

Canadian  
Forces  
College

Collège  
des  
Forces  
Canadiennes



## STAYING RELEVANT IN A RISK ADVERSE ENVIRONMENT

Maj C.J. Spearin

**JCSP 43**

***Exercise Solo Flight***

### **Disclaimer**

Opinions expressed remain those of the author and do not represent Department of National Defence or Canadian Forces policy. This paper may not be used without written permission.

© Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence, 2017.

**PCEMI 43**

***Exercice Solo Flight***

### **Avertissement**

Les opinions exprimées n'engagent que leurs auteurs et ne reflètent aucunement des politiques du Ministère de la Défense nationale ou des Forces canadiennes. Ce papier ne peut être reproduit sans autorisation écrite.

© Sa Majesté la Reine du Chef du Canada, représentée par le ministre de la Défense nationale, 2017.

CANADIAN FORCES COLLEGE – COLLÈGE DES FORCES CANADIENNES  
JCSP 43 – PCEMI 43  
2016 – 2017

EXERCISE *SOLO FLIGHT* – EXERCICE *SOLO FLIGHT*

**STAYING RELEVANT IN A RISK ADVERSE ENVIRONMENT**

Maj C.J. Spearin

*“This paper was written by a student attending the Canadian Forces College in fulfilment of one of the requirements of the Course of Studies. The paper is a scholastic document, and thus contains facts and opinions, which the author alone considered appropriate and correct for the subject. It does not necessarily reflect the policy or the opinion of any agency, including the Government of Canada and the Canadian Department of National Defence. This paper may not be released, quoted or copied, except with the express permission of the Canadian Department of National Defence.”*

Word Count: 4639

*“La présente étude a été rédigée par un stagiaire du Collège des Forces canadiennes pour satisfaire à l'une des exigences du cours. L'étude est un document qui se rapporte au cours et contient donc des faits et des opinions que seul l'auteur considère appropriés et convenables au sujet. Elle ne reflète pas nécessairement la politique ou l'opinion d'un organisme quelconque, y compris le gouvernement du Canada et le ministère de la Défense nationale du Canada. Il est défendu de diffuser, de citer ou de reproduire cette étude sans la permission expresse du ministère de la Défense nationale.”*

Compte de mots: 4639

## Introduction

Although the most lethal threat to Canada and its Western allies is the buildup of global powers, hybrid or asymmetric war is likely the most probable based on the last decade. During the same period there has been a decrease in the political appetite to put boots on the ground in these conflicts. Air power provides a way to commit forces in a risk adverse environment. However, contemporary military operations are very different from the previous wars of the last century. Unlike in the total war, in today's limited wars success is no longer measured solely in military terms. Today's conflicts do not take place on the battlefield against another state's forces. The fight takes place in much more complex environments, many times within the local populace. To compound the problem, opposing forces are generally non-state actors who do not restrict themselves by abiding by the Laws of Armed Conflict (LOAC). Conversely, they take advantage of the fact that allied or coalition forces do. As stated in the United States Joint Publication 3-24, "insurgents will inevitably exploit (collateral damage and civilian casualties) especially through propaganda, using international media coverage when possible."<sup>1</sup> They do not wear uniforms, they live and operate amongst the local civilian population and they may even use civilians as human shields. At the same time, the tolerance of society for collateral damage, specifically civilian casualties, is far less than 50 years ago. "In both asymmetric and conventional environments, avoiding non-combatant casualties has become increasingly important to the success of military operations."<sup>2</sup> The US DOD defines collateral damage as:

Unintentional or incidental injury or damage to persons or objects that would not be lawful military targets in the circumstances ruling at the time. Such damage is not

---

<sup>1</sup> Air University, "USAF Doctrine Update on Joint Publication 3-24, Counterinsurgency", 21 Jan 2014, [https://wss.apan.org/s/JSOFUN/jom\\_jqs/Shared%20Documents/Joint\\_Doctrine\\_Updates\\_Jan\\_2014.pdf](https://wss.apan.org/s/JSOFUN/jom_jqs/Shared%20Documents/Joint_Doctrine_Updates_Jan_2014.pdf)

<sup>2</sup> Tafolla, Tracy, Trachtenberg, David and Aho, John, "From Niche to Necessity", Joint Force Quarterly, issue 66, 3<sup>rd</sup> quarter 2012, p 72, <http://www.dtic.mil/dtic/tr/fulltext/u2/a566671.pdf>

unlawful so long as it is not excessive in light of the overall military advantage anticipated from the attack.<sup>3</sup>

Prussian military philosopher, Carl von Clausewitz, describes the ability to successfully wage war as a trinity. This trinity is composed of three elements, the government (purpose), the people (populace) and the military (chance). Today, any violation or even, perceived violation, of the LOAC is exploited by our adversaries in an attempt to separate the people from the government and/or military, thereby fracturing the trinity. For air forces, the risk of collateral damage can be mitigated by tactics, technology and sometimes by choice of weapon. By looking at the evolution of strategic bombing with respect to accuracy and risk reduction, the impact of collateral damage on operational success and the advent of Low Collateral Damage Weapons and Capabilities, this paper will show that in order to remain relevant in the contemporary battle-space, Air Forces must possess a Low Collateral Damage Capability.

