Non-lethality in reality: a defence technology assessment of its political and military potential

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Non-Lethal Weapons: Peace Enablers or Troublesome Force?
Assessing the Role of CS and Baton Rounds in the Northern Ireland Conflict *

Non-lethal weapons: peace enablers or troublesome force? Assessing the role of CS and baton rounds in the Northern Ireland conflict

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This article seeks to assess the utility of non-lethal weapons (NLWs) under ‘real world’ conditions. A defence technology assessment framework is applied to analyse the use of NLWs during the ‘Troubles’ in Northern Ireland in the late twentieth century. Case analysis demonstrates that the effects of NLW employment in real scenarios significantly depend on the operational context of its use. The approach followed and the assessment outcome can be used to inform the ongoing debate on the utility of existing and novel NLWs to support stabilisation operations in current and future conflict settings.

**Keywords**: British Army; Bogside; baton rounds; CS gas; defence technology assessment; Royal Ulster Constabulary; non-lethal weapons; rubber bullets; Provisional IRA

Introduction

**Non-lethality: origins and debate**

Non-lethal weapons (NLWs) have been in use with security forces since the 1950s. During the Cold War era NLWs were predominantly adopted by police and law enforcement agencies for domestic purposes. The military started to introduce these weapons during conflict intervention missions in the early 1990s.

What are NLWs for? In essence NLWs emerged from the need felt among Western armed forces to have at their disposal less destructive and less lethal instruments than those intended for large-scale warfare.¹ Military forces should become better capable of accomplishing their mission without inflicting unintended and innocent casualties, in particular among the civil population. NLWs should also provide for measured force responses in a range of situations where the use of lethal force would be politically and legally prohibitive. Such situations frequently occur during operations in conflicts dominated by irregular warfare (IW). Meanwhile, NATO member states, first of all the US, have adopted formal NLW policies, as has the Alliance itself. A useful definition of NLWs is the one used by NATO:

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Weapons which are explicitly designed and developed to incapacitate or repel personnel, with a low probability of fatality or permanent injury, or to disable equipment, with minimal undesired damage or impact on the environment.\textsuperscript{2}

However, even after their formal military acknowledgement, NLWs remain the subject of intensive debate. On the one hand, their availability raises high expectations with some analysts by portraying them as ‘weapons of mass protection’.\textsuperscript{3} Such optimism coincides with the responsibility felt in Western states to humanise war and to comply with the associated imperative of casualty aversion intensified by media presence in conflict zones.\textsuperscript{4} Others, such as McNab and Scott in 2009, add that in an increasingly complex operational environment NLWs may reduce the level of violence (US) forces both incur and experience in IW operations.\textsuperscript{5} New NLW-concepts have also been claimed to be promising for military tasks due to their potentially broad applicability and the novelty of the technologies applied.\textsuperscript{6}

Such claims are disputed by sceptics, who stress the unreliability of NLWs on the basis of accounts of incidents in which the application of NLWs led to severe harm or even fatal injury to individuals. In most of the cases NLWs were mostly used by the police. Such views are reinforced by reports from human rights organisations on the abuse, or excessive use, of such devices by law enforcement agencies.\textsuperscript{7} In addition, legal objections have been raised against the military use of NLWs abroad, drawing from international humanitarian law and arms protocols.\textsuperscript{8}

A key question underlying this debate is whether existing and novel NLWs meet their promises under real world conditions. Where NLWs are claimed to help manage violence in the complexity of today’s operational environment, in reality this complexity may also backfire on NLW performance. Most analyses of NLWs, however, lack operational evidence of the military performance of NLWs and tend to rely on design-based assumptions of utility and outcome rather than on assessments from hard data. Some analysts, such as Rappert in 2003, have recognised this shortfall and argue that the outcome of NLW use in real operations depends on the circumstances of the specific situation in which the NLW is applied.\textsuperscript{9}

Against this background, this article seeks to assess NLWs under ‘real’ operational conditions. It investigates how and to what extent the context of an event with NLW use is responsible for the outcome of its application compared to its original purpose. It will be demonstrated that the effect of NLW use is a result not so much of its technological sophistication, but rather of contextual factors. The case used for the analysis is the conflict in Northern Ireland that emerged in the late 1960s, also known as the ‘Troubles’.

For the purpose this article, this case is an appropriate one, because of the following considerations:

- there are sufficient data and accounts on the use and effects of NLWs available to inform the analytic approach of a defence technology assessment;
- some ‘intermediary variables’ can be reduced, especially communication and cultural gaps between interventionist forces and the local society;
the long duration of the conflict and the experiences and lessons learned by the security forces throughout has driven innovations in technologies and methods of operations of the NLWs employed, which helps us to investigate to what extent technological advances may help overcome the influence of operational circumstances.

Thus, it can be argued that the analysis of NLW use in Northern Ireland is relevant for assessing contemporary intervention forces’ NLW use. Of the NLWs that have been used in Northern Ireland (CS or ‘teargas’, baton rounds, the water cannon, the baton (night stick), and the electric shield), I will focus on the two most prominent and frequently used ones: CS and the baton round (BR).\textsuperscript{10} An assessment of precisely these two NLWs is also meaningful from a wider perspective, as both types are currently employed by military and police forces across the entire world.\textsuperscript{11}

The next section shows an outline of the analytical framework, drawing upon the method of defence technology assessment (DTA). After a synopsis of the Troubles, this framework is applied to several episodes of the conflict in which NLWs have been used. The results of this analytic approach provide some lessons learned to inform the perspective of NLW use in current conflicts.

**A DTA approach to NLWs**

Technology assessment (TA) is a research analysis approach that seeks to evaluate innovative technological concepts within a contextual framework to provide a balanced judgement of their utility and political desirability. DTA is specifically designed for a systematic approach to new military concepts within the operational context, including human and procedural factors, in which the system is to be applied.\textsuperscript{12}

Within the domain of non-lethality, the significance of operational context in analysing NLWs has been emphasised by various analysts. Rappert explains that an account of technology relies on context as a way to understand its meaning.\textsuperscript{13} Feakin expands on Rappert’s views and seeks to capture the notion of context in a formula that defines effect as an outcome of the ‘ICE’ equation of non-lethality: $\text{Intent} + \text{Context} = \text{Effect}$. He argues that if an NLW is used with the correct intent and within an appropriate context, this will equal a desired ‘non-lethal’ effect.\textsuperscript{14} However, representing effectiveness as a simple addition understates the complexity involved in a range of factors that also influence the outcome. Even under ideal circumstances, including the user’s correctness of intent and an appropriate situational context for using a particular NLW, considerable uncertainty remains regarding the variability of targets’ attitudes and their available response options against its working principle.

