

THE XM25 INDIVIDUAL SEMI-AUTOMATIC AIRBURST WEAPON SYSTEM AND INTERNATIONAL LAW: LANDING ON THE WRONG PLANET?

JAMES D FRY*

I INTRODUCTION

Soldiers today typically are trained to take shelter behind walls or in trenches to protect themselves from enemy fire. This training may have to change with the introduction of the new high-tech XM25 Individual Semi-automatic Airburst Weapon System. The XM25, also known as the XM25 Counter Defilade Target Engagement System or the ‘Punisher’ by those who have used it on the battlefield,¹ fires high-explosive programmed 25 millimetre projectiles that explode when they reach a set distance.² The XM25 has been heralded as the weapon that possibly could end guerrilla warfare, as it essentially eliminates the ability of enemy soldiers to hide behind walls or in ditches.³ Numerous reports explain how the XM25 has performed ‘flawlessly’ in Afghanistan.⁴ Despite its ‘stellar’ reviews on the battlefield, one cannot help but be reminded of German rocketeer Wernher von Braun’s assessment of the V-2 rockets that landed on London in 1944, which he had helped develop, that ‘we hit the wrong planet’.⁵

* Assistant Professor of Law and Director of the LLM Programme, University of Hong Kong Faculty of Law. The author thanks Campos Cheng and Kelly Kuan Shang for their research assistance, as well as the participants of the International Committee of the Red Cross’ 3rd International Humanitarian Law Advanced Course for University Lecturers in China, 31 July – 2 August 2013, where a version of this article was presented and where helpful feedback was received.

1 See *XM25 Individual Semi-Automatic Airburst System (ISAAS) Counter Defilade Target Engagement (CDTE) System Objective Individual Combat Weapon (OICW) Increment 2* (7 July 2011) GlobalSecurity.org <<http://www.globalsecurity.org/military/systems/ground/m25.htm>>.

2 See Jesus Diaz, ‘First Look and Full Details on the XM25, the Most Lethal Army Gun Ever’ on *Gizmodo* (26 September 2008) <<http://gizmodo.com/5055602/first-look-and-full-details-on-the-xm25-the-most-lethal-army-gun-ever>>.

3 See ‘New Super Bullet Could End Guerrilla Warfare’, *Asian News International* (online), 12 February 2012 <<http://www.aniin.com>>.

4 See, eg, Lance M Bacon, ‘“Punisher” Gets Its First Battlefield Tests’, *Army Times* (online), 14 February 2011 <<http://www.armytimes.com/article/20110214/NEWS/102140335/-8216-Punisher-gets-its-first-battlefield-tests>>.

5 Quoted in *Iron Man 3* (Directed by Shane Black, Marvel Studios, 2013). Von Braun first made this comment (in question form) in a heading of his manuscript memoir in 1950: see Michael J Neufeld, *Von Braun: Dreamer of Space, Engineer of War* (Vintage, 2008) 502.

When it comes to a new weapon, it seems easy to get caught up in its new capabilities and ignore the larger issues concerning the morality or legality of its deployment, especially when the weapon's deployment likely means a decreased mortality rate for the deploying state's troops. Use of the XM25 would appear to be such a situation. This article analyses the legality of this weapon system under existing international law and concludes that it is illegal, given the weight of its high-explosive projectile, the reasonable foreseeability that the projectile will explode within targets in some circumstances and the likely result of superfluous injury and unnecessary suffering. This last point will depend on the balance between the suffering caused by this weapon and the perceived military necessity associated with this weapon.

Contextualism forms the theoretical foundation of this article. Perhaps the closest analogy is to the New Haven approach to law, with its emphasis on viewing law in light of its contemporary context.⁶ Such an approach is needed with legal reviews of new weapons due to the language of article 36 of the 1977 *Protocol I Additional to the 1949 Geneva Conventions*, which requires *contextual* analysis:

In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, *in some or all circumstances*, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party (emphasis added).⁷

The International Court of Justice ('ICJ') supported this type of contextual approach in its *Legality of the Threat or Use of Nuclear Weapons* advisory opinion when it looked at the legality of nuclear weapons from multiple perspectives and within multiple contexts.⁸ Critics might argue that international law requires a contextual analysis of all treaties, and so this particular theoretical approach represents nothing special. While article 31(1) of the *Vienna Convention on the Law of Treaties* mentions context, this is just one of at least

6 See generally Myres S McDougal, 'Some Basic Theoretical Concepts about International Law: A Policy-Oriented Framework of Enquiry' (1960) 4 *The Journal of Conflict Resolution* 337; Michael N Schmitt, 'The Resort to Force in International Law: Reflections on Positivist and Contextual Approaches' (1994) 37 *Air Force Law Review* 105, 108.

7 *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, opened for signature 8 June 1977, 1125 UNTS 3 (entered into force 7 December 1978) art 36 ('*First Additional Protocol*').

8 See generally *Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion)* [1996] ICJ Rep 226. For more information on the contextual approach to international law, see generally James D Fry, 'Contextualized Legal Reviews for the Methods and Means of Warfare: Cave Combat and International Humanitarian Law' (2006) 44 *Columbia Journal of Transnational Law* 453, 458–73.

four distinct schools of interpretation reflected in article 31(1),⁹ with tribunals and parties often pointing to article 31(1) to support whatever school of interpretation that best suits their needs. Such indeterminacy with treaty interpretation will not necessarily lead to a contextual analysis in general, thus making the contextual analysis required by article 36 of the *First Additional Protocol* somewhat special.

This article is divided into five parts, including this brief introduction and an equally brief conclusion in Parts I and V, respectively. Part II describes the history of the development of the XM25. Part III analyses the customary international law relating to exploding projectiles and assesses the legality of the XM25 in light of those norms. Part IV assesses the legality of the XM25 in light of the customary international law relating to superfluous injury or unnecessary suffering, as codified in article 35(2) of the *First Additional Protocol*. This article concludes with a recommendation that the United States ('US') Army cease its development of and its reliance on the XM25 as both the XM25 and its probable use comprise a likely violation of customary international law.

II DEVELOPMENT OF THE XM25 WEAPON SYSTEM

The first public mention of the XM25 was on 24 October 2003, when a US supplier of defence products, Alliant Techsystems, presented its new technology in an effort to win the US Army's lucrative Land Warrior rifle contract.¹⁰ The goal of that project supposedly was to find a new, more reliable family of light arms to replace the M4, M9, M16, M203 and M249 for all of the branches of the US military.¹¹ A reporter at that unveiling described the XM25 in the following manner: 'The XM25 rifle ... uses computers, and it launches bullet-shaped grenades that are programmed to explode just inches from a target's head.'¹² The XM25 was described then as weighing nearly 12 pounds,¹³ although it grew to 18

9 See, eg, Francis G Jacobs, 'Varieties of Approach to Treaty Interpretation: With Special Reference to the Draft Convention on the Law of Treaties before the Vienna Diplomatic Conference' (1969) 18 *International and Comparative Law Quarterly* 318 (discussing these different methods of interpretation). For more information on the indeterminacy of interpretation under art 31(1) of the *Vienna Convention on the Law of Treaties*, opened for signature 23 May 1969, 1155 UNTS 331 (entered into force 27 January 1980), see generally James D Fry, 'Legitimacy Push: Towards a Gramscian Approach to International Law' (2008) 13 *UCLA Journal of International Law and Foreign Affairs* 307.

10 See Dee DePass, 'Alliant Unveils Futuristic Soldier Garb; The Land Warrior Uniform May Be Ready for Use in 2005', *Star Tribune* (Minneapolis/St Paul), 25 October 2003, 1D. See also 'ATK Wins \$65.8 Million Army Contract for XM25, Individual Semi-automatic Airburst System', *PR Newswire* (online), 28 March 2011 <<http://www.prnewswire.com/news-releases/atk-wins-658-million-army-contract-for-xm25-individual-semi-automatic-airburst-system-118763419.html>> (noting how Heckler & Koch and L-3 Brashear are partners with Alliant Techsystems in developing the XM25).

11 See Ann Roosevelt, 'Army Suspends Small Arms RFP to Add Joint Requirements', *Defense Daily* (online), 21 July 2005 <<http://www.defensedaily.com/articles/dd/2005/dd07210508.html>>.

12 DePass, above n 10.

13 Ibid.

pounds by 2010.¹⁴ Later reports have described the science behind XM25's technology:

As the 25-millimetre round is fired, the gunsight sends a radio signal to a chip inside the bullet, telling it the precise distance to the target. A spiral groove inside the barrel makes the bullet rotate as it travels, and as it also contains a magnetic transducer, this rotation through the Earth's magnetic field generates an alternating current. A patent granted to the bullet's maker, Alliant Techsystems, reveals that the chip uses fluctuations in this current to count each revolution and, as it knows the distance covered in one spin, it can calculate how far it has travelled.¹⁵

Alliant Techsystems' Precision Guided Weaponry unit was working on developing four to six prototypes that it would deliver to the US Army for testing in a year after the 2003 unveiling of these new concept weapons.¹⁶ Alliant Techsystems ultimately delivered six XM25 prototypes to the US Army on 27 April 2005 for field-testing and evaluation at the Picatinny Arsenal in New Jersey,¹⁷ with the US Army project manager already praising the XM25 as 'very promising' after initial tests.¹⁸ At that time, the XM25 was described as 'ideal for urban combat' as it 'puts precision firepower in the hands of the soldier, allowing them to eliminate threats without causing significant collateral damage'.¹⁹ The description continued in the following manner:

The revolutionary fire control system for the XM25 employs an advanced laser rangefinder that transmits information to the chambered 25mm round. As the round flies downrange to the target, it precisely measures the distance traveled and detonates at exactly the right moment to deliver maximum effectiveness. The XM25 increases the warfighter's probability of hit-to-kill performance by up to 500 percent over existing weapons. It also extends the effective range of the soldier's individual weapon to more than 500 meters.²⁰

In addition, the XM25 was praised at that time for 'not requir[ing] impact to detonate'²¹ and purported to extend soldiers' weapon range to 500 metres.²² While these formal tests were in progress, Alliant Techsystems and the US Army demonstrated the XM25 at the International Infantry & Joint Services Small

14 See 'The XM25: A Grenade Launcher That Can't Miss', *Machine Design* (Cleveland, Ohio), 10 June 2008, 28 (also noting how the cost of the XM25 was US\$25 000 per unit). But see 'New Rifles Shoot through Walls', *New York Post* (New York), 29 November 2010, 8 (asserting it weighs 12 pounds and costs US\$35 000 per unit).

15 Kurt Kleiner, 'Could Explosive Bullets Reduce Air Strike Casualties?', *New Scientist* (London), 3 June 2009, 22.

16 See DePass, above n 10.

17 See Glenn Maffei, 'XM25 Airbursting Munition Delivered to Army for Testing', *Inside the Army* (online), 2 May 2005 <http://www.defensenewsstand.com/component/option,com_ppv/Itemid,288/id,1772498>.

18 See 'ATK Delivers First XM25 Prototypes to US Army for Testing and Evaluation', *PR Newswire* (online), 27 April 2005 <<http://www.prnewswire.com/news-releases/atk-delivers-first-xm25-prototypes-to-us-army-for-testing-and-evaluation-54419327.html>>.

19 Ibid.

20 Ibid.

21 See 'ATK Delivers Advanced Airburst Weapons to Army for Testing', *Defense Daily* (online), 28 April 2005 <<http://www.defensedaily.com/articles/dd/2005/dd04280506.html>>.

