
Air-delivered non-lethal weapons and the RAAF weapons inventory

Squadron Leader C. R. Coles, RAAF

As low-intensity conflict rises to dominate, much of what has passed for strategy during the last two centuries will be proven useless. The shift from conventional war to lower intensity conflict will cause many of the most powerful and advanced weapons to be consigned to the scrap-heap.

Martin Van Creveld¹

Introduction

1. Martin Van Creveld's prediction above, made in the aftermath of the first Gulf War—the largest conventional conflict waged since World War II—appeared to be somewhat speculative. Developments in the global strategic environment since then however, have confirmed the preponderance of low-intensity conflict and although the 'scrap-heap' does not yet beckon for the most advanced weapons, their utility in such conflicts is under constant and legitimate scrutiny. In response, a number of defence forces from developed states, including the Australian Defence Force (ADF), have investigated the employment of alternative weapons—weapons more appropriate for use in such low-intensity conflicts, including non-lethal weapons.

2. The ADF, has previously conducted investigations into the potential for use of non-lethal weapons, however that process has stalled. Given the rise in asymmetric threats including fears of terrorist activity and considering the government's recent Strategic Review (*Defence Update 2003*), a reassessment of the requirement for, and the viability of, including non-lethal weapons in the RAAF weapons inventory, is prudent.

3. **Scope.** This paper will investigate the strategic requirement for non-lethal weapons in the RAAF, focusing initially on future war theory and the strategic guidance provided to the ADF by the Australian Government. The potential role of air power in meeting the challenges of future conflict will be highlighted. This will be followed by a brief analysis of the legal and political constraints as well as existing ADF and RAAF doctrine relevant to the acquisition and use of non-lethal weapons. To conclude, two types of non-lethal weapons—electro-magnetic pulse and chemical incapacitants—will be examined in light of the factors analysed and the feasibility of their inclusion in the RAAF weapons inventory assessed. Only two types of non-lethal weapon will be analysed for reasons of space. These two have been chosen because they best illustrate the complexity of non-lethal weapons selection, and because of the interest that defence forces comparable to the ADF have shown in their acquisition.

Aim

4. The aim of this paper is to determine the requirement for and the utility of including selected air-deliverable, non-lethal weapons in the RAAF weapons inventory.

DEFINITIONS

Working definition – Non-lethal weapons

5. The development and potential use of non-lethal weapons has generated much debate particularly in the post-Cold War era. Controversy has even centred on the most appropriate name for the range of weapons often referred to as non-lethal weapons. Some officials and academics have preferred phrases such as ‘less-than-lethal’ ‘disabling’ or ‘soft-kill’ weapons.²

6. The ADF has not adopted an official definition of non-lethal weapons. In the absence of a working Australian definition, that of our close ally the United States will be used. The United States Department of Defense *Policy for Non-Lethal Weapons* contained in Directive No. 3000.3, 9 July 1996, defines non-lethal weapons as:

explicitly designed and primarily employed so as to incapacitate personnel or materiel while minimising fatalities, permanent injury to personnel, and undesired damage to property and the environment.

7. In adopting the phrase ‘non-lethal weapons’, most definitions in official and academic literature, emphasise the intent or purpose behind the use of these weapons. To that extent, the definition offered by the former US Director of Policy and Planning in the Office of the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict Mr Christopher Lamb, is worth quoting in full:

non-lethal weapons are discriminate weapons that are explicitly designed and employed so as to incapacitate personnel or materiel, while minimising fatalities and undesired damage to property and environment. Unlike weapons that permanently destroy targets through blast, fragmentation, or presentation, non-lethal weapons have relatively reversible effects on targets and/or are able to discriminate between targets and non-targets in the weapons area of impact.³

8. The benefits of this definition, are that it highlights the impermanence of effect intended and its realistic emphasis on the minimisation not elimination of casualties and damage to infrastructure. This paper will use the phrase ‘non-lethal weapons’, in the sense adopted in the US State Department of Defense Directive while emphasising the points highlighted in Mr. Lamb’s definition.

Information operations

9. Methods of information warfare including computer viruses, while regarded as non-kinetic in effect and non-lethal by intent, will not be included in the definition of ‘non-lethal weapons’ for the purposes of this paper. Accordingly, the dropping of leaflets from a C-130 is not within the scope of this paper.

‘Air-Delivered’

10. Notwithstanding that the broader strategic environment discussed in this paper is relevant to the application of non-lethal weapons by all ADF military environments, this paper will emphasise only those with potential for inclusion in the RAAF inventory and not those of RAN or Army aviation assets. Further, the phrase ‘air deliverable’ is included in order to distinguish those non-lethal weapons relevant to the RAAF ground environment.