The DTA model aims at capturing this complexity. Rather than an equation, the model aims at framing the essential elements that through their interaction shape the outcome of the operational use of an NLW. The framework consists of three components that are to be understood as complexes: the user, the weapon & technology, and
The term complex is an expression of the variety of factors of influence that can be attributed to each of the components that shape the process of obtaining a particular non-lethal effect. The user complex, for instance, includes training of personnel and doctrinal guidance, organisational deployment of the non-lethal capability, experience, attitude, and familiarity with the deployment environment. Every single situation where NLWs are used is defined by a particular context. Besides the fact that the situational context directly affects the outcome, it also influences each of the three components separately, as is shown in Figure 1. The following case studies on CS and baton rounds (BRs) are used in the investigation into how the contextual dependency of the three components and their interactions during operational use of the NLW are responsible for potential differences between what is required and expected from NLW deployment and what the actual outcome is under field conditions.

The security context of Northern Ireland

The conflict in Northern Ireland ensued from a growing resistance among the Catholic community against their political and social marginalisation within the ‘Province’. The protests were inspired by the civil rights movements that arose in the US during the 1960s. However, the Catholic minority’s call for reforms was perceived by the Unionist dominated government as a threat to the legitimate status of the state. The government’s view of the protests as being illegal led to intervention by force.

Catholic civil rights marches met heavy-handed responses from the predominantly Protestant Northern Irish police force, the Royal Ulster Constabulary (RUC). The civil unrest and violence that followed grew to such a level that it could not be contained by the RUC, and the Northern Irish government felt no longer capable of assuring security in the province. The British Army was deployed to intervene between the sectarian groups for the first time.

Figure 1. The NLW defence technology assessment model. The central box represents the framework to analyse and explain differences between expectations and the actual outcome of NLW employment.
time in 1969. Initially, the British regarded the political unrest and violence in the province as a local and ‘law and order’ problem, and the British Army was therefore deployed in a peacekeeping role.\textsuperscript{18}

The absence of any solid political strategy towards a stable province-wide end state created a political vacuum in which the British Army developed its own strategic approach with a focus on the ‘hearts and minds’ of the Nationalist community.\textsuperscript{19} The (Provisional) Irish Republican Army (PIRA) did not accept the military presence and aggressively countered the British Army to try to eventually push it out of the province. By 1972, the British Army’s initial ‘hearts and minds’ approach was totally destroyed.\textsuperscript{20} Rather than providing a short-term solution, militarisation inevitably became part of a long-term problem. As Dodd noted, there was no way for the British Army to leave the province in the absence of a political settlement of the conflict, as this would result in civil war.\textsuperscript{21} A Catch-22 situation had been created: abandoning the military approach—by withdrawing the British Army from the province—would unleash the potential anarchy of all-out inter-communal violence. Relying on the military solution alone would fuel extremist violence.\textsuperscript{22} To defuse the dilemma, the concept of police primacy was chosen. The British Army would maintain a supporting role to the RUC within a law and order framework. However, the effect on the ground was that the RUC was drawn into a conflict with the Catholic community, which generated further recruitment for the insurgency.\textsuperscript{23}

During more than three decades the British Army faced the challenge of applying a minimal force approach in an environment that had become increasingly hostile to its presence. It had to strike a delicate balance between force protection against serious and life-threatening attacks on the one hand, and maintaining public order during public manifestations and sectarian confrontations on the other. The complexity of the situation was further compounded by the blending of paramilitary, hostile elements, and the normal community.

A need for dedicated capabilities emerged to cope with a mixed non-cooperative environment at an early stage of the conflict. The British Army could initially rely only on riot control equipment it had already employed in former colonies, in particular CS, to control mass events like demonstrations and marches. Rubber bullets and BRs should deal with direct threats, as an alternative to the use of lethal force. In the next section the method of assessing the operational use of these NLWs is outlined.

**CS**

**CS weapon/technology**

CS, commonly referred to as teargas, is an irritant chemical agent which was first synthesised in 1928. Although it is often presented as being a gas, in its basic form it is a crystalline solid. When used in devices designed for military or police purposes, such as cartridges or grenades, CS is mixed with a pyrotechnic substance and, on ignition, is expelled in the form of a vapour that immediately condenses to form minute liquid droplets or particles. Furthermore, in water or body fluids, CS rapidly
breaks down into far less active substances. Some types of CS are insoluble and can therefore remain active for several weeks and require decontamination of buildings, cloths, or other items. This is also critical due to the high flammability of CS.

CS can be used to disperse large gatherings, deny an area, or to incapacitate individuals temporarily. The physiological response of the human body to CS is irritation and inflammation of the skin, airways, and mucous membrane tissues. These effects worsen with increasing concentration and duration of exposure. The symptoms lessen after the exposure is removed, and gradually disappear after 30–60 minutes.

Medical analysis studies of CS exposure claim that the safety margin of inhaled CS for a person who is exposed to the agent in open air is very large. Under such conditions, CS is therefore considered not to cause any unacceptable health risks to people, including less healthy persons. However, more recent medical evidence indicates that already with relatively low concentrations medical risk groups may be seriously harmed. Other studies warn of health damage at higher levels of CS exposure, such as chemical burns to the skin, heightened blood pressure, and even heart failure. Individuals who are exposed to CS for an extended period of time and deprived of fresh air run a higher health risk, especially those with a weak physical condition. The bottom line claim is that, assuming CS is used by properly trained officers and exposed combatants leave the area rapidly, few, if any, significant long-term human disabling effects should occur.

The agent is typically delivered from a handheld launcher into an area at a range of dozens of metres away. Other techniques for CS release exist. In Aden in 1966 and 1967 the British Army dropped CS canisters from helicopters from altitudes of several hundreds of yards. A more recent application of CS is based on a handheld spray dispenser that fires a stream of irritant agent in solution, thus making it better directive against individual persons. In this way, the risk of harming bystanders is much smaller than is the case with area release of CS. However, medical experts and human rights groups are concerned about hazardous consequences of both the agent and the propellant, and their combination in particular.

**CS user**

In Northern Ireland CS was first used by the security forces in 1969. The aim was to disperse crowds not reacting to warnings, or to force the break-up of public disturbances. The agent could be delivered as hand-thrown grenades or as cartridges fired from a 1.5-inch signal pistol. This required only few additional basic skills, as practising with gas masks and hand grenades was part of regular military training. Given the limited capacity of a cartridge, forces had to deliver CS dispensers continuously to keep up effective concentration levels of the agent in the target zone. A platoon was usually issued with around 20 CS grenades, distributed over a quarter of the unit’s personnel.

During operations involving CS, the wearing of gas masks reduced communication among the forces, degraded vision, and was generally experienced...
as cumbersome. Eventually, the use of masks did not protect security forces against CS effects during its protracted use.