22 See Maffei, above n 17.

Arms Systems Annual Symposium on 19 May 2005, using a simulated urban scenario and meeting all of its stated goals.²³

The US Army suspended the project on 21 July 2005 in order to allow for the incorporation of the joint requirements for this weapon from all branches of the US military, with this suspension supposedly continuing until after a Joint Requirements Oversight Committee meeting could be held.²⁴ Nevertheless, the US Senate Appropriations Committee approved the development of the XM25 on 30 September 2005, with a senator's report noting how '[m]odeling of the system under simulated combat conditions indicates a fivefold increase in lethality over the weapons in current use'.²⁵ This determination came after a test of three new weapons in Germany on 24 September 2005 – the XM25, the XM312 machine gun and the SM320 grenade launcher – with the tester praising the XM25 for being 'totally smooth and light' and concluding that '[i]t shot fantastic'.²⁶ A report on 5 October 2005 noted how a project to develop a combined rifle and grenade launcher had been 'broken into [a] modular XM8 rifle element and XM25 grenade launcher',²⁷ thus reflecting some of the debates surrounding the development of the XM25 that were going on at the time.²⁸ Despite these debates, the US Senate approved US\$5 million for the development of the XM25 on 22 December 2005.²⁹ The fact that the Senate approved this funding before the Joint Requirements Oversight Council approved of the project led the Inspector General of the US Department of Defense to encourage the US Army to stop funding the XM25, although only after the US Army already had spent US\$59.6 million on developing the XM25 and was about to spend another US\$14.6 million.³⁰ Moreover, the Department of Defense concluded that the XM25 would leave soldiers vulnerable when fighting at close ranges.³¹ The

23 See 'ATK's XM25 Successfully Demonstrates Developmental Ammunition', *Defense Daily* (online), 24 June 2005 <<http://www.defensedaily.com/articles/dd/2005/dd06240505.html>>.

24 See Roosevelt, above n 11.

25 Office of Senator Arlen J Specter, 'Specter & Santorum Announce Senate Committee Approval of Defense Projects in Western Pennsylvania', *States News Service* (Washington, DC), 30 September 2005; see also 'US Deploys "Game Changer" in War', *Canberra Times* (Canberra), 11 December 2010, A22 (noting how the XM25 is '300 per cent more effective than current weapons at the squad level').

26 'US Soldiers in Germany Test Three New Weapons', *Aerospace Daily & Defense Report* (Washington, DC), 7 October 2005, 5 (noting positive reviews of the other weapons that were being tested); 'US Army Soldiers Test New Weapons in Germany', *Space War* (online), 5 October 2005 <<http://www.spacewar.com/news/miltech-05zzzf.html>>.

27 A Williams, 'Small Arms and the Soldier', *Jane's Defence Weekly* (Surrey, UK), 5 October 2005, 20.

28 See Diana Wueger, 'Nowhere to Hide; Reaching Out and Touching the Enemy Is Becoming a Lot Easier', *Defense Technology International* (Washington, DC), 1 April 2012, 16 (explaining how the XM25 became a single-purpose weapon to 'reduce the weapon's weight and to allow for a more lethal 25 mm round').

29 Office of Senator Arlen J Specter, 'Specter & Santorum Announce Senate Approval of Defense Projects in Western PA', *States News Service* (Washington, DC), 22 December 2005.

30 See 'DOD Inspector General Urges Army to Stop Funding XM25, XM29 Efforts', *Inside the Army* (online), 29 May 2006 <http://www.defensenewsstand.com/component/option,com_ppv/Itemid,288/id,1781592/>.

31 *Ibid.*

Inspector General reiterated these objections on 29 September 2006.³² Nevertheless, the US Army appears to have continued to showcase the benefits of the XM25, including in a technology display to the US Congress on 6 June 2007,³³ thus suggesting perhaps that the Inspector General's objections had gone unheeded. The Inspector General again reiterated these objections in August 2007.³⁴ Again, it appears that development continued on, with the US Army displaying the XM25 at exhibitions in Germany and Italy in January and February 2009.³⁵ Public accounts of field testing of the XM25 began to appear during the summer of 2009,³⁶ notably without any further objections by the Inspector General, suggesting that those problems had been resolved.

The reviews of the XM25 at that time referred to it as the 'first shoulder-fired smart weapon', which represented 'a leap ahead because it's the first smart weapon system with a smart round in small weapons'.³⁷ The report explained that a soldier uses the weapon by 'lazing' to the target in order to determine the range and then adjusts the target point for the projectile to explode before or after the target point in one-metre increments up to three metres on either side of the target.³⁸ The report noted how the XM25 represented an alternative to US Army soldiers having to call in an Air Force strike when trapped under enemy sniper fire, at the cost of between US\$20 000 to US\$50 000, whereas the XM round would cost only US\$25 once it entered into large-scale production.³⁹ The report further noted how the effective range of the XM25 was 750 metres, which was much better than the existing army rifles and grenade launchers at the time.⁴⁰ Therefore, not only is the XM25 smart in the sense that it has a microchip inside its projectiles that receives radio signals from the gun sight, but it is smart in the sense that it is a cost-efficient solution to the problems that infantry often face in urban warfare, including snipers and hidden combatants. Moreover, the XM25's

32 See 'Pentagon Inspector General Raps Army on Future Rifle Program', *Inside the Army* (online), 9 October 2006 <http://www.defensenewsstand.com/component/option,com_ppv/Itemid,288/id,1784865/>.

33 See US Army, 'Display to Showcase Soldier Technology, Chow to Congress' (Press Release, 1 June 2007) <www.army.mil/article/3430>.

34 See Michael Fabey, 'IG Finds Acquisition Problems with FCS-Related Systems', *Aerospace Daily & Defense Report*, 17 August 2007, 4.

35 See 'Army's Latest High-Tech Equipment to Be Featured at Exhibitions in Communities in Germany, Italy', *States News Service* (Washington, DC), 21 January 2009.

36 See J D Leipold, 'PEO Soldier Unveils Lighter, More Lethal Weapons Systems', *Army.mil* (online), 21 May 2009 <<http://www.army.mil/article/21503>>; 'US Ready to Test Deadly New Grenade Launcher', *defenceWeb* (online), 26 May 2009 <http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=2202&catid=74&Itemid=30> ('US Ready').

37 Leipold, above n 36; *US Ready*, above n 36.

38 Leipold, above n 36; *US Ready*, above n 36.

39 See Leipold, above n 36; *US Ready*, above n 36. See also Kleiner, above n 15 (noting how the air strike could even cost US\$70 000, and noting how the XM25 also could avoid having to call in artillery attacks); Robert Johnson, 'This New Rifle Uses Programmable Rounds to Blow Up Enemies 500 Yards Away', *Business Insider Australia* (online), 17 January 2012 <<http://www.businessinsider.com.au/bi-xm25-xm-25-new-army-rifle-2012-1>> (noting how the hand crafted XM rounds currently cost approximately US\$700 each, with that cost eventually dropping to US\$25 per round once production becomes automated).

40 See Leipold, above n 36; *US Ready*, above n 36.

increased accuracy over other grenade launchers and the ease in learning how to use it is seen as decreasing collateral damage to civilians.⁴¹ As a result of its superior capabilities, the XM25 was ranked 46th in *TIME Magazine*'s List of the 50 Best Inventions for 2009.⁴² Therefore, it is no surprise that the US Army planned in 2009 and 2010 to buy more than 12 500 XM25s starting 2011,⁴³ although the actual increase in orders of XM25s went from five in 2011 to 36 more in 2012,⁴⁴ to eventually 1424 in 2014.⁴⁵ In particular, the US Army sent five XM25s to Afghanistan towards the beginning of November 2010,⁴⁶ and these weapons were quickly put to use on the battlefield.⁴⁷ It did not take long for outstanding reviews of XM25's capabilities to be received, with the nickname 'Punisher' being applied by those who used the XM25 in nine operations from December 2010 to February 2011.⁴⁸

Due to the outstanding reviews of the XM25, Alliant Techsystems received a 30 month contract for US\$65.8 million on 28 March 2011 to conduct the engineering and manufacturing development of the XM25,⁴⁹ with Congress

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- 41 See 'US Deploys "Game-Changer" Weapon to Afghanistan', *The Nation* (Bangkok), 2 December 2010; Wueger, above n 28 (explaining how only '[t]wo days of training appear enough to establish basic proficiency' with the XM25).
 - 42 See Arundhati Parmar, 'Eden Prairie-Based Alliant Tech Inventions Make Time's Best of 2009 List', *Finance & Commerce* (Minneapolis), 17 December 2009; 'ATK Honored Not Once But Twice on TIME Magazine's List of 50 Best Inventions for 2009', *PR Newswire* (online), 17 November 2009 <<http://www.prnewswire.com/news-releases/atk-honored-not-once-but-twice-on-time-magazines-list-of-50-best-inventions-for-2009-70271042.html>>.
 - 43 See Christopher Lehner, 'Army Testing XM-25 "Smart" High-Explosive Weapon for Soldiers', *Army.mil* (online), 10 November 2009 <www.army.mil/article/30147>; 'The Smart Weapons', *Tampa Bay Times* (St Petersburg, Florida), 17 December 2010, 6A.
 - 44 See, eg, See C Todd Lopez, 'In 2014, Soldiers Get 1 Percent Raise, 3.9 Percent Increase in BAH', *Army.mil* (online), 10 April 2013 <<http://www.army.mil/article/100764>>; 'No Hiding from New Smart Gun', *Defense Technology International* (Washington, DC), 1 April 2011, 10.
 - 45 See 'In 2014, Soldiers Get 1 Percent Raise, 3.9 Percent Increase in BAH', *Defense Department Documents and Publications*, 10 April 2013. It is important to note that this figure might also be decreased if there are further budget cuts: see Wueger, above n 28.
 - 46 See Nick Brown, 'XM25 Ready for Afghan Deployment', *Jane's Defence Weekly* (Surrey, UK), 3 November 2010, 6.
 - 47 See 'US Deploys New Dream Weapon', *Townsville Bulletin* (Townsville, Queensland), 4 December 2010, 28.
 - 48 See, eg, Lopez, above n 44; C Todd Lopez, 'Army Wants 36 More "Punisher" Weapons in 2012', *Army.mil* (online), 8 February 2011 <<http://www.army.mil/article/51518>>; Mark DeYoung, 'Alliant Techsystems Inc at Cowen and Company Aerospace/Defense Conference', *Fair Disclosure Wire* (Washington, DC), 9 February 2011 (discussing the reviews); J D Leipold, 'AUSA Winter Symposium Focuses on Technology', *Army.mil*, 24 February 2011 <<http://www.army.mil/article/52400>>; Hearing of the Tactical Air and Land Force Subcommittee of the House Armed Services Committee, US Congress, Washington, DC, 17 March 2011 (Peter N Fuller) (mentioning the characteristics of the XM25 and the 'Punisher' nickname).
 - 49 See 'ATK Wins \$65.8 Million Army Contract for XM25, Individual Semi-automatic Airburst System', above n 10; Susan Feyder, 'Alliant Lands Army Contract', *Star Tribune* (Minneapolis/St Paul), 29 March 2011, 2D; 'ATK XM25 Moves into EMD', *Defense Daily* (online), 30 March 2011 <<http://www.defensedaily.com/publications/dd/13087.html>>.

approving US\$24.7 million more for the 36 prototypes later in 2011.⁵⁰ The XM25 has continued to be tested in Afghanistan, with it receiving outstanding reviews in the 200 times it had been used up until February 2012.⁵¹ Other branches of the US military have expressed interest in the XM25, such as the US Marine Corps, although it expressed reservations concerning the price and expressed the desire for a 40 millimetre round instead of the 25 millimetre round.⁵² The US Army's Program Executive Office Soldier provided Alliant Techsystems US\$16.8 million more in September 2012 for continuing to develop the XM25,⁵³ with use of the XM25 in Afghanistan leading to 100 requested changes to the design to further improve its performance.⁵⁴ Use of the XM25 in Afghanistan in 2012 was observed by weapons experts embedded in army units who could directly observe the XM25's performance in the field.⁵⁵ Users of the XM25 continued to express their support in 2013.⁵⁶ However, in February 2013, the XM25's safety came into question when one XM25 exploded during a training session, which was caused by an 'improper cycling sequence'.⁵⁷ Notwithstanding this accident, which represented the first negative public feedback for the XM25, Alliant Techsystems is still scheduled to receive US\$69 million in 2014 to begin initial production of 1424 XM25s.⁵⁸

To reiterate, the uniqueness of the XM25 is its sophisticated rangefinder that can measure the distance between the weapon and the target,⁵⁹ with its ability to detonate its high-explosive projectiles under, over, beside or conceivably within

50 See Raymond Piper, 'XM25 Feedback Demonstrates Lethality', *States News Service* (Washington, DC), 7 October 2011; 'ATK Receives \$24 Million Contract Modification to XM25, Individual Semi-Automatic Airburst System Engineering and Manufacturing Development Contract', *PR Newswire* (online), 2 November 2011 <<http://www.prnewswire.com/news-releases/atk-receives-24-million-contract-modification-to-xm25-individual-semi-automatic-airburst-system-engineering-and-manufacturing-development-contract-133105123.html>>.