## **EVOLUTION OF STRATEGIC/AERIAL BOMBING**

### **World War II**

From its very beginning, air power has threatened the concept of a just war. As early as the end of World War I, air power offered commanders the opportunity to strike deep behind enemy lines, directly attacking the industrial and urban centres of the adversary. It was initially believed that by concentrating violence on only those targets that were required to sustain conflict the immunity of non-combatants from direct attack would be assured. However, as World War II progressed it became evident that this was not going to be reality.<sup>4</sup> In 1943, the Royal Air Force conducted the first large-scale fire bombing against the city of Hamburg. The

---

<sup>3</sup> United States, Joint Publication (JP) 1-02, Department of Defense dictionary of Military and Associated Terms, 12 April 2001, [https://fas.org/irp/doddir/dod/jp1\\_02.pdf](https://fas.org/irp/doddir/dod/jp1_02.pdf)

<sup>4</sup> Martin Cook, *Strategic Theory, Military Practice and the Laws of War, The Case of Strategic Bombing, Ethics and the Future of Conflict: Lessons from the 1990s*, (Upper Saddle River: NJ, 2004), 163.

death total was estimated at 44,000 civilians. Two years later, in 1945, the Americans joined the RAF in the devastating fire-bombing of Dresden. That same year was the fire bombing of Tokyo, where 250 American B-29 Superfortress bombers dropped 1500 tons of bombs, mainly napalm. After almost sixteen square miles of Tokyo was burned, the death toll was placed at 83,793 with another 40,918 wounded.<sup>5</sup> The climax of the bombing campaign in Japan saw single bombers dropping atomic bombs over Hiroshima and Nagasaki, each killing tens of thousands of civilians.

There were a variety of objectives for different strategic bombing campaigns of World War II. As stated by Colonel Warden in *The Enemy as a System*, “we attain our objectives by causing such changes to one or more parts of the enemy's physical system that the enemy decides to adopt our objectives, or we make it physically impossible for him to oppose us.”<sup>6</sup> Additionally, in his 1921 book, *Command of the Air*, Italian air theorist Douhet, suggests that air power should not be used to directly attack the military capability of an enemy in the field, instead they should directly target the urban population centres that field and sustain the adversary's combat forces. Douhet is quoted as writing, “how could a country go on living and working under this constant threat, oppressed by the nightmare of imminent destruction and death? How indeed!”<sup>7</sup> Inspired by the work of Douhet, British Bomber Command justified its strategic bombing campaign as targeting munitions workers so as to terrorize them into absents themselves from work.<sup>8</sup> However, this campaign was ineffective against the Germans as they continued to resist, albeit ineffectively, until the death of Hitler. Conversely, the bombing

---

<sup>5</sup> Sahr Conway-Lanz, *Collateral Damage*, (New York, NY: Routledge, 2006), 1.

<sup>6</sup> John A. Warden III, “The Enemy as a System”, *Air Power Journal*, Spring 1995, [http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj95/spr95\\_files/warden.html](http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj95/spr95_files/warden.html).

<sup>7</sup> Martin Cook, Strategic Theory, Military Practice and the Laws of War, The Case of Strategic Bombing, *Ethics and the Future of Conflict: Lessons from the 1990s*, (Upper Saddle River: NJ, 2004), 165.

<sup>8</sup> Ibid, 166.

campaign against Japan, culminating with the use of atomic weapons, resulted in the unconditional surrender of Japan. From World War II, an assessment of the overall effectiveness of strategic bombing is inconclusive as it varied depending on the theatre of operations. However, after the war, as society became aware of the actions of their armed forces, there were growing concerns over the violence of war and the capacity for destruction. Never before in war had so many civilians been killed and so much destroyed in such a short time.<sup>9</sup>

## **Vietnam**

Two decades later, the United States found itself in a very different conflict. A noted Vietnam historian, George Herring is quoted as writing that he believed that it was the most complex war ever fought by the United States. Although the US entered the conflict in Vietnam in 1962, the first offensive strategic air action didn't occur until two years later when four torpedo boat bases were bombed. Although the attacks were a strategic success, over the next seven months only two other attacks were authorized in North Vietnam.<sup>10</sup> The vast majority of the air operations conducted during this period was in support of the US troops on the ground in the south. As with Germany in World War II, the assessment given to the Secretary of State Dean Rusk by Ambassador Maxwell Taylor in April 1965 was that "no amount of bombardment...is going to convince Hanoi to call off its action."<sup>11</sup> Despite this, in early spring that same year, in an effort to boost the morale of the allied government in the south, President Johnson ordered the commencement of sustained air operations against North Vietnam. Once

---

<sup>9</sup> Sahr Conway-Lanz, *Collateral Damage*, (New York, NY: Routledge, 2006), 2.

<sup>10</sup> James E. Hickey, *Precision Guided Munitions and Human Suffering in War*, (Farnham, UK: Ashgate Publishing Ltd, 2012), 75-76.