Instructions issued to the British Army forces in early August 1972 were that BRs were to be used in preference to CS. Some respondents have stated that the British Army was reluctant to use CS, as its effect was too indiscriminative. Occasionally security forces used CS in house searching operations, when looking for dangerous suspects, which obviously went against the general recommendation to employ CS in open air only.

**CS targets**

In Northern Ireland CS was normally used to control a crisis or a public disturbance in which large numbers of people were involved. Across such gatherings, individual’s intentions, responses, and levels of determination vis-à-vis the security forces varied widely. Bystanders and residents in the crisis zone often found themselves drawn into the disturbance.

The view the target group had of the security forces played a significant role during actual engagements. Ellison and Martin signal the shift from issue-motivated disturbances caused by the Catholic community towards activism directly aimed against the RUC:

> Complaints about discrimination quickly gave way to complaints about the RUC, and from the outset the response of the state and the forces of law and order to Catholic mobilization was an issue capable of arousing far more anger and activism than the issues around which mobilization had begun.

Determined members of targeted groups could develop methods to resist CS for extended time. Rioters covered their faces with handkerchiefs soaked in vinegar or lemon juice to mitigate the weapon’s effect. Improvised gasmasks were used whenever available to protect the eyes and to prevent respiratory discomfort. Hardened demonstrators could remove or return the gas canisters before these had released and dispersed the agent. Moreover, tolerance to CS could develop after prolonged or repeated exposure, allowing targets to stay in zones with high concentrations of CS.

**CS use-in-operational-context**

Evidence of how the operational context affects the impact of CS employment can be found in accounts of major cases of CS use in the cities of Londonderry and Belfast.

**Londonderry 1969**

The first and most significant use of CS ever in Northern Ireland took place in Londonderry, between 12 and 14 August 1969. In the preceding months the security forces, then still only the RUC, had frequently clashed with local Nationalists during their protests against the Northern Ireland Government and its agents. The event in mid-August, commonly referred to as the Battle of the
Bogside, and named after the Catholic residential area that was the centre of the confrontation, was triggered off by sectarian rioting arising from an Orange Order march close to the Bogside area. Acute tension grew after the authorities had refused to veto the march. After defenders in the Bogside had started to stone the marchers, the situation escalated into a battle between the Nationalists and the RUC that lasted for more than two days. The RUC aimed at entering the Bogside in order to seal off the march route and stop the stone barrage. Nationalists fiercely defended and barricaded the area against the security forces. As the RUC lacked the manpower to force through, it started to use CS.

The RUC received its first instruction on the use of CS just 50 minutes before the agent was actually used in the Bogside area. The introduction of CS did not help the RUC to get the situation under control. Some defenders had taken up positions on the top floors of the high-rise flats in the Bogside district, out of range of the CS. They could continuously throw stones and petrol bombs on the police forces. During the siege that followed, the RUC used CS in large quantities to counter rioters on the barricades, who engaged them with stones and other missiles.

CS hand grenades were used in the massive charges to force a breakthrough. As the RUC lacked the manpower to hold any ground gained, the stalemate with the Catholic defenders continued. This defined the context of the confrontation as a siege of the Bogside, and, in the absence of any alternative force options to the security forces, ensued in a protracted release of CS. Over 36 hours, over 1,000 CS canisters were fired inside the densely populated Bogside residential area. The situational context was further marked by the compact layout of the Bogside and the almost windless, extremely warm, and humid weather conditions. This resulted in a permanent CS ‘cloud’ over the Bogside, a condition very different from the ‘standard’ effect of CS, namely the quick dispersal of a target crowd.

These conditions stretched the target context far beyond the physical scene of the rioters in battle with the security forces. Even before CS was deployed, the profile of the resistance from the Bogside community against the RUC had started to broaden as police charges turned out to be a joint operation of the RUC and Loyalist militants, the latter being the sectarian opponents of the Nationalists. This perceived partiality of the RUC to wider parts of the Bogside community had dramatically changed its attitude towards the security forces in their role for the Northern Irish political authority. The massive and indiscriminate use of CS against rioters affected the Bogside community as a whole as it particularly hit children and elderly and weaker people in their homes. The effect was worse due to the weak health situation of the residents caused by the unfavourable climatic conditions in Northern Ireland, poverty and bad housing, together resulting in chronic respiratory illnesses. Some accounts from the Bogside speak of CS fired directly into houses. Raymond McClean, a medical doctor from Londonderry who treated the injuries during the battle, noted that the sheer amount of released agent and resulting concentration levels caused many citizens from the Bogside to suffer, hundreds of them so badly that they needed medical assistance. The excessive use of CS actually transformed the target context from a relatively small group of rioters and fighters into a much
wider mobilised community. McClean describes how women handed out water and vinegar from their homes to passers-by to help them protect themselves against CS, while others went out to collect money to buy petrol for petrol bombs.52

Determined fighters were able to withstand the effect of CS. During the battle one of their leaders, Bernadette Devlin, kept telling people ‘it’s OK, once you get taste of it’.53 A news pamphlet, the Barricade Bulletin, provided instructions on how to throw petrol bombs to best effect and minimise the effects of CS.54 To the defenders, the battle was one for survival which prompted the use of the strongest force available to them. How essential the role of the target context was to denying the incapacitating effect of CS is illustrated by an anecdote taken from a report of the British Society for Social Responsibility in Science:

Himsworth has even described Highland soldiers being tempted by a 5 £ note and a bottle of whisky to pass through a concentrated cloud of smoke and being unable to do so. Perhaps this shows the difference between financial motivation and fighting for a real cause or perhaps it shows the difference between laboratory and operational conditions.55

Tragically, it was precisely this motivation and resilience of the defenders that increased the harm done to innocent and helpless residents in the Bogside area. CS had merely served as the catalyst of a protracted and exhaustive battle, only to extend the target context far beyond the original local resistance of youngster. The Battle of the Bogside thus became the climax of a gradual escalation of tension and violence in and around Londonderry that had been building up since the early 1969. McLean’s comments:

An entire community had been at war with what was supposed to have been their own police force, a community determined and united, a community used to economic depression, emigration and hopelessness—now on its feet and with a spring in its step.56

During the siege the RUC was worn down by fatigue and had suffered so many casualties that it finally lost the battle. The Nationalists kept full control over the Bogside. The British Army was requested by Northern Ireland’s prime minister to prevent further escalation. Neither the Stormont government nor the RUC were in complete control any longer. The battle had caused hundreds of wounded RUC-members and over 1,000 injuries were claimed among the residents, many due to CS. The large amount of CS released by the RUC gave rise to an official enquiry into the medical aspects of the use of CS.57 In conjunction with the report, the Home Office stated that the RUC was not properly instructed beforehand in the use of such massive quantities of CS.58 The second part of the Himsworth report included a new Army Directive on the use of CS in closed spaces, issued in December 1969.59

