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DOES THE LAW OF ARMED CONFLICT REQUIRE THE USE OF PRECISION GUIDED MUNITIONS WHEN CONDUCTING URBAN AERIAL ATTACKS?

AUTHOR: Edward R. Lucas
Major
USAF
2003
80 pages
LL.M in International and Comparative Law
University of Iowa, College of Law

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The use of PGMs may be required by international law, as determined on a case-by-case basis, based on the information available at the time the mission was planned and executed. Factors that go into the determination of whether or not a PGM must be employed under the law of armed conflict include limiting factors such as environmental disruption or effective guidance jamming, and PGM availability. Availability is not only measured in immediate availability, but also considers whether or not there is a need to sustain a long operation, as opposed to the use of force in an isolated raid.

This paper also discusses whether, pursuant to the Martens Clause, a rule of customary law requiring the use of PGMs in all circumstances where there was the possibility of collateral damage could evolve. Due to the continuous development of new means of warfare, the lengthy process of developing custom, and, most importantly, the international law preference for recognizing general principles rather than creating specific prohibitions when there is no controlling treaty, customary international law requiring the use of PGMs is not likely to crystallize.

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G.A. Res. 2675, U.N. GAOR, 25th Sess., Supp. No. 28, at 76, U.N. Doc A/8028 (1971).

Geneva Convention (I) for the Amelioration of the Wounded, Sick and Shipwrecked Members of Armed Forces in the Field, 6 U.S.T. 3115. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988).

Geneva Convention (II) for the Amelioration of the Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, 6 U.S.T. 3219. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988).

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Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, 36 Stat. 2277. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988).

Hague Convention IX Concerning Bombardment by Naval Forces in Time of War, Oct. 18, 1907, 36 Stat. 2351. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988).

Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, adopted June 8, 1977, 1125 U.N.T.S. 1. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988).

Statute of the International Court of Justice, 59 Stat. 1055, T.S. No. 993, 3 Bevans 1179. *Reprinted in International Law Selected Documents*, Barry E. Carter (2001-2002 ed.).

United Nations Educational, Scientific, and Cultural Organization, Convention And First Protocol For the Protection of Cultural Property in the Event of Armed Conflict, at http://www.unesco.org/culture/laws/hague/html_eng/page9.shtml.

CASE LAW

The Paquete Habana, 175 U.S. 677 (1900).

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Georges Abi-Saab, *The Specificities of Humanitarian Law*, in *Studies and Essays on International Humanitarian Law and Red Cross Principles in Honour of Jean Pictet* 265 (Christophe Swinarski ed., 1984).

George H. Aldrich, *New Life for the Laws of War*, 75 Am. J. Int'l L. 764 (1981).

Michael Bothe, Karl Josef Partsch, Waldemar A. Solf, *New Rules for Victims of Armed Conflicts, Commentary on the Two 1977 Protocols Additional to the Geneva Conventions of 1949* (1982).

U.S. Ambassador Peter Burleigh, Statement To The U.N. Security Council, March 24, 1999, *reprinted in International Law Selected Documents 2001-2002*, at 915 (Barry E. Carter ed., Aspen Law and Business 2001) (1999).

President George W. Bush, *President Bush Outlines Progress in Operation Iraqi Freedom*, April 16, 2003, at <http://www.whitehouse.gov/news/releases/2003/04/20030416-9.html>.

President George H.W. Bush's *Remarks at the United States Air Force Academy Commencement Ceremony in Colorado Springs, Colorado*, 29 May 1991, 27 Weekly Comp. Pres. Doc. 22.

President George W. Bush, State of the Union Address, 28 January 2003.

Letter from J. Fred Buzhardt, General Counsel, U.S. Department of Defense (Sept. 22, 1972), in Arthur W. Rovine, *Contemporary Practice of the United States Relating to International Law*, 67 Am. J. Int'l L. (1973).

Antonio Cassese, *International Law* (2001).

Major Ariane L. DeSaussure, *The Role of the Law of Armed Conflict During the Persian Gulf War: An Overview*, 37 A.F.L. Rev. 41 (1994).

Col Charles J. Dunlap, *Technology: Recomplicating Moral Life for the Nation's Defenders*, Parameters: U.S. Army War College, Autumn 1999.

Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, 8 June 2000, 39 ILM 1257 (2000).

Dieter Fleck, *The Handbook of Humanitarian Law in Armed Conflicts* 29 (1995).

Judith Gail Gardam, *Non-Combatant Immunity as a Norm of International Humanitarian Law* (1993).

Green, *Essays on the Modern Law of War* (2d ed. 1999).

L.C. Green, *The Contemporary Law of Armed Conflict* (Manchester University Press 1993).

Sir Jeremy Grenstock (U.K.), Statement To The U.N. Security Council, March 24, 1999, U.N. Doc. S/PV. 3988 *reprinted in International Law Selected Documents 2001-2002*, at 917 (Barry E. Carter ed., Aspen Law and Business 2001) (1999).

Statement of John J. Hamre, U.S. Deputy Secretary of Defense, before the U.S. House Permanent Select Committee on Intelligence, July 22, 1999.

Human Rights Watch, *Civilian Deaths in the NATO Air Campaign – The Crisis in Kosovo* (2000), available at <http://www.hrw.org/reports/2000/nato>.

Human Rights Watch, *International Humanitarian Law Issues In A Potential War In Iraq, Human Rights Watch Briefing Paper*, February 20, 2003 at <http://www.hrw.org/backgrounder/arms/iraq0202003.htm#3>.

Danielle L. Infeld, Note, *Precision-Guided Munitions Demonstrated Their Pinpoint Accuracy In Desert Storm; But Is A Country Obligated To Use Precision Technology To Minimize Collateral Civilian Injury and Damage?*, 26 Geo. Wash. J. Int'l L. & Econ. 109 (1992). Republished with minor amendments as Danielle L. Gilmore, *Precision Guided Munitions and the Law of War*, Air Power Studies Centre, Paper Number 30, Royal Australian Air Force (1995).

Kalshoven, *Belligerent Reprisals* (Leyden, 1971).

Dino Kritsiotis, *The Kosovo Crisis and NATO's Application of Armed Force Against the Federal Republic of Yugoslavia*, 49 ICLQ 330 (2000).

Middle East Watch, *Needless Deaths in the Gulf War* (1991).

Shigeki Miyazaki, *The Martens Clause and International Humanitarian Law*, in *Studies and Essays on International Humanitarian Law and Red Cross Principles in Honour of Jean Pictet* 433 (Christophe Swinarski ed., 1984).

W. Hays Parks, *Air War and the Law of War*, 32 Air Force Law Review (1990) 1.

President Ronald Reagan's President's Message to the Senate Transmitting the Protocol, Jan. 29, 1987, 23 Weekly Comp. Pres. Doc. 91.

Restatement (Third) of Foreign Relations Law, §102(2).

Adam Roberts, *Documents on the Laws of War* (2d ed. 1989).

Peter Rowe, *The Gulf War 1990-91 In International and English Law* (1993).

M. Royse, *Aerial Bombardment and International Regulation of Warfare* (1928).

Abraham D. Sofaer, *The Position of the United States on Current Law of War Agreements: Remarks of Judge Abraham D. Sofaer, Legal Adviser, United States Department of State, January 2, 1987*, 2 Am. U.J. Int'l L. & Pol'y 460.

Col Thomas S. Tudor ed., *Air Force Operations and the Law* (The Judge Advocate General's Department United States Air Force, 1st ed. 2002).

Matthew C. Waxman, *International Law and the Politics of Urban Air Operations*, (2000).

U.S. MILITARY DIRECTIVES, INSTRUCTIONS, REGULATIONS, ETC.

Air Force Operations and the Law (The Judge Advocate General's Department United States Air Force, 1st ed. 2002), Col Thomas S. Tudor ed.

Air Force Pamphlet 14-210, *USAF Intelligence Targeting Guide* (1 February 1998).

Air Force Pamphlet 110-31, *International Law – The Conduct of Armed Conflict and Air Operations* (1976).

Air Force e-Publishing, *Obsolete Publications* at <http://www.e-publishing.af.mil/pubs/obsoletepub.asp?page=38&order=id>.

DoD Directive 5100.77, *DoD Law of War Program* (Dec 9, 1998).

Headquarters, U.S. Marine Corps, FMFM-1, *Warfighting* (1989).

JA 422, *Operational Law Handbook*, 2002.

Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms* (August 14, 2002).

Joint Publication 3-60, *Joint Doctrine For Targeting* (17 Jan 2002).

Joint Vision 2010, Gen John M. Shalikashvili, Chairman of the Joint Chiefs of Staff (1996).

Joint Vision 2020, Gen Henry H. Shelton, Chairman of the Joint Chiefs of Staff (2000).

Marine Corps Warfighting Publication 3-35.3, *Lessons Learned From Russian Military Operations In Chechnya 1994 – 1996*, Military Operations On Urbanized Terrain (2000).

TECHNICAL SOURCES

AGM-65 Maverick, Jane's Air-Launched Weapons, Vol. 41 2002.

AGM-114 Hellfire, Jane's Air Launched Weapons, Vol. 41 2002.

AS-14 "Kedge" (Kh-29), Jane's Air-Launched Weapons, Vol. 38 2001.

Mark Bowden, *Black Hawk Down* (2000).

Steve Dye, *GLONASS – The Russian GPS*, Satellite Times, November/December 1996.

MSgt Scott Elliott, *GPS Jamming No 'Silver Bullet' for Potential Adversaries*, Air Force Link, February 11, 2003, at <http://www.af.mil/news/Feb2003/21103349.shtml>

F-15E successfully launches five Boeing GBU-31 JDAMs on single sortie, Journal of Aerospace and Defense Industry News, May 17, 2002, at http://www.aerotechnews.com/starc/2002/051702/Boeing_F15.html.

Lt Gen Buster C. Glosson, *Impact of Precision Weapons on Air Combat Operations*, Airpower Journal, Summer 1993.

Lt General Buster C. Glosson, USAF Biography, at http://www.af.mil/news/biographies/glosson_bc.html.

Glenn. W. Goodman, Jr., *Terminal Accuracy*, Armed Forces Journal International, October 2002.

Rebecca Grant, *Reach-Forward*, Air Force Magazine, October 2002.

Iran Reveals Combat-Proven PGM Family, Jane's Air-Launched Weapons, Vol. 41 2002.

Jim Krane, *Pentagon Says Iraqi GPS Jammers Picked Off*, The Sacramento Bee, March 26, 2003.

Christian Lowe, *Smarter Bombs*, The Weekly Standard, January 9, 2003.

Col Phillip S. Meilinger, *Precision Aerospace Power, Discrimination, and the Future of War*, Aerospace Power Journal, Fall 2001.

John. D. Morroco, *Europe Slowly Filling Precision Weapon Gap*, Aviation Week and Space Technology June 18, 2001.

John D. Morroco, *Radical Review Urged of U.K. Smart Weapons*, Aviation Week and Space Technology, October 30, 2000.

New-Powered PGM, Jane's Air-Launched Weapons, Vol. 2 2002.

Operation Iraqi Freedom, Global Security.Org at http://www.globalsecurity.org/military/ops/iraqi_freedom.htm.

J.J. Patterson VI, *Smart Bombs and Linear Thinking Over Yugoslavia*, U.S. Naval Institute Proceedings, June 1999.

Precision Guided Bomb (PGB), Jane's Air-Launched Weapons, Vol. 41 2002.

RAPTOR I and II, Jane's Air-Launched Weapons, Vol. 40 2002.

K. Singleton, *Sorties Flown: The Breakdown*, Jane's Defence Weekly, January 2, 2002.

SPICE Range Extension Kit, Jane's Air-Launched Weapons, Vol. 40 2002.

Mark Thompson, *The Lessons of Afghanistan*, Time, February 18, 2002.

John A. Tirpak, *The State of Precision Engagement*, Air Force Magazine, March 2000.

Top U.S. Official: Iraq Has Executed Some POWs, CNN.Com, March 27, 2003 at <http://www.cnn.com/2003/US/03/27/sprj.irq.pows.executed/index.html>.

Denis Trifonov, *Moscow Hostage Crisis Prompts New Offensive In Chechnya*, Central Asia – Caucasus Analyst, December 18, 2002, at http://www.cacianalyst.org/2002-12-18/20021218_Moscow_Crisis_Chechnya.htm.

YJ-6/C-601 (CAS-1 "Kraken"), Jane's Air-Launched Weapons, Vol. 40, 2002.

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Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, 8 June 2000, 39 ILM 1257 (2000).

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Statement of John J. Hamre, U.S. Deputy Secretary of Defense, before the U.S. House Permanent Select Committee on Intelligence, July 22, 1999.

Human Rights Watch, *Civilian Deaths in the NATO Air Campaign – The Crisis in Kosovo* (2000), available at <http://www.hrw.org/reports/2000/nato>.

Human Rights Watch, *International Humanitarian Law Issues In A Potential War In Iraq, Human Rights Watch Briefing Paper*, February 20, 2003 at <http://www.hrw.org/backgrounders/arms/iraq0202003.htm#3>.

Danielle L. Infeld, Note, *Precision-Guided Munitions Demonstrated Their Pinpoint Accuracy In Desert Storm; But Is A Country Obligated To Use Precision Technology To Minimize Collateral Civilian Injury and Damage?*, 26 Geo. Wash. J. Int'l L. & Econ. 109 (1992). Republished with minor amendments as Danielle L. Gilmore, *Precision Guided Munitions and the Law of War*, Air Power Studies Centre, Paper Number 30, Royal Australian Air Force (1995).

Kalshoven, *Belligerent Reprisals* (Leyden, 1971).

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W. Hays Parks, *Air War and the Law of War*, 32 Air Force Law Review (1990) 1.

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Restatement (Third) of Foreign Relations Law, §102(2).

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Air Force Pamphlet 14-210, *USAF Intelligence Targeting Guide* (1 February 1998).

Air Force Pamphlet 110-31, *International Law – The Conduct of Armed Conflict and Air Operations* (1976).

Air Force e-Publishing, *Obsolete Publications* at <http://www.e-publishing.af.mil/pubs/obsoletepub.asp?page=38&order=id>.

DoD Directive 5100.77, *DoD Law of War Program* (Dec 9, 1998).

Headquarters, U.S. Marine Corps, FMFM-1, *Warfighting* (1989).

JA 422, *Operational Law Handbook*, 2002.

Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms* (August 14, 2002).

Joint Publication 3-60, *Joint Doctrine For Targeting* (17 Jan 2002).

Joint Vision 2010, Gen John M. Shalikashvili, Chairman of the Joint Chiefs of Staff (1996).

Joint Vision 2020, Gen Henry H. Shelton, Chairman of the Joint Chiefs of Staff (2000).

Marine Corps Warfighting Publication 3-35.3, *Lessons Learned From Russian Military Operations In Chechnya 1994 – 1996*, Military Operations On Urbanized Terrain (2000).

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AGM-114 Hellfire, Jane's Air Launched Weapons, Vol. 41 2002.

AS-14 "Kedge" (Kh-29), Jane's Air-Launched Weapons, Vol. 38 2001.

Mark Bowden, *Black Hawk Down* (2000).

Steve Dye, *GLONASS – The Russian GPS*, Satellite Times, November/December 1996.

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Lt Gen Buster C. Glosson, *Impact of Precision Weapons on Air Combat Operations*, Airpower Journal, Summer 1993.

Lt General Buster C. Glosson, USAF Biography, at http://www.af.mil/news/biographies/glosson_bc.html.

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John. D. Morroco, *Europe Slowly Filling Precision Weapon Gap*, Aviation Week and Space Technology June 18, 2001.

John D. Morroco, *Radical Review Urged of U.K. Smart Weapons*, Aviation Week and Space Technology, October 30, 2000.

New-Powered PGM, Jane's Air-Launched Weapons, Vol. 2 2002.

Operation Iraqi Freedom, Global Security.Org at http://www.globalsecurity.org/military/ops/iraqi_freedom.htm.

J.J. Patterson VI, *Smart Bombs and Linear Thinking Over Yugoslavia*, U.S. Naval Institute Proceedings, June 1999.

Precision Guided Bomb (PGB), Jane's Air-Launched Weapons, Vol. 41 2002.

RAPTOR I and II, Jane's Air-Launched Weapons, Vol. 40 2002.

K. Singleton, *Sorties Flown: The Breakdown*, Jane's Defence Weekly, January 2, 2002.

SPICE Range Extension Kit, Jane's Air-Launched Weapons, Vol. 40 2002.

Mark Thompson, *The Lessons of Afghanistan*, Time, February 18, 2002.

John A. Tirpak, *The State of Precision Engagement*, Air Force Magazine, March 2000.

Top U.S. Official: Iraq Has Executed Some POWs, CNN.Com, March 27, 2003 at <http://www.cnn.com/2003/US/03/27/sprj.irq.pows.executed/index.html>.

Denis Trifonov, *Moscow Hostage Crisis Prompts New Offensive In Chechnya*, Central Asia -- Caucasus Analyst, December 18, 2002, at http://www.cacianalyst.org/2002-12-18/20021218_Moscow_Crisis_Chechnya.htm.

YJ-6/C-601 (CAS-1 "Kraken"), Jane's Air-Launched Weapons, Vol. 40, 2002.

The views expressed in this article are those of the author and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the U.S. Government

**PRECISION GUIDED MUNITIONS
AND COLLATERAL DAMAGE:**

**DOES THE LAW OF ARMED CONFLICT
REQUIRE THE USE OF PRECISION
GUIDED MUNITIONS WHEN
CONDUCTING URBAN AERIAL ATTACKS?**

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I. Introduction

Technology, state policy, and international law all come together to determine if the use of Precision Guided Munitions (PGMs) is required by the law of armed conflict (also known as the law of war) to reduce collateral damage in urban air operations. Both international standards and standards for the United States, the world leader in PGM technology, will be addressed. Before moving on, it is helpful to define two key phrases; PGMs and collateral damage.

The United States Department of Defense definition of a precision-guided munition is “[a] weapon that uses a seeker to detect electromagnetic energy reflected from a target or reference point and, through processing, provides guidance commands to a control system that guides the weapon to the target. Also called PGM.”¹ The PGM is also popularly referred to as a “smart-bomb.” A more detailed discussion of the technical attributes of PGMs is found in section II.

The United States Air Force defines collateral damage as “[t]he damage to surrounding resources, either military or non-military, as the result of actions or strikes directed specifically against enemy forces or military facilities.”² More specifically, for purposes of this paper, collateral damage will entail the killing or injuring of non-combatant civilians and the destruction or damage to civilian property that is not being used for a military purpose.