51 See 'Super Bullet "Will Put End to Guerrilla War"', *Sunday Express* (London), 12 February 2012, 10.

52 See Wueger, above n 28.

53 See 'ARK Awarded Manufacturing Development Contract for XM25, Individual Semi-Automatic Airburst System', *PR Newswire* (online), 12 September 2012 <<http://www.prnewswire.com/news-releases/atk-awarded-manufacturing-development-contract-for-xm25-individual-semi-automatic-airburst-system-169443886.html>>; 'Army Funds Further Development of XM25', *United Press International* (online), 13 September 2012 <http://www.upi.com/Business_News/Security-Industry/2012/09/13/Army-funds-further-development-of-XM25/UPI-36001347549384>.

54 See Ben Wright, 'Women Soldiers to Get Their Own Armor; Protection May Be Issued Next Summer Following Testing', *Dayton Daily News* (Dayton, Ohio), 23 September 2012, A5.

55 See Kris Osborn, 'Army Refining Airburst Technology', *Targeted News Service* (Washington, DC), 27 September 2012.

56 See Steve Wold, Mark DeYoung and Neal Cohen, 'Event Brief of Q2 2013 ATK Earnings Conference Call', *Fair Disclosure Wire*, 1 November 2012.

57 Paul D Shinkman, 'Special Forces, Army Infantry to Get New XM25 "Punisher" Rifle', *US News & World Report* (Washington, DC), 22 April 2013 <<http://www.usnews.com/news/articles/2013/04/22/special-forces-army-infantry-to-get-new-xm25-punisher-rifle>>.

58 See 'In 2014, Soldiers Get 1 Percent Raise, 3.9 Percent Increase in BAH', above n 45; Shinkman, above n 57; C Todd Lopez, 'Army Officials Describe \$129.7 Billion Budget Request', *Army News Service* (online), 11 April 2013 <<http://www.defense.gov/news/newsarticle.aspx?id=119753>>.

59 See Diaz, above n 2.

the target.⁶⁰ The weapon has a point-target range of 500 metres and an area-target range of 700 metres.⁶¹ The XM25's high-explosive projectiles, four of which can be held in the magazine,⁶² have been described as being equivalent to a point-detonating 40 millimetres grenade in terms of lethal area, blast pattern and fragmentation pattern.⁶³ Interestingly, reports throughout the life of the XM25 have not focused on its capabilities as an anti-material weapon. They have instead focused on the XM25 as an anti-personnel weapon. As shall be explained in the remainder of this article, the main problem with this weapon system from a legal perspective is the weight of its high-explosive projectile and its apparent ability to cause superfluous injuries and unnecessary suffering.⁶⁴

III CUSTOMARY INTERNATIONAL LAW AND THE XM25 PROJECTILES' WEIGHT

The XM25 Individual Semi-automatic Airburst Weapon System, effective and powerful as it may be, arguably violates customary international humanitarian law by using explosive projectiles that weigh less than 400 grams. The exact weight of the projectiles used by the XM25 does not appear to have been published anywhere, and the designers and manufacturers of the weapon system have not replied to the author's inquiries. However, since the projectiles are known to have a diameter of 22 millimetres and a height of 59 millimetres, one can safely assume by mathematical approximation that its weight is far below 400 grams, likely even less than 254.33 grams.⁶⁵ In light of these

60 See Shane McGlaun, 'US Army's XM25 Fires Bullets That Target Enemies behind Cover', *Daily Tech* (online), 30 November 2010 <<http://www.dailytech.com/US+Armys+XM25+Fires+Bullets+that+Target+Enemies+Behind+Cover/article20272.htm>>.

61 See Program Executive Office Soldier, *Product Manager Individual Weapons – XM25 Counter Defilade Target Engagement System* (May 2009) <<http://peosoldier.army.mil>>.

62 See 'Alliant Techsystems Gets US \$16.8 Million Contract from US Army', *Mena Report* (Amman, Jordan), 17 September 2012; 'The XM25: A Grenade Launcher That Can't Miss', above n 14.

63 See 'XM1019 High Explosive Air Bursting (HEAB)', *GlobalSecurity.org* <<http://www.globalsecurity.org/military/systems/munitions/m1019.htm>>; 'The XM25: A Grenade Launcher That Can't Miss', above n 14; B Swift and G N Rutty, 'The Exploding Bullet' (2004) 57 *Journal of Clinical Pathology* 108, 108 (providing the technical details of exploding projectiles).

64 The projectiles for use against light-armoured vehicles (XM1049) and for 'training air bursting' (XM1050) are far less problematic than the high-explosive XM1019 projectile, inasmuch as the XM1019 seems designed for use against personnel (given the focus on counter-guerrilla warfare in the literature), and so the XM1019 projectile is the focus of this article. See 'The XM25: A Grenade Launcher That Can't Miss', above n 14. See also 'US Army Releases XM-25 Smart Gun Trial Videos', *International Business Times* (online), 7 April 2011 <<http://www.ibtimes.com/us-army-releases-xm-25-smart-gun-trial-videos-279017>> (discussing the types of projectiles that can be used in the XM25 weapon system); 'The XM25: A Grenade Launcher That Can't Miss', above n 14. See also 'US Army Releases XM-25 Smart Gun Trial Videos', *International Business Times*, 7 April 2011 (noting how less lethal rounds for riot control and other law enforcement uses could be developed in the future).

65 Even assuming that the projectile is a cylinder, instead of being shaped in the form of a cone, with a diameter of 22 millimetres, a height of 59 millimetres and being fully made of lead (the density of lead is 11.34 g/cm³), the weight of the projectile still only will be approximately 254.33 grams.

estimates, it seems relatively safe to assume that the projectiles of the XM25 weigh much less than 400 grams.

The 1868 *Declaration Renouncing the Use, in Time of War, of Explosive Projectiles under 400 Grammes Weight* at St Petersburg stated:

The Contracting Parties engage mutually to renounce, in case of war among themselves, the employment by their military or naval forces, of any projectile of less weight than four hundred grammes, which is explosive, or is charged with fulminating or inflammable substances.⁶⁶

The phrase ‘any projectile’ should stand out to the reader, inasmuch as it suggests that the prohibition was intended to be broad in its application and include both anti-personnel projectiles and anti-material projectiles.⁶⁷ Whether such a broad application remains plausible today is discussed below. Regardless, a few brief words about the negotiating history of the *St Petersburg Declaration* might help with interpreting its provisions and understanding its influence on the creation of customary international law in this area.

The *St Petersburg Declaration* has been described as the ‘first modern multilateral treaty addressing weapons’,⁶⁸ although there has been no shortage of attempts throughout history to regulate the existence or use of particular weapons.⁶⁹ Nevertheless, the *St Petersburg Declaration* was the product of a meeting between seventeen states, which meeting was called by Russia after it developed two types of exploding projectiles in 1863 and 1867 that could destroy ammunition wagons and soft surfaces, respectively.⁷⁰ The 17 states that joined in on formulating the *St Petersburg Declaration* were Austria-Hungary, Bavaria, Belgium, Denmark, France, Greece, Italy, The Netherlands, Persia, Portugal, Prussia and the North German Confederation, the Russian Federation, Sweden and Norway, Switzerland, Turkey, the United Kingdom (‘UK’) and Wurtemberg,

66 *Declaration Renouncing the Use, in Time of War, of Explosive Projectiles under 400 Grammes Weight*, opened for signature 11 December 1868, 18 Martens 474 (entered into force 11 December 1868), reprinted in (1907) 1 *Supplement to the American Journal of International Law* 95, 96 (‘*St Petersburg Declaration*’).

67 See Burrus M Carnahan, ‘Unnecessary Suffering, the Red Cross and Tactical Laser Weapons’ (1996) 18 *Loyola Los Angeles International & Comparative Law Review* 705, 716.

68 W Hays Parks, ‘Conventional Weapons and Weapon Reviews’ (2005) 8 *Yearbook of International Humanitarian Law* 55, 59.

69 See, eg, Arthur Nussbaum, *A Concise History of the Law of Nations* (Macmillan, 1947) 25 (describing the attempts in the 12th century AD to prohibit the crossbow); Trevor N Dupuy and Gay M Hammerman (eds), *A Documentary History of Arms Control and Disarmament* (R R Bowker Co, 1973) 3–4 (describing the 546 BC multilateral disarmament conference in ancient China).

70 See Hilaire McCoubrey and Nigel D White, *International Law and Armed Conflict* (Dartmouth, 1992) 219; Michael N Schmitt, ‘Humanitarian Law and the Environment’ (2000) 28 *Denver Journal of International Law and Policy* 265, 293–4; Jill M Sheldon, ‘Nuclear Weapons and the Laws of War: Does Customary International Law Prohibit the Use of Nuclear Weapons in All Circumstances?’ (1996) 20 *Fordham International Law Journal* 181, 212–13; Burrus M Carnahan, ‘The Civil War Origins of the Modern Rules of War: Francis Lieber and Lincoln’s General Order No 100’ (2012) 39 *Northern Kentucky Law Review* 661, 678.

with Baden and Brazil joining in 1869 and Estonia joining in 1991.⁷¹ The US was not a party to the conference that led to the adoption of the *St Petersburg Declaration*, presumably because the US lacked the requisite amount of power or prestige for an invitation. However, the US appears to have been opposed to the use of exploding projectiles ever since their use during the Civil War, when the US military leaders saw up close how devastating they were in their effects.⁷² The 400 gram limitation of the *St Petersburg Declaration* was established because that was the size of the lightest artillery shells then.⁷³

There is some disagreement over why Russia called this meeting. Some commentators assert that Russia called for the ban of exploding projectiles because they were ‘fast becoming obsolete’ due to the danger posed to the user, and so Russia did not mind giving up this weapon, especially if it meant improving its image.⁷⁴ Other commentators assert that Czar Alexander II wanted to show to the world that Russia was a civilised state by initiating an end to such heinous weapons as exploding projectiles that weigh less than 400 grams, thereby improving its damaged reputation after the 1853–6 Crimean War and leading others to promise not to develop such a heinous weapon.⁷⁵ Indeed, pragmatists such as US General Ulysses S Grant were opposed to exploding projectiles at that time because of their ‘barbarous’ nature in causing too much suffering with too little military advantage.⁷⁶

Therefore, the latter seems like a more plausible reason for Russia convening the conference. The question arises why more states did not join the *St Petersburg Declaration*. David Kennedy has asserted that ‘military leaders outlaw weapons which they no longer need, which they feel will be potent tools only for their adversaries, or against which defense would be too expensive or difficult’.⁷⁷ However, exploding projectiles were so revolutionary at the time of their invention that it is difficult to accept that states would stop caring about them and therefore refrain from joining the *St Petersburg Declaration*. A more likely explanation is that the contents of the *St Petersburg Declaration* became part of customary international law so quickly that joining the *St Petersburg Declaration* became superfluous. However, this does not explain why Estonia joined in 1991, which presumably had to do with the end of the Cold War and Estonia’s desire to signal to NATO member states that it was a potential

71 See International Committee of the Red Cross, ‘States Parties of the St Petersburg Declaration Renouncing the Use, in Time of War, of Explosive Projectiles under 400 Grammes Weight, St Petersburg, 29 November/11 December 1868’ <http://www.icrc.org/applic/ihl/ihl.nsf/States.xsp?xp_viewStates=XPages_NORMStatesParties&xp_treatySelected=130>.

