

The Humane Age of Non-Lethal Warfare

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Abstract:

There have been centuries of conventional warfare whereby each power strives to inflict as much damage as possible, whilst selfishly sustaining their own survival and pushing for their own causes. This is notwithstanding the fact that this kind of war causes collateral damage for all parties involved as well as civilian casualties. Now, according to the author, mankind has finally started to transcend violence and accept the fact that all it causes is more violence, that is, 'a vicious cycle of conflict', making long term peace solutions impossible. The author then discusses the idea of a revolutionary age of Non-Lethal Warfare (NLW) which is a more holistic form of asymmetric and humane warfare, in which non-lethal weapons are used to defeat the enemies and to achieve a swift yet benevolent victory. This essay also assesses the pros and cons of the various aspects of humane warfare and NLW at an operational level and also assesses its overall applicability to the Singapore Army.

Keywords: Non-lethal Weapons; Limited War; Electromagnetic; Information Warfare

INTRODUCTION

Are there signs of a humane age of Non-Lethal Warfare (NLW), especially in the context of urban land operations where collateral damage to civilians can be high? Currently, the aim in war is to win, albeit with the noble intention to win with minimal casualties on both sides, especially zero civilian collateral damage, at least in theory. Hence, war appears to be moving beyond mere killing, partly due to the casualties of the Vietnam War and the two World Wars and the fear of mutually assured destruction during the Cold War. As London School of Economics (LSE) Professor Christopher Coker remarked, war is becoming increasingly more humane, at least that is the Western powers' noble intention.¹ If the 20th century is a total war including the mass destruction of society itself,

then the 21st is pointing towards a limited war, which will be more humane, not only for soldiers who fight it, but also the enemy. Indeed, the United States (US) and allied forces went to great lengths recently to ensure the safety of the soldiers and enemies alike. For example, the US lost 270 men in the Gulf War vis-à-vis the predicted 10,000. US pilots shot down in the Balkans were flown home to a hero's welcome instead of a reprimand.² The increasing accuracy of precision guided munitions has made war more discriminating than in the past, killing 1,400 Balkans during the Kosovo air bombings vis-à-vis the London bombings in World War II (WWII) which killed an estimated 40,000 people.³ Humane warfare is a response to the dehumanisation of modernity, which reduces the human to a mere death figure. Humanism seeks to counter modernity by individualising both death

and human suffering. This, augmented by the civil society's wish, has reduced the incivility of warfare. As Coker elucidated, humane warfare *"is as much to reduce the incidents in which our own soldiers are traumatised, maimed or put in danger of being killed, as it is to mitigate our own inhumanity to our enemies."*⁴ This is the moral argument.

There are strategic reasons to fight humanely. In this humane age, a victory with precision strikes and swift manoeuvres may only guarantee tactical victory. Strategic victory requires more than speed and firepower and sometimes less is more, when understood and applied correctly. Axioms of speed, surprise and firepower remain important to the Singapore Armed

Forces (SAF). However, strategically, we will need a convincing victory that displays the benevolence and decisively superior strategies, doctrine and technology of the SAF. Exercising benevolence in the war process will also be vital in determining the outcome of the peace process and demonstrates the 'big-heart' character of Singapore in the eyes of the international community. For long-term peace, as US Army War College Commandant General Robert Scales once identified, we need to ensure *"minimal casualties and collateral damage and be sensitive to domestic and world opinion"* in order to prevent any future retaliation (whether conventional or unconventional warfare).⁵ Hence, the usage of Unmanned Aerial Vehicles (UAV) and robotics (protagonists of the Virtual War) is



UAVs make great rescue tools. They can look and go places people can't, and with infrared cameras, they can sometimes see beyond what human eyes can.

necessary but can be complemented by NLW, a more holistic form of asymmetric and humane warfare, to deliver this convincing strategic victory, with minimal damage on both sides. This is especially pertinent in the future complex war environment cluttered with urbanisation and civilians.⁶