This study is necessary because states are increasingly relying on PGMs as an effective means of warfare. At the same time, human rights organizations are advocating

¹ Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms* (August 14, 2002).

² Air Force Pamphlet 14-210, *USAF Intelligence Targeting Guide* (1 February 1998), 114.

the mandatory use of PGMs in all cases of urban bombardment where collateral damage is possible.

Lt Gen Buster Glosson, USAF (Ret.), captured the significance of PGMs in modern aerial bombardment. "One need only look back to our raids on Schweinfurt, Germany, in World War II to see how dramatically precision weapons have enhanced our capabilities over the last 50 years. Two raids of 300 B-17 bombers could not achieve with 3,000 bombs what two F-117s can do with only four. . . . To shut down an industry in World War II, we were forced to target entire complexes because of the inaccuracy of our weapons; today we would need to hit only a couple of key buildings."³

Human rights advocates and military planners recognize that precisely striking a target may minimize collateral damage instead of employing less accurate means. However, it would be a mistake to assume that PGM capable states and human rights advocates agree on the mandatory use of PGMs. Understanding the law of armed conflict, capabilities and limitations of PGMs, and the need for flexibility in executing air campaigns, is essential to understanding this difference of opinion.

This study will begin in the next section with a review of PGM types, capabilities, international availability, and employment. Section III will cover state policy and doctrine on the use of PGMS and minimizing collateral damage. Section IV will discuss the law of armed conflict applicable to aerial bombardment. This section will include an analysis of the Hague and Geneva conventions and established customary law. Section V will discuss whether customary law is developing to mandate the use of PGMs. This analysis will be conducted under the guidelines created by the law of armed conflict

³ Lt Gen Buster C. Glosson, *Impact of Precision Weapons on Air Combat Operations*, *Airpower Journal*, Summer 1993, at 4.

“Martens Clause” regarding the development of custom. Section VI will review the benefits and detriments to non-combatants occasioned by the use of PGMs. Finally, Section VII will include my conclusions on why the existing law of armed conflict is sufficient to protect humanitarian concerns and why the development of custom mandating the use of PGMs is unrealistic.

II. PGMs: Types, Capabilities, International Availability, and Employment

A “revolution in warfare”⁴ has occurred in the last decade. The revolution in the precise application of deadly force from the air is the result of “[t]remendous technological strides in the use of precision weapons . . . [which] have made it far easier to distinguish between military and civilian targets and then effectively strike the military ones.”⁵ Whereas the ability to reliably and precisely engage military targets is revolutionary, the development of PGMs is on-going and at varying levels of sophistication around the world. The international legal impact of PGMs cannot be discussed without first understanding the types and capabilities of PGMs, the international availability of PGMs, and how they have been employed by states. A discussion about how states, in particular the United States, plans to employ PGMs in future conflicts will be addressed in section III(B). Reviewing technological capabilities is an essential part of this study because the varying degrees of technological capabilities directly effect a state’s application of the law of armed conflict.

A. Types and Capabilities of PGMs

⁴ President George H.W. Bush’s Remarks at the United States Air Force Academy Commencement Ceremony in Colorado Springs, Colorado, 29 May 1991, 27 Weekly Comp. Pres. Doc. 22.

⁵ Col Phillip S. Meilinger, *Precision Aerospace Power, Discrimination, and the Future of War*, *Aerospace Power Journal*, Fall 2001, at 13.

For purposes of this paper, aerially delivered bombs can be divided into two general categories, gravity bombs and PGMs. PGMs “are, in general, guided gravity-bombs. Most have no propulsion of their own and require the pilot to drop the bomb at a certain distance, speed, and altitude from the target so that the bomb can travel the last few miles to the target without the launching aircraft over flying the target area.”⁶ Another precision munition is the CALCM, Conventional Air Launched Cruise Missile. While not truly a “bomb,” the CALCM is a missile capable of making a precision strike after being launched from hundreds of miles away.⁷

Gravity, or “dumb”, bombs have no integral targeting system. Once they are released, they are at the mercy of the wind and gravity. “PGMs are, of course, generally much more accurate than gravity bombs, typically hitting within a few meters of the desired impact point. However, there are a variety of operational difficulties and system failures that may occur on any particular mission to encourage assigning more than one bomb per target. PGMs are most useful in attacking high-value, fixed targets.”⁸ Gravity bombs are still widely used by air forces worldwide. Even within the technologically advanced United States military, gravity bombs accounted for twenty-eight percent of the tonnage dropped in Operation ENDURING FREEDOM.⁹ “PGMs are much more expensive than gravity bombs and . . . stockpiles are limited. In a permissive environment,” which is one where enemy air defenses have been suppressed, “gravity

⁶ Col Thomas S. Tudor ed., *Air Force Operations and the Law* (The Judge Advocate General’s Department United States Air Force, 1st ed. 2002) 295.

⁷ John A. Tirpak, *The State of Precision Engagement*, *Air Force Magazine*, March 2000 at 27.

⁸ Tudor, *supra* note 6.

⁹ K. Singleton, *Sorties Flown: The Breakdown*, *Jane’s Defence Weekly*, January 2, 2002.

bombs may be nearly as accurate. If the target is an area target where precision is not necessary gravity bombs . . . may be just as effective as PGMs.¹⁰

There are generally three types of guidance systems for PGMs. They are either laser-based, television-based, GPS-based, or some combination thereof.¹¹ Laser and GPS-based guidance systems are capable of scoring a hit within approximately ten feet of its target.¹² The types of aircraft that can deliver these types of weapons have steadily expanded since Operation DESERT STORM in 1991. In DESERT STORM, only a limited number of fighter and bomber airframes were certified to carry and deliver the various PGMs. As of 2001, Operation ENDURING FREEDOM demonstrated that the United States has made great progress in certifying its bomber and fighter fleets to deliver PGMs.¹³

“A laser-guided PGM requires that an aircraft”, or ground based observer, “designate or lase, the target during the attack so that the bomb can home in on the illuminated target. This, of course, requires line-of-sight to the target during the attack. Consequently, a laser-guided bomb will not work when there are intervening cloud decks. Similarly, TV-guided PGMs also require line of sight to the target and have the same difficulties with low-altitude cloud decks.”¹⁴

GPS guided PGMs are the newest PGMs in the United States arsenal. The first weapons employing this technology were fielded in Operation DESERT STORM. The CALCM (Conventional Air Launched Cruise missile) and the Tomahawk sea-launched

¹⁰ Tudor, *supra* note 6, at 296.

¹¹ *Id.* 295.

¹² Tirpak, *supra* note 7 at 28 for laser-guided bomb accuracy and 29 regarding GPS PGMs.

¹³ Mark Thompson, *The Lessons of Afghanistan*, Time, February 18, 2002, at 30.

¹⁴ Tudor, *supra* note 6 at 295.

cruise missiles were fired from hundred of miles away from their target.¹⁵ They were used and available in relatively small numbers. Thirty-five CALCMs were used in Desert Storm's opening volley. "The operational concept of precision engagement calls for using small numbers of expensive, long-standoff-range weapons first, gradually moving to larger numbers of shorter-range, less-expensive weapons as enemy air defenses are beaten down."¹⁶

The JDAM, Joint Direct Attack Munition, is an all-weather, inertial navigation system (INS) that is updated by a global positioning system satellite receiver. "Using the satellite signals, it flies autonomously – through clouds, smoke, or dust – to the GPS coordinates that are entered into its guidance unit by the aircrew before it is dropped."¹⁷ During the 1999 Kosovo Operation ALLIED FORCE air campaign, "the bulk of the precision-guided munitions used were laser-guided bombs, which had been the air-to surface weapon of choice for US air strikes for 20 years."¹⁸ JDAMs were in low rate production at the start of the Kosovo campaign and were certified for use only on the B-2 bomber.¹⁹ However, by 2002, the JDAM has been certified for employment by the B-1, B-52, F/A-18, F-16 and F-15E aircraft²⁰ and accounted for 4,600 of the 7,200 air delivered PGMS in Afghanistan in 2001, while the rest were laser-guided bombs and Tomahawk sea-launched cruise missiles.²¹ The increased, all weather accuracy of the JDAM is an important factor in considering the

¹⁵ Tirpak, *supra* note 7 at 27.

¹⁶ *Id.*

¹⁷ Glenn. W. Goodman, Jr., *Terminal Accuracy*, Armed Forces Journal International, October 2002 at 66.

¹⁸ *Id.* at 64.

¹⁹ *Id.*

²⁰ *F-15E successfully launches five Boeing GBU-31 JDAMs on single sortie*, Journal of Aerospace and Defense Industry News, May 17, 2002, at http://www.aerotechnews.com/starc/2002/051702/Boeing_F15.html

²¹ Goodman, *supra* note 17 at 64.

international law status of the use of PGMs. As recently as the Kosovo campaign in 1999, the capability to target precisely in any weather or environmental condition did not exist because employment was limited to the B-2. Indeed, when an analysis of the international law obligation to use precision weapons was conducted following Operation DESERT STORM in 1991,²² the capability was practically non-existent. The improved ability and availability provided by the JDAM and other GPS guided weapons to accurately strike a target in any weather partially invalidates the assertion in the last legal analysis of this topic that "PGMs are suited for use in clear weather for targets in heavily populated areas."²³ While they are suited for use in clear weather for targets in heavily populated areas, they have evolved to be capable of precisely striking targets in any environmental condition.

The evolution of PGMs continues. Smaller, more accurate PGMs are being developed. These smaller weapons will have a reduced blast that equates to reduced collateral damage. "[T]argets that might otherwise be off-limits because of their proximity to civilians or civilian structures could be safely hit without inflicting unwanted destruction."²⁴

B. International Availability of PGMs

²² Danielle L. Infeld, Note, *Precision-Guided Munitions Demonstrated Their Pinpoint Accuracy In Desert Storm; But Is A Country Obligated To Use Precision Technology To Minimize Collateral Civilian Injury and Damage?*, 26 Geo. Wash. J. Int'l L. & Econ. 109 (1992). Republished with minor amendments as Danielle L. Gilmore, *Precision Guided Munitions and the Law of War*, Air Power Studies Centre, Paper Number 30, Royal Australian Air Force (1995). All citation is to the Infeld note.

²³ *Id.* at 130.

²⁴ Tirpak, *supra* note 7 at 30.

The United States is the best-known state for its employment of PGMs, thanks largely to televised "slam-cam" tapes detailing the accuracy of PGMs on the nightly news. However, the United States is far from being the only state possessing "smart" munitions.

Short to medium range TV, IR (infrared), and laser-guided air to surface missiles have been provided by the US to: Bahrain, Belgium, Denmark, Egypt, Germany, Greece, Iran, Israel, Italy, Jordan, Kenya, South Korea, Kuwait, Malaysia, Mexico, Morocco, Netherlands, new Zealand, Norway, Pakistan, Philippines, Portugal, Saudi Arabia, Singapore, South Korea, Spain, Sudan, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Turkey, UK, Venezuela, Vietnam, and Yugoslavia (Serbia and Montenegro) since first entering service in 1972.²⁵

Short-range, laser and radar guided air to surface missiles have been sold by the United States since the 1970s to Sweden, Norway, Canada, Egypt, Greece, Israel, South Korea, Kuwait, Netherlands, Saudi Arabia, Singapore, Taiwan, Turkey, UAE, and the UK.²⁶

In October 2001, the United Kingdom's first laser-guided bomb that was augmented by GPS navigation went operational.²⁷ They are continuing to strive towards better GPS guided munitions. Deployment of GPS based PGMs by France, Italy, Greece and Sweden is imminent.²⁸

The Russian Federation has also had PGMs since the 1980s in the form of a medium-range, laser or TV guided air to surface missile. These weapons have been

²⁵ *AGM-65 Maverick*, Jane's Air-Launched Weapons, Vol. 41 2002.

²⁶ *AGM-114 Hellfire*, Jane's Air-Launched Weapons, Vol. 41 2002.

²⁷ *Precision Guided Bomb (PGB)*, Jane's Air-Launched Weapons, Vol. 41 2002.

²⁸ John. D. Morroco, *Europe Slowly Filling Precision Weapon Gap*, Aviation Week and Space Technology June 18, 2001, at 158.

exported to Afghanistan, Azerbaijan, Belarus, Bulgaria, the Czech Republic, Georgia, Germany, Hungary, Iraq, Kazakhstan, Poland, Romania, Slovakia, and the Ukraine.²⁹

The People's Republic of China has deployed long-range, radar-guided PGMs and is developing more accurate weapons.³⁰ The "Self-Sufficiency Group of the Islamic Republic of Iran Air Force" has developed a PGM that first appeared in photographs in 1997.³¹ Iranian sources state that they employed PGMs in the Iran-Iraq war.³² The Iranian PGM appears to have TV guidance and "is probably only effective against large fixed high-contrast targets."³³ Israel has fielded an Inertial/GPS guidance upgrade kit for gravity bombs and has sold them to Chile.³⁴ South Africa has produced a precision guided air-to-surface glide bomb with inertial and GPS guidance to its midcourse, with TV-guidance to its terminal phase.³⁵

The development of PGMs by states other than the traditional cold-war super-powers is evidence of their military effectiveness. However, all-weather PGM capability, permitted through the application of GPS technology, is much more limited.

C. United States Employment of PGMs

Information on the employment of PGMs is most readily available by reviewing three major United States led coalition operations. The evolutionary growth of reliance on PGMs for precision aerial attacks is apparent from Operation DESERT STORM in 1991 against Iraq, Operation ALLIED FORCE in 1999 in Kosovo, Operation

²⁹ *AS-14 "Kedge" (Kh-29)*, Jane's Air-Launched Weapons, Vol. 38 2001.

³⁰ *YJ-6/C-601 (CAS-1 "Kraken")*, Jane's Air-Launched Weapons, Vol. 40, 2002.

³¹ *New-Powered PGM*, Jane's Air-Launched Weapons, Vol. 2 2002

³² *Iran Reveals Combat-Proven PGM Family*, Jane's Air-Launched Weapons, Vol. 41 2002.

³³ Jane's, *supra* note 31.

³⁴ *SPICE Range Extension Kit*, Jane's Air-Launched Weapons, Vol. 40 2002.

³⁵ *RAPTOR I and II*, Jane's Air-Launched Weapons, Vol. 40 2002.

ENDURING FREEDOM commencing in 2001 in Afghanistan, and Operation IRAQI FREEDOM in 2003.

While PGMs made their first operational appearance during the 1970s in the Vietnam War,³⁶ they gained public prominence in Operation DESERT STORM in 1991. "Television networks showed cockpit videos detailing the accuracy of these weapons so frequently that they became one of the defining images of that war: the public saw bombs going down chimneys, through doors, and into specific windows."³⁷ Of the 250,000 bombs and missiles employed in Operation DESERT STORM, only 8.8% were PGMs. Except for a very small number of GPS-guided CALCM and TOMAHAWK Cruise missiles, the PGMs deployed were laser- or TV-guided bombs and anti-radiation missiles.³⁸

In Operation ALLIED FORCE in 1999, PGMs represented just thirty-five percent of the ground-attack weapons used, but accounted for seventy-four percent of the targets destroyed.³⁹ "The percentage of PGMs as a fraction of weapons used was much higher in the early weeks of the war, when they were used almost exclusively. Later, as big bombers swept in with large numbers of unguided munitions, the ratio shifted."⁴⁰ "In practice, only 20 of the approximately 23,000 munitions expended by NATO in the 1999 Balkan air operation caused collateral damage or civilian casualties. Some others were deliberately steered off course to avoid harming civilians who had not been seen in the target area until the last moment."⁴¹ The vast majority of PGMs employed in ALLIED

³⁶ Meilinger, *supra* note 5 at 13.

³⁷ *Id.*

³⁸ Infeld, *supra* note 22 at 127-128.

³⁹ Tirpak, *supra* note 7 at 26.

⁴⁰ *Id.*

⁴¹ *Id.*

FORCE were laser- or television-guided. The inherent limitations of laser and television guided munitions operation during adverse weather was readily apparent. United Kingdom's forces desired to employ their laser guided PGMs. However, they were only able to employ PGMs in twenty-four percent of their missions because the laser-guided PGMs were not able to operate due to the poor weather and heavy cloud cover that "persisted over the region for about two-thirds of the 78-day campaign."⁴² The GPS guided JDAM was employed exclusively, and for the first time, by the United States Air Force B-2 bomber. While the B-2 missions were successful in all-weather conditions, their availability was limited.⁴³ B-2s dropped 656 JDAMS, putting ninety percent of the bombs within twelve meters of their aim-points and damaging or destroying eighty-seven percent of the targets despite poor visibility.⁴⁴

As of December 17, 2001, more than seventy-two percent of the total tonnage of bombs dropped by the United States Air Force in Operation ENDURING FREEDOM were PGMs.⁴⁵ While the availability of GPS guided munitions available to other coalition members is more limited than to the United States, the extensive use of GPS guided munitions, primarily JDAMs, by the U.S. military to destroy high-value ground targets demonstrates the value the United States places on precision targeting. "During the first two months of the strikes on al Qaeda and Taliban targets in Afghanistan . . . [in the fall of 2001] . . . , 4,600 of the 7,200 air delivered PGMs expended were JDAMs, while the rest were laser-guided bombs and Tomahawk sea-launched cruise missiles."⁴⁶

⁴² John D. Morroco, *Radical Review Urged of U.K. Smart Weapons*, *Aviation Week and Space Technology*, October 30, 2000 at 45.

⁴³ Tirpak, *supra* note 7 at 28.

⁴⁴ Goodman, *supra* note 17 at 64.

⁴⁵ Singleton, *supra* note 9.

⁴⁶ Goodman, *supra* note 17 at 64.

Complete reports of the total number and percentage of all tonnage dropped, and the same information regarding urban bombardment in Operation IRAQI FREEDOM are not currently available.⁴⁷ However, President Bush stated on 16 April 2003, that “more than ever before, the precision of our technology is protecting the lives of our soldiers, and the lives of innocent civilians. The overwhelming majority of the munitions dropped in the Iraqi campaign were precision-guided.”⁴⁸

This brief review of United States led coalition operations reveals the meteoric rise of the United States reliance on PGMs, and in particular, GPS guided PGMs. PGMs were practically unknown to the public before Operation DESERT STORM in 1991, despite their limited usage. Based on the figures presented above, in ten short years, the use of PGMs has gone from 8.8 percent of tonnage employed in Operation DESERT STORM in 1991, to 35 percent in Operation ALLIED FORCE in 1999 to more than 72 percent employed in Operation ENDURING FREEDOM in 2001. That increase is even more impressive considering the fact that the United States now has the ability to employ PGMs in any weather condition. The percentage of GPS assisted PGMs was negligible in DESERT STORM, slightly more than .08 percent of all PGMs in Operation ALLIED FORCE, and at least 63.8 percent of all PGMs employed in the first few months of Operation Enduring Freedom. However, the United States employment of PGMs is not representative of the employment of PGMs on the international stage.