72 See Robert V Bruce, *Lincoln and the Tools of War* (University of Illinois Press, 1989) 282.

73 See Jean-Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law* (Cambridge University Press, 2005) vol 1, 272.

74 See, eg, Stephen W Simpson, ‘Shoot First, Ask Questions Later: Doubletapping under the Laws of War’ (2006) 108 *West Virginia Law Review* 751, 762–3.

75 See, eg, Carnahan, above n 70, 679–80.

76 David Glazier, ‘Ignorance Is Not Bliss: The Law of Belligerent Occupation and the US Invasion of Iraq’ (2005) 58 *Rutgers Law Review* 121, 130.

77 David Kennedy, ‘Modern War and Modern Law’ (2007) 36 *University of Baltimore Law Review* 173, 181.

candidate for membership by agreeing to what it saw as the key international norms regarding *jus in bello*.

Many other legal instruments have incorporated the *St Petersburg Declaration's* substantive standard against exploding projectiles, such as: (1) the *1874 Brussels Declaration*, which notes 'the use of projectiles by the Declaration of St Petersburg of 1868' is 'especially forbidden'; (2) the *1880 Oxford Manual*, which notes 'it is forbidden ... to employ ... projectiles, ... calculated to cause superfluous suffering, or to aggravate wounds – notably projectiles of less weight than four hundred grams which are explosive or are charged with fulminating or inflammable substances'; and (3) the *1913 Oxford Manual*, which forbids employment of 'projectiles ... calculated to cause unnecessary suffering ... especially ... explosive projectiles or those charged with fulminating or inflammable materials, less than 400 grammes in weight'.⁷⁸ However, it is not the *St Petersburg Declaration* itself or these other admittedly soft law instruments that creates a binding legal obligation today on states such as the US. Indeed, the *St Petersburg Declaration* has attracted only 20 states parties up until 2013, and the US is not a signatory.⁷⁹ Instead, it is the customary international law that has developed since the *St Petersburg Declaration* that arguably creates a binding legal obligation today.

Though it might be too basic, it is important to review the formation of customary international law for those who might not have a background in international law. Customary international law comprises two elements, state practice (or *usus*) and states' expressed expectations that they are bound to abide by such practice in the future (or *opinio juris*).⁸⁰ Starting with the first element, state practice denotes evidence of the actual conduct of states that is 'extensive and virtually uniform' in the sense of the provision invoked, although there is no mathematical formula for determining what constitutes a sufficient amount of practice.⁸¹ From a theoretical perspective, it is somewhat difficult to demonstrate state practice concerning a prohibition, much like how it is difficult to prove a negative in formal logic. Nevertheless, the very noteworthiness of the XM25 as a

78 Jean-Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law* (Cambridge University Press, 2005) vol 2, 1787. See *Project of an International Declaration Concerning the Laws and Customs of War* (1873–4) 65 *British Foreign and State Papers* 1005 (adopted 27 August 1874) art 13(e) ('*Brussels Declaration*'); *The Laws of War on Land* (1881–2) 5 *Annuaire de l'Institut de Droit International* 156 (adopted 9 September 1880) art 9(a) ('*1880 Oxford Manual*'); *The Laws of Naval War Governing the Relations between Belligerents* (1913) 26 *Annuaire de l'Institut de Droit International* 610 (adopted 9 August 1913) art 16(2) ('*1913 Oxford Manual*').

79 See ICRC, above n 71.

80 See generally Michael Akehurst, 'Custom as a Source of International Law' (1975) 47 *British Yearbook of International Law* 1; Oscar Schachter, 'International Law in Theory and Practice' (1982) 178 *Recueil des Cours* 9, 35–6.

81 Akehurst, above n 80, 17 (quoting *North Sea Continental Shelf Cases (Federal Republic of Germany v Denmark; Federal Republic of Germany v Netherlands)* [1969] ICJ Rep 4); Jean-Marie Henckaerts, 'Customary International Humanitarian Law: A Response to US Comments' (2007) 89 *International Review of the Red Cross* 473, 475–7 (noting how the lack of practice on the use of the white flag when surrendering does not disrupt the customary nature of that norm, and providing a discussion of some of the factors that go into determining the weight of practice with creating custom).

‘game changing weapon’ in numerous reports highlights the fact that states typically have not used such exploding projectiles.⁸² The remainder of this section discusses the military manuals and domestic legislation of states that prohibit or reflect a prohibition of exploding projectiles from states’ arsenals. While these manuals and legislation mainly are useful in determining *opinio juris*, they also support this characterisation of state practice in that states do not use exploding projectiles. Admittedly, state practice need not be written down and published for it to constitute *usus* or *opinio juris*. That said, these published reports of *usus* and *opinio juris* represent the best information that is publicly available at the time of writing this article. States that argue against this article’s interpretation of customary international law are invited to share with the world their *usus* and *opinio juris*, if they have not already.

Again, *opinio juris* is a psychological factor that stands for the belief that states are bound to abide by such practice in the future.⁸³ The particular form in which this recognition needs to be expressed may well differ depending on whether the rule involved contains a prohibition, an obligation or merely a right to behave in a certain manner.⁸⁴ As Mark Janis has observed, declarations of *opinio juris* are relatively rare, and so such declarations must be given considerable weight when given.⁸⁵ In the case of exploding projectiles, however, such declarations have been numerous in states’ military manuals and domestic legislations. The 2005 customary international humanitarian law study of the International Committee of the Red Cross (‘ICRC’) has been instrumental in uncovering this practice. In particular, the military manuals of Australia, Belgium, Canada, France, Germany, Italy, New Zealand, Russia, Spain, the UK and the US reflect the fact that these states do not use exploding projectiles below 400 grams.⁸⁶ Moreover, legislatures in Andorra, Australia, Ecuador, Italy and the

82 See, eg, Wueger, above n 28; Wright, above n 54; ‘\$16.8M Army Contract for XM25 Rifle Awarded to Alliant Techsystems’, Tendersinfo (online), 15 September 2012 <<http://www.tendersinfo.com/procurement-tendernews.php?id=1618>>; ‘ATK to Feature Its Products and Capabilities at the AUSA 2011 Annual Meeting & Exposition’, Reuters (online), 26 September 2011 <<http://www.reuters.com/article/2011/09/26/idUS109985+26-Sep-2011+PRN20110926>>; Daniel Goure, ‘The Army Should Improve Management of Its Soldier Programs’, *States News Service* (Washington, DC), 30 March 2011; ‘ATK Wins \$65.8 Million Army Contract for XM25, Individual Semi-Automatic Airburst System’, above n 10; Daniel Wasserbly, ‘Afghan Study Notes XM25 Is Potentially “Game-Changing”’, *Jane’s Defence Weekly* (Surrey, UK), 3 February 2011, 10; ‘US Deploys “Game Changer” in War’, above n 25; ‘New Rifles Shoot through Walls’, above n 14. Please note that some states, such as Israel and South Korea, are trying to develop their own versions of the XM25: Wueger, above n 28. Moreover, some non-state actors, such as the private security company Blackwater, have been reported as having used exploding projectiles: Joseph C Hansen, ‘Rethinking the Regulation of Private Military and Security Companies under International Humanitarian Law’ (2012) 35 *Fordham International Law Journal* 698, 732. As explained below, state practice need not be unanimous or even close to unanimous for customary international law to be created.

83 See Malcolm N Shaw, *International Law* (Cambridge University Press, 5th ed, 2003) 71.

84 See ICRC, *Assessment of Customary International Law* <http://www.icrc.org/customary-ihl/eng/docs/v1_rul_in_asofoeuin>.

85 See Mark W Janis, *An Introduction to International Law* (Wolters Kluwer Law & Business, 6th ed, 2012) 49.

86 See Henckaerts and Doswald-Beck, above n 78, 1788–9.

Socialist Federal Republic of Yugoslavia have prohibited the use of such exploding projectiles.⁸⁷ Admittedly, it is not always clear that these states refuse use of such projectiles for moral, practical or legal reasons, although, as explained below, the referral to the legal norm contained in the *St Petersburg Declaration* in the manual or legislation suggests a legal reason. A review of the ICRC database on customary international humanitarian law (valid up until 2007) and a general search for military manuals and domestic legislation relating to exploding projectiles essentially confirmed many of the examples cited in the 2005 ICRC study. Below is a summary of the content of these military manuals and domestic legislation, taken from the ICRC's customary international humanitarian law study and other sources, all grouped based on similar characteristics.

First, there are the manuals and legislation that broadly ban or reflect a broad ban on exploding projectiles. Belgium prohibits the use of exploding projectiles that weigh less than 400 grams, while at the same time also making reference to the *St Petersburg Declaration*.⁸⁸ Russia prohibits 'projectiles weighing less than 400 grammes, which are either explosive or charge with fulminating or inflammable substances'.⁸⁹ Spain prohibits 'the use of projectiles weighing less than 400 grammes which are explosive'.⁹⁰ Andorra broadly prohibits exploding projectiles.⁹¹ Indonesia prohibits exploding projectiles.⁹²

Second, there are the manuals and legislation that broadly ban or reflect a broad ban on exploding projectiles but that also provide some exceptions to this ban. For example, Italy prohibits the use of 'explosive or incendiary projectiles of a weight below 400 grammes, except for air or anti-air systems'.⁹³ Australia prohibits 'projectiles weighing less than 400 grams which are either explosive or contain fulminating or inflammable substances', with the exception for 'tracer[s] and incendiary ammunition[s]'.⁹⁴ New Zealand prohibits 'projectiles weighing less than 400 grams which are either explosive or charged with fulminating or inflammable substances', with the exception similar to those relating to anti-air

87 See *ibid* 1790.

88 See *ibid* 1788, citing Belgium, Ecole Royale Militaire, *Droit Pénal et Disciplinaire Militaire et Droit de la Guerre, Deuxième Partie: Droit de la Guerre*, D/1983/1187/029, 1983, 37.

89 *Ibid* 1789, citing Russian Federation, *Instructions on the Application of the Rules of International Humanitarian Law by the Armed Forces of the USSR*, 1990, s 6(c).

90 *Ibid* 1789, citing Spain, Estado Mayor del Ejército, Division de Operaciones, *Orientaciones: El Derecho de los Conflictos Armados*, OR7-004, 18 March 1996, vol 1 s 3.2.a.(2).

91 *Ibid* 1790, citing Andorra, *Decret Sobre Possessió, Ús i Circulació d'Armes*, de 3-7-89, Butlletí Oficial de Principat d'Andorra No 17, 10 August 1989, ch 1 s 2 art 2.

92 *Ibid* 1791, citing ICRC, *Report on the Practice of Indonesia* (1997) ch 3.4.

