic paralysis campaign. Strategic paralysis could not only minimize casualties and collateral damage but also avoid protracted war. Advocates of airpower even argued that the air campaign by itself could be decisive without any follow-up ground offensives or territorial occupations despite the fact that airpower cannot seize or hold any territories.<sup>1</sup> It was hoped that future wars would be comparatively shorter, less costly, and more humane.

However, time has revealed that the strategic paralysis campaign was not completely successful since it failed to achieve some of the objectives set by the coalition forces. Dr Grant T. Hammond argues that 'Iraq did not win militarily, but it did not lose politically.'<sup>2</sup> It is still debatable whether stability really exists in the Persian Gulf after the war and whether American citizens are now safer abroad. Moreover, neither Iraq's WMD capability nor the Republican Guard was completely destroyed. Similarly, William M. Arkin points out that while Saddam Hussein might have had great difficulty in directing his war efforts, the attacks against his leadership did not cause his regime to collapse as previously expected.<sup>3</sup> After a decade, the remaining fundamental conflicts and psychological hostilities still have a considerable potential to trigger subsequent wars.

While modern theories fail to explain why an overwhelming military success did not lead to the desired end-state, *The Art of War* written by Sun Tzu over two thousand years ago surprisingly accounts for the shortcoming.<sup>4</sup> Though 'friction' such as uncertainties, errors, accidents, technical difficulties, and unforeseen circumstances can adversely affect the outcome of war, Sun Tzu's strategic concept can approximate to a science on the nature of war because it is an accumulative experience of the Chinese people over thousands of years.<sup>5</sup> Friction can certainly make the outcome of war unpredictable. Nevertheless, a set of general principles governing various aspects of war can be empirically derived from history, given a sufficient number of historical cases. Even though Sun Tzu's work has been widely translated into many languages for centuries, not many people profoundly understand his concept.

The term 'paralysis' was used by Sir Basil H. Liddell Hart when he wrote, 'It is thus more potent, as well as more economical, to disarm the enemy than to attempt his destruction by hard fighting. ... A strategist should think in terms of paralyzing, not killing.'<sup>6</sup> In modern practice, the concept of strategic paralysis was derived from the combined ideas of Col. John R. Boyd's 'psychological' paralysis and Col. John A. Warden III's 'physical' paralysis. The practical concept is probably best defined by the US *Joint Vision 2010* as follows:

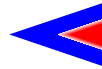
Airpower will simultaneously deliver precision weapons against strategic targets in a minimum time frame to inflict strategic paralysis on the enemy. Such parallel attacks will synergistically create both physical and psychological effects. The enemy's war fighting capability will be quickly reduced to a level that subsequent military operations can be accomplished easily.<sup>7</sup>

According to the definition, strategic paralysis seems to be feasible only for superpowers with sufficient assets to conduct parallel attacks. The objective of this paper is to demonstrate that strategic paralysis pursued in conjunction with Sun Tzu's concept could prevent failures similar to those of the 1991 Gulf War and might also be feasible for small nations with limited airpower.

The paper consists of seven parts. The first section will indicate the relevancy of Sun Tzu's concept of war to modern warfare. The second section will briefly discuss Boyd's psychological paralysis and Warden's physical paralysis. The third section will identify some possible theoretical flaws in the strategic paralysis concept. The fourth section will examine the practical limitations of military means and strategic paralysis at each level of strategy. The fifth section will discuss the most likely scenarios for small nations with limited airpower. The sixth section will discuss how to apply a prewar strategy prior to the state of war. The seventh section will discuss how to apply strategic paralysis in conjunction with Sun Tzu's concept. In addition to the thinking of Western scholars, the paper incorporates the practical experiences of some senior officers of the Royal Thai Air Force (RTAF).<sup>8</sup> Lastly, the conclusion will summarize the alternative approach to strategic thinking, military campaign planning, targeting strategy, and the exploitation of military success.

## **SUN TZU'S CONCEPT OF WAR**

It is quite difficult to interpret Sun Tzu's *The Art of War* accurately because of two major factors. Firstly, there are a number of ambiguities in any single translation because the Chinese ideograms may have several valid contextual meanings. For example, the ideogram '*bing*' in a particular context could be translated as 'war', 'conflict', 'military', 'strategy', 'tactic', 'combat', 'battle', 'manoeuvre', or 'weapon'.<sup>9</sup> Word-by-word translation sometimes does not make much sense while contextual translation is sometimes inaccurate due to the East-West cultural differences. It is also possible that Sun Tzu might have intentionally chosen these terms so that his work would always remain universally applicable. Secondly, a comprehensive understanding of Chinese



history and culture is essential for a precise translation. The Chinese perception of war in the past might have been different from modern beliefs. In an attempt to avoid misinterpretation, the quotations from *The Art of War* in this paper are based on the comparison of several available sources.

Sun Tzu's concept of war in general still remains relevant to modern warfare. At the grand strategic and military strategic levels, *The Art of War* discusses not only military strategy but also the political and economic aspects of war. At the operational and tactical levels, some of the operational doctrines and tactics are still applicable to modern warfare. For example, some of the principles of war discussed in *The Art of War* remain central to modern military doctrines. Modern guerrilla warfare illustrates a complete application of Sun Tzu's concept at all levels of strategy.<sup>10</sup> The nature of war may have changed significantly in terms of military hardware and the environment; nevertheless, the pattern of conflict and typical human deficiencies remain unchanged.<sup>11</sup> Hence, most of Sun Tzu's strategic and tactical concepts are still applicable or adaptable to modern warfare.

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Sun Tzu looked at war from a very broad perspective. 'War' not only means the actual state of war but also includes prewar efforts to avoid armed hostilities and postwar efforts to achieve the desired end-state.<sup>12</sup> Some wars continue for a long period of time as long as the fundamental conflicts remain, although the continuity of armed hostilities may be interrupted by forcible suppressions or domestic problems. The apparent peace achieved under these conditions is unlikely to endure. In other words, war may be a series of armed hostilities and other forms of struggle such as political propaganda or isolation, economic sanctions, or cultural/religious rivalries, as well as violence and terrorism. Thus, war in a normal sense may be just a single event of war in the broad sense. The Chinese unification wars (453-221 BC), the Crusades, the Arab-Israeli wars, and the Cold War are good examples of war under this definition.



Sun Tzu believed that the overall strategy to achieve the objectives of war should be comprehensive and consist of three elements: the prewar, war, and postwar strategies.<sup>13</sup> The overall strategy should utilize all available means to end the conflicts and hostilities as quickly as possible, thus minimizing losses and the residual effects. Non-military means are preferable to the use of force. Examples of non-military means that can be exploited to implement the overall strategy are political, economic, cultural, psychological, and diplomatic measures.



*The operational effectiveness of armed forces largely depends on rules that govern the conduct of military operations*

Even though Sun Tzu was an expert in warfare, he believed that war should be avoided by all means. The very first lines of *The Art of War* state that war is a vital affair of state because it determines life or death, and survival or ruin; therefore, it should be thoroughly considered.<sup>14</sup> A state should not go to war unless it is absolutely necessary to do so. Whether a state wins or loses, the population and economy will suffer to some degree. The success of a state should be measured by the well being of people, not the predominance over other states.

Sun Tzu placed the greatest emphasis on the grand strategic calculation of war. He believed that the

outcome of war could be predetermined by evaluating the five essential criteria: *tao* (way), heaven, earth, leadership, and rules.<sup>15</sup> We must ensure that our objectives of war, strategy, and conduct of war conform to these principles.

*Tao* is the most important factor at the grand strategic level. *Tao* means that a sovereign or political leader must be meritorious and his political rationale for war must be legitimate, justified, and convincing to his people. In other words, *tao* is the way to justify the political rationale for war in order to gain public consent and support. *Tao* also serves as a political motivation for the people and troops towards the desired end. *Tao* must remain credible throughout the war.

Apart from *tao*, heaven and earth are also important factors at the lower levels of strategy. The conduct of war must conform to the accepted rules or ethics of war. If the rules are deliberately violated, a just war may become unjust because *tao* no longer exists. Heaven means natural phenomena such as climate and weather. A flawless military strategy must take these uncontrollable factors into account. Earth means the environment such as geography and terrain that one must adapt to and take advantage of. The alteration of environment, if not impossible, is time consuming and requires great effort. The most efficient military strategy is the one that maximizes the exploitation of the existing environment.

Leadership and rules are more relevant to the operational and tactical levels. A military commander should be intelligent and competent. His success depends on careful thoughts rather than intuition (immediate apprehension by the mind without reasoning, or by a sense).<sup>16</sup> The operational effectiveness of armed forces largely depends on rules that govern the conduct of military operations. Examples of rules are laws, orders, doctrines, organizational structures, disciplinary codes, and incentive schemes.



Sun Tzu also placed great emphasis on knowing the enemy physically and mentally.<sup>17</sup> By ‘physically’, he means one must know what the enemy has on hand. This type of information includes the enemy’s assets, strength, capabilities, training, doctrine, logistics, and disposition. By ‘mentally’ he means one must be able to read the enemy’s mind correctly. This requires in-depth knowledge of the enemy’s leadership such as the competency and personal character of the enemy’s leader as well as his objectives and strategy. In addition, one needs to know about the discipline and morale of the enemy’s troops. Knowing the enemy allows us to direct our war efforts precisely at the enemy’s vulnerabilities or weaknesses, and predict accurately how the enemy will react in particular situations. In order to win, we may need to know the enemy even better than he knows himself.

Knowing the enemy might allow us to achieve our objectives of war without engaging in combat, or with minimum effort. Sun Tzu believed that winning a war without fighting at all is better than winning the war by defeating the enemy in one hundred battles.<sup>18</sup> Although there is disagreement whether he suggested that one should just keep ‘his own state and army’ intact or should also keep ‘the enemy state and its army’ intact, both interpretations make sense.<sup>19</sup> While the former obviously makes sense, the latter also does because we might be able to utilize the enemy’s remaining assets or turn him into an ally in future. Sun Tzu believed that the most efficient way to win a war, which he regarded as ‘strategy’, is to foil the enemy’s strategy; the next is to break his alliances; the next is to defeat his armies; and the last is to seize his fortified cities.<sup>20</sup> The first two most desirable options are unfeasible if we do not know the enemy mentally. Pursuing these options may not appear as decisive as using brute force but human lives and resources are preserved. In addition, knowing the enemy is also very important at the operational and tactical levels. Sun Tzu believed that the art of war lies in reading the enemy’s intentions.<sup>21</sup> For example, he suggested that we should attack the enemy at undefended positions, and defend the positions where the enemy would not dare to attack.<sup>22</sup>

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Sun Tzu pointed out a significant difference between ‘winning’ and ‘not losing’. The superior side normally aims at ‘winning’ whereas the inferior side may just aim at ‘not losing’. In other words, a stalemate may be regarded as a failure for the former and a success for the latter. Sun Tzu suggested that one should not engage a superior enemy in combat unless certain of victory.<sup>23</sup> ‘Not losing’ depends on whether we make mistakes whereas ‘winning’ depends on whether the enemy exposes his vulnerabilities or weaknesses.<sup>24</sup> A winner develops a strategy before engaging in combat while a loser does the opposite.<sup>25</sup> That is to say we must be smart not to lose but we need a foolish enemy to win.