D. International Employment of PGMs

⁴⁷, *Operation Iraqi Freedom*, Global Security.Org at http://www.globalsecurity.org/military/ops/iraqi_freedom.htm.

⁴⁸ President George W. Bush, *President Bush Outlines Progress in Operation Iraqi Freedom*, April 16, 2003, at <http://www.whitehouse.gov/news/releases/2003/04/20030416-9.html>.

While the international availability of PGMs was discussed in section II B above, very little information is readily available regarding the use of PGMs by other states.

As the heir to the Soviet Union's military capabilities, an analysis of Russia's employment of PGMs in their recent conflicts in Chechnya would be useful. Ideally, this analysis would not only reveal the capabilities and employment of PGMs by another state, but would also reveal whether the United States' emphasis on precision and minimizing collateral damage is widely held. Unfortunately, data on this topic is quite sparse.

As detailed in section II B above, the Soviet Union, and thus Russia, has had laser and TV-guided PGMs of some degree since the 1980s. Considering the information above that indicated that Russia's newest developments are still not satellite based, it appears that they lag at least ten years behind the developed western countries in PGM technology. That would place them somewhere around western capabilities during Operation DESERT STORM. However, the Russian Ministry of Defense does operate GLONASS, Global Navigation Satellite System, which is their equivalent of the United States GPS constellation of satellites.⁴⁹

One observer of the air operations against rebel forces in the second Chechnyan campaign in 2002 observed that "[t]he Russian Air Force . . . lacks capabilities to engage point targets as it simply does not have precision-guided munitions: non-guided fuel-air explosives and cluster bombs accounted for 90% of all combat sorties in the second Chechen campaign."⁵⁰ However, a United States Marine Corp assessment of Russian

⁴⁹ Steve Dye, *GLONASS – The Russian GPS*, Satellite Times, November/December 1996 at 74.

⁵⁰ Denis Trifonov, *Moscow Hostage Crisis Prompts New Offensive In Chechnya*, Central Asia – Caucasus Analyst, December 18, 2002, at http://www.cacianalyst.org/2002-12-18/20021218_Moscow_Crisis_Chechnya.htm.

actions in the first Chechnyan campaign from 1994 to 1996 stated that “[t]he Russians made extensive use of precision-guided weapons. When the weather allowed, the Russians were able to use precision-guided weapons, such as laser-guided bombs and missiles. They had great effect against priority targets such as bridges, major road intersections, and buildings.”⁵¹

The only other reference to the use of PGMs in actual combat other than by the United States coalition partners in the operations discussed in section II C above, is by Iran. Iran developed PGMs based on “urgent operational needs of the Iran-Iraq war [1980 to 1988], where they were rushed into service, but since then the Iranian PGMs have been enhanced and refined.”⁵²

From the available information, it appears that a wide variety of states possess PGMs and employ them. This data alone does not explain whether PGMs are used out of a state’s perceived obligation to limit collateral damage or because PGMs are the most efficient weapon for completing a mission. An analysis of policy statements will make this clearer.

III. State Policy and Doctrine on the Use of PGMs and Minimizing Collateral Damage

States policies on collateral damage during armed conflict are another topic that is not widely discussed. Policy and doctrine often have the laws of armed conflict, discussed in section IV below, as their foundation. However, policy and doctrine may have additional political, cultural, or economic influences. While state policy or doctrine can serve as a basis for the development of customary international law, the purpose of

⁵¹ Marine Corps Warfighting Publication 3-35.3, *Lessons Learned From Russian Military Operations In Chechnya 1994 – 1996*, Military Operations On Urbanized Terrain (2000) at J-7.

⁵² Iran, *supra* note 32.

this section is simply to identify policies. The possible development of customary international law will be discussed in section V. Two sources of information are available for divining policy in this area. The first is found in the efforts taken by the member states of NATO to minimize collateral damage in Operation ALLIED FORCE over Kosovo in 1999. The second, more prolific source is from the United States. Statements of the President of the United States and the United States Department of Defense are available to assist in determining the role that minimizing collateral damage plays in state policy.

A. Operation Allied Force

On 24 March 1999, NATO commenced Operation ALLIED FORCE in the airspace over the Federal Republic of Yugoslavia (FRY). This seventy-eight day campaign is of historic and legal significance because it was conducted primarily “to save lives”⁵³ and to prevent “a humanitarian catastrophe of immense proportions.”⁵⁴ The humanitarian catastrophe was the result of the FRY’s policy of “terrorization and ethnic cleansing” of Kosovar Albanians in Kosovo.⁵⁵ Kosovo was a semi-autonomous region within the FRY province of Serbia.

Precision air attack “proved to be vital not just for the prosecution of the Balkan military effort but also as a means of holding together the Western coalition by minimizing civilian casualties and damage.”⁵⁶ Due to the unique humanitarian purpose of

⁵³ Sir Jeremy Grenstock (U.K.), Statement To The U.N. Security Council, March 24, 1999, U.N. Doc. S/PV. 3988 *reprinted in* International Law Selected Documents 2001-2002, at 917 (Barry E. Carter ed., Aspen Law and Business 2001) (1999).

⁵⁴ U.S. Ambassador Peter Burleigh, Statement To The U.N. Security Council, March 24, 1999, *reprinted in* International Law Selected Documents 2001-2002, at 915 (Barry E. Carter ed., Aspen Law and Business 2001) (1999).

⁵⁵ Dino Kritsiotis, *The Kosovo Crisis and NATO’s Application of Armed Force Against the Federal Republic of Yugoslavia*, 49 ICLQ 330, 333 (2000).

⁵⁶ Tirpak, *supra* note 7 at 25.

this use of armed force, avoiding civilian casualties was of utmost importance. After all, the NATO states did not want to cause more suffering to the very civilians they were attempting to rescue.

The extreme political sensitivity of the NATO allies to the infliction of collateral damage led to the micromanagement of the target selection process. "Allies could, and did at times, hold back approval of a target because of political sensitivities. Two infamous examples: the Serb early warning radars positioned in Montenegro and a Serb television transmitter located in a dense urban area. Collateral damage was a top concern, and most targets submitted for approval had rough collateral damage estimates appended. The process of target approval wound its way from the theater commander, Army Gen. Wesley K. Clark, to the White House and back via the allies before targets entered the Combined Air Operations Center database of approved aim points."⁵⁷

The Supreme Allied Commander Europe, United States Army General Wesley K. Clark, told the United States Senate Armed Services Committee in October 1999 that "NATO commanders knew going into the Yugoslavian operation that they 'weren't going to be allowed to use decisive force' to compel Slobodan Milosevic to comply with NATO demands. By that, he meant that a large-scale ground operation, massive bombing, or other brute-force effort was out of the question."⁵⁸ According to United States Air Force Lieutenant General Michael C. Short, the combined forces air component commander, the emphasis placed on avoiding civilian casualties, and NATO losses in the air, "prompted the creation of strict protocols with regard to target selection

⁵⁷ Rebecca Grant, *Reach-Forward*, Air Force Magazine, October 2002 at 44.

⁵⁸ Tirpak, *supra* note 7 at 25.

and identification and to the weapons chosen to attack each one.”⁵⁹ The weapon of choice to achieve NATO’s goals was the PGM. “NATO nations abhorred all civilian deaths, and their militaries went to extraordinary lengths to avoid them.”⁶⁰ The commander’s executing the campaign stated that PGMs “proved very effective and demonstrated immense potential by allowing highly accurate strikes while minimizing collateral damage and civilian casualties.”⁶¹

The emphasis by the NATO allies on the eradication of collateral damage in Operation ALLIED FORCE is unique in the use of armed force. The goal of absolutely no collateral damage appears to have taken priority over the achievement of the operation’s military objectives at times. This operation shows that, at least in the western world, there is an awareness of the value of PGMs in reducing collateral damage. However, this operation cannot serve as a general proposition that minimizing collateral damage is the controlling factor in determining which munitions will be employed in aerial bombardment. Because of its humanitarian justification, Operation ALLIED FORCE was especially sensitive to collateral damage.

B. United States Policy and Doctrine

During the 28 January 2003 State of the Union Address, President George W. Bush touched upon the issue of collateral damage when he addressed the possibility of war with Iraq. He stated that “[i]f war is forced upon us, we will fight in a just cause and by just means, sparing, in every way we can, the innocent.”⁶² The President’s statement captures the United States sensitivity to collateral damage and reflects the policy of the

⁵⁹ *Id* at 26.

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² President George W. Bush, State of the Union Address, 28 January 2003.

United States. The execution of that policy falls to the United States military. It is the military's war-fighting doctrine that will convert policy to action.

Relevant doctrine regarding the use of PGMs and minimizing collateral damage is found in several Department of Defense (DOD) or Department of the Air Force publications. According to the DOD, doctrine are "[f]undamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application."⁶³

The starting point for analyzing DOD's vision of its evolution in the near future is Joint Vision 2010 and Joint Vision 2020. These documents provide the military departments with doctrinal guidance from the Joint Chiefs of Staff. Their purpose is to provide common goals for the services to work towards.

Joint Vision 2010 enunciated four developing operational concepts. These concepts will guide the way the services prepare for and wage war. They are dominant maneuver, precision engagement, full-dimensional protection, and focused logistics.⁶⁴

⁶³ Joint Publication 1-02, *supra* note 1.

⁶⁴ Gen John M. Shalikashvili, Chairman of the Joint Chiefs of Staff, Joint Vision 2010 (1996) (hereinafter referred to as JV 2010). Dominant Maneuver is "the ability of joint forces to gain positional advantage with decisive speed and overwhelming operational tempo in the achievement of assigned military tasks. Widely dispersed joint air, land, sea, amphibious, special operations and space forces, capable of scaling and massing force or forces and the effects of fires as required for either combat or noncombat operations, will secure advantage across the range of military operations through the application of information, deception, engagement, mobility and counter-mobility capabilities." Gen Henry H. Shelton, Chairman of the Joint Chiefs of Staff, Joint Vision 2020 (2000) (hereinafter referred to as JV 2020), at 26. Focused Logistics is "the ability to provide the joint force the right personnel, equipment, and supplies in the right place, at the right time, and in the right quantity, across the full range of military operations. This will be made possible through a real-time, web-based information system providing total asset visibility as part of a common relevant operational picture, effectively linking the operator and logistician across Services and support agencies. Through transformational innovations to organizations and processes, focused logistics will provide the joint warfighter with support for all functions." JV 2020 at 30. Full Dimensional Protection is "the ability of the joint force to protect its personnel and other assets required to decisively execute assigned tasks. Full dimensional protection is achieved through the tailored selection and application of multilayered active and passive measures, within the domains of air, land, sea, space, and information across the range of military operations with an acceptable level of risk." JV 2020 at 32.

The use of PGMs and minimizing collateral damage is best addressed by the doctrine of precision engagement.

According to Joint Vision 2020, precision engagement is “the ability of joint forces to locate, surveil, discern, and track objectives or targets; select, organize, and use the correct systems; generate desired effects; assess results; and reengage with decisive speed and overwhelming operational tempo as required, throughout the full range of military operations.”⁶⁵ “The concept of precision engagement extends beyond precisely striking a target with explosive ordnance. Information superiority will enhance the capability of the joint force commander to understand the situation, determine the effects desired, select a course of action and the forces to execute it, accurately assess the effects of that action, and reengage as necessary while minimizing collateral damage.”⁶⁶

Precision engagement “will build on current US advantages in delivery accuracy and low observable technologies. It will use a wide variety of means, including very accurate aerial deliveries or air drops, discriminate weapon strikes, and precise, all-weather stand-off capability.”⁶⁷

However, precision engagement includes more than just dropping PGMs. The service must have the ability to “locate the objective or target” and to “provide responsive command and control.” “Even from extended ranges, precision engagement will allow us to shape the battlespace, enhancing the protection of our forces.”⁶⁸ This ability to identify the right target at the right time is called “information operations.” The combination of information operations and placing a PGM on the target, collectively

⁶⁵ JV 2020, *supra* note 62 at 28.

⁶⁶ *Id.* at 28/29.

⁶⁷ *Id.* at 21.

⁶⁸ *Id.*

known as precision engagement provides “a greater assurance of delivering the desired effect, lessen the risk to our forces, and minimize collateral damage.”⁶⁹

It is arguable that under the auspices of Joint Vision 2010, minimizing collateral damage is now the United States’ military doctrine due to the emphasis on precision engagement in joint doctrine. However, care should be taken not to overstate the importance that minimizing collateral damage plays in modern warfare. Joint Vision 2010 and 2020 reveal that precision engagement, and thus the employment of PGMs, is not undertaken for the sole purpose of limiting collateral damage. If it were, the customary law requirement of *opinio juris*, i.e. a practice dictated by international law, could be more readily established. However, from the military doctrinal standpoint, precision engagement via the use of PGMs is undertaken first and foremost because of the combat effectiveness of PGMs. “Long-range precision capability, combined with a wide range of delivery systems, is emerging as a key factor in future warfare. Technological advances will continue the trend toward improved precision. Global positioning systems, high-energy research, electromagnetic technology, and enhanced stand-off capabilities will provide increased accuracy and a wider range of delivery options. These capabilities will increase the combat power available for use against selected objectives, resulting in enhanced economy of force and a higher tempo of operations.”⁷⁰ “The combination of these technology trends will provide an order of magnitude improvement in lethality. Commanders will be able to attack targets successfully with fewer platforms and less ordinance while achieving objectives more

⁶⁹ *Id.*

⁷⁰ JV 2010, *supra* note 64 at 11.

rapidly and with reduced risk.”⁷¹ In short, the emphasis on precision engagement and the use of PGMs is based on the fact that it is the most effective means of employing force to achieve the given mission. While a reduction in collateral damage is recognized as a desirable result of precision engagement, it appears to be subordinate to achieving the desired effect of the application of force and lessening the risk to the delivering forces.

Within aerial warfare doctrine, there is always a conflict between mission accomplishment and humanitarian concerns. But the scales of the conflict are weighted in favor of mission accomplishment. “Warfare will continue to be an act of force to compel an adversary to comply with specific requirements. Targeting, within military operations, must be focused on creating specific effects to achieve the . . . commander’s . . . objectives.”⁷² Targeting is “the process of selecting and prioritizing targets and matching the appropriate response to them, taking account of operational requirements and capabilities.”⁷³ “The joint targeting process is designed to provide a means to achieve the JFC’s operational objectives. Adherence to these principles throughout the targeting cycle should ensure that desired effects are achieved while diminishing undesired or collateral consequences.”⁷⁴

The use of PGMs for the sole purpose of reducing collateral damage has not risen to the level of doctrine in the U.S. military. While it is a very real concern and limiting factor in planning operations, collateral damage is still only, as quoted above, an “undesired or collateral consequence.”⁷⁵ M. W. Royse pragmatically recognized in his

⁷¹ *Id.* at 13.

⁷² Joint Publication 3-60, *Joint Doctrine For Targeting* (17 Jan 2002) (hereinafter referred to as JP-360), at I-1:

⁷³ *Id.* at I-2

⁷⁴ *Id.* at I-4:

⁷⁵ *Id.*

1928 publication *Aerial Bombardment and the International Regulation of Warfare*, “[t]he history of bombardment regulation shows a distinct utilitarian development, in which the idea of military effectiveness dominates, and in which the doctrines of permissible violence and social sanction are of secondary importance as checks or influences.”⁷⁶ As illustrated by Operation ALLIED FORCE, minimizing collateral damage will only be a primary concern in limited engagements justified solely on humanitarian grounds.

IV. Law of Armed Conflict Applicable to Aerial Bombardment

Recognizing that war “is among the greatest horrors known to mankind,”⁷⁷ states have codified laws of armed conflict in multilateral treaties. “What is legal is not necessarily moral and what is moral is not always legal; but, particularly with regard to the law of war, the two are inextricably intertwined. Historically, civilians seldom have fared well in wars, and it was primarily with their protection in mind that the modern law of war evolved.”⁷⁸

Six treaties have provisions relevant to aerial bombardment and collateral damage to civilians or non-military property. The sources are the 1907 Hague Convention IV Respecting the Laws and Customs of War On Land⁷⁹ and Convention IX Concerning Bombardment by Naval Forces in Time of War,⁸⁰ the 1949 Geneva Convention IV

⁷⁶ M. Royse, *Aerial Bombardment and International Regulation of Warfare* (1928) at 147.

⁷⁷ Headquarters, U.S. Marine Corps, FMFM-1, *Warfighting* (1989) at 11.

⁷⁸ W. Hays Parks, *Air War and the Law of War*, 32 Air Force Law Review (1990) 1 at 4.

⁷⁹ Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, 36 Stat. 2277. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988) (hereinafter referred to as Hague IV, citing reprint) at 63.

⁸⁰ Hague Convention IX Concerning Bombardment by Naval Forces in Time of War, Oct. 18, 1907, 36 Stat. 2351. *Reprinted in The Laws of Armed Conflicts* (Dietrich Schindler and Jiri Toman ed.s 1988) (hereinafter referred to as Hague IX, citing reprint) at 811.

Relative to the Protection of Civilian Persons in Time of War⁸¹ and Protocol I of 1977 Relating to the Protection of Victims of International Armed Conflicts,⁸² and the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict.⁸³ The United Nations has also passed General Assembly resolutions regarding the law of armed conflict, including United Nations Resolution 2444 entitled Respect for Human Rights in Armed Conflicts.⁸⁴

Mr. W. Hays Parks has produced an excellent, in depth, all encompassing work analyzing the law of war as it relates to aerial warfare.⁸⁵ Additionally, Ms. Danielle L. (Infeld) Gilmore⁸⁶ has produced the only published synthesis and analysis of this material directly on the topic of PGMs and collateral damage. While her study addressed the state of this area of the law following the 1991 Persian Gulf War, the treaty framework has not changed since then. I rely heavily upon her concise statement of the treaty law.