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NON-LETHAL WARFARE

As Alvin & Heidi Toffler argued, *“non-lethality is ... an intermediate phenomenon, an arena for contests where more outcomes are decided bloodlessly.”*⁷ However, NLW in itself is a contentious term. Without dwelling into the semantics of non-lethal and less-lethal, non-lethal weapons are hereby defined as *“weapons designed to function in a manner that degrades the capabilities of materiel or personnel and yet avoid unintentional casualties.”*⁸ There should be few fatalities to humans excluding accidents and/or misuse and have relatively reversible effects on materiel and personnel. As early as 1959, former Chief of US Army Chemical Corps Major-General Casey suggested the development of psycho-chemicals to wage war without killing the enemy. It was only in 1996 that the policy paper on non-lethal weapons was signed.⁹ There are hitherto at least 7 categories of weapons – physical restraints, chemical weapons, electromagnetic weapons, biological weapons, acoustic weapons, electromagnetic weapons and information warfare. Rather than giving a technical capability narrative, this essay will do a horizon scanning of selected capabilities and discuss their utility at the strategic/

operational and operational/tactical levels and their potential relevance to the SAF. The essay will end with an assessment of the overall applicability of humane warfare and NLW to the SAF.

STRATEGIC/OPERATIONAL – INFORMATION & ELECTROMAGNETIC WARFARE

At the strategic/operational level, one can expect Information Warfare (IW) to play a vital role, which will represent a growth area for Signals, Intelligence, Security and IW (including Information Operations/Information Management) practitioners in the SAF. As retired US Army Colonel Alexander commented, *“a concerted IW attack could be devastating and a quick recovery is not assured.”*¹⁰ The US Air Force Air Intelligence Agency defines IW as *“actions taken to preserve the integrity of one’s own information systems from exploitation, corruption or destruction while at the same time exploiting, corrupting or destroying an adversary’s information systems.”*¹¹ Indeed, the definition is so broad that it *“covers all human endeavor.”*¹²

The flip side of digitised militaries is its vulnerability to IW. At the strategic level, IW can come in the form of Computer Network Defence, Attack and Exploitation.¹³ Networks can be exploited by inputting false information and/or information blockade (denial) by the cutting/jamming of ground-based communications. Viruses can attack the enemy’s information systems. The high availability of user-friendly hardware and software to create viruses’ aids budding terrorists, thus further threatening our homeland security. With more militaries becoming reliant on Commercial Off-The-Shelves (COTS), it further aggravates this threat. For example, a stealth virus could be implanted during the manufacturing process, only to be activated by electromagnetic signals later, thus corrupting high-tech weapon systems during war.

To the extent that IW equates to media-operations/perception management, a sophisticated IW campaign at the grand strategic level and in collaboration with major international media, can even persuade the enemy's leadership to abide by one's will. The swaying of international opinion is a force to be reckoned with. This is asymmetric warfare—the least risky and most cost-effective way of influencing the will of the public and altering the enemy's policies, while avoiding defeat by superior conventional military forces; something Sun Tzu would have agreed with.¹⁴ With technology and increasing democratisation of countries, we no longer live alone but in a community of states where perception counts and must be managed.¹⁵ At the more operational/tactical level, some militaries term it Psychological Operations (PsyOps) to present the enemy with a false picture of the developing battlefield through the insertion of wrong information into the enemy's information systems to undermine their *"organisation, structure, methods and validity of knowledge."*¹⁶ Indeed, the target of IW is always the human mind, which can be deceived and swayed by emotion. IW is a double-edged sword; SAF needs to continue to look into the protective procedures and psychological resilience of its soldiers (defensive IW) whilst embarking on her ongoing quest for offensive IW.