Although protracted war should be avoided in general, the inferior side may need to preserve itself and wait for an opportunity.<sup>26</sup> One can always choose not to fight by making concessions for the time being.<sup>27</sup> Any losses, with the exception of human lives, could be regained or rebuilt. There are no good reasons to engage in combat and be defeated because the enemy will

eventually get what he wants anyway. If time is not a limiting factor and the strategic intentions remain, the objectives of war may be achieved in the long term by continuing to build up the means and seek strategic advantages before engaging the enemy decisively under favorable conditions.<sup>28</sup>

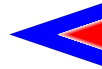
Apart from military expertise, military commanders in the past also needed other knowledge. The role of a sovereign or political leader in wartime was to ensure that the five essential criteria were met. Once his army was on the march, the total responsibility for the conduct of war rested with his supreme field commander. It was customary that the commander might disregard the commands of his sovereign that did not fit.<sup>29</sup> Although the practice might have been largely due to the inadequacy of communications, it offered some practical advantages. It allowed the commander not only to take his own initiative but also to respond to situations in the battlefield more effectively. Sun Tzu believed that political leaders should not interfere with military affairs.<sup>30</sup> Since a war strategy could also be implemented by non-military means, military commanders needed political, economic, cultural, and diplomatic knowledge to deal with, or take advantage of, the situations in the theatre.

According to Sun Tzu, war and battles can be won decisively, quickly, and efficiently if we seek strategic advantage and choose correct timing.<sup>31</sup> Practically, we should adhere to the principles of war such as objective, morale, deception, intelligence, initiative, secrecy, surprise, timing, offensive, defensive, mass, flexibility, and fluidity. For example, Sun Tzu emphasized that the objectives of war must be set and maintained in compliance with the five essential criteria.<sup>32</sup> If war is prolonged, troops will be demoralized.<sup>33</sup> He believed that warfare is based on the art of deceit and regarded espionage and intelligence as the essence of warfare.<sup>34</sup> We should take the initiative, keep our plans secret, make use of deceptions, and surprise the enemy.<sup>35</sup> Straightforward manoeuvres are generally used to engage the enemy while surprise should be used to defeat him decisively.<sup>36</sup> ‘Strategic advantages’ are just a potential for victory but it is ‘correct timing’ that makes a battle decisive.<sup>37</sup> Whether to take the offensive or the defensive depends on the situation and relative strengths.<sup>38</sup> Local superiority can be achieved by concealing one’s own dispositions and concentrating troops at a pre-selected decisive location.<sup>39</sup> Tactics should be flexible and fluid so that the momentum of force can be directed at the enemy’s weakest point.<sup>40</sup>

## **STRATEGIC PARALYSIS**

‘Strategic paralysis’ defined earlier by the US *Joint Vision 2010* is based on Boyd’s concept of ‘psychological’ paralysis and Warden’s concept of ‘physical’ paralysis.<sup>41</sup> It is necessary to understand the theoretical concepts comprehensively in order to analyze the practical concept.

Boyd’s concept of ‘psychological’ paralysis appeared in ‘A Discourse on Winning and Losing’ produced during 1976-87, and consisted of four slide presentations and one essay: ‘Pattern of Conflict’; ‘Organic Design for Command and Control’; ‘The Strategic Game of ‘Destruction and Creation’; and ‘Revelation’.<sup>42</sup> Unfortunately, his work has never been published. Boyd



**Boyd served as a fighter pilot during the Korean War operating F-86 aircraft**

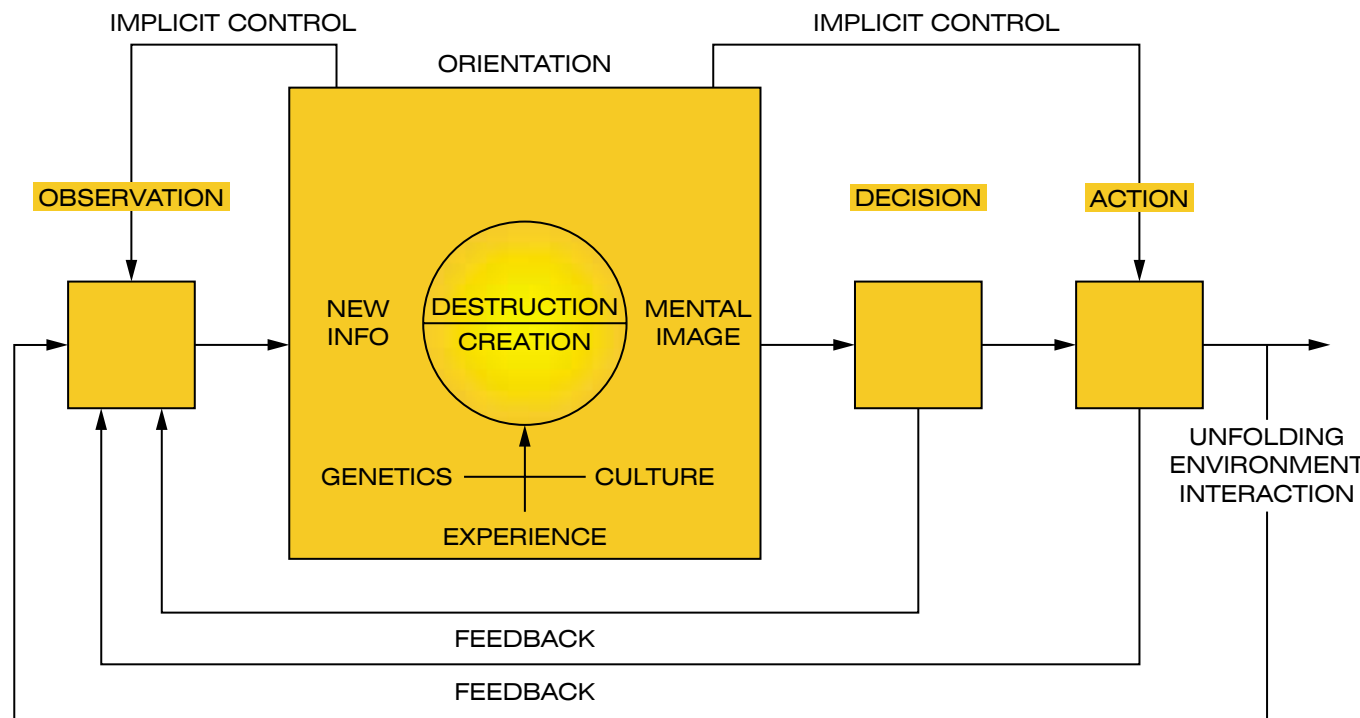
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served as a fighter pilot in the Korean War in which he was first inspired by the success of the F-86 against the Mig-15 because of its fast transient characteristics. Based on his extensive research in the history of warfare and his engineering background, he analyzed military successes and failures in the past in a scientific way. Boyd's concept in general is largely a modern reinterpretation of *The Art of War*. He was also highly influenced by the successes of the Mongols, Napoleon, Blitzkrieg, and guerrilla warfare. Boyd's strategic thinking was comprehensive because it covered all levels of strategy. The idea that made him best known was the Observation-Oriented-Decision-Action (OODA) time cycle or loop.

At the grand strategic level, Boyd suggested that first of all, political leaders should inspire their followers to take action enthusiastically towards confronting and conquering all obstacles that stand in the way.<sup>43</sup> Protracted war, high attrition, and collateral damage should be avoided. While undermining and isolating the enemy, the state should not only increase its own spirit and strength but also influence uncommitted and potential adversaries. The state should make the enemy regime appear corrupt, incompetent, and unfit to govern. That is to say while maintaining its own *tao*, a state should also try to destroy the enemy's *tao* at both the national and international levels. Having defeated the enemy, the state should ensure that the remaining conflicts or the conditions of peace will not lead to future conflicts. In brief, Boyd effectively suggested that the state should pursue a long-term strategy and aim for sustainable peace.

At the operational level, Boyd suggested that the OODA loop could be thought of as being the command and control loop.<sup>44</sup> The loop can be best explained by using its own origin. In air combat, a pilot continuously executes a cycle of physical/mental tasks. Firstly, he observes the enemy's initial action. Secondly, he orients himself by recognizing the relative energy-maneuvrability between his aircraft and the opponent. Thirdly, he decides what manoeuvre is most appropriate for that situation. And fourthly, he acts by executing the selected manoeuvre. He then begins his next OODA loop by observing the enemy's reaction to his initial maneuver and continues onto the next phase and cycle, and so on. Naturally, the OODA loop is always executed automatically, repeatedly, and continuously. The process occurs at all levels where strategic or tactical

decisions are made by commanders and passed on to subordinate units or troops to be executed, namely, where there is command and control. Boyd believed that orientation is the most critical phase of the four since it shapes the way one observes, decides, and acts. Orientation itself is shaped by generic heritage, cultural tradition, on previous experiences, and unfolding circumstances.



**Figure 1: Boyd's OODA Loop**<sup>45</sup>

the enemy from his allies and the uncommitted by exploiting his violation of the generally accepted codes of conduct or standards of behaviour that he professes or is expected to uphold.

To achieve the goal, Boyd suggested that we should operate inside the enemy's OODA loop, or get inside the enemy's mind-time-space (grand tactics).<sup>48</sup> We should OODA more inconspicuously, more quickly, and with more irregularity to maintain our initiative (tactics). As the enemy cannot generate mental images that are consistent with the threatening or non-threatening events/efforts and mismatches among those events/efforts, he will face uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos, and so on. Thus, the enemy will over-react or under-react to such ambiguous and unpredictable activities. In other words, we should accelerate our own OODA loop and simultaneously disrupt, decelerate, or interfere with the enemy's OODA loop until it reaches the point that the disoriented enemy is unable to adapt or endure. As the enemy is driven beyond his moral-mental-physical capacity – or is 'psychologically' paralyzed – he will be unable to continue his war efforts.

Boyd discussed his strategic thinking in terms of tactics, grand tactics, strategy, and strategic aim.<sup>46</sup> Boyd suggested that while we continue to improve our own freedom of action, we should try to diminish the enemy's freedom of action to cope with unfolding events (strategic aim). We should paralyze the enemy and collapse his will to resist by targeting his moral-mental-physical being (strategy). The enemy should be morally-mentally-physically isolated from his allies and any outside support. Similarly, his elements should be isolated from one another. Boyd suggested how to isolate the enemy in practice.<sup>47</sup> We 'physically' isolate the enemy from the supply of matter-energy-information by cutting both his internal and external links. We 'mentally' isolate the enemy from what is going on around him by presenting him with ambiguous, deceptive, or unusual situations. And we 'morally' isolate

In regard to Sun Tzu's concept of war, Boyd expressed the essence of *The Art of War* by the theme 'harmony, deception, swiftness of action, fluidity of action, dispersion/concentration, surprise, and shock.'<sup>49</sup> He agreed with Sun Tzu that the art of war is to subdue the enemy without fighting and to avoid protracted war. This could be achieved by probing the enemy to reveal his organization, disposition, patterns of movement, intentions, strengths, and weaknesses; manipulating the enemy by shaping his perceptions; foiling the enemy's plan or strategy as the best option; and employing *cheng* (regular, expected, straightforward, conventional) manoeuvre to expose the enemy's vulnerabilities or weaknesses, and *ch'i* (irregular, unexpected, surprising, unconventional) manoeuvre to defeat him decisively.