Determining the legality of a state's actions when military forces inflict collateral damage upon civilians or cultural property necessarily requires the placing of blame on one of the parties to the conflict. An analysis of the law of armed conflict reveals that while both the attacker and the defender bear responsibility for minimizing collateral

⁸¹ Geneva Convention (IV) Relative to the Protection of Civilian Persons in Time of War, 6 U.S.T. 3516, 75 U.N.T.S. 287. *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (hereinafter referred to as GC IV, citing reprint) at 495.

⁸² Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, adopted June 8, 1977, 1125 U.N.T.S. 1. *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (hereinafter referred to as Protocol I, citing reprint) at 621.

⁸³ Convention for the Protection of Cultural Property in the Event of Armed Conflict, May 14, 1954, 249 U.N.T.S. 240. *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (hereinafter referred to as Cultural convention, citing reprint) at 745.

⁸⁴ G.A. Res. 2444, U.N. GAOR, 23d Sess., Supp. No. 18, at 50, U.N. Doc A/7218 (1969). *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (Citing reprint) at 263.

⁸⁵ Parks, *supra* note 78. Mr. Parks (B.A., J.D., Baylor University) is Chief, International Law Team, International Affairs Division, Office of The Judge Advocate General of the Army; Professorial Lecturer on International law, The George Washington University School of Law, Washington, D.C.

⁸⁶ Infeld, *supra* note 22.

damage, "the primary responsibility for the protection of civilian persons or objects lay with the defender, not the attacker."⁸⁷ This is because, as the international community has acknowledged, the defending nation has the best ability to control civilian persons and objects.⁸⁸ "The inevitability of incidental collateral damage was also acknowledged; thus the applicable treaties discouraged the positioning of legitimate military targets in and around the civilian population."⁸⁹

A. 1907 Hague Convention IV Respecting the Laws and Customs of War on Land

The 1907 Hague Convention IV Respecting the Laws and Customs of War on Land⁹⁰ (1907 Hague Convention IV) relates primarily to the rules governing the means and methods of warfare.⁹¹ "Means and methods" regulate and limit the actual conduct of warfare, providing that the options for engaging an enemy in battle are not unlimited.⁹² The 1907 Hague Convention IV "was not regarded as a complete code of the applicable law."⁹³ The preamble to the 1907 Hague Convention IV states that cases not included in the Regulations annexed to the Convention remain governed by the customary international law relating to the conduct of warfare.⁹⁴

Though codified before the advent of modern aerial warfare, Articles 25, 26, and 27 of the 1907 Hague Convention IV apply to aerial bombardment. Article 25 states that "the attack or bombardment, by whatever means, of towns, villages, dwellings, or

⁸⁷ *Id.* at 112.

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ Hague IV, *supra* note 79.

⁹¹ *Id.*

⁹² *Id.*, article 23.

⁹³ Adam Roberts, Documents on the Laws of War (2d ed.1989) at 44.

⁹⁴ Hague IV, *supra* note 79, at preamble.

buildings which are undefended is prohibited."⁹⁵ "It was formerly the view that an undefended place should contain no fortified installation and it is still controversial whether a place defended by antiaircraft guns intended to protect it against an illegal attack renders the place defended. The better opinion would suggest that such a place is in fact defended, for it cannot be certain that this is the true reason for the emplacement of the guns."⁹⁶ Two points should be taken from this article. The first is that military defensive measures of an area that would otherwise not be a target, strips the locale of its protected status. Second, and more important, is that non-combatants were protected from being directly targeted for attack.

In the analysis of responsibility for collateral damage, Articles 26 and 27 are more important for what they do not say. Article 26 states that "[t]he officer in command of an attacking force must, before commencing a bombardment, except in cases of assault, do all in his power to warn authorities."⁹⁷ Requiring a commander to give notice of a bombardment, except when outweighed by the need for surprise in an assault, attempts to limit collateral damage by placing the burden on the state being attacked to evacuate its non-combatants. However, it also impliedly recognized, and did not condemn that fact, that collateral damage would occur when dictated by the necessity of surprise.

Article 27 states that "in sieges and bombardments all necessary steps must be taken to spare, as far as possible, buildings dedicated to religion, art, science, or charitable purposes, historic monuments, hospitals, and places where the sick and wounded are collected, provided they are not being used at the same time for military purposes. It is the duty of the besieged to indicate the presence of such building or places

⁹⁵ *Id.*, art. 25.

⁹⁶ L.C. Green, *The Contemporary Law of Armed Conflict* (Manchester University Press 1993) at 97.

⁹⁷ Hague IV, *supra* note 79, art. 26 at 84.

by distinctive and visible signs, which shall be notified to the enemy before-hand."⁹⁸

This article places the burden on the besieged state to take affirmative action to limit collateral damage to property by marking it and by insuring that it did not lose its protected status through misuse.

While the 1907 Hague Convention IV provided that "the right of belligerents to adopt means of injuring the enemy is not unlimited,"⁹⁹ the convention also "absolved the attacker of responsibility for "unavoidable" collateral damage. This was not new law; this, again, was a codification of the customary practice of nations. What must be realized is that collateral civilian casualties were regarded as the cost of war to a nation rather than the responsibility of the attacker."¹⁰⁰

The concept of the defending state being responsible for the deaths of its non-combatants as a collateral consequence of war has its roots in siege warfare. Mr. Parks captured the historical essence of state responsibility for collateral damage.

In the siege of a city, injury or death to noncombatants within the besieged city was regarded as permissible in that it created a burden on the besieged commander, or because it was his responsibility as a result of his refusal to surrender. If an offer of surrender were refused, the besieging commander was justified in putting to the sword all within the besieged city, including noncombatant women and children, for their refusal to surrender. While the latter practice had diminished by the nineteenth century, the law of war continued to place responsibility for civilian casualties in the hands of the besieged commander and permitted the besieger to look upon their injury as not only permissible but an effective means of war on the morale of the besieged. As an ancillary of this rule, any action take by the besieged that placed noncombatants at risk was the responsibility of the besieged commander.¹⁰¹

⁹⁸ *Id.*, art. 27 at 84.

⁹⁹ *Id.* art. 22.

¹⁰⁰ Parks *supra* note 78 at 18.

¹⁰¹ *Id.* at 4.

"Bombardment . . . resulting in collateral civilian casualties was not illegal it was merely a cost of doing the business of war."¹⁰² "Conventions IV and IX of 1907 were intended to be no more than a codification of the customary practice of nations and, properly read, relieved an attacker of any responsibility for collateral damage or collateral injury short of indiscriminate bombing."¹⁰³ "Responsibility for such collateral damage or injury was viewed as laying primarily with the defender because of its superior ability to control the civilian population."¹⁰⁴

"[T]he civilian population . . . must assume some common sense responsibility for the risks of war. The individual civilian who continues to live adjacent to a . . . facility that clearly would be a lawful target must assume a certain degree of risk for his or her decision. Both Germany and Great Britain recognized this during World War II by evacuating nonessential personnel from cities or areas containing military targets, or by requiring those who remained to construct individual air raid protection or move to air raid shelters during an attack."¹⁰⁵

The dynamics of war and the 1907 Hague Convention recognize that the responsibility for avoiding collateral civilian casualties or damage to civilian objects is a shared obligation of the attacker, the defender, and the civilian population.¹⁰⁶ Despite the human propensity to lay blame, often, injury cannot be attributed to any one party, but instead to the fortunes of war.¹⁰⁷ For example, no state would fault another state for defending its defense industries or command and control facilities from aerial attack. But

¹⁰² *Id.* at 19.

¹⁰³ *Id.* at 20.

¹⁰⁴ Infeld, *supra* note 22 at 114.

¹⁰⁵ Parks, *supra* note 78 at 29.

¹⁰⁶ *Id.* at 28-29.

¹⁰⁷ Infeld, *supra* note 22 at 114.

when a defender uses its anti-air weapons against an attacking force carrying out a lawful attack on a legitimate object, the falling shrapnel from the anti-aircraft weapon itself, the crashing attacking aircraft, or its bomb, may cause severe damage to civilian objects or to the civilian population.¹⁰⁸ “As a result, by using anti-air defenses, a defender places its own civilian population at risk. In this case, responsibility for collateral damage, injury, or death usually will be shared by all parties, or may be attributable to the confusion of war.”¹⁰⁹ However, assuming both the defender and the attacker were acting lawfully, no party is legally culpable for the collateral damage.

B. 1907 Hague Convention IX Concerning Bombardment by Naval Forces in Time of War

The 1907 Hague Convention IX Concerning Bombardment by Naval Forces in Time of War¹¹⁰ is of interest to the issue of collateral damage because it “is the only law of war treaty which, while incomplete in view of increased technology and modes of warfare, contains a list of lawful targets.”¹¹¹ Article 2 lists as lawful targets, “military works, military or naval establishments, depots of arms or war material, workshops or plant [sic] which could be utilized for the needs of the hostile fleet or army, and the ships of war in the harbor.”¹¹² As Ms. Infeld observed, this list “indicates that lawful targets are not exclusively military objects, but also industrial targets of value to the enemy war effort.”¹¹³ Recognizing that lawful targets include those targets where civilians are

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* at 115.

¹¹⁰ Hague IX, *supra* note 80.

¹¹¹ Infeld, *supra* note 22 at 116.

¹¹² Hague IX, *supra* note 80, art. 2.

¹¹³ Infeld, *supra* note 22 at 116.

expected to be is further indication that collateral damage is an expected and expected part of warfare.

C. The 1949 Geneva Conventions

The ability of airpower to by-pass a nation's front line armies and reach directly into the heart of the enemy nation was demonstrated in World War II. Long-range bombers gave battling nations the ability to strike at an enemy's industrial infrastructure. This infrastructure, namely factories, were manned by civilians and found in major cities. Civilian suffering during World War II was immense. Civilians suffered from collateral damage from massive air raids and at the hands of oppressive regimes in occupied territories. The Geneva Conventions of 1949 represent "the first attempt to protect the civilian population during conflict."¹¹⁴ Whereas the Hague Convention sought to limit the means and methods of conducting warfare, the Geneva Conventions focused on the lessening, or "ameliorating", the suffering of those touched by war. The 1949 Geneva Conventions consisted of four treaties that codify humanitarian principles related to war victims. They include the 1949 Geneva Convention I for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field;¹¹⁵ the 1949 Geneva Convention II for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea;¹¹⁶ the 1949 Geneva Convention III Relative to the Treatment of Prisoners of War;¹¹⁷ and the 1949 Geneva Convention IV Relative to the

¹¹⁴ Green, *supra* note 96 at 41.

¹¹⁵ Geneva Convention (I) for the Amelioration of the Wounded, Sick and Shipwrecked Members of Armed Forces in the Field, 6 U.S.T. 3115. *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (Citing reprint) at 373.

¹¹⁶ Geneva Convention (II) for the Amelioration of the Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, 6 U.S.T. 3219. *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (Citing reprint) at 401. .

¹¹⁷ Geneva Convention (III) relative to the Treatment of Prisoners of War, 6 U.S.T. 3317. *Reprinted in* The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) (Citing reprint) at 423.

Protection of Civilian Persons in Time of War.¹¹⁸ “There were 61 original signatory States to the Conventions and . . . [as of 1993] . . . there are 170 States Parties. Many of their provisions are now accepted as customary as well as conventional in nature and some have attained the status of *ius cogens*.”¹¹⁹

Despite being the most commonly recognized source of “rights” in armed conflict, the Geneva Conventions enunciate very few concrete protections for non-combatants from becoming casualties of collateral damage. The 1949 Geneva Convention IV Relative to the Protection of Civilian Persons in Time of War is the only portion of the convention’s framework that bears upon the issue of collateral damage, and even then it is of limited application. Article 4 defines a person protected by the Convention as anyone who, during a conflict or occupation, is “in the hands of a Party to the conflict or Occupying Power of which they are not nationals.”¹²⁰ In the context of aerial attack, this status as a protected person could impact mission planning when a civilian is in a territory occupied by an enemy, and while attempting to defeat that occupier, the third state conducts an attack. An example, had the convention been in effect at the time, could be a French citizen in Nazi occupied France, facing allied aerial attacks attempting to drive out the Nazis. However, Article 28 recognizes that “[t]he presence of a protected person may not be used to render certain points or areas immune from military operations.”¹²¹

Articles 13 through 26 of the convention are not limited to persons subject to the power of a party to a conflict, but rather deal “with the protection of the populations

¹¹⁸ G.C. IV, *supra* note 81.

¹¹⁹ Judith Gail Gardam, Non-Combatant Immunity as a Norm of International Humanitarian Law (1993) at 25.

¹²⁰ G.C. IV, *supra* note 81, art. 4.

¹²¹ *Id.*, art. 28.

against certain consequences of war.”¹²² Article 18, protects civilian hospitals from attack.¹²³ However, according to article 19, a civilian hospital’s protection from attack shall cease if it is “used to commit, outside their humanitarian duties, acts harmful to the enemy. Protection may, however, cease only after due warning has been given, naming, in all appropriate cases, a reasonable time limit, and after such warning has remained unheeded.”¹²⁴ This is yet another example of the law of armed conflict placing the responsibility for minimizing collateral damage on the defender. It is the defender on the ground that determines what a hospital building will be used for. While the attacking force has an obligation to warn before attacking a civilian hospital, the defender will still bear responsibility for the loss of life or civilian medical facilities if the warning is not heeded.

D. United Nations General Assembly Resolutions

In addition to the multilateral treaties comprising the Law of Armed Conflict, the United Nations General Assembly has passed several resolutions regarding the law of armed conflict. Of particular interest in regards to this study of collateral damage are the 1968 United Nations General Assembly Resolution 2444, entitled “Respect for Human Rights in Armed Conflicts”¹²⁵ and the 1970 General Assembly Resolution 2675, entitled “Basic Principles for the Protection of Civilian Populations in Armed Conflicts.”¹²⁶

¹²² The Laws of Armed Conflicts (Dietrich Schindler and Jiri Toman ed.s 1988) at 605.

¹²³ G.C. IV, *supra* note 81, art. 18.

¹²⁴ *Id.*, art. 19.

¹²⁵ G.A. Res. 2444, *supra* note 83.

¹²⁶ G.A. Res. 2675, U.N. GAOR, 25th Sess., Supp. No. 28, at 76, U.N. Doc A/8028 (1971).

GA Res. 2444 affirms the protection of civilian populations against the dangers of indiscriminate warfare.¹²⁷ This resolution affirms three general principles of the law of war, including military necessity and distinction:

(a) That the right of the parties to a conflict to adopt means of injuring the enemy is not unlimited;

(b) That it is prohibited to launch attacks against the civilian populations as such; and

(c) That distinction must be made at all times between persons taking part in the hostilities and members of the civilian population to the effect that the latter be spared as much as possible.¹²⁸

As Ms. Infeld stated,¹²⁹ the U.S. Government has expressly recognized this resolution as a declaration of existing customary international law.¹³⁰ The United States, however, has also made clear that although the civilian population may not be the object of attack, incidental civilian injury or damage to civilian objects is an unavoidable risk when attacking legitimate military targets.¹³¹ While clarifying the United States position on this resolution for the Senate, the United States Department of Defense General Counsel clarified that:

The principle of military necessity recognizes the interdependence of the civilian community with the overall war effort of a modern society. But its application enjoins the party controlling the population to use its best efforts to distinguish or separate its military forces and war making activities from members of the civilian population to the maximum extent

¹²⁷ Schindler, *supra* note 122 at 263.

¹²⁸ G.A. Res. 2444, *supra* note 83.

¹²⁹ Infeld, *supra* note 22 at 124.

¹³⁰ Letter from J. Fred Buzhardt, General Counsel, U.S. Department of Defense (Sept. 22, 1972), in Arthur W. Rovine, Contemporary Practice of the United States Relating to International Law, 67 Am. J. Int'l L. (1973) 118, 122.

¹³¹ Infeld, *supra* note 22 at 125, based on Rovine, *Id.* at 122-123.

feasible so that civilian casualties and damage to civilian objects incidental to attacks on military objectives, will be minimized as much as possible.¹³²

Following Resolution 2444, "the General Assembly adopted further resolutions concerning human rights in armed conflicts every year, most of which have a procedural character only or a call upon state to apply exiting conventions in particular situations."¹³³ For example, General Assembly Resolution 2675, Basic Principles for the Protection of Civilian Populations in Armed Conflicts, is merely another restatement of rules of international law.¹³⁴ It re-emphasizes the importance of human rights in armed conflict, distinction, and taking efforts to spare civilians from the ravages of war.¹³⁵

These resolutions add nothing new to the study of the use of PGMs to reduce collateral damage. They are included to demonstrate the universal acceptance of the enumerated laws of armed conflict beyond the parties of the law of armed conflict treaties.

E. 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict

Collateral damage is not limited to the consequential death of civilians, but also includes damage to property. The contracting parties recognized "that cultural property has suffered grave damage during recent armed conflicts and that, by reason of the developments in the technique of warfare, it is in increasing danger of destruction."¹³⁶ While neither the United Kingdom nor the United States are party to the 1954 Hague

¹³² Rovine, *supra* note 130 at 123.

¹³³ Schindler, *supra* note 122 at 267.

¹³⁴ *Id.*

¹³⁵ G.A. Res. 2675, *supra* note 126.

¹³⁶ Cultural Convention, *supra* note 84 at preamble.

Convention,¹³⁷ the concept of the protection of cultural property was integrated into U.S. Army doctrine as early as 1955.¹³⁸

The protections apply to “property of great importance to the cultural heritage of every people, such as monuments of architecture, art or history, whether religious or secular; archaeological sites, groups of buildings which, as a whole, are of historical or artistic interest; works of art; manuscripts, books and other objects of artistic, historical or archaeological interest; as well as scientific collections and important collections of books or archives or of reproductions of the property defined above.”¹³⁹ The enumerated property is protected from attack¹⁴⁰, unless the defending party uses the property and its immediate surroundings “for purposes which are likely to expose it to destruction.”¹⁴¹ In such a case where the defender militarizes cultural property, military necessity may waive the obligation to protect the property from attack.¹⁴² Thus, once again, the responsibility for minimizing collateral damage is a shared one.

F. Protocol I Additional to the Geneva Conventions of August 12, 1949

1. The Status of Protocol I in International Law

Protocol I to the 1949 Geneva Conventions (Protocol I)¹⁴³ is the primary source of legal standards for targeting and the issue of collateral damage. Adopted in Geneva on 8 June 1977, this protocol was an effort to bring the Hague rules up to date by recognizing

¹³⁷ United Nations Educational, Scientific, and Cultural Organization, Convention And First Protocol For the Protection of Cultural Property in the Event of Armed Conflict, List of 103 States Parties, at http://www.unesco.org/culture/laws/hague/html_eng/page9.shtml.