<sup>11</sup> *Ibid*, 78.

these operations started, it is estimated that approximately 6,300,000 tons of aerial munitions were dropped before the end of 1971.<sup>12</sup>

With regards to the evolution of aerial bombing, the latter years of the Southeast Asia conflict were the most significant. Although they were originally tested during World War II, in 1968 the US Air Force and Navy were both conducting Operational Test and Evaluation of Precision Guided Munitions (PGM) The USAF was testing the Laser Guided Bomb (LGB) and the United States Navy was testing a “Fire and Forget” weapon using electro-optical guidance. The use of PGMs increased in the latter years of the war. This marked the end of the non-precision era.

### **Gulf War I**

Probably the most significant conflict to affect the use of air power and strategic bombing in modern warfare was the first Gulf War. However, prior to the commencement of operations not all were convinced of its efficacy. Then US Secretary of Defense Cheney is quoted as saying, “the history of air campaigns suggests they are not terribly successful. Why would this one be different?”<sup>13</sup> The difference was that unlike in the other post World War II conflicts, namely Korea and Vietnam, “technology, political circumstance and the nature of the enemy social organization combined to provide a new “experiment” in the efficacy of pinpoint strategic bombing.”<sup>14</sup> Desert Storm was the first conflict where PGMs played a major role. In his 2009 article, *Lowering Risk*, in the *Armed Forces Journal*, Meilinger highlights that of the more than 200,000 bombs dropped during the war, still only slightly more than 7 percent, or fewer than

---

<sup>12</sup> Ibid, 79.

<sup>13</sup> Ibid, 119.

<sup>14</sup> Martin Cook, *Strategic Theory, Military Practice and the Laws of War, The Case of Strategic Bombing, Ethics and the Future of Conflict: Lessons from the 1990s*, (Upper Saddle River: NJ, 2004), 168.

17,000, were PGMs.<sup>15</sup> Fortunately, the Iraqi force disposition in Kuwait was ideal for the use of non-precision munitions which allowed the coalition to focus the use of their PGMs on the high value targets in areas where there was greater potential for collateral damage. “Using stealthy F-117s, armed with LGBs and Navy TLAM missiles, the coalition attacked air defense, command, control and communications (C3), electrical and leadership targets.”<sup>16</sup> This first wave of attacks eliminated the sophisticated Iraqi air defense system, thereby allowing the coalition near impunity in the skies for the remainder of the war.

The initial air campaign was designed using John Warden’s concept of five Rings. Warden describes his theory as a set of 5 concentric circles. Each of these circles represents one of the five centres of gravity of the adversary. The centre represents the leadership. The next smallest circle represents the infrastructure that is essential to military operations. The third circle includes other elements of infrastructure. The enemy’s population is represented by the fourth circle and its fielded military forces are the fifth and outer circle. However, Warden’s concept of directly attacking the enemy’s Centre of Gravity is not a new one. In *On War*, the theorist Clausewitz states that to effectively defeat an enemy, one must attack its centre of gravity, the hub of all power and movement on which everything depends. It is at this point that all energies should be directed.<sup>17</sup> Though, as discussed earlier, PGMs were used in the latter years of the war in Vietnam, the Gulf War was the first time the modern weapons made possible

---

<sup>15</sup> Philip S. Meilinger, “Lowering Risk”, *Armed Forces Journal*, (1 July, 2009), <http://armedforcesjournal.com/lowering-risk>; Philip S. Meilinger is a retired Air Force colonel and former defense analyst with a doctorate in military history.

<sup>16</sup> James E. Hickey, *Precision Guided Munitions and Human Suffering in War*, (Farnham, UK: Ashgate Publishing Ltd, 2012), 128.

<sup>17</sup> Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (N.J.: Princeton University Press, 1984), 595-596.



the much over-promised capability of air power from its inception: the direct attack on an enemy's Centres of Gravity.”<sup>18</sup>

### **Kosovo**

In 1999, the North Atlantic Treaty Organization conducted Operation Allied Force (OAF) against the Federal Republic of Yugoslavia (FRY). While the air campaign in Kosovo bore many similarities to that of Desert Storm, it was also quite different. Technology had come a long way. The difficulties experienced during the Gulf War with laser and electro-optical guidance were now mitigated by the use of Global Positioning System (GPS) guidance. The introduction of the B-2 Stealth bomber also provided the coalition a much greater precision ordnance capacity compared to the F-117. During the campaign, NATO aircraft conducted 10,484 strike sorties during which 23,614 air munitions were released. Precision guided munitions accounted for 35 per cent of the bombs and missiles used during the war.<sup>19</sup> In addition to the introduction of the Joint Direct Action Munition (JDAM), this conflict also marked first non-American use of Tomahawks when HMS Splendid launched twenty TLAMs of which seventeen reportedly hit their aim point.<sup>20</sup>

### **Lebanon 2006**

The 2006 conflict between Israel and Hizballah highlighted the issues with fighting the last war. Although Israel attempted to use the same style of air campaign that NATO used in Kosovo, it was facing a very different adversary. In Kosovo, the Serbians primarily used

---

<sup>18</sup> Martin Cook, *Strategic Theory, Military Practice and the Laws of War, The Case of Strategic Bombing, Ethics and the Future of Conflict: Lessons from the 1990s*, (Upper Saddle River: NJ, 2004), 170.

<sup>19</sup> UK Ministry of Defence, *Kosovo: An Account of the Crisis* (updated to 21 December 1999) from W.J. Fenrick, Targeting and Proportionality during the NATO Bombing Campaign against Yugoslavia, *EJIL*, Vol 12 No. 3, (2001), 489.