The Battle of the Bogside had turned the image of the agent from a crowd dispersal technique into one of indiscriminate repression. This became evident just some weeks later, when serious rioting had erupted again in the Bogside area. The British Army, now in charge of controlling Londonderry, had fired large amounts of CS canisters to stop the disturbances. A militant group within the Bogside responded by threatening that, unless the British Army ceased the use of
CS, the group would retaliate with explosives. The British Army decided to give in. CS had become a tripwire for opposing militant groups to escalate towards lethal levels of violence. In this way, the perceived abuse of CS had contributed to widening the gap between sectarian communities themselves and between the Nationalist community and the security forces. The establishment of a ‘no-go’ area as a result of the battle provided a sanctuary from where the militant elements of the PIRA could prepare and launch armed attacks against the British Army. The implications of the creation of this stronghold became evident in the years to come, including the tragic events of Bloody Sunday. The Report on the Bloody Sunday Enquiry of 2010 underlined the significance of the alienation between the Nationalist community and the security forces, with the latter only being able to enter the Bogside with large numbers of soldiers.

Belfast/Ballymurphy 1970

On 30 March 1970 a second event involving massive CS use took place in Ballymurphy, a Catholic estate in Belfast. Again, violence was triggered by a Protestant march that would pass close to a Catholic residential area. The British Army was tasked to keep Catholics and Protestants separated.

The rioting that evolved was thought to have been inspired or organised by the Provisional IRA in a deliberate attempt to disrupt relations between the British Army and civilians. In fact, the British Army had begun to look upon the Catholic community, which it was expected to protect, as the ‘problematic population’ at a very early stage. This defined the context of its deployment and it subsequently operated in line with this highly ‘political’ view of the situation.

From a user context perspective, the British Army, facing an overwhelming numerical superiority of crowds opposing each other at Ballymurphy, was denied to follow the doctrine of minimum force, as such an approach hinges on the presence of relatively large troop numbers. In the absence of any alternative to control the riots, the high stress conditions under which the force had to keep the two sides apart led it to use CS in large quantities.

Despite its bias against the Catholics resulting from the context of the situation, the British Army still believed that it was using CS in an impartial manner in order to keep Protestant marchers and Catholic opponents apart. In reality the two sides were exposed asymmetrically: the Protestants were ‘out on the streets’, whereas the Catholics were ‘at home’. Moreover, in the target context, the Scots-Protestant identity of the British Army unit deployed was a critical factor, as they were perceived by the Catholics as sympathising with the local co-religionists. These contextual asymmetries together were essential in the context of the confrontation, as they dramatically degraded the intended effect of CS use to mitigate the violence. What had started as a conflict between the British Army and Catholic youth, over use of CS also antagonised senior sections of the population.

The rioting and use of CS continued for four days, during which the British Army was exposed as a destructive, and not constructive, force. Some commentators
saw the outcome as a strategic disaster, as it radicalised the Catholic community that thus became alienated from the British Army. To the Catholics, the British Army had transformed from being their defender and ally into becoming their enemy.66

**The aftermath of CS deployment**

The experiences with CS in urban areas in Northern Ireland demonstrated that physical and environmental conditions complicated the control and predictability of the agent’s effect. The dynamics of confrontations between security forces and target populations further reduced the selective applicability of CS. At the physical level, simple countermeasures and increasing tolerance to the agent considerably reduced the intended effect of CS against determined target individuals.67 Peaceful residents suffered the worst effects, in particular under the protracted and intensified release of CS by security forces.

From the outset of their deployment in Northern Ireland, British Army officers had been aware and morally concerned about the counterproductive effects of CS on popular support for the British Army’s presence. Yet, management of public disturbances and aggressive riots would have been almost impossible without the use of CS, as the identification of targets in order to single them out was often problematic. CS was to be used as a last resort, after BRs had been used first. Yet, once resistance from the crowd had become too strong, the employment of CS was inevitable.68 The security forces also felt the pressure to act decisively, preventively, and effectively, to uphold the state’s political credibility.69 Violent disturbances had to be contained by the security forces with maximum effort, even when the effect was indiscriminate. Londonderry and Ballymurphy show that CS as an area denial NLW could not counterbalance undersized security forces without seriously antagonising broader parts of the population.

Northern Ireland has demonstrated that within the context of a charged political environment and in absence of an agreed political end state, the repetitive and indiscriminate use of CS merely galvanised resistance, triggered escalation of violence, encouraged recruitment of more insurgents, and contributed to the loss of hearts and minds among the population. Media and civil rights groups’ accounts of the impact of CS use reinforced these effects, thereby politicising the confrontation between the BA and Nationalists at the national and international level.

Other modes of CS use were practised, and on at least one occasion the agent was claimed to be successfully deployed against target subjects in a confined space. In 1972, in the Long Kesh internment centre, IRA prisoners who had taken control over their barracks were driven out by British Army personnel throwing CS grenades inside. No casualties or lasting injuries were claimed to have occurred among the IRA members.70 The rules for CS were tightened and after the mid 1970s it was rarely used.71 As an area denial NLW CS was last used in Northern Ireland in 1974.72 Notwithstanding the early negative experiences in Northern Ireland, CS made a comeback in the UK as a spraying device against individual close-in targets. Safety and health concerns persist.
**Baton rounds (BRs)**

**BR weapon/technology**

Baton rounds (BRs), also called ‘plastic bullets’, are blunt impact weapons launched against individuals. BRs are cylindrically shaped, have diameters between 30 and 40 mm, are between 10 and 15 cm long, and have a rounded impact face. The purpose of the BR is to induce pain, irritation, and minimal injury, in order to dissuade or prevent a violent or potentially violent person from pursuing the intended course of action. The physiological effect is directly related to the anatomical location where the projectile strikes the subject. The intended effect on the target individual resembles the punch of a boxer. Ideally, the BR strikes the abdomen, while hits on the extremities, in particular the legs, are also effective.

The projectile’s velocity and ballistic stability are key factors for aiming accuracy. Launching velocities are around 80 m/s. Ballistic stability can be enhanced with spin-stabilisation of the projectile. Required accuracy on the target is usually defined as a probability that the projectile strikes in an area of 20 cm wide and 60 cm high. In 2004, a report of a UK programme for an improved BR set this probability at 85% for a minimum distance of 25 metres, and desirably up to 40 metres. Desirable accuracy on a target should be 20 cm wide and only 40 cm high, with the aiming centre on the abdominal part of the body.