¹³⁸ Parks, *supra* note 78, at 59-60, note 212.

¹³⁹ Cultural Convention, *supra* note 84 at Art. 1.

¹⁴⁰ *Id.* at art. 2.

¹⁴¹ *Id.* at art. 4.1.

¹⁴² *Id.* at art. 4.2.

¹⁴³ Protocol I, *supra* note 82.

changes in the nature of warfare.¹⁴⁴ The items of interest that may influence this study of minimizing collateral damage through the use of PGMs is found in part IV of the treaty, entitled "Civilian Population."¹⁴⁵ This part includes a definition of military objectives and prohibitions of attack on civilian persons and objects.¹⁴⁶

Attempts to update the treaty based laws of armed conflict prior to 1977 were not well received because "governments, particularly those of the industrialized major military powers, tended to resist these codification efforts, clearly preferring custom as the vehicle for change. This preference doubtless reflected concern that codification would be more likely to result in unrealistic restrictions that would prove unacceptable in practice."¹⁴⁷ One hundred and sixty-one states, of the 190 that are a party to the Geneva Conventions of 1949, are parties to Protocol I.¹⁴⁸ The United States is not a party to Protocol I because it was deemed to contain provisions that reversed existing customary law. There was concern that such a reversal would cause an overall weakening of the laws of war.¹⁴⁹ Specifically, it is the United States position that portions of Protocol I are "fundamentally flawed" by undermining humanitarian law, including recognizing irregular forces by granting them combatant status, even if they do not distinguish themselves from civilians.¹⁵⁰ Recognizing as legal the ability to act as a combatant while not distinguishing oneself from the civilian population will increase the "risk to the

¹⁴⁴ Schindler, *supra* note 122 at 621.

¹⁴⁵ Protocol I, *supra* note 82 at Part IV.

¹⁴⁶ *Id.*

¹⁴⁷ George H. Aldrich, *New Life for the Laws of War*, 75 Am. J. Int'l L. 764, 777 (1981).

¹⁴⁸ *Depositary of the Geneva Conventions and Protocols*, The Swiss Federal Department of Foreign Affairs in Bern.

¹⁴⁹ Parks, *supra* note 78 at 94.

¹⁵⁰ President Ronald Reagan's President's Message to the Senate Transmitting the Protocol, Jan. 29, 1987, 23 Weekly Comp. Pres. Doc. 91.

civilian populations within which such irregulars often attempt to hide.¹⁵¹ However, the United States did “recognize that certain provisions of Protocol I reflect customary international law, and others appear to be positive, new developments.”¹⁵² The United States therefore incorporates those provisions “into rules that govern our military operations.”¹⁵³ Three matters of customary international law that bear on this study are the concepts of humanity, proportionality and military necessity.

2. Humanity, Proportionality and Military Necessity

The first concept is the principle of humanity. Humanity, also known as unnecessary suffering¹⁵⁴ in the context of the law of armed conflict, “forbids the employment of arms, projectiles, or material calculated to cause unnecessary suffering. This concept also extends to unnecessary destruction of property. Combatants may not use arms that are per se calculated to cause unnecessary suffering, e.g., projectiles filled with glass, and may not use otherwise lawful weapons in a manner that causes unnecessary suffering, i.e., with the intent to cause unnecessary suffering.”¹⁵⁵ In other words, the principle of humanity seeks to limit the harm done to human flesh to that amount necessary to accomplish the mission, and no more. For example, serrations on a bayonet, whose sole purpose is to inflict greater harm on the enemy, may be prohibited if a non-serrated bayonet will incapacitate the enemy as effectively, while not making it more difficult to treat the wound by unnecessarily ripping the flesh.

¹⁵¹ Abraham D. Sofaer, *The Position of the United States on Current Law of War Agreements: Remarks of Judge Abraham D. Sofaer, Legal Adviser, United States Department of State, January 2, 1987*, 2 Am. U.J. Int'l L. & Pol'y 460, at 463.

¹⁵² *Id.* at 471.

¹⁵³ *Id.*

¹⁵⁴ JA 422, *Operational Law Handbook*, 2002, at 9.

¹⁵⁵ JP 3-60, *supra* note 72 at A-1.

The most important principle dealing with the decision of whether or not to conduct an attack that could cause collateral damage is proportionality. As Ms. Infeld noted, “[p]rotocol I was the first codification of the customary international law concept of proportionality.”¹⁵⁶ However, the Protocol did little to help define the concept. Proportionality “represents the intersection of the demands of military necessity and humanity. Proportionality requires that commanders weigh the anticipated loss of civilian life and damage to civilian property reasonably expected to result from an attack against the military advantages expected to be gained. If the loss of life or damage to property is clearly excessive compared to the anticipated military advantage, the attack is disproportionate and should not be undertaken.”¹⁵⁷ Another way of describing proportionality is Middle East Watch’s assertion that “the legitimacy of a military target . . . does not provide unlimited license to attack it. The customary principles of military necessity and humanity require that the attacking party always seek to avoid or minimize civilian casualties and, thus, prohibit disproportionate and other kinds of indiscriminate attacks.”¹⁵⁸ The two definitions above represent the divergent views on proportionality. While the first definition, submitted by the United States Air Force considers an attack to not be proportional if the collateral damage is “clearly excessive,” Middle East Watch advocates a much higher standard to “always seek to avoid or minimize civilian casualties.”

The acceptance under the concept of proportionality of collateral damage presupposes that the object of the attack was a valid military target. Before going into more detail on proportionality, it is useful to understand what is considered a lawful target.

¹⁵⁶ Infeld, *supra* note 22 at 118.

¹⁵⁷ Tudor, *supra* note 6 at 26-27.

¹⁵⁸ Middle East Watch, *Needless Deaths in the Gulf War* at 41 (1991).

This determination is based on the principle of military necessity. The United States Air Force's Air Force Operations and the Law succinctly captures the essence of military necessity.

The most basic principle of the law of aerial warfare is that combatants involved in armed conflict may use force or violence only against those persons, places, or objects that are indispensable to securing the prompt submission of the enemy, with the least possible expenditure of resources.¹⁵⁹

The concept of military necessity has its roots in the 1907 Hague Convention IV, section II, article 23(g) which forbade the destruction or seizure of "the enemy's property, unless such destruction or seizure be imperatively demanded by the necessities of war."¹⁶⁰

The United States Department of Defense *Joint Doctrine for Targeting* states in its appendix on "International Law and Legal Considerations In Targeting" that "[i]nternational law considerations will directly affect all phases of the joint targeting process."¹⁶¹ The publication addresses what is a lawful target subject to attack.

Military attacks will be directed only at military targets. Only a military target is a lawful object of direct attack. By their nature, location, purpose, or use, military targets are those objects whose total or partial destruction, capture, or neutralization offer a military advantage.

Many objects are clearly military targets, such as military barracks, military airfields, armaments, aircraft, tanks, antiaircraft emplacements, or troops. Economic targets (i.e., factories, workshops, and plants) that make an effective contribution to adversary military capability are considered legitimate military targets. Dual-use objects, those serving both a military and a civilian purpose, may be lawful targets as determined by the application of the LOAC and, in large measure, the principle of proportionality. This may include economic targets that indirectly but effectively support and sustain the adversary's warfighting capability. Attacks on objects such as dikes and dams are prohibited if their breach or

¹⁵⁹ Tudor, *supra* note 6 at 26.

¹⁶⁰ Hague IV, *supra* note 77 at art. 23(g).

¹⁶¹ JP 3-60, *supra* note 72 at A-1.

destruction would result in the loss of civilian lives disproportionate to the military advantage to be gained. Traditional modern transportation and communications systems were considered military targets because of heavy use by the military during conflicts. Similarly, some civilian infrastructure (such as radio or television transmitters) may be a legitimate target if used by their government to support military operations.¹⁶²

The essence of the principle of military necessity is that a belligerent is permitted to strike military targets and those non-military targets that reasonably may be thought to contribute to the efforts of the adversary's military.

With an understanding of the principle of military necessity, we can now return to the discussion of proportionality. Protocol I attempted to codify proportionality in Articles 57 and 51, but did little to help define it. In a report to the Prosecutor of the International Criminal Tribunal for the Former Yugoslavia the problem of determining when an attack is proportional is discussed.

The main problem with the principle of proportionality is not whether or not it exists but what it means and how it is to be applied. It is relatively simple to state that there must be an acceptable relation between the legitimate destructive effect and undesirable collateral effects. For example, bombing a refugee camp is obviously prohibited if its only military significance is that people in the camp are knitting socks for soldiers. Conversely, an air strike on an ammunition dump should not be prohibited merely because a farmer is plowing a field in the area. Unfortunately, most applications of the principle of proportionality are not quite so clear cut. It is much easier to formulate the principle of proportionality in general terms than it is to apply it to a particular set of circumstances because the comparison is often between unlike quantities and values. One cannot easily assess the value of innocent human lives as opposed to capturing a particular military objective.

It may be necessary to resolve [this matter] on a case-by-case basis, and the answers may differ depending on the background and values of the decision maker. It is unlikely that a human rights lawyer and a experienced combat commander would assign the same relative values to military advantage and to injury to noncombatants.

¹⁶² *Id* at A-3.

Further, it is unlikely that military commanders with different doctrinal back grounds and differing degrees of combat experience or national military histories would always agree in close cases. It is suggested that the determination of relative values must be that of the "reasonable military commander." Although there will be room for argument in close cases, there will be many cases where reasonable military commanders will agree that the injury to noncombatants or the damage to civilian objects was clearly disproportionate to the military advantage gained.¹⁶³

Article 51, *Protection of the civilian population*, provides at sub-paragraph 5(b) that an attack is indiscriminate when the attack "may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated."¹⁶⁴ Article 51 goes on to note at sub-paragraph 7 that "[t]he presence or movements of the civilian population or individual civilians shall not be used to render certain points or areas immune from military operation, in particular in attempts to shield military objective from attacks . . ."¹⁶⁵ Sub-paragraph 8 further alludes to the defenders obligations to protect civilians from attack by stating that [a]ny violation of these prohibitions shall not release the Parties to the conflict from their legal obligations with respect to civilian population and civilians, including the obligation to take the precautionary measures provided for in Article 57.

Article 57, *Precautions in attack*, is the article that is most directly applicable to determining the obligation to employ PGMs in a given attack. It is helpful to relate the relevant contents of this article.

1. In the conduct of military operations, constant care shall be taken to spare the civilian population, civilians and civilian objects.
2. With respect to attacks, the following precautions shall be taken:

¹⁶³ Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, 8 June 2000, 39 ILM 1257(2000).

¹⁶⁴ Protocol I, *supra* note 82 at art 51(5)(b).

¹⁶⁵ *Id.* at art. 51(7).

(a) those who plan or decide upon an attack shall:

(i) do everything feasible to verify that the objectives to be attacked are neither civilians nor civilian objects and are not subject to special protection but are military objectives within the meaning of paragraph 2 of Article 52 and that it is not prohibited by the provisions of this Protocol to attack them;

(ii) take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects;

(iii) refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;¹⁶⁶

Consistent with the United States position that portions of Protocol I restates customary international law, the United States Air Force adopted language identical to paragraph 2(a) in its 1976 Air Force Pamphlet 110-31, *International Law – The Conduct of Armed Conflict and Air Operations*.¹⁶⁷ The precautions to be taken in an attack outlined by Article 57(2)(a) are consistent with the principles of discrimination (2(a)(i)), humanity (2(a)(ii)), and proportionality (2(a)(iii)).¹⁶⁸

The definition of “feasible” as it applies to humanity or unnecessary suffering in Article 57(2)(a)(ii) and AFP 110-31 is key to determining the obligation of planners when weaponeering a bomb load for a given mission. At the Diplomatic Conference for Protocol I, the delegates discussed the meaning of “feasible” when settling on the appropriate word to capture their intent. Mr.

¹⁶⁶ *Id.* at art. 57.

¹⁶⁷ Air Force Pamphlet 110-31, *International Law – The Conduct of Armed Conflict and Air Operations* at 5-9 (1976) (hereinafter referred to as AFP 110-31). (a) Do everything feasible to verify that the objectives attacked are neither civilians nor civilian objects . . . (b) Take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians, and damage to civilian objects; and (c) Refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.

¹⁶⁸ Matthew C. Waxman, *International Law and the Politics of Urban Air Operations*, 12 (2000).

Waldemar Solf, the former Chief International Affairs Division, Office of The Judge Advocate General of the U.S. Army, participated as a member of the United States delegation to the Diplomatic Conference.¹⁶⁹ He related the discussion regarding the meaning of “feasible.” “The Report of Committee III explains that the word ‘feasible’ (“pratiquement possible”) was preferred to ‘reasonable’ and that it is understood to mean ‘that which is practicable or practically possible’. Several delegations elaborated on the Rapporteur’s interpretation by expressing understandings to the effect that as used in Protocol I, ‘feasible’ means ‘that which is practical or practically possible taking into account all the circumstances at the time, including those relevant to the success of military operations’.”¹⁷⁰ Additionally, “India expressed the understanding that Art. 57 as a whole will apply in accordance with the limits of capability, practical possibility and feasibility of each Party to the conflict . . . These capabilities will vary, and ‘this article does not require a Party to undertake to do something which is not within its means or its methods or its capability. In its practical application, a Party would be required to do whatever is practical or possible.’”¹⁷¹ Finally, Mr. Solf opined that regarding “[t]he obligation under subpara. 2(a) (ii) to take all feasible precautions in the choice of means and methods of attack to avoid or

¹⁶⁹ Michael Bothe, Karl Josef Partsch, Waldemar A. Solf, *New Rules for Victims of Armed Conflicts, Commentary on the Two 1977 Protocols Additional to the Geneva Conventions of 1949*, preface v (1982). The authors of this book “participated as members of the delegations of their countries in the Diplomatic Conference from 1974 until 1977.” The authors wanted to contribute to the dissemination of the two 1977 Protocols by writing a commentary. Unless otherwise noted, the authors quoted directly from the official statements of the parties representing their respective state during the diplomatic conference. However, where the authors are making comments on the protocols after the fact, the “personal views are not necessarily those of the delegations of the countries to which they belonged during the Conference, nor can they be attributed to any government.” Preface v.

¹⁷⁰ *Id.* (Waldemar A. Solf) at 362.

¹⁷¹ *Id.*

minimize incidental civilian casualties and damage to civilian property is an injunction to promote the maximum feasible accuracy in the conduct of bombardments of military objectives situated in populated places.”¹⁷² Mr. Solf’s commentary, while worthy of great deference due to the faith placed in him by the United States as one of its representatives at the diplomatic conference, cannot be considered a statement of the United States position. This comment, made and published after the fact, is limited by the qualification that the author is personally responsible for the opinions expressed and that “[t]hese personal views are not necessarily those of the delegations of the countries to which they belonged during the Conference, nor can they be attributed to any government.”¹⁷³

The principle of humanity described as taking all feasible precautions to minimize collateral damage recognized in sub-paragraph 2(a)(ii) and the principle of proportionality in subparagraph 2(a)(iii) could provide a springboard for human rights advocates to argue that the use of PGMs in urban settings is required to minimize collateral damage. While the principles of humanity and proportionality are firmly rooted in the law of armed conflict, the practical application is often disputed. Indeed, the legal requirement to use PGMs is disputed. Since this section of the paper is intended to recite the current established law, and the United States considers Article 57 to restate customary law, the question of whether the principles underlying Article 57 require the use of PGMs is addressed below in section V on the development of customary law. However, before moving on to customary law, it is important to understand the United States military’s implementation of the law of armed conflict.

¹⁷² *Id.* at 364.

¹⁷³ *Id.* at preface.

G. United States Application of the Law of Armed Conflict

While this study is an attempt to determine if there are international law obligations to employ PGMs to minimize collateral damage in urban air operations, as the world's leading air-power, it is appropriate to review the United States application of the law of armed conflict. The law of armed conflict is imbedded in every operation that the United States military undertakes and is stressed from the President of the United States, through the Department of Defense, the individual services, down to the airmen flying the missions.

As noted in section III(B) on United States policy and doctrine, during the 28 January 2003 State of the Union Address, President George W. Bush touched upon the issue of collateral damage when he addressed the possibility of war with Iraq. He stated that "[i]f war is forced upon us, we will fight in a just cause and by just means, sparing, in every way we can, the innocent."¹⁷⁴

The Department of Defense, in DoD Directive 5100.77, DoD Law of War Program, makes it clear that the United States military respects the law of armed conflict. The directive states that "[i]t is DoD policy to ensure that: the law of war obligations of the United States are observed and enforced by the DoD components."¹⁷⁵ It goes on to recognize explicitly the applicability of international law when defining the law of war. The Department of Defense recognizes that the law of war is "[t]hat part of international law that regulates the conduct of armed hostilities. It is often called the law of armed conflict. The law of war encompasses all international law for the conduct of hostilities binding upon the United States or its individual citizens, including treaties or

¹⁷⁴ President Bush, *supra* note 61.

¹⁷⁵ DoD Directive 5100.77, *DoD Law of War Program* (Dec 9, 1998) at para 4.1.

international agreements to which the United States is a party, and applicable customary international law.”¹⁷⁶ The respect for customary law recognizes not only the customary international law that currently exists, but also that customary law that will develop. As the sole super-power, the actions of the United States will significantly influence the development of custom.

Several authors¹⁷⁷ have referred to Air Force Pamphlet 110-31 when discussing the United States views on collateral damage. The favored quotation is to para. 5-3c(1)(b)(1)(c) which admonishes airmen to “take all feasible precautions” to avoid non-combatant casualties.¹⁷⁸ However, this publication was deemed obsolete by the Department of the Air Force on December 20, 1995. No publication was designated to supersede it.¹⁷⁹ As a result, AFP 110-31 is no longer widely available for use in the field. While there was no direct replacement for AFP 110-31, Air Force personnel still receive guidance on the law of war from other publications.

Joint Publication 3-60, Joint Doctrine for Targeting,¹⁸⁰ contains a legal appendix that specifically addresses the law of armed conflict principles addressed in the major treaties. Since the publication is dealing specifically with targeting, its legal appendix is crafted to discuss the application of the LOAC to aerial attack. The publication outlines precautions to be taken while conducting or planning an attack. Specifically, it states that “[w]hen conducting military operations, positive steps and precautions must be taken to avoid or minimize incidental civilian casualties and damage to civilian property.”¹⁸¹

¹⁷⁶ *Id.* at para 3.1.