<sup>20</sup> James E. Hickey, *Precision Guided Munitions and Human Suffering in War*, (Farnham, UK: Ashgate Publishing Ltd, 2012), 176.

conventional tactics, but in this conflict Hizballah relied on irregular, guerilla tactics. Unlike the Serbians in Kosovo, Hizballah hid amongst the civilian population. In her article, *The 2006 Lebanon War: Lessons Learned*, academic Sarah Kreps argued that when a conventional force meets an asymmetric one, the outcome may show that not only airpower but military force in general may have limited effectiveness in the unconventional environment. She also discussed how the centres of gravity for asymmetric adversaries may not be the traditional ones associated with a conventional force. Instead it may become the political will of the citizens of the adversary. Further complicating the environment, as illustrated by the foreign fighters in Lebanon, the citizens of the adversary may be aligned due to a similar ideology rather than citizenship.<sup>21</sup>

### **The War or Terror**

The employment of air power and aerial bombing has evolved greatly since the beginning of the war on terror. Whether looking at Operation Enduring Freedom in Afghanistan or Operation Iraqi Freedom in Iraq “recent uses of airpower have largely diverged from the model of deliberative planning for strategic bombing. The exigencies of recent combat have forced an evolution of airpower to close air support (CAS) of ground forces...”<sup>22</sup> This was not a mission that was typical for Air Forces. As a result of the new demands placed upon it, air power adapted its mode of targeting to compensate for the more complex, dynamic battlefield. The evolution of the system ultimately created the Joint Terminal Attack Controller (JTAC) capability. JTACs were Air Force and Navy personnel who were trained to act as the liaison between the ground force commander and all aviation assets in the area. Although not as

---

<sup>21</sup> Sarah E. Kreps, *The 2006 Lebanon War: Lessons Learned*, *Parameters*, Vol 37 No. 1 (2007), 82.

<sup>22</sup> Martin Cook, “Ethical Issues in Targeting”, *Targeting: The Challenges of Modern Warfare*, (The Hague: T.M.C. Asser Press, 2016), 154-155.

thorough as the deliberate planning associated with a strategic bombing campaign, this system provides ground force commanders with an enhanced capability to deliver precise and timely air support, even in urgent ‘troops in contact’ situations.<sup>23</sup>

## **COLLATERAL DAMAGE**

In the modern world, harm to noncombatants has been central to cross-cultural ideas of what constitutes wrongful political violence.<sup>24</sup> The 1977 Additional Protocol I to the Geneva Conventions (API) calls for the Parties to a conflict to at all times distinguish between the civilian population (non-combatants) and combatants and between civilian objects and military objectives. It goes on to state that the Parties shall direct the operations only at the military objectives in order to ensure the protection of the civilian population and objects.<sup>25</sup> Article 50 of AP I defines the civilian population as all persons who are civilians. It also states that “the presence within the civilian population of individuals who do not come within the definition of civilians does not deprive the population of its civilian character.”<sup>26</sup> The moral standards that provide the foundation for modern society’s Laws of Armed Conflict, which are comprised of various international declarations including the Geneva and Hague Conventions, can be traced back in history. In his article *From Moral Norm to Criminal Code*, James Johnson states that as early as the tenth century when the earliest formal statements that fed into the development of the Just War traditions called for the protection of certain classes of persons.<sup>27</sup> Today’s existing Law of Armed Conflict (LOAC) has been framed over the past century. It was first framed in words for formally declared wars between nation states. Embedded in the Fourth Geneva Convention of

---

<sup>23</sup> Ibid, 155.

<sup>24</sup> Sahr Conway-Lanz, *Collateral Damage*, (New York, NY: Routledge, 2006), xi.

<sup>25</sup> 1977 Additional Protocol I to the Geneva Conventions, Art 50.

<sup>26</sup> Ibid, Art 51

<sup>27</sup> James Turner Johnson, “From Moral Norm to Criminal Code: The Law of Armed Conflict and the Restraint of Contemporary Warfare”, *Ethics and the Future of Conflict*, (Upper Saddle River: NJ, 2004), 75.

1949 is the principle of avoiding civilian casualties. This convention reflects an agreement by civilized nations that, while warfare is by nature highly destructive, it should not be conducted indiscriminately.<sup>28</sup>

As the nature of conflict evolved over the next three decades, so have the set of formal international declarations and laws. Since the addition of the 1977 Protocols to the Geneva Conventions, the LOAC was adapted to more widely apply to other forms of conflict both interstate and intrastate, which had previously been widely accepted to be outside the purview of international law.<sup>29</sup> Under the modern law of war, legitimate targets are limited to military targets where the attack is not expected to cause excessive collateral damage in relation to the concrete and direct military advantage anticipated. AP I also stipulates that nations are to refrain from launching any attack that may be expected to cause incidental injury to or death of civilians, damage to civilian objects, or any combination thereof, which would be excessive in relation to the expected military advantage.<sup>30</sup> As argued by John Murphy, an American lawyer and professor, the problem is that in any determination as to whether collateral damage was excessive in relation to the achieved military advantage is included a measure of subjectivity. This measure of subjectivity may lead reasonable persons to come to different conclusions. When looking at the strategic bombing campaigns of the past, when applying today's standards, it would be extremely difficult to argue that the level of violence, in terms the number of civilian casualties and destruction of civilian property, was not excessive. That being said, one must remember that World War II was a total war and such was unlike the numerous limited wars since. What may have constituted a legitimate military target then may not now. Nevertheless, it

---

<sup>28</sup> Tafolla, Tracy, Trachtenberg, David and Aho, John, "From Niche to Necessity", Joint Force Quarterly, issue 66, 3<sup>rd</sup> quarter 2012, p 72.