BRs were introduced in Northern Ireland in the mid 1970s. Until then rubber bullets were deployed, with lower ballistic accuracy standards. A medical report on injuries caused by rubber bullets states that due to firing the round from a CS canister launcher, the tumbling of the projectile in flight, and poor aerodynamic shape it was difficult to hit at 18 metres a target with a 2 metre diameter. Early versions of the BR deployed in Northern Ireland also had low performance standards, which were gradually raised through successive improved designs.

The delivery system for BRs is usually a handheld baton gun. From the 1980s on, innovations of the launching device added to increased technical performance and reliability. Currently the launching device includes a mounted sighting system for accurate aiming.

BRs have limited potential for performance growth. Effectiveness at ranges above 50 metres is poor. Kinetic energy drops significantly at longer ranges, at 25 metres to about 75% of the level at a range of 10 metres. At longer engagement ranges, the flight trajectory of the round is more curved, reducing aiming accuracy. Shorter firing ranges enhance accuracy, but deliver a heavier impact on the target, thereby increasing the injury potential.

**BR user**

Handling a BR-gun requires dedicated skills, drills, and procedures in order to ensure the officer or soldier acquires proficiency with the baton gun under real situation conditions to achieve the desired physical effect on the target. The BR capability is complementary to other functions within a police or military unit.
Security forces in Northern Ireland equipped with rubber bullets and BRs were subject to specific guidelines on their use. These guidelines were based on the principle of minimum and reasonable force, both for the RUC and the British Army, and put restrictions on the use of the projectiles. Rules have been adjusted over time, partly as a result of operational experiences, ensuing policy changes, and technological advances in weapon design. A central issue was the minimum permissible targeting range. Former officers explained that during their deployment to Northern Ireland in the early 1970s a minimum firing range of 20 metres had to be observed. Firing at distances as near as 10–15 metres was only allowed for self-defence against very aggressive individuals. While rubber bullets should be aimed at the ground in front of targets to strike after ricochet, BRs should be fired directly at the target. The British Army started to replace the rubber bullet in 1974/1975 and the RUC from 1978 on.

The 1980 Yellow Card instructions for BA personnel specified the RoEs for BRs:

General
- BRs may be used to disperse a crowd whenever it is judged to be the minimum and reasonable force in the circumstances
- The rounds must be fired at selected persons and not indiscriminately at the crowd. They should be aimed so that they strike the lower part of the target’s body directly (i.e. without bouncing)
- The authority to use these rounds is delegated to the commander on the spot.

Additional rules for the 25 grain PVC BR
- Rounds must not be fired at a range of less than 20 metres except when the safety of soldiers or others is seriously threatened.
- The BR was designed and produced to disperse crowds. It can also be used to prevent an escape from HM Prisons if it is, in the circumstances, still considered to constitute the use of minimum and reasonable force.

BRs hitting target individuals within 20 metres can cause serious or even fatal injury. The option to employ BRs at close range actually provided for a dual use role, namely a non-lethal and (less) lethal one.

In 1995, revised guidelines for the RUC on how to use BRs were largely similar to the above rules, but also gave more precise instructions regarding discipline in handling the BR-gun and the proportionality of the amount of force to be used. Any (first) use of BRs should be preceded by a verbal warning. BRs should not be fired without the express order of the group leader, and in circumstances where such authorisation was not practical, individual riot gunners could use their own initiative and judge if and how to act. The rules also specified that while persons firing BRs should preferably be dismounted from vehicles, firing from inside (stationary) vehicles would be permissible when circumstances justified such action. The revised instruction also included the provision to employ a medium range BR to attain ranges of up to 50 metres to engage riotous mobs. Finally, every discharge of a BR had to be reported to supervising command levels.
Although the guidelines were more specific, they gave leeway for various interpretations. Leaving the judgement of the severity of a situation to the gunner, the risk of inappropriate or disproportionate use increased. In addition, the use of BRs to control riotous mobs at extended ranges could well be at odds with the rule that BRs should not be aimed indiscriminately at a crowd.

In the mid 1990s British Army guidelines for BR use were more stringent than those of the RUC. British Army gunners could not fire BRs unless ordered to do so by a sergeant or higher-ranking officer. Another difference was that the British Army instructions prescribed that the medium range BR (45 grains) for ranges of up to 50 metres was neither to be fired at ranges of less than 35 metres, nor in circumstances in which persons between the firer and the target were within 5.5 meters of either side of the line of fire. The RUC instruction merely cautioned for the influence of wind conditions on the BR at extreme ranges. Thus, an RUC officer and a British soldier patrolling jointly in the streets of a Northern Ireland town would actually operate under different sets of rules.

Almost a decade later, police regulations were made more stringent as BR release needed authorisation from the unit’s commander. Furthermore, an accountability procedure through the Police Ombudsman was introduced. For British Army personnel such a procedure does not exist.

The above reflects that in Northern Ireland the police as well as the military as users of BRs were bound by—mutually different—and increasingly tightened rules. In practice, the capability of a police officer to assess risk in real situations depended on his confidence and resilience, which in turn depended on his training and personal equipment. The absence of language barriers in Northern Ireland between user and target reduced the pressure on police officers and soldiers to become overly reactive to perceived threats.

**BR targets**

The reaction of a person struck by a BR depends on a range of factors, including the impact energy, the area of the body struck, and the individual’s determination. Responses may vary more widely when individuals are under the influence of alcohol, drugs, or suffer from mental disorder.

The intended effect of the BR on an aggressor is to stop his violent actions. Non-compliant and very motivated aggressive individuals may be capable of continuing their initial behaviour and use different ways to counter the BR effect. In Northern Ireland, tactics were used to evade BR strikes such as keeping exposure time to a minimum, using improvised weapons, and taking cover immediately after the strike, either behind barricades (which were often present in conflict scenes), or simply by moving quickly out of the engagement range of the BRs, or hiding in a crowd. BR effectiveness was also reduced by wearing protective gear. Motorcycle helmets were often used, as well as chin caps, improvised shields, and thick clothing.

The use of the BR in a situation of public disorder could have a profound effect on crowd dynamics. There was a potential risk that crowds would turn
riotous and become more aggressive in response to perceived unnecessary or excessive use of violence by security forces. The fact that occasionally target individuals take multiple hits indicates that a single hit has a certain probability to be insufficiently effective, or that the operator could not or did not assess the impact result of the first shot. The latter was also noted in accounts of police officers on BR firing incidents.

**BR use-in-operational-context**

Next the role of the operational context on the outcome of BR use both through addressing general contextual issues as well as through looking into a specific major case of BR employment in Londonderry will be examined.