FUTURE CONFLICT SCENARIOS

11. In order to assess the requirement for non-lethal weapons and the viability of including various types in the RAAF weapons inventory, it is first important to analyse the strategic environment and

the potential conflicts in which the RAAF will be called upon to conduct operations. Notwithstanding the prevalence in academic and official writings of the phrase ‘future war’, this paper will adopt the alternative phrase ‘future conflict’ as it more accurately reflects the broader range of activities in which the ADF is likely to engage, including operations other than war. Notwithstanding, ‘future war theory’ is an integral part of the debate over future conflict scenarios.

‘Future war theory’

12. The post-Cold War world has brought with it, not the much sought after ‘new world order’ of peace and security, rather a fundamental shift in the nature of conflict and its participants. What has occurred is the ‘democratisation of conflict’. No longer is the use of force effectively reserved to the major powers and their proxies—it is now the domain of ordinary peoples with a range of rational and irrational motivations. Their lack of technological sophistication is more than made up for by the savagery with which they participate.

13. Israeli military theorist Martin Van Creveld has dubbed the types of conflict that have emerged in the past decade, ‘non-trinitarian’.⁴ This phrase refers paradoxically to the Clausewitzian conception of warfare as a triangular paradigm consisting of government, armed forces and the people. Van Creveld’s contention is that recent conflict does not conform to this paradigm and that these distinctions no longer exist. The result is a shift away from the type of ‘rational activity directed toward rational ends’, for which Western defence forces are traditionally structured.⁵ As Van Creveld has noted:

If the last fifty years or so provide any guide, future wars will be overwhelmingly of the type known, however inaccurately, as “low intensity”. Both organisationally and in terms of the equipment at their disposal, the armed forces of the world will have to adjust themselves to this situation by changing their doctrine, doing away with much of their heavy equipment and becoming more like the police.⁶

14. This ‘non-trinitarian’ reality will manifest itself in a variety of conflict scenarios, all of which will be characterised by their social and political complexity.

Nature of future conflict

15. **Scale and rationale.** Conflicts in the post-Cold War era have tended to remain as smaller scale contingencies, although they have been no less brutal for that. They have only exceptionally developed into major conflicts on a national or regional scale. It is expected that, with rapid globalisation and the common economic interests of the major powers discouraging large-scale conflict,⁷ this will continue for the foreseeable future. These conflicts will involve internal power struggles in weak or failed states. They will entail inter-ethnic or inter-religious violence and increasingly, terrorism or asymmetric conflict driven by ideological fundamentalism. Their targets will increasingly include ‘soft-targets’ in developed nations.

16. **Means and methods.** Whatever their hue, these conflicts will be characterised by the increasingly blurred distinction between what have traditionally been regarded as legitimate combatants and those protected as non-combatants.⁸ They will be fought with little or no regard for the laws or ethics that have characterised the ‘Western’ approach to warfare for the last 100 years or more.

17. **Urban Environment.** In conjunction with the prominence of small scale conflict will be the tendency for conflict to be conducted in an urban environment. This is a consequence of rapid urbanisation in under-developed states—by 2005, half of the world’s population is expected to be urban.⁹ Such urbanisation will exacerbate the already strained resources of under-developed states

generating further poverty and inequality, as well as placing pressure on existing religious and ethnic fault-lines. Because of the proximity of civilians and essential infrastructure, urban environments present complex challenges for the conduct of military operations.

18. **Conclusion.** The limited nature of many of these future conflicts, belies their considerable threat to international stability and the potential for direct impact on developed states. Accordingly, the attention of the international community is paramount. Although this attention must encompass a full range of responses including political and economic measures, the military response will be crucial. As a consequence, the ADF will be employed increasingly in police actions, peace enforcement or more traditional armed conflict in urban environments, in a warlike and non-warlike capacity.¹⁰ This conclusion does not diminish the importance of more conventional forms of warfare and the means of waging them, which will continue to be the most significant influence on the structure of defence forces of developed states.

Australian strategic guidance and future conflict

19. The impact of these developments on the ADF have been recognised by the Australian Government and the ADF. The government's latest statement of defence policy, *Australia's National Security – Defence Update 2003*, identifies this trend in future conflict and tasks the ADF with preparing for the conduct of military operations in such circumstances.¹¹

20. These developments are reflected in ADF doctrine that acknowledges the growing military and political complexities of future conflict. The *Australian Defence Doctrine Publication–D, Foundations of Australian Military Doctrine (ADDP-D)* refers specifically to the technological developments, including weapons platforms, which will 'transform the means, modes, environmental dimensions and purposes of war.' However, no specific reference to non-lethal weapons is made in higher level doctrine.

Limitations on military response to future conflict

21. **Background** Because of its asymmetric nature, the successful resolution of future conflict will not be a simple matter of militarily overcoming an opponent. The political–strategic environment will impact both the nature of a military response and the means by which it is achieved. Further, notwithstanding current and future belligerents' tendency to disregard the limitations traditionally placed on the use of force by governments, Australia will continue to be subject to stringent controls and its response to future conflict scenarios will be limited accordingly.¹²

22. **Political factors – Domestic Public Opinion.** Notwithstanding the apparent license afforded governments to conduct offensive operations in pursuit of 'terrorists', public opinion remains an important limitation on the means by which military operations are carried out. Public opinion is relevant on two levels. Firstly it impacts on decisions to use force against enemy combatants as well as on the potential for injury to non-combatants. Secondly, it impacts on the risks to personnel that governments are prepared to take in the pursuit of a military solution—a factor relevant not only to the lethality of weapons but to the manner of their delivery.¹³ This latter factor has impacted heavily on the decision to use air forces in circumstances not previously considered conducive to the application of air power, for example in Kosovo.