<sup>29</sup> Ibid, 79.

<sup>30</sup> 1977 Additional Protocol I to the Geneva Conventions, supra note 3, Art 57(2).

should also be clear that from both legal and moral perspectives, the practice of strategic bombing as it was done in the past would not be acceptable in contemporary conflicts.

### **Limiting Collateral Damage**

The drive to limit civilian casualties and collateral damage has generated great scrutiny among military planners. Commanders must minimize the risk they are exposing their own forces to, and at the same time, minimize collateral damage and civilian deaths. As discussed earlier, this is further complicated by the fact that contemporary adversaries such as Hizballah, Al Qaeda, Hamas, Serbs and Taliban deliberately commingle their forces and equipment amongst the civilian population. In the case of the 2006 War in Lebanon, Sarah Kreps writes that “in trying to target elusive leaders and katyushas, the IDF inevitably contributed to a number of Lebanese civilian casualties.”<sup>31</sup> In 2007, after the number of civilian deaths attributable to NATO airstrikes tripled from the previous year. That year, the incoming commander of ISAF, General McChrystal, noted during his nomination hearing before the US Senate that the critical point to campaign success was how ISAF conducted its operations. He recognized that ISAF needed to win the support of the Afghan people to succeed. He told the senators “that ISAF would have ‘to operate in ways that minimize (civilian) casualties or damage – even when doing so makes our task more difficult.’”<sup>32</sup> In the contemporary battle space, as in Afghanistan, there is likely an asymmetry in capability and firepower, especially when it comes to airpower. When asked why he believes air-inflicted casualties get the most attention, USAF General Norton A. Schwartz stated that although only eight percent of the civilian casualties in Afghanistan were caused by air-delivered munitions, that the enemy recognized the advantage that air power

---

<sup>31</sup> Sarah E. Kreps, The 2006 Lebanon War: Lessons Learned, *Parameters*, Vol 37 No. 1 (2007), 79.

<sup>32</sup> Theo Farrell and Rudra Chaudhuri. “Campaign Disconnect: Operational Progress and Strategic Obstacles in Afghanistan, 2009-2011,” *International Affairs* 87, no. 2 (2011): 273-274.

provided and he (the enemy) was doing all that he can to limit that capability through suggestions that somehow the coalition was indiscriminate.<sup>33</sup> With the increased attention placed on collateral damage, in today's conflicts "every bomb, missile or bullet fired by one of our soldiers, sailors, airmen or Marines is a political act, so we can no longer afford to miss. More than that, even when we hit the target, we have to do so almost softly and with minimal impact."<sup>34</sup>

### **Relationship between collateral damage and insurgent attacks**

In a September 2008, Human Rights Watch issued an article, *Afghanistan: Civilian Deaths From Airstrikes*, which highlighted the findings of a report on airstrikes and civilian deaths in Afghanistan. The report found that "mistakes by the US and NATO have dramatically decreased public support for the Afghan government and the presence of international forces providing security."<sup>35</sup> There has been debate as to whether this decrease in public support due to civilian casualties translates into an increase in insurgent violence. If this is the case, in addition to addressing moral and legal concerns, a reduction in the number of civilian casualties would also have strategic value. Underlying this question is a set of theories as to how insurgents are able to mobilize the population and produce violence. The most common theory is that "violence committed by the counterinsurgent forces generates resentment and antipathy that enable political violence by angering the population and encouraging insurgent recruitment."<sup>36</sup>

---

<sup>33</sup> John Tirpak, "Airpower for Best Effect, *Airforce Magazine*, (Jan 2011), 8, <http://www.airforcemag.com/MagazineArchive/Pages/2011/January%202011/0111watch.aspx>; Quoted while speaking to reporters on Nov. 23, 2010

<sup>34</sup> Philip S. Meilinger, "Lowering Risk", *Armed Forces Journal*, (1 July, 2009), <http://armedforcesjournal.com/lowering-risk>

<sup>35</sup> Human Rights Watch, *Afghanistan: Civilian Deaths From Airstrikes*, (23 Sep 2008), <https://www.hrw.org/news/2008/09/08/afghanistan-civilian-deaths-airstrikes>.

