

Non-Lethal Weapons

The Legal & Ethical Debate Rages On

Non-Lethal Weapons (NLWs) are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel and undesired damage to property and the environment. NLW technologies include electromagnetic, chemical, acoustic, and mechanical and kinetic technologies. The mechanical and kinetic technologies (e.g., barriers, entanglements, and blunt impact) are well developed and not surprisingly, are the most commonly used in NLWs now available.

NLWs based on these technologies are perhaps approaching their developmental limits from a science and technology point of view. Directed energy (i.e. electromagnetic and acoustic) and chemical (i.e. agents that affect the central nervous system or operation of equipment, subject to the legal constraints) technologies, on the other hand, have greater growth potential, although whether such developments will still permit a genuine 'non-lethal' tag to be applied to weapons that incorporate such technologies is questionable.

The Canadian Forces (CF) participation in peace support operations, evolving military requirements and the rise of non-state terrorism have all contributed to the need to re-evaluate whether there is a more appropriate response to NLW R&D than the "technology watch" maintained by Defence R&D Canada (DRDC) since the mid-1990's.

There are numerous legal and ethical constraints related to the use (in war or in peace support operations) of NLWs. International treaties, conventions, and the various other laws grouped under the *Law of Armed Conflict* all restrict the operational

use of certain weapons in peace support and war situations. Rules of Engagement can clarify the use of non-lethal force for deployed soldiers in specific scenarios but may also restrict their use based upon the particular operational mission.

The legal and ethical suitability of the non-lethal application of technologies is further complicated by the fact that many of the international laws and protocols were developed at a time when wars were generally fought between states using uniformed forces abiding by some recognized code of conduct. Now military forces are conducting peace support operations where a state of declared war does not exist even though one is being fought, non-state armed organizations are involved and many non-combatants are present. Furthermore, certain technological advances were not foreseen or anticipated when these international agreements were drafted.

While R&D cannot, by itself, resolve these legal and ethical issues, it can assist in informing the debate, by providing sound scientific data on NLW effects and through, for example, modeling and simulation on their operational effectiveness.

Military capability needs continually evolve in response to changing military missions and the operational environment. The importance of a NLW capability is an excellent example of this where their deployment is becoming a common feature of Peace Support Operations. NLWs expand the options open to a commander when the use of lethal force is either prohibited or inappropriate.

Unfortunately, NLW R&D has not kept pace with the rise in NLW requirements. While NATO and other allied R&D

programs have conducted many studies on the effects and effectiveness of NLWs, indicating a large international effort by Canada's allies in the NLWs areas. The international studies suggest a number of R&D challenges.

First, there is a scarcity of well-documented human and materiel target response data to the various NLW technologies. While there are many anecdotal references to NLW effects, the scientific values of these observations and conclusions are difficult to validate. Moreover, the development and potential application of non-lethal/directed energy technologies is outpacing the understanding of their effects. In particular, the human physiological and psychological effects of many NLW technologies, in both the short term and long term, are not well understood, even by countries with large NLW programs.

Secondly, the lack of standardization in the data collection and in the research protocols, both of which are considered essential, complicates collaboration and transfer of existing data both within and between nations.

Thirdly, even when the effects of NLW technologies are known, modeling and simulation tools are needed to assess NLW operational effectiveness in realistic employment scenarios and to analyze the cost/benefit ratio of the R&D investment to the CF. These tools have not been developed, in part because the effects data needed to populate and exercise them have not been collected.

And finally, the right to self-defence is never denied and counter-measures against non-lethal attacks may become an important force protection measure. The requirement may be particularly acute where the opposing force's NLW inventory is more extensive or advanced than that of the CF. Some adversaries may not feel constrained by international law and so develop chemical and biological NLWs that other states may consider illegal or prohibited.

In view of the significant challenges facing the CF, DRDC is now carrying out a study and will make recommendations on a way ahead with respect to R&D related to NLWs. **FL**

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