23. **Political factors – Reversibility of damage.** The use of force by developed nations is further influenced by the recognition of the requirement to rebuild states after conflict ceases. Such a need impacts heavily on the extent to which force is applied in offensive operations. 'Creating the means

to reverse anti-materiel or anti-personnel effects could decrease the time and investment necessary to return a region to stability.¹⁴

24. **Political factors – Alienation.** Another issue that often fails to attain the public prominence that it deserves, is the strategic importance of not alienating the people among whom the military campaign is being conducted. This is concession to the nature of future conflict and its source among disaffected civilian populations. Non-lethal weapons may provide defence forces with the capacity to achieve operational objectives while preserving a minimum level of civilian support in the area of operations. A recent statement by the Secretary-General of the United Nations, Mr Kofi Annan, throws this reality into stark relief in relation to military operations targeting terrorism:

Terrorist groups may actually be sustained when ... governments cross the line and commit outrages themselves, whether it is ... indiscriminate bombardment of cities, the torture of prisoners, targeted assassinations or accepting the death of innocent civilians as collateral damage.¹⁵

25. **Legal considerations.** The manner in which the ADF conducts operations in future conflict scenarios, will be governed by extensive legal principles.¹⁶ These legal principles will directly impact the development and use of weapons. Further, *Protocol I Additional to the Geneva Conventions of 1949, and Relating to the Protection of Victims of International Armed Conflict of June 1977*, to which Australia is a signatory, requires that before their adoption, all weapons must be examined to ensure compliance with principles of international humanitarian law.¹⁷

26. **Discrimination.** International humanitarian law provides a general prohibition on the targeting of civilians and accordingly, belligerents in applying force during operations, must discriminate between combatants and non-combatants.¹⁸ This prohibition applies to the use of all force against civilians, both lethal and non-lethal and accordingly, in an armed conflict, non-lethal weapons cannot be directed at civilians.¹⁹

27. **Unnecessary suffering.** International law prohibits the use of force which is 'of a nature' to cause 'superfluous injury or unnecessary suffering'.²⁰ This principle provides an important ethical and legal benchmark according to which new weapons are developed and has provided the impetus for existing bans on a number of weapons including 'dum-dum' bullets and anti-personnel land mines.²¹ It has also been the basis upon which many proposed non-lethal weapons, have been challenged, including laser blinding weapons.

28. **Indiscriminate weapons.** In addition to the requirement to distinguish civilians from combatants, belligerents are prohibited from employing weapons that are themselves incapable of being directed at a specific military objective.²² This principle will have considerable impact on the use of non-lethal weapons by the RAAF not least because of the inherent nature of many proposed non-lethal weapons, but also because of the natural implications of their delivery by air. This principle has been the basis upon which non-lethal weapons such as bacteriological and chemical incapacitants have been challenged. This principle also supported the restrictions placed on the delivery of incendiary weapons by air.²³

29. **Treaty considerations.** In addition to the general principles of humanitarian law prescribed in customary international law and The Hague and Geneva series of conventions, a large number of independent treaties restrict the type of weapons that can be used by belligerents. These treaties deal with a wide range of possible weapons. For reasons of space only the *Chemical Weapons Convention* (CWC) will be examined here.

30. **Chemical Weapons.** The CWC does not provide the same absolute prohibition in relation to the use of chemical weapons. The CWC prohibits the development and possession of chemical agents that ‘cause death, temporary incapacitation or permanent harm to humans or animals,’ except for a limited number of permitted purposes (which include domestic riot control). It should be noted that this ban extends to the use of chemical weapons against enemy soldiers, but not to the use of exclusively ‘anti-materiel’ chemical weapons. Of particular relevance to the debate over non-lethal weapons, is the CWC ban on the use of riot control agents (RCAs) ‘as a method of warfare’. RCAs are defined as:

Any chemical ... which can produce rapidly in human’s sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.

RCAs are not prohibited from use in law enforcement operations, which some interpret as including peacekeeping or even peace enforcement operations. Australia is a signatory to the CWC.