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Boyd also made an interesting observation that modern Western commanders just concentrate on defeating the enemy in battle rather than attempting to foil the enemy's plan or strategy prior to battle.<sup>50</sup> Boyd criticized Clausewitz for his concept of centre of gravity (COG) that had led to 'bloodbath' attrition wars.<sup>51</sup> While Clausewitz believed that the COG is always found where the mass is concentrated most densely, Boyd argued that many non-cooperative COGs could be generated by attacking the enemy's vulnerabilities. From a different perspective, the enemy's perception can also be thought of as the COG.<sup>52</sup> Moreover, Boyd also criticized the modern principles of war. Boyd argued that the principles are not really principles unless variety, rapidity, harmony, and initiative are emphasized and fully exploited.<sup>53</sup>

Warden's concept of 'physical' paralysis was first originated in 1988 when he wrote a book titled *The Air Campaign: Planning for Combat* under the influence of the Cold War and from his experience in Vietnam.<sup>54</sup> To some extent, his concept of the air campaign was successfully applied during the 1991 Gulf War. He has written a few articles since then. 'Employing Air Power in the Twenty-first Century' explained his concept of centre of gravity (COG) by the five concentric rings of COG components: the command structure, essential production, transportation network, population, and military field forces.<sup>55</sup> The analysis of the enemy as a system and the equation 'Physical x Morale = Outcome' first appeared in 'The Enemy as a System' in which the rings also became known as 'the Basic Five-Ring Model'.<sup>56</sup> And in 'Planning to Win', Warden suggests the whole planning process for an air campaign.<sup>57</sup> In contrast to Boyd, Warden is highly influenced by what Clausewitz called the ideal form of war – simultaneous attacks or parallel warfare.<sup>58</sup> His focus is on the military strategic and operational levels of strategy. Despite their clarity, his works have been criticized for their redefined concept of COG, the simplicity of his model, the selectivity of supporting evidence, and the universality of application.<sup>59</sup>

In *The Air Campaign: Planning for Combat*, Warden uses 'centre of gravity' or COG to describe the 'point where the enemy is most vulnerable and the point where an attack will have the best chance of being decisive.'<sup>60</sup> He believes that air superiority should be the first priority in any military campaign because it is crucial to the success of subsequent military operations. He



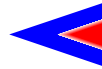
*In 'Employing Air Power in the Twenty-first Century', Warden points out the major advantages of airpower, such as its responsiveness, decisiveness, mobility, firepower, accuracy, and ability to circumvent the enemy's field forces to attack his COG...*

believes that offensive airpower is the strongest form of air warfare. He suggests that offensive operations should be planned 'without concern for defence.' Defensive operations, if unavoidable, should aim to inflict sufficient casualties on the enemy so that he cannot continue his offensive operations. This could be achieved by concentrating airpower locally to achieve numerical superiority over the enemy.

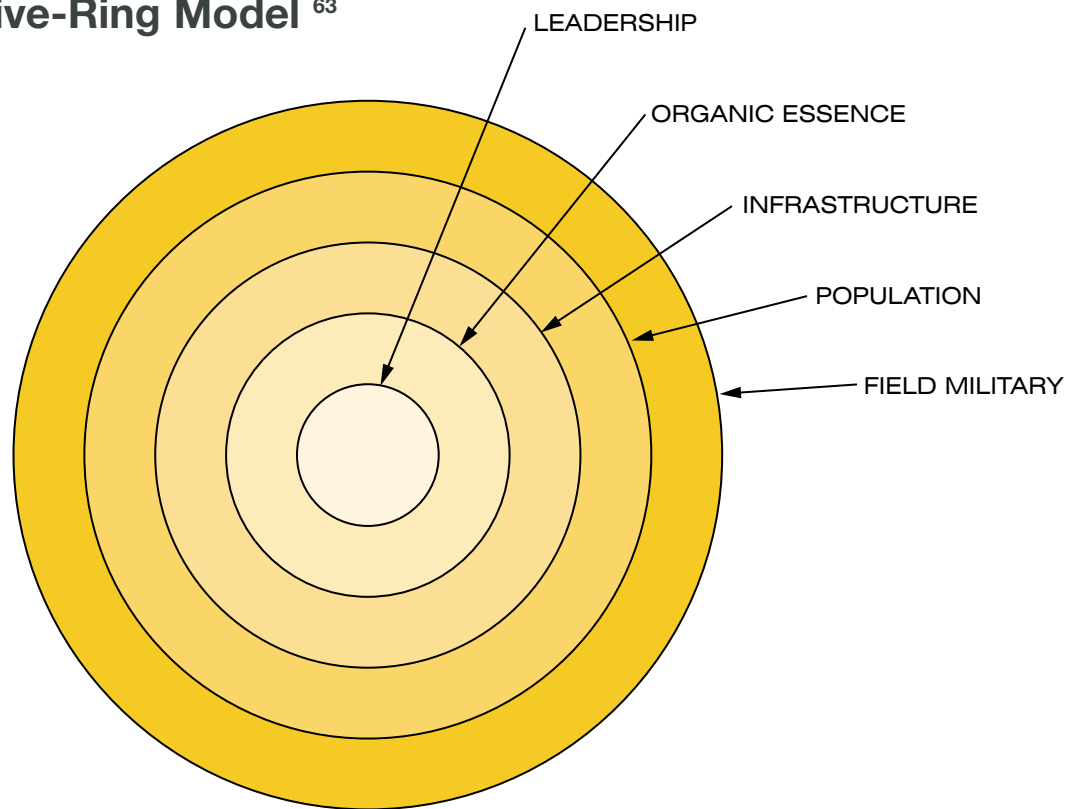
In addition, Warden recognizes that military objectives should serve political objectives that '...can range from demanding unconditional surrender to asking the opponent to grant favourable terms for an armistice.'<sup>61</sup> Military objectives can be the destruction of the enemy's armed forces, economy, or will to resist. He emphasizes that the enemy's COG must be correctly identified and attacked. He points out that airpower can bypass the enemy's surface forces. In a joint campaign, the key force must be identified and all efforts must be orchestrated for synergy. Unnecessary seizure of the enemy's territory and protracted war should be avoided. Airpower must be the key force when surface forces have insufficient strength or cannot reach the enemy's COG. Airpower may be the key force if the enemy's field forces can be isolated, or until ground and/or naval offensives take place.

In 'Employing Air Power in the Twenty-first Century', Warden points out the major advantages of airpower, such as its responsiveness, decisiveness, mobility, firepower, accuracy, and ability to circumvent the enemy's field forces to attack his COG directly.<sup>62</sup> Airpower can also minimize war casualties and collateral damage. As a political instrument, airpower can be used to threaten the enemy or actually attack his COG to achieve the objectives of war.

Warden believes that all states and military organizations have unique sets of COGs or 'vulnerabilities'.<sup>64</sup> Nonetheless, it is possible to create a general model of COGs that consists of five concentric circles as mentioned earlier. He believes that the most critical ring is the command structure. All war efforts should aim to affect, whether directly or indirectly, the innermost ring



**Figure 2: Warden's Basic Five-Ring Model** <sup>63</sup>



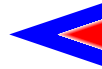
because that is where concessions are made. In most cases, all the rings exist in that order and the outer rings can be bypassed. He points out that the COGs also exist at the operational level. Warden claims that the Gulf War was the first true 'inside to outside' war in which attacks were conducted against the innermost ring outward to the outermost ring. Iraq was both 'strategically' and 'operationally' paralyzed so it could do nothing to resist the coalition forces. Manoeuvre, mass, and concentration could be effectively achieved by the use of precision weapons in conjunction with stealth technology. Warden believes that it is almost impossible to defend against offensive airpower that has become dominant in 'hyper-warfare'.

In 'The Enemy as a System', Warden argues that airpower and precision weapons have made it possible to separate the physical side and the morale side of the enemy into distinct categories.<sup>65</sup> The outcome of the enemy's war efforts can be represented by the following equation:

$$\text{Physical} \times \text{Morale} = \text{Outcome}$$

If the physical side can be reduced close to zero, even high morale cannot produce an effective outcome. Warden believes that human behaviour is complex and unpredictable while the physical effects of military action are more predictable. Since it is more difficult to deal with the enemy's morale, war efforts should be primarily directed at his physical side. In brief, Warden believes that we may achieve our objectives in war by causing changes to one or more parts of the enemy's physical system so that the enemy decides to adopt our objectives. In other words, we make it physically impossible for the enemy to oppose us. This is how Warden defines 'physical' paralysis.

Warden suggests that we should look at the enemy as 'a system composed of numerous subsystems.'<sup>66</sup> He defines a 'strategic entity' as anything that can 'function on its own and is free and able to make decisions as to where it will go and what it will do' or 'any organization that can operate autonomously; that is, it is self-directing and self-sustaining.' An enemy system is a strategic entity that consists of central leadership or direction, organic essentials, infrastructure, population, and fighting mechanisms (or field military). Although Warden renames the five concentric rings as 'the Basic Five-Ring Model', his description of the COG components and their relationships is almost the same.



To paralyze the enemy system, Warden suggests that parallel attacks, as opposed to serial attacks, are more effective because they prevent the enemy from responding effectively, or reacting at all.<sup>67</sup> Ideally, all of the enemy's vulnerabilities should be attacked simultaneously and modern technology has made this concept possible. Nonetheless, he realizes that the model may be inapplicable in some circumstances such as a struggle against brutal invaders. If people believe that surrendering would not make any difference to their fate, every person will become a strategic entity and fight to death. In Warden's view, strategic paralysis provides the most positive resolution of conflicts.

In 'Planning to Win', Warden defines winning as '... when the opponent ... is in the state we want it to be in and when it can only do what we want it to, or will only do what we want it to.'<sup>68</sup> In regard to the information revolution, he believes that it is counter-productive trying to keep secrets. Instead, we should try to exploit information faster than our opponent. That is, he disregards the principle of surprise in the traditional way. He believes that parallel warfare will dominate future wars. He suggests that planning to win must be a top-down process starting from the highest level of strategy. Warden favours parallel attacks in a compressed timeframe since he believes that as the time to attack the enemy's key strategic and operational targets increases, the number of incidents that might adversely affect the outcome of war will increase.

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Boyd focuses on the enemy's decision-making process whereas Warden looks at the enemy system from a physical perspective. Despite their differences, there are many common and/or consistent ideas that could be merged into a practical concept. Nonetheless, the practical concept appears to have been dominated by Warden's thinking, and the rest of Boyd's thinking, apart from the OODA loop, seems to have been disregarded. Warden's concept of parallel warfare fits nicely with Boyd's suggestion to accelerate the OODA time cycle because physical and psychological paralysis can be concurrently achieved. However, Boyd's emphasis on the grand strategic level is absent from the practical concept. This is probably one of the reasons why the application of strategic paralysis did not lead to a complete political success and the desired end-state in the 1991 Gulf War.

## **POSSIBLE THEORETICAL FLAWS IN THE STRATEGIC PARALYSIS CONCEPT**

While scientific theories can be both proven theoretically and verified experimentally in a controlled environment, the same approach cannot be applied to military theories because there are many uncontrollable factors in war. Hence, theoretical flaws or weaknesses in a military theory may not be revealed until its application has resulted in failure. Strategic paralysis, like all other military strategies, is not perfect. *The Art of War* implies that the smarter side, not necessarily the superior side, will succeed. If Sun Tzu were correct, strategic paralysis would be ineffective against a smart enemy who did not expose his



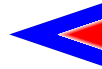
vulnerabilities or weaknesses, and might fail if the assailant made his own mistakes. This approach will be used to access the concept theoretically.