<sup>36</sup> Luke Condra, Joseph Felter, Radha Iyengar and Jacob Shapiro, *The Effect of Casualties in Afghanistan and Iraq*, Working Paper 16152, (Cambridge, MA: NBER, 2010), n.p., <http://www.nber.org/papers/w16152>

The results of their research showed that there is a relationship between civilian casualties and violent incidents. For Afghanistan, they found that “if the average ISAF-caused incident (which resulted in two civilian deaths) was eliminated, then in an average-sized district there would be one fewer insurgent attack over the next six weeks.”<sup>37</sup> Their research also found strong evidence that in Afghanistan revenge is the mechanism for the increased violence meaning that there is an increase in participation and support for insurgent activity due to a personal loss or exposure to violence. Interestingly, the corresponding violence is asymmetrically aimed at ISAF/Coalition troops, i.e. if insurgents were responsible for the casualties there was no corresponding increase in violence. In Iraq, their findings differed only in the mechanism in which the response occurs. Unlike in Afghanistan, in Iraq the response mechanism was the sharing of information on insurgent activity with coalition troops. They hypothesized that the reason for the difference between Iraq and Afghanistan is the availability/number of insurgent fighters. In urban Iraq there are more fighters available so information is the critical requirement while in the more rural Afghanistan, the number of fighters is the factor. What their research shows is that over the long term, efforts to minimize civilian casualties due to counterinsurgency (COIN) operations will have a positive impact on the safety of ISAF/coalition troops. Supporting their findings is an unrelated statement by Brad Adams, the Asia director at Human Rights Watch, in which he says “Civilian deaths from airstrikes act as a recruiting tool for the Taliban and risk fatally undermining the international effort to provide basic security to the people of Afghanistan.”<sup>38</sup>

---

<sup>37</sup> Ibid, n.p.

<sup>38</sup> Human Rights Watch, Afghanistan: Civilian Deaths From Airstrikes, (23 Sep 2008), <https://www.hrw.org/news/2008/09/08/afghanistan-civilian-deaths-airstrikes>.

In World War II, the death toll of civilians and combatants was 60 million people. In today's conflicts the numbers of civilian casualties discussed are orders of magnitude less. In 2003, a Washington Post article cited a figure of 500 civilian casualties during the NATO bombing campaign against Serbia, and 800 deaths in Afghanistan in 2001-2002.<sup>39</sup> Even with these relatively low figures, collateral damage can erode the support of the population. For example, during the second Chechen War, Russian forces conducted numerous bombing missions using imprecise techniques which resulted in the loss of both civilian lives and property. This causing of collateral damage led to a decline in Russian support from both the Russian and Chechen populations.<sup>40</sup> Another example is the decrease in international support for Israel's bombing campaign against Hizballah in August 2006. Initially there was support from most of the international community, but as the conflict continued and Hizballah created the perception of indiscriminate bombing of civilian assets by Israel it began to wane. Collateral damage caused by an ill-fated attack on the Lebanese town Qana raised questions about proportionality from the international community. Even though Hizballah had been operating from within the town and it was most probably a legitimate target in accordance with the LOAC, images of the destruction eroded international support for Israel. Weary of anti-Americanism feelings within the region, while supporting their ally, Israel, the United States was eager for a quick resolution to the conflict.<sup>41</sup> This very likely limited Israel's strategic options in the conflict.

---

<sup>39</sup> US State Department, Air force Uses New Tools to Minimize Civilian Casualties, (18 March, 2003), <http://www.defense-aerospace.com/article-view/feature/18894/usaf-plans-to-minimize-civilian-casualties.html>.

<sup>40</sup> Marcel de Hass, cited in Glen Beck, *Offensive Air Power in Counter-Insurgency Operations: Putting Theory into Practice*, Working Paper 26, Royal Australian Air Force Air Power Development Centre, (2008), 13, <http://airpower.airforce.gov.au/Publications/Details/56/26-Offensive-Air-Power-in-Counter-Insurgency-Operations-Putting-Theory-into-Practice.aspx>

<sup>41</sup> Peter Baker, "Crisis Could Undercut Bush's Long-Term Goals," *The Washington Post*, (31 July 2006), <http://www.washingtonpost.com/wp-dyn/content/article/2006/07/30/AR2006073000578.html?wb48617274=E6719D8A>.



As illustrated above, despite efforts to minimize collateral damage in conflict, it still occurs. For commanders and planners, there must be a recognition that protecting civilians is just as important as defeating the enemy. If coalition forces fail to protect civilians, especially from collateral damage, it undermines the efforts of the coalition to win the “hearts and minds” of the population. In any counter-insurgency campaign, any perception of indiscriminate or non-proportional bombing would likely prove at best detrimental, or at worst disastrous to the overall strategic campaign.

### **Low Collateral Damage Weapons**

“Precision Conventional Strike (PCS) is the practice of attacking selected targets with sufficient accuracy for high probability of kill and low collateral damage.”<sup>42</sup> The major limitation of air powers contribution to the contemporary conflict, namely asymmetric or counterinsurgency warfare is the fact the air attacks can – and do – cause civilian casualties.<sup>43</sup> However, through the use of sophisticated targeting systems and precision guidance the risk of collateral damage is greatly reduced. The other element that can further reduce the risk of collateral damage is munitions technology, specifically low collateral damage weapons (LCDW). The USAF defines LCDW as “those weapon technologies or systems that have the specific capacity to precisely attack an adversary function while minimizing collateral damage and casualties.”<sup>44</sup>

---

<sup>42</sup> RAND, A Framework for Precision Conventional Strike in Post-Cold War Military Strategy, (Santa Monica, CA:RAND, 1996), xiii, [http://www.rand.org/pubs/monograph\\_reports/MR743.html](http://www.rand.org/pubs/monograph_reports/MR743.html)

<sup>43</sup> Major General Charles J. Dunlap, USAF, “Collateral damage and Counterinsurgency Doctrine”, *Small Wars Journal*, (n.d.), <http://smallwarsjournal.com/blog/collateral-damage-and-counterinsurgency-doctrine>.