31. **Operations other than war.** The law applicable to ADF members using force during operations not involving armed conflict may include not only the law of the territory over which the member is operating, but Australian domestic law applicable via the DFDA. As a consequence, the impact of domestic law will have to be carefully considered before non-lethal weapons are adopted for use in peacekeeping or humanitarian operations. General international Human Rights principles will apply to the use of force by ADF members during operations. Human Rights will generally provide a very basic guarantee of fair treatment to any person caught up in operations. Such guarantees include freedom from cruel, inhuman or degrading treatment,²⁴ and the right to life.²⁵

PROPOSED ADDITIONS TO RAAF NON-LETHAL WEAPONS INVENTORY

Background

32. Throughout the developed world, a vast array of non-lethal weapons has been and continues to be researched and produced for use by military forces. This includes anti-materiel as well as anti-personnel weapons using a range of technologies including optics, chemicals, radio frequency and physical restraining devices. For reasons of space, only electro-magnetic pulse and chemical incapacitants will be discussed in detail. This necessarily excludes a number of non-lethal weapons with potential for inclusion in the RAAF inventory including:

- a. **Optical weapons and lasers.** These weapon systems are comprised of highly focused light sources and are used to disrupt an adversary’s optical sensors—human or mechanical. They have the capacity to be mounted on aircraft.²⁶ Such weapons have already received a great deal of negative attention, particularly as they relate to the legal principles of ‘unnecessary suffering’ and ‘discrimination’.
- b. **Acoustics.** These weapons use very low frequency (less than 20-hertz), high intensity sound beams and are often referred to as ‘infrasound’. Although infrasound can be used against materiel its primary application would be against personnel—causing disorientation, nausea, vomiting and bowel spasms.²⁷ These weapons can be mounted on aircraft and have clear relevance to air forces in future conflict scenarios.
- c. **Restraining mechanisms.** A variety of other non-lethal methods of inhibiting an adversary have been developed, which are amendable to delivery by air. These include polymer adhesives (sticky foam) and ultra-slick liquids designed to impede movement.²⁸

Directed energy weapons

33. **Introduction.** Directed energy weapons including ‘High-powered microwave’ (HPM) weapons and ‘Electro-magnetic pulse’ (EMP), have been considered for use since World War II. Their development gained impetus in the US armed forces after operations in Haiti, Somalia and the Former Yugoslavia, which were in many ways a measure of the complexities of future conflict discussed above. Lasers will not be considered direct energy weapons for the purposes of this section.

34. **Characteristics.** HPM weapons involve the directing of high concentrations of electromagnetic energy at a target. They are designed to generate a short, intense energy pulse that produces a transient surge of thousands of volts.²⁹ While conventional HPMs can be generated by standard RF generators, the effect required for military application, can be generated less conventionally by exploiting the energy created from an explosive device. The resulting single, intense pulse is referred to as EMP.³⁰ In order to deliver the EMP, conventional explosives can be carried in missiles and directed against the target. The energy released by the explosion is converted into radio-frequency energy,³¹ and the effect is capable of being directed at a specific target.

35. **Anti-materiel application.** Directed energy weapons are capable of application against both personnel and materiel. Against materiel targets, the EMP is employed to cause an overload in sensitive electrical equipment, such as that employed in air defence or broader communications networks. The range and intensity of the effect will depend on the power generated, the spectral characteristics of the pulse and on the extent to which the target is shielded.³² Some specifically anti-materiel weapons can be applied with minimal effect on humans or other infrastructure.

36. **Anti-personnel application.** HPM and EMP weapons can have a range of effects when directed against personnel. The electromagnetic weapons used in the US armed forces’ Vehicle Mounted Active Denial System, penetrate the skin causing water molecules to vibrate, producing heat and discomfort.³³ HPMs on the other hand are capable of doing extensive damage to humans. This includes the scrambling of brain waves, blurring of vision, nausea, vomiting, muscle spasms and uncontrolled body movement.³⁴ The extent of damage will be governed by the range at which the weapon is applied. Although the effects are largely temporary—death can occur if HPMs are applied from a short distance.

Directed energy weapons and air power

37. Directed energy weapons are well suited to the air campaign, particularly where that campaign involves conventional warfare against developed states.³⁵ Notwithstanding, air power provides unique platforms from which directed energy weapons can be delivered in future conflict scenarios as well.

38. The characteristics of air power, including penetration, reach, responsiveness and precision all lend themselves to the application of non-lethal weapons in the environments in which future conflict scenarios will be played out. In relation to both anti-personnel and anti-materiel directed energy weapons, the delivery vehicle may not be immune from the effects and hence the speed with which aircraft can egress the target area is critical.³⁶

39. Carlo Kopp writing in 1996, assessed that electromagnetic warheads were capable of use with the Mk84 bomb and could be ‘readily integrated into [the RAAF’s] existing operational cycles and deployed capabilities for warhead delivery.’³⁷

Compliance with strategic, political and legal constraints

40. **Australian future conflict scenarios.** Do directed energy weapons provide an answer to Australia's future conflict requirements? Directed energy weapons, used against materiel are of more relevance where the adversary is dependent on 'semiconductor based military and supporting technologies'.³⁸ Their application against materiel has less relevance to the expected belligerents in future conflict scenarios. The application of anti-personnel directed energy weapons has more relevance to the future conflict scenarios discussed above, as well as those identified by the government as more likely for RAAF involvement. This would include peace enforcement and anti-terrorist operations in the Asia-Pacific region and globally in support of a coalition campaign.