Beyond Electronic Warfare, electromagnetic weapons are the nemesis of the network-based militaries and this is something that Signal practitioners might be looking into next. Non-nuclear high-energy electromagnetic pulse (EMP) generates one or more very intense pulses of electromagnetic energy that penetrates equipment to degrade or destroy sensitive electronic circuitry.¹⁷ This coupling process is executed either via the front-door (energy enters via an antenna or other path that is exposed to the outside and leads directly to the target device e.g. in Operation Desert

Storm) or the back-door (the electromagnetic energy travels to the target indirectly, e.g. through electrical cables, poorly shielded interfaces or even holes in the walls of the system) possibly with special operations support.¹⁸ This happened to the Iraqi Air-Defence system at the onset of Operation Desert Storm when the *"US's AGM-86 Air-Launched Cruise Missile detonated within ten metres of protruding antennae, releasing a huge EMP that 'fried' the electronics of Baghdad's Air-Defence Command Centre."*¹⁹

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The Desert Storm example epitomises Sun Tzu's advice on cheng/chi (indirect approach) for maximum shock and non-violent attacks in the order of priority, the enemy's strategies, alliances, soldiers and worst resort, walled cities.²⁰ By not having any C4I support, the enemy is too isolated to execute any wise strategies and is uncontactable to its diplomatic allies and subordinate units. Furthermore, imagine the psychological impact when a massive EMP cripples the enemy nation's civilian infrastructure (telecommunications, financial, transportation and energy distribution systems), whether temporarily or permanently. With greater reliance on Integrated Knowledge Command and Control (IKC2), the 3G SAF should also embark on a long quest to develop more reliable protective measures, beyond the costly shielding, against EMP. COTS is especially vulnerable to EMP attacks and the massive investment on IKC2 technology is counter-productive if it does not even survive the first wave of backdoor EMP attacks. Research into EMP and counter-EMP should be simultaneous and immediate.

OPERATIONAL/TACTICAL – THE REST

At the operational/tactical level, physical restraints, low kinetic impact, EM, acoustic, chemical and biological weapons have both anti-materiel and anti-personnel applications and they offer new growth areas for Engineer and Signal practitioners.

Physical restraints present an exciting array of options for Mobility/Counter-Mobility (MCM) and non-lethal offensive operations. The modern 'Roman Gladiator' (net and trident), armed with high strength, lightweight, synthetic fibre nets coupled with advanced projection techniques, can ensure an accurate and non-lethal capture of the enemy soldier at substantial range (Netgun, within 45 feet).²¹ The US Army Armaments Research and Engineering Development Command (ARDEC) have both anti-personnel (for single or multiple human targets at longer ranges) and anti-materiel weapon applications.²² The infantry/guards can use 'smart' anti-personnel nets, which can sense struggle and administer a shock when the captured person attempts to escape.²³ Thanks to Los Alamos National Laboratory, militaries can now emulate 'Spiderman', forming net-like entanglement on enemies.²⁴ Mine clearing is much easier using a net laced with 'det-cords', which detonate all the mines when mechanically dispersed over a suspected minefield.²⁵ Similarly, air-defence can use Miller's 'Birdcatcher' device to detonate an incoming missile before impact point.²⁶ For counter-mobility operations, clear plastic caltrops (four-pointed scatterable spikes) may be dispersed to deflate the enemy vehicles' tyres or even detonate the pre-planted explosive via radio signal.²⁷ The more advanced 'Silver Shroud' ballistically-deployed polymer film can literally wrap up a targeted vehicle and is especially effective for counter-armour operations since the tank turrets will be stuck.²⁸ When aptly employed on key targets, physical restraint techniques can yield operational

advantages for Divisions, Brigades and even Battalions at the warfront.

Low kinetic weapons present a revolutionary array of non-lethal infantry/guards weapons for 3G SAF. Originally used by the British against Irish rioters in the 1970s and later by the Israeli military and police operations, rubber/plastic bullets can be fitted onto M-16 rifles and fired to incapacitate enemy soldiers without breaking bones, only causing bruises.²⁹ The vehicle-mounted, multiple-cartridge version is capable of 1,400 ballistic rounds that can be used for area anti-personnel targets.³⁰ Byers' Special Purpose Low Lethality Anti-Terrorist shells can blast a lock of the door without penetrating anything within the room.³¹ Hence, low kinetic munitions provide a good alternative to lethal rounds; they can be fired from existing weapons although the fire range needs to be improved to provide the benevolent SAF soldier a tactical safety distance.