<sup>44</sup> United States Joint Forces Command, “Doctrinal Implications of Low Collateral Damage Capabilities”, *Joint Doctrine Series Pamphlet 2*, (27 Jan 2003), n.p., <http://www.dtic.mil/doctrine/doctrine/jwfc/jwfc pam2.pdf>

During the period 2000-2001 the United States Joint Force Command conducted a group of experiments using the hypothesis that if non-kinetic technologies could be weaponized, the joint force could engage critical targets and achieve desired operational effects with acceptable collateral damage.<sup>45</sup> Some of the technologies considered were: an electronic bomb that could be parachute dropped and emits an electromagnetic pulse, and micro air vehicles that would swarm an air defence site and disable it with small precision armor piercing warheads. Although these examples were still conceptual, there are numerous LCDW that are already in service.

In late 2006, the GBU-39B Small Diameter Bomb (SDB) was deployed for use by the USAF. It provided a lower yield, precision guided weapon for the COIN mission. It's lower yield, and associated smaller blast radius allows it to be used in some instances where the risk of collateral damage had previously limited attack options. Another variant of the SDB has had the steel casing replaced with a composite casing and different explosive fill. This variant reportedly reduces the fragmentation effect radius to 100 feet vice the 2000 feet associated with the steel casing. Currently the USAF is in the process of developing and testing the SDB II which will have improved guidance capability against moving targets and a greater effective range.

The US Navy also developed the BLU-126/B Low Collateral Damage Bomb. It is based on the Mark 82 dumb bomb but has precision guidance and a smaller warhead. The new design has resulted in a greater than 90% reduction in fragment quantity and a greater than 50% reduction in range for collateral damage application.<sup>46</sup>

---

<sup>45</sup> Ibid, n.p.

<sup>46</sup> Naval Air Warfare Center Weapons Division, Quick Response Application of Insensitive Munitions (IM) System Solutions: An example of applying lessons learned to a successful, quick, low-cost IM improvement (China Lake, CA. n.d.), n.p.

Besides the examples given of weapons being developed and optimized for use in urban environments where the risk for collateral damage is high, there are examples of using existing munitions in unconventional ways. One such example is described by Major General David Deptula. He noted that during Operation Northern Watch from 1998 to 1999, US and coalition forces had to contend with mobile Iraqi surface-to-air missiles systems operating in close proximity to civilian sites. The coalition was unable to attack the sites with 500 lb bombs due to the risk to the nearby civilian property. The solution was to put precision guidance packages on to inert weapons. As he states “if I’ve got good enough precision, and I can hit it with 500 pounds of concrete, that does the trick.”<sup>47</sup> Regardless of the means, the ultimate effect desired is a reduction in the risk of collateral damage, even when attacking a legitimate target.

## CONCLUSION

Especially in the air domain, the art and science of minimizing collateral damage has come a long way since the end of the Second World War. Advancement in technology has been the key enabler. The development of sophisticated targeting systems and precision guidance has led to far greater accuracy than ever envisioned even just a half century ago. As well, in the years following World War II there was a realization the extreme violence that nation’s armed forces used against combatants and non-combatants alike. Although this destruction was justified at the time by commanders, subsequent reflection has adopted a more humanistic view of the cost of total war. Thus there has been a reconciliation with the concept of a just war. Today, for democracies waging war, acting in accordance with the LOAC is critical for military success. Likewise, the protection of an individual Human Rights is paramount. It was shown that failure

---

<sup>47</sup> US State Department, Air force Uses New Tools to Minimize Civilian Casualties, (18 March, 2003), <http://www.defense-aerospace.com/article-view/feature/18894/usaf-plans-to-minimize-civilian-casualties.html>

of a nations troops to abide by the laws of war, will have an adverse effect on the achievement of a coalitions objectives. Although the unintentional killing of civilians is not necessarily unjust by international law, it is vilified in the court of international opinion. Thus, even the unintentional causing of civilian deaths negatively affects the operating environment. Therefore, it must be the goal of all forces involved to employ weapons and strategies that will limit collateral damage and loss of civilian lives. With the urban landscape being the most likely operating environment for the foreseeable future, in light of the proven impact of collateral damage and the continued importance of airpower, it is an absolute requirement that air forces provide a Low Collateral Damage Weapon as one of the tools available to the Joint Force Commander.