41. **Political constraints.** Air delivered directed energy weapons have the potential to deliver decisive force while remaining within the political constraints expected to impact military operations in future conflict scenarios. The use of stand-off weapons reduces the threat to friendly personnel, while benefiting from the use of precision delivery systems. Directed energy weapons minimise the potential costs of rebuilding infrastructure and by reducing the risk of civilian casualties, lessens the risk of alienating the population among whom the conflict is being fought. The only concern from a political perspective, is the potential for public disaffection emerging from scenes of violently ill civilians. However, where the only other option is lethal weaponry, such scenes could be cogently argued as entirely reasonable.

42. **Legal constraints.** Legal considerations present a more complex problem. It remains that non-combatants should never be made the object of attack, and considerable limitations are placed on the allowable collateral damage resulting from an attack—whether by lethal or non-lethal means. Further, belligerents are expected to discriminate between combatants and non-combatants in the application of force. It is uncertain whether delivery of such weapons by air, particularly in the urban environment anticipated and notwithstanding the use of precision systems, would satisfy this requirement. Finally, directed energy weapons have not been 'tested' against the 'unnecessary suffering' principle, although so long as the effects remain temporary, this principle should not overly constrain the use of these weapons.

Directed energy weapons – Conclusion

43. Directed energy weapons demonstrate considerable potential for inclusion in the RAAF weapons inventory. Both in their anti-materiel and anti-personnel form, they would provide credible options for RAAF commanders in both future conflict scenarios and more conventional warfare. Although their development and use will be impacted by legal considerations, this does not threaten their essential viability.

Chemical incapacitants

44. **Characteristics.** Chemical agents can be applied in a vast array of forms to achieve a military objective. For reasons of space and relevance to future conflict scenarios, this paper will only investigate those chemical weapons that are designed for use against people. This necessarily excludes a considerable range of weapons that are designed for use exclusively against materiel. For example, supercaustic agents derived from chemical or biological agents can be employed to deteriorate materials like rubber (tyres), plastics and can be employed to contaminate fuel. Chemical and biological agents can be used as super-lubricants or extremely strong adhesives, or as combustion inhibiting substances to further disrupt vehicles or aircraft.³⁹ Anti-personnel chemical weapons can be

divided into three major groups; riot control agents, malodorants and calmatives. They can be used to disable individuals, large crowds or discrete groups such as a headquarters.

45. **Riot control agents.** RCAs (as defined in paragraph 33 above), include chemicals that irritate mucus membranes and ‘produce rapid sensory irritation or disabling physical effects that disappear within a short time following termination of exposure.’⁴⁰ The most common forms include oleoresin capsicum (OC) and ochlorobenzylidene malononitrile (CS or tear gas). RCAs are commonly used by police forces and some defence forces have authorised their use in limited circumstances.

46. **Malodorants.** Commonly referred to as ‘stink bombs’ malodorants are derived from living organisms or toxins and produce a powerful smell which humans find repugnant. When applied can be used to disperse a crowd or deny an area to an adversary and quite clearly have potential application in all forms of military action including peacekeeping. The effects of exposure to malodorants can range from mild displeasure to gagging and vomiting.

47. **Calmatives.** Calmatives act much like sedatives—they depress the central nervous system having a psychological effect in altering moods as well as a physiological effect by depressing the respiratory system.⁴¹ Calmatives have obvious applications against large bodies of people or against individuals who are either unmanageable or are dispersed among a group of civilians. They have been particularly considered in hostage situations. The risks of using calmatives are amply demonstrated by the use of ‘fentanyl’ during the hostage crisis in the Moscow theatre in October 2002.

Chemical incapacitants and air power

48. Like directed energy weapons, chemical incapacitants can be adapted reasonably easily to delivery from air force platforms. The characteristics of air power are again conducive to the delivery of chemical incapacitants—penetration, reach, responsiveness and precision in particular. Air power would be particularly effective where chemical incapacitants are employed for area denial or where the target is housed in a discrete building, for example, a headquarters. They have less utility where the target is discrete or where friendly forces are in close proximity. Further, delivery by air platforms reduces the risk of the weapon affecting the personnel delivering it.

Compliance with strategic, political and legal constraints

49. **Australian future conflict scenarios.** Anti-personnel chemical incapacitants are clearly relevant to the ADFs future conflict scenarios. They are potentially effective in the debilitation of adversaries situated in urban environments or among groups of non-combatants. They may also provide a means of denying access by agitated crowds to areas sensitive to an ADF operational unit deployed overseas. Notwithstanding the results of the Moscow theatre siege, anti-personnel chemical incapacitants also promise a real alternative for the resolution of certain hostage situations. However, while anti-personnel chemical incapacitants are capable of delivery by the RAAF and in some circumstances they are clearly appropriate, it is anticipated that these circumstances will be limited and these weapons would be more appropriate for delivery by Army aviation assets, or ground units.