Firstly, the enemy's decentralization of command and control may render strategic paralysis ineffective. One can paralyze highly developed living organisms such as human beings but cannot paralyze microorganisms such as germs. This is because human beings have a vulnerable nervous system but germs do not. Similarly, decentralized or independent field forces are less vulnerable to strategic paralysis than highly centralized ones. The enemy could decentralize his war efforts at the tactical level while still centralizing his strategic directions that seldom change. For example, China is interested in the concept of 'guerrilla air war' after having studied the lessons learned in recent wars.<sup>69</sup> If a well-prepared enemy restructures and operates his field forces in such a way, a strategic paralysis campaign may be unable to degrade his capabilities in a short timeframe. Thus, a quick victory is unlikely.

Secondly, the enemy may not engage in direct combat or compete at a fast pace. The enemy may choose to engage only under favourable conditions such as using hit-and-run tactics. Numerical superiority could also be used to offset the advantages of technological superiority. Though the assailant may have a strategic paralysis capability, there may not be suitable targets to attack. The absence of such targets does not necessarily mean that the enemy's field forces have been rendered ineffective. A smart enemy would fight at his comfortable pace and only engage when he is certain of victory. If he becomes disoriented, he should avoid reacting in a risky way that might lead to disaster. If the enemy pursues this strategy and time is on his side, the assailant may have to abandon his war efforts.

Thirdly, the acceleration of the OODA loop may also create problems for the assailant himself. Most importantly, more mistakes will be made in a given period of time if his strategy is inappropriate. Although future technology might allow near real time corrections to be made in the subsequent loops, the incorrect course of action might be irreversible after the initial action has been taken. For instance, attacking certain targets may inadvertently escalate and prolong the war. Once escalated, the scale of war cannot be brought back to the initial level. Moreover, the outcome of previous attacks may be unavailable or inaccurate when new decisions have to be made. As a result, subsequent attacks may be wasteful and result in a shortage of weapons and other supplies, or create undesired impacts that may lead to additional political implications.

Furthermore, there are likely to be more mistakes in both the planning process and the execution of strategic paralysis. It is a fact that human mental capacity has some limitations. That capacity decreases significantly when human beings have to perform concurrent mental tasks under stress. Military planners may have difficulties in working continuously for several days. There is also a possibility of information overload.<sup>70</sup> Consequently, there are likely to be more mistakes in the planning process of parallel attacks as compared to sequential attacks simply because parallel operations are more intensive and more complex. Field coordination also becomes a crucial factor to operational success. Since parallel attacks are conducted simultaneously by several branches of effort in a compressed timeframe, the difficulties of coordination will increase as the number of branches



increases, and as the timeframe is compressed. Similarly, there are likely to be more mistakes in the execution of parallel attacks as compared to sequential attacks.

Fourthly, the enemy may try to interfere with the assailant's OODA loop.<sup>71</sup> Since war is interactive, both sides will try every possible way to win. Relying on a highly automated system means that there are fewer personnel and less human time to screen the large amount of incoming information before decisions are made. This might become the assailant's vulnerability. For instance, key staff could be directly targeted and the assailant might be unable to find suitable replacements in time. Even if replacements were readily available, their orientation with the current situation would take some time. The enemy could also indirectly target their loved ones so that the psychological impact would degrade their mental capacity.

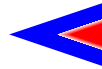
In addition, information technology has not only created a superhighway of information for the assailant's decision makers but also provided the enemy with an expressway to reach and deceive them. Although the assailant may know exactly what the enemy is doing by using advanced sensors, he might still be unable to read the enemy's mind correctly and deduce what the enemy is thinking. Hence, strategic deceptions that have been almost impossible may once again become possible.

Fifthly, the Basic Five-Ring Model may be too simplified since it does not take into account some internal relationships between the COG components, and it also disregards any external relationships between the COG components and the outside world. The model represents an orderly strategic entity such as a democracy or an industrialized economy in which the relationships between the COG components are quite predictable.<sup>72</sup> According to Warden, all war efforts should aim to have either direct or indirect impacts on the enemy's leadership in order to compel the desired concessions. While such attacks may create the desired impacts on the leadership, they may also create undesired impacts on other COG components as well as many strategic entities outside. Other COG components may become significant factors in determining the outcome of war. The affected strategic entities from the outside world may also change their stances in the enemy's favour. These unpredictable impacts may adversely affect the campaign and the outcome of war.

Lastly, the morale side may be a significant factor in the long term. Warden's equation 'Physical x Morale = Outcome' implies that the enemy's morale is an insignificant factor to the outcome of war if the assailant can reduce the enemy's physical effort close to zero.<sup>73</sup> While this may be true for a brief event of war, it might not be applicable to war in the broad sense. In fact, physical and psychological wars are always fought simultaneously. Morale determines the output of war efforts that consists of tangible and intangible outcomes. The equation should be more precisely rewritten as follows:

$$(\text{Physical} + \text{Psychological}) \times \text{Morale} = \text{Tangible Outcome} + \text{Intangible Outcome}$$

Even if the physical effort is driven close to zero and there is no significant tangible outcome, the psychological effort may still produce a significant intangible outcome provided that morale is still high. An intangible outcome has the potential to turn into a tangible outcome and vice versa. For example, while devastating damage could turn into fear, hatred may also turn into some



other forms of struggle such as terrorism. The assailant's postwar casualties due to terrorist attacks might be even higher than his field casualties in war. In brief, the enemy's psychological effort and morale should also be dealt with to prevent such after-effects.<sup>74</sup>

## **THE PRACTICAL LIMITATIONS OF MILITARY MEANS AND STRATEGIC PARALYSIS**

When it comes to practice, strategic paralysis has many limitations. At the grand strategic level, military means may be unsuitable for some types of war, especially wars of belief such as religious, ethnic, and ideological conflicts. It is a fact that human beings may continue to fight from generation to generation for their beliefs. Strategic paralysis is not an exception to this limitation because it is a military means. According to Sun Tzu, a true victory is one that can change the enemy's long-term strategic intentions. Defeating the enemy in war may not be an absolute victory if there is still a potential for subsequent war. The grand strategic calculation implies that without *tao*, one may be unable to win a war even against an inferior enemy. In other words, there are wars that may not be won by a particular side. In such situations, states capable of conducting strategic paralysis may be unable to exploit such a capability to achieve their objectives. The fact that strategic paralysis is not always applicable despite its potential should be regarded as its greatest practical limitation.

*According to Sun Tzu, a true victory is one that can change the enemy's long-term strategic intentions. Defeating the enemy in war may not be an absolute victory if there is still a potential for subsequent war*

At the military strategic level, there may be some political, economic, legal, and/or other constraints that prevent the full application of the strategic paralysis concept. According to Sun Tzu, all available means should be used to achieve the objectives of war. It is a fact that some wars may not be won solely by military means, or may be won more quickly if the war efforts are enhanced by other means. To apply non-military means successfully, some constraints may have to be imposed on the application of military means. Consequently, military planners may be unable to apply the entire theoretical concept of strategic paralysis in practice. For instance, the assailant may be unable to isolate the enemy by blockade, or may have to exclude some sensitive targets. The partial application of the strategic paralysis concept may reduce the campaign effectiveness or could lead to a failure.

In addition, there is the argument that strategic paralysis may not be feasible without an effective nuclear deterrence.<sup>75</sup> The argument is based on the assumption that the enemy would be deterred from using WMD to counter strategic paralysis because of the fear of nuclear retaliation. Even small states may have a capability to employ WMD.<sup>76</sup> Without a nuclear capability, the assailant might be unable to deter such counter-attacks. On the other hand, the



strategic paralysis capability itself may have raised the credibility of conventional deterrence to a degree that it could effectively deter the use of WMD.

At the operational level, there are many complicating factors. First, the availability of forward bases may be a factor. A strategic paralysis campaign may require some suitable forward bases in third countries. The bases may be unavailable to the assailant, or the hosts may impose restrictions due to political reasons. Though long-range operations may be possible, there are many disadvantages such as higher operational costs, fewer available sorties, and aircrew fatigue.<sup>77</sup>

Second, the deployment phase that normally takes quite some time may create difficulties. The enemy could use this opportunity to strengthen his defence and prepare counter-attacks.<sup>78</sup> The enemy may also seize the opportunity to launch a pre-emptive strike against the assembling forces. The assailant might have to delay or abandon the campaign if the enemy succeeds in destroying his key assets.

Third, there may be no suitable targets for strategic paralysis. If the enemy is a non-industrialized economy, his basic infrastructure and industry may not be as critical to him as compared to an industrialized economy. Striking such targets may have little effect on his war efforts. The enemy may also disperse his assets so that they become inaccessible, or are no longer high-value targets. The use of smart weapons may be unfeasible, or become excessive and less cost-effective against such targets.

Fourth, the campaign may be ineffective if the enemy's vulnerabilities or weaknesses are incorrectly identified.<sup>79</sup> The COG may be different from state to state. The assets that the assailant regards as vital may not be that important to the enemy. Targeting can be very difficult unless the assailant knows the enemy inside out. Attacking a wrong COG may lead to protracted war and excessive losses for both sides.

Fifth, the environment may not be ideal for strategic paralysis. The assailant may be unable to isolate the enemy physically due to unfavourable geography or other reasons. It is also a fact that airpower, the primary instrument

*...there may be no suitable targets for strategic paralysis. If the enemy is a non-industrialized economy, his basic infrastructure and industry may not be as critical to him as compared to an industrialized economy*





of strategic paralysis, is not fully effective in bad weather. In addition, certain types of terrain such as forests, mountains, or urban areas may be unsuitable for some types of smart weapons.<sup>80</sup>

Sixth, there may be some operational constraints that reduce operational effectiveness. For example, the conduct of the campaign will have to comply with the Law of Armed Conflict that restricts certain actions.<sup>81</sup> There might also be a problem in a joint or combined campaign. The available assets may not be fully exploited due to the allocation of responsibilities among the services or nations that make up the joint or combined force.

Seventh, the zero casualties and minimum collateral damage concepts may lead to unproductive efforts.<sup>82</sup> The operational directions may be influenced by the media and public (the so-called 'CNN effect'). The assailant may have to allocate considerable assets to counter relatively insignificant threats instead of attacking more lucrative targets. He may also have to attack insignificant targets while omitting key targets in the vicinity of populated areas.

Eighth, logistics may become a bottleneck for strategic paralysis. Massive airlift may be required in a short timeframe for both the deployment and the campaign itself. The assailant's airlift capacity may be insufficient to support such a requirement, or could be affected by the enemy's initiative. Moreover, the high consumption of smart weapons that have become the weapon of choice may deplete the limited stockpile quickly.<sup>83</sup> This could cause serious operational problems if the acquisition process cannot keep up with the demands.

Ninth, some combat and supporting components may become the assailant's vulnerabilities as strategic paralysis makes them critical to operational success.<sup>84</sup> In a compressed timeframe with several branches of effort, some critical components such as high-demand assets that are limited in number, air operations centres, key communication nodes, or special supporting facilities would become lucrative targets for the enemy. If the enemy successfully attacked these key components, the assailant might have to suspend his war efforts even though his remaining forces were still at full strength.

Last, the assailant may have to allocate substantial assets to guard against asymmetric threats posed by the enemy.<sup>85</sup> Since the strategic paralysis capability has become dominant in modern warfare, weaker states are effectively forced to develop asymmetric means as a countermeasure. For example, China has developed the concept of 'unrestricted warfare' that utilizes every possible means to offset the technological advantages enjoyed by the West. Even though asymmetric attacks are unlikely to cause high casualties on the battlefield or have a significant direct impact on operational effectiveness, the indirect impacts due to public sensitivities could considerably affect the campaign. Moreover, the enemy may have a capability to conduct asymmetric attacks against the assailant's homeland.<sup>86</sup> Such attacks may even have greater indirect impact on the campaign.