93 *Ibid* 1788, 1790, citing Italy, Stato Maggiore della Difesa, I Reparto, Ufficio Addestramento e Regolamenti, *Manuale di Diritto Umanitario*, vol 1, s 8(5); Italy, Stato Maggiore della Difesa, I Reparto, Ufficio Addestramento e Regolamenti, *Legge Italiana di Guerra*, 8 July 1938, art 35(5) (as amended).

94 Australian Defence Force, *The Manual of the Law of Armed Conflict*, 11 May 2006, [4.10] <<http://www.defence.gov.au/adfwc/Documents/DoctrineLibrary/ADDP/ADDP06.4-LawofArmedConflict.pdf>>; see Henckaerts and Doswald-Beck, above n 78, 1788, citing Australian Defence Force, *Law of Armed Conflict: Commanders Guide*, 7 March 1994, s 932(f); Australian Defence Force, *Manual on Law of Armed Conflict*, 1994, s 408 (not mentioning an exception).

systems.⁹⁵ Canada prohibits ‘projectiles of a weight below 400 grams that are either explosive or charged with fulminating (exploding) or inflammable substances’, with the exception that ‘tracer rounds are not prohibited so long as they are used for marking’.⁹⁶ The UK’s prohibition that is reflected in its military manual is similar to New Zealand’s with the note about anti-air systems and tracers,⁹⁷ while its 1981 *Law of Armed Conflict* pamphlet only expresses the limitation that prohibited exploding projectiles are only those that are used against personnel in international armed conflicts.⁹⁸ A more recent version of the UK’s *Joint Service Manual* than the one cited by the ICRC study makes clear that the UK views state practice as prohibiting the ‘use of explosive or incendiary bullets designed solely for use against personnel’, thus presumably aiming to allow tracers and anti-material ‘explosive or combined-effects munitions’.⁹⁹ Moreover, the recent *UK Joint Service Manual* noted how the *St Petersburg Declaration* is unclear whether it contemplated anti-material exploding projectiles.¹⁰⁰ The portion of the *UK Joint Service Manual* on explosive or incendiary projectiles concludes in the following manner:

The 400 gram limit in the *St Petersburg Declaration* is, in any event, obsolete as states have developed 20 mm and 25 mm combined-effects munitions which weigh less than 400 grams. The use of tracer, or small incendiary or explosive projectiles, must be considered to be lawful if it is directed against inanimate military objectives, including aircraft, or is used for range-finding or target indication. It is also lawful to use tracer mixed with normal ammunition for range-finding or target indication at night against combatant personnel, for snipers to use combined-effects munitions against either materiel or personnel targets, and for aircraft to strafe enemy combatants in the open.¹⁰¹

Therefore, it would appear that the *UK Joint Service Manual* supports the views of the US, as contained in the joint statement described below. However, it must be noted here that use of a prohibited weapon does not necessarily lead to a lifting of the prohibition, just as speeding does not remove the need to follow the speed limits provided by the law. A more appropriate example for the international law context might be the occasional use of force by one state against another not disrupting the general prohibition of the use of force under the *UN Charter* and elsewhere.

95 Henckaerts and Doswald-Beck, above n 78, 1788–9, citing New Zealand, *Interim Law of Armed Conflict Manual*, 1992, s 510(f), 617(f).

96 Canada’s Office of the Judge Advocate General, *The Law of Armed Conflict at the Operational and Tactical Levels Manual* (2001) art 510 <http://www.fichl.org/uploads/media/Canadian_LOAC_2001_English.pdf>. See Henckaerts and Doswald-Beck, above n 78, 1788, *LOAC Manual* 1999 (Canada) 5-2.

97 See Henckaerts and Doswald-Beck, above n 78, 1789, citing United Kingdom, The War Office, *The Law of War Being on Land Being Part III of the Manual of Military Law* (1958) s 109.

98 See Henckaerts and Doswald-Beck, above n 78, 1789, citing United Kingdom, Ministry of Defence, *The Law of Armed Conflict*, D/DAT/13/35/66, 1981, 20, s 1(a).

99 United Kingdom, Ministry of Defence, *The Joint Service Manual of the Law of Armed Conflict* (2004) [6.10] <http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/27874/JSP3832004Edition.pdf> (*‘UK Joint Service Manual’*).

100 Ibid [6.10.1].

101 Ibid [6.10.2].

Third, certain legislation classifies the use of exploding projectiles as a war crime. For example, a law in The Netherlands provides for such a classification.¹⁰² Australian legislation used to include such a war crime,¹⁰³ but this was repealed by the *War Crimes Amendment Act 1988* (Cth), which removed references to the ways a war was conducted from the definition of ‘war crime’, such as the use of exploding projectiles.¹⁰⁴ The Socialist Federal Republic of Yugoslavia Penal Code listed as a war crime ‘means or methods of combat prohibited under the rules of international law, during a war or an armed conflict’, with use or order of use of ‘explosive projectiles under 400 grams that burst or have an incendiary charge’ being such a war crime.¹⁰⁵ Other states, such as Ecuador, have introduced criminal penalties for use or order to use exploding projectiles.¹⁰⁶ Unfortunately, the Rome Statute for the International Criminal Court and the negotiations leading up to its conclusion are unclear on exploding projectiles as a war crime.

Fourth, some states expressly refer to the commitments under the *St Petersburg Declaration* within their military manuals and official pronouncements, such as those of France and Brazil.¹⁰⁷ Still other states refer to a narrower commitment than the one provided by the *St Petersburg Declaration*. For example, Germany adopts a rule similar to the one advocated in the US joint statement explained below, in that it limits the prohibition to ‘explosive and incendiary projectiles’ specifically directed against individuals and that weigh much less than 400 grams.¹⁰⁸

Fifth, there are instances where states simply have asserted that they do not permit the use of exploding projectiles. There is the example of Jordan, which the ICRC study reports as ‘not us[ing], manufactur[ing] or stockpil[ing] explosive bullets and it has no intention of possessing or using such weapons in the future’,

102 See Henckaerts and Doswald-Beck, above n 78, 1790, citing *Begripsomschrijving Oorlogsmisdrijven*, 1 June 1946, art 1 (*Definitions of War Crimes Decree*).

103 See Henckaerts and Doswald-Beck, above n 78, 1790, citing *War Crimes Act 1945* (Cth) s 3 (incorporating by reference regulations involving exploding projectiles, which detail the ICRC does not mention).

104 *War Crimes Amendment Act 1988* (Cth) pt II.

105 Henckaerts and Doswald-Beck, above n 78, 1790, citing *The Criminal Code of the Socialist Federal Republic of Yugoslavia 1976* (SFRY) art 148(1).

106 See Henckaerts and Doswald-Beck, above n 78, 1790, citing *Código Penal de la Policía Civil Nacional 1960* (Ecuador) art 117(4).

107 See Henckaerts and Doswald-Beck, above n 78, 1788, citing France, Ministère de la Défense, Direction des Affaires Juridiques, Sous-Direction du Droit International Humanitaire et du Droit Européen, *Manuel de Droit des Conflits Armés* (2001) 53; Brazil’s Statement of 11 December 2001 at the Second Review Conference of the States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or Have Indiscriminate Effects, Geneva, UN Doc CCW/CONF.II/2 (11–21 December 2001) 85.

108 See Henckaerts and Doswald-Beck, above n 78, 1788, citing the Federal Ministry of Defence, Federal Republic of Germany, *Humanitarian Law in Armed Conflicts – Manual* (1992) s 406. See generally John B Bellinger and William J Haynes, ‘A US Government Response to the International Committee of the Red Cross Study *Customary International Humanitarian Law*’ (2007) 89 *International Review of the Red Cross* 443.

which seems weak in terms of establishing *opinio juris*, as it does not state if that practice is due to a belief that it must act in this manner.¹⁰⁹ The US joint statement makes this same observation.¹¹⁰

Finally, some states focus on how the *St Petersburg Declaration* relates to the prohibition on superfluous injuries or unnecessary suffering. For example, Norway recognised in 2001 that the problem with exploding projectiles lies in the fact that they cause superfluous injury or unnecessary suffering, after affirming the customary international law established through the *St Petersburg Declaration*.¹¹¹ Similarly, the UK focused on the horrific injuries that exploding projectiles cause when it noted in the proceedings of the ICJ's 1996 *Legality of the Threat or Use of Nuclear Weapons* advisory opinion that the *St Petersburg Declaration* prohibited these kinds of exploding projectiles.¹¹²

Inasmuch as the US currently is developing and deploying a weapon system that uses these kinds of exploding projectiles, it is important to highlight how the US military branches have recognised a prohibition on their use. There is a considerable amount of variety in the standards that the different branches have adopted in addressing exploding projectiles. At one end of the spectrum, the 2012 *Law of Armed Conflict Deskbook* of the US Army specifies that 'small arms projectiles ... [m]ust not be exploding or expanding projectiles', with the only support for this prohibition of exploding projectiles coming from the *St Petersburg Declaration*, which 'prohibits exploding rounds of less than 400 grams (14 ounces)'.¹¹³ The 2005 *Law of War Handbook* of the US Army provides identical language on this point.¹¹⁴ Similarly, US Air Force material from 1976 acknowledges a broad prohibition – that 'international law has condemned ... exploding bullets because of types of injuries and inevitability of death,' indirectly referring to the prohibition of exploding projectiles under the analysis.¹¹⁵ The 2007 joint statement discussed below did not mention these broad definitions of the prohibition contained in US Army and US Air Force material.¹¹⁶ This article considers the views of the US Army as most important since it is the branch principally responsible for developing and deploying the XM25.

109 Henckaerts and Doswald-Beck, above n 78, 1791, citing ICRC, *Report on the Practice of Jordan* (1997) ch 3.4.

110 See Bellinger and Haynes, above n 108, 464.

111 See Henckaerts and Doswald-Beck, above n 78, 1791, citing Letter from Norway to the President of the ICRC, 11 May 2001.

112 See Henckaerts and Doswald-Beck, above n 78, 1791, citing United Kingdom, Written Statement Submitted to the ICJ, *Nuclear Weapons Case*, 16 June 1995, s 3.65.

113 International and Operational Law Department of the United States Army Judge Advocate General's Legal Center and School, *Law of Armed Conflict Deskbook* (2012) 153–4 <http://www.loc.gov/rr/frd/Military_Law/pdf/LOAC-Deskbook-2012.pdf>.

114 See International and Operational Law Department of the Judge Advocate General's School, US Army, *Law of War Handbook* (2005) 177–8 <www.loc.gov/rr/frd/Military_Law/pdf/law-war-handbook-2005.pdf>.