Some electromagnetic weapons can also reap tactical yields. Electronic stun guns can be useful to incapacitate an aggressive soldier during battle. Tasers use compressed air to shoot electrical darts, which delivers a 25,000-volt shock causing loss of neuromuscular control in the aggressor.³² Although widely used by the police, there is potential usage in the military/peace support operations when the effective range of the weapon is extended. In addition, light, with as much as 6 million candlepower – can prevent an attacker from seeing the source of the beam and prevent any successful aimed shots from the enemy.³³ Illuminating grenades, amongst other techniques, can produce flameless chemical light, temporarily blinding the enemy for several minutes.³⁴ Hence, there is ample time to literally capture the enemy with minimal resistance. Adding to the list, Battlefield Optical Munitions are direct energy weapons that dazzle the targeted optical sensors temporarily and can be used



An EMP simulator HAGII-C, being tested on an American E-4 aircraft.

by Air-Defence weapons against incoming aircraft with optical-tracking missiles, as well as by infantry/guardsmen against enemy heavy weapons with target acquisition and tracking optical sensors.³⁵ These weapons maximise the electromagnetic spectrum to expand the arsenal of anti-personnel and anti-materiel non-lethal weaponry.

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Acoustic weaponry is an ancient tactic that Alexander dated to the time of Joshua and the battle for Jericho.³⁶ It has the advantage of incremental applications with intensity increasing until compliance and can be efficiently transmitted through fog, smoke and dust. With advanced beam steering techniques (accurate directionality) and a phase-array system (reducing size), acoustic weapons have immense potential in anti-personnel and anti-materiel weapons. According to Soviet research, high intensity infrasound can induce sensations of panic and impairment in tracking ability, peripheral vision and choice-reaction time in humans. At 7 Hertz, the Soviet scientists reported difficulty in mental

activities and precision work. In addition, ultrasound was reported to create fatigue and general weakness.³⁷ Employing electro-neurophysiology, Dickhaut created Pulsed Periodic Stimuli (PPS) that caused perceptual disorientation in targeted individuals and importantly, it uses minimal intensity.³⁸ Anti-materiel acoustic weapons can destabilise critical metal elements causing the ineffectiveness of enemy equipment.³⁹ The most important advantage of acoustic weapons is its stealthiness; the enemy will probably be affected without even knowing the source!

The biological and chemical weapons discussed here should not be confused with those banned under the Biological Weapons Convention (BWC) and Chemical Weapons Conventions (CWC). These weapons are strictly used to immobilise the enemy troops/vehicles during battle. Anti-materiel chemical agents such as super-acids can degrade tyres or, coupled with a caltrop (see physical restraints), can slowly delaminate tyres over less than 50 miles.⁴⁰ Different super-caustics (aggressive solvating agents) can be used to destroy a computer board circuitry, aluminium, glass optics, engines, filters or basically any targets.⁴¹ As this indirect approach promises, there is no need to engage the enemy vehicles face-to-face. Direct viscosification agents can make fuel clogs up the fuel pumps, pipes and carburetors. Of use for counter-Armour operations, adhesive foams, super-acids and special paint-splattering bullets can etch the optics enough to blind a tank.⁴² Conversely, one can spray super-lubricant on the ground, making movement impossible. Anti-personnel chemical agents include high-pressure water cannons, tear gas, foam technology and stink bombs amongst others. They present a faster way of overcoming area targets with benevolence vis-à-vis the low kinetic impact weapons (fairly point-targets). Of course, there are more powerful chemicals that induce sleep (soporifics),

drowsiness (ozone cannon) and disorientate people (psychoactive drugs). However, these may involve ethical issues contravening the CWC.

Anti-personnel biological weapons such as Ebola virus and Ricin are highly contentious and definitely contravene the Biological Weapons Convention. Biological warfare is defined as *“the use of disease to harm or kill an adversary's military forces, population, food or livestock.”*⁴³ From the perspective of benevolence and strategic utility, anti-materiel biological weapons have more to offer. Biological agents can degrade the chemical bonds (plastisers) of the critical sub-components. With minimal effort, a small amount of damage can cause the malfunction of the entire system; this is a good return of investment. Microbe attacks can result in *“the acceleration of corrosion, degradation or decomposition of roads and aircraft runways”, sufficient to slow down an enemy's advance.*⁴⁴ In all, NLW presents a revolutionary approach to war with minimal casualties but no less tactical/operational success and strategic victories.