¹⁷⁷ Infeld, *supra* note 22, Parks, *supra* note 79, Middle East Watch, *supra* note 156.

¹⁷⁸ AFP 110-31, *supra* note 167.

¹⁷⁹ Air Force e-Publishing, Obsolete Publications at <http://www.e-publishing.af.mil/pubs/obsoletepub.asp?page=38&order=id>.

¹⁸⁰ JP 3-60, *supra* note 72.

¹⁸¹ *Id.* at appx. A, para. 5(a).

Furthermore, “[i]ncidental civilian injury or collateral damage to civilian objects must not be excessive in relation to the expected military advantage to be gained.”¹⁸² This appendix manages to reduce to six pages all the relevant provisions of treaty and customary law.

V. Is Customary International Law Developing

The current treaty based and customary law discussed above in section IV sets forth obligations for both the attacker and the defender to “take all reasonable precautions to avoid losses of civilian lives and damage to civilian objects.”¹⁸³ However, the minimization of collateral damage is merely a limitation on the most basic principle of the law of aerial warfare, which is that combatants involved in armed conflict may use force or violence to secure the prompt submission of the enemy, with the least possible expenditure of resources.¹⁸⁴ The existing law, as applied by responsible states, provides sufficient guidance to all parties to a conflict to minimize collateral damage while permitting the execution of air operations. The remaining question is whether or not a rule of customary international law is in the process of development that would require the use of PGMs in urban warfare in all instances where collateral civilian damage is possible. An analysis of the potential development of customary international law reveals that it could possibly develop as a result of interpreting, or arguably stretching, the provisions of the current treaty regime to mandate the use of PGMs or independent of the existing treaties.

A. The Martens Clause: Customary International Law as a Source of the Law of Armed Conflict

¹⁸² *Id.* at appx. A, para. 5(b).

¹⁸³ Protocol I, *supra* note 82, at art. 57.

¹⁸⁴ Tudor, *supra* note 6, at 26.

The existence of customary international law as one of the sources of the Law of Armed Conflict is well established. Customary international law, by its very nature, is subject to change or growth. The inability of a law of armed conflict treaty to capture or incorporate all rules of customary international law in a given treaty was recognized by the drafters of the major law of armed conflict treaties. To insure that customary international law was recognized as a legitimate source of law for the law of armed conflict, a "Martens clause" was included in the law of armed conflict treaties.

The Martens Clause is named after the Russian Foreign Minister who first introduced it in the preamble of Hague Conventions (IV) on Land Warfare in 1907.¹⁸⁵ As Leslie C. Green noted, "[i]ts purpose was to deal with any lacunae or unexpected situation that might arise and was intended to prevent the possibility of any belligerent contending that its actions were legitimate since they were not expressly forbidden by the Convention. Today, it is understood to apply to every armed conflict and tends to be embodied, either directly or by way of paraphrase, in every treaty concerning the conduct of hostilities."¹⁸⁶

The most recent treaty based codification of the Martens Clause is found in Article 1, paragraph 2, of Protocol I, 1977. It provides that, "[i]n cases not covered by the Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience." . . . It is unfortunate, however, that no attempt has been made to define what constitutes 'the principles of humanity and the dictates of the public conscience.'

¹⁸⁵ Green, *Essays on the Modern Law of War* (2d ed. 1999) 30-31.

¹⁸⁶ *Id.*

Presumably, it is assumed that these are so well known and so generally accepted as to render definition superfluous.”¹⁸⁷

The Martens Clause is both reactive and proactive in capturing humanitarian norms. “[T]he meaning of this clause has been understood in two ways: (1) International customary law in a wide sense remains valid as long as it is not abolished by the codification of the *Regulations Respecting the Laws of War on Land*; hence, one must not be led to the negative conclusion that law does not exist if there is no stipulation in respect of a certain situation in the said *Regulations*. (2) When new means of warfare develop in the future, even if there are no concrete provisions regulating such means of warfare in the treaties, the assertion of the absence of law is not permitted.”¹⁸⁸ “The Martens Clause has a major significance in the event of the appearance of new means of warfare and the advent of new war situations.”¹⁸⁹

The Martens Clause made it clear that “when seeking the law of war it is not enough to look merely at the written documents drawn up and accepted by states as treaties. These reflect what has developed in practice, representing which restrictions states are prepared to impose upon their armed forces. Although it may not always be easy to ascertain what are claimed to be the customary rules in this regard, the principles of humanity and the dictates of public conscience, along with considerations of the accepted practices of the most significant military forces, are probably sufficiently well known and accepted to provide the necessary guidance.”¹⁹⁰

¹⁸⁷ *Id.*

¹⁸⁸ Shigeki Miyazaki, *The Martens Clause and International Humanitarian Law*, in *Studies and Essays on International Humanitarian Law and Red Cross Principles in Honour of Jean Pictet* 433, 436-437 (Christophe Swinarski ed., 1984).

¹⁸⁹ *Id.* at 441.

¹⁹⁰ Green, *supra* note 185, at 39-40.

The Martens Clause captures the “unexpected situation”¹⁹¹ arising from the revolution in warfare engendered by the PGM’s unprecedented ability to discriminate amongst urban targets through precision delivery as a “new means of warfare.”¹⁹² The Clause applies the “principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience”¹⁹³ to their employment. The unexpected situation is the quantum leap forward in precision bombardment that aerial warfare has taken since the development of the customary principles identified in Protocol I. As indicated above in section IV(F), Protocol I, Article 57, *Precautions in Attack*, has set the stage for a debate over whether or not the customary international law principle of humanity described as taking all feasible precautions to minimize collateral damage recognized in sub-paragraph 2(a)(ii) and the principle of proportionality described in subparagraph 2(a)(iii) require the use of PGMs in urban settings to minimize collateral damage. An analysis is based on the three criteria established by the Martens Clause.

B. Established Custom

There is disagreement about whether or not there is an obligation to use PGMs imposed by the 1977 Protocol I, Article 57(2)(a)(ii)’s requirement to take “all feasible precautions.” Human Rights Watch is the most visible advocate of the use of PGMs to minimize collateral damage and bases their argument on their understanding of the customary principles identified in Article 57. On the other side of the coin is the objection to the development of a customary obligation to employ PGMs because it may restrict a military’s “operational and tactical flexibility and because the military’s

¹⁹¹ *Id.* at 30-31.

¹⁹² Miyazaki, *supra* note 188, at 436-437

¹⁹³ Green, *supra* note 185, at 30-31.

precision-guided arsenal is limited and financially costly.”¹⁹⁴ Scholars associated with the United States Air Force have raised the operational concern. In particular, Matthew C. Waxman, a scholar associated with the RAND Corporation to conduct a study on “International Law and the Politics of Urban Air Operations,” recognized that the “practice of relying on precision weapons over urban environments contributes to public and international expectations that the United States will continue to do so, potentially accelerating creation of a legal norm requiring it.”¹⁹⁵ Additionally, a senior U.S. Air Force Judge Advocate expressed his concern that “the perception that failure to use PGMs represents a considered American decision to cause noncombatant deaths. If this perception comes to represent the consensus of world opinion, it is not inconceivable that international law may someday require PGM use . . . by those nations with the resources to produce or acquire them.”¹⁹⁶

It is necessary to determine how customary international law is formed before going forward. A commonly accepted definition of customary law is that “[c]ustomary international law results from a general and consistent practice of states followed by them from a sense of legal obligation.”¹⁹⁷

1. General and Consistent Practice of States

It was illustrated in section II(B) that although many states have PGMs, their degree of sophistication and reliability varies greatly. The evolution of PGM capabilities goes hand in hand with their employment. The more reliable and capable a PGM, the more likely it is to be used. This is apparent from the United States increasing use of

¹⁹⁴ Waxman *supra* note 168, at 13.

¹⁹⁵ *Id.* at 57.

¹⁹⁶ Col Charles J. Dunlap, *Technology: Recomplicating Moral Life for the Nation's Defenders*, Parameters: U.S. Army War College, Autumn 1999, 29.

¹⁹⁷ *Restatement (Third) of Foreign Relations Law*, §102(2).

PGMs in engagements from Vietnam through Afghanistan. Until PGMs have all weather capability and are readily available, states will continue to employ gravity bombs in urban areas. The prevalence of the use of gravity bombs by many states prevents the recognition of a general and consistent practice of states.

However, consistent with the realities of warfare, norms of international law based on state practice can be established and applied to a limited field of states with a given capability. The laws of armed conflict do not recognize the lowest common denominator in the evolution of weaponry as the standard of conduct. As noted above in India's understanding of the requirement to "take all feasible precautions in the choice of means and methods of attack,"¹⁹⁸ the requirement "will apply in accordance with the limits of capability, practical possibility and feasibility of each Party to the conflict These capabilities will vary, and 'this article does not require a Party to undertake to do something which is not within its means or its methods or its capability.'¹⁹⁹ India's understanding was an attempt to clarify that poor states could continue to use the means of warfare available to them instead of being required to purchase expensive new advanced technology weapons. However, the opposite conclusion can also be drawn that states that do possess more precise weapons must employ them if the weapon could minimize collateral damage, while still accomplishing the mission.

2. Followed From a Sense of Legal Obligation: Interpreting Article 57's "Feasible" Standard

Minimizing collateral damage is a result of selecting both the most discriminating means or method to minimize unnecessary suffering, usually a PGM, and employing that

¹⁹⁸ Protocol I, *supra* note 82, at art. 57(2)(a)(ii).

¹⁹⁹ Bothe, *supra* note 169, at 362.

munition in a proportional manner. Proportionality, codified in Protocol I Article 57(2)(a)(iii), “demands that parties refrain from attacks, even against legitimate military targets, likely to cause civilian suffering and damage disproportionate to the expected military gain.”²⁰⁰ While the questions of proportionality and means and methods to reduce unnecessary suffering are inextricably intertwined in the consideration of minimizing collateral damage in urban bombardment, the emphasis in this section is on whether the selection of a PGM is required by Protocol I’s Article 57(2)(a)(ii). That article provides that with regard to attacks, one must “take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects.”²⁰¹ This article has been noted as representing the principal of humanity or unnecessary suffering.²⁰² However, equating Article 57(2)(a)(ii) to the principles of humanity or unnecessary suffering without emphasizing that the article is discussing the selection of means and methods of warfare may mislead the law of armed conflict practitioner. The plain language of the article goes far beyond the limitation that unnecessary suffering merely means that a weapon will not be designed or employed to cause more harm than militarily necessary. Whereas Article 57(2)(a)(iii)’s guidance on proportionality invites disagreement on how many civilian deaths are permissible, Article 57(2)(a)(ii) guidance on means and methods goes to the heart of selecting bomb loads.

The point of contention is between those that interpret Article 57(2)(a)(ii)’s direction to avoid or minimize collateral damage by requiring an attacker to “choose the

²⁰⁰ Waxman, *supra* note 168, at 8.

²⁰¹ Protocol I, *supra* note 82, at art. 57(2)(a)(ii).

²⁰² Waxman, *supra* note 168, at 12 and Tudor, *supra* note 6, at 9.

means and methods that minimize risk of incidental civilian damage to the greatest extent feasible”²⁰³ as requiring the use of PGMs and those that do not.

Those that advocate the affirmative requirement to use PGMs in all circumstances where collateral damage is possible rely in part on the United States past practice to establish the sense of legal obligation. Human Rights Watch published a position paper on February 20, 2003 entitled *International Humanitarian Law Issues In A Potential War In Iraq* addressing, amongst other things, the obligation to use PGMs to minimize collateral damage.

Recent reports and past history indicate that the use of precision-guided aerial munitions (PGMs), or so-called "smart bombs," will play a significant role in a U.S.-led attack against Iraq.²⁰⁴

In deciding whether to use precision-guided weapons, states have a duty to take all feasible steps, including choosing the means of attack, that will minimize injury to civilians and civilian objects. With the proper intelligence, and assuming no technical failure or human error, PGMs can significantly enhance the ability of an attacker to discriminate between combatants and civilians. Therefore, a party to the conflict that has precision weapons at its disposal should favor their use over "dumb" bombs when planning an attack on a given military target located in or near populated areas.²⁰⁵

Despite recognizing intelligence, technical, and human error limiting factors on the effectiveness of PGMs, Human Rights Watch then goes on to make a blanket statement.

“Only PGMs should be used in populated areas.”²⁰⁶

The counter-argument adopted by the U.S. Air Force is that while the principle of humanity “proscribes unnecessary or disproportionate suffering by the civilian

²⁰³ Waxman, *supra* note 168, at 12-13.

²⁰⁴ Human Rights Watch, *International Humanitarian Law Issues In A Potential War In Iraq*, Human Rights Watch Briefing Paper, February 20, 2003 at <http://www.hrw.org/backgrounder/arms/iraq0202003.htm#3>.

²⁰⁵ *Id.*

²⁰⁶ *Id.* Another example of Human Rights Watch’s absolutist views is their blanket assertion that “Landmines and Cluster Bombs must not be used” *Id.*

population, it also implicitly recognizes that some collateral damage and civilian casualties are inevitable in war. . . . [I]t does not require the exclusive use of expensive precision-guided weapons; the rule is one of reason, simply that a nation must do what is practically possible to avoid civilian casualties.”²⁰⁷ This argument is supported by the definition of “feasible.” The Committee to the conference on Additional Protocol I determined that the word “feasible” was understood to mean, “that which is practicable or practically possible” or “that which is practical or practically possible taking into account all the circumstances at the time, including those relevant to the success of military operations.”²⁰⁸

The increasing reliance on PGMs demonstrates that practical differences between the blanket obligation to use PGMs and the “practically possible” position is narrowing. However, a blanket rule in this case is not appropriate. There are still circumstances where the use of gravity bombs in an urban environment is more appropriate than PGMs. For example, area targets that need to be saturated with munitions to destroy the target could not be accomplished with PGMs. This might include troops in a staging area, a military motor pool, or a war material producing industrial complex. Even if these targets were inside a city, their destruction would still best be accomplished through the use of gravity bombs saturating the target area. Of course other law of armed conflict considerations like discrimination between military and civilian locations and proportionality when considering the potential loss of civilian life must be weighed against the military advantage. However, if a city park ringed by civilian homes has been taken over by soldiers as a staging area, the use of gravity bombs to saturate the area is

²⁰⁷ Tudor, *supra* note 6, at 293.

²⁰⁸ Self, *supra* note 169, at 362.

permissible. So long as the attacking force takes into consideration factors such as wind, release altitude, and the inherent accuracy or inaccuracy of a given platform to deliver gravity bombs, the attacker would have taken all steps feasible or practicable to minimize collateral damage. The fact that civilian homes ringing the park may be unintentionally struck at the beginning or end of a bomb run is not a violation of the law of armed conflict. The use of PGMs in this scenario would not be practical to saturate an area. Rather they are better suited for striking discrete, individual targets.

Another argument that could show that the use of PGMs is required would be evidence that gravity bombs have fallen into disuse. It could be argued that a weapon that has fallen into disuse, while another weapon has gained favor, is evidence that the weapon, in this case gravity bombs, are illegal because the state feels obliged to use the other weapon. As an example, “[w]hile it is true that the modern soldier might *in extremis* use his rifle as a club, the mace, the broad-ax, the ball and chain, the halberd, the glaive, the partizan, the military fork, and the like have all fallen into desuetude. Moreover, they have been out of use so long that they would now be considered illegal.”²⁰⁹ However, that argument is not persuasive. A decision to use a new weapon is most likely the result of the increased efficiency of the new weapon, instead of humanitarian reasons. Additionally, gravity bombs are still used on many situations including urban bombardment. While the United States makes significant use of PGMs, there is no evidence that other states rely on them to the same extent. To borrow from *The Paquete Habana*, “no single nation can change the law of . . .” armed conflict. “That

²⁰⁹ Green, *supra* note 185, at 333.

law is of universal obligation..." and no usage of "one or two nations can create obligations for the world.."²¹⁰

3. The United States' Conundrum

The United States has the most robust state practice regarding PGMs. Matthew Waxman addressed the conundrum that the United States faces by increasingly employing PGMs while seeking to prevent their use from evolving into a legal obligation.

It could be argued that the consistent U.S. practice over the past several decades of using precision-guided weapons against urban targets is creating customary law demanding that nations possessing precision munitions always use them in highly populated environments. Recall . . . that a customary international legal norm is created when states act in conformity with it and the international community accepts it as obligatory. It is also, however, an international legal principle that by persistently objecting to a norm while it is becoming law, a state may exempt itself from it. The usual problems of determining whether a practice has "matured" into customary law and whether a state has opted out of its development are complicated in this case because the party perhaps seeking to opt out (the United States) of the norm (i.e., using precision-guided weapons against urban targets) is the one to whom the norm would most often apply, and also because U.S. actions do not corroborate – indeed, they seem to contradict – its objection to the norm. It is also not immediately clear, given that U.S. and many allied forces generally follow the proposed norm as a matter of policy anyway, whether regarding it as a legal requirement will promote civilian protection in the long term. The positions taken by an international actor with regard to this issue . . . depend not only on whether a state has precision capabilities or expect to be the target of air attacks, but also on policy judgments (for instance, will inhibiting forces' flexibility regarding how best to use their available technology reduce incentives to develop weapons more capable of protecting civilians?) . . . [P]ublic expectations at home and abroad will push U.S. decision makers not to deviate from the consistent U.S. policy regarding precision weapons and urban environments, regardless of how one resolves this interesting legal question.²¹¹

While not an answer to the United States dilemma, the question of whether a state can engage in consistent practice based on policy decisions, while objecting to the

²¹⁰ The Paquete Habana, 175 U.S. 677, 711 (1900).

²¹¹ Waxman, *supra* note 168, at 13-14.

formation of a norm may be made irrelevant by the evolution of technology itself. If effective defensive counter-measures are created that defeat the benefit gained by using PGMs, or a high-technology weapon evolves to make gravity bombs obsolete, the requirement to use PGMs will either fail to crystallize or become moot.