In the mid 1970s, when BRs were introduced in Northern Ireland, medical evidence on injuries caused by rubber bullets highlighted the high number of casualties due to striking prohibited vulnerable parts of the body. This was a result of unreliable technical performance, poor accuracy of the round, and wrongful aiming. Hence, at an early stage of the Troubles, the BR had inherited the dubious reputation of causing fatalities and severe injuries from its predecessor, the rubber bullet. As a result, the use of BRs by security forces against civilians was generally perceived by the public as a symbol of heavy force. From the user’s perspective, however, the introduction of the BR was received more positively. Rosenhead wrote:

A liberal regime in an advanced Western country has to impose strict limitations on the brutalities it inflicts on citizens. So, the rubber bullets and after it the plastic bullet were developed specifically for use within the United Kingdom.

The relatively ‘benign’ view of BRs on the part of the security forces, and the British Army in particular, could be understood within a historical context and was reinforced by the media. A former British Army officer explained:

the press turned out to be enthusiastic about the baton round, as it was a weapon that was used selectively. During the operations in Aden the press had been very supportive. The reason was that the population there was seen as ‘other people’. This created a feedback loop that encouraged the Army to proceed along the same (sometimes lethal) line.

The label ‘other people’ could well fit Northern Irish Nationalists, too, given the democratically and economically inferior position of the Catholic population within Northern Ireland’s political and societal landscape. The decision in the UK to field BRs exclusively in Northern Ireland merely confirmed their self-image of being ‘different’. From the onset of its deployment, the BR was seen by the Nationalists as a weapon of sectarian discrimination rather than a discriminative NLW.

In operational circumstances it was often difficult to determine whether the discharge of BRs by security forces served to prevent an individual from continuing unlawful or aggressive action or to protect the security forces against serious or life-threatening harm. Since militant elements intermingled with crowds during riots with the intent to engage security forces from concealed
positions, BRs were used to maintain a safe distance from crowds, rioters, and possible militants armed with improvised projectiles and other—lethal—missiles, such as stones, petrol bombs, and guns.93

From accounts from British Army officers who served in Northern Ireland during the early 1970s, it appears that in reality BRs were often discharged from fairly close range to the target individual. Although a minimum range of 20 metres should be respected, above that range the use became very inaccurate and the rounds lost too much kinetic energy to be effective. Furthermore, the BR should always be aimed low. Rioters were quite aware of these rules and would, therefore, not be deterred much by their use. For self-defence, ranges were down to 10 metres or less.94 Whether engaging targets at such short ranges was justified was often obscured by the ‘fog of war’, a phenomenon in warfare that may apply to the turbulence and chaos of riotous clashes as well.

The ability of security forces to understand the intent of a mobilised crowd or mob was a critical factor in the operational context of BR use. Young rioters could confront the British Army in a sort of ritual, usually happening on Saturday evenings and often fuelled by their use of alcohol. Clashes could also arise from boredom; having a fight was a kind of entertainment.95 Security forces hence needed to differentiate between riotous recreation and seriously motivated disturbances. Such contextual intelligence was indispensable for a measured response aimed at control and de-escalation of violence. Overall, officers and soldiers of the British Army forces were not eager to engage members of the Northern Irish population with NLWs, as they considered this primarily a police task.96

BRs have inflicted serious injury in hundreds of instances and also fatalities in 17 cases. The majority of these incidents occurred well before the 1990s. Reviews of these cases point out that engagement ranges were mostly less than 20 metres, targets killed were often children and women who were not taking part in a riot. The fact that those killed were hit from close range in the head or upper body may indicate that the incorrect aiming was intentional.97 Civil rights organisations have repeatedly claimed that BRs were used to cause serious harm to relatively innocent civilians, implying the indiscriminate use of a discriminate weapon. The question was publicly raised whether these were undisciplined responses of individual soldiers and policemen in circumstances of increasing stress caused by the recent IRA campaign, or whether such incidents were tacitly accepted by the authorities. The authorities’ response to civilian complaints strongly supported the second interpretation.98 In circumstances where undisciplined use of BRs was left unsanctioned, the threshold to wrongful use was implicitly lowered. In addition, contextual issues affecting the security forces, such as stressful experiences during deployment including lethal attacks by insurgents, moral fatigue, and political bias, may be responsible for the wrongful use of BRs.

After the Hunger Strikes in 1981 violence in Northern Ireland diminished, and so did, at least in general terms, the use of BRs. To the Nationalist community in Northern Ireland, the BR had become a symbol of repression, when any political perspective to improve its inferior position in the Province was
lacking. Some 15 years later, a major resurgence of BR use occurred in Londonderry, which will be discussed next.

**Londonderry 1996**

In July 1996, a major public disturbance arose after a decision by the RUC to let an Orange Order march through Garvaghy Road, a Catholic residential area. This sparked outbreaks of violence all over Northern Ireland. In Londonderry, the confrontation between the Nationalists and the security forces escalated into a massive use of BRs, which went on from 11 till 14 July.

According to witness statements taken and reported by human rights watch organisations in Northern Ireland, over 5,000 BRs were fired by the RUC and the British Army, to which Nationalist activists responded with petrol bombs, stones, and bottles. Many of the rounds were reported to have been fired in barrages and volleys, not aimed at the lower body parts of selected targets, but mostly indiscriminately against crowds, including people not engaged in the disturbances. BRs continued to be used even against demonstrators kneeling down and covering their heads for protection.

In one incident, after the closing of pubs in the city centre around midnight on 11 July, young people emerging from clubs and pubs were met by a hail of BRs from the RUC aimed at anyone who tried to leave the area. This resulted in a high level of injuries, partly due to the very close firing range. This pattern was reported to have been repeated in the following days. Over 300 residents of Derry injured by BRs needed medical care at the hospital. Medical analysis pointed out that a considerable number of them were hit in the chest or higher.

In 1997, batches of BRs, which had been in use with the RUC and the British Army since 1994, were withdrawn after a defect was discovered. Almost 9,000 of these bullets had been fired by the RUC and British Army since 1994, the majority in Londonderry in July 1996. It had already been discovered in 1995 that a significant number of these BRs had muzzle velocities in excess of the upper limit in the equipment specifications. Hence the faulty rounds might also explain the high number of injuries from BRs.

The Pat Finucane Centre, a human rights organisation based in Londonderry, stressed the RUC’s historical links to Unionism and Orangism. The highly charged situation before and during the Orange Order march created an operational context of sharp polarisation between the RUC, supported by the British Army, and the Nationalist community. This might to a large extent explain the escalation in the use of BRs below the minimum engagement range of 20 metres in situations claimed to be of no immediate threat to the safety of the security forces.