115 See Henckaerts and Doswald-Beck, above n 78, 1789, citing *Air Force Pamphlet 1976* (US) s 6-3(b)(2).

116 See Bellinger and Haynes, above n 108.

Admittedly, US Army material has not been entirely consistent in recognising a broad prohibition, with a 1998 legal review of an exploding projectile noting the following:

[A] projectile that will explode on impact with the human body would be prohibited by the law of war from use for anti-personnel purposes. This remains the view of the US.¹¹⁷

Again, in the 2000 update to the legal review of an exploding projectile, the US Army reiterated this position against the legality of exploding projectiles:

[T]he considerable practice of nations during this century suggests that States accept that an exploding projectile designed exclusively for antipersonnel use would be prohibited, as there is no military purpose for it.¹¹⁸

In 2001, the US asserted that ‘there is no valid military requirement for a bullet designed to explode upon impact with the human body.’¹¹⁹ These latter views are reflected in the 2007 joint statement of the US Department of State and the US Department of Defense discussed in the following paragraphs of this section.¹²⁰

In 2007, the Legal Adviser for the US Department of State John B Bellinger III and the General Counsel for the US Department of Defense William J Haynes II jointly provided an initial response to the ICRC’s 2005 study on behalf of the US Government, which provided numerous objections from the US Government to the rules the ICRC proposed.¹²¹ The joint statement focused a significant portion of its content on Rule 78 of the ICRC’s study dealing with exploding projectiles, which states: ‘The anti-personnel use of bullets which explode within the human body is prohibited.’¹²² The joint statement asserted that only anti-personnel projectiles that are specifically designed to explode within the human body are illegal under customary international humanitarian law, and it asserts that all other projectiles that ‘could, under some circumstances, explode in the human body (but were not designed to do so)’ are not illegal. Such projectiles included anti-material projectiles that might be used against personnel, because they were not designed specifically as an anti-personnel projectile that explodes within the human body.¹²³ In sum, the joint statement asserted that the rule’s failure to distinguish between these types of exploding projectiles is a fatal flaw

117 Henckaerts and Doswald-Beck, above n 78, 1791, citing United States, Department of the Army, Office of the Judge Advocate General, ‘DAJA-10 (27-1A) Memorandum of Law, ‘Mk211, MOD O, Cal 50 Multi-Purpose Projectiles: Legal Review’, 19 February 1998.

118 Henckaerts and Doswald-Beck, above n 78, 1791, citing United States, Department of the Army, Office of the Judge Advocate General, DAJA-10 (27-1A) Memorandum of Law, ‘Mk211, MOD O, Cal. 50 Multi-Purpose Projectiles: Legal Review’, 14 January 2000, 17.

119 Henckaerts and Doswald-Beck, above n 78, 1791–2, citing United States, Statement of 5 October 2001 at the Third Preparatory Committee for the Second Review Conference of the States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or Have Indiscriminate Effects, Geneva, UN Doc CCW/CONF.II/PC.3/PV.1 (24–28 September 2001) 54.

120 See Bellinger and Haynes, above n 108.

121 See *ibid.*

122 See *ibid* 460.

123 *Ibid.*

of this rule, primarily because it focuses on effect instead of on design. The joint statement pointed out:

The practice the Study cites does not support a rule banning the use of exploding bullets against personnel in all circumstances. The Study includes in Volume II examples from the military manuals of eleven countries, only six of which contain unqualified bans on exploding bullets; the legislation of six countries, only three of which provide additional support for the rule as stated; statements made by several States at diplomatic conferences, most of which are ambiguous; and the reported operational practice of only two States. Among all these sources, at most two cite customary international law as the legal basis for regulations on the use of exploding bullets. Even disregarding the existence of contrary State practice, this body of evidence is insufficient to establish the customary nature of the rule as stated.¹²⁴

A comparison of this assessment of the US joint statement and the summaries of state practice provided above shows that the US assessment is mostly accurate, with the major difference being that there were five examples of qualifications to the general prohibition for anti-air systems. Indeed, the state practice summarised above suggests that there is, in fact, an exception for exploding projectiles in the context of anti-air systems, although that practice does not appear to extend to airplanes strafing enemy soldiers located on the ground, contrary to what some commentators assert.¹²⁵ Nor would the US military's long use of the 12.7 millimetre Raufoss Multipurpose Projectile demonstrate that no custom exists when it comes to exploding projectiles, as the US government and international law commentators have persuasively argued that these projectiles do not explode, but rather use kinetic energy.¹²⁶

The joint statement makes a valid point that the rules articulated by the ICRC's study are flawed with their incomplete quotations and references.¹²⁷ However, the joint statement is equally flawed, if not more so, by its overlooking of a key point of international humanitarian law: article 36 of the *First Additional Protocol* and the identical customary international law that runs parallel to it indicate that the legality of weapons is not determined entirely by design but also with regard to their anticipated uses and effects. In other words, if it is anticipated that the XM25 will be used against personnel and that they might explode within the human body, that would be enough for a weapon to be deemed illegal under international law. Given this language in article 36 and the customary status of article 36, as explained below, it becomes irrelevant that this effects-based argument has not been accepted by some 'military, medical, legal and diplomatic

124 Ibid 463–4.

125 See Carnahan, above n 67, 717, citing David Hughes-Morgan, *Legal Criteria for the Prohibition or Restriction of Use of Categories of Conventional Weapons* (1974), quoted in Frits Kalshoven, 'Conventional Weaponry: The Law from St Petersburg to Lucerne and Beyond' in Michael A Meyer (ed), *Armed Conflict and the New Law: Aspects of the 1977 Geneva Protocols and the 1981 Weapons Convention* (British Institute of International and Comparative Law, 1989) 251, 259 (asserting there is an exception for anti-air systems and the targeting enemy soldiers on the ground).

126 See Bellinger and Haynes, above n 108; Parks, above n 68, 90–7; W Hays Parks, 'The ICRC Customary Law Study: A Preliminary Assessment' (2005) 99 *Proceedings of the Annual Meeting (American Society of International Law)* 208, 208, 211–12.

127 See Bellinger and Haynes, above n 108.

experts who participated in the [Superfluous Injury or Unnecessary Suffering ('SirUS')] Project',¹²⁸ as the requirement for an effects-based analysis appears within the *First Additional Protocol* itself and no objections have been expressed concerning article 36's status as customary international law. In fact, the US has recognised the customary international law status of the *First Additional Protocol* except for articles 1(4), 35(3), 39(2), 44, 47, 55 and 56.¹²⁹

While critics will argue that the XM25 was not *designed* to explode within the human body, it is difficult to forget the words of the reporter when Alliant Techsystems first unveiled the XM25 in 2003, that the XM25 was designed to 'explode just inches from a target's head'.¹³⁰ Presumably, this description reflects the intended design described by Alliant Techsystems to the reporter on the day it first unveiled the XM25. Assuming, *arguendo*, that the customary international humanitarian law prohibition requires an intended design for the projectile to explode *within* the target's body, then an intended design of exploding 'just inches from a target's head' is not literally *within* the target's body. Nevertheless, it seems overwhelmingly foreseeable that the projectile could explode *within* the target's body, especially when the programmability of the XM25 is in the order of metres, not inches. As Part IV below discusses, these projectiles have the equivalent blast and fragmentation patterns of a standard grenade, and so the effect likely will not vary dramatically between when the projectile is placed within inches from the target's head and when the projectile is placed within the target's head. Both scenarios likely will be prohibited under article 35(2) of the *First Additional Protocol* and its parallel customary international law norm. As the following paragraphs explain, the requirement under article 36 of the *First Additional Protocol* and its parallel customary international law norm to assess the legality of a weapon in light of its foreseeable misuses means the difference between intending to place the projectile within inches of a target's head and placing the projectile within a target's head has no legal significance.

As mentioned in the introduction, article 36 of the *First Additional Protocol* requires that states review the legality of their weapons, means and methods of warfare at various stages of their development and deployment 'in some or all circumstances'.¹³¹ The phrase 'in some or all circumstances' is particularly important here, as it requires states to determine the legality of the use and *anticipated* use of their weapons, at all stages of their development and

128 Parks, above n 68, 99.

129 See Graham H Todd, 'Armed Attack in Cyberspace: Deterring Asymmetric Warfare with an Asymmetric Definition' (2009) 64 *Air Force Law Review* 65, 80, citing International & Operations Law Division, Office of the Judge Advocate General, Department of the Air Force, *Air Force Operations & the Law* (2002) 25, 48. See also Michael J Matheson, 'Session One: The United States Position on the Relation of Customary International Law to the 1977 Protocols Additional to the 1949 Geneva Conventions' in Martin D Dupius, John Q Heywood and Michèle Y F Sarko, 'The Sixth Annual American Red Cross-Washington College of Law Conference on International Law and the 1977 Protocols Additional to the 1949 Geneva Conventions' (1987) 2 *American University Journal of International Law and Policy* 415, 419, 424-5 (noting no objections to article 36).

130 DePass, above n 10.

131 *First Additional Protocol*, art 36.

deployment on an ongoing basis. This provision supposedly became needed when states were unable to reach a consensus about the interpretation of ‘superfluous injury or unnecessary suffering’ in the preceding provision of the *First Additional Protocol*.¹³² This language of article 36 generally has been interpreted to mean that states must decide on the legality of a weapon in accordance with ‘the *normal* use of the weapon as anticipated at the time of evaluation’,¹³³ as opposed to the designed use. The Third Committee of the Diplomatic Conference responsible for drafting this language explained the following about what would become article 36 in the final version, which supports this interpretation:

It should also be noted that [article 36] is intended to require States to analyse whether the employment of a weapon for its *normal or expected use* would be prohibited under some or all circumstances. A State is not required to foresee or analyse all possible misuses of a weapon, for almost any weapon can be misused in ways that would be prohibited.¹³⁴

This interpretation suggests that legal reviews under article 36 must consider *expected* uses, which goes beyond mere ‘normal’ uses and which goes far beyond the ‘designed’ uses. Therefore, it seems conceivable that the drafters intended for states to assess the legality of weapons in the context of at least a few possible misuses of the weapon from how it was designed, although admittedly assessment in light of ‘all possible misuses’ might not be reasonable.

Given the customary international law that is applicable to the US, it becomes irrelevant that ‘[t]he ICRC put forward an effects-based standard at the Second [Convention on Certain Conventional Weapons] Review Conference in 2001, in proposing that CCW States Parties consider negotiating a protocol that would prohibit the anti-personnel use of bullets that explode within the human body’ and that it was rejected, as the joint statement pointed out to support that an effects-based standard does not exist for exploding projectiles.¹³⁵ This assumes that the ICRC proposed such a protocol at the Second CCW Review Conference in 2001, which the ICRC claims it did not propose.¹³⁶ Despite the views provided in the 2007 joint statement, one would expect the more recent pronouncement – such as the broad prohibition of the 2012 *Law of Armed Conflict Deskbook* of the US Army – to be more accurate of the current US military position. Moreover, US military lawyers talk of the broad prohibition of exploding projectiles, as reflected in the 2012 *Law of Armed Conflict*

132 See Jean de Preux, ‘Article 36 – New Weapons’ in Yves Sandoz, Christophe Swinarski and Bruno Zimmerman (eds), *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Convention of 12 August 1949* (Martinus Nijhoff, 1987) 421, 424.

133 Ibid 423 (emphasis added).

134 Report to the Third Committee on the Work of the Working Group Committee III, Doc No CDDH/III/293 in Howard S Levie, *Protection of War Victims: Protocol I to the 1949 Geneva Conventions* (Oceana, 1980) vol 2, 287 (emphasis added). For a more detailed analysis of article 36 of the First Additional Protocol and the need for contextualised legal reviews, see generally Fry, above n 8, 453.

135 See Bellinger and Haynes, above n 108, 461.

136 See Henckaerts, above n 81, 484–5.

Deskbook.¹³⁷ Finally, the US government acknowledged in the 1996 ICJ proceedings in the *Legality of the Threat or Use of Nuclear Weapons* advisory opinion that there is a 'specific category' of exploding projectiles that international law prohibits, without referring to limitations or exceptions in that category,¹³⁸ and the ICJ agreed.¹³⁹ In light of these assertions of the US Army and the US government that there is a broad prohibition of exploding projectiles that weigh less than 400 grams, it seems much more surprising to read of the US military continuing to develop the XM25 and deploy the XM25 in places like Afghanistan. At a minimum, one certainly would have expected the joint statement to have tried to reconcile these assertions of a broad prohibition with the position set out there.