50. **Political constraints.** Notwithstanding their clear utility in future conflict scenarios, chemical incapacitants do not unequivocally satisfy the political imperatives that shape military operations. Any use of force against civilians, however unavoidable, would create some disquiet in Australian public opinion and this would be exacerbated should that force involve the use of chemicals. This fact would necessitate very stringent authorisation procedures that may nullify the benefits that

air power brings—that of speed of application. Further, the limited capacity to contain the effects of chemical incapacitants even where targeted against identified combatants would equally cause political disquiet. On the other hand, chemical incapacitants do reduce the risk to ADF personnel, appropriately applied they have the capacity to minimise reconstruction costs and by avoiding deaths among the civilian population, there is a reduced risk of alienating the local civilian population.

51. **Legal constraints.** Legal considerations present the greatest challenge to the use of chemical incapacitants. In addition to the general principles of international humanitarian law and broad principles of Human Rights, the provisions of the CWC, place considerable restraints on the development and use of chemical incapacitants. It would be difficult to argue that RCAs, malodorants and calmatives do not fall within the definition in the CWC of prohibited chemical agents—‘cause death, temporary incapacitation or permanent harm to humans’—thereby attracting the ban. Should future conflict scenarios be interpreted as ‘law enforcement’ operations, then RCAs could be used by the ADF, however the value of air-delivered RCAs is open to question.

Chemical incapacitants – Conclusion

52. Chemical incapacitants would provide the RAAF with a number of options in the conduct of operations in future conflict scenarios, particular in terms of area denial and precision targeting of groups of individuals for example headquarters. As weapons however, chemical incapacitants attract considerable political and legal opposition. That opposition is comprehensive and until the humanitarian aspect of chemical incapacitants is proven and the legal environment altered, there is little utility in the RAAF researching and developing such weapons.

Conclusion

53. The RAAF’s contribution to Australia’s future military challenges remains a complicated question, the answer to which will depend largely on deciphering the nature of future conflict. The post-Cold War era has brought with it a fundamental change in the nature of conflict. Where traditional, conventional warfare is engaged in by distinct and distinguishable armed forces, future conflict will be conducted by non-state, issue-motivated groups who do not constitute armed forces in accordance with traditional ‘Western’ definitions. Conflict will occur in urban environments, among civilian populations who may or may not support the belligerents.

54. Notwithstanding the different participants and unique ‘methods’ of future conflict, the military response by developed states will continue to be constrained by largely traditional political and legal factors. Domestic public opinion, the requirement to rebuild the area of operations and the strategic importance of not alienating the local civilian population, all impact on the means and methods adopted by the military in response to future conflict scenarios. Legal obligations will apply to the ADF notwithstanding the failure of an adversary to recognise those same obligations. These considerations will all impact on the viability of non-lethal weapons and the type chosen for development and inclusion in the RAAF weapons inventory.

55. In analysing the viability of non-lethal weapons for use by the RAAF, two of the more prominent weapon systems were measured against the political and legal considerations identified and how conducive they are to delivery by air power. Directed energy weapons, both anti-materiel and anti-personnel, hold considerable promise for the RAAF, not least because of their capacity to be integrated into the air battle. They are well suited to future conflict scenarios and satisfy the political–strategic limitations within which the ADF response must be conducted. The legal factors,

while certain to impact on the manner with which directed energy weapons are applied, are not an impediment to their development and incorporation into the RAAF weapons inventory.

56. Similarly, chemical weapons provide a solution to the complexities of future conflict scenarios—allowing the targeting of an adversary in the urban environments in which they are expected to operate. However strategic-political factors present considerable hurdles, particularly the emotive response that chemical weapons inevitably induce. Further, legal factors present a significant obstacle to the legitimate development and use of chemical weapons, notwithstanding their non-lethal nature.

57. Ultimately, non-lethal weapons have reached a stage in their development where they can be seriously considered for incorporation into the RAAF weapons inventory:

[Non-lethal] weapons can provide airpower with capabilities that will yield new supports to diplomacy, a credible deterrent below the level of massive conventional force projection, and an expanded ability to meet evolving mission needs ...⁴²

Recommendation

58. The RAAF further investigate the incorporation of directed energy weapons, in particular anti-materiel and anti-personnel high powered microwave weapons, into the RAAF weapons inventory.