STRATEGIC IMPETUS TOWARDS HUMANE WARFARE & BENEVOLENT WARFARE

Humane warfare does not mean no war. The SAF must always be prepared for the worst-case scenario – war. In unconventional war, if we retaliate against the terrorists in the same way using unscrupulous methods to kill and harm soldiers and citizens alike, we lose our moral high ground and become terrorists ourselves; our retaliation further fuels the grassroots support for such terrorists.

As keepers of the peace, we may need to fight benevolently to win the hearts and minds of the people. The same logic can be argued for conventional warfare. The domestic populations of both countries will want minimal casualties and will surely react negatively against their government, should news

outlets like 'CNN or Channel News Asia' catch them in any acts of cruelty—the US-Vietnam war is a case in point.

The new strategy may try to be as moral and humane as possible in the conduct of war. While Coker highlighted that humane warfare is largely a Western phenomenon, an insight into selected Asian classics of wisdom suggest an East-West consensus on humanism.

The approach towards war is important in determining the strategic victory. NLW can be seen as a humble attempt to creatively adapt Sun Tzu's *Art of War* to 21st century warfare—the indirect approach to war at a grand-strategic level. As Sun Tzu said, *"attack in the order of priority, the enemy's strategies, alliances, soldiers and worst resort, walled cities."*⁴⁵ It is strategically unsound to win a war with maximum casualties on either side. Any loss of lives will breed

hatred and hence retaliation resulting in a vicious cycle of conflict. Strategically, countries will still want to win wars, whether it is the conventional wars against states or unconventional wars against terrorists and/or guerillas. Hence, NLW can help shape the way war is fought by achieving the ideal of 'less physical destruction, more strategic victory'. As Coker analysed, this also highlights the peaceful Chinese notion of harmony, non-violence and minimal use of force in Sun Tzu's treatise.⁴⁶ The mere usage of non-lethal weapons is both strategic and symbolic. Even the enemy troops will be awed by the goodwill and peaceful intentions of our forces. Whether the captured enemy soldiers will eventually surrender or even divulge their own forces' secrets, in the hope for a shorter war, is unfathomable; but suffice to say, the result is a strategic victory and a workable long-term peace reconciliation process.



Singapore's MRF (Medical Response Force) is well equipped to deal with potential Biological and Chemical threats to our nation.

In a rational age of today, the Confucian dictum, “*the benevolent has no equals*” (仁者无敌) still rings true in various manifestations.⁴⁷ To a great extent, it is the people, as a collective, who determine the strategic outcome of a war. Whether in conventional or unconventional wars, NLW firstly wins the moral high ground. This benevolent means to war garners international support (multilateral bodies, fellow countries, other international organisations of sufficient repute and media) on one’s side, especially when one is on the defensive side. If defeated, the loser will also feel convinced of one’s capability and moral ground; the chances of rekindling such conflicts will be much reduced since less seeds of hatred are sown. Hence, perception management is important and NLW delivers that comparative advantage.

There are also seemingly concurrence for this peaceful non-lethal approach to war amongst other faiths and philosophies. Both Christ and Buddha taught to “*counter hatred (war) with love and compassion*”.⁴⁸ Gandhi’s ‘oppositional non-violence’ embodies the Hindu notions of peace. Islam, by definition, means peace. Most importantly for the SAF, NLW is very much in line with Singapore’s pragmatic philosophy.⁴⁹ If pragmatism is “*considering what effects of a conceivably practical kind the object may involve*”, then NLW does exactly that to ensure a decisive strategic victory and long-term peace, should a war ever break out.⁵⁰

REALITY CHECK - WHITHER BURDEN OF BENEVOLENCE?