Based on most of the information provided above, the ICRC established rule 78 of the Customary Rules of International Humanitarian Law.¹⁴⁰ A portion of the state practice portion of the ICRC's study notes how experts in this area have asserted that the prohibition of exploding projectiles, as contained in the *St Petersburg Declaration*, 'continues to be valid' and that use of such exploding projectiles is a violation of international law.¹⁴¹ The ICRC's commentary to this rule asserts that there is no contrary state practice that would undermine the validity of this rule as part of customary international law.¹⁴² The main external commentary on the ICRC's study notes that the treaties dealing with weapons, means and methods of warfare generally involve 'establishing new rules about specific weapons at the point of agreement, rather than to codify pre-existing customary norms.'¹⁴³ The main exception to that general observation would appear to be rule 78 relating to exploding projectiles: 'The ban on use [of exploding projectiles under rule 78] is uncontroversial, is well traced in treaty

137 See, eg, Todd, above n 129, 79. Civilian commentators also regularly talk of the broad prohibition of exploding bullets: see, eg, Roger S Clark, 'The Laws of Armed Conflict and the Use or Threat of Use of Nuclear Weapons' (1996) 7 *Criminal Law Forum* 265, 288; Evan J Wallach, 'A Tiny Problem with Huge Implications – Nanotech Agents as Enablers or Substitutes for Banned Chemical Weapons: Is a New Treaty Needed?' (2010) 33 *Fordham International Law Journal* 858, 923 n 252; Nicholas Rostow, 'Ethical Responsibilities: The Law of War, War Crimes, and Operational Law' (1994) 5 *United States Air Force Academy Journal of Legal Studies* 1, 5.

138 See Conrad K Harper, Michael J Matheson, Bruce C Rashkow and John H McNeill, 'Letter Dated 20 June 1995 from the Acting Legal Adviser to the Department of State, Together with Written Statement of the Government of the United States of America', *Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion)*, 20 June 1995, 10 <<http://www.icj-cij.org/docket/files/95/8700.pdf>>.

139 See *Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion)* [1996] ICJ Rep 226, 256.

140 Henckaerts and Doswald-Beck, above n 73, 272.

141 Henckaerts and Doswald-Beck, above n 78, 1792, citing Expert Meeting on Exploding Projectiles of 12.7 mm and Below, Geneva, 29–30 March 1999; *Final Declaration*, Second Review Conference of the States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or Have Indiscriminate Effects, Geneva, UN Doc CCW/CONF.II/2 (11–21 December 2001) 9.

142 See Henckaerts and Doswald-Beck, above n 73, 274.

143 Steven Haines, 'Weapons, Means and Methods of Warfare' in Elizabeth Wilmshurst and Susan Breau (eds), *Perspectives on the ICRC Study on Customary International Humanitarian Law* (Cambridge University Press, 2007) 261–2.

law and is acknowledged widely as having achieved customary status.¹⁴⁴ The generally critical nature of the entire external commentary solidifies its appearance as an objective assessment of these rules and makes this observation concerning rule 78 seem more reliable than had it been provided by the ICRC or one of the drafters of the rules.

Admittedly, there are flaws in the ICRC's study as it relates to exploding projectiles. For example, it is easy to see how the examples of state practice in volume 2 of the study come primarily from English-speaking states, with analysis of even the French-speaking states' practice being entirely underdeveloped. This is surprising, given that French occupies the position of principal working language of the ICRC. It is tempting to presume that the focus on English sources occurred due to the ICRC's outsourcing of the research and to the limited linguistic abilities of those outsourced reviewers. Such a situation presumably is common with most 'comparative' studies, which typically lack the seemingly endless resources needed to hire an army of competent research assistants who have the linguistic skills to do a thoroughly comprehensive review. Presumably the British Red Cross Society and the Lauterpacht Centre for International Law at the University of Cambridge, which have been tasked with updating the ICRC's study,¹⁴⁵ are more competent in providing this sort of comprehensive, comparative review. That said, the ICRC's study is only as good as the information provided by states and allowed to be included in a publication.

Despite these apparent inadequacies of the ICRC's study, it is important to note that the practice of all states is not needed in order to say that a customary rule exists on a particular point. For example, there is a principle of specially affected states having a key role in determining custom where the limited number of states involved in a particular area of international life have a disproportionate amount of influence over the formation of custom in that particular area.¹⁴⁶ Moreover, there is a relatively popular notion that customary international law now is formed by consensus on account of the increased number of states, as opposed to unanimity or even close unanimity over the practice of states, where states that have not expressly consented to an emergent customary norm are nonetheless deemed as having implicitly consented to the norm by not objecting

144 Ibid 272.

145 See Henckaerts, above n 81, 487–8.

146 See *North Sea Continental Shelf Cases (Federal Republic of Germany v Denmark; Federal Republic of Germany v Netherlands) (Judgment)* [1969] ICJ Rep 4, 42. See also Jonathan I Charney, 'Universal International Law' (1993) 87 *American Journal of International Law* 529, 537 (noting how the practice of 'a limited number of states, often only the largest, most prominent, or most interested among them' is particularly important in the formation of custom); Sabrina Balgamwalla, 'Review of Conference: "The Reaffirmation of Custom as an Important Source of International Humanitarian Law"' (2006) 13 *Human Rights Brief* 13, 14–15 (summarising the comments of Michael Matheson at the North American launch of the ICRC's customary international humanitarian law study, and noting the importance he placed on the practice of specially affected states in determining customary international humanitarian law). Note that the principle of specially affected states need not apply with the creation of customary international humanitarian law, inasmuch as all states have the potential to be 'specially affected' and all states have 'a legitimate interest in the development of humanitarian law': Henckaerts, above n 81, 482.

to it in the multilateral plenary forum where it was created.¹⁴⁷ The ICRC's response to the joint statement notes that the joint statement represents 'the first formal comments [on the ICRC's study] to be received by the ICRC at governmental level'.¹⁴⁸ Exhaustive research and a confirmation by the ICRC supports the conclusion that the US joint statement is the only formal and published criticism that the ICRC's study has received.¹⁴⁹ The above analysis has shown this objection to be fundamentally flawed based on an analysis of article 36 of the *First Additional Protocol* and its related customary international law, to the point that it is difficult to see this objection as forming a new consensus or even representing a significant challenge to the validity of the ICRC's customary rule in relation not only to exploding projectiles but also to the need to assess the legality of weapons in 'some or all circumstances'. Therefore, even with consideration of the practice of only a few states, it is possible to talk of binding customary international law on states. Of course, it is virtually impossible to be exhaustive when analysing state practice, and custom can evolve beyond the codified rules, so the ICRC's study should not be seen as the definitive treatise on customary international humanitarian law.¹⁵⁰ Moreover, while there is the

147 See, eg. Richard A Falk, 'On the Quasi Legislative Competence of the General Assembly' (1966) 60 *American Journal of International Law* 782, 785 (noting 'a discernible trend from consent to consensus as the basis of international legal obligations'); Charney, above n 146, 543–51 (inter alia, defining 'consensus' as 'the lack of expressed objections to the rule by any participant': at 544); Jose E Alvarez, 'The New Treaty Makers' (2002) 25 *Boston College International and Comparative Law Review* 213, 231; O Yoshida, 'Soft Enforcement of Treaties: The Montreal Protocol's Noncompliance Procedure and the Functions of Internal International Institutions' (1999) 10 *Colorado Journal of International Environmental Law and Policy* 95, 120–1; Joseph Isanga, 'Counter-Terrorism and Human Rights: The Emergence of A Rule of Customary Int'l Law from UN Resolutions' (2009) 37 *Denver Journal of International Law & Policy* 233, 239; Curtis A Bradley and Mitu Gulati, 'Customary International Law and Withdrawal Rights in an Age of Treaties' (2010) 21 *Duke Journal of Comparative & International Law* 1, 7; Harold Hongju Koh, 'Is International Law Really State Law?' (1998) 111 *Harvard Law Review* 1824, 1853–4; Leonard M Hammer, 'Reconsidering the Israeli Court's Application of Customary International Law in the Human Rights Context' (1998) 5 *ILSA Journal of International & Comparative Law* 23, 32–3; John King Gamble and Charlotte Ku, 'New Actors and New Technologies: Center Stage for NGOs?' (2000) 31 *Law & Policy in International Business* 221, 240–1; Annecoos Wiersema, 'The New International Law-Makers? Conferences of the Parties to Multilateral Environmental Agreements' (2009) 31 *Michigan Journal of International Law* 231, 247–8; Mark A Chinen, 'Game Theory and Customary International Law: A Response to Professors Goldsmith and Posner' (2001) 23 *Michigan Journal of International Law* 143, 172; Michelle A Hansen, 'Preventing the Emasculation of Warfare: Halting the Expansion of Human Rights Law into Armed Conflict' (2007) 194 *Military Law Review* 1, 17–18 (noting how failure to object can be deemed consent); Stuart Walters Belt, 'Missiles over Kosovo: Emergence, *Lex Lata*, of a Customary Norm Requiring the Use of Precision Munitions in Urban Areas' (2000) 47 *Naval Law Review* 115, 152–3. See also Jan Klabbers, *An Introduction to International Institutional Law* (Cambridge University Press, 2nd ed, 2009) 207–8 (explaining the difference between unanimity and consensus).

148 Henckaerts, above n 81, 474.

149 See Confidential Source, Interview with ICRC (Email, 20 May 2013).

150 See Henckaerts, above n 81, 487.

possibility of persistent objectors being excluded from this customary norm,¹⁵¹ the broad prohibitions against exploding projectiles of the US Army and the US Air Force arguably indicate that the US has not been sufficiently persistent for this exception to apply.

When it comes to the XM25, it appears that the US has breached customary international law by inventing, deploying and using the XM25, which is prohibited under the ban on exploding projectiles below 400 grams and under the law's requirement for contextualised legal reviews. As discussed in the introduction to this part, the projectiles used by the XM25 are far below 400 grams in weight, and they are designed to detonate in the vicinity of personnel, and it is foreseeable that it may detonate within personnel. Thus, it would appear that the XM25 falls squarely under the scope of this customary international law prohibition. This is to say nothing about the strategic and moral issues that might arise when putting such powerful weapons in the hands of soldiers many of whom, according to the US government, suffer from stress-related illnesses.¹⁵² Assuming, *arguendo*, that there is no prohibition under customary international law of use of exploding projectiles that weigh less than 400 grams, then the XM25 nevertheless is illegal under the customary international law norm that prohibits weapons that cause superfluous injury or unnecessary suffering, which is the topic of the following part.

IV SUPERFLUOUS INJURY OR UNNECESSARY SUFFERING BY THE XM25 WEAPON SYSTEM

In addition to the prohibition of exploding projectiles that weigh less than 400 grams, the *St Petersburg Declaration* introduced in its preamble the notion that certain weapons should be prohibited based on the unnecessary suffering they cause.¹⁵³ Some commentators have asserted that this portion of the *St Petersburg Declaration* is more important for contemporary international law than its substantive portion dealing with exploding projectiles.¹⁵⁴ The rationale behind this prohibition based on unnecessary suffering was that the exploding component of the projectile would be superfluous if the injury from the non-

151 See generally Jonathan I Charney, 'The Persistent Objector Rule and the Development of Customary International Law' (1985) 56 *The British Yearbook of International Law* 1; Ted L Stein, 'The Approach of a Different Drummer: The Principle of the Persistent Objector in International Law' (1985) 26 *Harvard International Law Journal* 457; David A Colson, 'How Persistent Must the Persistent Objector Be?' (1986) 61 *Washington Law Review* 957.

152 See 'Afghanistan: A Testing Ground for American Military Hardware', *Plus News Pakistan* (Pakistan), 13 December 2010 (noting how the US asserts that 20 per cent of its forces in Afghanistan suffer from 'temporary stress injuries', with 10 per cent suffering from 'stress illnesses').