Endnotes

1. M Van Creveld, 1991, *The Transformation of War*, The Free Press, New York, p. 205.
2. See N Lewer and S Schofield, 1997, *Non-lethal weapons – A Fatal Attraction?*, Zed Books Ltd, London, p. 7 and the University of Bradford, Non-Lethal Weapons Research Project website, viewed 25 Sep 03, <<http://www.bradford.ac.uk/acad/nlw/background.html>>.
3. C Lamb, *Non-lethal weapons Policy: Department of Defense Directive*, quoted in Nick Lewer and Steven Schofield, 1997, op. cit., p. 7.
4. Van Creveld, 2002, 'The Transformation of War Revisited', *Small Wars and Insurgencies*, vol 13, no 2, Summer p 8.
5. *ibid.*, p 14.
6. Van Creveld, 2000, 'Through a Glass, Darkly – Some Reflections on the Future of War', *Naval War College Review*; Vol 53, No 4, Autumn 2000, p. 26.
7. Department of Defence, 2003, *Australia's National Security – A Defence Update 2003*, Defence Publishing Service, Canberra, p. 8.
8. Department of Defence, 2002, *Australian Defence Doctrine Publication–D, Foundations of Australian Military Doctrine (ADDP–D)*, Defence Publishing Service, Canberra, p. 3–10.
9. Report of the Secretary-General to the Commission on Sustainable Development, *Demographic Dynamic and Sustainability*, United Nations Economic and Social Council, 15 March 2001, paragraph 6, viewed 29 September 2003 <<http://odsddsny.un.org/doc/UNDOC/GEN/N01/290/29/PDF/N0129029.pdf?OpenElement>>.
10. For the ADF doctrinal position on these terms see Department of Defence, 2002, op. cit., Defence Publishing Service, Canberra, p. 3–2.
11. Department of Defence, 2003, op. cit., p. 23.
12. Department of Defence, 2002, op. cit., p. 3–6.
13. Often referred to as the 'Casualty-Aversion Mindset'—see R Barr, 2001, *Can "Air Power" Counter the Asymmetric Threat? Factors Influencing the Employment of Air-Power Against International Terrorist Threats*, Air Command and Staff College, Maxwell Air Force Base, Alabama, p. 23.
14. J Siniscalchi, 1998, *Non-Lethal Technologies: Implications for Military Strategy*, Centre for Strategy and Technology, Maxwell Air Force Base, Alabama, viewed 5 Oct 03, <<http://www.au.af.mil/au/aws/awcgate/cst/cs3at3.pdf>>.
15. 'US Aggression breeds terror', *Sydney Morning Herald*, 24 Sep 2003, p. 9.
16. Department of Defence, 2002, op. cit., Chapter 6.
17. Article 36.
18. *Protocol I Additional to the Geneva Conventions of 1949, and Relating to the Protection of Victims of International Armed Conflict of June 1977 (Additional Protocol I)*, Article 51 paragraphs 2 and 4.
19. This orthodox interpretation is questioned by DP Fidler, 'Non-Lethal Weapons and International Law: Three Perspectives on the Future', in N Lewer (ed.), 2002, *The Future of Non-Lethal Weapons; Technologies, Operations, Ethics and Law*, Frank Cass Publishers, London, p. 26. Fidler suggests that what he terms the 'Radical Change Perspective' will in future challenge the orthodoxy and permit the direct targeting of civilians with non-lethal weapons.
20. *Additional Protocol I*, Article 35(2).
21. N Lewer & S Schofield, 1997, *Non-Lethal Weapons – A Fatal Attraction?*, Zed Books, London, p. 84.
22. *Additional Protocol I*, Article 51(4)(b) and Paragraph 51(5).
23. *Protocol on Prohibitions or Restrictions on the use of Incendiary Weapons (Protocol III) Article 2, to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects*, Geneva, 10 October 1980.
24. *Universal Declaration of Human Rights*, Article 3, and *International Covenant on Civil and Political Rights*, Article 7.

25. *International Covenant on Civil and Political Rights*, Article 6.
26. J Bobb, 2002, *Non-Lethal Weaponry: Applications to AC-130 Gunships*, Air Command and Staff College, Maxwell Air Force Base, Alabama, p. 19.
27. J Altman, 'Non-lethal Weapons Technologies: The Case for Independent Scientific Analysis', in N Lewer (ed.), op. cit., p. 117.
28. J Siniscalchi, 1998, loc. cit.
29. C Kopp, 1993, 'A Doctrine for the Use of Electro Magnetic Pulse Bombs (Revised Draft of RAAF APSC Working Paper #15, July, 1993)', viewed 11 October 2003, <<http://www.csse.monash.edu.au/~carlo/archive/MILITARY/APSC/wp15-draft.pdf>>.
30. Committee for an Assessment of Non-Lethal Weapons Science and Technology, 2003, *An Assessment of Non-Lethal Weapons Science and Technology*, The National Academies Press, Washington, p. 30.
31. N Lewer & S Schofield, 1997, op. cit., p. 11.
32. C Kopp, 1993, loc. cit., p. 2.
33. N Lewer (ed.), 2002, op. cit., p. 3.
34. D Morehouse, 1996, *Non-lethal Weapons: War Without Death*, Praeger Publishers, Westport, p. 120.
35. C Kopp, 1993, loc. cit., p. 9–12.
36. *ibid.*, p. 5.
37. C Kopp, 1996, 'An introduction to the Technical and Operational Aspects of the Electromagnetic Bomb', Air Power Studies Centre, viewed 10 Sep 2003, <<http://www.csse.monash.edu.au/~carlo/archive/PAPERS/APSC/wp50-draft.pdf>>.
38. *ibid.* p. 7.
39. J Siniscalchi, 1998, loc. cit.
40. Committee for an Assessment of Non-Lethal Weapons Science and Technology, 2003, op. cit., p. 26.
41. *ibid.*, p. 27.
42. C Morris et al., 'Weapons of Mass Protection: Nonlethality, Information Warfare, and Airpower in the Age of Chaos', *Airpower Journal*, Spring 1995, viewed 25 Sep 2003, <<http://www.airpower.maxwell.af.mil/airchronicles/apj/spr95.html>>.