C. Principles of Humanity

The second basis recognized in the Martens Clause for the inclusion of a rule requiring the use of PGMs in urban areas in the law of armed conflict is the principle of humanity. Both the principles of humanity and the dictates of public conscience “are stated in the present text to be *part of* international law. They are ‘general principles of law’.”²¹² This is important in light of the fact that the parties rejected the International Committee of the Red Cross’s proposal to have these two principles stand alone “as separate sources *outside* international law.”²¹³ As was noted earlier though, “[i]t is unfortunate, however, that no attempt has been made to define what constitutes ‘the principles of humanity and the dictates of the public conscience.’ Presumably, it is assumed that these are so well known and so generally accepted as to render definition superfluous.”²¹⁴

An attempt to define humanity, or humanitarian law, reveals that it is a relatively new term that refers to “all or part of the *jus in bello* component of the law of war.”²¹⁵ It is subjective and depends on “the dominant moral ideas and degree of community feeling obtaining among the major contenders in society.”²¹⁶ Humanity as it pertains to selecting

²¹² Bothe, *supra* note 169, at 44.

²¹³ *Id.*

²¹⁴ Green, *supra* note 185, at 31.

²¹⁵ Georges Abi-Saab, *The Specificities of Humanitarian Law*, in *Studies and Essays on International Humanitarian Law and Red Cross Principles in Honour of Jean Pictet* 265 (Christophe Swinarski ed., 1984).

²¹⁶ *Id.*

the means and methods of warfare for urban bombardment was specifically captured in Protocol I, Article 57(2)(a)(ii). The analysis at pages 35-43 above discusses the role that humanity plays in selecting a bomb load. As noted in section IV(F)(1) [see page 35], the United States has recognized Article 57(2)(a)(ii) as customary international law by incorporating it “into rules that govern our military operations.”²¹⁷ Since Article 57(2)(a)(ii) specifically covered the humanitarian aspects of selecting the means and methods of employing force, the broader humanitarian principles component of the Martens Clause is not ripe for employment.

D. Dictates of Public Conscience

As just implicated, the “dictates of public consciences” have not been well defined. “Dictates of public conscience” are part of international law, rather than operating as a separate source of limitation on the conduct of warfare outside of international law.²¹⁸ Therefore, the dictates of public conscience “are ‘general principles of law’ in the sense of Art. 38 of the Statute of the ICJ.”²¹⁹

Determining if a general principle of law based on the dictates of public conscience has developed, or is developing, is factually similar to the method used to determine state practice in the development of custom. However, in the case of the dictates of public conscience, more emphasis is placed on the international public’s reaction to a particular means or method of the employment of force. While not

²¹⁷ Sofaer, *supra* note 151 at 471.

²¹⁸ Bothe, *supra* note 169 at 44.

²¹⁹ *Id.* Article 38 of the Statute of the International Court of Justice recognizes as sources of international law: international conventions, international custom, and “the general principles of law recognized by civilized nations.” See Barry E. Carter, International Law Selected Documents, *Statute of the International Court of Justice*, (2001-2002 ed., Article 38) 28 at 36. 59 Stat. 1055, T.S. No. 993, 3 Bevans 1179.

intentionally addressing the dictates of public conscience, Mr. Parks captured its essence with the phrase “the temper of the times.”²²⁰

Twenty-four hour news networks, live feeds from an area of operations (AOR), and DOD’s willingness to provide bomb camera footage have all contributed to the public’s perceptions about the accuracy of the United States weapons and the corresponding perception that through accuracy, collateral damage should not occur. The television media and the public fed on “slam-cam” “footage of television- or laser-guided bombs homing in on a targeted air duct on a specific building in the middle of downtown Baghdad” in Operation DESERT STORM.²²¹ Military commanders, aware of the “CNN factor”²²² know that the media most directly influences the dictates of public conscience. Commanders are acutely aware of the impact that their actions have on public perception of the legitimacy of their operations. Conversely, commanders are also aware of the impact that public perception can have on their operations. Public pressure can lead to self-defeating rules of engagement.

The public conscience that is agitated during military operations is less focused on the means employed, than on the results. Despite the impact of widespread slam-cam footage, public conscience does not appear to be focused on creating a demand that militaries use PGMs. While bomb video feeds are interesting, public outcries do not rise to a fever pitch until video of civilian deaths are aired. The bombing of the Amirya bomb shelter during Operation DESERT STORM with a PGM, resulting in the deaths of 200 to 300 Iraqi civilians, according to Iraqi reports,²²³ resulted in reactions ranging from

²²⁰ Parks, *supra* note 78, at p.48.

²²¹ Christian Lowe, *Smarter Bombs*, The Weekly Standard, January 9, 2003.

²²² Meilinger, *supra* note 5, at 15.

²²³ Middle East Watch, *supra* note 158 at 6-7.

condemnations to remorse. In the rational light of the law, based on the information available at the time the attack was planned and executed, there was no violation of the law of armed conflict.²²⁴ However, the public, as informed by the media, had no knowledge of the laws of armed conflict.

The public conscience fed by the mass media is not demanding the use of PGMs, because the prevalence of bomb video feeds has led the public to believe that PGMs are used with great regularity.²²⁵ As indicated in preceding sections, the use of PGMs by the United States is continuing to rise. However, the prevalence of PGMs employed by other world actors is lower than in the United States.

While the general public is content in the belief that the use of PGMs is the norm in aerial bombardment, Human Rights Watch has taken it upon itself to advocate for the requirement that PGMs always be employed in urban areas as a way to minimize collateral damage. Their efforts could create a public conscience if widely publicized, promoted, and accepted.

Following Operation DESERT STORM, Middle East Watch, a division of Human Rights Watch, published "Needless Deaths in the Gulf War" to "contribute to the public debate about the conduct of the Persian Gulf War and to draw attention to violations and possible violations of humanitarian law."²²⁶ One of Middle East Watch's premises for its study was that "[t]he precision weapons and surveillance technology available to the United States and its allies increased their capacity still further to avoid harm to

²²⁴ Major Ariane L. DeSaussure, *The Role of the Law of Armed Conflict During the Persian Gulf War: An Overview*, 37 A.F.L. Rev. 41, at 64-65(1994).

²²⁵ Middle East Watch, *supra* note 158 at 113.

²²⁶ *Id.*, at preface.

civilians.”²²⁷ Following NATO’s air campaign over Kosovo in 1999, Human Rights Watch published “Civilian Deaths in the NATO Air Campaign – The Crisis in Kosovo.”²²⁸ While the primary weight of Human Rights Watch’s crusade was against the use of cluster bombs, they attempted to influence public conscience by calling on NATO to “examine . . . weapons selection during the war and take whatever corrective measures are needed in the future to further minimize the civilian effects of the use of military force.”²²⁹ The boldness of Human Rights Watch’s assertions regarding the use of PGMs to minimize collateral damage has evolved since Operation DESERT STORM right along with the United States reliance on PGMs. In their most recent release on the topic, Human Rights Watch made the blanket assertion that “[o]nly PGMs should be used in populated areas.”²³⁰

Despite the efforts of organizations to mandate the use of PGMs and the common perception fueled by bomb camera footage, the use of PGMs in urban areas to reduce collateral damage has not become international law based on the dictates of public conscience. Two reasons exist for this conclusion; one factual and one legal.

Factually, the obligation to use PGMs in urban areas to minimize collateral damage has not risen to a level of public conscience that would equate to customary international law’s requirement of *opinio juris*. The public’s viewing on the news of slam-cam footage does not engender recognition of the benefits to reducing collateral damage. Rather, the footage is viewed with curiosity or amazement. Additionally, the

²²⁷ *Id.*, at 3.

²²⁸ Human Rights Watch, *Civilian Deaths in the NATO Air Campaign – The Crisis in Kosovo* (2000), available at <http://www.hrw.org/reports/2000/nato>.

²²⁹ *Id.* Human Rights Watch called for the suspension of the use of cluster bombs.

²³⁰ Human Rights Watch, *supra* note 204.

work of advocacy groups does not amount to the dictates of public conscience without the widespread, knowing support of the public.

The legal argument is that while the Martens Clause is recognized as an important tool for recognizing human rights that are not enunciated in treaties, there is disagreement as to how a norm would be implemented in international law based on the dictates of public conscience. This controversy was captured in "The Handbook of Humanitarian Law in Armed Conflicts."

What is not clear is whether the Martens Clause goes further and introduces into humanitarian law a rule that all weapons and means of warfare are to be judged against the standard of 'the public conscience' even if their use [or in this case the failure to use PGMs] does not contravene the specific rules of customary international law such as the unnecessary suffering principle. Although this suggestion has been made from time to time it is impracticable since 'the public conscience' is too vague a concept to be used as the basis for a separate rule of law and has attracted little support. The Martens Clause should be treated as a reminder that customary international law continues to apply even after the adoption of a treaty on humanitarian law and as a statement of the factors which are likely to lead states to adopt a ban on a particular weapon or means of warfare.²³¹

As Bothe argued above, the "dictates of public conscience" can help formulate general principles of law recognized by civilized nations.²³² However, those "general principles of international law" are "sweeping and rather loose standards of conduct that can be deduced from the various rules by extracting and generalizing some of their most significant common points."²³³ Therefore, the "dictates of public conscience" is not a tool for implementing narrow, specific obligations to employ a particular weapon system.

E. Martens Clause Conclusions

²³¹ Dieter Fleck, *The Handbook of Humanitarian Law in Armed Conflicts* 29 (1995).

²³² Bothe, *supra* note 169 at 44.

²³³ Antonio Cassese, *International Law* 151 (2001).

Customary international law provides the most likely avenue for the use of PGMs in urban areas to minimize collateral damage to become law. Evidence of state practice is found in the increasing use of PGMs in urban areas. The sense of legal obligation is more difficult to prove. *Opinio juris* could arguably be intimated from statements regarding a state's goal to minimize collateral damage. However, the more likely route by which proponents of obligating the use of PGMs would attempt to establish *opinio juris* would come from the repeated, systematic stretching of Protocol I's Article 57 provisions regarding what are feasible, i.e. reasonable, precautions to take in an attack until the new definition is accepted by the international community.

VI. The Humanitarian Benefits and Detriments of Employing PGMs

The application of treaty provisions or the development of customary law regarding the determination of whether or not PGMs must be employed to minimize collateral damage cannot be determined in a vacuum. The "slam-cam" footage from DESERT STORM of "television- or laser-guided bombs homing in on a targeted air duct on a specific building in the middle of downtown Baghdad—announcing its bull's-eye hit with the crackle and fuzz of sudden static"²³⁴ created the common perception that PGMs are capable of surgical precision and that therefore technology has made collateral damage a thing of the past. However, before the obligation to employ PGMs can be determined, the benefits and detriments of employing PGMs must be considered.

A. Benefits of Using PGMs

As was mentioned in section III(B) regarding the doctrinal use of PGMs, they were not developed to prevent collateral damage, but because they permit an effective and efficient application of force against a target. The first priority of aerial warfare is to

²³⁴ Lowe, *supra* note 221.

destroy the target and then get the pilot back home safely. Lt Gen Buster Glosson, USAF, director of campaign plans for U.S. Central Command Air Forces during Operation DESERT STORM,²³⁵ observed that although precision weapons are not perfect, "they maximize our combat capability by permitting us to hold any target in a country at risk while minimizing the cost – both in lives and dollars."²³⁶ General Glosson illustrated the military value of PGMs by comparing a World War II bombing run to the capabilities of the USAF in 1993.

One need only look back to our raids on Schweinfurt, Germany, in World War II to see how dramatically precision weapons have enhanced our capabilities over the last 50 years. Two raids of 300 B-17 bombers could not achieve with 3,000 bombs what two F-117s can do with only four. Precision weapons have truly given a new meaning to the term mass.

To shut down an industry in World War II, we were forced to target entire complexes because of the inaccuracy of our weapons; today we would need to hit only a couple of key buildings. What we historically achieved with volume we now can accomplish with precision. After all, the objective has never been to see how many bombs we could drop, but to produce results.

Along with increasing our combat capability, PGMs reduce the human costs of war. No one who has ever sent airmen into combat relishes the idea of their loitering over hostile territory dodging surface-to-air missiles or enemy airplanes in order to deliver their bombloads. Each Schweinfurt raid placed 3,000 airmen in harm's way. Today, we can do the same job with just two airmen.²³⁷

The military justification for the development and employment is impressive in terms of efficiency. However, precision targeting has also had the consequential benefit of reducing collateral damage. "When America aircraft struck Serbian targets in Bosnia in 1995 and Serbia/Kosovo in 1999, they used PGMs almost exclusively in populated

²³⁵ Lt General Buster C. Glosson, USAF Biography, at http://www.af.mil/news/biographies/glosson_bc.html

²³⁶ Glosson, *supra* note 3, at 4.

²³⁷ *Ibid.*

areas. Once again, the accuracy of these weapons was extraordinary. Visitors to Serbia were amazed to see radio towers neatly separated from their concrete bases and toppled, while civilian buildings not more than 50 feet away remained untouched. In another instance, the bombing razed a Serbian defense facility but left buildings on either side largely unscathed.”²³⁸

The ability to accurately strike military targets in populated areas fulfills the obligation to discriminate between civilians and military targets. Furthermore, the use of PGMs demonstrates the application of the principle of proportionality, the right amount of force was employed to accomplish the mission while limiting collateral damage. Specifically, under Protocol I Additional to the Geneva Conventions of August 12, 1949, Article 57, *Precautions in attack*, subparagraph 2(a)(ii) all feasible precautions in the choice of means and methods of attack were taken by selecting PGMs with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects. The law of armed conflict may have required the use of a PGM rather than gravity bombs in the examples given in the preceding paragraph if several conditions were met. Those conditions include the assumption that (1) there were civilians in the nearby non-military structures, (2) that the civilians had no reason to suspect that they were near a military target, (3) they did not voluntarily place themselves there as human shields, (4) that when weighing the value of the military objective against the possible collateral damage, the concrete gain from striking the target was not proportional to the collateral damage, and (5) that PGMs were readily available to strike the target. If PGMs were not readily available to strike the target, greater collateral damage resulting from the use of gravity bombs would be acceptable if

²³⁸ Meilinger, *supra* note 5, at 13.

destroying the target was deemed to be of a significant military necessity when weighed against the probable collateral damage. In the case of the Kosovo air campaign, supreme significance was placed on minimizing collateral damage as a result of the humanitarian justification for the attacks.

Another benefit of the technological advancement of PGMs that has consequential benefits for minimizing collateral damage is the ability to accurately engage targets from a safe stand-off distance. Mr. Parks helps me make the point that PGMs which permit a pilot to accurately engage a target from a safe distance from the air-defenses protecting his target, help reduce collateral damage. While discussing attempts to define the laws of war applicable to aerial bombardment in World War II, Mr. Parks noted that:

In the race to condemn aerial bombardment, many have failed to take into proper account the effect of a defender's actions. If a bomb is dropped and misses the target, the bomber is guilty of indiscriminate bombing. This is an untenable position even by today's bombing standards. It holds World War II bomber crews to a higher standard of bombing accuracy than is justified by the facts, holds aerial bombardment to a higher standard than artillery or naval gunfire, and in particular fails to take into account intervening actions by a defender that prevent-and are intended to prevent-a bomber from bombing as accurately as possible.²³⁹

Historically bombing accuracy diminishes by 200% once an aircraft is taken under fire. Thus, an aircraft whose normal Circular Error Probable (the radius of a circle within which half of the bombs are expected to fall) is, for example, 500 meters would increase to 1500 meters once the aircraft is taken under attack.²⁴⁰

Even though revolutionary advances in precision bombardment have taken place since World War II, as illustrated in section II(A), the most common type of PGM guidance system is laser based, which requires a direct line of sight from the attacking aircraft to the target. While the United States has developed targeting pods that can keep

²³⁹ Parks, *supra* note 78, at 53. Mr. Parks' historical statistics on the diminishment of bombing accuracy may not be accurate regarding PGMs, but it is still illustrative of the effect of enemy fire.

²⁴⁰ Kalshoven, *Belligerent Reprisals* 168-169 (Leyden, 1971). Parks, *supra* note 78, at foot note 197.

the bomb on target while the pilot performs defensive maneuvers,²⁴¹ other states do not have this technology. The requirement to keep the laser calmly trained on the target exposes the aircraft to anti-aircraft defenses. The anti-aircraft fire may require a pilot to conduct defensive maneuvers, throwing the laser-guided PGM off target, thus causing more collateral damage. However, GPS guided PGMs have a greater stand-off capability that relieves the attacking aircraft from having to loiter in the area of enemy air defenses until the bomb strikes the target.

The evolution of targeting systems is evidence that the application of the law of armed conflict provisions dealing with minimizing collateral damage is directly related to the development of technology. Therefore, since different states have different capabilities, the duty to employ PGMs can only be determined on a case-by-case basis and then only after factoring in other considerations, including the actions of the defender in defeating that PGM capability. That topic will be addressed below.

Munitions are not developed with the specific purpose of minimizing suffering.²⁴² Rather, they are developed for their military benefits. PGMs are first and foremost an offensive tool employed to defeat an enemy. The humanitarian benefits of this precision weapon are merely beneficial side effects. No bright line rule exists to mandate the use of PGMs. When determining if the law of war requires the use of a PGM, many factors, including the actions of the enemy must be considered, based on the information available to the commander at the time.²⁴³

²⁴¹ Lowe, *supra* note 221.

²⁴² However, weapons must not be designed to cause unnecessary suffering. In the United States, all new weapons are subjected to a legal review by the appropriate service Judge Advocate General (DoD Instruction 5000.2) for a legal review to ensure compliance with the laws of armed conflict, specifically Article 36 of Protocol I.

²⁴³ Final Report to the Prosecutor, *supra* note 163.

B. Detriments of Using PGMs

1. PGM Limitations

PGMs are not the final word in preventing collateral damage. Their ability to accurately engage a target can be defeated by mechanical problems, environmental factors, or active defensive measures by the enemy.

The popular theory about PGMs is that "PGMs have a smaller circular error probable (CEP) and therefore are capable of greater accuracy than unguided munitions...[B]ecause PGMs are more accurate than unguided weapons, they are less likely to cause civilian casualties."²⁴⁴ However, like any mechanical object, a PGM can suffer from a malfunction and pose a risk to noncombatants.

Precision-guided munitions—whether guided by laser energy, data link, or on-board global positioning system (GPS) receivers – depend upon delicate equipment and a sophisticated manipulation of geometry and tactics to perform as advertised. If any of that equipment fails, if the geometry or tactic was planned poorly or executed incorrectly, or if the air crew supporting the weapon (in the case of a laser-guided bomb [LGB]) is forced to take evasive maneuvers for self-preservation during the weapon time of flight, the weapon goes stupid – and a stupid PGM is far less accurate (and far more unpredictable) than a properly delivered dumb bomb.