The records of the events in Derry imply that on a number of occasions the security forces, in particular the RUC, have not followed the guidelines for the use of BRs. Accounts from the security forces on what was going on in Londonderry differed widely from those of witnesses in the streets. On 11 July RUC Superintendent Keatley declared on behalf of the Chief Constable:
(Plastic bullets . . .) are used in accordance with the principle of the minimum and reasonable amount of force necessary to the protection of life and property, the preservation of the peace and the prevention of crime,

whereas the Londonderry Sentinel of 17 July wrote:

Soon the air was filled with the fumes of burning petrol and the machine-gun like sound of plastic bullet gun being fired almost incessantly.105

These two statements reflect the widely different perceptions of what happened on the ground. The explanation can be found in the respective contexts of user and target. The RUC statement suggests consistency with a situation legitimising BR use for self-defence against life-threatening aggression, whereas from an independent observer’s point of view BRs were fired at an excessive rate with regard to crowd control and even with regard to self-defence.

The outcome of the Londonderry event was that severe damage had been done to the fragile peace process, which had already been underway for a few years. ‘The peace process is in absolute ruins’ said Gerry Adams.106 As a result of these events, the civil rights movement in Northern Ireland called for a ban on BRs and recommended that the RUC be disbanded and replaced by a police service that would be acceptable to all traditions within the North of Ireland.107

After the Good Friday Agreement 1998

The Good Friday Agreement marked the end to the counterinsurgency and set the conditions for true democratic governance, recognising the rights of the Catholics. In this new political context BRs continued to play their part in maintaining public order in Northern Ireland. Despite technological improvements and tight regulations on their employment, serious injury through BR use still occurred. The new L21A1 BR which had been issued to the British Army and the RUC in June 2001 was expected to be more accurate and thus reduce the incidence of life-threatening injuries and of unintended hits.108 The actual results showed otherwise, according to a report on 29 cases of BR injuries, of which seven required admission to hospital.109

From accounts on the results of BR discharges, it appears that, despite the increased technical precision of BR systems, considerable numbers of rounds miss their target. One report on RUC police officers with records of 122 firings of BRs between 1997 and 2000 states that only 48 people had been registered as having been hit. The report also notes that the vast majority of these firings took place in twilight or darkness.110 It provides evidence that BRs missing their target pose a considerable risk of uncontrolled hits against unintended targets. The operational context compromises aiming reliability as a result of the dynamic behaviour of target individuals and diminished visibility. Furthermore, aiming at the extremities of the body, in particular the legs, may have contributed to failure of striking, thus enhancing the risk of accidental hits due to ricochet.

A Police Ombudsman study into the use of BRs in 24 events, mainly in Belfast in 2001 and 2002, concludes that in all incidents the authorisation to use the BR and
their subsequent discharge was justified, proportionate, and without any misconduct. Half of the BRs fired were aimed at petrol bombers. Yet, although the discharge records indicate that 69% of the hits struck the legs or feet of individuals, half of the remaining 31% hit the buttock or groin. This implies that potentially 15% of hits involved considerable risk of permanent harm. Most rounds were fired from between 20 and 35 metres to the target, with a considerable number of the discharges during evening hours. This may explain why 29% of the rounds missed their target, implying a risk of unintentional hits.111

Conclusions
This article has assessed the employment of CS and BRs under ‘real’ operational conditions during the ‘Troubles’ in Northern Ireland. The application of the DTA framework to this case was aimed at analysing and laying out the NLW-effects in terms of the framework’s three defining components and their interactions in an operational context. The results are presented here for CS and BRs, respectively.

CS
From the field events examined it becomes evident that the CS weapon & technology basically produced the immediate physiological effect of discomfort on individuals. However, the level of the effect varies considerably, partly because of the large variety of the agent’s concentration in the deployment area. The limited control of the spatial distribution of CS caused collateral effects against unintended targets. No technological concept has been developed to avoid or reduce this collateral effect of CS release against crowds.

The user–weapon & technology interaction was dominated by two mechanisms, namely the protracted use of CS over a course of several days and the increasing intensity of its release to excessive levels, including the use of CS in closed spaces. This tendency of security forces to ignore the guidelines on CS use can to a large extent be considered as a desperate and forcing attempt to accomplish their mission, after the initial constrained use of CS didn’t achieve the desired outcome. The conduct of operations with CS beyond the rules of engagement can partly be ascribed to a lack of training, at least in the Bogside case. CS employment turned out to be progressively ineffective for the purpose it was meant to serve.

In the target–weapon & technology interaction several paths can be distinguished. The first and most direct exchange resided with the active target groups, who quickly developed technical and tactical countermeasures to neutralise the CS effect. These countermeasures were steadily improved and proliferated as targets became more experienced and familiar with CS exposure. Moreover, over time resisting target persons tended to become physically less sensitive to the irritating effect, and their motivation contributed to this immunity. In contrast, secondary target groups, who were unintentionally exposed to the collateral effect of CS were generally unprepared for the exposure
and among them this created considerable health problems, in particular for those with a fragile physical condition. These problems worsened under prolonged exposure. Hence an increasing divergence grew between the two target groups with respect to the harming effect of CS. At the same time, a section of the second group indirectly joined the active target group by providing the activists with improvised logistical and medical support.

The user–target interaction during the process of CS employment is marked by a considerable shift in the mutual perceptions and attitudes of target populations and security forces. From the onset of CS use, the Nationalists target group’s perception of the security forces, initially only the RUC, was one of partiality. Any use of force, including CS, was received as an act of repression rather than public order management. The image of partiality had been reinforced by the target group’s experiences with the user’s attitude and performance during disturbances and clashes that had taken place well ahead of the first use of CS. Furthermore, the composition of the security forces in terms of sectarian representation was too much off balance to be viewed as neutral by the target population. This aspect was also a significant factor of influence with the deployment of British Army units in some cases, as the Ballymurphy case demonstrated. The security forces’ attitude towards the target population was biased as well. Provocations by target groups could well be taken by the security forces as motivated by sectarian preoccupation, which in turn might have triggered robust responses, such as excessive use of CS. This mechanism was less prominent with the British Army, which started from a more credible neutral position. However, their employment of CS soon contributed to the alienation process with the target populations as well. Overall, the deployment of CS had galvanised resistance against the user by the target population not only at the tactical/physical level, but also at the political level as it mobilised a broader section of the Nationalist community for its cause. The general political context of the Troubles, in which the target population perceived the user as an agent of a repressive regime, lifted the interaction between the two sides to a level that made the non-lethal nature of CS almost irrelevant. This was an important reason for abandoning its employment at an early stage of the conflict.

**BRs**

Regarding the BR *weapon & technology* system, innovation efforts have been undertaken on a continuous basis throughout the Troubles and afterwards. This has brought higher ballistic accuracy of the BR at longer range and better safety control of its physiological impact on the target individual, thus reducing the risk of severe casualties. Nevertheless, BRs have inflicted many hundreds of severe injuries and also 17 fatalities, the majority during the first two decades of the conflict. BRs have limited potential for further technological performance growth.