At the tactical level, the execution of strategic paralysis may be ineffective due to many factors. For example, it may be difficult to locate and destroy moving targets.<sup>87</sup> Tactical targets are unlikely to be static in highly mechanized warfare. Though the assailant may be able to locate moving targets quickly by advanced sensors, the targets may have moved by the time the

attackers arrive. Employing airborne alerts may not be a cost-effective solution because it withholds valuable assets from other purposes.

In addition, the enemy's deception combined with self-imposed constraints may reduce the effectiveness of attacks. The assailant may have to impose his own constraints such as minimum altitude restrictions for safety or other reasons. The enemy may also use camouflage to conceal his field forces or decoys to attract the attackers' attention. Moreover, the enemy could enhance the effectiveness of his deception by selecting favorable terrains such as urban areas.<sup>88</sup> Consequently, intelligence, which is a crucial factor to the success of an air operation, could be inaccurate at the time of planning or execution. In such situations, it may be very difficult for aircrews to identify targets, or to make precise assessments of their attacks.<sup>89</sup> These limitations may also reduce the overall effectiveness of the campaign.

## **STRATEGIC PARALYSIS FOR SMALL NATIONS WITH LIMITED AIRPOWER**

From the strategic perspective, 'small nations' should be defined in terms of state power that is derived from the means states could use to achieve their national objectives, such as political, economic, and military power. According to Sun Tzu, a great military power without comparative economic and political strengths cannot expect to prevail in the long run. 'Small nations' can be any states of which political, economic, and military strengths are between those of superpowers and poor countries. Similarly, 'limited airpower' should be defined in terms of capability that is derived from air assets that small nations possess. In general, small nations have many constraints on employing their airpower.<sup>90</sup> For example, they cannot do everything that superpowers can because they lack certain air assets. They cannot replace attrition losses quickly. They have limited stockpiles of weapons and other supplies. They cannot sustain protracted war. Nonetheless, they may have a capability to gain control of the air and strike any targets in the theatre of war and the enemy's homeland. Such a capability is a potential for strategic paralysis and will be regarded as 'limited airpower'. Although some concepts in the following discussion are universally applicable, the use of airpower by superpowers will not be discussed because they are unconstrained by these limiting factors. For poor countries, it is obvious that this military option is unviable.

Strategic paralysis is a relative capability. The assailant must be far superior to the enemy in terms of overall military capability and airpower in particular. A superpower may have a strategic paralysis capability in relation to a small nation. Similarly, a small nation with relatively far superior airpower may have a strategic paralysis capability in relation to a weaker nation. For example, the US had a strategic paralysis capability against Iraq but may not have such a capability against a near-peer competitor such as Russia. Israel, with its relatively larger and far more effective airpower, may have a strategic paralysis capability against some of its weaker hostile neighbours.

Limited armed conflicts over territorial disputes are the most likely scenarios for small nations. Since economic development is normally their primary concern, they would only go to war for non-negotiable issues such as sovereignty. Territorial disputes are

the most common source of conflict although there might be political, economic, religious, or cultural factors. Even in civil wars, each party fights for territorial control more than anything else. Nevertheless, contested territories are not always critical to strategic needs, or vital to economies.<sup>91</sup> In many cases, states engage in armed conflict for the purpose of maintaining their status quo and/or the legitimacy of their claims. If the disputes are not a matter of national survival, small nations should be able to force their adversaries to make concessions provided that the conditions of war are favorable. Military means are usually feasible for state-versus-state conflicts although they should be used only as the last resort.

Small nations may not have to paralyze their enemies in the same way superpowers do. Generally, patients have to be completely paralyzed in major surgical operations. However, complete anaesthesia may be unnecessary for minor operations. A patient may only have to be paralyzed locally on the part of his body where the operation is going to take place. Local anaesthesia is less costly and takes shorter time for patients to recover. While superpowers may choose to paralyze their enemies completely to prevent them from responding at all, small nations may have to paralyze their enemies locally and briefly, precisely where and when the paralysis is required. 'Tactical paralysis' could be as effective as strategic paralysis if small nations paralyze the right part of the enemy at the right time. This approach would suit their operational limitations because it minimizes the demand for air assets. Moreover, tactical paralysis would be less costly in terms of operational and postwar reconstruction costs.

Whether decisive air campaigns are feasible depends on the strategic environment. If the theatre of war is isolated, such as a remote island, ground offensives may be unnecessary. If airpower alone can isolate the enemy's field forces in the theatre of war, decisive air campaigns should be feasible. However, it should be noted that airpower only has a potential to destroy physical targets. It cannot seize and hold any contested territories. It does not have the same degree of presence in terms of psychological effects as occupying forces. If more tasks need to be done in order to secure the victory, the assailant may still have to employ his ground forces.

## **THE APPLICATION OF SUN TZU'S CONCEPT PRIOR TO THE STATE OF WAR**

Sun Tzu recommended an active approach to war; namely, one should predetermine the outcome of war and take the initiative prior to the state of war.<sup>92</sup> The grand strategic calculation should be performed in peacetime for a few reasons. Firstly, the decision whether to go to war should be based on the predicted outcome. If we are caught by surprise and forced to go to war unprepared, it is because we have been passive. Secondly, the calculation would give an opportunity to foil the enemy's strategy prior to the state of war. War could be successfully avoided if the available time were sufficient to implement the prewar strategy. Thirdly, the decision would allow an early preparation

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for war. The accomplishment of the preparation might change the outcome of war in our favour.

Although Sun Tzu might have been too optimistic about ‘not losing’, some of his suggestions are still very useful. First of all, we should not enter a war we are unlikely to win. Such a war should be avoided by all means because it is a waste of effort. A war that may not be won solely by military means should be carefully considered. We should have the necessary means to implement our strategy before committing ourselves in such a war. A war against a superior enemy or a war that may not be won quickly should be avoided or delayed until we have gained sufficient strategic advantages and strength to defeat the enemy decisively.

In addition, we must meet all the essential criteria discussed earlier and should be reasonable in setting our objectives of war. Most importantly, our political rationale for war must be justified and accepted by our people. The political objectives should be based on a feasible end-state in which peace is sustainable. The military objectives should be realistically achievable under the existing conditions. Generally, the overall political objective is always ‘winning’ but the overall military objective may be either ‘winning’ or ‘not losing’ depending on the relative strengths.

Although ‘winning’ depends on whether the enemy exposes his vulnerabilities or weaknesses, we might be able to win a war without engaging in combat if we successfully foil the enemy’s strategy prior to the state of war. From the enemy’s perspective, his strategy is based on ‘the strategic trinity’ of will, means, and opportunities. More accurately, ‘will’ is the enemy’s strategic intentions rather than his will to fight. ‘Means’ includes both non-military and military means that could be exploited to achieve objectives. And ‘opportunities’ arise when the conditions are favourable to achieve his objectives. An elimination of one or more components would be sufficient to foil the enemy’s strategy and cause him to abolish his war option. Sun Tzu regarded the avoidance of war by this method as the best strategy.<sup>93</sup>

If we have not succeeded and war breaks out, we should continue our effort to foil the enemy’s strategy along with other war efforts. However, it should be noted that while the elimination of means and/or opportunities might terminate an event of war, it will not necessarily change the enemy’s long-term strategic intentions. This is because the means could be rebuilt and opportunities might arise again in future. Hence, one needs an effective postwar strategy to change the enemy’s long-term strategic intentions.

The enemy’s strategic intentions could be changed by destroying his political rationale for war or by providing him with alternatives to war. The first possibility is that the enemy’s strategic intentions are sometimes based on parochial interests or the personal aspirations of the enemy’s leader rather than the people’s will. If the people are convinced by psychological warfare that the reasons to go to war are unjustified, the leader might have to change his intentions because he is unlikely to win without public support.

The second possibility is that the enemy may have no choice but to go to war. The enemy could be persuaded not to go war if provided with alternatives. War can always be avoided if both parties are willing to compromise. Not only the apparent costs but



also the hidden or incalculable costs should be taken into account in the cost-benefit calculation. War is mutually destructive so both parties would benefit from settling the dispute peacefully. To persuade the enemy to choose an alternative, both positive and negative incentives should be used. Namely, one should not only make the enemy realize the negative consequences but also offer him some advantages if he is willing to cooperate. The enemy should also be provided with a comfortable way out otherwise he might have no choice but to pursue his war option.

Some of the enemy's means could be neutralized prior to the state of war. In addition to the armed forces (fighting organs) which is the primary means, traditionally recognized means also include the mechanisms that drive (a nervous system) and feed (blood) the armed forces, such as the administration, basic infrastructure, industry, agriculture, energy supplies, military infrastructure, and field logistics. These normal means can only be neutralized in wartime. Furthermore, Sun Tzu recognized non-military means such as political power, economic influence, cultural ties, diplomacy, alliances, proxies, and the people as means to achieve the objectives of war. These additional means could, and should, be neutralized before war breaks out.

In some cases, the enemy's key means to achieve his objectives are of the latter types. If we successfully neutralize these key means prior to the state of war, the enemy might have to drop his plan. To accomplish the task, we have to identify the enemy's key means correctly. We should develop a strategy and implement its prewar element to neutralize them. It should be noted that the key means are not always the same, and the same enemy may use different means in different wars. This is probably why Sun Tzu never specified the enemy's COG but only recommended foiling the enemy's strategy.<sup>94</sup> Nevertheless, the enemy's COG in any war is always part of the strategic trinity.

We can deny the enemy's opportunities by creating a credible deterrence and removing the conditions of war. We can effectively deter the enemy by eliminating or minimizing our vulnerabilities, improving our overall military capability, and seeking additional allies. Opportunity is a function of the vulnerabilities. Since it is impossible to deal with all vulnerabilities, we need to identify and eliminate the vulnerabilities that really interest the enemy. We must analyze our vulnerabilities from the enemy's perspective. The way that we improve our overall military capability should not appear too threatening to the enemy otherwise it might encourage a pre-emptive strike, thus accelerating the war. In an anarchic world, there are neither permanent friends nor permanent foes. We should not fixate or rely solely on particular allies. Besides potential adversaries, we should also pre-identify potential allies in each particular context so that we could seek additional allies when necessary.

In addition, we should try to remove the conditions of war because they are the enemy's incentives or motives to go to war. For example, some conditions provide the enemy with strategic advantages. Some conditions serve the enemy as his political rationale for war. And some conditions could be used by a superior enemy to initiate a war in his favour.

*In an anarchic world, there are neither permanent friends nor permanent foes. We should not fixate or rely solely on particular allies*

## THE APPLICATION OF STRATEGIC PARALYSIS IN CONJUNCTION WITH SUN TZU'S CONCEPT

If the attempt to avoid war fails, the assailant should prepare the battlefield before engaging the enemy in combat. Since strategic paralysis is most effective against a closed system, the assailant should try to isolate the enemy not only physically and economically but also politically and culturally as much as possible prior to the campaign. This is consistent with Sun Tzu's recommendation that the second best strategy is to break the enemy's alliances.<sup>95</sup> By doing so, the assailant effectively eliminates the external factors that may adversely affect the campaign and also prevents the escalation of conflict. For example, Dr David R. Mets points out that Iraq's inaccessibility to Russian space resources was a factor that contributed to the success of Operation Desert Storm.<sup>96</sup>

The assailant should also think defensively and prepare for the worst cases. It is a fact that vulnerabilities at home and in the theatre of war can never be completely eliminated. Sun Tzu noted that a wise military commander considers both favourable and unfavourable conditions to make his plan both feasible and flawless.<sup>97</sup> The assailant should never bet on a desperate enemy and always be prepared to defend. Although the enemy's counterattacks are unlikely to affect the overall conduct of war, one of the assailant's real vulnerabilities might be the public sensitiveness on war casualties.<sup>98</sup> If the political rationale for war is truly justified, the best way to eliminate this vulnerability is to educate the people to understand the risks and accept the consequences of war.