Dumb bombs or unguided weapons whose delivery solution is valid at release, however, will be valid at impact.²⁴⁵

In other words, when a PGM goes "stupid," its point of impact is much more unpredictable than that of a gravity bomb. Considering the stand-off capability of PGMs, the munition may be released far from its intended target and is not likely to hit anywhere near its intended target should a mechanical problem develop. A gravity bomb on the other hand is subject only to the law of gravity and wind upon release. However, the

²⁴⁴ J.J. Patterson VI, *Smart Bombs and Linear Thinking Over Yugoslavia*, U.S. Naval Institute Proceedings, June 1999, at 88.

²⁴⁵ *Id.*

author fails to consider the additional threat to the pilots delivering the gravity bombs. Delivering gravity bombs will often subject the pilot and his aircraft to anti-aircraft fire that could be avoided if a GPS based PGM were employed, but not necessarily if a laser-guided bomb was used. Not only is the pilot endangered, but if he is struck by anti-aircraft fire, his aircraft is likely to become an uncontrolled massive flaming bomb screaming towards the same civilians that he was originally attempting to avoid. While mechanical failure of PGMs is a possibility, if it is of a low incidence, a mission planner could not rely on potential failure alone as a basis to use gravity bombs in a situation where a PGM would be more appropriate.

Environmental factors, either man-made or naturally occurring, can also limit the effectiveness of PGMs. Laser-guided bombs are generally the most accurate, but “because lasers cannot penetrate clouds, one cannot use them when bad weather obscures the target.”²⁴⁶ In the Kosovo campaign, the United Kingdom recognized the limitations of laser-guided munitions. Their “lack of an all-weather capability to deliver precision-guided weapons from the air severely compromised the RAF’s and Royal Navy’s effectiveness.”²⁴⁷ Their laser-guided weapons were constrained by poor weather and heavy cloud cover that “persisted over the region for about two-thirds of the 78-day campaign.”²⁴⁸ Iraq’s “destruction of Kuwaiti oil fields late in the war foiled the laser guidance systems of many [PGMs] because the smoke deflected the laser energy the bombs homed in on.”²⁴⁹

²⁴⁶ Meilinger, *supra* note 5, at 13.

²⁴⁷ Morroco, *supra* note 42, at 44.

²⁴⁸ *Id.*

²⁴⁹ Lowe, *supra* note 221.

If a state relies on laser-guided PGMs, obstruction of the target, by clouds or by smoke, will result in either PGMs going astray if the link is broken, or states will resort to gravity bombs. While the law of armed conflict requires a party to take all reasonable precautions to avoid losses of civilian lives and damage to civilian objects²⁵⁰ it does not require a state to cease hostilities until the weather or a defender's smoke clears. Limited visibility, be it from smoke screens or bad weather, is used by an enemy to maneuver their forces to gain a military advantage. Therefore, after considering the requirements of proportionality, if military necessity dictates that a target be destroyed in a timely manner, it is appropriate to resort to less precise methods.

Another PGM limitation is the possibility that GPS technology can be jammed and send the bomb astray. This concern can apply equally well to the next section's discussion of harmful humanitarian consequences of employing PGMs. Prior to Operation IRAQI FREEDOM, Iraq purchased GPS jammers, purportedly from Russia, in an attempt to send PGMs astray by blinding the GPS guidance systems.²⁵¹ United States Air Force Major General Victor Renuart of United States Central Command discussed the impact that Iraqi GPS Jammers had in Operation IRAQI FREEDOM.

We have noticed some attempts by the Iraqis to use a GPS jamming system that they obtained from another nation. We have destroyed all six of those jammers in the last two nights' airstrikes. I'm pleased to say they had no effect on us. In fact, we destroyed one of the GPS jammers with a GPS weapon.²⁵²

The Associated Press went on to cite Mr. Martin Streetly, "an expert in radar and electronic warfare technology with the London-based Jane's Information Group." Mr.

²⁵⁰ Protocol I, *supra* note 82 at part IV.

²⁵¹ MSgt Scott Elliott, *GPS Jamming No 'Silver Bullet' for Potential Adversaries*, Air Force Link, February 11, 2003, at <http://www.af.mil/news/Feb2003/21103349.shtml>

²⁵² Jim Krane, *Pentagon Says Iraqi GPS Jammers Picked Off*, The Sacramento Bee, March 26, 2003, also available at <http://www.sacbee.com/24hour/technology/story/827324p-5838324c.html>.

Streetly stated that GPS jammers are being made in Eastern Europe, the former Soviet Union, and China.²⁵³ But assuming for sake of argument that effective jamming technology will be developed at some point, the analysis is no different from the use of smoke to defeat the technology by obscuring the target.

Another limitation of PGMs is not an inherent problem with the munition. Poor intelligence can lead to mistakes being made and the wrong target being bombed. An example of bad intelligence was the bombing of the Chinese Embassy in Kosovo.²⁵⁴ In testimony to Congress, the Department of Defense described the bombing of the Chinese embassy as being "unique in that we had a legitimate target that we wanted to hit; the only problem is we had the target located in the wrong building."²⁵⁵ Bombing the wrong target based on bad intelligence is not limited to PGMs. The combination of PGMs and inaccurate intelligence results in the wrong targets being bombed very accurately.

2. Harmful Humanitarian Consequences of Employing PGMs

Western nations with PGM capabilities are not employing them against noble adversaries. Rather, military force, including the employment of PGMs, is being used against ruthless villains who have no compunction against harming their own citizens, cultural treasures, or environment to keep their positions of power. Examples include Operation DESERT STORM and Operation IRAQI FREEDOM where the coalition forces faced Saddam Hussein, whose human rights and environmental abuses are unequaled in modern times. NATO drove Slobodan Milosevic's murdering forces out of Kosovo to halt ethnic cleansing. The Taliban violently repressed the citizens of

²⁵³ *Id.*

²⁵⁴ Meilinger, *supra* note 5 at 13.

²⁵⁵ Statement of John J. Hamre, U.S. Deputy Secretary of Defense, before the U.S. House Permanent Select Committee on Intelligence, July 22, 1999.

Afghanistan, and al Qaida is responsible for the murder of thousands of non-combatants. Therefore, it should come as no surprise that leaders facing their destruction from precision engagement choose to violate the law of armed conflict by endangering the civilians they are obligated by law and as their leader to protect in order to retain their power. The callous disregard for the lives of civilians by despots seeking to retain their power is a consequence that persons advocating a broader use of PGMs to minimize collateral damage often fail to recognize. Examples of the LOAC violations encouraged by the use of PGMs are the use of human shields and attacks on the environment to reduce PGM capabilities.

Using human shields to prevent attacks on military objectives is not a new development in warfare. It has existed as a dishonorable tactic long before the advent PGMs. "On 19 May 1967, U.S. Air Force aircraft successfully attacked the Hanoi Thermal Power Plant, placing it out of commission. Immediately thereafter, the North Vietnamese established a small prisoner of war facility (nicknamed *Dirty Bird* by American POWs because of its filth) in a building adjacent to the Hanoi Thermal Power Plant, and made sure that U.S. authorities were made aware of the presence of American POWs next to the power plant. One prisoner, Captain George G. McKnight, USAF, was made to work outside the *Dirty Bird* so that they would be observed by officials from the Canadian Embassy in Hanoi, as the North Vietnamese knew the Canadians would report their observations to United States authorities. . . . The Hanoi Thermal Power Plant remained off limits until the December 1972 Linebacker II bombing operations, when U.S. Air Force F-4 Phantom aircraft disabled the power plant using laser-guided

bombs.”²⁵⁶ In this case, the development of PGMs made it possible to disable the target without harming the non-combatants (POWs). However, as the use of PGMs has become much more prevalent, so has the use of human shields.

Customary and treaty law “permits the attack of a military target even when the defender uses civilians to “immunize” the target in violation of the customary laws of warfare and the 1907 Hague rules. This makes more sense when considering the civilian’s best interests. If customary law were otherwise, it would encourage defenders to leave the civilian population in place rather than evacuate them from the vicinity of a military objective, or to use the civilian population as a shield from attack in violation of article 51(7) of Protocol I. It would also permit defenders to “cost-out” a high value target by surrounding a target with so many civilians that the effects of the attack would be disproportionate to the perceived value of the attack.”²⁵⁷ Impending defeat inflicted by any type of weapon system, not just PGMs, can encourage a despot to undertake desperate and despicable acts.²⁵⁸ However, as the accuracy of PGMs has advanced, the use of human shields has become both more sinister.

During Operation DESERT STORM, “[t]he Iraqis had a history of using civilians as military shields, and were now placing tanks and artillery beside private houses and small villages, and had located command and control centers on top of schools and public

²⁵⁶ Parks, *supra* note 78, at footnote 210 at 59.

²⁵⁷ Infeld, *supra* note 22, at 124.

²⁵⁸ An extreme example of a desperate response to impending defeat that would cause immense collateral damage is a reference by Brig. Gen. Dunlap notes that “[m]any Russian military theorists believe nuclear weapons provide the best answer to the challenge posed by conventionally armed precision guided munitions, which have become such an important part of Western military strategies. Russian generals fear that in a general war, Western nations could employ such “smart munitions” to degrade Russian strategic forces, without ever having to go nuclear themselves. Consequently, said General Volko, Russia ‘should enjoy the right to consider the first [enemy] use of precision weapons as the beginning of unrestricted nuclear war against it.’” See Dunlap, *supra* note 196 at 25.

buildings.”²⁵⁹ In Operation IRAQI FREEDOM, amongst other numerous violations of the law of armed conflict, Hussein loyalists used civilians as human shields, stored weapons in schools, and set up command posts in hospitals.²⁶⁰ Placing POWs near a target is dishonorable and illegal. Intentionally placing military equipment so that your own citizens would be within a kill zone is unimaginable. But intentionally placing command centers on top of schools, within hospitals or in other public non-military buildings represents the ultimate depravity. However, for a dictator desperate to hold on to power at all costs, it’s a win-win situation. If the opponent fails to attack based on their moral objection, the dictator’s command and control facility remains intact, thus prolonging the war. It is even more dangerous if the dictator learns that this is an effective tactic, thus encouraging him to use it more widely. On the other hand, if the target were attacked, it would be a public relations coup by shifting the focus from his own actions to those of the attacker. The ability to precisely attack a target that both sides know is militarily significant obligates the defender to avoid collateral damage by not intentionally placing his citizens at risk. This could be achieved through better concealment in unpopulated or more sparsely populated areas. However, the desperate acts of a doomed despot will more likely lead to exploiting his opponent’s weakness, morality.

²⁵⁹ Peter Rowe, *The Gulf War 1990-91* In *International and English Law* 22 (1993). Other examples of Iraq’s militarization of protected places abound, including schools, hospitals, and places of worship. Military equipment was placed in mosques, schools, and hospitals in Iraq and Kuwait. Silkorm surface-to-surface missiles were found inside a school in Kuwait. See U.S. Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress*, app. O, at O-11 to O-12. In February 2003, U.S. intelligence sources reported that Iraq has moved equipment used for launching Scud missiles next to mosques and historic sites. See Barbara Star, *U.S. Intelligence: Iraq Moves Scud Launchers*, CNN.com, February 11, 2003 at <http://www.cnn.com/2003/US/02/11/sprj.irq.baghdad.military/index.html>.

²⁶⁰ Top U.S. Official: Iraq Has Executed Some POWs, CNN.Com, March 27, 2003 at <http://www.cnn.com/2003/US/03/27/sprj.irq.pows.executed/index.html>.

I am not suggesting that PGMs should not be used because they encourage the receiving state to violate its obligations under the law of armed conflict to minimize collateral damage to its own citizens. Usually, in urban warfare, the PGM is the best weapon for accomplishing the mission, minimizing collateral damage, and insuring the safe return of the pilot. Ms. Infeld concluded that one reason not to require PGMs is that they are not always the best weapon for the job and could cause unpredictable collateral damage.²⁶¹ While it is true that a PGM may not always be the best weapon for a given mission, in urban attacks it often is. The unpredictable nature of collateral damage caused by environmental interference or defensive counter-measures is a consideration that must be assessed based on the employing state's capabilities. The United States superior PGMs will often make it the best munition for the strike.

Any suggestion that the use of elite ground forces would be more appropriate for taking out an urban target that has a high probability of collateral damage from an air strike is unrealistic. One needs only to consider the consequences of the raid by Task Force Ranger in Somalia in 1993. In that case, an elite group of ground forces were inserted into a hostile city to capture the leaders of a violent warlord's clan. After all was said and done, "eighteen Americans were dead and dozens more were badly injured."²⁶² Conservative accounts estimate that the Somali death toll was "five hundred dead among more than one thousand casualties."²⁶³ It is not possible to determine how many of those civilians were noncombatants.

²⁶¹ Infeld, *supra* note 22 at 140-141.

²⁶² Mark Bowden, *Black Hawk Down* 408 (2000). The members of Task Force Ranger included U.S. Army Rangers, Delta Force, and Night Stalkers, U.S. Navy SEALs, and U.S. Air Force PARARESCUE.

²⁶³ *Id.*

The reality of modern warfare is that as nations become more precise in their application of force, and thus their ability to minimize collateral damage, those despots clamoring to maintain their power will cause their own people greater suffering by not fulfilling their obligations under the law of armed conflict by dispersing and hiding their military assets amongst the civilian population. Despite the potential to minimize collateral damage, the incidence of collateral damage may increase due to the acts of the defender.

VII. Conclusion

This study of PGMs has discussed their performance, international availability, state policy and doctrine regarding their use, the customary and treaty based law of armed conflict, and their benefits and detriments. It is an attempt to meld all of these considerations together in to make informed decisions about the appropriateness of employing PGMs in urban environments. The following conclusions are established: (1) current treaty and customary Law of Armed Conflict does not contain a blanket mandate to use PGMs in urban environments to minimize collateral damage, (2) the law of armed conflict may evolve to require the use of PGMs in certain circumstances, but there are significant limiting factors.

The law of armed conflict establishes common principles for worldwide use regarding the application of force. It does not however attempt to set a worldwide standard based on technology or weapons availability. An industrialized western nation may have to employ PGMs to strike a given target, whereas another state that does not have the capability will be permitted to use those munitions available to it, usually gravity bombs. Regardless of the type of munition employed, the key is that each state

must apply the principles of the law of armed conflict based on the weapons they have at their disposal. Nothing in the law of armed conflict obligates a state to purchase the latest, state-of-the-art munitions.

However, once a state elects to purchase those munitions, even if its motivation is because the weapon is more effective, the consequential humanitarian capability to discriminate more accurately between civilian and military targets obligates the state to use it in a manner consistent with the law of armed conflict. The preceding sentence though is not an assertion that a state must use PGMs in all circumstances where collateral damage is possible. The law of armed conflict does not obligate a state with precision munitions to employ its finite supply of PGMs before it can resort to gravity bombs. The principles of proportionality and humanity must be applied and the overall goals of a campaign must be considered when building every bomb-load. Assume for a moment that two targets must be attacked. One PGM is available for one sortie and a load of gravity bombs is available for the other mission. The two targets are both of an extremely high value, whose destruction may shorten the war. Target A is very heavily defended, though no civilians are near it. Target A's destruction is best assured by employing the sole remaining GPS guided PGM from a safe stand-off distance. Target B is equally, or less important to the war effort. However, it is lightly defended, but surrounded by civilians. It would be appropriate to destroy it by using the less accurate gravity bombs, even though they are likely to cause more collateral damage than the single GPS PGM would cause. The law of armed conflict does not obligate a commander to employ the PGM against target B in order to achieve the lowest possible amount of

collateral damage, while unnecessarily endangering a pilot and the success of the mission by using gravity bombs against the heavily defended, high priority target A.

Ms. Infeld concluded in 1992 that "[p]arties to conflicts are not required to use their most discriminating weaponry according to the current law of war which recognizes that the most precise means may not always be the most effective to minimize collateral civilian injury and damage."²⁶⁴ I agree to the extent that the most precise weapon will not be the most effective means of minimizing collateral damage if there is bad intelligence causing the wrong site to be attacked or if the correct target is attacked at a time when civilians are known to be present, or if the state's PGM technology is subject to disruption by environmental or technological counter-measures. However, the argument that a PGM of appropriate size, low incidence of operational error, released from a safe stand-off distance could cause more collateral damage than a less accurate gravity bomb is not consistent with the current state of technology possessed by the United States.

My conclusions do not differ that much from Ms. Infeld, except that she seems to make a black letter or blanket declaration that the use of PGMs is not mandated by international law. I agree that there is no broad over-arching requirement to do so. However, the use of PGMs may be required by international law, as determined on a case-by-case basis, based on the information available at the time the mission was planned and executed. Factors that go into the determination of whether or not a PGM must be employed under the law of armed conflict include those limiting factors identified above (environmental disruption or effective guidance jamming) and PGM availability. Availability is not only measured in immediate availability, but also

²⁶⁴ Infeld, *supra* note 22 at 141.

considers whether or not there is a need to sustain a long operation, as opposed to the use of force in an isolated raid.

This paper discussed whether, pursuant to the Martens Clause, a rule of customary law requiring the use of PGMs in all circumstances where there was the possibility of collateral damage could evolve. Due to the continuous development of new means of warfare, the lengthy process of developing custom, and the international law preference for recognizing general principles rather than creating specific prohibitions when there is no controlling treaty, a customary law requiring the use of PGMs is not likely to crystallize. Additionally, the sense of legal obligation, i.e. *opinio juris*, to use PGMs is not established. PGMs are first and foremost employed by militaries because they are effective and efficient. Aside from the military efficiency though, political leaders recognize the value of reducing collateral damage. Reducing collateral damage helps maintain national and international support for operations. This was essential in maintaining support for NATO operations over Kosovo.²⁶⁵ While political and military leaders are genuinely concerned about the humanitarian aspect of collateral damage, that concern is still subordinate to other interests.

While “[i]t is unlikely that a human rights lawyer and a experienced combat commander would assign the same relative values to military advantage and to injury to noncombatants,”²⁶⁶ the principles of the existing law of armed conflict, particularly proportionality, humanity, and military necessity, provide adequate guidance to states in general and mission planners. The judicious use of PGMs, in light of the principles of the

²⁶⁵ Meilinger, *supra* note 5 at 14.

²⁶⁶ Final Report of the Prosecutor, *supra* note 163.

law of armed conflict makes it possible for states to achieve their military objectives while minimizing collateral damage.