Bibliography

- Altman J, 2002, 'Non-lethal Weapons Technologies: The Case for Independent Scientific Analysis', in Lewer N (ed.), 2002, *The Future of Non-Lethal Weapons; Technologies, Operations, Ethics and Law*, Frank Cass Publishers, London.
- Barr, R, 2001, *Can "Air Power" Counter the Asymmetric Threat? Factors Influencing the Employment of Air-Power Against International Terrorist Threats*, Air Command and Staff College, Maxwell Air Force Base, Alabama.
- Bobb, J, 2002, *Non-Lethal Weaponry: Applications to AC-130 Gunships*, Air Command and Staff College, Maxwell Air Force Base, Alabama.
- Committee for an Assessment of Non-Lethal Weapons Science and Technology, 2003, *An Assessment of Non-Lethal Weapons Science and Technology*, The National Academies Press, Washington.
- Department of Defence, 2003, *Australia's National Security – A Defence Update 2003*, Defence Publishing Service, Canberra.
- Department of Defence, 2002, *Australian Defence Doctrine Publication–D, Foundations of Australian Military Doctrine*, Defence Publishing Service, Canberra.
- Fidler, DP, 2002, 'Non-Lethal Weapons and International Law: Three Perspectives on the Future', in N Lewer (ed.), 2002, *The Future of Non-Lethal Weapons; Technologies, Operations, Ethics and Law*, Frank Cass Publishers, London.
- International Covenant on Civil and Political Rights*, 999 U.N.T.S. 171, entered into force Mar. 23, 1976.
- Kopp, C, 1993, 'A Doctrine for the Use of Electro Magnetic Pulse Bombs (Revised Draft of RAAF APSC Working Paper #15, July, 1993)', viewed 11 October 2003, <<http://www.csse.monash.edu.au/~carlo/archive/MILITARY/APSC/wp15-draft.pdf>>.
- Kopp, C, 1996, 'An introduction to the Technical and Operational Aspects of the Electromagnetic Bomb', Air Power Studies Centre, viewed 10 Sep 2003, <<http://www.csse.monash.edu.au/~carlo/archive/PAPERS/APSC/wp50draft.pdf>>.
- Lewer, N (ed.), 2002, *The Future of Non-Lethal Weapons; Technologies, Operations, Ethics and Law*, Frank Cass Publishers, London.
- Lewer, N and Schofield, S, 1997, *Non-lethal weapons – A Fatal Attraction?*, Zed Books Ltd, London.
- Lamb, C, 1997, 'Non-lethal Weapons Policy: Department of Defense Directive' quoted in Nick Lewer and Steven Schofield, 1997, *Non-lethal weapons – A Fatal Attraction?*, Zed Books Ltd, London.
- Morris, C et al., 1995, 'Weapons of Mass Protection: Nonlethality, Information Warfare, and Airpower in the Age of Chaos', *Airpower Journal*, Spring 1995, viewed 25 Sep 2003, <<http://www.airpower.maxwell.af.mil/airchronicles/apj/spr95.html>>.
- Protocol I Additional to the Geneva Conventions of 1949, and Relating to the Protection of Victims of International Armed Conflict of June 1977*.
- Protocol on Prohibitions or Restrictions on the use of Incendiary Weapons (Protocol III) Article 2, to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects*, Geneva, 10 October 1980.
- Siniscalchi, J, 1998, *Non-Lethal Technologies: Implications for Military Strategy*, Centre for Strategy and Technology, Maxwell Air Force Base, Alabama, viewed 5 Oct 03, <<http://www.au.af.mil/au/aws/awcgate/cst/cs3.pdf>>.
- Sydney Morning Herald* 'US Aggression breeds terror', 24 Sep 2003.
- United Nations Economic and Social Council, Report of the Secretary-General to the Commission on Sustainable Development, *Demographic Dynamic and Sustainability*, 15 March 2001.
- Universal Declaration of Human Rights* of 10 December 1948.
- Van Creveld, M, 2000, 'Through a Glass, Darkly – Some Reflections on the Future of War', *Naval War College Review*; Vol 53, No 4, Autumn.
- Van Creveld, M, 2002, 'The Transformation of War Revisited', *Small Wars and Insurgencies*, vol 13, no 2, Summer.
- Van Creveld, M. 1991 *The Transformation of War*, The Free Press, New York.