153 See *St Petersburg Declaration*, preamble; see also Ganesh Sitaraman, 'Counterinsurgency, the War on Terror, and the Laws of War' (2009) 95 *Virginia Law Review* 1745, 1754–5; Carnahan, above n 67, 715–16.

154 See, eg, Stockholm International Peace Research Institute, *Anti-Personnel Weapons* (Taylor & Francis Ltd, 1978) 212.

exploding projectile itself would render the target *hors de combat*.¹⁵⁵ Over time, this notion has crystallised into article 35(2) of the *First Additional Protocol*: 'It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.' This part of the article analyses XM25's legality under the parallel customary international law to article 35(2) of the *First Additional Protocol*. Indeed, even if the XM25 has not contravened the customary international law prohibiting exploding projectiles that weigh less than 400 grams, the US nevertheless may have contravened article 35(2) of the *First Additional Protocol* for causing 'superfluous injury or unnecessary suffering' from this weapon system. As Julius Stone explained about exploding projectiles, the difficulties of treating the wounds that result from them pose the largest problem, whereas the projectile without the explosion would have injured the combatant to the point that he would be removed from the conflict anyway.¹⁵⁶ As the *St Petersburg Declaration*'s preamble implies, it seems that death could be inevitable when such exploding projectiles are used.¹⁵⁷ Such inevitability of death certainly violates the principle of humanity, but it also undermines the subtler objective of international humanitarian law to enable commanders to inspire and direct their soldiers towards achieving military objectives.¹⁵⁸

Although the prohibition against 'weapons ... of a nature to cause superfluous injury or unnecessary suffering' represents a well established rule of law, the definition of 'superfluous injury or unnecessary suffering' is rather vague and ambiguous. Therefore, in 1997, the ICRC initiated the SirUS Project in order to define the objective criteria for determining which effects of weapons constitute 'superfluous injury or unnecessary suffering' and are therefore illegal under the *First Additional Protocol*.¹⁵⁹ The project also aimed to help develop public opinion with regard to the illegality of certain weapons for being 'abhorrent' or inhuman in the public conscience.¹⁶⁰ The main task of the SirUS Project has been to collect and evaluate data relating to injuries caused from armed conflicts throughout the world in an effort to determine the mortality and permanent injury rates of the wounds from various weapons.¹⁶¹ The data ultimately came from ICRC hospitals operating in the field, with over 26 000

155 See Carnahan, above n 67, 715–16.

156 See Julius Stone, *Legal Controls of International Armed Conflict* (Rinehart, 1954) 550–3.

157 See Henckaerts and Doswald-Beck, above n 73, 241.

158 See Frits Kalshoven and Liesbeth Zegveld, *Constraints on the Waging of War: An Introduction to International Humanitarian Law* 203–4 (International Committee of the Red Cross, 3rd ed, 2001) (juxtaposing the doctrine of humanity and the doctrine of military necessity).

159 See Robin M Coupland and Peter Herby, 'Review of the Legality of Weapons: A New Approach, The SirUS Project' (1999) 81 *International Review of the Red Cross* (1999) 583; Justin McClelland, 'The Review of Weapons in Accordance with Article 36 of Additional Protocol I' (2003) 85 *International Review of the Red Cross* 397, 399.

160 Coupland and Herby, above n 159.

161 See Robin M Coupland (ed), *The SirUS Project: Towards a Determination of Which Weapons Cause 'Superfluous Injury or Unnecessary Suffering'* (International Committee of the Red Cross, 1997) 7.

victims being included.¹⁶² A few of the aspects of the injuries that were recorded were the degree of permanent disability, how many blood transfusions were needed, how long they stayed in the hospital, how many operations were needed, and how many large wounds were caused by the weapon.¹⁶³ This information has been used to show the ways that victims are injured by particular weapons.¹⁶⁴ This database enables a comparison between the design and effects of old weapons and new weapons, which helps draw conclusions on a weapon's legality.¹⁶⁵

The SIrUS Project uses four criteria for determining whether a weapon system causes 'superfluous injury and unnecessary suffering':

- a. [A] specific disease, specific abnormal physiological state, specific abnormal psychological state, specific and permanent disability or specific disfigurement; or
- b. [F]ield mortality of more than 25% or a hospital mortality of more than 5%; or
- c. Grade 3 wounds as measured by the Red Cross wound classification scale; or
- d. [E]ffects for which there is no well-recognized and proved treatment.¹⁶⁶

The middle two criteria are pertinent to the analysis of the XM25's legality. In particular, the criterion involving grade 3 wounds is most relevant, with the second criterion being linked to the third inasmuch as the size of wounds has a role with mortality rates. Grade 3 wounds generally involve such wounds as those to the skin that are 10 centimetre or more in length with a cavity.¹⁶⁷ Moreover, grade 3 wounds are said to deposit more than 1500 joules of energy, similar to shotgun wounds and wounds from dum dum bullets.¹⁶⁸ The SIrUS Project asserts that this third criterion needs to apply to weapons that, without targeting a particular part of the body, simply inflict large wounds.¹⁶⁹ This would appear to apply specifically to the XM25's exploding projectiles. Moreover, ICRC experts associated with the SIrUS Project have concluded that exploding

¹⁶² Ibid.

¹⁶³ Ibid 15.

¹⁶⁴ See International Committee of the Red Cross, 'Protection of Victims of Armed Conflict through Respect of International Humanitarian Law', Reference Document, 27th International Conference of the Red Cross and Red Crescent, Geneva (31 October – 6 November 1999) [18] ('*Protection of Victims*') <<http://www.icrc.org/eng/resources/documents/misc/57jpn.htm>>.

¹⁶⁵ See Andrew Koch, 'Should War Be Hell?', *Jane's Defence Weekly* (Surrey, UK), 10 May 2000, 23 (quoting from an interview with Parks); Robin M Coupland, 'The "Design-Dependent" Effects of Weapons: A Fundamental Consideration in Reviewing the Legality of Weapons', Proceedings of the 9th Annual Conference of the Australian and New Zealand Society of International Law (13–14 June 2001) 37 <anzsil.anu.edu.au/Conferences/2001/2001proceedings.pdf>; ICRC, above n 164.

¹⁶⁶ McClelland, above n 159, 400; David P Fidler, 'The International Legal Implications of "Non-Lethal" Weapons' (1999) 21 *Michigan Journal of International Law* 51, 87; Coupland, *SIrUS Project*, above n 161, 23.

¹⁶⁷ See Coupland, *SIrUS Project*, above n 161, 15. But see Donna Marie Verchio, 'Just Say No! The SIrUS Project: Well-Intentioned, but Unnecessary and Superfluous' (2001) 51 *Air Force Law Review* 183, 209 (criticising this aspect of the criteria).

¹⁶⁸ See Coupland, *SIrUS Project*, above n 161, 15. But see Verchio, above n 167, 209 (criticising this aspect of the criteria).

¹⁶⁹ See Coupland, *SIrUS Project*, above n 161, 24.

projectiles ‘are usually lethal or cause grade 3 limb wounds’, and so could be considered as illegal under article 35(2) of the *First Additional Protocol*.¹⁷⁰

Admittedly, there might be situations where the XM25’s exploding projectiles do not cause grade 3 wounds, for example when the projectile explodes at a distance where the wounds are less than 10 centimetres and without a cavity, or if not less lethal projectiles are used in place of their high-explosive ones, assuming they eventually are developed. However, this analysis of the SIrUS Project makes it seem as though there is a default conclusion with exploding projectiles of the kind typically associated with the XM25 – that they cause grade 3 wounds and therefore are illegal under article 35(2) of the *First Additional Protocol*. From a policy perspective, it makes sense to adopt this type of default conclusion despite the exceptions noted above because the XM25 represents the primary weapon of a soldier. The US Army’s apparent policy decision that new families of weapons eventually will be fitted with a bayonet suggests that the XM25 has been designed to become a soldier’s primary weapon.¹⁷¹ This means that the soldier typically will not switch between the XM25 and a more traditional weapon when targeting enemy soldiers on the battlefield. In situations where the target is not hiding, the wounds likely will be more horrendous, given that the barriers that typically blunt an attack will provide no protection. Even if there were a policy of reserving the XM25 just for use against hidden targets, the requirement of article 36 of the *First Additional Protocol* to assess the legality of weapons in the context of at least a few possible misuses of the weapon, as explained in Part III above, means that the XM25 likely would be illegal notwithstanding such a policy, inasmuch as direct targeting of exposed enemy soldiers seems like a highly probable use of the XM25, not merely a possible one. The contextual review of the methods and means of warfare under article 36 of the *First Additional Protocol* applies to compliance with the ‘superfluous injury or unnecessary suffering’ standard in article 35(2) of the *First Additional Protocol*. Therefore, US military commentators are incorrect for criticising the SIrUS Project for going beyond the normal or intended weapon use in its assessment of legality,¹⁷² as that is what actually is required by article 36 of the *First Additional Protocol*.

All of that said, it must be recognised that superfluous injury and unnecessary suffering must be determined by balancing military necessity with the likely suffering from that particular weapon’s use. The ICJ clarified this point in its *Legality of the Threat or Use of Nuclear Weapons* advisory opinion,¹⁷³ and this balancing with military necessity widely has been accepted in the literature. The

170 See Coupland and Herby, above n 159, 586. See also *SIrUS Project*, above n 161, 24–5. It is important to note that the ICRC recently has moved away from the SIrUS Project, although the rationale behind the SIrUS Project and its criteria appear to retain a large measure of their validity in determining superfluous injury and unnecessary suffering.

171 See Roosevelt, above n 11.

172 See, eg, Verchio, above n 167, 209.

173 See *Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion)* [1996] ICJ Rep 226, 257 [78]–[79].

failure of the ICRC's SIrUS Project to take into consideration military necessity when determining superfluous injury and unnecessary suffering could be seen as one of its major flaws. Certainly the introduction of the XM25 might be demanded by the imperatives of modern warfare, which has to be determined on a case-by-case basis in accordance with the relevant laws. Therefore, it is difficult to determine in isolation and even in context whether the XM25's necessity sufficiently overwhelms the gravity of the injuries and suffering that the XM25 may cause. Nevertheless, military necessity must not be allowed to be defined too broadly or else the protections from the norms of international humanitarian law might be undermined. With this in mind, this analysis concerning the XM25 in relation to the norms on superfluous injury and unnecessary suffering has been framed as an alternative argument, but one that still should be taken seriously by states studying, developing, acquiring and adopting the XM25.

V CONCLUSION

The US Army has been developing a new weapon system called the XM25 Individual Semi-automatic Airburst Weapon System since 2003, which mainly has been aimed at destroying enemy soldiers who employ guerrilla tactics. This weapon, effective as it may be on the battlefield, arguably violates customary international law. First, the XM25 appears to breach customary international law by using exploding projectiles that weigh less than 400 grams. Second, the use of the XM25 appears to breach article 35(2) of the *First Additional Protocol* because its projectiles can cause superfluous injury or unnecessary suffering. Whereas critics might claim that the XM25 and its projectiles were not *designed* to explode within individual soldiers, international law requires that the legality of all weapons be assessed with the context of their reasonably foreseeable use and misuse in mind. Consequently, the US Army should cease its development of and reliance on the XM25 Individual Semi-automatic Airburst Weapon System. Alternatively, the US Army could strictly limit the use of the XM25 to situations where the target cannot directly be hit by the XM25's projectile, although this limitation likely would not make direct attacks with the XM25 unforeseeable in all circumstances. Nevertheless, ceasing plans to put a bayonet on the XM25 would be a good start to showing that the XM25 will not be used as the primary weapon for troops, where the chances seem relatively significant that a projectile will explode within the target.