*The objectives of Operation Desert Storm are an example. The objective to destroy the Iraqi WMD capability was set without an objective to occupy Iraq. By the nature of WMD, it was unlikely that the task could have been accomplished without an occupation. Consequently, the objective was not fully achieved*

According to Sun Tzu, the success of a military campaign should be measured by the achievement of military objectives with the initial allocation of assets and within the timeframe.<sup>99</sup> If that is not the case, the achievement may be arguable and could also be regarded as a partial failure. Military objectives must be effective to attain political objectives. Many failures are due to the fact that people may do things right but may not do the right things. Setting the right military objectives seems straightforward but there are many problems in practice.

Firstly, political objectives are sometimes ill-defined because war may not really be a matter of national survival but something else less important to the state and the people. Consequently, political leaders may be reluctant to make a full commitment to the war effort and may fail to define political objectives clearly.<sup>100</sup>

Secondly, political objectives are sometimes dictated by military solutions. In many cases, political objectives are set according to the option most preferred by the military that may not necessarily be the best course of action.<sup>101</sup> As a result, such political objectives may not accurately represent the national goal and what should be done to attain the national goal may not be done.



Thirdly, military objectives may be inadequate or irrelevant to attain the desired political objectives or end-state. Effective military objectives and realistic timeframes cannot be set if the assailant does not know under what conditions the enemy would concede defeat. The shortcoming usually leads to political interference and ineffective conduct of the military campaign.

Fourthly, military objectives and political objectives are often intermixed or are inconsistent with one another. For instance, military objectives such as defeating the enemy's field forces and seizing his territories are often intermixed with political objectives such as changing the enemy's strategic intentions and restoring sustainable peace. As a result, the military may be unable to attain a military objective that is supposed to be a political objective. Moreover, military objectives are sometimes set without their essential prerequisites. The objectives of Operation Desert Storm are an example. The objective to destroy the Iraqi WMD capability was set without an objective to occupy Iraq.<sup>102</sup> By the nature of WMD, it was unlikely that the task could have been accomplished without an occupation. Consequently, the objective was not fully achieved.

Fifthly, it may be a fallacy to establish a direct relationship between military actions and political objectives while the strategic linkage between military objectives and political objectives is bypassed or missing. For instance, a military option may attain the desired political objectives in a particular war while resulting in an unfavourable political outcome in another war. In fact, each war is unique. Without any military objectives, one can easily make a mistake by incorrectly assuming that a particular military option will always result in a certain political outcome. On the other hand, many military options may attain the same military objectives. With the military objectives designed to attain the desired political objectives, we should never make the same mistake no matter which military option we choose.

The assailant must not make these mistakes. Effective military objectives are based on what is most likely to cause the enemy to concede defeat, not necessarily the most desirable military option. When the enemy decides to go to war, he should be prepared to lose part of certain assets such as his infrastructure, industry, and population in return for the stake. It would take small nations with limited airpower a long time and great effort to achieve military objectives that target such assets. In addition, such assets are unlikely to be critical to the enemy's war efforts in the short term. This shortcoming is evident by the fact that the conventional strategic bombing during World War II was not as decisive as previously expected.<sup>103</sup> Traditionally, military planners aim directly at the contested territory. Achieving such military objectives does not necessarily cause the enemy to concede defeat because he might choose to retreat strategically and wait for future opportunities.

The assailant needs to know the enemy's core interests as well as how he values his assets and the stake. He needs to identify and target exactly what the enemy cannot afford to lose so that the enemy will have to make the desired concessions. Military objectives set accordingly will have the best chance of being decisive and preventing protracted war. The assailant may indirectly target the assets that are most highly valued by the enemy instead of directly targeting the contested territory. The alternative approach is consistent with Sun Tzu's suggestions to seize what the enemy values most, and to attack undefended positions.<sup>104</sup>

For example, states contesting a territorial dispute are normally prepared for holding the contested territory.<sup>105</sup> Seizing or retaking the territory would be very difficult, and the territory itself may not be the real source of conflict or highly valued by the enemy. Alternatively, the assailant could seize or target key strategic areas, highly industrialized zones, or major ports that the enemy does not expect to be attacked. If the enemy does not know exactly where to defend, the tasks could be accomplished with comparatively less effort. Such military objectives are more likely to be effective because the bargaining chip is more critical to the enemy.

Clear military objectives allow military planners to utilize all available assets most efficiently. As discussed earlier, some military objectives may require parallel attacks to be conducted in a compressed timeframe while others may just require independent attacks only when necessary. What, where, when, and how to attack should be primarily determined by the desired effects on the enemy system. In other words, the extra effects besides the operational requirements should not be a dominant factor in targeting. The effects-based approach would not only minimize the operational requirement for air assets but also free them for other purposes. Since all bombs are expensive and could potentially create collateral damage, they should not be wasted on irrelevant targets or used unnecessarily. It does not make sense for small nations to increase the tempo of war unless doing so will significantly minimize losses and/or maximize the effects. According to Sun Tzu, it is correct timing that makes attacks most effective.<sup>106</sup>

Traditionally, air campaigners prefer to target strategic targets in the enemy's homeland first, and then work outward to the battlefield. After gaining control of the air, the typical priorities are strategic attacks, air interdiction, and close air support. Although strategic paralysis is based on parallel attacks, such targeting priorities still exist in practice.

Tactical paralysis may require a new targeting strategy to suit small nations' operational limitations and requirements, although the core ideas of strategic paralysis remain unchanged. Control of the air will remain the first priority in a campaign dominated by

manned aircraft because substantial casualties inflicted by the enemy's airpower could adversely affect the campaign both operationally and politically. Long-range precision attack capabilities such as attack UAVs and cruise missiles will remain unfeasible and unaffordable for most small nations for quite some time. The air superiority campaign may still require



*...a study of the strategic air campaign in the 1991 Gulf War by Olsen reveals that 'decapitation', another coercive strategy that targets the enemy's leadership as well as his command and control, did not work*

parallel attacks to be conducted in a compressed timeframe in order to minimize the effectiveness of the enemy's resistance. However, strategic attacks may be unnecessary for short military campaigns since such attacks are unlikely to have significant impacts on the effectiveness of the enemy's field forces during the campaign.<sup>107</sup> The assailant should focus primarily on the field forces because they are most likely to be the key means for limited conventional war. This is why Pape finds that 'denial', a coercive strategy that targets the enemy's military means, works best in territorial disputes.<sup>108</sup> In addition, a study of the strategic air campaign in the 1991 Gulf War by Olsen reveals that 'decapitation', another coercive strategy that targets the enemy's leadership as well as his command and control, did not work.<sup>109</sup>

Nevertheless, the assailant should not attack the combat elements directly in the early stage because they would be highly prepared. First, the assailant should focus on the enemy's vulnerabilities or weaknesses such as his rear areas. He should indirectly target the logistic lines and some less-protected elements to create an immediate physical and moral effect on the enemy, and then work inward to his homeland as deeply as required in order to prevent further supplies and attrition replacements from reaching the battlefield. The depth of attacks should depend on how long it will take to defeat the enemy's combat elements. For example, if a decisive ground offensive is expected to last only a few days, there is no need to strike logistic depots from which supplies will reach the front in a few weeks. Targets should be neutralized or destroyed only if they really contribute to the enemy's war efforts. By this method, the enemy would start suffering from the very first days of the war instead of just before the beginning of the ground offensive. More importantly, the preparation phase for any ground offensive could be significantly shortened. This step is analogous to preventing oxygen and nutrients from reaching the enemy's fighting organs through blood vessels. The shortage of oxygen and nutrients will incrementally affect the organs.

Once the enemy's field forces have been sufficiently weakened, the assailant should start an air offensive against the remaining combat elements. Having lost the key means, the enemy might decide to surrender and make the desired concessions at this stage. If the enemy does not give up, a ground offensive would be necessary and close air support would be required. It is important to note that attacks against the remaining command and control targets should be withheld until the start of a decisive air offensive or ground offensive to maximize shock effects. Tactical paralysis is fully achieved at this stage by further blocking the enemy's nervous system temporarily so that his fighting organs cannot function during the decisive operation. Such attacks should not be conducted too soon otherwise the enemy might have sufficient time to adapt to the situations and overcome the problems. In brief, the effectiveness of tactical paralysis depends largely on targeting strategy and correct timing.

It should be noted that while strategic paralysis aims at paralyzing the whole enemy system during the entire campaign, tactical paralysis only aims at paralyzing the enemy's fighting organs temporarily during the decisive phase. It is a 'just enough' and 'just in time' strategy. Although the execution of tactical paralysis seems very similar to that of a traditional air campaign, the two actions are largely different in concept. The aim of tactical paralysis is not attrition or 'cutting off' the enemy's fighting organs.<sup>110</sup> The assailant only needs to paralyze the enemy's field forces on the battlefield briefly to achieve his military objectives with

minimum resistance. The goal is to minimize casualties for both sides. For tactical paralysis, timing is as crucial as targeting, whereas it may be less important in traditional air campaigns. Tactical paralysis is consistent with Sun Tzu's concept because the assailant could not only preserve his assets but also keep the enemy's field forces intact.<sup>111</sup>

According to Sun Tzu, strategy should be flexible and fluid in order to take situational advantages and exploit the enemy's vulnerabilities.<sup>112</sup> Hence, the targeting strategy should be responsive to situational development.<sup>113</sup> The versatility and flexibility of airpower makes it an ideal means to implement such an adaptive strategy. The main effort should be directed at the enemy's weaknesses or targets of opportunity to produce maximum effects at minimum costs. In other words, military objectives may have to be revised from time to time to suit the changing situations.<sup>114</sup>

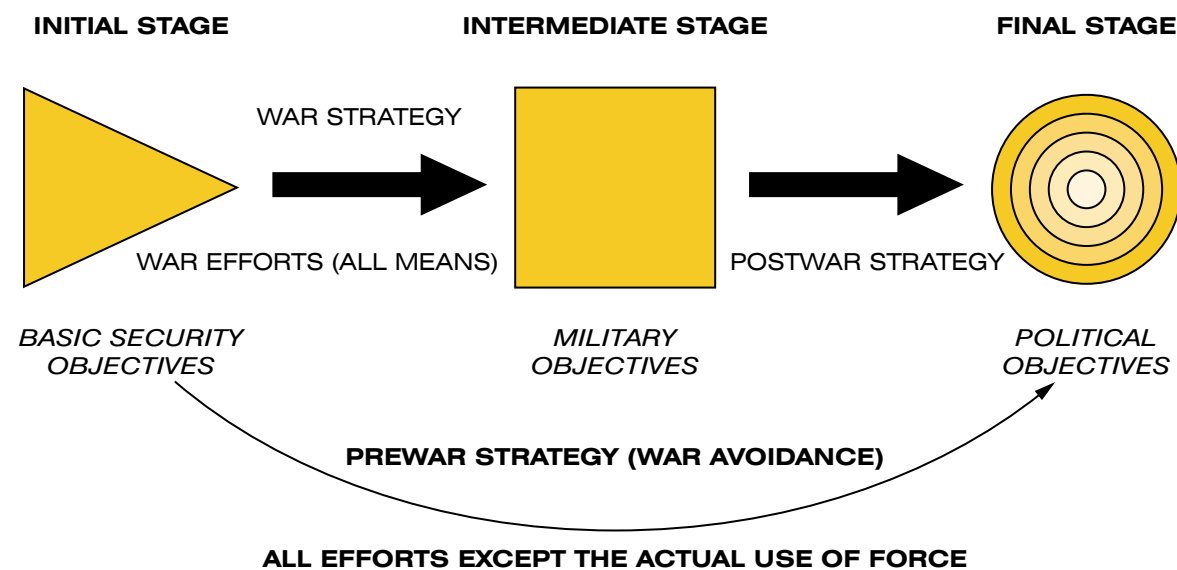
The assailant should always prepare for a ground offensive although it might be unnecessary if there is a shortcut to victory. The shortcut is possible only if the assailant is able to read the enemy's mind correctly, and willing to accommodate him out of deteriorating situations. By human nature, nobody wants to be defeated, lose power, and become a war criminal. In many cases, political leaders do not give up even though their field forces are about to be defeated because they cannot accept the consequences. According to Sun Tzu, one should leave a way out for a desperate enemy otherwise he might decide to fight to the death.<sup>115</sup> When there is an indication that the enemy might give up, the assailant should seize the opportunity by providing him with a comfortable way out. If the enemy decides to take the offer, the assailant would benefit from a quick victory.