## BIBLIOGRAPHY

- 1977 Additional Protocol I to the Geneva Conventions,  
<https://www.icrc.org/eng/resources/documents/misc/additional-protocols-1977.htm>
- Air University, "USAF Doctrine Update on Joint Publication 3-24, Counterinsurgency", 21 Jan 2014,  
[https://wss.apan.org/s/JSOFUN/jom\\_jqs/Shared%20Documents/Joint\\_Doctrine\\_Updates\\_Jan\\_2014.pdf](https://wss.apan.org/s/JSOFUN/jom_jqs/Shared%20Documents/Joint_Doctrine_Updates_Jan_2014.pdf)
- Baker, Peter, "Crisis Could Undercut Bush's Long-Term Goals," *The Washington Post*, 31 July 2006  
<http://www.washingtonpost.com/wp-dyn/content/article/2006/07/30/AR2006073000578.html?wb48617274=E6719D8A>
- Chaudhuri, Rura and Farrell, Theo, "Campaign Disconnect: Operational Progress and Strategic Obstacles in Afghanistan, 2009-2011," *International Affairs* 87, no. 2, 2011.
- Condra, Luke, Felter, Joseph, Ivengar, Radha and Shapiro, Jacob, The Effect of Casualties in Afghanistan and Iraq, Working Paper 16152. Cambridge, MA: NBER, 2010,  
<http://www.nber.org/papers/w16152>
- Cook, Martin, Strategic Theory, Military Practice and the Laws of War, The Case of Strategic Bombing, *Ethics and the Future of Conflict: Lessons from the 1990s*. Upper Saddle River: NJ, 2004.
- Conway-Lanz, Sahr, *Collateral Damage*. New York, NY: Routledge, 2006.
- de Hass, Marcel, quoted in Glen Beck, Offensive Air Power in Counter-Insurgency Operations: Putting Theory into Practice, Working Paper 26, Royal Australian Air Force Air Power Development Centre. 2008, <http://airpower.airforce.gov.au/Publications/Details/56/26-Offensive-Air-Power-in-Counter-Insurgency-Operations-Putting-Theory-into-Practice.aspx>
- Dunlap, Major General Charles J., Collateral Damage and Counterinsurgency Doctrine, online  
<http://smallwarsjournal.com/blog/collateral-damage-and-counterinsurgency-doctrine> accessed 21 Apr 2017
- Hickey, James E., *Precision Guided Munitions and Human Suffering in War*, Farnham, UK: Ashgate Publishing Ltd, 2012.
- Human Rights Watch, Afghanistan: Civilian Deaths From Airstrikes, 23 Sep 2008, online  
<https://www.hrw.org/news/2008/09/08/afghanistan-civilian-deaths-airstrikes> accessed 19 April 2017.
- Johnson, James Turner, "From Moral Norm to Criminal Code: The Law of Armed Conflict and the Restraint of Contemporary Warfare", *Ethics and the Future of Conflict*. Upper Saddle River: NJ, 2004.
- Kreps, Sarah E., The 2006 Lebanon War. : Lessons Learned, *Parameters*, Vol 37 No. 1, 2007,  
<http://ssi.armywarcollege.edu/pubs/parameters/articles/07spring/kreps.pdf>

- Meilinger, Philip S., "Lowering Risk", *Armed Forces Journal*, Online  
<http://armedforcesjournal.com/lowering-risk> accessed 21 April 2017.
- RAND , *A Framework for Precision Conventional Strike in Post-Cold War Military Strategy*. Santa Monica, CA:RAND, 1996, [http://www.rand.org/pubs/monograph\\_reports/MR743.html](http://www.rand.org/pubs/monograph_reports/MR743.html)
- Tafolla, Tracy, Trachtenberg, David and Aho, John, "From Niche to Necessity", *Joint Force Quarterly*, issue 66, 3<sup>rd</sup> quarter 2012, <http://www.dtic.mil/dtic/tr/fulltext/u2/a566671.pdf>
- Tirpak, John, "Airpower for Best Effect", *Airforce Magazine*. Jan 2011,  
<http://www.airforcemag.com/MagazineArchive/Pages/2011/January%202011/0111watch.aspx>
- Naval Air Warfare Center Weapons Division, *Quick Response Application of Insensitive Munitions (IM) System Solutions: An example of applying lessons learned to a successful, quick, low-cost IM improvement*. China Lake, CA, n.d.
- UK Ministry of Defence, *Kosovo: An Account of the Crisis* (updated to 21 December 1999) from W.J. Fenrick, Targeting and Proportionality during the NATO Bombing Campaign against Yugoslavia, *EJIL*, Vol 12 No. 3, 2001
- United States Joint Forces Command, "Doctrinal Implications of Low Collateral Damage Capabilities", *Joint Doctrine Series Pamphlet 2*, 27 Jan 2003,  
<http://www.dtic.mil/doctrine/doctrine/jwfc/jwfc pam2.pdf>
- United States, Joint Publication (JP) 1-02, Department of Defense dictionary of Military and Associated Terms, 12 April 2001, [https://fas.org/irp/doddir/dod/jp1\\_02.pdf](https://fas.org/irp/doddir/dod/jp1_02.pdf)
- US State Department, "Air force Uses New Tools to Minimize Civilian Casualties", *Defence Aerospace*, (18 March 2003), <http://www.defense-aerospace.com/article-view/feature/18894/usaf-plans-to-minimize-civilian-casualties.html>.
- von Clausewitz, Carl, *On War*, trans. and ed. Michael Howard and Peter Paret N.J.: Princeton University Press, 1984.
- Warden, John A., "The Enemy as a System", *Air Power Journal*, Spring 1995,  
[http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj95/spr95\\_files/warden.htm](http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj95/spr95_files/warden.htm)