Unlike CS, for the BR the *user–weapon & technology* interaction is much more critical to its appropriate employment. The operator’s skills, training,
self-confidence, and mental attitude during real deployments are pre-conditional for achieving the required physical effect on the target individual. Furthermore, the instructions on when and how to use BRs during the conflict provided for a control mechanism to the security forces, and were progressively tightened over time. Yet, security forces still faced the challenge of dealing with situations which called for the weapon to be fired at extensive ranges without compromising the rule prohibiting the indiscriminate use of the weapon. A similar challenge occurred at sub-safe range use of the weapon, which was only permitted in situations that posed an immediate threat to life. This introduced some ambiguity in the interpretation of instructions, as well as in assigning responsibility for authorising the use of BRs. In the major case considered, the rules could not prevent the user force from demonstrating a disregard of discipline and an inclination to punishment leading to the excessive and indiscriminate use of BRs at prohibited firing ranges.

Central to the target–weapon & technology interaction is the dependence of the physical effect on the area of the body where the BR strikes. Given the fact that the intent of the BR is to cause considerable pain with acceptable minor injuries, it is obvious that a target’s dimensions as well as its dynamic behaviour represent considerable variations as regards the severity of the effect received. This can hardly be influenced by the technological sophistication of the BR. At the same time, targets have successfully used body protection gear as countermeasures to deny the BR effect. Furthermore, tactical methods, such as short exposure time to limit engagement opportunity to security forces, have been used. An implication of these countermeasures was that the behaviour of resisting target groups put at harm innocent bystanders, who unwillingly became part of a dynamic and often chaotic scene, and at least a considerable number of them were hit unintentionally.

The user–target interaction reflects to a large extent the same mechanisms that are at work in operations involving CS. The atmosphere during the cases considered was much shaped by the preceding history and specific events. In a highly charged confrontation, the escalation of animosity and violence triggered the massive and inappropriate employment of BRs almost as a surrogate for an area denial NLW. Against the background of an ongoing CI against the user, public disobedience of target groups had the potential to lower the user’s threshold to engage the target disproportionately. A relatively strong weapon such as the BR lent itself to that purpose. After the Good Friday Agreement, the significance of the user–target interaction was sharply reduced. Higher accountability standards imposed on the user, in combination with much improved political incentives for the target population to disengage, have significantly contributed to the sharp decline in BR use and the number of injuries caused.

**Synopsis and outlook for NLW assessment**

The above findings demonstrate that the utility of the NLWs examined within the Northern Ireland case was to a large extent defined by contextual factors in the operational theatre of deployment. In particular it has been shown that the
relationship and interaction between the user and the target play a dominant role in the outcome of NLW use for mission accomplishment. The analysis also revealed that technological innovation of the NLW is much less relevant for the outcome than was intended and expected. It is therefore plausible that even with current technology standards BRs would not have made much difference to the course of events during the Troubles as discussed here.

The assessment also reveals that the duration of the conflict and the consequent repetitive use of the two types of NLWs rendered them increasingly ineffective over time. Rather than performing as instruments to manage public order and de-escalate violence, the tendency of security forces to compensate for effect degradation by using them at an excessive rate actually transformed both NLWs into symbols of political repression for the target population and even large parts of the international community. NLWs thus became entirely counterproductive to the stabilisation missions they were supposed to support.

Notwithstanding the above assessment results and in the absence of any alternatives for the security forces, the NLWs employed were indispensable in controlling and restoring public order without having to use lethal force, in particular for self-protection. This got increasing weight after Bloody Sunday. The long absence of a true political strategy to redress the political and societal balance in Northern Ireland has in the long run severely handicapped any use of (non-lethal) force in Northern Ireland.

Looking at contemporary stabilisation operations, the ex post DTA of NLW use in Northern Ireland can be taken to reflect to what extent NLWs may help manage stability in the complexity of irregular conflict environments, such as those in Iraq and Afghanistan. Rather than drawing on design-based assumptions of novel NLWs, a thorough assessment of their utility requires to take into account the contextual issues as addressed in this article. The use of empirical military data from the envisioned theatre of deployment is indispensable for that purpose, and could well be fitted into an ex ante DTA of NLWs.

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Notes
1. Lorenz, ‘“Less-Lethal” Force in Operation United Shield’, 69.
2. NATO, NATO Policy on Non-Lethal Weapons, 1. This article deals with anti-personnel devices only.
7. Amnesty International, United States of America: Excessive and Lethal Force?
10. CS is named after the scientists Ben Corson and Roger Stoughton who synthesised the agent in 1928.
17. Ibid.
19. *Nationalist* refers to the section of the (Catholic) people of Northern Ireland that views itself primarily as part of the population of Ireland as a whole. *Republicans* are Catholics who wish to see Northern Ireland united with the Republic of Ireland.
31. Micky Barnes (major UK Army, retired), interview by the author, 16 December 2008.
34. Dunstan, *The British Army in Northern Ireland*, 50.
35. Mike Jelf (lieutenant colonel UK Army, retired), interview by the author, 13 April 2010.
36. Instructions were found in a pamphlet issued by the Committee on the Administration of Justice (CAJ), *Plastic Bullets and the Law*, 9.
37. Philip Schofield (lieutenant colonel UK Army, retired), interview by the author, 13 April 2010; Jelf, interview.
38. Jelf, interview.
42. Sidell, ‘Riot Control agents’, 311.
43. Museum of Free Derry, ‘History’.
44. McCann, *War and an Irish Town*, 59.
46. McClean, *The Road to Bloody Sunday*, 78.
49. Paul O’Connor (Pat Finucane Centre, Londonderry), private discussion with the author, 18 February 2010.
52. Ibid., 71.
53. McCann, *War and an Irish Town*, 60.
54. Museum of Free Derry, ‘History’.
63. Perkins, ‘Soldiers or Policemen?’, 9.
68. Schofield, interview.
69. Jelf, interview.
71. David Benest (colonel UK Army), interview by the author, 18 December 2008.
78. Schofield, interview; Jelf, interview.
82. The 45 grain charge dissipates almost the double amount of kinetic energy to the BR than the 25 grain charge. Bell, *The Use of Rubber and Plastic Bullets in Northern Ireland*, Appendix A.
83. McVerry, ‘RUC and Army Fire Guns to Different Guidelines’.
92. Tom Longland (brigadier UK Army, retired), interview by the author, 15 December 2008.
94. Schofield, interview; Jelf, interview; Longland, interview.
95. Barnes, interview; Schofield, interview.
96. Schofield, interview; Jelf, interview; Longland, interview.
97. Weir, ‘No Weapon which Deters Rioters is Free from Risk’, 83.
99. O’Connor, private discussion.
100. Pat Finucane Centre, *In the Line of Fire*, 16, 17.
101. Ibid., 17.
105. Quotes taken from Ibid., 14.
106. Ibid., 12.
107. Ibid., 29.

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