Once the military objectives have been achieved, the war may have not yet come to an end although armed hostilities may no longer exist. The postwar strategy must be implemented in order to turn the short-term military success into the desired end-state. In terms of mind-time-space, we also have to change the enemy's mind after having prevented him from exploiting time and space. One of the lessons learned from the 1991 Gulf War was that there was no postwar strategy to terminate the conflict.<sup>116</sup> While the use of force may bring the enemy to negotiation, the long-term political objectives can only be achieved by conflict resolution. The victorious assailant may have a bargaining power to coerce the loser to accept the terms of peace but it would be meaningless unless the loser is also satisfied with the resolution. Conflict resolution is largely based on compromise. The fundamental conflicts must be correctly identified and the most suitable solution or course of action to remove the

*One of the lessons learned from the 1991 Gulf War was that there was no postwar strategy to terminate the conflict. While the use of force may bring the enemy to negotiation, the long-term political objectives can only be achieved by conflict resolution*



conflicts must be agreed upon by both sides. The victorious assailant may have to make some concessions himself in return for sustainable peace otherwise he might have to wage subsequent wars.



Since the advent of airpower, there have been many unsatisfactory attempts to explain the relationship between a targeting strategy and its strategic consequences. Dr Hammond points out that the connection between the application of military force on a particular target set and its strategic effects is wrongly assumed to be automatic.<sup>117</sup> Only 'knowing the enemy', specifically what he values and his cultural mind-time-space, will tell us how a military action may achieve a moral, mental, and emotional strategic effect. Recently, scholars have begun to focus on what the enemy values. For example, 'axiological targeting' is a strategy that targets what the enemy leaders at every level value.<sup>118</sup> 'Countervalue military targeting' is another strategy that targets military assets most valued by the enemy.<sup>119</sup>

**Figure 3: The three stages of war according to Sun Tzu's concept**

According to Sun Tzu, the connection between a military action and the desired end-state is by design. A right military strategy may bring a military victory but does not guarantee a favorable political outcome unless military objectives are set correctly and postwar political efforts are successful. This can be visualized by breaking down war into progressive stages as illustrated by figure 3. Military actions can only bring us to the intermediate stage. A military success is just a stepping-stone toward the end, not an end in itself, and does not necessarily lead to a strategic success. It is an effective postwar strategy that will allow us to proceed further to the final stage. While it may not be easy to change the enemy's mind, it may even be more difficult to change our own minds. To achieve sustainable peace, we need to have the right attitude toward the coexistence of nations.

In summary, Sun Tzu's concept of war is still relevant to modern warfare. Although the strategic paralysis concept is based on the combined concepts of Boyd's psychological paralysis and Warden's physical paralysis, it is largely dominated by Warden's emphasis on the physical side while Boyd's emphasis on the grand strategic level is missing. There are a number of possible theoretical flaws in the strategic paralysis concept. There are also many practical limitations at all levels of strategy. Although some of these limitations could be overcome by advanced technology and/or new tactics, new limitations would certainly arise as a result of the enemy's adaptations.<sup>120</sup>

Sun Tzu's concept may make it possible for small nations with limited airpower to adopt the strategic paralysis concept with some modifications. Since strategic paralysis is a relative capability, small nations may have such a capability in relation to a weaker state. The most likely scenarios for them are limited armed conflicts due to territorial disputes. Small nations may not have to use their airpower in the same way superpowers do because their enemies may only have to be paralyzed locally by tactical paralysis campaigns.

Sun Tzu's concept of war offers an alternative approach that suits small nations. In regard to strategic thinking, war should be perceived from a broad perspective. The overall strategy to achieve the objectives of war should be comprehensive and exploit all available means. States should avoid war by all means and non-military means should take precedence before the use of force. States should base their strategy on the grand strategic calculation of war. States should always comply with the five essential criteria. Most importantly, *tao* should always be maintained even in peacetime. Knowing the enemy both physically and mentally is very important because it allows states to avoid war by foiling the enemy's strategy. A strategy can be foiled by eliminating one or more components of the strategic trinity: will, means, and opportunities.

Pursuing a right strategy is crucial to small nations. If war breaks out, small nations should aim for a short military campaign because of their limitations. Protracted war, high attrition, and collateral damage should be avoided to minimize losses and the residual effects. They have to aim at both 'not losing' and 'winning'. In order not to lose, they must not make any mistakes themselves. In order to win, they must expose and target their enemy's vulnerabilities and weaknesses. The key to military success is to seek strategic advantages and choose correct timing, not necessarily superior military strength or the rapidity of attacks. Small nations should also continue their efforts to foil the enemy's strategy during the state of war along with other war efforts.

The conduct of war should also comply with Sun Tzu's concept. Small nations should prepare the battlefield by isolating their enemies as much as possible. They should think defensively and prepare for the worst cases. They should aim at achieving their military objectives with the initial allocation of assets and within the timeframe. This could be achieved by setting military objectives correctly. They should target what their enemies cannot afford to lose, which may not necessarily be the contested territories or the stakes. The application of tactical paralysis may require a new targeting strategy that better suits their operational limitations and requirements. Since military objectives may have to be revised from time to time, the targeting strategy should be flexible. Small nations should take a shortcut to quick victory whenever possible by providing their enemies with a comfortable way out. They may also have to compromise with their enemies in return for sustainable peace. That is to say, the postwar strategy must be implemented to turn the short-term military success into the desired end-state.

This paper has demonstrated that strategic paralysis applied in conjunction with Sun Tzu's concept of war could prevent similar failures to those of the 1991 Gulf war and might also be feasible for small nations with limited airpower. One should always bear in mind that war is always fought simultaneously in both the physical and psychological dimensions, and that time is not a limiting

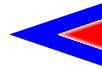


factor for war in the broad sense. While the strategic paralysis concept emphasizes the overwhelming superiority on the physical side, one should never ignore the psychological side because it is potentially as important and may be the factor that determines the outcome of war in the long term.

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- 11 Group Interview, Note: For example, a senior RTAF officer points out that Thailand currently faces many territorial disputes that are not much different from the conflicts of the past in terms of the source, pattern, and resolution of conflict.
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- 13 *ibid*
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- 16 *ibid*, pp. 201-202 and 250-254 (*The Art of War* Chapters 8 and 11)
- 17 *ibid*, pp. 84-86 and 284-286 (*The Art of War* Chapters 3 and 13)
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- 19 Ames, pp. 111-112 (*The Art of War* Chapter 3), interprets that one should keep himself intact while Tao, p. 99 (*The Art of War* Chapter 3), interprets that one should take all under heaven intact (i.e. everything including the enemy state and its army).
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- 27 Group Interview, Note: For example, a senior RTAF officer believes that it was a 'compromising' strategy that enabled Thailand to maintain its sovereignty during the Colonization Period. Thailand achieved its political objectives although it had to give away some of its territories to the Western powers in order to avoid military confrontations. Had Thailand fought against the superior powers, its inferior military would have been easily defeated and the country would have been colonized.
- 28 Ames, pp. 119-121 (*The Art of War* Chapter 5)
- 29 *ibid*, pp. 135 and 150 (*The Art of War* Chapters 8 and 10)
- 30 Sawyer, pp. 178-179 (*The Art of War* Chapter 3)

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- 32 *ibid*, p. 103 (*The Art of War* Chapter 1)
- 33 *ibid*, p. 107 (*The Art of War* Chapter 2)
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- 35 *ibid*, pp. 119-121, 153-162, and 169-171 (*The Art of War* Chapters 5, 11, and 13)
- 36 *ibid*, pp. 119-121 (*The Art of War* Chapter 5)
- 37 *ibid*
- 38 *ibid*, pp. 115-116 and 123-127 (*The Art of War* Chapters 4 and 6)
- 39 Tao, pp. 105-107 (*The Art of War* Chapter 6)
- 40 *ibid*
- 41 See the introduction for the definition of 'Strategic Paralysis'.
- 42 Boyd, John R., 'A Discourse on Winning and Losing', Unpublished Work, 1976-1987, Available from Dr Alan Stephens, University College, ADFA, Note: The work consists of 'Pattern of Conflict', a 193 pages slide presentation dated Dec 1986; 'Organic Design for Command and Control', a 37 pages slide presentation dated May 1987; 'The Strategic Game of ? and ?', a 59 pages slide presentation dated Jun 1987; 'Destruction and Creation', a 16 pages unpublished essay dated 3 Sep 1976; and 'Revelation', a 38 pages slide presentation undated.
- 43 Boyd, 'Pattern of Conflict', pp. 139-143
- 44 Boyd, 'Organic Design for Command and Control', pp. 13 and 26
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- 46 Boyd, 'Pattern of Conflict', pp. 134-137
- 47 Boyd, 'The Strategic Game of ? and ?', pp. 35-36 and 47
- 48 Boyd, 'Pattern of Conflict', pp. 133-134, Note: By the phrase 'getting inside the enemy's mind-time-space', Boyd probably suggested that one should shape the enemy's perception as well as prevent him from using time and space.
- 49 *ibid*, pp. 13-14
- 50 *ibid*
- 51 *ibid*, pp. 41-42
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- 58 Warden, 'The Enemy as a System', p. 54
- 59 Belote, Howard D., 'Warden and the Air Corps Tactical School', *Airpower Journal*, Vol. 13, No. 3, Fall 1999, pp. 44-45; and Murphy, Timothy G., 'A Critique of the Air Campaign', *Airpower Journal*, Vol. 8, No. 1, Spring 1994, p. 70
- 60 Warden, *The Air Campaign: Planning for Combat*, pp. 7, 13, 22-23, 33, and 59-60
- 61 *ibid*, pp. 109-126
- 62 Warden, 'Employing Air Power in the Twenty-first Century', pp. 61-62
- 63 Warden, 'The Enemy as a System', p. 47
- 64 Warden, 'Employing Air Power in the Twenty-first Century', pp. 64-82
- 65 Warden, 'The Enemy as a System', pp. 42-43
- 66 *ibid*, pp. 42-48 and 55
- 67 *ibid*, pp. 53-55
- 68 Warden, 'Planning to Win', pp. 78-90
- 69 Perry, James D., 'Operation Allied Force', *Aerospace Power Journal*, Vol. 14, No. 2, Summer 2000, pp. 3 and 8-9 of 13 (through internet), Note: One of the key ideas is to disperse airpower by operating small air units from many concealed locations. Hence, future fighter aircraft should have short takeoff and landing capability to be able to operate from these dispersed