However, there needs to be a reality check. Benevolent or humane warfare is difficult to implement in practice. How many people have the magnanimity of Jesus Christ, Buddha Gautama, Prophet Mohammed or any of their accomplished disciples? Indeed, it is easier to kill than to save and win the heart of the ‘other’ side. Jet Li’s role in the Mandarin movie

Fearless (霍元甲) best illustrates this difficulty: A young and well-skilled martial exponent, hot-tempered Jet Li, as Huo Yuan Jia (霍元甲), fought hard to kill a fellow martial exponent over a trivial dispute. Remorseful after losing his family consequently, Huo became a recluse only to return a patriotic and benevolent fighter. His battle against opponents from 8 nations in 1910 demonstrated the challenge to win his opponent over as against to merely winning him. It takes a lot more skill and energy on Huo’s side to ensure his opponent, the British Boxer Hercules O’Brien, is defeated wholeheartedly amidst also saving O’Brien’s life. This requires superior moral character, perseverance and goodwill for long-term peace. Nonetheless, benevolence is benevolence; the world has eyes to judge.

NLW can potentially deliver the strategic victory without the international political backlash and signals the benevolence of a small but developed nation concerned with the long-term regional peace and security.

Nevertheless, facets of humane warfare and NLW are relevant to the SAF. Humane warfare reminds the SAF to consider the media angle and international opinion in war and such notions of humane warfare will put Singapore in good stead after the war. NLW, in its purist sense, represents a challenge to conventional thinking of lethal warfare and propounds that NLW too can make a significant impact in war. In fact, the unknowing disabling of equipment and personnel may be even more effective than direct strikes because such NLW attacks (e.g. EMP, anti-personnel and anti-materiel chemical, biological and even acoustic weapons) may be even more silent, more un-attributable, and hence unavoidable.

CONCLUSION - NLW AS SUPERIOR STRATEGY-TO-BE

In whichever form or weaponry, NLW is a useful approach to warfighting that seeks to preserve rather than eliminate lives and in the course of doing so, is by no means less deadly in determining the outcome of war. The nature of war has not changed. It remains, to a great extent, true to the Clausewitzian dictum—“*war as an extension of politics*”, for reasons of greed, hatred and anger.⁵¹ But “*to impose one’s will does not mean the physical destruction*”, as Clausewitz also clarified. Indeed, in this globalised age checked by international public opinion, the un-finessed usage of force can be counter-productive.⁵² To healthily compete in a military arena but not to savagely kill and destroy, NLW will be the pacifist model of war for many decades to come as the world progresses towards a humanistic civilisation. For states like Israel, NLW is a superior strategy-to-be that can help to slowly placate the centuries of hatred from mutual killings and misunderstandings. NLW is also a useful strategy-to-be for states like Singapore on a defensive posture, always deterring but ever ready to achieve a swift and decisive victory, should security be compromised. It can potentially deliver the strategic victory without the international political backlash and signals the benevolence of a small but developed nation concerned with the long-term regional peace and security.

Notwithstanding, in reality, war is still blind and players will not play by any rules of benevolence. Till then, when the rules of NLW are universally practised and regarded as sacrosanct, the SAF should actively maintain its lethal arsenal whilst complementing it with useful non-lethal weaponry and competencies that can deliver an equally potent edge in a cluttered war environment. 🌐

ENDNOTES

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22. Ibid, 82.
23. Ibid, 83.
24. Spyder-gun, conceptualised by Craig Taylor and others in the Chemical Science and Technology Division at Los Alamos National Laboratory as cited in John B. Alexander, 86.
25. John B. Alexander, 82.
26. Ibid, 83.
27. Ibid, 86.
28. Of interest to counter-vehicle efforts would be the Speedbump capable of stopping a 5,100-pound vehicle travelling up to 60 miles per hour, without any serious injuries to passengers. John B. Alexander, 83-85.
29. 'Non-lethal Ordinance Family of Products', TAAS-Israel Industries Ltd as cited in John B. Alexander, 90. There are many more options such as bean-bag rounds which spread the impact over a broad area, reducing physical injury.
30. John B. Alexander, 90.
31. Ibid, 91.
32. Ibid, 67.
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