- primitive strips. In addition, future ground forces will have to be small and well-trained to survive in high-tech wars.
- 70 Thomas, Timothy L., 'Kosovo and the Current Myth of Information Superiority', *Parameters*, Vol. 30, No. 1, Spring 2000, pp. 1-14 (through internet), Note: Thomas interviewed Admiral James Ellis, C-in-C of NATO's Allied Forces Southern Europe in 1999. Thomas finds that excessive information has a potential to reduce a military leader's awareness of an unfolding situation and excessive data also leads to sensory overload. He quotes Admiral Ellis that, 'Information saturation is additive to the fog of war ... uncontrolled, it will control you and your staffs and lengthen your decision-cycle times.'
- 71 ibid, Note: Thomas points out that despite NATO having almost total information superiority, its situation awareness during Operation Allied Force was manipulated by the Serbs more often than expected. Although NATO knew almost everything that happened in the battlespace, it did not understand everything. NATO also experienced delays in its integrated information operations as a result of the lack of key personnel.
- 72 Warden, 'Employing Air Power in the Twenty-first Century', pp. 64-68; and Warden, 'The Enemy as a System', pp. 49-53
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- 74 Hosmer, Stephen T., *Psychological Effects of U.S. Air Operations in Four Wars 1941-1991: Lessons for U.S. Commanders*, RAND, Santa Monica, CA, 1996, p. 189, Note: Hosmer concludes from the study of psychological effects of air operations in WWII, the Korean War, the Vietnam War, and the Gulf War that the psychological dimension of war should be emphasized in military education, training, planning, and the conduct of military operations.
- 75 Stephens, Alan, Private Discussion, Oct 2000
- 76 Linn, Thomas C., 'Adversarial Use of Weapons of Mass Destruction', *Joint Force Quarterly*, No. 23, Autumn/Winter 1999-2000, pp. 58-64, Note: Linn points out that WMD are cheap, available, potent, and very difficult to detect. Therefore, it is possible that nation states or terrorists could use WMD to attack their adversaries' population centers.
- 77 Correll, John T., 'Visions', *Air Force*, Vol. 83, No. 9, Sep 2000, pp. 36-37, Note: According to the US Joint Vision 2020, the effects of mass could be achieved regardless of where platforms reside, fly, or orbit. Nevertheless, these limitations will still exist to some extent.
- 78 Stillion, John and Orletskey, David T., *Airbase Vulnerability to Conventional Cruise-Missile and Ballistic-Missile Attacks*, RAND, Santa Monica, CA, 1999, pp. 59-60, Note: Stillion and Orletskey conclude that by combining several well-known and widely available technologies such as UAVs, GPS, submunition warheads, and ballistic missiles, an enemy could severely disrupt the USAF's ability to conduct air operations from airbases in the theater.
- 79 Meilinger, Phillip S., 'Air Strategy: Targeting for Effect', *Aerospace Power Journal*, Vol. 13, No. 4, pp. 1-13 (through internet), Note: Meilinger believes that selecting the correct targets is the essence of air strategy. He also points out that COGs of one country are not necessarily those of another and may change over time within the same country.
- 80 Vick, Alan, et al., *Aerospace Operation in Urban Environments: Exploring New Concepts*, RAND, Santa Monica, CA, 2000, pp. 264-265, Note: Vick and his colleagues find that one of the major factors that significantly degrades the effectiveness of airpower is concern about friendly and non-combatant casualties.
- 81 RAAF, *DI(AF) AAP 1003 Operations Law for RAAF Commanders*, Air Power Studies Centre, RAAF Base Fairbairn, Canberra, 1994, the introduction and pp. 7-1 to 7-6
- 82 Arkin, William M., 'Smart Bombs, Dumb Targeting?', *The Bulletin of the Atomic Scientists*, Vol. 56, No. 3, May/June 2000, pp. 46-53, Note: Arkin effectively argues that the effectiveness of Operation Allied Force was compromised by the need to minimize civilian casualties.
- 83 Thomas, p. 6 of 14 (through internet), Note: This problem actually occurred in the early stage of Operation Allied Force.
- 84 Haffa, Robert P. and Watts Barry D., 'Brittle Swords: Low-Density, High-Demand Assets', *Strategic Review*, Vol. 28, No. 4, Fall 2000, pp. 43-48, Note: The US admitted that it could not meet the operational demands for some low-density, high-demand assets which were critical to its advanced war fighting capabilities during Operation Allied Force even though those assets were not affected by the enemy's actions.
- 85 O'Brien, Kevin A., 'Intelligence Gathering on Asymmetric Threats – Part One', *Jane's Intelligence Review*, Vol. 12, No. 10, 2000, p. 52; and Perry, pp. 1-13 through internet, Note: Some PLA officers believe that in future, dedicated computer viruses could paralyze the adversary's electric power plants, financial institutions, stock markets, telecommunication infrastructure, and integrated defence networks, thus creating national chaos and reducing the effectiveness of armed forces.
- 86 Larsen, Randall J. and David, Ruth A., 'Homeland Defense: Assumptions

- First, Strategy Second', *Strategic Review*, Vol. 28, No. 4, Fall 2000, pp. 4-10, Note: Larsen and David believe that the threat of asymmetric attacks against the US homeland, either by nation states or terrorist organizations, is real and increasing. They recommend that homeland defence should be seriously addressed.
- 87 Thomas, p. 3 of 14 (through internet), Note: Despite the lesson learned from hunting Scuds in the Gulf War, a similar problem was experienced again in Operation Allied Force.
- 88 Gerwehr, Scott and Glenn, Russell W., *The Art of Darkness: Deception and Urban Operations*, RAND, Santa Monica, CA, 2000, pp. 57-59
- 89 Tilford, Earl H., 'Operation Allied Force and the Role of Air Power', *Parameters*, Vol. 29, No. 4, Winter 1999/2000, p. 5 of 11(through internet), Note: This problem was experienced in Operation Allied Force. The Serbs made use of deception effectively while NATO itself imposed a minimum altitude of 15,000 feet to avoid casualties.
- 90 Clarke, Shaun, *Strategy, Air Strike and Small Nations*, Air Power Studies Centre, RAAF Base Fairbairn, Canberra, 1999, pp. 67-70, Note: Clarke summarizes that small nations' main limitations are largely economic based. These constraints include inability to mass platform and weapons, inability to sustain protracted war, limited access to advanced technology, low tolerance to casualties, and low capacity to replace attrition.
- 91 Group Interview, Note: A senior RTAF officer notes that unlike in the Middle East, many of the contested territories in Southeast Asia are neither economically valuable nor strategically vital to the disputing parties because gaining or losing the territories is unlikely to have significant economic or security impacts on the parties in the short term.
- 92 Ames, pp.103-105 and 119-121 (*The Art of War* Chapters 1 and 5)
- 93 *ibid*, p. 111 (*The Art of War* Chapter 3)
- 94 *ibid*
- 95 Huang, p. 49 (*The Art of War* Chapter 3)
- 96 Mets, David R., 'To Kill a Stalking Bird', *Airpower Journal*, Vol. 12, No. 3, Fall 1998, pp. 91-92
- 97 Tao, p. 111 (*The Art of War* Chapter 8)
- 98 Edwards, Sean J.A., *MARS Unmasked: The Changing Face of Urban Operations*, RAND, Santa Monica, CA, 2000, pp. xiv-xv and 95-98
- 99 Tao, pp. 97-98 (Sun Tzu, *The Art of War* Chapter 2)
- 100 Handel, Michael I., *Masters of War: Classical Strategic Thought* (Third, Revised and Expanded Edition), Frank Cass, London, 2001, pp. 307-326, Note: This problem gave birth to the 1984 Weinberger Doctrine. Whether vital US interests are involved and whether political and military objectives are clearly defined are two of the six major tests to be applied before committing US combat forces overseas.
- 101 Bryan, Ian, 'Military Success Requires Political Direction', *Strategic Review*, Vol. 27, No. 4, Fall 1999, pp. 3-11, Note: Brian argues that the military may fail to recommend the best course of action because of many reasons. For example, it may pursue bureaucratic objectives, misinterpret national political objectives, misjudge the political impact of its actions, or fail to support foreign policy.
- 102 USGAO, *Operation Desert Storm: Evaluation of the Air Campaign*, USGAO, Washington, D.C., 1997, pp. 194-195
- 103 Pape, Robert A. Jr., *Bombing to Win: Air Power and Coercion in War*, Cornell University Press, New York, 1996, pp. 10-11
- 104 Ames, pp. 123 and 162 (*The Art of War* Chapters 6 and 11)
- 105 Group Interview, Note: From his experience in many territorial disputes, a senior RTAF officer observes that the adversaries usually strengthen their positions before engaging in limited armed conflicts. The application of airpower is often ineffective when the adversaries conceal themselves in modified natural shelters especially in mountainous terrain.
- 106 Ames, p. 120 (*The Art of War* Chapter 5)
- 107 Pape, p. 75
- 108 *ibid*, p. 20
- 109 Olsen, John Andreas, 'Operation Desert Storm: An Examination of the Strategic Air Campaign', Dissertation submitted to De Montfort University for PhD, UK, Mar 2000, pp. 317-321
- 110 Barlow Jason B., 'Strategic Paralysis: An Air Power Strategy for the Present', *Air Power*, Vol. 7, No. 4, Winter 1993, p. 6, Note: According to Barlow, the 'attrition' strategy seeks victory by exhausting the enemy in time, space, energy, and supplies.
- 111 Tao, p. 99 (*The Art of War* Chapter 3)
- 112 *ibid*, pp. 102 and 107 (*The Art of War* Chapters 4 and 6)
- 113 Meilinger, p. 12 of 13 (through internet), Note: Meilinger similarly suggests that 'flexibility is the key to airpower.'
- 114 Bryan, p. 11, Note: Bryan argues that the exclusion of political input would degrade military effectiveness. However, this should not be confused with

political interference. He suggests that political leaders should monitor military policy and action; nonetheless, they should not micromanage military operations or flippantly disregard military advice.

- 115 Ames, p. 132 (*The Art of War* Chapter 7)
- 116 Horner, Charles A., 'New Era Warfare', in Stephens, Alan (ed.), *The War in the Air*, Air Power Studies Centre, RAAF Base Fairbairn, Canberra, 1994, p. 324, Note: General Horner who was in charge of the coalition's air assets during Operation Desert Storm, admits that he did not know what to negotiate with the Iraqis when he was directed by the US Government to do so.
- 117 Hammond, Grant T., Private Correspondence, Feb 2001
- 118 Wijninga, Peter W.W. and Szafranski, Richard, 'Beyond Utility Targeting: Toward Axiological Air Operations', *Aerospace Power Journal*, Vol. 14, No. 4, Winter 2000, pp. 47-48
- 119 Mueller, Karl, 'Counter military Strategies for Coercion: Threatening What the Enemy Values', Presentation at the International Studies Association 42nd Annual Convention, Chicago, Feb 2001, pp. 4-5
- 120 Scales, Robert H., Jr., 'Adaptive Enemies: Dealing with the Strategic Threat after 2010', *Strategic Review*, Vol. 27, No. 1, Winter, 1999, p. 13, Note: Scales believes that 'Every successful technical or tactical innovation that provides a dominant military advantage eventually yields to a countervailing response that shifts the advantage to the opposing force.'

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